

**Indiana Department of Natural Resources
Division of Forestry
DRAFT
RESOURCE MANAGEMENT GUIDE**

State Forest: **Harrison-Crawford** Compartment **14** Tract **2**

Forester: **Dwayne Sieg, Property Manager**

Date: **Inventory August 2016; Plan September 2016**

Management Cycle End Year **2032** Management Cycle Length **16 years**

Location

This tract is located in Jennings Township, Crawford County, Indiana. It lies within the eastern edge of Section 20, the western edge of Section 21, and in the NE ¼, NE ¼, Section 29, T3S, R2E. Tract 2 is about 2.3 miles SE of Carefree and about 2.6 miles NE of Leavenworth.

General Description

The tract contains around 114.8 acres. Tract 2 consists of a mosaic of stands, stand ages and stand conditions. The largest cover type would be considered oak hickory (62.7 acres), followed by eastern redcedar and/or cedar well on its way transitioning to hardwoods (40.5 acres). A third cover type was labeled as mixed hardwoods (11.6 acres). Overall, the tract would be described as mostly sawtimber in size. Timber quality varies considerably. At least 50% of the tract area had once been fields and have since completely reforested, with the exception of a powerline r-o-w going across the southern part of the tract. Some areas of the tract show decline from over maturity (esp. black oak) and drought (yellow poplar). An estimated 35 white ash sawtimber trees are on the tract, containing around 8,200 bd.ft. These ash trees had yet to show the effects of emerald ash borer, although that pest is either there or near at this time.

History

Tract 2 is made up of parts of 2 acquisitions. The eastern part (from Henry Mock, Crawford Co. Commissioner, in 1940, following a legal action. The western portion was purchased from Levi and Anna Morrison in 1966. The tract shows evidence of a history of farming over much of the area, particularly on the ridge tops and elsewhere in the southern 2/3 of the tract. The early aerial photos show the more level ground open and was probably tilled. The 26 years difference between these acquisitions is evident by the greater size of the trees in the old field areas of the earlier purchase (longer since farming abandonment). Much of the more gently sloping ground adjacent appears to have been semi wooded pasture. Those areas that had remained in forest cover or partially open pastureland during private ownership still show lingering effects of past high grading and/or pasturing effects, such as lower quality trees, lower stocking, or wolf trees. The first documented management, found to date, was a tract level inventory and plan done in 1973. Another inventory and plan were written in 1999. Subsequently, a harvest was conducted in 2000, which removed an estimated 72,276 bd.ft. in 327 trees. Black oak made up 44% of the volume and 40% of the trees harvested.

Landscape Context

Within a 2.5 mile radius around this tract, it is estimated that about 80% of the landscape is forested. The majority of this forestland is owned by the Indiana Division of Forestry (Harrison-

Crawford State Forest), the remainder in private ownership. All of the Leavenworth Barrens Nature Preserve lies within this radius, as does the Mulzer Tower Quarry (limestone) property. Around 3.8 miles of the Blue River runs through this 'zone'. Close to 5 miles of the I-64 corridor, along with the Carefree interchange lies within 2.5 miles of the tract. Single family residences and farms make up the majority of the non-state forest ground within this nearby region. This private property segment has seen a change over the past few decades from single family farms to either diminished farming properties to small housing developments and small residential lots. This trend is likely to continue.

Topography, Geology and Hydrology

The topography of tract 2 contains a couple of ridgelines with gently sloping terrain. Compared to the entirety of the State Forest, the slopes are less steep and shorter. Change in elevation within the tract is around 180 feet. The primary aspect is westerly. This tract is underlain by limestone. There were a few sinkholes observed during the field inventory. The tract is in the Dry Run creek watershed. Dry Run is at the base of the slope and across the county road for about 2/3 of the tract's western boundary. The watershed eventually drains into the Blue River, approximately 5-6 miles downstream.

