Indiana Department of Natural Resources - Division of Forestry

Resource Management Guide

Harrison-Crawford State Forest **Compartment: 17 Tract: 2**
Dieter Rudolph **Date: July 6, 2010**

Acres Commercial Forest: 100
Acres Noncommercial Forest: 0
Acres Permanent Opening: 0
Acres Other: 0

Acres Total: 155

Basal Area >= 14 inches DBH: 60.42 sqft/ac
Basal Area < 14 inches DBH: 58.35 sqft/ac
Basal Area Culls: 3.04 sqft/ac
Total Basal Area: 118.77 sqft/ac

Number Trees/Acre: 265

Species	Harvest Volume(MBF)	Leave Volume(MBF)	Total Volume(MBF)
White Oak	107.86	213.73	321.59
Black Oak	34.08	34.3	68.38
Yellow Poplar	13.35	35.92	49.27
Scarlet Oak	21.16	9.11	30.27
Virginia Pine	20.09	8.32	28.41
Eastern Red Cedar	13.2	10.72	23.92
Pignut Hickory	4.73	12.71	17.44
Chinkapin Oak	6.33	2.94	9.27
Sugar Maple	2.64	5.47	8.11
Shagbark Hickory	0	5.96	5.96
American Beech	3.39	1.38	4.77
Northern Red Oak	0.89	3.55	4.44
White Ash	0	3.57	3.57
Persimmon	0	1.98	1.98
Post Oak	0	1.05	1.05
Sassafras	0	1.05	1.05
Bitternut Hickory	0	0.89	0.89
Blackgum	0.89	0	0.89
Total Volume	228.61	352.65	581.26
Total Volume per Acre	2.29	3.53	5.81

Location

This 155 acre tract is located in Crawford County, Indiana. It is in sections, 28, 29 and 32 T3S R2E,

General Description

This tract is located 1.3 miles from SR 62. A firelane that comes off of SR 62 runs along the eastern boundary of the tract. The eastern portion of the tract is on top of a ridge which descends into lower lands that were once fields. There are multiple drainages running down from the ridge top that form the northern and southern boundaries of the tract.

Within the tract were three major stands as well as a small area of mixed hardwoods (3 acres). The largest stand was the Oak Hickory stand (58 acres) which took up the central and eastern portion of the tract. This stand was predominantly white oak with other oak-hickory and mixed hardwoods species also present in smaller amounts. The other two stands were the Old Field stand (28 acres) and the Virginia Pine stand (11 acres). These two stands are located in the western third of the tract in an area that was a large field based on the 1940s aerial photo. The pine stand was likely planted when the land was converted from field to forest around 50 years ago. At the moment there are large areas of blowdown throughout the pine stand. The Old Field stand is mainly comprised of yellow poplar and eastern red cedar followed by various oak species. Also present in smaller quantities were multiple hardwood species associated with old fields and mixed hardwood forests. The Mixed Hardwoods stand was located in the center of the tract in a large sinkhole. No inventory points were in this area but the stand mostly contained American beech, yellow poplar, and maple species.

History

This tract of land was obtained in three separate purchases. The area in section 29 and the western half of the area in section 32 was obtained in 1940 from Allen as a part of a 120 acre purchase. The eastern half of the tract in section 32 was obtained in 1940 from Cole as a part of a 40 acre purchase. The portion of the tract in section 28 was obtained in 1951 from Sharp as part of an 80 acre purchase.

As can be seen in the 1940 aerial photo, the western third of the tract was used as a field. A few areas throughout the field were severely eroded to bare mineral soil and/or rocks. There is a sudden change in the stand types from field to deciduous forest shown in the old photo which is likely due to the area being owned by two different families. No historical features were found, though it is possible some exist based on those found in the neighboring tract to the north and the fact that a portion of the stand was used as a field in the past.

A TSI was performed in this tract in 2000. At this time, evidence of this TSI remains in the form of standing snags with evidence of having been girdled.

