Indiana Department of Natural Resources
Division of Forestry
DRAFT

RESOURCE MANAGEMENT GUIDE

State Forest: **Ferdinand** Compartment: **01** Tract: **07**
Tract Acreage: **122** Commercial Forest Acreage: **120**
Forester: **Evan McDivitt and Sabrina Schuler** Date: **6/22/2016**

Location

Compartment 1 Tract 7 is located within Ferdinand State Forest, approximately 1.5 miles north of Ferdinand State Forest Lake. The legal location of this tract is SE ¼, Section 6, T3S, R3W, Jackson Township, Dubois County and the NE ¼ of Section 7 T3S, R3W, Ferdinand Township, Dubois County.

General Description

C1T7 contains approximately 122 acres with half of the tract being dominated by oak-hickory overstory and half of the acreage being dominated by mixed hardwoods. Table 1 represents tree species identified during the inventory.

Figure 1. Ferdinand SF Compartment 01, Tract 07.

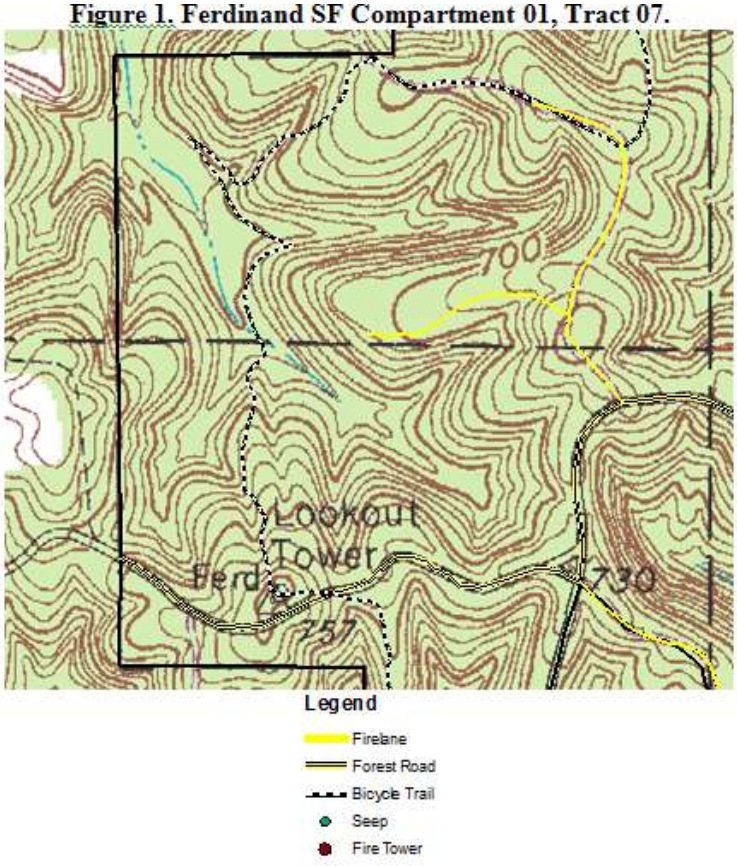


Table 1. Overview of Tree Species in Tract 0107

Overstory Sawtimber Layer	Understory Poletimber Layer	Regeneration Layer
Chestnut Oak	Chestnut Oak	Chestnut Oak
White Oak	White Oak	White Oak
Black Oak	Bitternut Hickory	Black Oak
Post Oak	Pignut Hickory	Northern Red Oak
Northern Red Oak	Sugar Maple	Sassafras
Scarlet Oak	Sassafras	Yellow Poplar
Yellow Poplar	Yellow Poplar	Red Maple
Sugar Maple	Red Maple	Flowering Dogwood
Pignut Hickory	American Beech	Blackgum
Shagbark Hickory	American Elm	Black Cherry
Bitternut Hickory	Flowering Dogwood	White Ash
American Beech	Blackgum	Red Mulberry
Red Maple	Shagbark Hickory	Sugar Maple
	American Hornbeam	Pignut Hickory
	Post Oak	American Elm
	Black Oak	American Holly
	Downy Serviceberry	American Elder
	Basswood	

History

This tract is made up of three separate land acquisitions. The first is the South ½ of the tract from Lysander and OlaJane Trent from Dubois County. The 1936 purchase comprised approximately 120 acres. The second purchase occurred in November 1939 from Roman H. Egler of Dubois County. This 40 acres makes up the current NW ¼ of the tract. Finally, the NE ¼ was purchased from Sylvester B. and Mildred Fleig of Dubois County. This 1941 acquisition makes up parts of tracts 1 and 6 as well.

