

Indiana Department of Natural Resources
Division of Forestry

DRAFT
Resource Management Guide

Harrison-Crawford State Forest
Dieter Rudolph

Compartment: 18 Tract: 3
Date: July 9, 2009

Acres Commercial Forest: 163
Acres Noncommercial Forest: 11
Acres Permanent Opening: 1
Acres Other: 0

Basal Area >= 14 inches DBH: 44.53 sqft/ac
Basal Area < 14 inches DBH: 57.33 sqft/ac
Basal Area Culls: 4.64 sqft/ac
Total Basal Area: 102.9 sqft/ac

Acres Total: 175

Number Trees/Acre: 276

Species	Harvest Volume(MBF)	Leave Volume(MBF)	Total Volume(MBF)
Eastern Red Cedar	89.14	11.35	100.49
Silver Maple	28.49	44.34	72.83
White Oak	25.08	101.95	127.03
Yellow Poplar	22.68	38.76	61.44
Chinkapin Oak	21.98	42.7	64.68
Scarlet Oak	19.07	17.95	37.02
American Sycamore	13.25	43.06	56.31
Sugar Maple	12.61	42.12	54.73
Eastern Cottonwood	12.35	0	12.35
Black Oak	7.57	15.85	23.42
Pignut Hickory	6.92	24.91	31.83
White Ash	5.93	10.02	15.95
Shingle Oak	4.04	2.35	6.39
Shagbark Hickory	3.36	1.19	4.55
Blue Ash	2.74	2.38	5.12
Black Walnut	2.66	21.41	24.07
Bitternut Hickory	2.3	0	2.3
Boxelder	1.56	0	1.56
Black Cherry	0.94	0	0.94
Northern Red Oak	0	17.24	17.24
American Beech	0	8.34	8.34
Red Maple	0	4.29	4.29
Ohio Buckeye	0	1.56	1.56
Total	282.67	451.77	734.44
Total per acre	1.62	2.56	4.18

Location

This tract is located in Crawford County, Indiana. It is within sections 33 and 34 in T3S, R2E and sections 3 and 4 in T4S, R2E. 1803 lies between SR 62 and the Blue River.

General Description

This tract can be broken into 6 forested stands; Oak-Hickory (72 Acres), Bottomland Hardwoods (54 Acres), Mixed Hardwoods Steep (24 Acres), Field (11 Acres), Mixed Hardwoods (10 Acres), and Eastern Red Cedar (3 Acres). There was also a power line going through the tract which had all trees cleared from the area. The opening due to the power line was 1 acre in size.

History

The majority of this tract was obtained in 1972 from Engleman as a portion of a parcel totaling 208 acres. A single acre section in the northern part of the tract, the site of the old Hilltop Restaurant, was obtained in 1974 from Philpott. The restaurant building was demolished soon after. 30 acres in section 4 was a portion of a 90 acre purchase in 1967 from Sharp. The tail in the southwestern portion of the tract, totaling 15 acres, was obtained in 1968 from Tower Estates. The 1940 aerial photo showed that all the more level areas (flood plains or terraces) along Blue River were still open and being farmed at that time. In 1975, a black walnut progeny test (Indiana Division of Forestry genetic study) was planted in the largest area designated as old field near the southeastern part of the tract. A visit ca. 1986 indicated that this planting was not doing well (see more later). It is likely that autumn olive was planted in the old fields in the mid 1970s for wildlife food. These and some invasive control work (see below) were the only known management activities conducted in the tract to date. This inventory is the first conducted on this tract.

Landscape Context

1803 is part of a contiguous body of land owned by the State of Indiana and is completely surrounded by state land, all of which is forested. However, private property is only about ¼ mile to the west of the southwestern tip of the tract. That private land is a mixture of open grassland (hay, cattle) and single family residences. Obviously, since Blue River forms a good deal of the tract's boundary, there is a riparian corridor on the edge of tract 3. The O'bannon Woods State Park is a short distance to the south. A maintained power line r-o-w goes across the western part of the tract.