Landscape Context

1702 is part of a contiguous body of land owned by the State of Indiana. Private property neighbors this tract along the western boundary. The neighboring privately owned land is mostly forested but also has a house in the proximity as well as a long driveway. Mulzer Stone quarry is less than 1 mile to the north. The town of Leavenworth is about 2 miles to the south.

Topography, Geology, and Hydrology

The eastern portion of the tract is the top of a ridge with a drainage along the northern and southern boundaries. This slope then moves down into the flatter land that was historically a field. The slopes were more severe near the drainages but gradual in the center of the tract.

There was a large sinkhole in the center of the tract visible from the topographical maps. This sinkhole housed a mixed hardwoods forest type while the surrounding area was oak hickory. Within the sinkhole was an opening which was not passable, but suggested underground water activity. In the north central section of the tract was a series of openings into an underground waterway which opened into a spring adding to the northern drainage. A couple of large sinkholes (though smaller than the central one) were also located in the western portion of the tract.

Soils

Adyeville Very Fine Sandy Loam (AbqE2, AciE)

The Adyeville series consists of moderately deep, somewhat excessively drained soils. Surface Horizon is 9 inches thick. The subsurface horizon then grades into 8 inches of silt loam then with the remaining 60 inches turns into a loam texture type soil. The bedrock consists of moderately cemented sandstone with some siltstone, and shale. The permeability is moderately rapid. The mean annual precipitation is about 43 inches and the mean annual temperature is about 54 degrees F.
Degree Slope: 8-60%
Woodland suitability group: 3o10
Site Index: 70
Growth Range potential: 200
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 Loam (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%
Woodland suitability group: 1o1
Site Index: 68
Growth Range potential: 300
Management Concerns: runoff and erosion

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 a clay. The stratum is 9 inches of loam. The bedrock which is at 45 inches form the surface is an acid 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

A logging road/firelane/disabled hunters trail off of SR 62 borders the eastern boundary of the tract. This firelane is in good condition but tends to get muddy and difficult to travel when wet.

Boundary

The eastern boundary of this tract is defined by the top of the ridge with the firelane on it while the northern and southern boundaries are marked by drainages. The western boundary is shared with private property in a straight north/south line. This boundary is marked by an old fence line and metal t-posts. These markings appear to be fairly accurate along the western boundary.

Wildlife and Plant Communities

The Natural Heritage Database Review shows no rare, threatened, or endangered species within the tract. The Leavenworth Barrens to the south of 1703, to the south of this tract, housed a large number of plant species of special concern due to it being a nature preserve. Nonetheless, no actions within this tract should affect the barrens.

Nearly all of the wildlife goals were met for this stand. Only one goal was not met, that being snags with a diameter of 19"+ with a deficit of 39 trees. The optimal goals were for all classes except the one which did not pass the maintenance goals. During the prescribed management activity, larger trees of poor quality should be girdled in order to increase the amount of large snags within the tract. Overall, this tract proves to be a good one for the local wildlife species.

The wildlife that was noted during the inventory was typical with other areas in Crawford County. Evidence of deer, turkey, coyotes, squirrels, raccoons, and various birds were noted during the inventory. The vast difference between the stands creates a large range of habitat for the local wildlife. The presence of the pine stand helps to create a thermal cover for the colder months. Meanwhile, the difference between the ages of the forest in the Old Field and Oak Hickory stands creates a diverse habitat for the wildlife.

Wildlife Habitat Feature (Tract Wide)

Category	Maintenance level	Optimal Level	Inventory	Available Above maintenance	Available Above Optimal
Legacy Trees *					
11"+	900		5207	4307	
20"+	300		795	495	
Snags (all species)					
5"+	400	700	2608	2208	1908
9"+	300	600	775	475	175
19"+	50	100	11	-39	-89
Cavity Trees (all species)					
7"+	400	600	825	425	225
11"+	300	400	769	469	369
19"+	50	100	320	270	220

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

Indiana Bat

As management activities can currently 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 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 tract meets all optimal requirements for the Indiana bat except for snags with a diameter of 19"+ (this size class also does not meet maintenance level requirements). As the tract is in the region of Wyandotte Cave, a major hibernaculum, the tracts appeal for Indiana bat is increased.

