RESOURCE MANAGEMENT GUIDE

STATE FOREST: Harrison Crawford **COMPARTMENT**: 09 **TRACT**: 05

Date: October 28, 2009 **Forester: Wayne Werne, Christine Martin, Amanda Bradshaw**

(Inventory - June 2007)

INVENTORY SUMMARY

NUMBER OF STANDS: **2** **Est. growth: ?? bd. ft/ac/yr**
PERMANENT OPENINGS: **0.0 ac** **Est. cutting cycle: ?? yrs**
TOTAL ACREAGE: **61.0 ac** (no prev. inventory - no growth info)
AVERAGE SITE INDEX: **70-80** (for upland oaks)
AVERAGE BASAL AREA: **112 sq. ft/ac**

TRACT 905 TOTAL VOLUME (bd ft)

	CUT		LEAVE		TOTAL	
SPECIES	per acre	total	per acre	total	per acre	total
Black oak	1,250	76,250	540	32,940	1,790	109,190
Eastern redcedar		-	20	1,220	20	1,220
Northern red oak		-	190	11,590	190	11,590
Pignut hickory	220	13,420	160	9,760	380	23,180
Red maple	30	1,830		-	30	1,830
Scarlet oak	160	9,760		-	160	9,760
Shagbark hickory		-	60	3,660	60	3,660
Shingle oak		-	70	4,270	70	4,270
Sugar maple	80	4,880		-	80	4,880
Sycamore		-	50	3,050	50	3,050
White ash	50	3,050		-	50	3,050
White oak	480	29,280	1,890	115,290	2,370	144,570
Yellow-poplar	650	39,650	390	23,790	1,040	63,440
TTOTAL	2,920	178,120	3,370	205,570	6,290	383,690

STAND 1 – Oak hickory **ACREAGE: 44.9**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	3,390	3,990	7,380	
TOTAL VOLUME:	152,211	179,151	331,362	
BASAL AREA/ACRE:	47.1	67.2	114.3	
# TREES/ACRE:	97	363	460	

STAND 2 – Old field **ACREAGE: 16.1**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	1,610	1,630	3,240	
TOTAL VOLUME:	25,921	26,243	52,164	
BASAL AREA/ACRE:	28.3	75.5	103.8	
# TREES/ACRE:	62	536	598	

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

TRACT BOUNDARIES: This tract is part of an outlying block of state forest land lying north of the interstate highway. It is bordered on the north by private land. The northern neighbor is currently Phil Etienne, and an attempt was made to purchase this property to get access to this block of state land. This process was held up by the commissioners of Crawford County who stand behind a nonbinding resolution passed several years ago that discourages the state from acquiring any additional land in that county. This private land is currently listed for sale. One of the lots listed for sale that lies on the ridgetop near the northwestern boundary was sold to a different individual several years ago. Another lot on the northeastern boundary was also sold to a third individual at about the same time.

The western boundary of this tract is a ridgeline that divides it from tract 906, and the eastern boundary is bordered by private property. The southern boundary is the interstate highway R.O.W. fence apparently, though older maps show a small sliver of private land between what was the state forest and what is now the interstate. It is assumed this land was bought as part of the right of way acquisition and subsequently transferred to the state forest. The tract line as it appears in the GIS layer is apparently somewhat off from the actual right of way fence for the interstate (actual line farther south).

There are old fence fragments forming part of the north boundary line. Also, what is currently tract 905 was formerly part of a larger tract 905 that included 906 as well. The tract boundaries were re-delineated sometime in the 1990's.

ACCESS: Currently, access is being obtained by driving down the private road coming off of Shafer Ridge Road which goes into the Etienne property. This road is in excellent condition, but currently serves multiple parcels in that tract, because it was parcelized for sale as smaller tracts. There is apparently a road maintenance covenant in place for the future owners that requires shared maintenance costs for this road. Currently, Phil Etienne does not have a problem granting access to the state property from this property, but if this land does sell to other assorted private buyers in the future, the state will probably not be able to use that road. Currently, Phil Etienne is in the process of seeing if the current covenant can be amended to allow state access via the access road even after the land might sell. This problem was foreseen and was why the state was trying to acquire outright ownership of the Etienne property until the deal was stalled by the Crawford County officials.