Topography, Geology, and Hydrology

The majority of this tract is comprised of a southerly facing slope which peaks along the western boundary of which the highest point is Indiana 62. Change in elevation is around 250 feet (400-650 feet above sea level). The southwestern section of this tract has rocky cliffs and steep rocky slopes. Similar steep rocky slopes occur in the northeastern section of the tract. The slope goes about halfway into the tract and is replaced by flatter land which serves as part of the Blue River's flood plain and consists mostly of bottomland hardwoods.

The Blue River acts as a major influence in the hydrology of the tract. When it floods, it likely covers a portion of the bottomland hardwoods. Likewise multiple sinkholes were found, some of which had openings, suggesting the presence of underground waterways.

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 subsoil 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

Bartle Silt Loam (BbhA)

The Bartle series consists of very deep, somewhat poorly drained soils that formed in silty alluvium and loess on stream terraces. They are moderately deep to a fragipan. Mean annual precipitation is about 43 inches, and mean annual temperature is about 54 degrees F. The surface horizon is consisted of a brown silty loam plow layer. The next 7 inches is comprised of a yellowish brown silt loam B/E complex. The next 6 inches are made up of a brownish loam silt loam with increasing clay. There are 50 inches left of the pedon which are a yellowish brown silt loam, of various different layers. The substratum starts at 55 inches below the surface.

Degree Slope: 0-4%

Site Index: 75

Growth Range Potential: 342

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

Haggatt Silt Loam (HarE2, HarD2) Silty Clay (HafC3, HafD3)

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 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%

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 24 inches 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 moderately 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

Millstone Loam (MsC2)

The Millstone series consists of very deep, well drained soils on stream terraces and flood-plain steps. They formed in loamy alluvium. Mean annual precipitation is about 43 inches, and mean annual temperature is about 54 degrees F. The surface horizon consists of a plowed A horizon. This horizon is a light yellowish brown loam. The next eight mapped horizons are argillic. These all are a strong brown loam. The profile description extends to 80 inches and does not stop at the substratum.

Degree Slope: 0-40%

Site Index: 80

Growth Range Potential: 342

Wellston Silt Loam (WhfC2, WhfD2, WhfD3)

The Wellston series consists of deep, or very deep, well drained soils formed in silty material from loess and from fine-grained sandstone or siltstone and with bedrock at depths of 40 to 72 inches. These soils have moderate permeability. The surface horizon is a silt loam which is 2 inches thick. The subsurface horizon is a silt loam about 8 inches thick. The first portion of the subsoil consists of 11 inches of a silt loam, the next portion consist of 4 inches of a silty clay loam. The last portion of the subsoil is one inch of clay. The stratum is 9 inches of loam. The bedrock which is at 45 inches from the surface is an acidic fine-grained sandstone. Mean annual precipitation is about 40 inches, and mean annual temperature is about 53 degrees F. Well drained. Runoff is medium to rapid.

Degree Slope: 0-50%

Woodland suitability group: 3o10

Site Index: 80

Growth Range potential: 342

Management Concerns: runoff and erosion

Access

Access can be gained along Indiana 62 in the northern portion of the tract. The best point of entrance would be a system of old farm trails in the north central section that go towards the southeastern section. These trails show up on the old aerial photograph from the 1940s and were areas that were once fields and lead to the portion that is now an old field coverytype in the southeastern section. These trails showed evidence of having been used by equestrians despite the fact that they are not legal horse trails. The road leading to the old iron bridge can be used to access the southern finger of the tract.

Boundary

The Blue River and Indiana 62 act as the main boundaries of the tract, the first on the south and east, the second on the north and west. Along Indiana 62 were concrete pillars marking the right-of-way for the state road. Only 3 were marked with GPS but it is likely that they run alongside Indiana 62 throughout the tract. The southern boundary not made up of the Blue River is defined by the road leading to the old iron bridge. A small section of the northern boundary is the least defined and consists of a ridge bordering tract 1804.

Trespass

At the bottom of a rock cliff near Indiana 62 was a dump site. In the site were large steel cables, various trash, and large numbers of bones, both deer and canine. While dumping will likely continue to occur in areas near major roads, it should be attempted to decrease this problem. A fence should be placed along the road to reduce dumping in this area. Illegal vehicle traffic originating from the parking lot at the iron bridge site going along Blue River upstream. In most cases, this traffic is involved with fishermen and people camping illegally.

