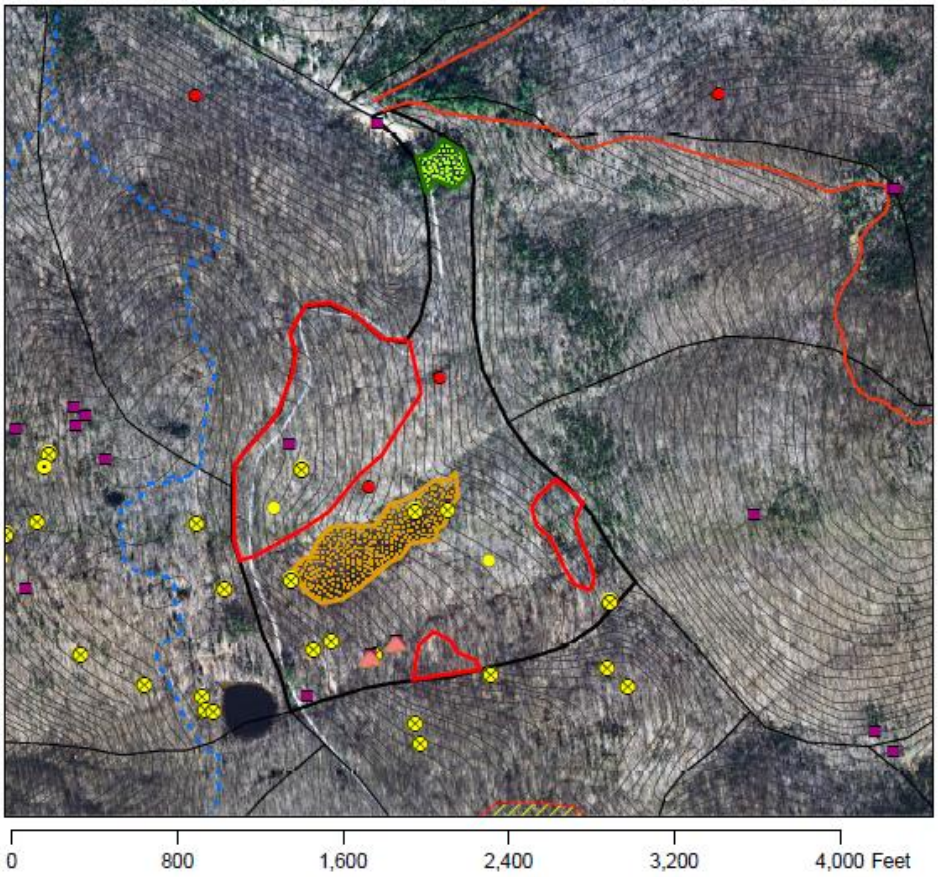
# Indiana Department of Natural Resources – Division of Forestry

## RESOURCE MANAGEMENT GUIDE - DRAFT

**STATE FOREST**: Harrison Crawford **COMPARTMENT**: 29 **TRACT**: 02

**Date: March, 2015** **Forester: Wayne Werne**
**(Inventory - May 2014)**




**Legend**

- 2902 rockpiles
- Historic sites
- Caves
- Ailanthus
- 2902 sinkholes
- Horse trails
- Fire Lanes

**Tract_ID**

- Tract 2902

**Stand 1: Mixed mesophytic - 39.4 ac**

**Stand 2: Oak hickory - 17.0 ac**

**Stand 3: Old regen opening - 4.6 ac**

**Stand 4: Small pine pocket - 0.8 ac**

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## INVENTORY SUMMARY

**NUMBER OF STANDS:** **3** **Est. growth: 40 bf./ac/yr**
**PERMANENT OPENINGS:** **0.1 ac** **Est. cutting cycle: 20-40 years**
**TOTAL ACREAGE:** **61.8 ac**
**AVERAGE SITE INDEX:** **75-85** (for upland oaks) **85-95** (for poplar)
**AVERAGE BASAL AREA:** **100 sq. ft/ac**

