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: 134
Acres Noncommercial Forest: 0
Acres Permanent Opening: 3
Acres Other: 0

Acres Total: 137

Basal Area >= 14 inches DBH: 33.36 sqft/ac
Basal Area < 14 inches DBH: 76.69 sqft/ac
Basal Area Culls: 5.36 sqft/ac
Total Basal Area: 109.82sqft/ac

Number Trees/Acre: 303

Species	Harvest Volume(MBF)	Leave Volume(MBF)	Total Volume(MBF)
Eastern Red Cedar	122.03	25.23	147.26
Eastern White Pine	77.12	98.29	175.41
Virginia Pine	16.41	5.04	21.45
Sugar Maple	13.11	9.6	22.71
Scarlet Oak	8.64	15.11	23.75
Black Oak	7.88	4.12	12
Yellow Poplar	6	36.23	42.23
American beech	5.88	0	5.88
Chinkapin Oak	5.75	25.45	31.2
White Ash	5.48	17.58	23.06
American Sycamore	4.17	3.71	7.88
Post Oak	3.94	1.03	4.97
Pignut Hickory	1.53	18.14	19.67
Black Cherry	1.03	1.35	2.38
Sassafras	1.03	0	1.03
White Oak	0	17.18	17.18
Shagbark Hickory	0	16.72	16.72
Blue Ash	0	9.08	9.08
Chestnut Oak	0	2.9	2.9
Ohio Buckeye	0	1.87	1.87
Bitternut Hickory	0	1.43	1.43
Total	280	310.06	590.06
Total per acre	2.04	2.2	4.24

Location

This tract is located in Harrison County, Indiana. It is mainly in sections 34 and 35, R2E T3S. The tract is the southern ‘half’ of Greenbrier knob.

History

A majority of this tract was heavily high graded (1986) and about 10 years prior to that before coming into the possession of the state. The trees are still showing signs of this act, causing the low number of large legacy trees present. Before the land was obtained by the state, a family was living in a log cabin on this property. A previous landowner left a 10 acre parcel to this family prior to turning the rest of the land over to the state. There is no evidence as to where the private property begins, all mapped documents showing this land are an estimate. That land owner sold the land to The Nature Conservancy, who in turn sold it to the State. Primary motivations for purchase were consolidation of the existing state property around this large parcel and the protection of some plant species within that ownership. A few years after acquisition (1999), the access road through this property was repaired and somewhat improved with the long range intention to use it to provide reliable management access to this and other property in that area of the State Forest. Ca. 2006-07, efforts to control the Ailanthus (tree of heaven) presence were undertaken. The 1940 aerial photo shows most of the more gently sloping ground at the southern edge of the tract, as well as some of the top of the ridge to be open farm ground.

General Description

This tract is a southerly facing slope with large rock outcroppings in areas. It is the southern portion of Greenbriar Knob and borders the Blue River for a small section on the west side. The current forested stands exhibit the after effects of severe high-grading (stocking and quality concerns). The majority of this tract is a Mixed Hardwoods stand, totaling 96 acres. Parts of the slope are steep and rocky. A white pine plantation exists along the eastern half of the southern border totaling 17 acres. The plantation continues into the tract to the south. The remaining stands were all found in small areas, the Oak Hickory stand was in two small pockets and three minor pockets totaling 10 acres while the Cedar stand was 3 pockets totaling 5 acres. A small area of Virginia pine was in the southwestern section of the tract at 5 acres. There were also two small fields that totaled 3 acres. One of the fields continued into the parcel of private property within the tract. There were also three areas with a thick matt of Ailanthus, each along the top of the knob.

Landscape Context

1911 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 within this tract. The surrounding land is forested, mainly deciduous, with the continuation of the white pine stand along the southern edge. A section of the western boundary is defined by the Blue River while the northern boundary is defined by the top of the knob. A moderate size area of private property is located just to the north, across Blue River. This private land is made up of a mixture of forested ground and some open grasslands, with a single family residence and buildings owned by absentee owners. The state owned Stage Stop campground is a short distance to the northeast and across Blue River.