Wildlife and Plants

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, songbirds, and raptors were found, seen, or heard during the inventory. The consistent presence of hard mast producing tree species (oaks, hickories, etc) offers a good food source for many forms of wildlife in the area. While not picked up on the inventory plots, pecan trees are known to be present, at least at the far southern end of the tract. The opening created for the power lines also acts as a benefit to wildlife by creating a fringe habitat preferable to some species.

Indiana Bat

As management activities can only be performed in the winter months due to Indiana bat regulations, 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.

This area does not meet the Indiana bat habitat guidelines due to the low presence of snags throughout the tract. There remains a large surplus of living trees in both the size categories preferred by the bat, however the snags are about half of what they need to be for both the 9"+ and 19"+ dbh trees.

Indiana bat habitat guidelines (entire tract, desired species only)			
Category	Required	Inventory	Available for removal
Live trees			
11"+	1575	6723	5148
20"+	525	951	426
Snags			
9"+	1050	572	-478
19"+	175	87	-88

Due to current adherence to the voluntary Indiana Bat guidelines offered by the USFWS, in the area all management activities would likely occur in the winter months when the bats are in the hibernaculumns. As a result of this timing, no bats would be directly harmed carrying out any prescriptions. If any activities are performed within this tract, they should aim to increase the suitability of the tract to the bat by increasing the number of snags while still retaining a sufficient amount of living trees estimated to be desired by the Indiana Bat.

Recreation

Hunters utilize the area, as could be seen by used shotgun cartridges found throughout the tract. Also, as the Blue River runs along a large portion of the tract, the area is frequented by boaters and fishermen, especially near the old iron bridge, which acts as a popular public access site.

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.

Invasive Species

Along the power line and surrounding areas were cases of Ailanthus. Until a few years ago, there was a plethora of ailanthus trees along SR 62 approaching the road to the old iron bridge. Control efforts were taken over 2 years. Unfortunately, the species was

observed to persist at this site in 2011. Follow up efforts are planned within the near future.

There is a variety of exotics found along the lane accessing the bridge. Most likely, these plants originated at this location in association with the former Hockman residence.

Autumn Olive was present in the Old Field stands but was not very dense and appears to be of low concern at the moment.

Management Limitations

The Mixed Hardwoods Steep cover type was too steep and rocky for equipment to be used on it. If a harvest were to occur, some trees could possibly be pulled up or down the slope if it appears to be cost effective, but otherwise no commercial management should occur in this cover type.

Several sinkholes were found throughout the tract, some of which were greater than ten feet deep. At the bottom of some of these sinkholes were openings that appeared to lead to underground waterways. These areas need to have a buffer placed around them limiting the use of heavy equipment in order to protect the underground water quality.

Summary Tract Silvicultural Description, Prescription, and Proposed Activities Oak-Hickory (72 Acres)

This stand is both the largest and most diverse in terms of tree species. At the moment the stand is relatively dense, having a basal area of 118.8 square feet per acre and 4,910 BF/AC. Of this, 30.4 square feet and 2,050 BF/AC are harvestable, leaving 88.4 square feet and 2,860 BF/AC. A harvest in this stand would reduce competition among the remaining trees, many of which are pole sized and small sawtimber white oak. Areas of this stand, especially those surrounding the cedar stand have a high amount of eastern red cedar of which most should be removed to promote hardwood growth.

A harvest would greatly benefit this stand by promoting the growth of the smaller white oak and other hardwoods. Eastern red cedar should be greatly reduced as well as lower quality trees, especially scarlet oak which mostly appeared to be low quality. Common understory trees such as dogwood, redbud, and sassafras were present but were in small quantities, therefore posing little problem in out-competing oak regeneration. However, a high level of young sugar maple is of concern as it threatens to move the stand towards a homogenous sugar maple stand.