Since two of the lots of the former Etienne property were sold to different individuals, the best access to this tract currently lies on those properties along the ridgetops on the northeast and northwest corners. The new owner on the northeast corner has generally indicated he is not interested in providing access through his property.

This tract was also reconned/cruised in 2006 by Will Hirschfeld who noted that there was an old frontage road that extended beyond the Jasper Engines/industrial park access road to the west of tract 907. This frontage road intersects the southwest corner of the tract 907, and could have well been established when the interstate came through and cut off certain property's former access. The legal status of this access and road is not clear, and apparently the road would require some fixing up to be used as an access road.

ACQUISITION HISTORY: The majority of this tract was acquired from George Harper in 1939 for an undisclosed sum of money (deed 131.84). Most of the southern portion below the majority was acquired from Pearl and John Tucker in 1943 for an undisclosed sum of money (deed 131.123). A small portion that juts out to the southeast was apparently transferred by Henry Mock – a commissioner – as a result of unpaid taxes or some other legal dispute with Aniel Froman in 1940-1941. There may be some portion of this tract that was part of a transfer by INDOT to DNR as they acquired I-64 right-of-way acreage, and the leftover acreage to the north of this was added onto the state forest ownership. This would amount to very little if any of the tract acreage, though.

TRACT DESCRIPTION: This tract was divided into two stands based on cover type and past management – oak hickory and old field. The old field also included some flat creek bottomland along the main drainage that might be more aptly described as mixed mesophytic in places, but this area was limited in size and blended into the actual old field sites so much, that it was included in the old field stand type. Realistically, these low flat areas were undoubtedly cleared and farmed historically, with the exception of a narrow line of trees along the drainage, and have just grown back to a better stand than most of the other old field areas. The stands will be described in detail below.

Stand 1 – Oak hickory

This 45-acre stand was found on the west and south facing slopes on the east side of the tract, as well as on the east facing slopes on the west side of the tract. It is the dominant stand type on this tract. Most of the steeper slopes that were not farmed fell within this stand type.

The total volume of the stand (7380 bd. ft/ac) is composed overwhelmingly of white oak (3160 bd. ft/ac), and black oak (2150 bd. ft/ac). The remaining 30% of the volume consists of yellow-poplar, pignut hickory, northern red oak, scarlet oak, and various other species.

Stand 2 – Old field

This 16-acre stand is found along the lower slopes by the main drainage, and along the more gentle slopes on the east facing hillside. These areas have been colonized by sassafras and cedar in many areas. Likely, they suffer from old erosion and reduced site productivity.

The total volume of the stand (3240 bd. ft/ac) is composed overwhelmingly of yellow-poplar (1860 bd. ft/ac), and also black oak (790 bd. ft/ac). The remaining 20% of the volume consists of shingle oak, white oak, red maple, and eastern redcedar. This old field area is coming back to an oak hickory stand type in places. There is also a lot of cedar growing in much of this area, but all of it was small enough not to show up on the volume tally, though it makes up a substantial part of the basal area and number of trees per acre. This stand was not cruised using the cedar scale (which gives volume to much smaller trees), like others subsequently were, and so the cedar does not appear as dominant as it truly is.

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

WhfD3 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.

TblG Tipsaw-Adyeville complex, 25-75% slopes Upland oak SI is 70-80, Yellow-poplar SI is 70-80, est. growth is 185-260 bd. ft/ac/yr. for both oaks and yellow-poplar.

AbqE2 Gilpin silt loam, 18-25% slopes, eroded Upland oak SI is 70-80, Yellow-poplar SI is 90-100, est. growth is 185-260 bd. ft/ac/yr. for oaks and 335-415 bd. ft/ac/yr. for yellow-poplar.

AgrB Apalona 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.

