Indiana Department of Natural Resources
Division of Forestry

DRAFT

Resource Management Guide

Harrison-Crawford State Forest **Compartment: 18 Tract: 1**
Dieter Rudolph **Date: June 9, 2009**

Acres Commercial Forest: 73
Acres Noncommercial Forest: 2
Acres Permanent Opening: 0
Acres Other: 0

Acres Total: 75

Basal Area >= 14 inches DBH: 49.56 sqft/ac
Basal Area < 14 inches DBH: 51.41 sqft/ac
Basal Area Culls: 2.29 sqft/ac
Total Basal Area: 102.3 sqft/ac

Number Trees/Acre: 248

Species	Harvest Volume (MBF)	Leave Volume (MBF)	Total Volume (MBF)
White Oak	27.37	74.37	101.74
Scarlet Oak	22.02	5.16	27.18
Sugar Maple	16.97	28.76	45.73
Chinkapin Oak	10.58	35.12	45.7
Northern Red Oak	8.08	2.97	11.05
White Ash	8.03	9.58	17.61
Black Oak	6.47	11.44	17.91
Black Walnut	1.86	2.42	4.28
Yellow Poplar	1.86	1.15	3.01
Eastern Red Cedar	0	16.22	16.22
Pignut Hickory	0	14.32	14.32
Shagbark Hickory	0	9.45	9.45
Post Oak	0	4.13	4.13
Boxelder	0	1.42	1.42
Black Cherry	0	0.93	0.93
Red Elm	0	0.84	0.84
Butternut	0	0.71	0.71
Blue Ash	0	0	0
Ironwood	0	0	0
Redbud	0	0	0
Total	103.24	218.99	322.23
Total per acre	1.37	2.93	4.3

Location

This tract is located in Crawford county Indiana, sections 4 & 5, T4S, R2E. The closest road is Indiana 62 which borders C18 T5 along that tract's eastern side.

General Description

This tract can be broken into 5 stands; Black Walnut-Yellow Poplar (6 acres), Eastern Red Cedar (2 acres), Field (2 acres), Mixed Hardwoods (29 acres), and Oak-Hickory (35 Acres). For exact locations see attached map.

For the purpose of this inventory, the Black Walnut-Yellow Poplar stand was combined with the Mixed Hardwood stand due to the late successional stages of the past plantation in the Black Walnut-Yellow Poplar stand which is moving it into a mixed hardwoods cover type.

History

This tract of land was obtained in two purchases. The area in section 5 was a 40 acre purchase from Hiser occurring in1939. The area in section 4 was part of a 271 acre purchase from Mockmen in 1968. The lowland area along the tract's eastern border had previously been farm field. Although no documentation has been located, much of this former field was planted into yellow poplar and black walnut in the 1970s (former employee account). By the 2000s, this area was heavily infested with grape vine. Ca. 2005, vine control was conducted to protect the desirable tree cover from vine damage. No other forest management is known to have taken place on this tract to date.

Landscape Context

This tract is at the edge of a contiguous body of land owned by the State of Indiana. The tract borders private land on three sides (the northern, western, and southern boundaries) and state land on the eastern boundary. The private land that borders this tract is forested on the northern and western boundaries while the southern boundary consists mainly of fields with houses nearby. The eastern boundary is defined by a major drainage. The tract is part of the Blue River valley.

Topography, Geology, and Hydrology

The topography of this tract varies considerably. The southwestern portion is nearly bluff with frequent rock outcroppings, while the northeastern part is very gently sloping. The change in elevation runs from a high of 780 feet above sea level at the northwestern corner to a low of 430 feet at the southeastern corner, an overall change of 350 feet in elevation. The parent rock is mostly limestone, with common exposed outcroppings along the southern steep area. Sandstone is expected to cap this limestone at the higher elevations. The tract contained multiple sinkholes, two of which gave way to openings. One opening is located in a large sinkhole about a third of the way down in the center of the tract. The second is along the western boundary of the northern projection of the tract and is a larger opening. This second cave is said to be Old Timer's Cave, named for the old signatures on the cave walls. The tract drains entirely into an unnamed intermittent stream that eventually flows to the Dry Run Creek, which in turn, empties into Blue River about 1 mile downstream from the tract.