Bottomland Hardwoods (54 Acres)

The Bottomland Hardwoods stand was not as dense as the Oak Hickory stand, having 89.8 square feet and 3,840 BF/AC. 20 square feet and 1,520 BF/AC were deemed harvestable leaving 69.8 square feet and 2,330 BF/AC. Most of the harvestable timber was silver maple with some chinkapin oak occurring near the border of the stands.

This stand ran along the Blue River throughout the tract. Due to the proximity of the waterway, this stand needs to be managed more carefully in terms of best management practices. The trees that were in the stand were large trees that were more widely spaced than the other stands in the tract. The crowns of these trees were larger, creating a closed canopy despite the wide spacing. The understory had very little tree regeneration in it. If a harvest were to go through a portion of the stand (parts to be harvested dependent on the best management practices) some of the larger trees could be removed which would create large canopy gaps which in turn will aid in creating a regeneration and understory layer for the stand.

Mixed Hardwoods Steep (24 Acres)

This stand is in two different sections. One part is along the southwestern boundary while the other is along the northeastern boundary. The section along the northeastern boundary has had a large amount of recent blowdown and broken tops. Upon falling, other surrounding trees were damaged and appear to be in bad health. This occurrence could improve bat habitat by creating multiple snags for the Indiana Bat.

No management activity is recommended at this time in this stand due to both areas being too steep for the use of heavy equipment. There were some individual trees that might be large enough to skid up the hill if near enough the top, but this is on an individual tree basis.

Old Field (11 Acres)

There are two areas that are labeled as old field type (although most of the 'bottomland hardwoods' area was once fields), one being a small section near the road leading to the old iron bridge and the other, which is significantly larger, at the southeast corner. The iron bridge section is mostly shrubs and raspberry with few trees. Due to its small size, no management should be done here in the near future.

The southeastern field was planted in black walnut for a genetic progeny test in 1975. The project was abandoned and the area was left to grow on its own. At this moment the stand consists mainly of small, low quality black walnut and yellow poplar of varying degrees of quality and size. There is a dense shrub/understory layer in this field limiting the regeneration of tree species and should be thinned. There also is a presence of autumn olive in the area which should be removed and treated with herbicide when the thinning occurs.

Mixed Hardwoods (10 Acres)

This stand was relatively dense at 102.8 square feet and 5,930 BF/AC. Most of this was comprised of yellow poplar, sugar maple, and chinkapin oak. Of this, 15 square feet and 1,240 BF/AC was designated as harvest and 87.8 square feet and 4,690 BF/AC as leave. If a harvest were to occur in the Oak-Hickory stand, then this stand should be included. More sugar maple and yellow poplar could be removed than indicated in the inventory to

thin the stand more, but the chinkapin oak should be left alone in order to increase the amount of bat species and the more desirable lumber species.

Eastern Red Cedar (3 Acres)

While this stand was small, the areas around it had a large component of eastern red cedar in the understory. In order to increase the growth of hardwood species, all eastern red cedar should be removed from this stand as well as the surrounding areas, resulting in 8,040 BF/AC being removed. The resulting basal area would be 35.6 square feet per acre and should allow the northern red oak and white oak found in the stand to establish themselves in the overstory and the oaks in the surrounding area to move into this stands area.

This harvest should occur separate from the harvests proposed for the Oak-Hickory and Mixed Hardwood stands as cedar trees are sent to a different mill than hardwoods. As the Oak-Hickory surrounding this stand is more valuable and easier to access, its harvest should occur first to reduce the damage to hardwood trees in the harvesting process and removal.

TRACT ACCOMPLISHMENT RECORD
Compartment 18, Tract 3

DATE PLANNED	ACTIVITY / REMARKS	DATE COMPLETED
2012	Continue Treatment of Ailanthus	
2015	Submit Archeological Clearance Request for Road Improvement/Yard/Timber Harvest	
2015	Revisit Ailanthus Treatment Areas	
2015	Plan Harvest. Consult DoNP, TNC	
2015	Perform Road Improvement Work	
2016	Timber Harvest	

2017-18	Post Harvest TSI-Include Autumn Olive Control	
2038	Re-enter Tract for Management Planning	

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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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