GacAW Gatchel loam, 1-3% slopes Yellow-poplar SI is 95-105, est. growth is 375-450 bd. ft/ac/yr.

AgrC3 Apalona 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.

RECREATION: Due to limited access, and its location directly north of the interstate, this tract probably receives limited recreational use by the public. There are no trails or facilities here. Likely it receives some hunting use by neighbors, but the noise of the interstate nearby would also limit its utility for that as well.

WILDLIFE: This tract represents typical upland forest habitat, in addition to a small component of old field 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 scattered cedar trees. These areas provide cover and 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 905 actual present – harvest = residual
12"-18" DBH class	6	35.7 – 19.1 = 16.6
20" DBH and greater	3	10.8 - 6.2 = 4.6
Total	9	46.5 - 25.3 = 21.2

# snags per acre	Guidelines maintenance	Guidelines optimal	Tract 905 actual
6" - 8" DBH class	1	1	6.9
10"-18" DBH class	2.5	5	4.8
20" DBH and greater	0.5	1	0.4
Total	4	7	12.1

These numbers show that both live tree densities as well as snag densities meet maintenance guidelines on this tract with the exception of the largest category of snags – which was barely below target. 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, and 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 this size class could be undertaken by girdling large cull trees in a post-harvest TSI operation.

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

This tract is bordered on the south by Interstate 64, which itself represents a barrier to free travel by wildlife in a north-south direction. There should be no disruption of any potential wildlife travel corridors by forest management activities. This is due to fact that this portion of the landscape is 50-75% forested, and management in this area will not eliminate or isolate this habitat. The habitat on this tract in the context of the surrounding landscape does represent a component that would be used more preferentially by wildlife

for traveling or dispersion in an east-west direction. But, again, it is not an isolated fragment of forest that would be unduly impacted with management activities.

Since this tract is part of an outlying piece of state forest acreage not connected to the main body of the forest, it is less likely that forest management activities might disrupt any forest interior species by creating edge habitat for generalist species to "invade" the area. This would possibly occur if regeneration openings were put in place that offered a habitat preferred by such generalist species which might move in and start using such habitat. In the context of the surrounding landscape, this tract represents a moderate chunk of forest in a matrix of surrounding forest and agricultural land.

WATERSHED / HYDROLOGY: The majority of the tract contains gentle to moderately steep slopes that drain into a tributary of Jordan Creek which generally runs north-south through nearby tract 907 to the west. This portion of Jordan Creek is near the upstream reaches, but qualifies as an intermittent that is usually dry, and has a wide well defined channel bottom. Shortly after Jordan Creek leaves tract 907, it flows under I-64 and drains into Dry Run Creek. Dry Run eventually drains into Blue River near its confluence with the Ohio River.

This area is starting to get more distant from the karst landscape with underground drainage that is more common toward the east and south. There were no caves or open sinkholes noted in this tract, but there are stories that the back reaches of Eric's River Cave (south of I-64) once had another opening near where Jasper Engines is located on the north side of the interstate, which would put it close to the west of this tract. The story states that at one time, this opening allowed for a flush of leaves and other debris to be deposited throughout the cave. This opening has since reclosed.

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 shows no recorded occurrences for any RTE species on tract 907, 906, 905, or any other nearby tracts as of 2009.

EXOTICS: At the time of the inventory, there were no notations made as to presence of exotic species. There is probably some multiflora rose in the southern portion, and possibly some other species that have come up in the old field portion. As always, ailanthus should always be monitored in case it is invading or spreading into the area. If this area is marked for a sale, an effort will be made to paint any ailanthus with a bright color for followup management.

SILVICULTURAL HISTORY AND PRESCRIPTION:

General: There were no records of previous inventories done in this tract in the files. Because of this, and since no increment cores were taken, it is not known what the overall growth rate is on this tract. The potential productivity on this tract is probably in the range of moderate based on the current cover type and soils association. The creek bottom soils likely have higher productivity, while the old eroded hillside farm fields undoubtedly have lower productivity.