**TRACT 2902 TOTAL VOLUME (bd ft)**

| | CUT | | LEAVE | | TOTAL | |
|---|---|---|---|---|---|---|
| **SPECIES** | per acre | total | per acre | total | per acre | total |
| American beech | 240 | 14,832 | | - | 240 | 14,832 |
| Basswood | 50 | 3,090 | 63 | 3,893 | 113 | 6,983 |
| Bitternut hickory | 25 | 1,545 | 54 | 3,337 | 79 | 4,882 |
| Blackgum | 77 | 4,759 | | - | 77 | 4,759 |
| Black locust | 10 | 618 | | - | 10 | 618 |
| Black oak | 52 | 3,214 | 71 | 4,388 | 123 | 7,601 |
| Black walnut | | - | 122 | 7,540 | 122 | 7,540 |
| Blue ash | 40 | 2,472 | 56 | 3,461 | 96 | 5,933 |
| Chinkapin oak | 56 | 3,461 | 298 | 18,416 | 354 | 21,877 |
| Eastern white pine | | - | 216 | 13,349 | 216 | 13,349 |
| Northern red oak | 87 | 5,377 | 478 | 29,540 | 565 | 34,917 |
| Persimmon | | - | 49 | 3,028 | 49 | 3,028 |
| Pignut hickory | 149 | 9,208 | 622 | 38,440 | 771 | 47,648 |
| Red maple | | - | 23 | 1,421 | 23 | 1,421 |
| Red pine | 13 | 803 | | - | 13 | 803 |
| Scarlet oak | | - | 21 | 1,298 | 21 | 1,298 |
| Shagbark hickory | 120 | 7,416 | 318 | 19,652 | 438 | 27,068 |
| Sycamore | 18 | 1,112 | | - | 18 | 1,112 |
| Sugar maple | 345 | 21,321 | 902 | 55,744 | 1,247 | 77,065 |
| White ash | 437 | 27,007 | 60 | 3,708 | 497 | 30,715 |
| White oak | 105 | 6,489 | 1130 | 69,834 | 1,235 | 76,323 |
| Yellow-poplar | 549 | 33,928 | 258 | 15,944 | 807 | 49,873 |
| **TTOTAL** | 2,373 | 146,651 | 4,741 | 292,994 | 7,114 | 439,645 |

**STAND 1 – Mixed mesophytic** **ACREAGE: 39.4**

| | CUT | LEAVE | TOTAL |
|---|---|---|---|
| VOLUME/ACRE: | 2,893 | 5,337 | 8,230 |
| TOTAL VOLUME: | 114,000 | 210,300 | 324,300 |
| BASAL AREA/ACRE: | 42.3 | 68.2 | 110.5 |
| # TREES/ACRE: | 53 | 78 | 131 |

**STAND 2 – Oak hickory** **ACREAGE: 16.9**

| | CUT | LEAVE | TOTAL |
|---|---|---|---|
| VOLUME/ACRE: | 2,090 | 5,113 | 7,203 |
| TOTAL VOLUME: | 35,300 | 86,400 | 121,700 |
| BASAL AREA/ACRE: | 39.6 | 56.4 | 96.0 |
| # TREES/ACRE: | 61 | 67 | 128 |

**STAND 3 – Regeneration opening** **ACREAGE: 4.6**

| | CUT | LEAVE | TOTAL |
|---|---|---|---|
| VOLUME/ACRE: | 283 | 263 | 546 |
| TOTAL VOLUME: | 1,300 | 1,200 | 2,500 |
| BASAL AREA/ACRE: | 9.6 | 39.0 | 48.6 |
| # TREES/ACRE: | 79 | 193 | 272 |

**TRACT BOUNDARIES:** This tract is in the main chunk of the state forest, and is surrounded by other state forest tracts. The southern boundary is a slight drainage that forms the boundary with tract 2910. The eastern boundary is the main drainage that forms the boundary with tracts 2901 and 2903. The western boundary is a formed by Cold Friday Road, beyond which are tracts 2911 and 2808 to the west.

**ACCESS:** Cold Friday Road provides direct access to the west side of this tract.

**ACQUISITION HISTORY:** The land within this tract was acquired from two owners - primarily Wesley and Georgia Lowe in 1934 for an undisclosed sum, and some from Joseph and Carrie Pfeister in 1931 for a reported $5 per acre.

