

RESOURCE MANAGEMENT GUIDE

STATE FOREST: Harrison Crawford

COMPARTMENT: 28 TRACT: 04

Date: January 15, 2009
(Inventory - summer 2008)

Forester: Wayne Werne & Abby Irwin

INVENTORY SUMMARY

NUMBER OF STANDS: 4 Est. growth: 188 bd. ft/ac/yr**
 PERMANENT OPENINGS: 0.0 ac Est. cutting cycle: 13 yrs
 TOTAL ACREAGE: 130.3 ac
 AVERAGE SITE INDEX: 70-80 (for upland oaks)
 AVERAGE BASAL AREA: 128 sq. ft/ac

**Growth was calculated by using 2008 volume MINUS cedar, subtracting the volume of 2236 bd ft/ac from the 1977 inventory and the approx. 80,000 bd. ft. from the 1986 sale, and dividing by 31 years of growth. Cedar volume was figured using a different cedar log scale (much more volume from small trees), which was not used in 1977.

TRACT 2804 TOTAL VOLUME (bd ft)

SPECIES	CUT		LEAVE		TOTAL	
	per acre	total	per acre	total	per acre	total
American beech	-	-	40	5,212	40	5,212
Basswood	-	-	20	2,606	20	2,606
Bitternut hickory	-	-	70	9,121	70	9,121
Black cherry	30	3,909	60	7,818	90	11,727
Black oak	630	82,089	310	40,393	940	122,482
Black walnut	30	3,909	10	1,303	40	5,212
Bur oak	-	-	20	2,606	20	2,606
Chestnut oak	230	29,969	180	23,454	410	53,423
Chinkapin oak	60	7,818	230	29,969	290	37,787
Eastern redcedar*	170	22,151	70	9,121	240	31,272
Northern red oak	180	23,454	860	112,058	1,040	135,512
Pignut hickory	60	7,818	80	10,424	140	18,242
Red elm	-	-	30	3,909	30	3,909
Scarlet oak	20	2,606	40	5,212	60	7,818
Shagbark hickory	30	3,909	180	23,454	210	27,363
Sycamore	110	14,333	50	6,515	160	20,848
Sugar maple	100	13,030	200	26,060	300	39,090
White ash	260	33,878	450	58,635	710	92,513
White oak	330	42,999	1,360	177,208	1,690	220,207
Winged elm	-	-	10	1,303	10	1,303
Yellow-poplar	790	102,937	400	52,120	1,190	155,057
TTOTAL	3,030	394,809	4,670	608,501	7,700	1,003,310

*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 – Mixed mesophytic**ACREAGE: 42.8**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	3,420	5,080	8,500	
TOTAL VOLUME:	146,400	217,400	363,800	
BASAL AREA/ACRE:	40.8	79.3	120.1	
# TREES/ACRE:	35	328	363	

STAND 2 – Oak hickory**ACREAGE: 73.1**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	2,970	4,750	7,720	
TOTAL VOLUME:	217,100	347,200	564,300	
BASAL AREA/ACRE:	57.3	79.8	137.1	
# TREES/ACRE:	107	349	456	

STAND 3 – Rocky south slope**ACREAGE: 10.3**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	1,320	1,820	3,140	
TOTAL VOLUME:	13,600	18,700	32,300	
BASAL AREA/ACRE:	30.0	107.5	137.5	
# TREES/ACRE:	76	354	430	

STAND 3 – Old field**ACREAGE: 4.1**

No plots taken in this small stand, so no numerical data

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 southern tip, which has a small portion that borders private property. Fire trail 303 forms the northeastern and northwestern boundaries, beyond which are tracts 2806 and 2805. There is a fire trail that diverges off of 303 and goes down along the ridge line to the south to Cold Friday Road near where it dead ends. This fire trail also forms the boundary with tract 2803 to the southwest, which is part of the Deam Cliffs nature preserve. The eastern boundary is formed by a ridgetline that goes downhill to the south and turns into a drainage. Tracts 2912 and 2913 border to the east of this.

ACCESS: Fire trail 303 provides access to the north portion of this tract via the ridgetops that form the northeastern and western sides of the tract.

ACQUISITION HISTORY: Most of the land within this tract was acquired from Samuel Breeden in 1944 for an undisclosed sum, and the rest was acquired from James Brewster in 1934 for a little over \$5 per acre.