Number of trees per acre and basal area per acre figures indicate that all stands are overstocked at between 110% to 115%. Removal of trees tallied as "cut" either via a timber sale or TSI would reduce the stocking levels to about 70-85% stocking. Stocking levels would be reduced to a level considered fully stocked above the B-line.

There are no records of timber sale activity on this tract since the state acquired it 60 years ago. Due to the amount of volume being carried on the merchantable majority of the tract (7380 bd. ft/ac), the fact that no managed sale has taken place in the 50+ years the state has owned this tract (according to any records in the files), and the general condition of the overstory trees in the majority of the tract, the initial impression was that a light to medium level harvest could be undertaken in this tract at any time. This would produce a sale volume of about 178,000 board feet or about 2920 board feet per acre and leave about 206,000 board feet, or about 3370 board feet per acre (across the entire tract acreage).

Worthy of note is the fact that in 1983, an actual wildfire burned through parts of tracts 905, 906, and 907. It was caused by an overheated truck tire that threw chunks of burning rubber off from the interstate, which caused four separate ignitions that coalesced into one larger fire that burned over an estimated 60-80 acres of forest and 15-20 acres of fields in this area. This fire may or may not have affected the composition of the understory of this stand, depending on how hot the fire became. Some evidence of this fire was noted in the southwestern portion during the inventory.

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. Ailanthus needs to be monitored and eliminated when found to be present or establishing itself.

Stand 1: Oak hickory

This 45-acre stand contains a volume of 7380 board feet per acre of which 3390 was classified as harvestable and 3990 was classified as residual. This would remove 47

square feet of basal area, which would leave the residual stand with 67 sq. ft. Stocking would drop from 115% to about 70% with the indicated management (fully stocked above the B-line).

Since there is no record of harvest in this tract since the state has owned it (65+ years), and because it currently contains a moderately high volume of harvestable material and a moderate 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 parts of stand 2, and possibly being combined with neighboring tract 906 and 907. The majority (79%) of the harvest volume for stand 1 (3390 bd. ft/ac) would be contained in black oak (1580 bd. ft/ac), white oak (650 bd. ft/ac), and yellow-poplar (460 bd. ft/ac). The remainder would be contained in pignut hickory, scarlet oak, sugar maple, and white ash.

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 much heavier to white oak – the primary residual tree species, with a lesser component of other oak and hickory 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 kill grapevines where present. As always, any ailanthus present should also be treated and eliminated.

Stand 2: Old field

This 16-acre stand is located primarily along the lower slopes by the main drainage. It contains a volume of 3240 board feet per acre of which 1610 was classified as harvestable and 1630 was classified as residual. This would remove 28 square feet of basal area, which would leave the residual stand with 76 sq. ft. Stocking would drop from 110% to about 84% with the indicated management (fully stocked above the B-line).

Since this stand intermingles with the more merchantable oak hickory stand, there would likely be some trees included from here along with any timber sale taking place in stand 1. All of the harvest volume tallied in this stand (1610 bd. ft/ac) was represented by yellow-poplar (majority), black oak, and red maple. Much of the composition of this area was made up of small cedars, many of which should be removed to release the oak regeneration present. Since these are relatively small areas on the hillsides and along the creek, they likely will be left alone to maintain some habitat diversity, with the exception of some hardwood trees along the edges that might be included in any hardwood sale.

TSI could be performed to eliminate any residual cull or small pole-sized trees not cut during the harvest, as well as thin where necessary, and treat the cedar and 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.

