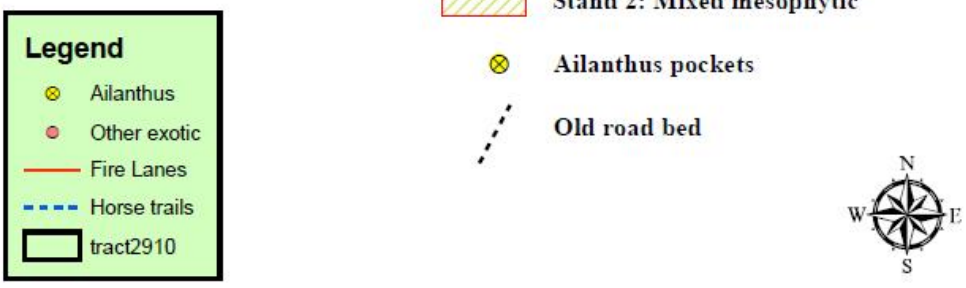
Indiana Department of Natural Resources – Division of Forestry
RESOURCE MANAGEMENT GUIDE - DRAFT

STATE FOREST: Harrison Crawford **COMPARTMENT**: 29 **TRACT**: 10

Date: October, 2014 **Forester: Wayne Werne**
(Inventory - May 2014)



INVENTORY SUMMARY

NUMBER OF STANDS: 2 **Est. growth: 133 bf./ac/yr**

PERMANENT OPENINGS: **0.0 ac** **Est. cutting cycle: 14-18 years**
TOTAL ACREAGE: **43.3 ac**
AVERAGE SITE INDEX: **75-85** (for upland oaks) **85-95** (for poplar)
AVERAGE BASAL AREA: **100 sq. ft/ac**

TRACT 2910 TOTAL VOLUME (bd ft)

	CUT		LEAVE		TOTAL	
SPECIES	per acre	total	per acre	total	per acre	total
American beech		-	24	1,039	24	1,039
Basswood	66	2,858	74	3,204	140	6,062
Bitternut hickory		-	58	2,511	58	2,511
Blackgum	24	1,039		-	24	1,039
Black oak	107	4,633	167	7,231	274	11,864
Black walnut		-	28	1,212	28	1,212
Chinkapin oak	24	1,039	325	14,073	349	15,112
Northern red oak	62	2,685	377	16,324	439	19,009
Pignut hickory	156	6,755	112	4,850	268	11,604
Red elm	20	866	34	1,472	54	2,338
Shagbark hickory	129	5,586	385	16,671	514	22,256
Sugar maple	284	12,297	855	37,022	1,139	49,319
Sweetgum	31	1,342		-	31	1,342
White ash	755	32,692	92	3,984	847	36,675
White oak	212	9,180	542	23,469	754	32,648
Yellow-poplar	386	16,714	494	21,390	880	38,104
TTOTAL	2,256	97,685	3,567	154,451	5,823	252,136

STAND 1 – Mixed mesophytic **ACREAGE: 26.0**

	CUT	LEAVE	TOTAL
VOLUME/ACRE:	2,604	3,491	6,095
TOTAL VOLUME:	67,700	90,800	158,500
BASAL AREA/ACRE:	42.9	62.9	105.8
# TREES/ACRE:	57	85	142

STAND 2 – Oak hickory **ACREAGE: 17.3**

	CUT	LEAVE	TOTAL
VOLUME/ACRE:	1,834	3,663	5,497
TOTAL VOLUME:	31,700	63,400	95,100
BASAL AREA/ACRE:	33.0	59.7	92.7
# TREES/ACRE:	43	84	127

TRACT BOUNDARIES: This tract is in the main chunk of the state forest, and is surrounded by other state forest tracts. The northern boundary is a slight drainage that forms the boundary with tract 2902. The eastern boundary is the main drainage that forms the boundary with tract 2903. The southern boundary is another slight drainage that forms the boundary with tract 2909. The western boundary is a formed by Cold Friday Road on the ridgeline, beyond which is tract 2911 to the west.

ACCESS: Cold Friday Road provides direct access to the west side of this tract.

ACQUISITION HISTORY: The land within this tract was acquired from several owners including Wesley and Georgia Lowe in 1934 for an undisclosed sum, Joseph and Carrie Pfeister in 1931 for a reported $5 per acre, and Winifred and George Doolittle in 1951 for a reported $9 per acre. These acquisitions make up the majority of this tract in the order listed.