Resource Management History

Initially inventoried in 1976 by Ben Hubbard, the tract was estimated to have a volume of 437,197 bf. In 1981, property forester Janet Eger and APM Don Hoppenjans reported findings of Looper Damage to 150-200 trees to Phil Marshall. At this time, a timber sale was prescribed to salvage damaged trees. In 1984, a timber harvest was conducted of approximately 120 acres, comprising 253,350 bf, and 1,015 trees. Branchville Labor Line completed grapevines and post-harvest TSI in 1985. Later, this tract was inventoried in May 2002 by G. Herbaugh, estimating a total of 772,797 bf with 83,326 bf of harvestable volume. The silvicultural prescription indicated a stocking level of 76% , with harvest needs to be re-evaluated in 5-7 years.. In 2007, a roadside portion along the southern boundary of this tract was included in a timber sale in adjacent tract (Compartment 01, Tract 08). The project area was located along the gravel forest road and extended approximately 50 yards into the tract on the southern boundary. No skid trails or haul roads were constructed for this harvest. In May 2016, wind damage elicited a re-evaluation of the tract for salvage inventory.

Landscape Context

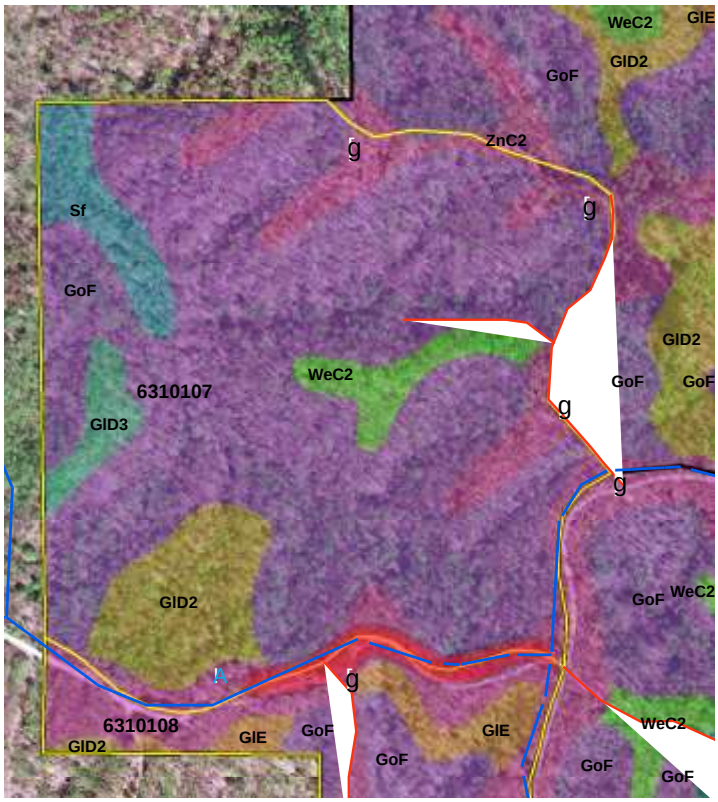
Mixed hardwood stands can be found in the valleys, bottomlands and along the slopes. Some clusters can be found on ridgetops mixed with chestnut or white oak. Oak-hickory stands occur on ridgetops. A majority of land within one mile of this tract is closed-canopy deciduous/mixed hardwood forest, primarily in private land. Other prominent land uses on private lands within one mile are cropland and pastures.