PROPOSED ACTIVITIES LISTING

Summer 2007	Field inventory
Fall 2009	Write mgmt plan
Fall 2009 - 2010	Mark timber sale
Winter 2009 or Winter 2010	Sell timber sale
2010 / 2011	Post harvest TSI
2015	Recon & monitor for exotics
2020-2025	Inventory for next mgmt cycle

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APPENDIX

(Various tables and graphs describing tract 905)

A SUMMARY OF VARIOUS STATISTICS FOR TRACT 905

Summary of basal area (sq ft per acre)

STAND	LEAVE	CUT	(SNAG)	TOTAL (live)
Oak hickory	67.2	47.1	??	114.3
Old field	75.5	28.3	??	103.8

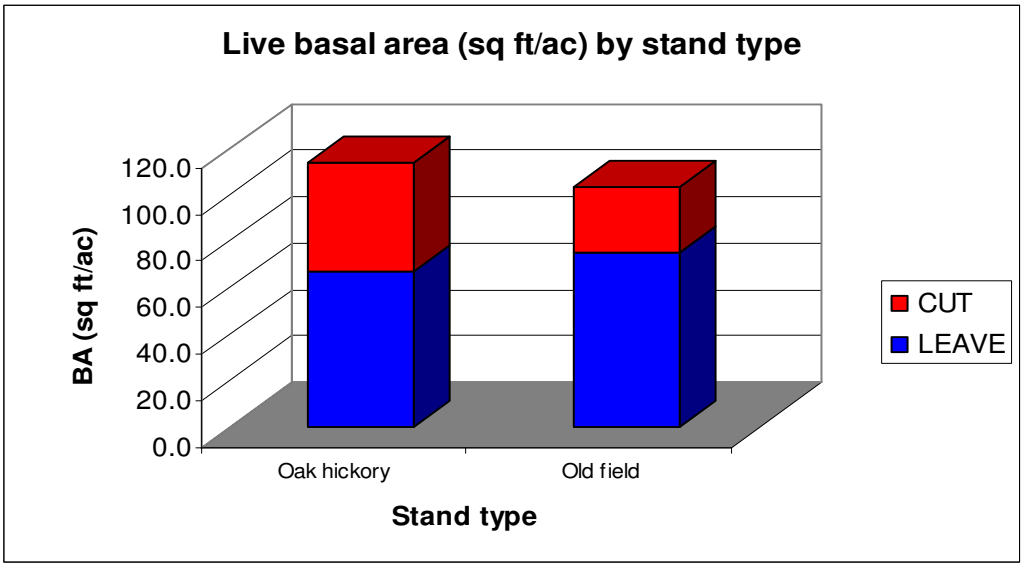
Summary of volume (bd ft per acre)

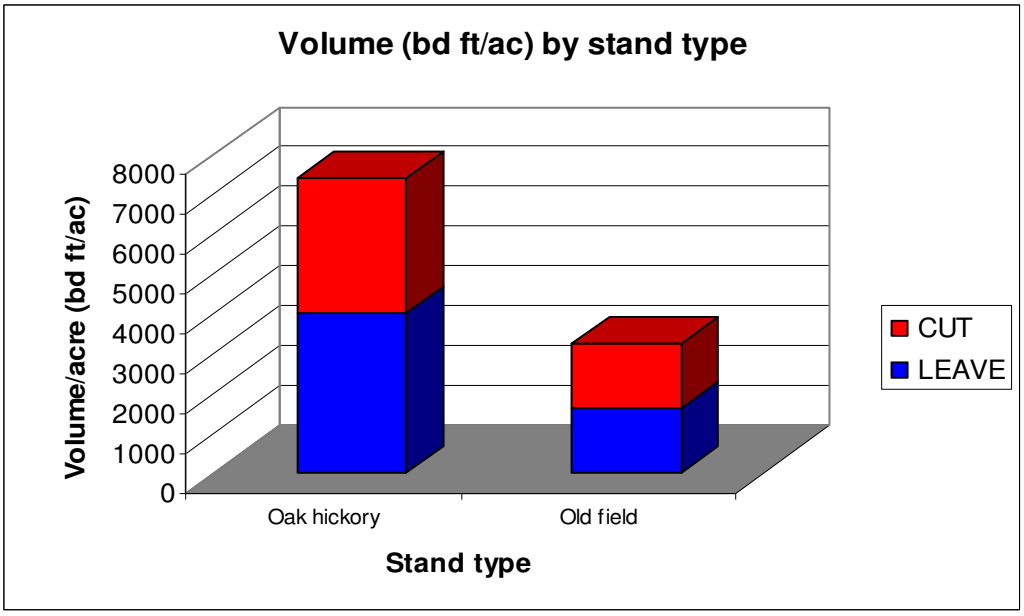
STAND	LEAVE	CUT	TOTAL (live)
Oak hickory	3990	3390	7380
Old field	1630	1610	3240