TRACT DESCRIPTION: This tract was divided into four stands based on cover type and past management. These stands include: mixed mesophytic, oak hickory, rocky south slope, and old field. The rocky south slope had a noticeable amount of cedar, as these stands always seem to have. The old field area amounted to only about 4 acres, and no plots fell within this stand type, so there is no numerical data that was collected for that stand. These stands will be described in detail below.

Stand 1 – Mixed mesophytic

This 43-acre stand was found primarily along the lower drainage slopes and on the east facing slope on the western side of the tract.

The total volume of the stand (8500 bd. ft/ac) is composed primarily of yellow-poplar (2460 bd. ft/ac), white ash (1460 bd. ft/ac), and northern red oak (1430 bd. ft/ac). The remaining 35% of the volume consists of sugar maple, sycamore, chinkapin and white oak, and various other species.

Stand 2 - Oak hickory

This 73-acre stand is the primary stand type in this tract, and is found mostly in the northern half and on the upper slope positions as compared to stand 1.

The total volume of the stand (7720 bd. ft/ac) is composed primarily of white oak (2750 bd. ft/ac), black oak (1600 bd. ft/ac), and northern red oak (930 bd. ft/ac). The remaining 30% of the volume consists of chestnut oak, hickory, yellow-poplar, white ash, and various other species.

Stand 3 – Rocky south slope

This 10-acre stand is found mostly on the exposed south slope on the eastern ridge, with a pocket farther south on the western ridge as well. The primary area is a shallow soil – exposed rock site that has always had natural low productivity, and contains the typical assemblage of cedar and chinkapin oak. The other smaller area is the result of a former agricultural field being eroded, and coming back to a cedar component.

The total stand volume (3140 bd. ft/acre) is composed primarily of eastern redcedar (1380 bd. ft/acre), chinkapin oak (830 bd. ft/acre) and white ash (340 bd. ft/acre). The remaining 20% of the volume consists of pignut hickory, white oak, and black cherry. 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.

Stand 4 - Old field

There is also about 4 acres of old field type that is found mostly on the western ridge, but also a little on the eastern ridge. No plots fell within this stand type, so no data was taken here, but this small area consisted mostly of smaller pole sized sassafras and sugar maple trees. It is an early successional stand maturing into more of a true forest stand.

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.

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.

GpF Gilpin-Berks complex, 18-30% slopes Upland oak SI is 70-80, Yellow-poplar SI is 70-80, est. growth is 185-260 bd. ft/ac/yr. for oaks and for yellow-poplar.

GIE2 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.

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.

TIB2 Tilsit 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.

RECREATION: This tract is located in the heart of the largest contiguous block of forest comprising Harrison-Crawford State Forest. It is bounded on three sides by horse trails, and the Adventure Hiking Trail winds through the southern reaches of it, as well. Cold Friday road gives access to the southern tip of the tract. Consequently, there is probably a high amount of usage of this tract by trail riders and hikers, as well as hunters during the fall season.

WILDLIFE: This tract represents typical upland forest habitat, in addition to a small component of rocky south slopes 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. As a note, the numbers for the live tree densities were calculated using all species of trees and not just the list of 14 “preferred” species that have been documented as being used by the Indiana bat. The reasoning behind this is that once a tree dies, regardless of the species, the bark starts to separate from the wood and produces potentially suitable habitat for maternity usage by bats. Indeed, species has never been a consideration with regard to either actual tallies or recommendations for optimal number of snags. Consequently, it is assumed that any species of live tree can potentially serve as dead snag habitat if natural mortality occurs. Additionally, limiting live tree counts to only 14 species will likely result in a deficit from recommended target numbers – especially larger trees.

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

Tree type	Number of trees per acre	
	10 to 18 inches DBH	20 inch DBH and greater
LIVE	6 (in 12-18” class)	3
SNAG	3	0.5

Actual numbers from tract 2804:

Tree type	Number of trees per acre (present – harvest = residual)	
	10 to 18 inches DBH	20 inch DBH and greater
LIVE	39.0 – 17.9 = 21.1 (in 12-18” class)	12.1 – 4.5 = 7.6
SNAG	5.7	0.8

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 definitely 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.

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 does come close to bordering a major stream – the Ohio River, but there should be no disruption of any potential travel corridors by forest management activities. This is due to fact that this portion of the Ohio River corridor is generally and heavily 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, as riparian habitat can be. But, again, it is not an isolated fragment of forest that would be unduly impacted with management activities.

