Indiana Department of Natural Resources
Division of Forestry

DRAFT

Resource Management Guide

Harrison-Crawford State Forest **Compartment: 19 Tract: 11**
Dieter Rudolph **Date: November 19, 2009**

Acres Commercial Forest: 105
Acres Noncommercial Forest: 0
Acres Permanent Opening: 4
Acres Other: 0

Acres Total: 109

Basal Area >= 14 inches DBH: 47.51 sqft/ac
Basal Area < 14 inches DBH: 73.24 sqft/ac
Basal Area Culls: 4.72 sqft/ac
Total Basal Area: 120.5 sqft/ac

Number Trees/Acre: 273

Species	Harvest Volume(MBF)	Leave Volume(MBF)	Total Volume(MBF)
Eastern Red Cedar	295.77	95.79	391.56
Eastern White Pine	34.19	14.86	49.05
Scarlet Oak	23.34	28.49	51.83
Yellow Poplar	18.3	75.22	93.52
Black Oak	12.64	2.69	15.33
Black Cherry	11.3	5.69	16.99
Sugar Maple	10.98	34.44	45.42
American Sycamore	9.11	26.58	35.69
American Beech	5.39	0	5.39
Black Walnut	5.1	15.83	20.93
White Ash	4.59	22.34	26.93
Blue Ash	4.32	0	4.32
Shumard Oak	3.83	1.83	5.66
Northern Red Oak	3.72	3.71	7.43
Chinkapin Oak	3.61	1.13	4.74
Silver Maple	2.41	10.22	12.63
Boxelder	0.86	2.63	3.49
White Oak	0	6.49	6.49
Shagbark Hickory	0	5.84	5.84
American Elm	0	1.41	1.41
Hackberry	0	0.86	0.86
Pignut Hickory	0	0.86	0.86
Total	449.46	356.91	806.37
Total per acre	4.11	3.26	7.37

Location

This tract is located in Harrison County, Indiana. It is mainly in sections 34 and 35, R2E T3S. The tract is the south of Greenbrier knob, in the Fox Hollow valley.

History

The land in this tract was purchased in two segments. The area in the SE ¼ of section 34 was obtained as a piece of a 234 acre parcel from Hudson in 1932. The area in the SW ¼ of section 34 was a piece of a 124 acre parcel purchased from Davis in 1977. The northern 'tip' of the tract was acquired in 1999 as part of a purchase from The Nature Conservancy (TNC). While the exact time is not known, accounts of a sawmill operating on the tract have been told, reportedly to saw red cedar. At least as late as a few years ago, there were residual pieces of slab wood or boards remaining that had been discarded in the one pond.

Tract 4 was heavily farmed. The 1940 aerial photo of the area indicated that 50.9 acres or 46% of the tract was still open land. Those field sites on the low hill within the tract exhibit many extinct erosion gullies. The prevalence of the eastern red cedar cover type is due directly to that species inhabiting the abandoned fields. The white pine plantation at the northern tip was planted by previous owners ca. 1940s-50s.

This tract has had wildlife projects throughout it. Most recent habitat development took place in the late 1980s. This work involved lineal daylighting of the access lane and creation of small permanent openings by the Division of Fish and Wildlife, primarily for the purpose of providing 'bugging' for young turkeys. There are three ponds within the tract of varying size. It is not known if all were created for wildlife watering holes or perhaps may have been there during the farming era (see earlier paragraph).

General Description

This tract is south of Greenbrier Knob and has two low hills surrounded by flatlands. As previously described, the present forested cover types and stands are products of the agricultural practices, prior to state ownership. There is some influence by the proximity to Blue River and Fox Hollow. The majority of this tract is a Mixed Hardwoods stand, totaling 40 acres followed closely by a Cedar stand at 33 acres. Even with a majority of the tract being hardwoods of some type, the most common tree species is eastern red cedar. An old white pine plantation exists along the northern border totaling 6 acres. The plantation continues into the tract to the north. The remaining stands were all found in small areas, the Oak Hickory stand was in three small pockets totaling 9 acres. There was an area of field and the firelane is surrounded by a narrow band of field totaling 4 acres. A small section in the southeastern corner and the southwestern corner of the main section were an Old Field stand at 9 acres.