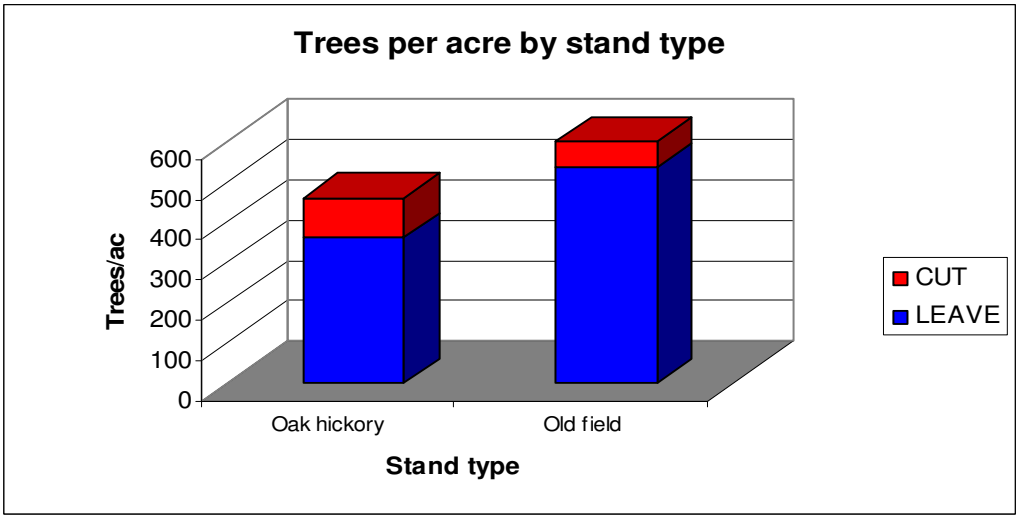
Summary of number of trees per acre

STAND	LEAVE	CUT	(SNAG)*	TOTAL (live)
Oak hickory	363	97	?	460
Old field	536	62	?	598

*snags/acre >= 9" DBH = 5.6/acre across entire tract


Live basal area (sq ft/ac) by stand type
BA (sq ft/ac)
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Oak hickory
Old field
Stand type
CUT
LEAVE


Volume (bd ft/ac) by stand type
Volume/acre (bd ft/ac)
8000
7000
6000
5000
4000
3000
2000
1000
0
Oak hickory
Old field
Stand type
CUT
LEAVE


Trees per acre by stand type
Trees/ac
600
500
400
300
200
100
0
Oak hickory
Old field
Stand type
CUT
LEAVE