Soils

This tract has a grouping of upland soils typical of the local area. With westerly aspects predominating, most of the sites tend to be moderately dry on most slopes. For those sites with a more northerly aspect, available soil moisture increases. Evidence of farming caused erosion exists in or along the edges of the old field sites, where sloping increased. The gullies from past erosion are most noticeable along the western edge of the tract on the gentle north facing slope, but also exist elsewhere in the old field areas. Past farming, especially in the southern part of the tract, had degraded those soils noticeably. With forest cover and time, these soils have stabilized and are showing signs of recovery. Refer to the Attachment section for soils descriptions.

Access

Direct access to this tract is very easy, since most of the boundary length is formed by 3 county roads. Dry Run road runs along the western side. Access from the east is via Scott Hill road which forms the northern boundary and intersects with the beginning of Becker road that adjoins the tract along the eastern perimeter.

Boundary

As described, county roads form most of the tract's boundary. The southern end and a small part of the northern tip of the tract are bounded by segments of legal land subdivision. All of this southern part has partially standing or old fence fragments along the boundary. The E-W line at the very southern end had a survey done by the neighbor some years ago. He installed steel t-posts and has painted them yellow. There is a sandstone cornerstone at that SE corner. D.K. Lynch surveyed the N-S line at the SW boundary of the property in the past year. Only vinyl flagging was left from their work on the line, but pins were installed at the tract's SW corner and about 1,044 feet north. That surveyor flagged a sandstone as the cornerstone at the common corner of the 4 sections involved with this tract. The adjoining landowner (Mulzer Quarry) to the west had surveyed and marked their adjoining boundary some years ago and installed orange carsonite posts along those line segments. The boundary evidence was gps'd and entered into the property GIS and in the property Boundary notebook. There is a legal discrepancy that shows a conflict of ownership between the state and Mulzer quarry. Their deed shows 5 acres belonging to them along the western side of the tract. The state deed does not mention the

supposed inholding. Investigation to compare the deeds and determine rightful ownership was initiated, but yet to be completed at this time. The legal status of the powerline r-o-w was investigated. Duke Energy holds an easement (1954) from before state acquisition of the affected property.

Wildlife

This tract represents typical oak hickory habitat, in addition to components of mixed hardwoods and old field successional habitat, with cedar and smaller hardwoods. Consequently, the tract likely receives use from a typical assemblage of common game and nongame wildlife species such as white-tailed deer, wild turkey, squirrels, songbirds, snakes, box turtles, and others. Hard mast food sources are provided by the abundant oaks and hickories in the tract. Another important habitat component would come from the old field cedar stands.

The DoF has developed compartment level guidelines for two important wildlife structural habitat features: Forest Snag Density, Preferred Live Roost Trees. Current assessments indicate a lower occurrence of snags or cavity trees than preferred. Mortality was comparatively light for this tract, though present. It is important to note that these are compartment level guidelines and that even though the estimated tract data shows a deficiency for a particular target level; it is likely that suitable levels are present for this habitat feature in the surrounding landscape. The prescribed management will maintain or enhance the relative abundance of these features. A possible way to provide more snags in this tract would be to perform post-harvest TSI and deaden cull or undesirable trees in all diameter ranges.

Communities

A Natural Heritage Database review was completed for this tract. If Rare, Threatened or Endangered (RTE) 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.

Tract 2 has a concerning amount of autumn olive within it. While this exotic species is most common in the old field site along the eastern boundary, it can be found scattered throughout the tract and County. It is uncertain as to where the source for the local invasion originated, but it may be coming from neighboring property.

Recreation

There are no developed recreation facilities, including trails, in this tract. The primary recreational use would be hunting. An empty deer food bag was found in the interior of the tract.

Cultural

This tract was reviewed for cultural sites during the forest resource inventory. Cultural resources may be present on this tract but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

Tract Subdivision Description and Silvicultural Prescription

As described earlier, this tract is a mosaic of stands, mostly due to past agricultural practices. For the purpose of inventory, the tract was subdivided into 3 types.