Topography, Geology, and Hydrology

This tract contains a mapped intermittent stream cutting diagonally through the tract from the northwest corner, flowing southeast, into the south-central portion of the tract, where it originates. The stream drains toward and meets up with Flat Creek. Steep banks are found along some of the mapped intermittent stream segments and the fingers extending from it. A seep occurs along the bike trail loop. It is recommended to avoid the seep and surrounding area during timber harvests. The tract primarily contains north and south facing slopes, with occasional west facing slopes near the center of the tract. Tract access is good, with some steeper slopes having access and equipment limitations. The majority of the tract has underlying bedrock composed of nearly horizontal, interbedded gray and brown acid siltstone, shale, and sandstone. Some portions of the tract also have soils derived from loess deposits overtop the siltstone, shale, sandstone residuum.

Soils

Figure 2. Compartment 01, Tract 07 Soils.



Steff silt loam (Sf) is a frequently flooded soil with a depth of more than 80 inches to the water table occurring on 0-2% side slopes in upland areas. It is moderately well-drained. It contains 1-

3% organic matter and is moderately permeable. Available water capacity is low, 3.7 inches in the upper 60 inches. The site index is 100 for sweetgum.

Gilpin silt loam (GID2) is a well-drained soil with a depth of more than 40 inches to the water table occurring on12-18% side slopes in upland areas. It is eroded and contains 1-3% organic matter. It is moderately permeable at 0.6 to 2 inches per hour above 60 inches and available water capacity is low at 3.9 inches above 60 inches. The pH ranges from 3.6 to 5.5. Bedrock begins at a depth of 20-40 inches.

Gilpin silt loam (GID3) is similar to Gilpin silt loam (GID2). This silt loam differs only in that it is severely eroded and contains less organic matter at 1-2%. Both soils have a site index of 95 for yellow poplar. Both can be subject to drought.

Gilpin-Berks complex (GoF) makes up the greatest area of this tract. The Gilpin-Berks complex contains Gilpin and Berks soils. They are well-drained with a depth of more than 40 inches to the water table. They occur on 20-50% side slopes in upland areas. The Gilpin surface layer is silt loam and the Berks surface layer is channery silt loam. Organic matter content is moderately low and permeability is moderate. Available water capacity is 3.7 inches above 60 inches in Gilpin soils and 2.6 inches above 60 inches in Berks soils. The pH ranges from 3.6 to 5.5. Bedrock begins at a depth of 20-40 inches. The site index for Gilpin soils is 95 for yellow poplar and the site index for Berks soils is 70 for black oak.

Wellston silt loam (WeC2) is a well-drained soil with a depth of more than 40 inches to the water table occurring on 6-12% side slopes in upland areas. It is eroded and has a silt loam surface layer, contains moderately low organic matter, and has moderate permeability. Available water capacity is 7.8 inches above 60 inches. The pH ranges from 4.5 to 6.0. Bedrock begins at 40 to 72 inches. This soil has a site index of 81 for northern red oak.

Zanesville silt loam (ZnC2) is a moderately well-drained soil with a depth of 24-36 inches to the water table, seasonally. It occurs on 6-12% side slopes in upland areas. Organic matter content is moderately low at 1-2% and permeability is very slow. Available water capacity is 8.2 inches above 60 inches. The pH ranges from 4.5 to 6.0 Bedrock begins at a depth of 50-90 inches. This soil has a site index of 69 for white oak and 90 for yellow poplar. Approximately 6 acres of Oak-Hickory was blown down on the east side of this tract where ZnC2 soil predominates. As this site index is good for white oak, and the area is already opened up, this would be one of many ideal sites for a prescribed burn (see silvicultural prescription below) to promote white oak regeneration.

Roads and Access

Access to this tract is excellent. Primary access may be obtained by the forest owned road, also identified as CR 700 South, which creates the southern border. Secondary or internal access may be gained easily via the use of Firelane 5, creating the eastern border. A spur from fire lane 5 also runs into the main ridgetop of the center of the tract. A mapped intermittent stream is found in the Northwest part of the tract. Problematic stream crossings can be avoided, or minimized by accessing the tract from the forest road along the southern boundary of the tract.

Boundary
This tract is bordered only on two sides by private land. Approximately ½ of the northern line and the entire west line adjoin private property. The southern and eastern boundaries are identified by CR 700 South and Firelane 5.

Wildlife
A Natural Heritage Database Review was completed for tract 0301 in 2015. 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.