A SUMMARY OF VOLUME PER ACRE (bd ft/ac) BY SPECIES FOR TRACT 905

Stand 1: Oak hickory

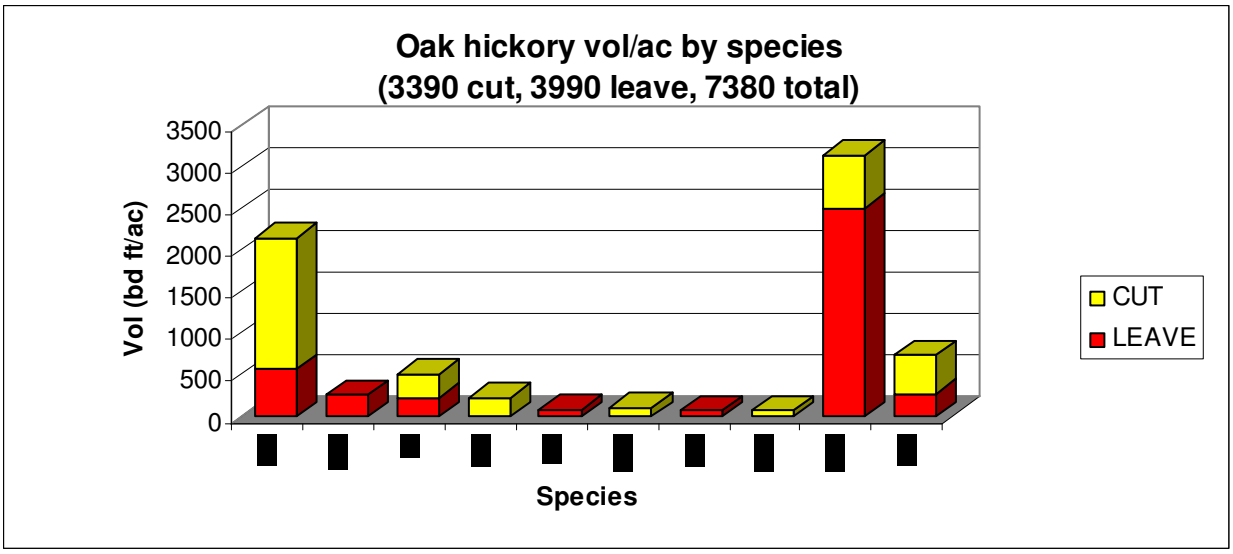
Volume (bd ft/ac)

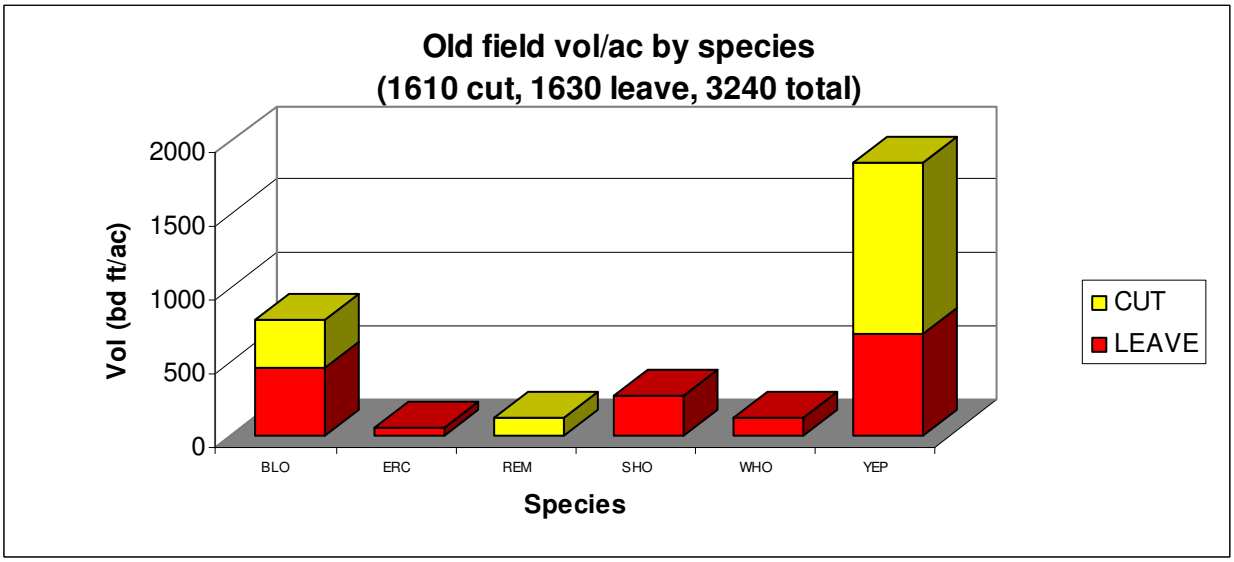
Species	CUT	LEAVE	TOTAL
BLO	1580	570	2150
NRO		260	260
PIH	300	220	520
SCO	220		220
SHH		80	80
SUM	110		110
SYC		70	70
WHA	70		70
WHO	650	2510	3160
YEP	460	280	740
TOTAL	3390	3990	7380

