RESOURCE MANAGEMENT GUIDE

State Forest Harrison-Crawford Compartment 29 Tract 1
Forester Dwayne Sieg Date July 2009
Management Cycle End Year: 2030 Management Cycle Length: 20 years

Location
Tract 1 is located in Harrison County, mostly in the SW ¼, Section 11, T4S, R2E. The nearest town is probably Corydon, which is about 12 miles east of the tract.

General Description
This tract contains 55. 5 acres. It is fully reforested with primary cover type of mature oak-hickory. Lesser areas contain a strong contingent of eastern red cedar.

History
The history of this tract in State ownership goes back as far as 1932. The majority of the tract's acreage was purchased then as part of a larger parcel from a Joseph and Carrie Pfeister (Deed file 131.2). It had the distinction of being the second acquisition for the State Forest. Much lesser amounts of the tract were purchased as parts of 3 other acquisitions. These include J.M. and America Conner, et.al. in 1932 (131.4) along the east edge; Wesley and Georgia Lowe in 1934 (131.20) along the SW edge; And Tenia Curts in 1967 (131.213) along the NE edge. Prior to State ownership, the more gently sloping ground had been used for agriculture. The SW portion, the Conner, and the Curts portions all had been mostly open at one time. The SW and the Curts areas were severely eroded prior to abandonment to farming. The former Cold Friday Public road ran along Briles Hollow at the base of the tract. There is a small piece of a red and white pine planting just in the tract's boundary line at the far NW edge, with most of this planting being in Compartment 24, tract 5 to the north. These pines had been planted by the CCC on an old field site in the 1930s. Until 1979, there is no documentation of other management taking place. During the 2005 inventory, an area of e. red cedar (post) harvesting was noticed, near Briles Hollow. It is guessed that the trees were cut ca. late 1970s. In 1979, D. Martin and R. Dotzauer conducted the first inventory and wrote up a management plan. That inventory indicated an average annual growth of 63.3 bd.ft./ac./yr. Additionally, the tract was estimated to contain a total of 3,705 bd.ft./ac. As a reflection of prevailing forest species, sugar maple, n. red oak, white oak, and black oak were the top 4 species in volume. In 2005, this forester conducted the second inventory. It may be of interest that the top 4

species (volume wise) were white oak, black oak, red oak, and yellow poplar, in that order. The access road that serves this tract, as well as others in the area was rehabilitated and improved in 2007-2008.

Landscape Context
Tract 3 is surrounded by forested, State Forest ground. Within a short distance is the Post Oak-Cedar Nature Preserve and the O'bannon Woods State Park. The nearest private properties are over 1/2 mile away. Those properties tend to contain a mix of open grass/pasture and wooded areas with single family residences.

Topography, Geology and Hydrology
The relief in tract 1 runs from about 520 feet to 820 feet above sea level, a change of 300 feet in elevation. Slopes vary from gentle to somewhat steep. Aspects range from southeast to southerly to northwesterly. Bedrock is limestone under the lower 1/3 to 1/2 of the slope, with a sandstone 'cap' above that. There are minor amounts of karst features present, with the main feature being limestone outcroppings or talus along the lower slope. An area that is prone to seasonal seepage is found along the uppermost part of the tract at the eastern end.

Soils
Soils on this tract have had a large influence by past agricultural practices, particularly along the lower 1/3 slope that had once been a field(s). At the time this plan was written, the descriptions for 2 types (symbols Ho and BtD5) were not located. They occupied sites previously described as Hm-Haymond and Gu-Gullied. The descriptions for these soils are used as it is likely that the descriptions would be similar or the same. Site index was calculated using a weighted average of the indices of the soils. The low end of the range for most of the soils was used, because of the degradation of the tract during the agricultural era (both soils and resulting timber condition) and lack of previous stand improvement work. The estimated average **site index is 72.**

Corydon Stony Silt Loam (CoF) (22.5 acres) 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