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

WATERSHED / HYDROLOGY: The majority of the tract contains gentle to moderately steep slopes that drain into the central intermittent drainage that very shortly drains into the Ohio River to the south. This area lies within a karst landscape with underground drainage, and there are several sinkholes scattered within the tract.

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 showed one record for an Indiana bat mist net capture along the bordering fire trail in 2004. This indicated an individual that was flying along the open fire trail foraging for insects that evening.

The database also shows a large circle centered on a neighboring tract, but inclusive of a large surrounding area that overlaps part of this tract, for which three species were listed – Bachman’s sparrow (observed 1953), rough rattlesnake root (observed 1945), and hooded warbler (observed 1988). The size of these circles would seem to indicate a poor (nonspecific) location point. Also, the length of time since the first two species were recorded indicates that these species likely may not be present any longer. The hooded warbler sighting was also over 20 years ago as well, and an individual bird sighting indicates only that one individual was at that particular location at that time.

These records seem to indicate occasional use of the area in general by certain species over time rather than a permanent inhabitation of tract 2804 in particular by any species of concern.

EXOTICS: There are numerous pockets of ailanthus scattered in the northern half of the tract – usually where small openings have opened up the canopy. These are small trees, but are producing seed, and so should be treated as soon as possible so as to better control the seed source and potential future problems. There is also some infestation of stilt grass along the edges of the trails in places.

SILVICULTURAL HISTORY AND PRESCRIPTION:

General: Utilizing records of the past history of this tract, an inventory done in 1977 indicated a total standing volume of 2236 board feet per acre. There was a timber sale marked and sold in 1986 that included both tract 2804 and 2805, which removed 160,600 board feet – mostly yellow-poplar, black oak, and red oak. It appears from the sale map that about half the area was in each tract, so it was assumed that about 80,000 board feet was removed from 2804.

The 2008 inventory shows 7460 board feet per acre (no cedar), and this figures out to a growth rate of about 188 board feet per acre per year, after taking into account the volume removed in the 1986 sale and 31 years of growth since then. Cedar volume was figured using a different cedar log scale (much more volume from small trees), which was not used in 1977, and this is why cedar volume is being excluded from growth calculations, as it was probably given marginal volume in 1977.

Number of trees per acre and basal area per acre figures indicate that all stands are overstocked at between 112% and 130%. Removal of trees tallied as “cut” either via a timber sale or TSI would reduce the stocking levels to about 80% stocking (105% for stand 3). Stocking levels would be reduced to a level considered fully stocked above the B-line.

Due to the amount of volume being carried on the majority of the tract (7460 bd. ft/ac – not including cedar), the length of time since the last managed sale (23 years back to 1986), and the general condition of the overstory trees in the majority of the tract, the initial impression was that a medium level harvest could be undertaken in this tract at any time. This would produce a sale volume of about 370,000 board feet (not including cedar) or about 2900 board feet per acre and leave about 600,000 board feet plus 30,000 board feet of cedar, or about 4600 board feet per acre of hardwood and 230 board feet per acre of cedar (according to the cedar log scale).

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. There were several small areas of ailanthus noted at the time of inventory – mostly scattered around in the northern half.

Stand 1: Mixed mesophytic

This 43-acre stand contains a volume of 8500 board feet per acre of which 3420 was classified as harvestable and 5080 was classified as residual. This would remove 41 square feet of basal area, which would leave the residual stand with 79 sq. ft. Stocking would drop from 112% to about 80% with the indicated management (fully stocked above the B-line). These figures DO include some cedar as figured according to the cedar log scale.

Since the last harvest in this tract was 23 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. The majority (55%) of the harvest volume for stand 1 (3420 bd. ft/ac) would be contained in yellow-poplar (1440 bd. ft/ac) and white ash (440 bd. ft/ac). The remainder would be contained in northern red oak, sugar maple, sycamore, cedar, and various other 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. There are pockets of ailanthus scattered primarily in the northern half of this tract.

Stand 2: Oak hickory

This 73-acre stand covers slightly over half of the tract, and is located primarily along the mid to upper slopes. It contains a volume of 7720 board feet per acre of which 2970 was classified as harvestable and 4750 was classified as residual. This would remove 57 square feet of basal area, which would leave the residual stand with 80 sq. ft. Stocking would drop from 130% to about 80% with the indicated management (fully stocked above the B-line).