TRACT DESCRIPTION: This tract was divided into two stands based on cover type and past management. These stands include: mixed mesophytic and oak hickory. These stands will be described in detail below.

Stand 1 – Mixed mesophytic

This 26-acre stand is found both on the lower slopes as well as the drainage on the north side all the way up to the road, and also on the southwestern portion where it appeared to be natural succession from former old field conditions.

The total stand volume (6095 bd. ft/acre) is composed primarily of yellow-poplar (1454 bd. ft/acre), sugar maple (1256 bd. ft/acre), and white ash (1118 bd. ft/acre). The remaining 37% of the volume consists of northern red oak, white oak, and various other species.

Stand 2 - Oak hickory

This 17-acre stand forms the remainder of the tract, and occupies the central hill slope portion of the tract. Though mostly dominated with oak and hickory, there was a definite component of more mesophytic species mixed in, and so this stand shows signs of the relentless transition to maple dominated stands as oak drops out of the overstory over time and minimal disturbance impedes oak establishment in the understory.

The total volume of the stand (5497 bd. ft/ac) is composed primarily of white oak (1288 bd. ft/ac), sugar maple (1000 bd. ft/ac), and shagbark hickory (871 bd. ft/ac). The

presence of sugar maple at this level indicates that most of the stand has a mesic component that intermingles with the more distinct mesic stand. The remaining 43% of the volume consists of white ash, pignut hickory, chinkapin oak, black oak, and various other species.

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

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.

GlD2 Gilpin 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.

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.

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.

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.

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

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.

RECREATION: This tract is within the largest contiguous block of forest comprising Harrison-Crawford State Forest. Cold Friday road gives direct nearby access. Consequently, there is a higher amount of usage of this tract by the general public year round, including foraging (mushrooms) and hunting.. Due to the proximity of nearby caves, there is probably a fair amount of use by people seeking out new cave openings. There are no official hiking or horse trails located in this tract.

WILDLIFE: This tract represents typical upland forest habitat. 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.

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

DBH Class	Recommended Maintenance level	Current trees/ac	Potential harvest	Residual trees/ac
12"-18"	6	40.9	14.8	26.1
20" & greater	3	9.7	4.4	5.3
Total	9	50.6	19.2	31.4

Guidelines for snag tree levels (trees/acre)

DBH Class	Recommended Maintenance level	Optimal level	Current levels (trees/ac)
6"-8"	1	1	15.4
10"-18"	2.5	5	5.3
20" & greater	0.5	1	0.5
Total	4	7	21.2

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 somewhat 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 are less suitable 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, hazard or storm damaged trees, and not negatively impact that component significantly. Creation of more snags could be undertaken by girdling large cull trees in a post-harvest TSI operation.

Additionally, management activities involving a timber harvest should not affect this habitat long-term from the perspective of wildlife utilizing it due to the maintenance of a forested habitat on the tract and the structural diversity created through these activities. 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.

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.

Since this tract represents a component of contiguous forest, forest management activities might disrupt forest interior species by creating temporary edge habitat for generalist species. . However, the described regeneration openings if undertaken have been shown to be of less an issue compared to hard edges such as public roadways, utility corridors and crop filed edges. Placement of regeneration openings away from hard edges can minimize these potential impacts.

WATERSHED / HYDROLOGY: The majority of the tract contains gentle to moderately steep slopes that drain into an intermittent drainage that drains into Potato Run and then 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. These features will be buffered during management activities.

HISTORICAL AND CULTURAL:
This tract is reviewed for cultural sites during the forest resource inventory and planning process. Cultural resources may be present on this tract but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

RARE, THREATENED, OR ENDANGERED SPECIES:
A Natural Heritage Database review was completed for this tract. If Rare, Threatened or Endangered (RTE) species were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

EXOTICS: There are a few pockets of ailanthus present this tract – scattered around where small openings have opened up the canopy. These are small trees, but some 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 Cold Friday Road as well. Both species are widespread in the region.

SILVICULTURAL HISTORY AND PRESCRIPTION:

General: The records in the file for this tract show that an inventory was done in 1978, which indicated a total volume of 3600 bd. ft/ac and an annual growth rate of 157 bd. ft/ac per year. Prior to this, a harvest was conducted in 1976 covering three tracts and totaling 127,000 bd. ft, as well as a veneer sale in the same year totaling 22,000 bd. ft, and probably also encompassing several tracts. Post harvest TSI was done in 1979.