**TRACT DESCRIPTION:** This tract was divided into three stands based on cover type and past management. These stands include: mixed mesophytic, oak hickory, and an old regeneration opening in the mixed mesophytic stand that was put in place in 1997. There was also a small pocket of less than 1 acre of planted white pine at the northern tip of the tract that was too small to delineate with stand numbers. These stands will be described in detail below.

**Stand 1 – Mixed mesophytic**

This 39-acre stand is found generally on the lower slopes and in the central portion of most of the tract.

The total stand volume (8230 bd. ft/acre) is composed primarily of sugar maple (1410 bd. ft/acre), yellow-poplar (1217 bd. ft/acre), and white oak (1113 bd. ft/acre). The

remaining 55% of the volume consists of pignut hickory, white ash, northern red oak, white oak, and various other species.

**Stand 2 - Oak hickory**

This 17-acre stand forms most of the remainder of the tract, and occupies the northwestern portion of the tract and a couple of other pockets in the south. Though mostly dominated with oak and hickory, there was a definite component of more mesophytic species mixed in, and so this stand shows signs of the relentless transition to maple dominated stands as oak drops out of the overstory over time and minimal disturbance impedes oak establishment in the understory.

The total volume of the stand (7203 bd. ft/ac) is composed primarily of white oak (1879 bd. ft/ac), pignut hickory (1187 bd. ft/ac), sugar maple (1172 bd. ft/ac), and shagbark hickory (1018 bd. ft/ac). The presence of sugar maple at this level indicates that most of the stand has a mesic component that intermingles with the more distinct mesic stand. The remaining 25% of the volume consists of northern red oak, white ash, yellow-poplar, and various other species.

**Stand 3 – Regeneration opening**

This 4.6-acre stand is found in the middle of the tract and is contained within the mixed mesophytic stand. It was created during the last sale in 1997, and was put in place to liquidate primarily fire damaged sugar maple trees. Currently it is growing back to a young mixed mesophytic stand composed primarily of yellow-poplar. Ailanthus was notably present 10 years ago and was treated at that time. There is still some ailanthus present, but not to the degree that it once was.

The total stand volume (546 bd. ft/acre) is composed entirely of some residual sugar maple and sub-merchantable yellow-poplar, sugar maple, beech, ash, and cherry. There is some presence of grapevines in this area as well.

**SOILS:** The following soils are found on the tract in approximate order of importance.

**HaE2 Hagerstown silt loam, 18-25% slopes, eroded** Upland oak SI is 85-95, Yellow-poplar SI is 95-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 375-450 bd./ ft/ac/yr. for yellow-poplar.

**GpF Gilpin-Berks complex, 18-30% slopes** Upland oak SI is 70-80, Yellow-poplar SI is 70-80, est. growth is 185-260 bd. ft/ac/yr. for oaks and for yellow-poplar.

**CoF Corydon stony silt loam, 20-60% slopes** Upland oak SI is 65-75, Yellow-poplar SI is 80-90, est. growth is 155-220 bd. ft/ac/yr. for oaks and 260-335 bd. ft/ac/yr. for yellow-poplar.

**GlD2 Gilpin silt loam, 12-18% slopes, eroded** Upland oak SI is 70-80, Yellow-poplar SI is 90-100, est. growth is 185-260 bd. ft/ac/yr. for oaks and 335-415 bd. ft/ac/yr. for yellow-poplar.

**BtD5 Gullied** Virginia pine SI is 53-72, est. growth is 100-200 bd. ft/ac/yr.

**TlB2Tilsit silt loam, 2-6% slopes, eroded** Upland oak SI is 70-80, Yellow-poplar SI is 85-95, est. growth is 185-260 bd. ft/ac/yr. for oaks and 300-375 bd./ ft/ac/yr. for yellow-poplar.