Since the last harvest in this tract was 23 years ago, and because it also currently contains a high volume of both harvestable material and residual growing stock, it should be included with stand 1 as a medium to high priority for conducting a harvest. The majority (84%) of the harvest volume for stand 2 (2970 bd. ft/ac) would be contained in black oak (1100 bd. ft/ac), white oak (510 bd. ft/ac), yellow-poplar (470 bd. ft/ac), and chestnut oak (410 bd. ft/ac), with white ash, hickory, 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 – the primary residual tree species, 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 numerous pockets of ailanthus scattered throughout the northern half of this tract – mostly within this stand.

Stand 3: Rocky south slope

This 10-acre stand is located on a south rock exposure, and contains a volume of 3140 board feet per acre of which 1320 was classified as harvestable and 1820 was classified as residual. This would remove 30 square feet of basal area, which would leave the residual stand with 108 sq. ft. Stocking would drop from 130% to about 104% with the indicated management (overstocked above the A-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 and 2. Most of the harvest volume (55%) tallied in this stand (730 bd. ft/ac) is

represented by eastern redcedar due to use of the cedar scale. A separate cedar sale would probably have to be undertaken to actually market and remove this cedar. Since it is a small area on a rocky south slope, it 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.

There was one patch of ailanthus growing in and near part of this stand that should be included in any tract-wide ailanthus control that should be done in this tract.

Stand 4: Old field

This stand consisted of small areas on the ridgetop that blended in with the oak hickory of stand 2. There were smaller trees of early successional species like sassafras, ash, and also maple growing here, but these areas were small enough not to warrant separate stand delineation.

PROPOSED ACTIVITIES LISTING

Summer 2008	Field inventory
Winter 2008 – Spring 2009	Write mgmt plan
Summer 2009	Basal bark treat ailanthus
Summer 2009	Mark timber sale
Winter 2009 - Spring 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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You **must** indicate “Harrison-Crawford C28 T4” 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 2804)

A SUMMARY OF VARIOUS STATISTICS FOR TRACT 2804

Summary of basal area (sq ft per acre)

STAND	LEAVE	CUT	(SNAG)	TOTAL (live)
Mixed mesophytic	79.3	40.8	??	120.1
Oak hickory	79.8	57.3	??	137.1
Rocky south slope	107.5	30.0	??	137.5