Gilpin Silt Loam (GlD2, GlD3, GlE2, GpF) (14.2 acres) 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

Hagerstown Silt Loam (HaC2, HaD2, HgC3, HgD3, HgE3) (9.3 acres) 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

Wellston Silt Loam (WeC2, WeC3, WeD2, WeD3) (5.5 acres) 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

Haymond Silt Loam (Hm)(includes area with symbol Ho) (2.2 acres) 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

Tilsit Silt Loam (TlB2) (1.6 acres) Deep, gently sloping, modrately well drained soils on uplands. Fragipan in the lower part of the subsoil. Surface layer is dark yellowish-brown silt loam about 8 inches thick. Subsoil is about 38 inches thick. Depth to interbedded shale and sandstone bedrock is about 66 inches. Moderate in content of organic matter and low in natural fertility. Available water capacity is moderate and permeability is very slow. Runoff is medium.
Degree Slope: 2-6 %
Woodland Suitability Group: 3d9
Site Index: **70-80** (Upland Oaks)
Growth range potential (Upland oaks): **185-260** bd.ft./acre/year
Management Concerns: Erosion, wetness early in spring, available water capacity, lack of moisture in mid and late summer if rainfall is below normal.

Zanesville Silt Loam (ZaC2, ZaC3, ZaD2) (.19 acres) 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

Tract 1 is reached by taking Cold Friday road south to Potato Run creek, crossing the ford on the creek and entering the access road running uphill at the far side of the ford.

Boundary

An access lane forms the northern boundary of the tract. The eastern boundary is a somewhat arbitrary line and probably should be adjusted at some time to follow a more readily identifiable landmark, such as the old road bed in that area. The southern boundary is an ephemeral drainage separating the tract from tract 3. The western boundary is 'Briles' Hollow.

Wildlife

There should be a fair diversity of habitats found on tract 1, once again, due as a result of past agricultural practices and the natural and artificial reforestation of the various sites within the tract. Mature hardwood (oak-hickory) forest constitutes about 43% of the area. Species needing hard mast, such as squirrels, deer, turkey, and some songbirds should find a food supply in this portion. The mid succession hardwood areas offer some soft mast, such as sassafras and persimmon. Conifers, such as e. red cedar and the small amount of mature non-native white pine offers roosting cover for some birds. At this point in time, the woodland habitat type most lacking is early succession. Regeneration opening(s) created from harvesting should provide a small amount of this succession level.

A check of the Natural Heritage Database indicated several species of plants and animals within a mile of the tract. One of these species, the Indiana bat was observed during a 2004 survey conducted by the Division of Forestry. This occurrence was an overnight roost by a male and was considered transitory. There were a few species of subterranean (caves/voids) invertebrates noted.

Indiana Bat

Timber harvest activities may have both positive and negative effects on the Indiana bat. While undetected but occupied roost trees could be cut during spring, summer or fall, the probability of disturbance or direct injury or death to bats is extremely small. Timber harvest could create conditions that are beneficial to Indiana bats. Roads and/or skid trails provide improved canopy foraging conditions by reducing clutter. Roosting habitat could also be improved by reducing clutter around roost trees. Edges of log landings and regeneration openings could provide roost trees with improved solar exposure, thus improving microclimate/ thermal conditions for roosting areas. This would improve reproductive success and fitness, contributing to local population stability or increase. In cases of maternity trees this could provide conditions that increase growth and activity rates of young bats, leading to reduced time for parental care.

Suitable roost trees such as large diameter snags or live trees with loose or exfoliating bark will be retained in sufficient numbers to provide continuing roosting habitat for the Indiana bat. See Appendix for additional information about the Indiana bat's habitat needs and management around it.

A major hibernacula, Jug Hole Cave, is just over a mile from tract 3. A single Indiana bat was trapped in Compartment 29, tract 1 during a survey done in 2004.

Hooded Warbler

This warbler was noted (1988) within a mile of the tract. This species is included in this narrative as it is mobile.