This tract has good wildlife habitat diversity and typical wildlife assemblages for the area. Dense underbrush of greenbrier provides heavy cover for numerous wildlife species. And, recent blowdown areas offer opportunity for expanded early successional habitat. Deer have been noted throughout the tract. Other wildlife observed within the tract include songbirds of the following species: woodthrush, pileated woodpecker, ovenbird, northern parula, cowbird, red-winged blackbird, vireo, and eastern towhee. Crows, numerous frogs and butterflies were also observed throughout the tract.

The Division of Forestry has instituted procedures for conducting forest resource inventories so that the documentation and analysis of live tree and snag tree densities are examined on a compartment level basis in order to maintain long-term and quality forest habitats. The number of snags and Legacy Trees in the tract is greater than the maintenance level for optimal Indiana Bat habitat in all size classes. Management practices conducted on 0107 will be conducted in a manner that will maintain the long-term and quality forest habitats for wildlife populations.

Table 1. Live Legacy Trees* and Snags inventoried June, 2016 on 0107.

	Maintenance Level	**Inventory**	**Available Above Maintenance**
Legacy Trees *			
11"+ DBH	1098	1808	710
20"+ DBH	366	510	144
Snags (all species)			
5"+ DBH	488	1173	685
9"+ DBH	366	841	475

19"+ DBH	61	168	107

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

Communities

Tract 7 contains dry ridgetop, dry southwest facing slope, dry-mesic, mesic, and some bottomland associated communities. A strong component of chestnut oak and associates is found primarily on dry ridgetops and dry southwest facing slopes. Within these communities, associates include greenbrier, poison ivy, Virginia creeper, other oaks and hickories. Dry-mesic to mesic communities contain a strong component of white, red, and black oak; pignut and bitternut hickory; generally with American beech and sugar maple in the subdominant canopy. Mixed hardwood communities exist in the mesic and bottomland sites and include overstory associates such as white ash, yellow poplar, sugar and red maple, American elm, and American sycamore, along with some oaks and hickories.

Mesic upland forests are found throughout the state, but are most common in hilly regions where slopes are protected from excessive evaporation and from fire. They generally occur on north-facing slopes, in ravines, and on level soil with moderately high available moisture. Ideal soil moisture conditions result in a dense overstory and, in undisturbed stands, an understory of shade-tolerant species. Sugar maple, American beech, red oak, and basswood are typical dominant trees in mesic upland forest. Other plants found in this community include pawpaw, Ohio buckeye, blue beech, bitternut hickory, red mulberry, and bladdernut. Tiger salamanders, wood frogs, and wood thrushes are commonly found in Mesic Upland ForestsDry-mesic upland forests are one of the most prevalent forest communities in Indiana. This community is in an intermediate position along a soil moisture gradient. Trees grow well, but the canopy is usually more open than in mesic forests. Dominant trees found are white oak, red oak, and black oak. Other plants and animals characteristic of this community include shagbark hickory, mockernut hickory, flowering dogwood, hop hornbeam, black haw, broad-headed skink, white-footed mouse, and eastern chipmunkDry upland forests occur on steep ridges at the crests of river bluffs and edges of escarpments throughout Indiana, but are most common on bedrock outcrops in the Shawnee Hills and Highland Region. Soils are very dry and poorly developed because of steep, exposed slopes, or because of bedrock, gravel, or sand at or near the surface. In a dry upland community, trees grow slowly, but there usually is a well-developed understory and ground layer. Dominant trees in this community include chestnut oak, post oak, and black oak. Characteristic plants include pignut hickory, broom moss, and pincushion moss. Ground skinks, five-lined skinks, fence lizards, and summer tanagers are some of the animals which may be found in a Dry Upland Forest.

Exotic Species

Invasive multiflora rose and Japanese honeysuckle were noted throughout the tract. These invasives were observed along roads and trails, in forest openings, and even found sparsely scattered in remote, closed-canopy parts of this tract. Both of these species are of concern

because they compete with desirable tree seedlings, native shrubs and herbaceous vegetation in current and future cohorts. However, these species are also common and widespread throughout the county and eradication is not feasible. Populations will be monitored for problem occurrences and treated as may be warranted. This is further discussed in the tract prescription section.