**RECREATION:** This tract is within the largest contiguous block of forest comprising Harrison-Crawford State Forest. Cold Friday road gives direct nearby access. Consequently, there is a higher amount of usage of this tract by the general public year round, including hunters, foragers (mushrooms) and cave interests. Due to the proximity of a couple of caves in this tract, there is probably a fair amount of unauthorized use by people exploring these, as well as seeking out other cave openings. At this time caves and other karst features are closed to exploration due to habitat concerns. There are no official hiking trails in this tract, but a horse trail skirts outside the eastern edge of the tract, which leads to further recreational use. Karst features will be buffered during forest resource management operations.

(Move cave details to an appendix)
**WILDLIFE:** This tract represents typical upland forest habitat. Consequently, it 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 oak hickory stand.

In concert with various agencies and organizations, the DoF has developed compartment level guidelines for two important wildlife structural habitat features: Forest Snag Density, Preferred Live Roost Trees. Snags and preferred roost trees were tallied in this inventory and summarized in the following tables. The categories of optimal and maintenance guideline numbers were broken down by size class subcategory, but are inclusive of size classes above that. In other words, the maintenance guideline for number of snags in the 6" class and larger was 4 per acre, but of that number 0.5 per acre should be 20"+ and 3 should be 10'-18" or greater. This was done because larger trees are more valuable and less common, and were given the greater importance when calculating total guideline numbers.

**Guidelines for preferred roost trees (trees/acre)**

| DBH Class | Recommended Maintenance level | Current trees/ac | Potential harvest | Residual trees/ac |
|---|---|---|---|---|
| 12"-18" | 6 | 35.1 | 15.0 | 20.1 |
| 20" & greater | 3 | 13.2 | 5.0 | 8.2 |
| Total | 9 | 48.3 | 20.0 | 28.3 |

**Guidelines for snag tree levels (trees/acre)**

| DBH Class | Recommended Maintenance level | Optimal level | Current levels (trees/ac) |
|---|---|---|---|
| 6”-8” | 1 | 1 | 2.7 |
| 10”-18” | 2.5 | 5 | 8.5 |
| 20” & greater | 0.5 | 1 | 0.3 |
| Total | 4 | 7 | 11.5 |

These numbers show that live tree as well as smaller snag densities meet guidelines on this tract, but large snags are below the target density. The result for large snags is consistent with several other recently completed inventories on other tracts of the forest, where large snag densities seem to hover at about 0.3 per acre. The vast majority of snags are in the medium size classes, which are be very suitable habitat for most cavity nesting birds and all bats that use snags for roosting.

Management activities will not intentionally remove snags, with a few exceptions of larger recently dead, hazard or storm damaged trees and not negatively impact that target component significantly. Creation of more snags in this size class could be undertaken by girdling large cull trees in a post-harvest TSI operation to bring the density per acre up to a higher level.

Additionally, management activities involving a timber harvest should not affect this habitat long-term from the perspective of wildlife utilizing it due to the maintenance of a forested habitat on the tract and the structural diversity created through these activities. Creation of openings will create early successional forest habitat that will be beneficial to certain groups of wildlife dependent upon this habitat. Likely, early successional habitat created with such management will also benefit a wider segment of wildlife species that preferentially utilize such habitat for feeding and cover more so than later successional stage habitat.

Since this tract does not border a major stream, there should be no disruption of any potential travel corridors by forest management activities. The habitat on this tract in the context of the surrounding landscape does not represent any special component that would be used more preferentially or exclusively by wildlife for traveling or dispersion, as riparian habitat might be, or as forest in a non-forested landscape might be.

Since this tract represents a component of contiguous forest, management activities may potentially disrupt forest interior species by creating temporary edge habitat for generalist species. However, the described regeneration openings if undertaken have been shown to be of less an issue compared to hard edges such as public roadways, utility corridors and

crop filed edges. Placement of regeneration openings away from hard edges can minimize these potential impacts.

**WATERSHED / HYDROLOGY:** The majority of the tract contains gentle to moderately steep slopes that drain into an intermittent drainage that drains into Potato Run and then shortly drains into the Ohio River to the south. This area lies within a karst landscape with underground drainage, and there are several caves and sinkholes scattered within the tract. Besides the two aforementioned caves, there were at least two other open sinkholes located within this tract – one along the western edge of the tract near the road, and one generally in the southeastern portion of the tract. These features will be buffered during management activities.