Landscape Context

1904 is part of a contiguous body of land owned by the State of Indiana and is surrounded by state land. There is a 10 acre inholding of private property in the northern tract. The surrounding land is forested, mainly deciduous, with the continuation of the white pine stand along the northern edge. A section of the western boundary is defined by the Blue River while half of the southern boundary and the eastern boundary are defined by the beginning of the slopes. Within about .3 mile to the NE of this tract is the Stage Stop campground, a facility owned by the Division of Forestry.

Topography, Geology, and Hydrology

This tract has two main hills surrounded by flatlands. Neither hills are steep or have a substantial elevation change with the high and low points being only 120 feet difference in elevation. While the tract is part of the Blue River watershed, only a small part of it drains directly into that stream. The southern portion drains into Fox Hollow, a tributary of the Blue. Perhaps more interesting is that much of the northern slope drains into a 'blind' valley, or into the ground at a large depression (see following). Presumably, this empties into Blue River, which is a short distance away.

There is also evidence of karst activity in the tract. Sinkholes were found throughout the tract, some of them being fairly large. At least one sinkhole had an opening at the bottom creating an area for water to drain into the underground waterways without being filtered through the soil.

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

Crider Silt Loam (CrB2, CrC2, CsB3, CsC3, CtC2) Deep, gently sloping and moderately sloping well-drained soils on uplands. Surface layer is dark-brown silt loam about 8 inches thick. Subsoil is about 62 inches thick. Moderate in content of organic matter and in natural fertility. Available water capacity is high and permeability is moderate. Typically, these soils are eroded. Runoff is medium to rapid.
Degree Slope: 2-12%
Woodland Suitability Group: 1o1
Site Index: 85-95 (Upland Oaks)
Growth range potential (Upland oaks): 300-375 bd.ft./acre/year
Management Concerns: Runoff and erosion

Elkinsville Silt Loam (ElA, ElB2, ElC2, ElC3) Deep, nearly level to moderately sloping, well-drained soils on terraces. Surface layer is about 12 inches thick. Subsoil is about 50 inches thick. The underlying material is stratified layers of silt or sand and minor amounts of gravel. Moderate in content of organic matter. Available water capacity is high, and permeability is moderate. Runoff is slow to rapid.
Degree Slope: 0-12 %
Woodland Suitability: 1o1
Site Index: 85-95
Growth range potential (Upland oaks): 300-375 bd.ft./acre/year
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

Haymond Silt Loam (Hm) Deep, nearly level, well-drained soils on bottom lands and in basins of sinkholes in uplands. Surface layer is dark-brown about 9 inches thick. Subsoil dark yellowish-brown about 17 inches thick. Underlying material is dark yellowish-brown stratified silt loam that contains less prominent layers of loam. Moderate in content of organic matter. Available water capacity is high, and permeability is moderate. Runoff is slow.
Degree Slope: 0%
Woodland Suitability Group: 1o8
Site Index: (95-105- no rating for upland oaks)
Growth range potential (Tulip poplar-no rating for oaks): 375-450 bd.ft./acre/year
Management Concerns: Flooding between December and June

McGary Silt Loam (Mg) Deep, nearly level, somewhat poorly drained soils on terraces. Included with it in mapping were a few small areas of gently sloping eroded soils and areas where there is a loess cap more than 14 inches thick. They formed in calcareous lacustrine material. The native vegetation was mixed hardwoods. The surface layer is grayish-brown silt loam about 8 inches thick. The subsoil is about 37 inches thick. The upper 6 inches is grayish-brown and yellowish-brown firm silty clay loam, and the next 16 inches is yellowish-brown and grayish-brown very firm silty clay. The lower 15 inches is gray very firm silty clay that has dark brown mottles. The underlying material is gray silty clay loam.
Degree Slope: 0-2%
Woodland Suitability Group: 3w5
Site Index: 70-80
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Wetness

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 is accessible, primarily, through the firelane that enters the woods near the Fire Tower and splits heading both to the north and east across the center of the tract. There is also an old road bed that travels along the old property boundary and along the white pine plantation. This road starts about 2 miles to the east at SR 462. While this old road bed at this location is in relatively good condition and can be repaired without much trouble, the segment(s) further east would require considerable improvements to provide reliable vehicle access.