Mature Oak-Hickory (62.7 acres) was the largest stand type, comprising about 62.7 acres. Generally, this type had remained in forest cover during the agricultural days of the tract. Even so, there are small areas that appear to have once been semi open pasture ground. Predictably, most of the more sloping ground falls into this stand. The portion in the northern third of the tract contains the higher quality timber, with good stocking levels, good form, and

has a high percentage of white oak sawtimber. This stand was the primary area that was managed during the 2000 harvest. This sub unit of the oak-hickory cover type could receive a moderate harvest to reduce stocking where needed, remove some of the mature trees, and limited improvement selections. That timber found further south shows residual effects of past pasturing and high grading prior to the state acquisition. Stocking drops off and stem quality is reduced. Emphasis with a harvest would be to continue improvement efforts where residual crop trees would benefit from relief. Black oak saw timber is in decline, as this species is over mature and its presence is falling out of the stand through natural mortality. Nevertheless, take opportunities to retain vigorous appearing black oaks to provide seed for possible regeneration and mast for wildlife. There will likely be a need to create regeneration openings within this stand in locations where the current cover shows little potential for quality improvement, fully occupying the site, and/or maintaining itself through the next management cycle. Those locations left over from high grading may need to start over. While not a high presence in this stand, if the opportunity presents itself, autumn olive control should be undertaken. **Future desired condition-** The desired condition of this cover type is to maintain the character and resulting benefits provided by oak-hickory with sawtimber size trees predominating over most of the cover type, yet make allowance for sufficient regeneration of this stand when the opportunity or need arises.

Old Field E. Redcedar/Mixed Hardwoods (40.5 acres) With not so well defined boundaries between cedar and the hardwoods transitioning into dominance, it was decided to include these subunits together. Particularly in the old field area along the tract's eastern boundary, the transition is well on its way to becoming a mixed hardwood stand. Sometime after acquisition, Virginia pine was planted in this eastern area. Relatively few of these have survived. There were only limited amounts of timber removed from this stand during the 2000 harvest. This sub stand should have harvesting done to encourage the better hardwood stems, like the pole to small saw timber size black oak scattered throughout, and to remove those trees that are not doing well, such as drought stressed yellow poplar. There was not much advanced oak regeneration observed during the inventory. Should any significant areas within the stand host a good amount of advanced oak regeneration, the cedar should be included in a sale to release these oaks and allow them to start a new stand. Otherwise, consider a cedar harvest on its own to accelerate the conversion to native hardwoods. It could be an option to leave a visual enhancement buffer of about a tree length along where this stand meets Becker road. Marking could either be reduced in this buffer or abstain from marking. The previous log yard and connecting access road was located in this stand. It is planned that the same yard and road be reactivated for the next harvest. If the harvest takes place during the winter, the road would need drainage enhancements and crushed stone applied. Although containing mostly cedar, the included stand in the 1966 acquisition differs in that the trees are younger, and the sites are poorer (farming influence, but also steeper ground). Planted before state acquisition, there is a small group of very large white pines near the western edge of the tract with diameters at or exceeding 30". This sub stand could have limited improvement work done in it during a harvest in the adjacent hardwood stands. For the most part, the size of the cedar trees are not large enough to warrant a harvest for anything other than posts and over much of the area, they are still serving an useful purpose of continuing the rehabilitation of the farmed out soils. The powerline right of way is located within this sub stand. Operations to remove timber south of this stand may have to take care to avoid the wire. There was a seasonal spring location found in the far SW portion of this cover type. Any near term harvest operations would not approach this location. **Future desired condition-** These stands are to be managed to encourage the transition to native hardwoods, and eventually an oak-hickory type with the benefits from the products and ecological benefits this forest type provides. These stands will also be free from the presence of autumn olive.

Old Field Maturing Mixed Hardwoods (11.6 acres) This stand is adjacent to the Old Field E. Redcedar/Mixed Hardwood stand towards the eastern midsection of the tract. At one time, this area was also opened for agricultural use. Judging from the 1940 aerial photograph and the size and species present now, the area had long been abandoned to farming and was mostly reforested by 1940. Extinct agriculture gully erosion is still noticeable over some of the stand, especially near the property lines. Redcedar is a reduced presence within this stand. Oaks are common, as are yellow poplar and sugar maple. A less common species on the state forest, largetooth aspen, was encountered in this stand. Mortality in the yellow poplar from drought stress was noted during the inventory. White ash may be more common in this stand than elsewhere on the tract. The state forest is significantly impacted by the emerald ash borer and the removal and regenerating of white ash to capture seed, regeneration and valued wood product ahead of full EAB infestation and Ash mortality is prescribed.

