Indiana Department of Natural Resources
Division of Forestry
DRAFT

RESOURCE MANAGEMENT GUIDE

Harrison-Crawford State Forest **Compartment: 29 Tract: 07**
Dieter Rudolph, John Segari **Date: September 10, 2009**
Management Cycle **20 years**

Acres Commercial Forest: 61
Acres Noncommercial Forest: 0
Acres Permanent Opening: <1
Acres Other: 0

Basal Area >= 14 inches DBH: 58.92 sqft/ac
Basal Area < 14 inches DBH: 48.90 sqft/ac
Basal Area Culls: 3.63 sqft/ac
Total Basal Area: 107.82 sqft/ac

Acres Total: 61

Number Trees/Acre: 187

Species	Harvest		Leave		Total	
	Volume, bf/ac	Volume, bf total	Volume, bf/ac	Volume, bf total	Volume, bf/ac	Volume, bf total
White Oak	470	28,800	1,660	102,050	2,130	130,850
Northern Red Oak	370	22,740	590	36,180	960	58,920
Yellow Poplar	310	18,780	500	30,450	810	49,230
Black Oak	280	17,210	330	20,150	610	37,360
Sugar Maple	130	8,160	150	9,100	280	17,260
Scarlet Oak	70	4,550	0	0	70	4,550
Chinkapin Oak	70	4,430	20	1,340	90	5,770
Sassafras	60	3,730	10	710	70	4,440
Chestnut Oak	40	2,220	0	0	40	2,220
Pignut Hickory	30	2,020	250	15,120	280	17,140
Shagbark Hickory	0	0	170	10,650	170	10,650
Black Walnut	0	0	70	4,510	70	4,510
White Ash	0	0	40	2,220	40	2,220
American Sycamore	0	0	10	600	10	600
Black Cherry	0	0	10	600	10	600
Total	**1,830**	**112,640**	**3,810**	**233,680**	**5,640**	**346,320**

Location

This tract is located in Harrison County, T4S R2E in Sections 11, 12, 13 and 14. Firetrail 304 leads to the southern portion of this tract off Cold Friday Road.

General Description

This tract is made up of two main stratum (referred to as stands for this discussion); Mixed Hardwoods (18 acres) and Oak Hickory (43 acres). There is also an opening in the southeastern section of this tract. The opening is less than an acre in size and is one of multiple openings on this ridge top that were created as a wildlife project. The Mixed Hardwoods stand can be found on the ridge top and has qualities similar to that of an old-field covertype. The Oak Hickory stand is on the slopes and ravines in the tract, taking up the largest portion of the land.

History

The land in this tract was obtained in four separate segments, each in a different section. The area in section 12 was part of a 160-acre purchase from Kintner in 1950. The area of land in section 13 was a part of a 762-acre purchase from Brewster in 1934. The land in section 14 was purchased as a part of a 270-acre parcel from Kintner in 1934. The land in section 11 was a part of an 80-acre purchase from Kintner in 1936.

This tract received a managed harvest, along with the adjacent tract 2906 in 1985. This harvest removed an estimated 103,951 bd.ft. from these tracts.

Landscape Context

2907 is a part of a contiguous body of land owned by the state of Indiana. It is surrounded by state land. The immediate surrounding area of this tract is forested, being mainly deciduous hardwoods. Within a 5 mile radius, the landscape is a mixture of forest land, agriculture, much of the Indian Creek and Blue River watersheds, and several miles of the Ohio River. Most of the open ground is made up of grassland, although some row cropping exists. Most private land parcels are private single family owned, although this area includes a portion of the small town of Leavenworth. Also included is an active limestone quarry, located along the Ohio River in Kentucky. There are at least 4 nature preserves and a portion of a 5th located within this zone. Lastly, the O'bannon Woods State Park is nearby.

Topography, Geology, and Hydrology

A portion if 2907 is the top of a ridge. The higher elevation and flatter land associated with the ridge top comprises the Mixed Hardwoods stand. The slopes of the ridge are mainly oak-hickory covertypes and take up the largest portion of the tract. The slopes are not steep in the northwestern section of the tract and more gradual in the northeastern section.