Boundary

The western and northern boundary of the westernmost section is defined by the Blue River. The eastern boundary is the ending of the flat area where the slopes of the neighboring tracts start. The northern boundary is the end of the slope from the main hill within the tract. The southern boundary is defined by Fox Hollow. At some point, the boundary of the privately owned 10 acres needs identified. At the time of the purchase of the land from TNC, this parcel was excepted, but it is was reported that the actual boundary was not defined on the ground. This property may or may not intercept the northeastern tip of the tract and will need identification before any active management takes place in that vicinity.

Wildlife

A Natural Heritage Database review was obtained for this tract. 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 presence of cavity trees in the tract is above the optimal level for all size classes. The tract also meets the optimal requirement for snags for the 5”+ and 9”+ size classes and the maintenance requirements for the 19”+ size class. The presence of snags and cavity trees creates habitat for wildlife species including the Indiana bat. In terms of legacy trees, there are an adequate number of trees in the 11”+ class, but not for the 20”+ size class.

Wildlife species that were noted on this stand were those typical of the area. Evidence of deer, squirrels, chipmunks, and turkey were seen in the area. Many of these species utilize the field and its surrounding areas, benefiting from the presence of fringe habitat. The presence of oak and hickory species creates a source for hard mast which is beneficial to multiple wildlife species, especially in the Oak Hickory pockets.

Wildlife Habitat Feature (Tract Wide)

Category	Maintenance level	Optimal Level	Inventory	Available Above maintenance	Available Above Optimal
Legacy Trees *					
11"+	981		1383	402	
20"+	327		108	-219	
Snags (all species)					
5"+	436	763	3316	2880	2553
9"+	327	654	1068	741	414
19"+	54.5	109	79	24	-30
Cavity Trees (all species)					
7"+	436	654	752	316	98
11"+	327	436	493	166	57
19"+	54.5	109	236	181	127

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

Indiana Bat

As management activities are currently only be performed in the winter months due to voluntary adherence to the seasonal recommendations provided by the USFWS, it is unlikely that direct harm will come to the Indiana bat as they are hibernating in nearby caves at this time. 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. Furthermore, the areas around likely roost trees can be opened up to benefit the bat. 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 to increase the recruitment of trees into the categories suitable for the Indiana bat.
At the moment this stand contains a surplus of live trees in the diameter classes between 11 and 20 inches in diameter and a deficit in those greater than 20 inches in diameter. This situation is due (again) to the past agricultural use and the resulting prevalence of the small-medium size tree species that invaded the field sites, particularly e. red cedar. The tract also meets the optimal requirements for all size classes for snags and cavity trees except for snags in the 19”+ size class, where the maintenance level is met.

Despite the low amount of large legacy trees in the tract, this area shows promise as Indiana bat habitat. Given time, the tract will grow into meeting the legacy tree requirements making it overall an ideal area for Indiana bat.

Recreation

This tract contained a firelane commonly used by equestrians. Also, the presence of deer and turkey offers a site to be used by hunters while the blue river allows for fishing. The same fire trail serves as a segment of one of the property's designated disabled hunters trails.

Cultural

Cultural resources may be present on this tract but their location is protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

Management Limitations

Most soil types in this tract have a management concern of runoff and erosion while a few others have the management concern of wetness. Since a large portion of the tract is relatively flat and the hill is neither high in elevation or steep, runoff and erosion are not large problems. To avoid the wetness concern, no heavy equipment should be used during periods of heavy rainfall or snowmelt.

Summary Tract Silvicultural Description, Prescription, and Proposed Activities

Overall, this tract roughly follows a reverse J-shaped curve which is the typical diameter distribution for uneven-aged stands with trees going up to 28" in diameter. The type of distribution allows for multiple diameter classes while allowing the young trees the opportunity to succeed into dominance.