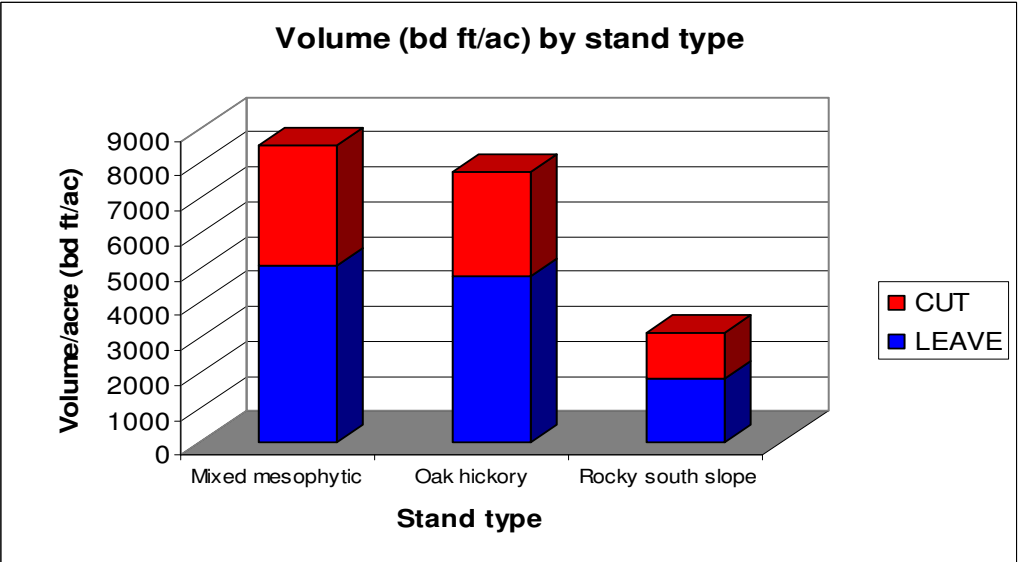
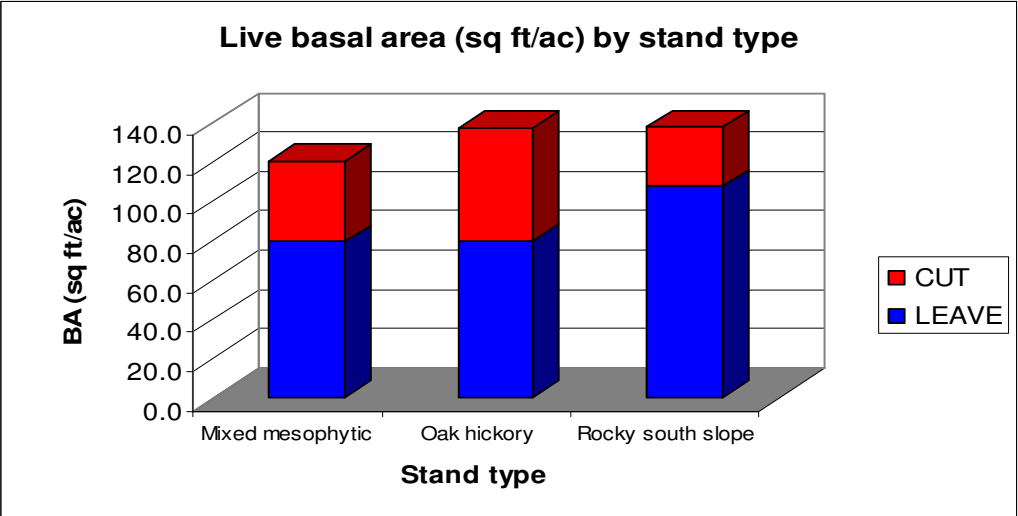
Summary of volume (bd ft per acre)

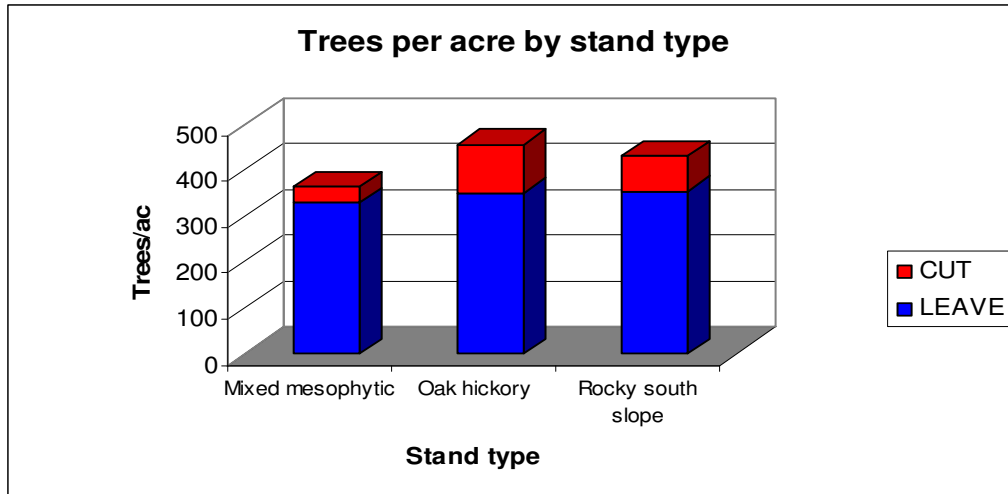
STAND	LEAVE	CUT	TOTAL (live)
Mixed mesophytic	5080	3420	8500
Oak hickory	4750	2970	7720
Rocky south slope	1820	1320	3140

Summary of number of trees per acre

STAND	LEAVE	CUT	(SNAG)*	TOTAL (live)
Mixed mesophytic	328	35	?	363
Oak hickory	349	107	?	456
Rocky south slope	354	76	?	430

*snags/acre \geq 9" DBH = 6.5/acre across entire tract





A SUMMARY OF VOLUME PER ACRE (bd ft/ac) BY SPECIES FOR TRACT 2804

Stand 1: Mixed mesophytic

Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
AMB		100	100
BAS		40	40
BIH		100	100
BLC	40	120	160
BLO	40	80	120
BLW	70	30	100
BUO		70	70
ZCO	150	270	420
ERC	320	50	370
NRO	300	1130	1430
REE		30	30
SHH		130	130
SUM	230	490	720
SYC	300	140	440
WHA	440	1020	1460
WHO	90	230	320
WIE		30	30
YEP	1440	1020	2460
TOTAL	3420	5080	8500