Recreation

This area is most commonly used by hunters due to the proximity of the firelane/disabled hunters trail. The firelane also doubles as a horse trail but simply borders the tract, but does not goes through it.

Cultural

A large amount of this tract and the tracts to the north and south were utilized as fields in the past. No historical sites were found during the inventory within this tract but it remains possible that, due to the use of the stand in the past, cultural sites can be found upon closer inspection.

Summary Tract Silvicultural Description, Prescription, and Proposed Activities

This tract was last inventoried in September of 1984. The management guide from 1984 showed a total volume of 4,300 bf/ac present within this tract with white oak being the most dominant species by a large margin. The present inventoried also showed white oak as being the most dominant and had a total volume of 5,812 bf/ac. There were 26 full growing seasons between these two guides which show an increase of 58 bf/ac per growing season within this tract with most of that growth being in white oak. While white oak prospered over the years, black oak has decreased in volume which suggests the black oaks present in the stand are over mature and will be losing volume as time progresses.

<u>Oak Hickory (58 acres)</u>

The Oak Hickory stand is the largest and the oldest stand within the tract. While the other two stands were field, this stand was a hardwood forest, likely comprised of oaks as it is today. At the moment there are 117 sqft/ac and 6,760 bf/ac within the stand. Roughly two thirds of the volume was from white oak as well as half of the basal area. The higher basal area suggests a harvest should occur which, based on the inventory, would be roughly 2,770 bf/ac and 45.5 sqft/ac leaving 4,000 bf/ac and 71.5 sqft/ac.

The neighboring stands to the north and south, 1701 and 1703, are like this tract in that, half of each was a field, possibly under the same previous ownership as this tract. Many of the trees within this tract were of good quality and form. The similarity between these

three tracts suggests that these three tracts be managed together. By removing a portion of the trees within this stand, the remaining trees would prosper from reduced competition, allowing for quicker growth and better form. Trees of lower quality or less desirable form should be removed to reduce competition. A majority of the black oaks should also be removed before they become over mature, a common occurrence with the species. Focus should also be given to the smaller sawtimber and the pole size white oaks which will move into the dominant position in the overstory after the harvest. Trees that are of larger size but too low of quality for the mills should be girdled to increase the number of snags for the area in order to meet Indiana bat regulations.

Old Field (28 acres)

The Old Field stand is found in the western third of the tract. The stand follows the common trend of old field cover types, mainly high diversity of tree species with the more dominant being pioneer species or those planted after the field was abandoned (commonly pine and cedar). The most prominent tree in terms of basal area and volume was yellow poplar. The overall volume of this stand was 3,827 bf/ac with a basal area of 122 sqft/ac. This high basal area with a low volume further shows the younger age of the stand in comparison to the Oak Hickory stand. In order to promote growth, this stand needs to be thinned with the goals of reducing competition to increase growth rate and form. A thinning will also control the species that remain in the stand with the goal of mimicking the Oak Hickory stand as that was likely what the land was like pre-settlement. The thinning would likely be pre-commercial if done before the proposed harvest for the Oak Hickory stand. If performed at the same time as the Oak Hickory stand, it is likely that a majority of this stand could be included in the harvest in order to utilize some of the volume that is present in the Old Field stand with a timber stand improvement following the harvest to take out any of the removable trees not taken during the harvest.

Like the Oak Hickory stand, this stand was similar to the Old Field stands of tracts 1701 and 1703. Due to this similarity, these stands should be harvested/ thinned together in order to keep them on the same tract to reaching maturity.