Additionally, while there are some desirable overstory species, the second story is lacking desired diversity and tree species due to past high-grading. A combination single tree and group selection is prescribed to open the way for a new diverse stand of trees.

Future desired condition- The eventual condition will be a forest cover with an optimum stocking of quality, vigorous hardwood species. Where poor stocking or stocking of vigorous, desirable hardwoods is lacking, regeneration openings could be created to better utilize the site's capabilities. Opportunities to enhance the presence of oaks and hickories will be taken, which will allow the ecological and products benefits these species provide to be achieved.

Summary Tract Silvicultural Prescription and Proposed Activities

A managed timber harvest is prescribed. The primary objectives include group selection which would involve improvement cutting and sanitation in the hardwood stands. Include selections from the cedar/mixed hardwood stands to improve hardwood composition. The cedar in the easternmost stand could be marketed on its own, probably after the completion of a hardwood harvest. Perform control of the autumn olive in this tract, particularly in the eastern portion.

Proposed Activities Listing

- Courthouse deed research to determine ownership of 5 acres. Pass on recommendations to resolve conflict.
- Preparations for timber harvest, including archeological review, marking, re-opening and improving access lane to log yard.
- Chemically treat ailanthus (and other exotics encountered).
- Post harvest Timber Stand Improvement (TSI), focusing on completion of regeneration openings and invasive control.
- Conduct timber harvest in hardwood stands.
- Conduct harvest in eastern cedar stand.
- Crop tree release, vine control in regeneration openings

Proposed Management Activity Proposed Date

2016-17 Complete courthouse deed research
2016-17 Prepare timber harvest
2016-17 Perform autumn olive control
2017-18 Timber harvest
2018-19 Perform post-harvest TSI and regeneration check
2019 Prepare e. red cedar harvest
2019-20 Cedar harvest
2029 Crop tree release in regeneration openings
2032 Re-enter tract for management cycle

Total Trees/Ac. = **257 Trees/Ac.** Overall % Stocking = **96% Stocking**
BA/A = **108 Ft²/Ac.** Sawtimber Trees/Ac. = **46.4 Trees/Ac.** Cull Trees/Ac. = **2.3 Trees/Ac.**
Present Volume = **7,899 BdFt/Ac.** Harvest Volume = **4,164 Bd. Ft. /Ac.**

Species	Harvest Volume (Bd.Ft.)	Leave Volume (Bd.Ft.)	Total Volume (Bd.Ft.)
White oak	152,560	219,440	372,000
Black oak	104,560	52,430	156,990
E. Redcedar	93,010	21,720	114,730
Yellow poplar	36,350	20,530	56,880
Pignut hickory	24,500	53,650	78,150
Red oak	14,220	12,960	27,180
Scarlet oak	12,480	4,160	16,640
White ash	10,150	00	10,150
Virginia pine	8,360	00	8,360
Largetooth aspen	7,570	00	7,570
Post oak	3,980	2,580	6,560
Black cherry	3,180	00	3,180
Shagbark hickory	2,210	21,250	23,460
American beech	1,590	00	1,590
Bitternut hickory	4,130	00	4,130
Black walnut	00	4,660	4,660
Sugar maple	00	14,650	14,650
Totals:	478,840	428,020	906,860
Totals per Acre	4,164	3,722	7,886
Hardwoods Only	377,470	406,300	783,770
Hardwood per Acre	3,282	3,533	6,815

Stocking Levels

Tract Level. Tract wide stocking is approximately 96% or fully stocked. After a harvest the whole tract residual stocking would be about 62%. This would still be considered fully stocked.

E. redcedar/Mixed hardwoods stand. Currently these stands are overstocked at a level of about 106%. A harvest could reduce stocking to about 60%, borderline between fully and understocked.

Mixed hardwoods stand. The prescribed harvest would reduce the residual stocking to the somewhat understocked range. The reasons for this reduction include the called for removal of all white ash (13.4 sq.ft./acre) and much of the overmature black oak (16.7 sq.ft./acre), in addition to the 13.3 sq.ft./acre of white oak to be removed within this stand.