Soils

Alford Silt Loam (AcuB2)

The Alford series consists of very deep, well drained soils formed in loess. These soils are commonly on loess hills and less commonly on outwash plains. The surface horizon

consists of silt loam which is a light yellowish brown color, which is 6 inches deep. The subsoils consists of 4 horizons that accumulate more clay the further down the profile. The subsoil is 66 inches thick. These subsoil horizons are mainly a silty clay loam with the last horizon before the parent material is a silt loam. The last horizon starts at 72 inches and is a brown silt loam with weak structure. The permeability of this soil is moderate. The mean annual temperature is about 56, the mean annual precipitation is 42 inches.
Degree Slope: 2-60%
Site Index: 70
Growth Range Potential: 342
Management Concerns: Runoff and erosion

Apalonia Silt Loam (AgrA. AgrB, AgrC2, AgrC3)

The Apalonia series consists of very deep, moderately well drained soils forms in loess and the underlying residuum from shale with limestone and siltstone. They are moderately deep or shallow to a fragipan. The surface horizon is a silt loam 8 inches thick. The first 8 inches of the subsoil is a silty clay loam. The next 33 inches is a silt loam. The next 11 inches is clay then it turns into a clay loam for 9 inches. The last 21 inches of the subsoil is a loam. The bedrock is weakly cemented shale with moderately and strongly cemented sandstone. The mean annual precipitation is about 43 inches and the mean annual temperature is about 54 degrees F.
Degree Slope: 0-12%
Woodland suitability group: 3d9
Site Index: 60
Growth Range potential: 258
Management Concerns: runoff and erosion

Corydon Stony Silt (CqyG)

The Corydon series consists of shallow, well drained soils that formed in as much as 8 inches of loess and in the underlying limestone residuum. The Corydon soils are on hills underlain with limestone. The surface horizon is 8 inches of a silt loam. The subsoil is 9 inches of clay. The bottom of the profile is unweathered bedrock. Mean annual precipitation is about 44 inches, and mean annual air temperature is about 54 degrees F.
Degree Slope: 20-60%
Woodland suitability group: 1o8
Site Index: 64
Growth Range potential: 258
Management Concerns: runoff and erosion

Gatchel Loam (GacAW)

The Gatchel series consists of very deep, somewhat excessively drained soils on flood plains. They formed in loamy alluvium containing a high percentage of rock fragments in the lower part. The surface horizon is a loam that is 4 inches thick. The first 5 inches of the subsoil is loam, the next 9 inches is a fine sandy loam. The substratum is a coarse sandy loam turning into a sandy loam. Mean annual precipitation is about 43 inches and mean annual temperature is about 54 degrees F.

Degree Slope: 0-2%
Woodland Suitability: 1o8
Site Index: 60
Growth Range potential: 155
Management Concerns: runoff and erosion

Haggatt Silt Loam (HarE2, HarD2)

The Haggatt series consists of deep, well-drained soils formed in clayey residuum that can be capped with up to 20 inches of loess. They are on hills and in sinkholes underlain with limestone. The Surface Horizon is a silt loam that is 5 inches thick. The first 11 inches of the subsoil is a silty clay loam. The next 28 inches of the subsoil is a clay. The bedrock is fractured, indurated limestone bedrock. Mean annual precipitation is about 43 inches, and mean annual temperature is about 54 degrees F.
Degree Slope: 2-25%
Woodland suitability group: 1o1
Site Index: 68
Growth Range potential: 300
Management Concerns: runoff and erosion

Haymond Silt Loam (HcgAH)

The Haymond series consists of very deep, well drained, soils that formed in silty alluvium. These soils are on flood plains and flood-plain steps. Slope ranges from 0 to 3 percent. Mean annual air temperature is about 55 degrees F, and mean annual precipitation is about 42 inches. The surface horizon is a brown silt loam plow layer that extends approximately 10 inches. The first subsurface horizon is a dark yellowish brown silt loam that extends to 25 inches. The second subsurface horizon is a yellowish brown silt loam that extends until 44 inches. The stratum is a massive yellowish brown fine sandy loam.

Markland Silty Clay (McpD3)

The Markland series consists of very deep, well drained soils on lake plains. They formed in thin loess and the underlying calcareous, fine-textured lacustrine sediments. The surface horizon is a pale brown silt loam which extends for approximately 4 inches. The subsoils are comprised of two horizons of increasing clay. These horizons are yellowish silty clay. The two horizons are 24inches thick. The next three horizons are comprised of increasing clay and calcium. These soils are a yellowish brown silty clay loam. These three horizons are 31 inches thick. The final horizon is the substratum which is a yellowish brown silty clay loam with weak structure. The permeability is moderalty slow to slow. The mean annual precipitation is 43 inches and the mean annual temperature is 54 degrees F.
Degree Slope: 12-50%
Site Index: 72
Growth Range Potential: 342
Management Concerns: runoff and erosion