Subsequently, another inventory was done in 1996, which indicated a total volume of 4984 bd. ft/ac and an annual growth rate of 108 bd. ft/ac per year according to increment cores. Actual calculated growth rate using the two inventories gave a much lower growth estimate of 77 bd. ft/ac/year. A harvest was conducted in 1997 in this tract and neighboring tract 2902 which resulted in 66,700 bd. ft being removed in 362 trees from this tract (1551 bd. ft/ac) – most of which was yellow-poplar, black oak, white oak, and red oak.

The tract had a low growth rate in 1996, and the current growth rate of 133 bd. ft/ac/year was calculated by using the 2014 volume of 5823 bd. ft/ac, subtracting the volume of 4984 bd ft/ac from the 1996 inventory and the 66,700 bd. ft. from the 1997 harvest, and dividing by 18 years of growth. This calculation resulted in a figure of 133 bd. ft/ac per year, which is between the historic high and low growth rates, but seems somewhat low considering the mesic nature of the tract.

Number of trees per acre and basal area per acre figures indicate that both stands are fully stocked at between 80% to 90%. Removal of trees tallied as "cut" either via a timber harvest or TSI would reduce the stocking levels to a level much closer to the B-line.

Due to the amount of volume being carried on the majority of the tract (5823 bd. ft/ac), the length of time since the last managed harvest (17 years back to 1997), and the general condition of the overstory trees in the majority of the tract, a light to medium level harvest could be undertaken in this tract at any time. This would produce a harvest volume of about 98,000 board feet or about 2256 board feet per acre and leave about 155,000 board feet, or about 3567 board feet per acre. Likely, this tract would again be combined with neighboring tract 2902 in any proposed harvest.

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 a few small areas of ailanthus noted at the time of inventory.

Stand 1: Mixed mesophytic

This 26-acre stand covers 60% of the tract, and it contains a volume of 6095 board feet per acre of which 2605 was classified as harvestable and 3491 was classified as residual. This would remove 43 square feet of basal area, which would leave the residual stand with 63 sq. ft. Stocking would drop from 88% to about 55% with the indicated management. White ash and yellow-poplar account for over 40% of the volume of this stand, which accounts for the drastic reduction in stocking, by tallying many of these trees for removal.

The last harvest on this tract was conducted in 1997. Due to current stand conditions, stocking levels and projected residual conditions a managed timber harvest is of medium priority and prescribed to be undertaken in the next 1-5 years. The majority (75%) of the harvest volume for stand 1 (2604 bd. ft/ac) would be contained in white ash (1062 bd. ft/ac), yellow-poplar (549 bd. ft/ac), and sugar maple (329 bd. ft/ac), with black oak, basswood, northern red oak, and various other species making up of the remainder of the harvest volume. Most of the stand would utilize a single tree selection routine with group selection regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees.

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 a few pockets of ailanthus scattered throughout this stand.

Stand 2: Oak hickory

This 17-acre stand covers 40% of the tract, and contains a volume of 5497 board feet per acre of which 1834 was classified as harvestable and 3663 was classified as residual. This would remove 33 square feet of basal area, which would leave the residual stand with 60 sq. ft. Stocking would drop from about 78% to about 50% with the indicated management.

The last harvest on this tract was conducted in 1997. Due to current stand conditions, stocking levels and projected residual conditions a managed timber harvest is of medium priority and prescribed to be undertaken in the next 1-5 years. The majority (70%) of the harvest volume for stand 2 (1834 bd. ft/ac) would be contained in white ash (386 bd. ft/ac), white oak (370 bd. ft/ac), shagbark hickory (284 bd. ft/ac), and sugar maple (231 bd. ft/ac), with pignut hickory, yellow-poplar, and various other species making up of the remainder of the harvest volume.

Most of the stand would utilize a single tree selection routine with group selection regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees. The residual stand should be heavier to white oak – the primary residual tree species, with a lesser component of maple and other oak 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 a few pockets of ailanthus scattered throughout this stand.

PROPOSED ACTIVITIES LISTING

Summer 2014	Field inventory
Winter 2014 - Spring 2015	Write mgmt plan
Summer 2015 - Fall 2015	Basal bark treat ailanthus
Fall 2017 – Winter 2017	Mark timber harvest
Spring 2018	Sell timber
2019 / 2020	Post harvest TSI
2020	Recon & monitor for exotics
2029-2030	Inventory for next mgmt cycle

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