> The hooded warbler is a forest-gap species that nests within a dense shrub layer in mature deciduous forests (Crawford et al. 1981, Robbins et al. 1989, Moorman et al. 2002). Preferred nesting sites often are associated with regenerating forest gaps (Gartshore 1988, J. Castrale, IDNR, pers. comm. 2008). This species is associated with large forested tracts, so extensive deforestation, clearing, and fragmentation on breeding and wintering grounds are thought to be threats (NatureServe Explorer 2008). The hooded warbler frequently is parasitized by the brown-headed cowbird (NatureServe Explorer 2008, J. Castrale, IDNR, pers. comm. 2008).

The management implications are that temporary regeneration openings would provide the natural regeneration needed for preferred nesting sites.

Special Habitats

In the 'Ecological Resource Review' document developed for this tract, it asks for explanations for such habitats found in or near this tract. First listed were seasonal ephemerals or pools. Included as such when consideration was given were the occasional pools in the mapped intermittent streams (Potato Run and Briles Hollow) that are just outside or along the edge of the tract. These habitats were not noted within the tract. Management activities in tract 3 should not affect these features. There is a wildlife pond in Compartment 24, tract 5, just outside of this tract. There could be a potential impact on this pond by a planned log yard. Keep debris and runoff out of the pond during logging activities. While none were noted, it is likely that there is/are sinkholes within the tract. Follow the DoF Procedures manual to avoid allowing runoff and debris into the feature. There are amounts of outcroppings and talus in areas of the tract. Disturbance should be minimal with occasional skid trails crossing through them during a harvest.

Communities

Plant communities found in tract 1 should be fairly consistent with those found in the nearby region. Oak-hickory forest is the prevailing type, with species such as white, red, and black oaks, pignut and shagbark hickories commonly found making up the overstory. Since there has been fire prevention for many decades now, and absence of browsing livestock, the lower and mid canopies are being occupied primarily by shade tolerants such as sugar maple and American beech. There are small areas of limestone outcroppings and surface rock that are likely inhabited by forest glade communities. Eastern red cedar and post oak are the

main overstory species in these areas. Where open farm ground once occurred, natural hardwood species are going through a succession process with the earliest invaders such as sassafras and persimmon fading out of the stand and being replaced by species such as red and sugar maple and white ash. Some of the harsher sites that had been farmed are more commonly inhabited by e. red cedar, hickories, to name a few. Again, the NHDB noted several plant species of concern within a mile of the tract, but none within. Many, if not most of the plants noted are protected within the boundaries of the Post Oak-Cedar Nature Preserve to the north. The presence of Japanese stilt grass has been observed along the forest roads/horse trails in the area. This species should be monitored and treated if opportunity/resources are available.

Recreation

Tract 1 is just east of the O'bannon state park's horse campground. The beginnings of 2 horse trails are at the western tip of the tract. These trails, more or less, follow the tracts northern and southern boundaries. The northern trail utilizes the tract's access road as a segment. Hunting of upland game would be the highest use of the tract's interior.

Cultural

Cultural resources may be present on the tract but their location is protected. Adverse impacts to significant cultural resources will be avoided during any management or construction projects.

Tract Subdivision Description and Silvicultural Prescription

The tract's history in the agricultural era has done as much as anything to create subdivisions.

-The primary type is a native cover of mature/ overmature oak-hickory (about 28.9 acres). Most of this type was fully forested in the 1949 aerial photograph. White oak is the most common species with black and red oaks and yellow poplar common, also. Overall quality is fair to good. Management is needed to remove mature and defective trees and to release crop trees. Black oak, as a species, is showing the typical signs of over maturity and is fading out of the stand. The second most common subdivision is eroded old field sites. These are typically inhabited by e. red cedar and scattered early succession hardwoods such as persimmon, yellow poplar, sassafras with occasional areas of advanced oak regeneration and pole size oaks. These areas should be more closely evaluated to see if cedar removal or other TSI would stimulate more desirable trees trying to get established. A small area of about 2.2 acres can be found on the hill towards the southeastern corner of the tract that was also former field ground. This area is somewhat higher in productivity and contains a somewhat differing set of species which includes red