Oak hickory stand. The inventory estimates this stand's present stocking level to be at 100% or borderline fully stocked and overstocked. A harvest, as prescribed, would reduce the stocking to about 60% or borderline between fully stocked and understocked. As in the mixed hardwood stand, creating regeneration openings would be cause for a temporary reduction in average stocking.

Soils Descriptions

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

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

Tipsaw Very Fine Sandy Loam (TblG)

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's first 15 inches is a fine sandy loam and the last 20 inches is a loam. The bedrock consists 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

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 from 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

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

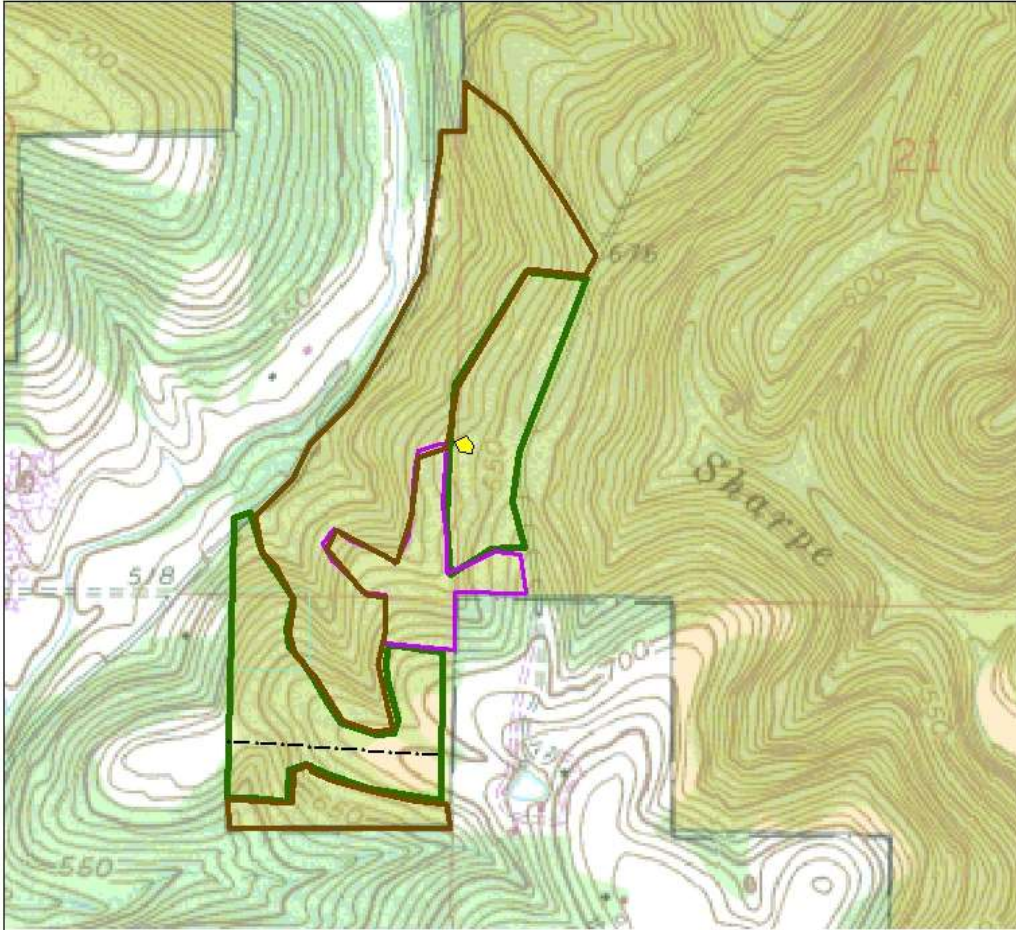
Site Index: 60

Growth Range potential: 258

Management Concerns: runoff and erosion

Harrison-Crawford State Forest
Compartment 14, Tract 2
September 2016
Stand Type Map

Dwayne Sleg



Legend

-  Oak-Hickory
-  E. Redcedar/Mixed Hardwoods
-  Mixed Hardwoods
-  Harrison-Crawford State Forest



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