The drainage along the northern boundary is intermittent and drains into Potato Run.

No signs of karst features were found within this tract.

Soils

Corydon Stony Silt Loam (CoF) Shallow, moderately steep to very steep, well-drained, stony soils on uplands. Surface layer is about 3 inches. Subsurface is about 6 inches thick. Subsoil about 9 inches thick. The depth to hard limestone bedrock is about 18 inches. High in organic matter and low in natural fertility. Runoff is rapid or very rapid. Soil type is characterized by limestone outcrops, with as much as 15% on benches which are deeper than 20 inches to bedrock.
Degree Slope: 20-60 %
Woodland Suitability Group: 3d7
Site Index: 65-75 (Upland oaks)
Growth range potential (Upland oaks): 155-220
Management concerns: Runoff and erosion

Gilpin Silt Loam (GlD2, GlD3, GlE2, GpF) Moderately deep, strongly sloping to steep, well-drained soils. Surface layer is very dark grayish-brown silt loam about 3 inches thick. Subsurface layer is pale brown silt loam about 9 inches thick. Subsoil is about 17 inches thick. Depth to hard sandstone and shale bedrock is about 29 inches. Moderate in organic matter. Available water capacity is low and permeability is moderate. Runoff is rapid to very rapid.
Degree Slope: 12-30 %
Woodland Suitability Group: 3o10 or 3r12
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Site Index: 70-80
Management Concerns: Runoff and erosion

Hagerstown Silt Loam (HaC2, HaD2, HgC3, HgD3, HgE3) Deep, moderately sloping to moderately steep, well-drained soils on uplands. Surface layer is dark yellowish brown silt loam about 6 inches thick. The subsoil is about 46 inches thick. The depth to limestone is about 52 inches. Characteristically, this soil is eroded to severely eroded. Moderate in content of organic matter and medium in natural fertility. Available water capacity is moderate or high, and permeability is moderate. Runoff is rapid to very rapid.
Degree Slope: 6-25 %
Woodland Suitability Group: 1o1 or 1r2
Site Index: 85-95 (Upland Oaks)
Growth range potential (Upland oaks): 300-375 bd.ft. /acre/year
Management Concerns: Runoff and erosion

Zanesville Silt Loam (ZaC2, ZaC3, ZaD2) Deep, moderately sloping and strongly sloping, well-drained soils on uplands. Avery firm fragipan in the lower part of the subsoil. Surface layer is very dark grayish-brown silt loam about 3 inches thick. The subsurface layer is about 5 inches thick and dark yellowish-brown. Subsoil is about 42 inches thick. The depth to sandstone bedrock is about 65 inches Moderate or low in content of organic matter and low in natural fertility. Available water capacity is high, and permeability is very slow. Runoff is medium to rapid.
Degree Slope: 6-18%
Woodland Suitability Group: 3d9
Site Index: 70-80 (Upland Oaks)
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Runoff and erosion. Fragipan limits the available water capacity.

Access

This tract can be accessed from Firelane 304 that comes off Cold Friday Road. This firelane is a large loop with both entrances coming off the same road. The southern entrance is preferred due to the quality of the road. The tract itself is close to being at equidistance from both entrances. The previous yard location is on the south end of the tract and should be accessed from the southern fire trail entrance. The old sale map shows it in a place in which there are no canopy gaps large enough to have yarded. The most likely location of the previous yard is the permanent opening on the north of the firetrail on the southern most ridge.

Boundary

The drainage acts as a well-defined boundary for the northern section of this tract while a ravine between two fingers of the ridgetop makes up the western and eastern boundaries. The firelane does not follow the southern boundary line perfectly but is near enough to be used in determining the southern boundary. The internal section corner is marked with a probable stone. It is not scribed but has a cross on the top, approximately 6x6 and 8 inches tall. The stone is found just downhill from a large black walnut tree.

