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

STATE FOREST: Harrison Crawford **COMPARTMENT**: 29 **TRACT**: 14

Date: Dec 18, 2012 **Forester: Wayne Werne**
(Inventory - summer 2011)

INVENTORY SUMMARY

NUMBER OF STRATA: **2** **Est. growth: 74 bf./ac/yr ****
PERMANENT OPENINGS: **0.0 ac** **Est. cutting cycle: 27 years**
TOTAL ACREAGE: **80.7 ac** **Est. mgmt cycle: 15 years**
AVERAGE SITE INDEX: **72-82** (for upland oaks) **83-93** (for poplar)
AVERAGE BASAL AREA: **112 sq. ft/ac**

****Growth** was calculated by using 2011 volume **MINUS cedar**, subtracting the volume of 2957 bd ft/ac from the 1978 inventory and the 16,300 bd. ft. from the 1998 sale, and dividing by 33 years of growth. Cedar volume was figured using a different cedar log scale (much more volume from small trees), which was not used in 1978

TRACT 2914 TOTAL VOLUME (bd ft)

	CUT		LEAVE		TOTAL	
SPECIES	per acre	total	per acre	total	per acre	total
Black oak	296	23,680	140	11,200	436	34,880
Blue ash		-	33	2,640	33	2,640
Chestnut oak	189	15,120	244	19,520	433	34,640
Chinkapin oak	17	1,360	96	7,680	113	9,040
*Eastern redcedar**	*307*	*24,560*		-	*307*	*24,560*
Northern red oak	171	13,680	145	11,600	316	25,280
Pignut hickory	260	20,800	70	5,600	330	26,400
Post oak	108	8,640	130	10,400	238	19,040
Scarlet oak	40	3,200	52	4,160	92	7,360
Shagbark hickory	33	2,640	29	2,320	62	4,960
Sugar maple	132	10,560	66	5,280	198	15,840
White ash	376	30,080	30	2,400	406	32,480
White oak	428	34,240	2,059	164,720	2,487	198,960
Yellow-poplar	65	5,200		-	65	5,200
TTOTAL	2,422	193,760	3,094	247,520	5,516	441,280

**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.*

STRATUM 1 – Oak hickory **ACREAGE: 65.5**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	2,634	3,674	6,308	
TOTAL VOLUME:	172,500	240,600	413,200	
BASAL AREA/ACRE:	51.6	61.5	113.1	
# TREES/ACRE:	74	203	277	

STRATUM 2 – Rocky south slope **ACREAGE: 15.1**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	1,715	1,157	2,872	
TOTAL VOLUME:	25,900	17,500	43,400	
BASAL AREA/ACRE:	40.4	68.3	108.7	
# TREES/ACRE:	128	386	514	

TRACT BOUNDARIES: This tract is in the main chunk of the state forest, and is surrounded by other state forest tracts. The western boundary is a ridgeline that borders tract 2911, and the southern boundary is a drainage that forms the border with tract 2913. Cold Friday Road forms the eastern and northern boundaries of the tract.

ACCESS: Cold Friday Road provides direct access to about half of this tract, and fire trail 305 provides access to the southern tip of the tract.

ACQUISITION HISTORY: The land within this tract was acquired from several owners including Dovey and George Lowe in 1935 for an undisclosed sum, Jesse and Laura Gibson in 1939 for an undisclosed sum, and Joseph and Carrie Pfeister in 1931 for $5 per acre.

TRACT DESCRIPTION: This tract was divided into two strata based on cover type and past management. These stands include: oak hickory and rocky south slope. The rocky south slope had a noticeable amount of cedar, as these stands always seem to have. These strata will be described in detail below.

Stratum 1 - Oak hickory

This 66-acre stratum is the primary type in this tract, and it covers most of the east facing slopes in the tract.

The total volume of the stratum (6308 bd. ft/ac) is composed primarily of white oak (2979 bd. ft/ac), black oak (566 bd. ft/ac), chestnut oak (563 bd. ft/ac), and white ash (527 bd. ft/ac). White oak makes up almost half the volume – probably because the 1998 sale removed more chestnut oak and black oak, and left white oak as the primary residual species. The remaining 25% of the volume consists of northern red oak, post oak, sugar maple, and various other species.

Stratum 2 – Rocky south slope

This 15-acre stratum is found mostly on the west slope below Cold Friday Road, and in a few south facing exposures farther west. This area has shallow soil and exposed rock that has always had natural low productivity, and contains the typical assemblage of cedar, ash, post oak, and chinkapin oak.

The total stratum volume (2872 bd. ft/acre) is composed primarily of eastern redcedar (1200 bd. ft/acre), and white oak (845 bd. ft/acre). The remaining 30% of the volume consists of northern red oak, blue ash, post oak, 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.

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.

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.

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.

GlE2 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.

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.

RECREATION: This tract is located in the largest contiguous block of forest comprising Harrison-Crawford State Forest. Two horse trails traverse the eastern side by Cold Friday Road, and the western side down the ridge. Cold Friday road gives direct nearby access. 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. The categories of optimal and maintenance guideline numbers were broken down by size class .

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

# of live trees per acre	Guidelines maintenance	Tract 2914 actual present – harvest = residual
12”-18” DBH class	6	38.4 – 17.1 = 21.3
20” DBH and greater	3	12.6 - 5.7 = 6.9
Total	9	51.0 - 22.8 = 28.2

# snags per acre	Guidelines maintenance	Guidelines optimal	Tract 2914 actual
6” - 8” DBH class	1	1	24.8
10”-18” DBH class	2.5	5	6.5
20” DBH and greater	0.5	1	1.0
Total	4	7	30.2

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 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 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 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. 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.