Virginia Pine (11 acres)

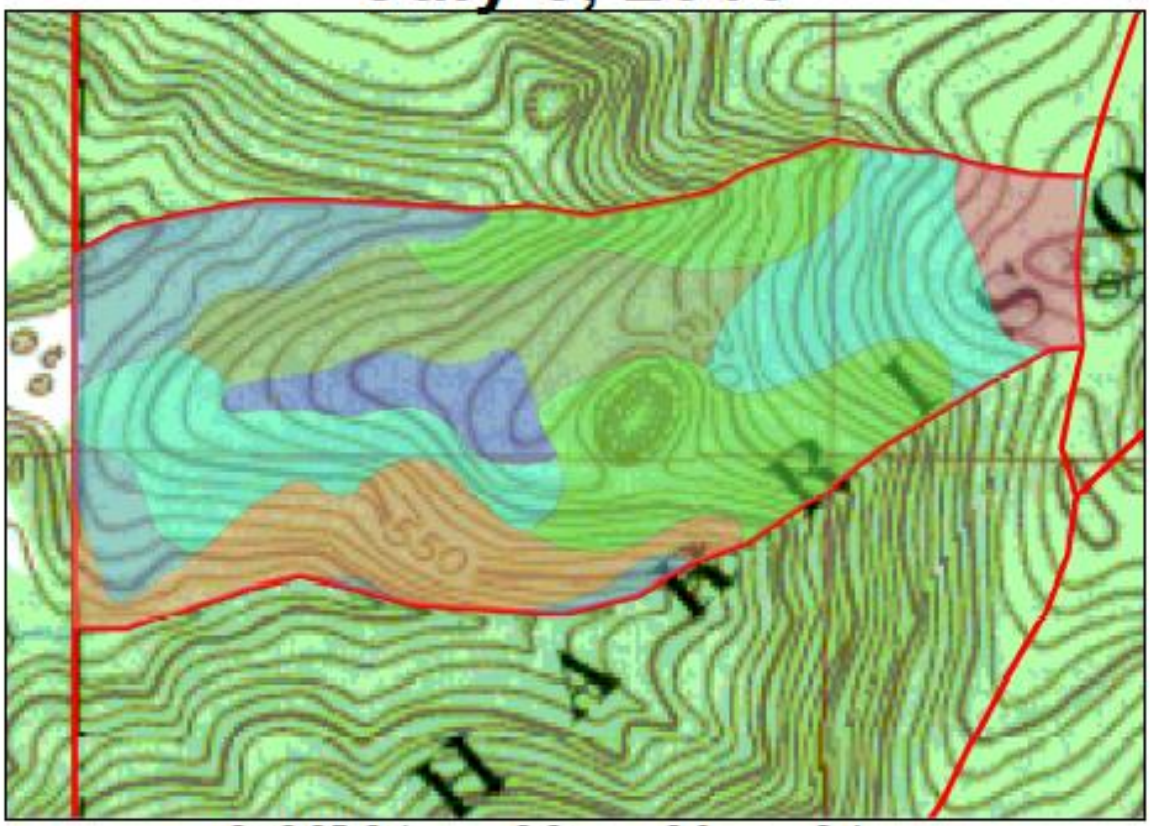
This stand was of a relatively small size and almost completely pine. The pine in this stand is mostly near the cut off between pole and sawtimber sized timber. There was also a large amount of blow down within the stand. A common tendency with pine is that when blow down begins in a stand, it typically continues at a higher rate. This trend is due to the low wind resistance each individual pine tree has and the fact that the canopy gaps create an area for the wind to catch on the pine's crown and push it over. The result in continual blow down in this stand would be that the stand becomes difficult to travel in and much of the volume would be wasted. A harvest in this stand would remove the volume before it falls and begins to decay while also removing the hindrance of logs across the ground. By clearing up the ground layer of fallen logs, hardwood species have more area to grow, thus increasing the rate of change to a hardwood forest.

If a harvest cannot be performed in this stand, it will still move towards a hardwood stand, but at a slower pace. The tendency for the pines to suffer from blow down would remove the pine from the overstory and create gaps in the canopy for the hardwoods to move into. Thos hardwoods already present would prosper and begin to dominate the stand as much of the pine goes to ground over the next several years.

To submit a comment on this document, click on the following link:
http://www.in.gov/surveytool/public/survey.php?name=dnr_forestry

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.

Harrison Crawford State Forest
Compartment 17 Tract 2
July 6, 2010



Legend

- AbqE2
- AgrB
- AgrC2
- CqyG
- HafD3
- WhfD2
- WhfD3

Harrison Crawford State Forest
Compartment 17 Tract 2
July 6, 2010