Recreation

This tract contains a bike trail starting at the fire tower running north where it connects with Firelane 5 and exits the tract. As of 2016 the bike trail is in good condition with steep portions showing some rutting associated with normal use and normal stormwater flow. Some stretches have been well-maintained with rock and fabric as needed. The short campground trail, extending from the fire tower east onto Forest Road, also is in good repair. Trail interaction and impacts to be given due consideration during planning and implementation of any resource management activities.

The fire tower is accessible to the public and offers stair climbing with expansive views at the top. Other likely recreational activities on this tract include hiking, biking, hunting, bird watching, wildlife viewing, and mushrooming.

Due to the well-developed trail system and presence of the fire tower, there exists information/education potential in this tract in the following ways: 1.) Interpretive signage relating to wind disturbance, timber harvests, and other aspects of forest management; 2.) Interpretive signage relating to springs and seeps, wet site vegetation and ecological characteristics; 3.) Interpretive signage relating to the fire tower and historical aspects of forestry at Ferdinand State Forest and/or installation of historic forestry tools / structures near the fire tower to add to the recreational experience These and other opportunities for information development are recommended in this tract.

Cultural

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

The overall stand structure for this tract is represented in the following Gingrich Stand and stock table that follows the individual stand summary. Due to the large amount of blow-down areas from the windstorm, residual stocking for this tract is shown to be lower than a typical tract managed for un-even aged silviculture. Due to the windstorm reducing residual stocking in a significant portion of this tract (approximately 9.5% of total acreage, or 11.34 acres), a silvicultural shift to large group selection openings is recommended.