Wildlife

A Natural Heritage Database Review is part of management planning. 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.

The prominent presence of oaks in the overstory of this tract makes the area ideal for many types of wildlife. The hard mast produced by the oaks provide a food source for species such as white-tailed deer, wild turkey, raccoons, opossums, and forest rodents. A sufficient number of standing snags also provide habitat and structural diversity for forest animals providing both shelter and a food source to many forest species.

Indiana Bat

Any skid trails/haul roads created in this tract could improve the habitat for the Indiana bat by improving the canopy foraging conditions due to the reduction of understory

clutter or travel corridors. Furthermore, the areas around likely roost trees can be opened up to benefit the bat by increasing solar exposure to the trunks. The edge of log yards can increase the solar exposure of roost trees which improves the microclimate and thermal conditions of the roosting areas.

Trees that are ideal for roosting bats such as large snags and large trees that have loose/exfoliating bark can be retained to provide for the Indiana bat. Furthermore, the growth of ideal tree species for the Indiana bat can be managed to promote growth and increase the recruitment of trees into the categories suitable for the Indiana bat.
Now this stand contains a surplus of live trees in the 11 to 20 inches class and those greater than 20 inches in diameter. Likewise, there is an adequate amount of snags in both the maintenance level for all of the size classes. The optimal level for snags is also met by the 5"+ and 9"+ size classes but not the 19"+. In order to reach the optimal level, some lower quality large legacy trees could be girdled in order to meet these standards.

Wildlife Habitat Feature (Tract Wide)

Category	Maintenance level	Optimal Level	Inventory	Available Above maintenance	Available Above Optimal
Legacy Trees *					
11"+	553.5		2274	1720	
20"+	184.5		317	132	
Snags (all species)					
5"+	246	430.5	1384	1138	954
9"+	184.5	369	774	590	405
19"+	30.75	61.5	46	15	-15

* species include: AME, BIH, BLL, COT, GRA, REO, POO, REE, SHH, ZSH, SIM, SUM, WHA, WHO

Recreation

This tract is almost ¾ mile from the nearest public access point. The main recreation taking place on this tract would be hunting and horseback riding. These uses are not incompatible with ecosystem management and should be continued. The wildlife opening on the ridgetop could provide for non-consumptive wildlife viewing.

Cultural

Cultural resources may be present this tract, but if present their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

Invasive

Ailanthus was marked as being an upcoming problem in one area of the tract near the opening (marked on the map). If left untreated, this species could take over the open areas in and around the tract and continue inward as the native species die. As this opening is near the fire trail, it would be easy to treat the Ailanthus now before it becomes an uncontrollable problem.

Management Limitations

All soil types in this tract have a management concern of runoff and erosion. In order to limit these problems, management activities need to follow established BMPs.

Summary Tract Silvicultural Description, Prescription, and Proposed Activities

This tract was last inventoried in the fall of 1978 and showed a total volume of 200,157 bf/ac. The volume at this time was comprised mostly of white oak followed by black and red oak. These three oak species made up roughly three quarters of the tracts volume. The current inventory showed there to be 5,677 bf/ac, which was an increase of 77 bf/ac/year. The current stand had a large amount of white oak followed by black oak, yellow poplar, and red oak. While black oak still had a high volume in this stand, it has decreased in volume at a rate of 7 bf/ac/year. The likely reason for the decrease would be that the black oak has reached its point of maturity and has then begun to decrease in volume over the years. The large increase in yellow poplar volume, 25 bf/ac/year was a result of the Mixed Hardwoods stand, which was likely an old field stand having a high amount of yellow poplar moving in. The white oak had the highest level of growth in this stand at 29 bf/ac, which kept it as the highest volume species in the tract.

This tract was harvested in 1985 with the adjacent tract 2906, producing 103,951 bf. While the sale volume was not divided by tract we know that approximately 63% of the area of the sale was in 2907. Assuming an equal volume per acre harvest across the sale results in 65,489 bf removed from 2907. If used in the growth calculations we find a better growth estimate for the tract to be 112 bf/ac/yr from 1978 to 2009.