Mixed Hardwoods (40 acres)

This stand takes up most of this tract and had a high diversity of tree species. This stand has a basal area of 114.2 sqft/ac and a volume of 6,100 bf/ac. Of this, 2,650 bf/ac (32.5 sqft/ac) was deemed harvestable leaving 3,450 bf/ac (81.7 sqft/ac). The trees with the highest volume were yellow poplar at 1,650 bf/ac and eastern red cedar at 1,000 bf/ac. The tree with the highest basal area was sugar maple being nearly triple that of any other species.

This tract was overstocked and would benefit from a thinning. This procedure would focus on the removal of the eastern red cedar which is competing with the more desirable hardwood species. After the removal of this species, as well as other lower quality trees, the competition would be reduced and the remaining hardwoods would be able to prosper. This practice will increase tree growth, which will improve the site for wildlife habitat by increasing large legacy trees while also increasing the volume of the stand for future harvests.

Cedar (33 acres)

The Cedar stand was the second largest stand with 10,010 bf/ac and 143.8 sqft/ac. Of this, 8,360 bf/ac was eastern red cedar. The cedar in this tract did not limit itself to this stand but was a high component across the tract. As a result, the cedar in this stand and the rest of the tract should be thinned to promote hardwood growth. The stand should not be clearcut in order to maintain structural diversity in the area. The thinning would take

about 6,050 bf/ac of eastern red cedar and 55 sqft/ac. After the proposed thinning, the stand would still have 82.5 sqft/ac and 3,810 bf/ac.

Oak Hickory (9 acres)
This stand was broken up into three small pockets throughout the stand. There were 6,850 bf/ac within the stand and 142.8 sqft/ac. Of this volume, the majority was scarlet oak (2,220 bf/ac) and eastern red cedar (2,110 bf/ac).

The goal for this stand is to increase the growth of quality oak/hickory species. In order to obtain this goal, the cedar component should be removed while also practicing single tree selection with the other species. The focus for the residual would be on tree form, quality, and growth. This thinning would take out nearly half of the basal area (63.9 sqft/ac) and a large portion of the volume (4,960 bf/ac). This thinning is relatively heavy, but should increase the quality of the stand for the future.

Old Field (9 acres)
This stand is mainly small trees in the pole sized classes or the lower ends of sawtimber. The total volume of the stand is 5,600 bf/ac and 120.4 sqft/ac. This stand had a large amount of eastern red cedar which should be removed. The hardwoods could be thinned in a timber stand improvement cut, but that thinning should be minimal so that the current hardwoods have a chance to grow and reach harvestable sizes in the future. By removing the cedar, the stand will be less likely to move into a cedar stand while also allowing for the hardwoods to have less competition as they establish themselves in the overstory.

White Pine Plantation (6 acres)
This plantation continues into the tract to the north. The trees in this stand were larger in size and height than the rest of the tract. The total volume for this stand was 6,960 bf/ac and 100 sqft/ac. The plantation had a high amount of blown down trees among the white pine.

Due to the high basal area, this stand needs to be thinned. The proposed activity would be to remove about half of the volume. By thinning this plantation, the residual pines would have increased growth. After the thinning, this tract should re-cruised in 10 years to establish a time for a final harvest in the stand. This practice should also continue into the portion of the plantation in the tract to the north. This can be combined with the hardwood or cedar harvest.

Bottomland Hardwoods (4 acres)
This stand was both small and isolated, located in the westernmost area of the tract with the Blue River near it. The stand had a low basal area of 85 sqft/ac and a large volume of 6,600 bf/ac. These estimations are not very accurate due to only one inventory plot falling within this stand. The larger silver maple and American sycamore that were present will aid in increasing structural diversity and providing habitat for species such as the Indiana bat.

TRACT ACCOMPLISHMENT RECORD
Compartment 19, Tract 4

DATE PLANNED	ACTIVITY / REMARKS	DATE COMPLETED
2014	Improvement Harvest in Hardwood Stands	
2015	E. Red Cedar Harvest	
2015	Identify Private Property Boundary	
2024	Re-inventory	

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You must indicate the State Forest Name, Compartment Number and Tract Number 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.

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