Stand 2: Old field

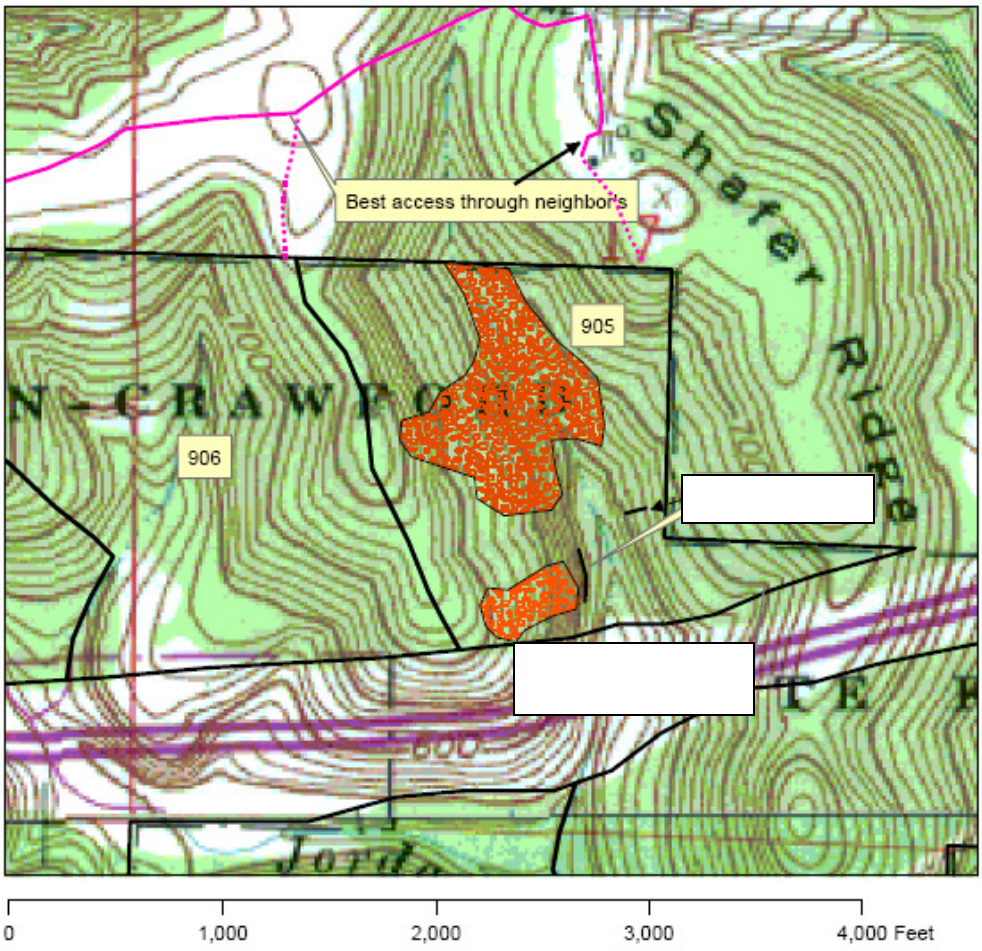
Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
BLO	320	470	790
ERC		60	60
REM	130		130
SHO		270	270
WHO		130	130
YEP	1160	700	1860
TOTAL	1610	1630	3240


Oak hickory vol/ac by species
(3390 cut, 3990 leave, 7380 total)
Vol (bd ft/ac)
3500
3000
2500
2000
1500
1000
500
0
Species
CUT
LEAVE


Old field vol/ac by species
(1610 cut, 1630 leave, 3240 total)
Vol (bd ft/ac)
2000
1500
1000
500
0
BLO
ERC
REM
SHO
WHO
YEP
Species
CUT
LEAVE

Tract 905



Legend

Tract boundaries

Oak hickory stand type - 45 acres

Old field stand type - 16 acres