**HISTORICAL AND CULTURAL:**
This tract is reviewed for cultural sites during the forest resource inventory and planning process. 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.

**RARE, THREATENED, OR ENDANGERED SPECIES:**
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.

**EXOTICS:** There are a several pockets of ailanthus present this tract – scattered around where small openings have opened up the canopy. These are mostly small trees, but some are producing seed, and so should be treated as soon as possible so as to better control the seed source and potential future problems. There was one large tree near the south boundary of the tract as well. These trees were painted with pink bands to facilitate location for future treatment. There is also some infestation of stilt grass along the edges of Cold Friday Road as well. Both species are widespread in the region.

**SILVICULTURAL HISTORY AND PRESCRIPTION:**

**General:** The records in the file for this tract show that an inventory was done in 1979, which indicated a total volume of 3774 bd. ft/ac and an estimated annual growth rate of 100 bd. ft/ac per year. Prior to this, a harvest was conducted in 1976 covering three tracts and totaling 127,000 bd. ft, as well as a veneer sale in the same year totaling 22,000 bd. ft, and probably also encompassing several tracts. Post harvest TSI was done in 1979.

Subsequently, another inventory was done in 1996, which indicated a total volume of between 7261-8056 bd. ft/ac (depending on tract acreage used) and an annual growth rate of 181 bd. ft/ac per year according to increment cores. Actual calculated growth rate using the two inventories gave a higher growth estimate of 205 bd. ft/ac/year. A harvest was conducted in 1997 in this tract and neighboring tract 2910 which resulted in 53,000 bd. ft being removed in 326 trees from this tract (858 bd. ft/ac) – most of which was sugar maple, black oak, yellow-poplar, and red oak.

The tract had a good growth rate in 1996, and the current growth rate of 40 bd. ft/ac/year was calculated by using the 2014 volume of 7114 bd. ft/ac, subtracting the volume of 7261 bd ft/ac from the 1996 inventory and the 53,000 bd. ft. from the 1997 harvest, and dividing by 18 years of growth. This calculation resulted in a figure of 40 bd. ft/ac per year, which is not at all in line with previous calculated and estimated growth rates, nor does it seem to be in line with the mesic nature and assumed productivity of the tract as a whole. The artificially low number may be the result of using different tract acreages in the past or anomalies in the inventories, or perhaps a high amount of mortality in this tract – which was noticed after an ice storm in 2009.

Number of trees per acre and basal area per acre figures indicate that the mature stands 1 and 2 are fully stocked at between 80% to 90%. Removal of trees tallied as "cut" either via a timber harvest or TSI would reduce the stocking levels to a level much closer to the B-line.

Due to the amount of volume being carried on the majority of the tract (7114 bd. ft/ac), the length of time since the last managed harvest (18 years back to 1997), and the general condition of the overstory trees in the majority of the tract, a light to medium level harvest could be undertaken in this tract at any time. This would produce a harvest volume of about 147,000 board feet or about 2373 board feet per acre and leave about 293,000 board feet, or about 4741 board feet per acre. Likely, this tract would again be combined with neighboring tract 2910 in any proposed harvest.

It is recommended that Timber Stand Improvement (TSI) be undertaken in this tract after the harvest to accomplish a variety of tasks, including completion of any marked openings. TSI of pole-size trees may be required for thinning in places, and to open up the understory for potential oak regeneration to take hold or be released. Vines did not seem to be a big problem in this tract – except in the old regeneration opening, but need to be kept at bay with TSI activities as well. Extensive understory treatment of shade tolerant species will be necessary to encourage oak regeneration where present. Ailanthus needs to be monitored and eliminated when found to be present or establishing itself. There were several small areas of ailanthus noted at the time of inventory.

**Stand 1: Mixed mesophytic**

This 39-acre stand covers 64% of the tract, and it contains a volume of 8230 board feet per acre of which 2893 was classified as harvestable and 5337 was classified as residual. This would remove 42 square feet of basal area, which would leave the residual stand

with 68 sq. ft. Stocking would drop from 90% to about 55% with the indicated management. White ash and yellow-poplar account for about 25% of the volume of this stand and about 45% of the tallied removal volume, which accounts for the drastic reduction in stocking. As with other stands on other tracts in the forest, the impending mortality of white ash from EAB and the drought stress and impending mortality of the yellow-poplar is the reason for tallying these species for heavier removal in stands where they are present.