Stand 2: Oak hickory

Volume (bd ft/ac)

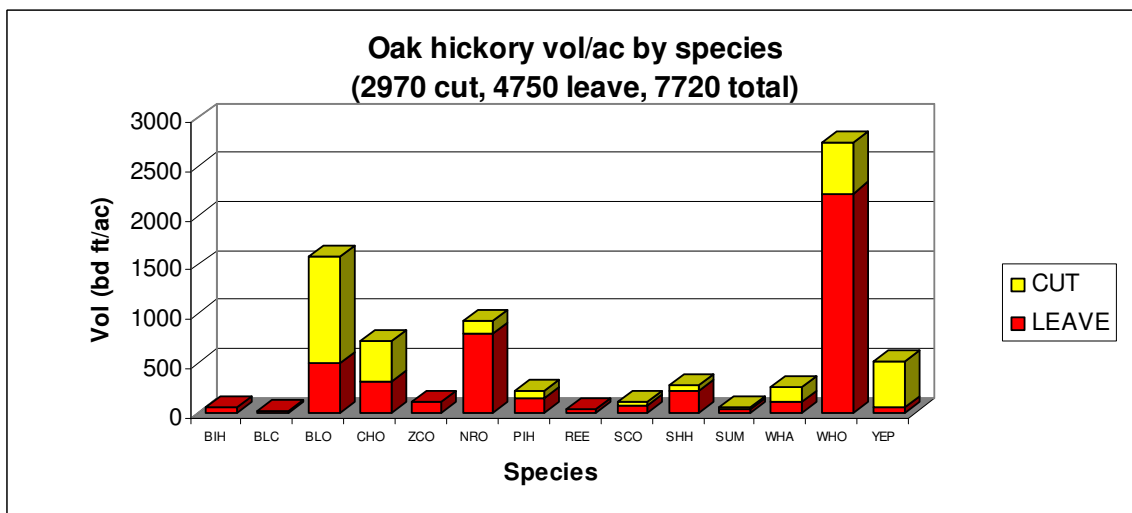
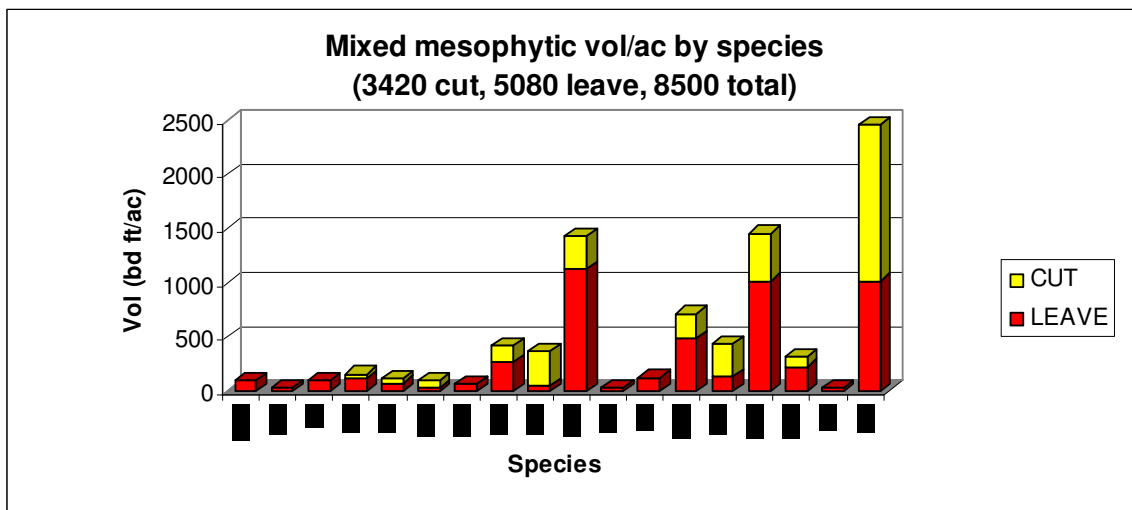
Species	CUT	LEAVE	TOTAL
BIH		50	50
BLC		20	20
BLO	1100	500	1600
CHO	410	320	730
ZCO		120	120
NRO	120	810	930
PIH	80	150	230
REE		30	30
SCO	40	80	120
SHH	60	230	290
SUM	30	30	60
WHA	150	110	260
WHO	510	2240	2750
YEP	470	60	530
TOTAL	2970	4750	7720