maple and not much cedar. TSI to remove defective trees and to release crop trees might benefit this location subsequent to a harvest in the tract.
-An area of about .9 acre of planted white and red pine can be found along the northwestern corner of the tract. This area is just the edge of a large area that lies mostly in Compartment 24, tract 5. The red pine is largely fading out of the stand as this species is not suitable long term for this region of the country. Some of the white pine has achieved large size. If markets allow, limited harvesting to remove trees from below may be beneficial.
-In the same general area of this tract are a couple subdivisions that are defined by the fact that they contain shallow soils on steep or somewhat steep south facing slopes (2.9 acres of steep and 3.3 acres of shallow and somewhat steep slopes). The productivity is noticeably lower. Rock outcroppings and surface rock are common. Species found here are mostly white and post oak and e. red cedar. Management needs are low to marginal.

Summary Tract Silvicultural Prescription and Proposed Activities

Tract 1 silvicultural prescription is to have a general improvement harvest over the oak-hickory type. Include any needed improvement selections or thinnings in the other stand types described above. Combine this harvest with Compartment 29, tracts 3 and 4. Create regeneration openings where present conditions warrant (e.g. site inhabited by defective trees left behind after an old high grade harvest).

Proposed Activities Listing

2009-10. Mark improvement harvest.
2012. Perform post-harvest TSI.
2013. Evaluate invasive exotic control needs (esp. stilt grass). Treat if needed.
2025-30. Perform crop tree release in any regeneration openings.
2025. Tract inventory and prescription.
2030-35. Prepare harvest.

HARRISON-CRAWFORD STATE FOREST
RESOURCE MANAGEMENT GUIDE
ADDENDUM

COMPARTMENT 29, TRACT 1

Dwayne Sieg

METHODS Tract 1 was sampled by a variable radius plot method, using a 10.0 factor prism. There were 26 (or 1 for every 2.1 acres) random plots measured. Software used was 2Dog.

SNAG GUIDELINES Minimum 5 snags per acre ≥ 9 inches DBH. Minimum 1 snag tree per acre ≥ 19 inches DBH

RESULTS

SNAG COUNT

SPECIES	≥ 9" DBH	≥ 19" DBH	TOTALS
Black oak		.3	0.3
E. red cedar	1.9		1.9
Post oak	2.1		2.1
Sassafras	3.6		3.6
White oak	.3		0.3
Yellow poplar	.3		0.3
Chinquapin oak	.6		0.6
TOTALS	8.8	0.3	9.1

LIVE TREE GUIDELINES

Guideline standards: Minimum 3 live trees per acre ≥ 20" DBH; Minimum 6 live trees per acre ≥ 11" DBH, these trees preferably of bark characteristics determined to be desirable for the Indiana bat

	Live Trees ≥ 11"DBH	Live Trees ≥ 11"DBH Harvest	Live Trees ≥ 20"DBH	Live Trees ≥ 20"DBH Harvest
	42.1	15.6	11.0	6.5
Residual Trees		**26.5**		**4.5**

HARVEST IMPACTS

The residual numbers of trees in the smaller class of live trees should easily meet the recommended retention guideline. The number of residual trees in the larger class should exceed the recommended number by 1.5 trees per acre. For clarification, the numbers indicated in the 2 harvest columns also include trees removed by timber stand improvement, especially in

the smaller class. The interim guidelines for the Indiana bat calls for leaving the 3 largest trees per acre from a list of 14 species when harvesting. White oak is on that list and is the predominate species on the tract. This species now, and to the distant future will supply ample numbers of trees with desirable bark characteristics. However, for the purpose of encouraging bat habitat, efforts during the harvest and subsequent management should take advantage of possible circumstances to grow these trees to larger size, faster (thin and release), to provide increased solar exposure to trunks, and to encourage regeneration of these oaks, should there be areas of advanced regeneration (understory release with overstory removal at the appropriate time). Inventory indicated a shortfall (of the guidelines) of snags in the ≥ 20" DBH category. Numbers of snags could be artificially created by girdling 52 trees in that size range, should it be necessary. If enough cull trees of that diameter range cannot be found, an alternative to provide these quantities might be killing otherwise sound or nearly sound trees (not preferred).