Mixed Hardwoods (18 acres)

This stand was located at the top of the ridge and the beginning of the slopes. The stand had a high basal area of 111.4 sqft/ac and 6,470 bf/ac. The inventory showed that 2,030 bf/ac were harvestable at 36.8 sqft/ac while 4,440 bf/ac at 74.6 sqft/ac would remain. The majority of this volume and basal area was yellow poplar. There was also a large amount of sugar maple in the poles and merchantable size classes, but not in the overstory. Various oaks and hickories were also present within the tract.

Due to the relatively high basal area, the stand should undergo a commercial thinning. This thinning would focus on increasing diversity in the overstory while also managing for quality residual trees. In order to increase the diversity, the focus would be on the yellow poplar component. By removing this species, it would create an opportunity for the sugar maple, oaks and hickories to increase their prominence in the overstory. As there was a large amount of sugar maple in the understory, this species should also be thinned in the pole-sized classes in order to aid the other hardwood species in their ascent into the overstory.

Oak Hickory (43 acres)

Surrounding the Mixed Hardwoods stand, occupying most of the slopes, this stand makes up the majority of the tract. Like the previously mentioned stand, this covertype has a high basal area at 108.3 sqft/ac coming out at 5,610 bf/ac. Of this amount, 1,840 bf/ac

was deemed removable at 34.3 sqft/ac, leaving 3,770 bf/ac at 74 sqft/ac. The basal area is dominated by white oak and sugar maple, both at 33 sqft/ac. The board feet is predominantly oak, mostly white oak followed by red oak and black oak. Multiple other hardwood species are also present in lower quantities through the stand.

Due to the higher basal area of the stand, this area would also benefit from a thinning. This prescription would focus on keeping the stand an oak-hickory covertype, making the sugar maple a target species. The majority of the sugar maple present was in the understory making it important to have a timber stand improvement (TSI to reduce the amount of sugar maple. In terms of the overstory thinning, the focus needs to be on the residual. The lower quality individuals should be removed to increase the growth potential for the remaining trees.

Open (<1 acre)

This small area was originally created as a wildlife project and has multiple other openings in the neighboring tracts. The only trees within this opening were found at the fringe. At the moment, the opening is covered with grasses and flowering plants commonly found in prairies and grasslands. The stand offers hunting areas for predators and habitat for rodents making it an important component of the forest. There was a small component of Ailanthus found on the fringe of this opening. As Ailanthus is a fast moving/growing invasive, this should be taken care of before it establishes itself within the opening.

Tract Wide Prescription

Due to the relatively small size of this tract and the neighboring tract 2906, these two tracts should be combined in the management prescription. Both tracts have the same covertypes and each covertype is similar in composition. For both tracts, the Oak Hickory and Mixed Hardwoods stands should be thinned based on an individual tree selection marking plan in order to reduce the amount of erosion and runoff. The thinning of each stand will follow the goals and marking guides described above.

A special focus should also be given to cavity trees during the thinning. As there is a deficit at the moment, trees showing cavities should not be targeted as heavily as other trees in order to protect wildlife dens.

Uneven aged management is a philosophy ascribed to by the Division of Forestry. This requires constant establishment of regeneration to release in future management cycles. As such, a portion of each tract should be regenerated at each entry to ensure a multiple-aged distribution. Regenerating up to 6 acres of this tract will establish up to 10% of the tract in early successional habitat. This has the effect of a 200-year rotation on the oldest trees assuming entry on 20-year cycles. White oak can live that long and if they die early will simply add structural diversity in the form of snags. Target areas for regeneration should include a portion of the oak-hickory covertype but should focus on the mesic hardwood component if any oak or hickory regeneration is present.

Proposed Management Schedule

Treat ailanthus	2013-14
Mark thinning and openings	2013/2014
Sell thinning	Summer 2014
Harvest	Winter 2014-spring 2016
Post harvest TSI	2017
Monitor openings	2020
Inventory and write new guide	2033

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