Stand 3: Rocky south slope

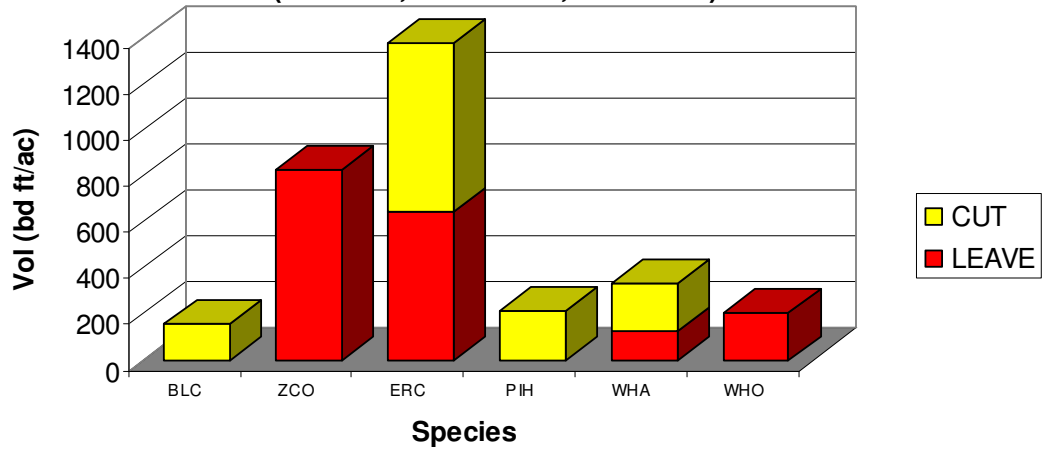
Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
BLC	160		160
ZCO		830	830

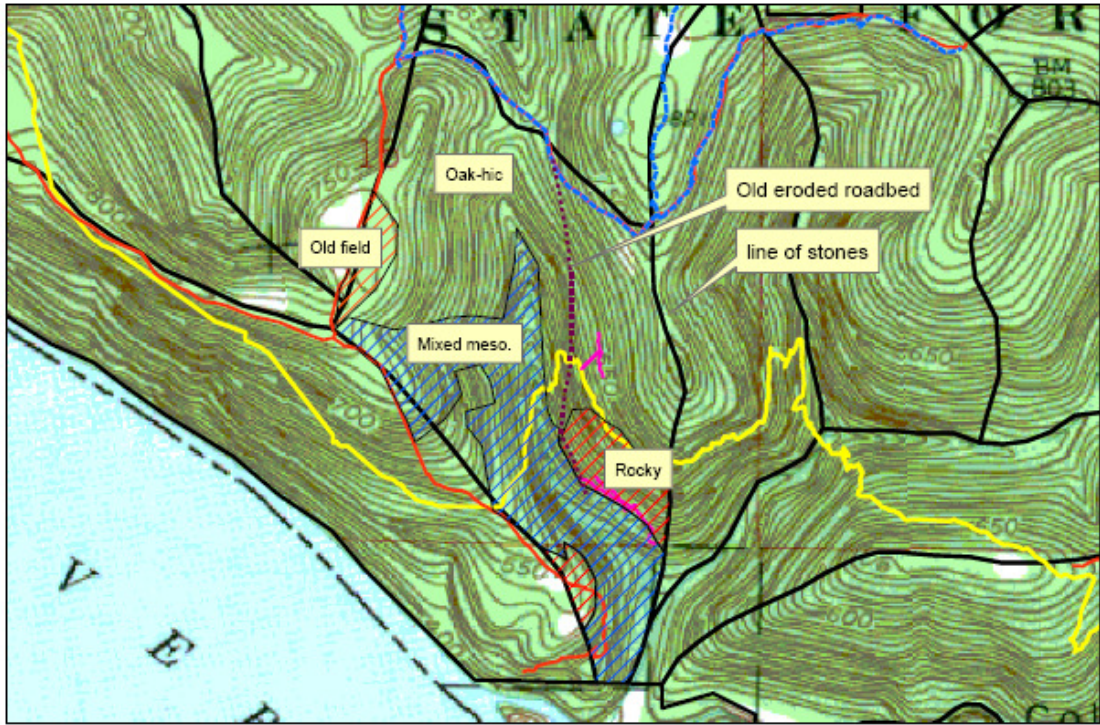
ERC	730	650	1380
PIH	220		220
WHA	210	130	340
WHO		210	210
TOTAL	1320	1820	3140