Note: Information for cavity trees had not been required at the time of this inventory (2005).

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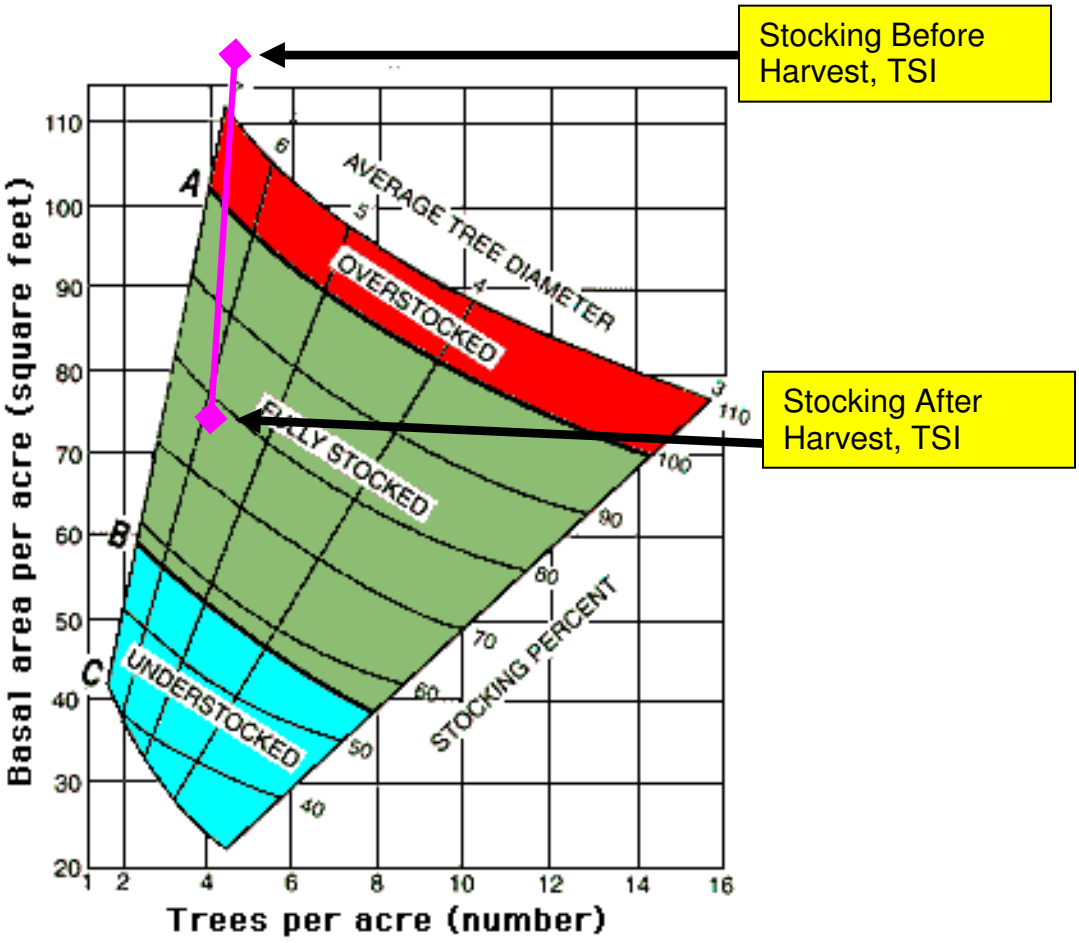
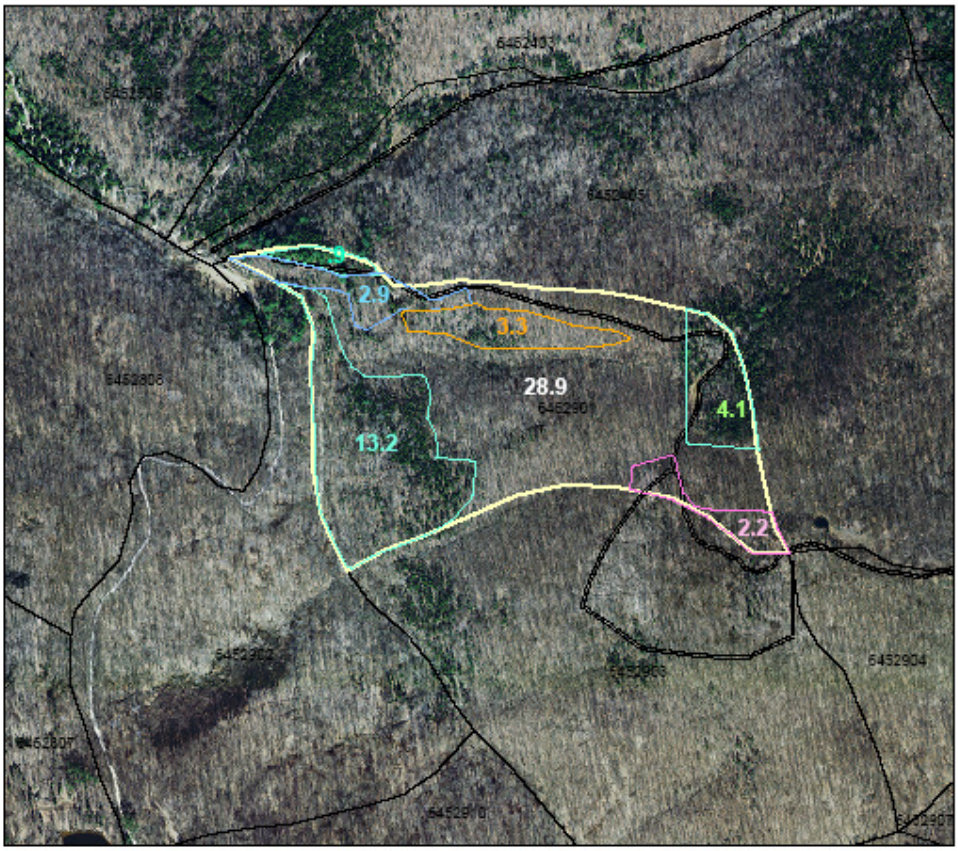
You **must** indicate "Harrison-Crawford C29 T1" in the "Subject or file reference" line to ensure that your comment receives appropriate consideration. Comments received within 30 days of posting will be considered.