The last harvest on this tract was conducted in 1997. Due to current stand conditions, stocking levels and projected residual conditions a managed timber harvest is of medium priority and prescribed to be undertaken in the next 1-5 years. The majority (68%) of the harvest volume for stand 1 (2893 bd. ft/ac) would be contained in yellow-poplar (776 bd. ft/ac), white ash (569 bd. ft/ac), American beech (351 bd. ft/ac), and sugar maple (267 bd. ft/ac), with northern red oak, blackgum, pignut hickory, and various other species making up of the remainder of the harvest volume. Most of the stand would utilize a single tree selection routine with group selection regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees.

Post harvest TSI should be performed to eliminate any residual cull or small pole-sized trees not cut during the harvest, as well as thin where necessary, complete any regeneration openings, and treat the understory to eliminate shade tolerant species in favor of oaks and other more desirable species. As always, any ailanthus present should also be treated and eliminated. There are a several pockets of ailanthus scattered throughout this stand.

**Stand 2: Oak hickory**

This 17-acre stand covers 27% of the tract, and contains a volume of 7203 board feet per acre of which 2090 was classified as harvestable and 5113 was classified as residual. This would remove 40 square feet of basal area, which would leave the residual stand with 56 sq. ft. Stocking would drop from about 80% to about 50% with the indicated management.

The last harvest on this tract was conducted in 1997. Due to current stand conditions, stocking levels and projected residual conditions a managed timber harvest is of medium priority and prescribed to be undertaken in the next 1-5 years. The majority (70%) of the harvest volume for stand 2 (2090 bd. ft/ac) would be contained in sugar maple (511 bd. ft/ac), white ash (333 bd. ft/ac), yellow-poplar (304 bd. ft/ac), and shagbark hickory (287 bd. ft/ac), with white oak, pignut hickory, and various other species making up of the remainder of the harvest volume.

Most of the stand would utilize a single tree selection routine with group selection regeneration openings targeting groups of low-grade trees or multiple large trees growing

together. When possible, selection should also favor releasing future crop trees. The residual stand should be heavier to white oak – the primary residual tree species.

Post harvest TSI should be performed to eliminate any residual cull or small pole-sized trees not cut during the harvest, as well as thin where necessary, complete any regeneration openings, and treat the understory to eliminate shade tolerant species in favor of oaks and other more desirable species. As always, any ailanthus present should also be treated and eliminated. There are a few pockets of ailanthus scattered throughout this stand.

**Stand 3: Regeneration opening**

This 5-acre stand is contained within the mixed mesophytic area and was created in the sale of 1997. The notes in the file say that this was an area of high graded and/or fire damaged sugar maple. Currently it is growing back to a young mixed mesophytic stand composed primarily of yellow-poplar with some black cherry, white ash, sugar maple, and beech. Ailanthus was notably present 10 years ago and was treated at that time. There is still some ailanthus present, but not to the degree that it once was.

This stand contains very little sawtimber volume which is composed of residual sugar maple trees. The stand needs to grow and be monitored for ailanthus issues, and the ailanthus and vines should be treated again at some point to eliminate them. Subsequently, the area needs to be thinned of low quality and lower value trees to encourage any oak and walnut, and primarily grow the best vigorous poplar trees, which will likely be the dominant species present here.

**PROPOSED ACTIVITIES LISTING**

| | |
|---|---|
| Summer 2014 | Field inventory |
| Winter 2014 - Spring 2015 | Write mgmt plan |
| Summer 2017 - Fall 2017 | Basal bark treat ailanthus |
| Fall 2017 – Winter 2017 | Mark timber harvest |
| Spring 2018 | Sell timber |
| 2018 / 2019 | Post harvest TSI |
| 2020 | Recon & monitor for exotics |
| 2029-2030 | Inventory for next mgmt cycle |

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