Markland Silt Loam (MaB2, MaD2, MaF, McD3) Deep, gently sloping to very steep, well drained and moderately well drained soils on terraces. Surface layer is dark grayish-brown silt loam about 3 inches thick. Subsurface layer is dark-brown silt loam about 4 inches thick. Subsoil is about 23 inches thick. The underlying material is yellowish-brown stratified silty clay and silty clay loam that has less prominent layers of silt loam. Moderate or low in content of organic matter and low in natural fertility. Available water capacity is high, and permeability is slow. Runoff is medium to very rapid.
Degree Slope: 2-70%
Woodland Suitability Group: 3r18
Site Index: 70-80 (Upland Oaks)
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Runoff and erosion

Tipsaw Very Fine Sandy Loam (TbIG)
The Tipsaw series consists of moderately deep, somewhat excessively drained soils. They formed in loamy residuum from sandstone with shale and siltstone. The surface is a dark grey very fine sandy loam about 2 inches thick. The subsurface horizon is also a very fine sandy loam about 3 inches thick. The subsoil is 15 inches is a fine sand loam and the last 20 inches is a loam. The bedrock consist of a weakly cemented and moderately cemented sandstone with shale, siltstone. The mean annual precipitation is about 43 inches, and mean annual temperature is about 54 degrees F. Permeability is moderate or moderately rapid
Degree Slope: 20-70%
Woodland Suitability: 3r12
Site Index: 70
Growth Range potential: 342
Management Concerns: runoff and erosion

Access

This tract cannot be accessed directly from a public road, but access can be gained through the tract along the eastern boundary of the tract. The distance between the eastern boundary and Highway 62 is minimal, being about .1 mile in distance. Along Highway 62 is a parking area commonly used by hunters. From this parking area is a horsetrail that enters the tract in the Black Walnut-Yellow Poplar stand. It is possible that this horsetrail could be widened and used as a haul road if need be.

Boundary

A major drainage acts as the main boundary for the entire eastern edge of the tract.

The western section of the northern finger of the tract is partially defined by an old fence line that is identifiable in sections where fence fragments remain in the tree. This line was followed for about half of the northern appendage leading to the corner where the boundary turns from a north/south line to an east/west line. This corner contains an old

cedar stump which had barbed wire wrapped around it and a standing stone. The stone appears smooth, which could be due to weathering, but is planted firmly in the ground and standing straight up making it believable that it is an old corner marker.

The northwestern corner is marked by a brass benchmark mounted in a cylinder of concrete put in by the Division of Forestry's surveyor ca. 1986.

Corner markers for the southwestern corner were found in the last inventory but were not found in this inventory. The difficulty in locating these markers is due to the high grass in the field which makes up the southwestern corner.

Possible Trespass

Along the western portion of the southern boundary line are systems of ATV trails. Many appear to enter state property briefly while others go straight into the property. As the southwestern corner was not located in this inventory, it was not possible to accurately determine the extent of the trespass.

Also, a house is located along the southern boundary at the location where the boundary goes from being an east/west line to one that is slightly angled south. This house appears to come right up to the line and coming from the house into the forest are clear trails that appear to be used by ATVs.

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.

Wildlife in this tract is consistent with that found in Crawford County. Evidence of deer, turkey, squirrels, chipmunks, and songbirds were found during the inventory while the tract also appears to offer the habitat desirable to species such as raccoon and opossum.

The high amount of mast producing species (oaks and hickories) promote wildlife habitat by providing food for a majority of the wildlife species.

<u>Indiana Bat</u>

As management activities are currently performed in the winter months due to voluntary adherence to Indiana bat management recommendations issued 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 those greater than 20 inches in diameter. There also remains a sufficient number of snags between 9 and 19 inches in diameter. There is an insufficient number of snags greater than 19 inches in diameter at this moment. It is possible to girdle some of the larger cull/low quality trees to increase the number of large snags to reach the required amount of live trees for the Indiana Bat.

Indiana bat habitat guidelines (entire tract, desired species only)

Category	Required	Inventory	Available for removal
Live trees			
11"+	675	3550	2875
20"+	225	429	204
Snags			
9"+	450	620	170
19"+	75	64	-11

Recreation

As previously mentioned, a horestrail runs through a section of this tract providing recreation for equestrians. The primary recreation use for this tract is likely to be by hunters, especially deer hunters.

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

The south facing slopes in the western section of this tract limits the use of heavy equipment in this area.

Near the center of this tract is a large sinkhole that has an opening about halfway up its slope. While the opening is small, it still creates a source for runoff to enter underground waterways so a buffer would need to be placed around this opening to protect subterranean water quality.

Likewise, a cave exists along the western boundary of the northern finger of the tract. This cave is a larger opening, wide enough to enter for a short distance at least. A buffer would also need to be placed around this cave to protect water quality.