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 an 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. One open sink or possible cave was noted in the western portion of the tract. A spring is present on the eastern side of the tract near Cold Friday Road. Springs, sinkhole openings and caves will be buffered during management activity.

HISTORICAL AND CULTURAL: Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during management or construction activities

RARE, THREATENED, OR ENDANGERED SPECIES:

A Natural Heritage Database Review is part of the management planning process. If Rare, Threatened or Endangered 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 scattered pockets of ailanthus present this tract – mostly in the northwest portion along the ridgetop where the old skid trail was located, and 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 horse trails in places.

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 2957 bd. ft/ac and an annual growth rate of 106 bd. ft/ac per year. A sale was conducted in 1998 in this tract and neighboring tract 2911 which resulted in 16,300 bd. ft being removed in 114 trees from this tract (only 200 bd. ft/ac) – most of which was chestnut oak, white oak, and black oak. Only 10% of what the 1978 plan called for in harvest volume was actually marked and removed in 1998, partially due to the fact that only part of the western half of the tract was included in the sale area.

The tract had a low growth rate in 1978 as determined from increment cores, and current growth was calculated by using 2011 volume MINUS cedar, subtracting the volume of 2957 bd ft/ac from the 1978 inventory and the 16,300 bd. ft. from the 1998 sale, and dividing by 33 years of growth. Cedar volume was figured using a different cedar log scale (much more volume from small trees), which was not used in 1978, and so was excluded.

This calculation resulted in another low figure of 74 bd. ft/ac per year, which seems inordinately low considering less than 20% of the tract was composed of the rocky south slope type, which would certainly show lower productivity. The predominant oak hickory type should be showing a better growth rate based on similar oak hickory types across the forest, and the amount of time since the harvest thinned the site also should be reflected in increased growth rates. It was noted, however, during the current inventory, that a certain level of overstory mortality was setting in. Some of this is no doubt due to drought stress, but some was due to wind damage, and several large oaks in the overstory were noted to have died recently, which is no doubt having a negative impact on overall volume accumulation in this tract. Additionally, since only 10% of the volume recommended for harvest in 1978 was actually removed, this stand has probably stagnated over the long term.

Number of trees per acre and basal area per acre figures indicate that both strata are fully to overstocked at between 102% to 110%. Removal of trees tallied as “cut” either via a

timber sale or TSI would reduce the stocking levels to between 60% to 70% (fully stocked at or above the B-line).

Due to the amount of volume being carried on the majority of the tract (5209 bd. ft/ac – not including cedar), the mortality of the overstory trees that was noted, the length of time since the last managed sale (15 years back to 1998), 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 sale volume of about 169,000 board feet or about 2100 board feet per acre (not including cedar) and leave about 248,000 board feet, or about 3100 board feet per acre plus 25,000 board feet of cedar. Likely, this tract would again be combined with neighboring tract 2911 in any proposed sale.

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. Understory treatment of shade tolerant species is prescribed 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 – mostly scattered around near the northern edge.

Stratum 1: Oak hickory

This 66-acre stratum covers 80% of the tract, and contains a volume of 6308 board feet per acre of which 2634 was classified as harvestable and 3674 was classified as residual. This would remove 52 square feet of basal area, which would leave the residual stand with 62 sq. ft. Stocking would drop from 102% to about 60% with the indicated management (fully stocked at the B-line). These figures DO include cedar as figured according to the cedar log scale.

Since the last harvest in this tract was 15 years ago, and because it also currently contains a moderate volume of both harvestable material and residual growing stock, the recommendation would be to rank this stand as a medium priority for conducting a harvest. The majority (65%) of the harvest volume for stratum 1 (2634 bd. ft/ac) would be contained in white oak (510 bd. ft/ac), white ash (488 bd. ft/ac), black oak (384 bd. ft/ac), and pignut hickory (338 bd. ft/ac), with chestnut oak, sugar maple, post oak, and various other species making up of the remainder of the harvest volume.

Most of the area would probably be harvested under a single tree selection routine with larger regeneration openings targeting groups of low-grade, declining and mature trees . 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.

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 along the northern edge of this tract.

Stratum 2: Rocky south slope

The areas that make up this 15-acre stratum are scattered across the tract, but the largest area is located mostly on a west facing slope just below Cold Friday Road. It is characteristic of these stands across the forest and consists of thin soils and exposed rock, with generally small and scrubby slow growing trees with short boles.

It contains a volume of 2872 board feet per acre of which 1715 was classified as harvestable and 1157 was classified as residual. This would remove 40 square feet of basal area, which would leave the residual stand with 68 sq. ft. Stocking would drop from 110% 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. Cedar contributes the majority of the volume to this stratum, and it was all tallied for removal, which is what led to the majority of reduction of stocking.

Since this stratum intermingles with the more merchantable hardwood areas, there would likely be some trees included from here along with any timber sale taking place in stratum 1. Most of the harvest volume tallied in this stratum (1715 bd. ft/ac) is represented by eastern redcedar (1200 bd. ft/ac) - due to use of the cedar scale. A separate cedar sale would probably have to be undertaken to generate interest to actually harvest any of these trees. Since most of these areas are on rocky slopes rather than recovering old field areas with oak regeneration, most of it will 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..

PROPOSED ACTIVITIES LISTING

Summer 2011	Field inventory
Fall 2012 - Winter 2012	Write mgmt plan
Winter 2012 - Summer 2013	Basal bark treat ailanthus
Spring 2013 – Winter 2013	Mark timber sale
Summer 2013 - Spring 2014	Sell timber sale
2014 / 2015	Post harvest TSI
2017	Recon & monitor for exotics
2026-2027	Inventory for next mgmt cycle

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