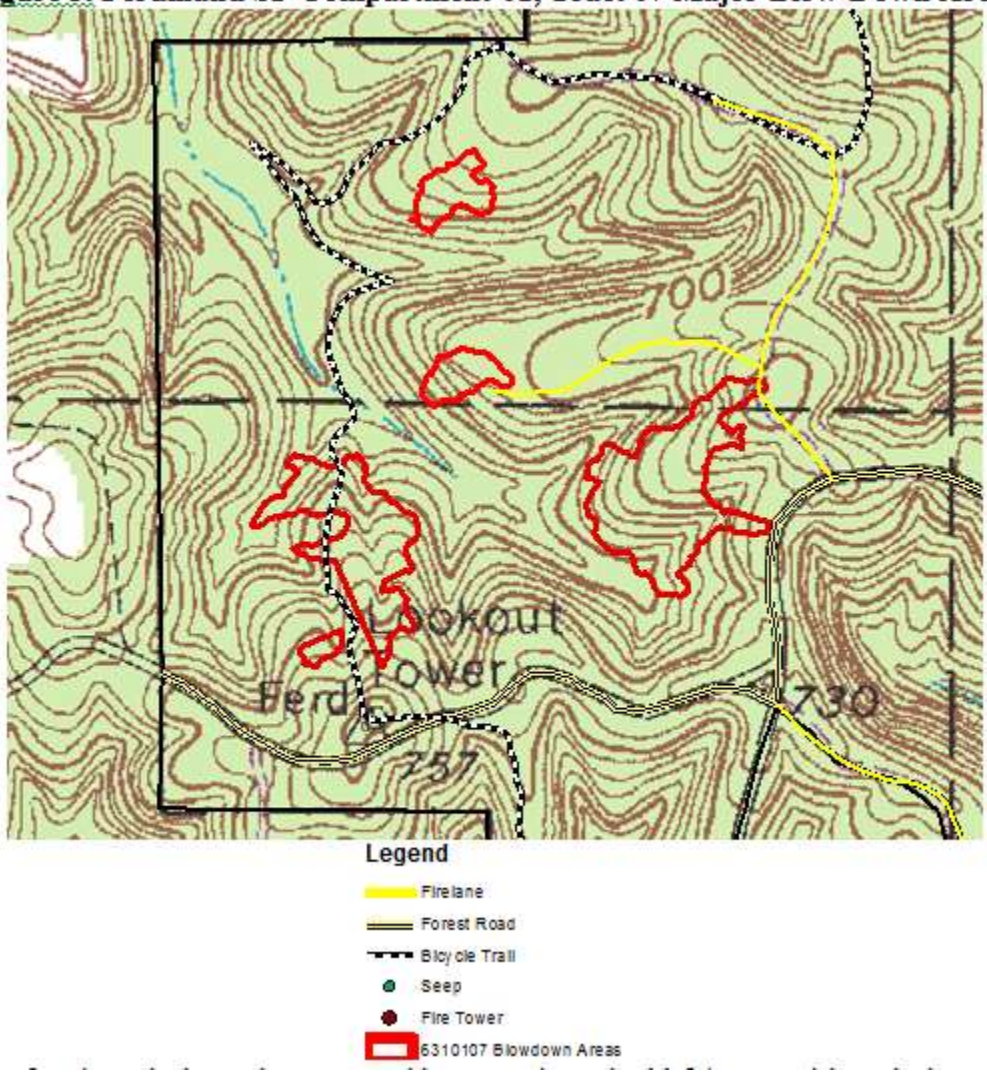
Tract Summary Data

Total Trees/Ac. = **110 Trees/Ac.** Overall % Stocking Hardwoods = **83%** (Fully Stocked)
Basal Area = **105.1 Sq. Ft./Ac.** Harvestable Trees = **35 Trees/Ac.**
Present Volume = **9,340 Bd. Ft./Ac.**

Wind Storm

Figure 3 shows major areas in Compartment 01, Tract 07 where the May 2016 wind storm did the most damage.

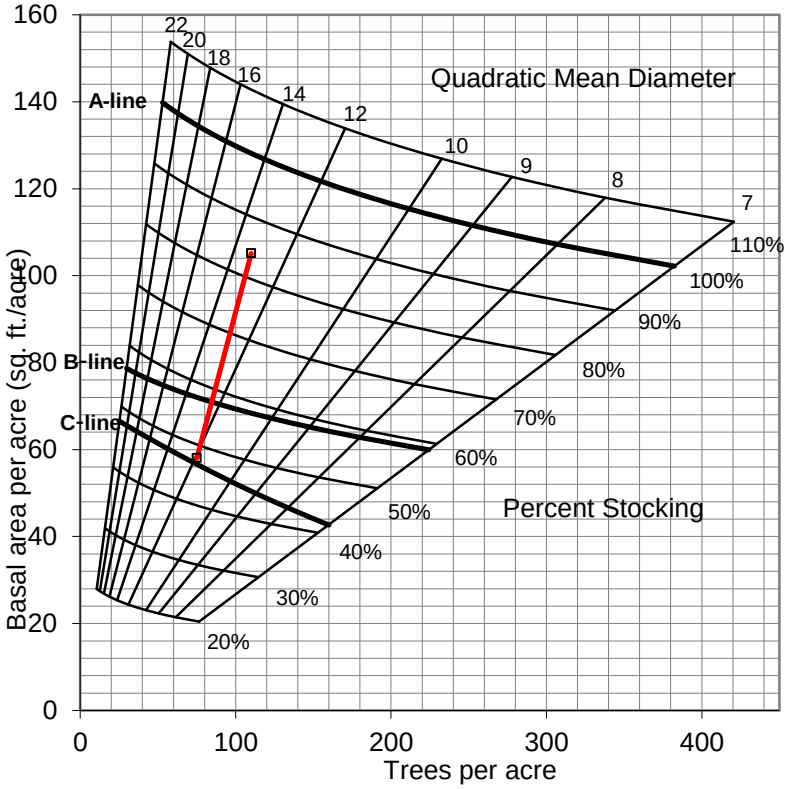
Figure 3. Ferdinand SF Compartment 01, Tract 07 Major Blow-Down Areas



Total area of major wind openings created is approximately 11.34 acres although the total acreage is probably larger given un-mapped smaller openings existing throughout the tract. A majority of these areas are at higher elevations, on dry south-west facing slopes and where chestnut oak stands predominate. These areas have a thick understory of greenbrier, invasive species, and also contain very good oak regeneration interspersed throughout. These blowdown areas should be considered as potential areas to completely open up, expanding group selection openings where good oak regeneration exists. After the harvest, a prescribed burn is

recommended in these areas to control or setback greenbrier, invasives, and other species while promoting vigorous oak regeneration. Constructing a firebreak for this activity may be challenging and should be incorporated into sale planning to facilitate operations.