Summary Tract Silvicultural Description, Prescription, and Proposed Activities

Overall

This tract overall has a diameter distribution reminiscent of a reversed J-Curve (where the diameter distribution is high among the lower diameter trees and decreases in a non-linear fashion as diameter increases) with a couple diameter classes being significantly larger. A J-Curve such as this is typical for an uneven aged stand and shows that it is progressing in a natural trend.

Black Walnut-Yellow Poplar

This stand is 6 acres and is grouped with the Mixed Hardwoods stand in the inventory data. This area was planted in black walnut and yellow poplar in the 1970s. A vine control was performed in 2004 in order to reduce the amount of grapevines competing with the trees. This stand currently has a dense shrub/understory layer and would benefit from a Timber Stand Improvement which would aim at thinning out the understory to reduce competition thus improving growth rates and quality. It would be possible to try and promote the growth of the walnuts already present in the area, but as many are small and have not grown into the ideal form, it would be more productive to aid in the progression to a mixed hardwoods stand through the proposed TSI.

Mixed Hardwoods

As the larger component in the Mixed Hardwoods stand, totaling at 29 acres, this stand will utilize the inventory data. Currently this stand contains 3,090 BF/AC of sawtimber per acre and has a basal area of 95.9 sqft per acre. Of this 1,360 BF/AC was deemed harvestable (amounting to 18.5 sqft per acre). This would leave a basal area of 77.4 sqft per acre which would be open enough to promote growth while remaining closed sufficiently to maintain the desirable tree form.

The dominant species in this stand is sugar maple followed by yellow poplar, chinkapin oak, and black walnut. Sugar maple is also the dominant regeneration in this area, though there is also a high amount of young yellow poplar, white ash, and boxelder.

Despite the lower levels of volume, this stand would benefit from a small scale harvest. A harvest would reduce the basal area which is on the verge of becoming overstocked and would also provide a chance to improve the stands overall quality.

Eastern Red Cedar

This stand is small, consisting of 2 acres, and is located in the northwestern section of the tract. Cedar is frequent in the understory in the areas outside of this stand but within this stand it is the dominant overstory tree. The stand has basically no harvestable timber, being only some white ashes which were tallied for removal as a preventative to the emerald ash borer. At the moment the best management practice for this stand would be to let it go naturally, which would likely cause it to remain a cedar stand. It is too small an area with, what appears to be low quality site, to have any management practices be economically feasible.

Oak-Hickory

The largest stand in the tract, measuring at 36 acres, this stand contains the largest amount of volume, totaling 5,720 BF/AC. Of this total, 1,640 BF/AC were deemed harvestable. The total basal area for the stand was 108.9 sqft per acre with 22 sqft per acre identified as harvestable. This would leave the stand somewhat open, but still rather denser than a thinning would typically aim for.

The understory of this stand is rather open and the regeneration that is present is primarily sugar maple. In order to promote oak regeneration, some openings should be made so that the oak, being less shade tolerant than sugar maple, would have a chance to establish itself in the understory. Single tree selection should be avoided or used minimally as the result will likely be that the sugar maple already in the understory will outcompete any oak regeneration for filling the small canopy gap that is created by this practice. The scarification created by making these openings would satisfy the seedbed requirement for the oak species, thus promoting their regeneration.

Field

This area, totaling 2 acres, is found in the southwestern corner of the stand. This area has no trees growing in it and all trees sampled were in the fringe that was between the Mixed Hardwoods stand and the field stand. Throughout the field were mowed paths that appeared to be ATV trails. According to the GPS many of these trails were on State Property, including some that went out of the field area and into the Mixed Hardwoods stand. The remainder of these trails lead to a house that was just south of the boundary line. As the corner marker was not found in this inventory, it is uncertain how much of the trails were on state property.

Silvicultural Prescription

While this stand would benefit from a thinning, it appears somewhat optimistic that it would be performed commercially due to the smaller diameter trees and low output of volume. Therefore this tract could be left to progress naturally and should be re-cruised in 5-10 years. If a buyer were found for a smaller sized harvest, then this tract could be harvested to improve the quality of the stand. A removal of the maple understory, especially in the Oak Hickory stand would aid in keeping this area from becoming dominated by sugar maple. If a timber stand improvement were to be planned, it could effectively take place either before or after a harvest.

TRACT ACCOMPLISHMENT RECORD

Compartment 18, Tract 1

DATE PLANNED	ACTIVITY / REMARKS	DATE COMPLETED
2012	Submit Request to Gain Archeological Clearance for Road	

	Work	
2013	Crop Tree Release in Black Walnut/Y.Poplar Stand	
2013	Improve/Construct Road to Gain Access to Tract	
2014	Timber Harvest	
2015-16	Post Harvest TSI	
2025	Return for Inventory	

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