Topography, Geology, and Hydrology

This tract is a south facing slope with small areas of rocky outcrops. There is a large elevation change from the northern boundary (the top of Greenbrier Knob) and the southern boundary (822-410 feet above sea level). Some of these slopes are steep and rocky.

The Blue River acts as the watershed for this tract.

Much of the underlying bedrock is limestone, with a sandstone 'cap' above that. The limestone presence is very noticeable, as much of it is found on the surface in the tract. There is also evidence of karst activity in the tract. Greenbrier Knob was found in the tract to the north as well as Turkey Run Cave in the tract to the west. A spring was found coming out of a rock face along the slopes in the private property inholding.

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

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

Gullied Land (Gu) On uplands in areas that are mostly 3-15 acres in size but in places are as large as 40 acres. Underlain at a depth of 2-6 feet by bedrock of limestone, shale, or sandstone. Bedrock is exposed in the bottoms of gullies in many places. Most of the land is barren, but in places shrubs, weeds, and wild grasses are growing.
Woodland Suitability Group: 4r3
Site Index: 72-85
Growth range potential (Shortleaf and Virginia pine): 100-300 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

Wellston Silt Loam (WeC2, WeC3, WeD2, WeD3) Moderately deep and deep, moderately sloping and strongly sloping, well draineds soils on uplands. Surface layer is about 9 inches thick and yellowish-brown. The subsoil is about 31 inches thick. Depth to hard sandstone bedrock is about 40 inches. Moderate in content of organic matter and low in natural fertility. Available water capacity is moderate or high, and permeability is moderate. Runoff ranges from medium to very rapid.
Degree Slope: 6-18 %
Woodland Suitability Group: 3o10
Site Index: 70-80 (Upland oaks)
Growth range potential (Upland oaks): 185-260 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 is accessible through the firelane that enters the woods just west of the Fire Tower and goes around the peak of Greenbrier Knob on the east. Currently, this is probably the best access. There is also the remnant of an old firelane or skid trail that parts from the main firelane and goes along the top of the knob that can be repaired and utilized. Another avenue is the firelane that is just west of the intersection of SR462 and Old Forest Rd. Either way, the lane once into the tract, should be further improved and protected to provide reliable management access through most of the year.

Multiple old road beds are located throughout the tract that could aid in access. The old road that heads north from the firelane to the top of the knob is gullied beyond repair. Likewise, a section of the old road that heads north from the white pine plantation is rocky and would have limited use. This limitation occurs where the path begins the steep ascent. The other road beds were clear and reasonably repairable.

Boundary

The northern boundary is defined by the top of Greenbrier Knob. The western boundary is partially marked by the Blue River, and the other part is where the south facing slope begins to transition to a west facing slope. The southern boundary goes around the slope of a smaller hill in the western half and by a ridge in the eastern half. A probable corner marker was found at an old section corner interior to the tract boundary in the northwest. From this post ran an old fence line to the north, likely representing an old property line.

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.

The presence of cavity trees in the tract is above the optimal level for the 7"+ and 11"+ size classes and above the maintenance level for the 19"+ size class. The tract does meet the minimum requirement for snags for the 5"+ and 9"+ size classes but not the 19"+ size class. Furthermore, there are an insufficient number of large legacy trees within this tract but a surplus of 11"+ legacy trees.

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 areas of the tract that border the flat fields to the south, 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"+	1233		4545	3312	
20"+	411		229	-182	
Snags (all species)					
5"+	548	959	2714	2166	1755
9"+	411	822	733	322	-89
19"+	68.5	137	48	-21	-89
Cavity Trees (all species)					
7"+	548	822	2555	2007	1733
11"+	411	548	1200	789	652

19"+	68.5	137	96	27	-41

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

Indiana Bat

As management activities are currently only performed in the winter months due to voluntary adherence to the Indiana bat seasonal guidelines suggested 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. Likewise, there is an adequate amount of snags in the 5"+ and 9"+ size class. There are not enough snags in the 19"+ size class to meet the Indiana bat requirements.

Due to not being able to meet the maintenance level in most of the categories listed above, this tract does not offer a quality habitat to the Indiana bat. Snags cannot be created from the large legacy trees in this tract due to their numbers being below the maintenance level. At this time there is no way to increase habitat quality for the Indiana bat other than encouraging growth in the stands.