**Rocky south slope vol/ac by species
(1320 cut, 1820 leave, 3140 total)**



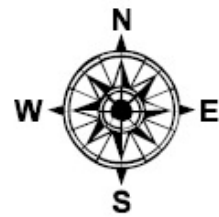
Tract 2804



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

Legend

- Fire Trail
- Horse Trail
- Adv. Hiking Trail
- + Cemetery
- Spring
- Cave
- Lime kiln
- Old quarry
- Rock Outcrop



Stand 1: Oak - hickory



Stand 2: Mixed Mesophytic



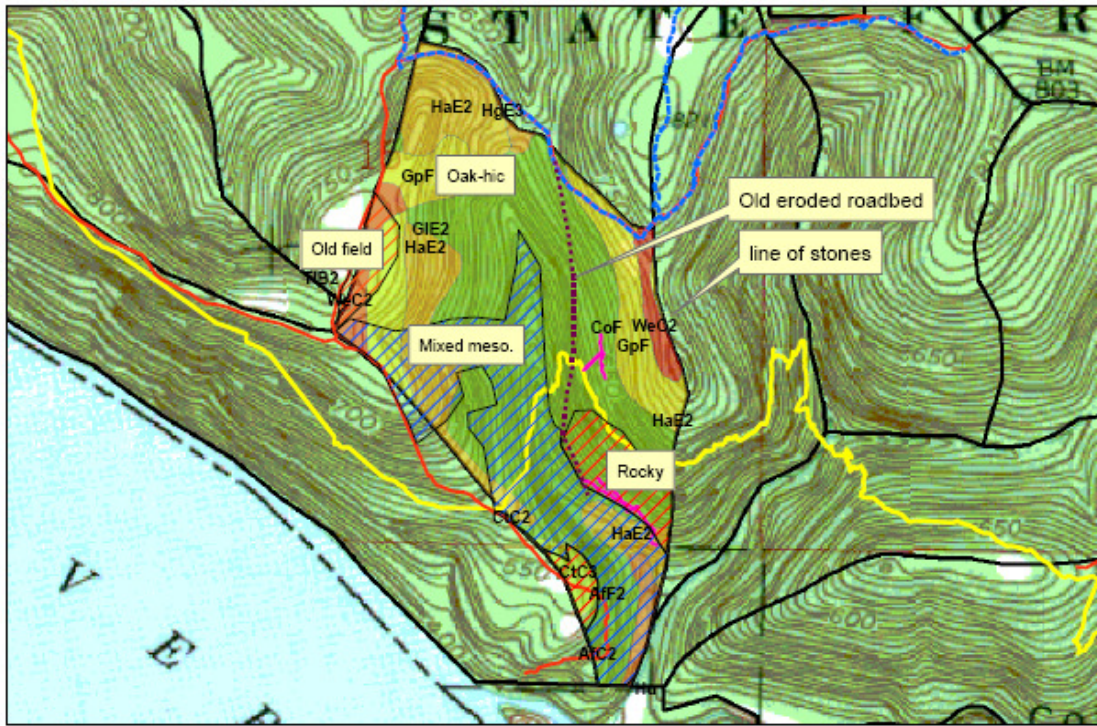
Stand 3: Rocky south slope



Stand 4: Old Field



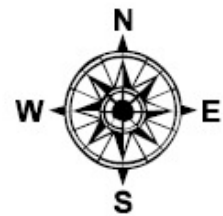
Tract 2804 - Soils



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

Legend

- Fire Trail
- Horse Trail
- Adv. Hiking Trail
- ⊕ Cemetery
- Spring
- Cave
- Lime kiln
- Old quarry
- Rock Outcrop



Stand 1: Oak - hickory



Stand 2: Mixed Mesophytic



Stand 3: Rocky south slope



Stand 4: Old Field