GINGRICH STOCKING TABLE
UPLAND CENTRAL HARDWOODS



Harrison-Crawford State Forest
STAND TYPE MAP
Compartment 29, Tract 1
July 2009

Dwayne Sieg



- Mature Oak-Hickory
- Eroded Old Field
- Somewhat Steep, Thin Soils
- Steep, Thin Soils
- Old Field, More Productive
- Pine Planting

770 385 0 770 Feet

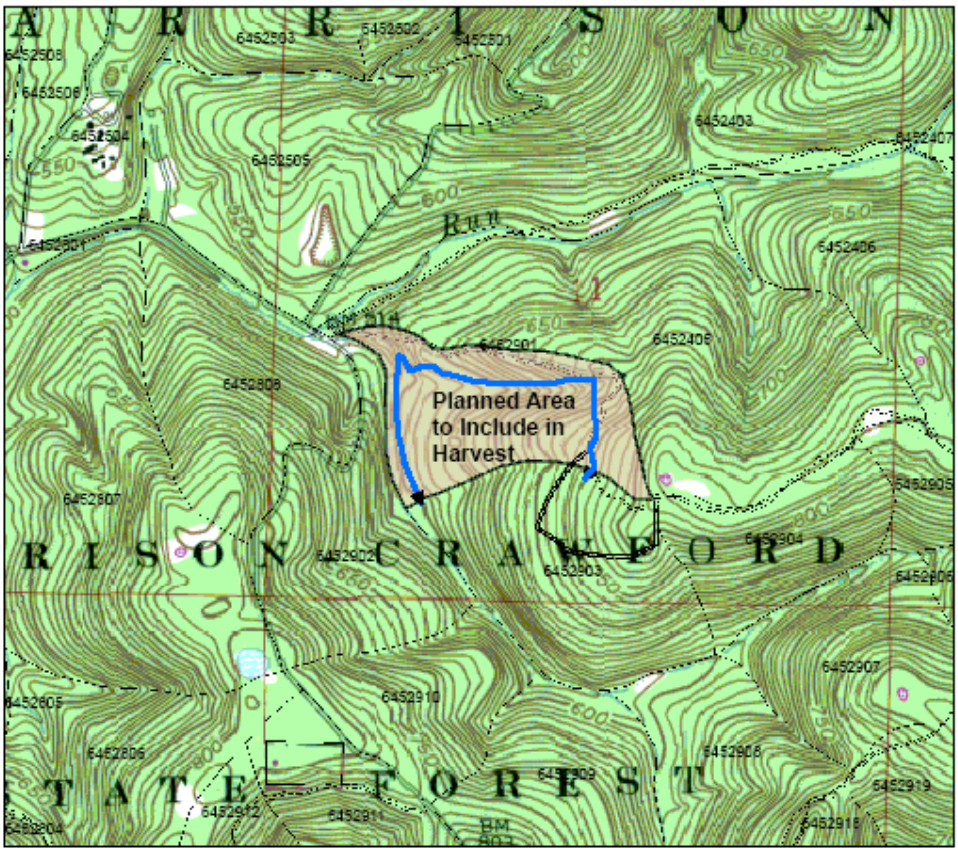
N
W
S

Forestry DNR INDIANA

6452901

Harrison-Crawford State Forest
PLANNED HARVEST AREA
Compartment 29, Tract 1
July 2009

Dwayne Sieg



1,400 700 0 1,400 Feet

Potential Sale Boundary

N
W
S

Forestry
DNR
INDIANA

Acres Commercial Forest: 45.5 Basal Area ≥ 14 Inches DBH: 56.85 ft²/ac.

6452901

Acres Noncommercial Forest: 9 Basal Area < 14 Inches DBH: 54.09 ft²
Acres Permanent Openings: Basal Area Culls: 7.47 ft²
Acres Other: 1 (Historic site) Total Basal Area: 118.41 ft²/ac.
Acres Total: 55.5 Number Trees/Acre: 457

Average Site Index: 72 Stocking Level[1]: Overstocked, off chart
Calculated Annual Growth: 85.1 bd.ft./acre/year

SPECIES	LEAVE VOL.	HARVEST VOL.	TOTAL VOL BD.FT.
Blackgum	3,600	00	3,600
Black oak	18,500	55,800	74,300
Pignut hickory	4,600	6,500	11,100
Red oak	12,400	31,600	44,000
Shagbark hickory	2,600	00	2,600
Sycamore	2,000	00	2,000
White ash	17,400	3,400	20,800
White oak	59,500	48,600	108,100
Yellow poplar	10,500	19,100	29,600
Blue ash	1,400	00	1,400
Chinquapin oak	5,900	9,500	15,400
Totals	**138,400**	**174,500**	**312,900**
Totals/Acre	**2,498**	**3,144**	**5,642**

[1] "Forestry Handbook" Northeastern Area, State and Private Forest Service, U.S. Department of Agriculture