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.

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

Ailanthus was marked as being a problem in this tract. There were areas that young Ailanthus was thick, forming a matt over the forest floor. These areas were delineated with GPS and were mostly found on the peak of Greenbrier Knob. These pockets had been treated in the past and the overstory trees have mostly died, but it needs to be treated again to eradicate the Ailanthus regeneration. Also, throughout the tract were areas with a few Ailanthus sprouts but not as dire as the three marked pockets.

Management Limitations

Most soil types in this tract have a management concern of runoff and erosion. In order to limit these problems, any management activities on the slopes need to be sure to leave downed dead wood and trees to hold the soil in place.

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 few trees above 21" in diameter. The type of distribution allows for multiple diameter classes while allowing the young trees the opportunity to succeed into dominance.

Mixed Hardwoods (96 acres)

This stand takes up most of this tract and had a high diversity of tree species. This stand has a basal area of 100.3 sqft/ac and a volume of 2,950 bf/ac. Of this, 1,450 bf/ac (26.8 sqft/ac) was deemed harvestable leaving 1,500 bf/ac (73.5 sqft/ac). The tree with the highest volume of all species was e. red cedar. The tree with the highest basal area was sugar maple being nearly triple that of any other species.

As this tract is a south facing rocky slope that had been severely high graded before transferred to state ownership, the trees are smaller and of poor quality. The northern half was the rockier and steeper part of the tract, making it have lower potential. The volume described above makes a harvest economically impractical at this time. The tract could be thinned in order to promote the desirable species with better growth potential. However, due to the potential of a south facing rocky slope, the time involved in performing this prescription might be better spent in another area.

White Pine Plantation (17 acres)

This plantation continues into the tract to the south. The trees in this stand were larger in size and height than the rest of the tract. The total volume for this stand was 10,760 bf/ac and 143.2 sqft/ac. The plantation had a high amount of blowdown 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 (4,960 bf/ac) and 56sqft/ac. This action would leave 87.2 sqft/ac and 5,800 bf/ac. 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.

Cedar (5 acres)

The Cedar stand was small with 6,060 bf/ac and 128.5 sqft/ac. Of this, 4,460 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. However, as described in the Mixed Hardwoods stand, this stand's current trees have lower potential for productivity.

Virginia Pine (10 acre)
This tract was another small stand with a low amount of volume. In total, there was 2,170 bf/ac and 100 sqft/ac. The prescription for this tract is similar to the Cedar stand. The area of the tract is small, making it have little overall influence on the tract.

Oak Hickory (10 acres)
This stand was broken up into a couple small pockets throughout the stand. There were 4,680 bf/ac within the stand and 125.6 sqft/ac. Eastern red cedar was the most prevalent species in this stand, and made up almost all of the harvest volume (2,560 bf/ac). The high amount of cedar is likely due to the poorer quality slopes with limestone outcrops. Thinning the cedar would promote the growth of hardwoods; however, as described earlier, the site itself does not have high potential. It is likely that hardwoods will eventually take over, but these will be of low quality.

Overall prescription
Due to the low site quality, it is recommended that this tract (excluding the white pine plantation) should have no action occur on it in the near future. The area does not offer much potential for looking at the area with the intentions of timber harvesting, but could act as an area for wildlife. There are components of the tract preferable to the local wildlife such as the proximity of the Blue River, small fields and areas of fringe, food sources from mast, and thermal cover in the form of the pines and cedar. Also, the trees, being left to grow, will eventually grow into the size classes desired by the Indiana bat making the area suitable for the endangered species.

The white pine plantation, however, should be thinned. After thinning this stand, the area should be re-visited to decide on a time for the final harvest to occur. When the pine plantation is re-assessed, the rest of the tract should be inventoried to monitor its progression towards an area suitable for wildlife and to decide if any active management practices could aid in reaching this goal.

TRACT ACCOMPLISHMENT RECORD
Compartment 19, Tract 11

DATE PLANNED	ACTIVITY / REMARKS	DATE COMPLETED
2012	Perform follow up ailanthus control along with C19T2	
2015	Establish property boundary around inholding	
2015	White pine harvest	
2030	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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