Table 2. Gingrich Stand and Stock Table for Hardwoods for 0107 in June 2016.



The current forest resource inventory was completed in June, 2016 by Sabrina Schuler and Evan McDivitt. Fifty prism points were sampled over 122 acres. A tract summary of the forest resource inventory is given above and a species breakdown of the summary is given in Table 3 below. The tract's forest resource is composed of two different stratums based on the two major timber types and size classes mentioned below.

Oak-Hickory Stratum

The Oak-Hickory timber type provides very significant wildlife, timber resource, and value. The retention of species in this stratum is important in the Division's long-term timber management objectives. The Oak-Hickory type covers roughly 50.0% of the tract or about 61 acres and has an average basal area of 94.7 square feet per acre. The overstory is dominated by Chestnut Oak, White Oak, Black Oak, Pignut Hickory, and Yellow Poplar. The understory layer consists of mainly Chestnut Oak, White Oak, Yellow Poplar, Shagbark Hickory, and Pignut Hickory. The regeneration layer consists of mainly Sugar Maple, American Beech, Blackgum, Dogwood, and Sassafras.

Oak-Hickory Areas Not Affected By Blow-Down:
Single tree selection is prescribed to remove lower quality stems and mature to overmature trees to release a growing stock of high quality, more vigorous stems. Likewise, careful selection by free thinning of co-dominant stems will help to improve overall croptree spacing. Lower quality trees that include low-forking, leaning, overtopped/suppressed intermediates, epicormically sprouting, and deformed trees are planned to be marked for removal in an improvement cutting. Group selection may be implemented in areas of low quality stems, disease/damaged stems, low basal area, or maturity to help maintain long-term forest regeneration and sustainability. Regeneration will likely be mixed hardwoods with a component of oak. Areas with advanced oak regeneration present should be released with a group selection opening as conditions warrant. Following harvest, post-harvest TSI is recommended.

Oak-Hickory Areas Affected By Blow-Down:
The blowdown that occurred on May 7, 2016 opened up a significant portion of this tract (estimated 11.34 acres where basal area was effectively reduced to 0- 30 square feet/acre residual stocking). A salvage harvest is prescribed for these areas to remove merchantable timber and complete openings as soon as possible before it degrades and becomes un-merchantable. Because the wind essentially created the beginnings of large group selection openings residual trees in and around blown-down areas should be removed to complete these openings. Due to the presence of excellent oak rootstock in the 1-10 year age class within these openings, coupled with the need to address competing vegetation and (including invasives), a prescribed burn is recommended within five years after the salvage harvest in some or all of the openings. Such a burn would setback and help control competing vegetation and invasive species long enough to allow oak seedlings to vigorously re-sprout after the fire and then go on to establish and occupy the site.

Mixed Hardwoods
The mixed hardwoods type covers roughly 50% of the tract or about 61 acres with an average basal area of 115.1 square feet per acre. The overstory is dominated by Yellow Poplar, White Oak, Chestnut Oak, Black Oak, and Northern Red Oak, with Yellow Poplar sawtimber comprising approximately 37.5% of total basal area. The understory consists of mainly Yellow Poplar, Sugar Maple, Chestnut Oak, American Beech, and Red Maple. The regeneration layer consists of mainly Sugar Maple, Blackgum, American Beech, and Yellow Poplar.

Single tree selection cuttings are prescribed to remove lower quality stems and mature to overmature trees to improve crop tree spacing. An improvement cutting is prescribed to release quality oaks and hickories from crown competition of lesser-valued timber species. Overall, marking objectives within this component should consider oak, hickory, and other species of significant timber and wildlife value as the preferred crop trees to release. Improvement cuttings in this area will also be applied to remove low-forking, leaning, overtopped/suppressed intermediates, epicormically sprouting, and deformed trees. The long term result of these prescribed cuttings will increase timber and wildlife habitat diversity. Group selection is a possibility in areas of low quality, disease/damaged stems, low basal area, or maturity to help maintain long-term forest regeneration and sustainability. Planned regeneration openings are expected to return to mixed hardwoods with a strong component of Yellow Poplar. Areas with a

higher volume of oak-hickory regeneration will return with a heavier component of oak-hickory. Following the commercial harvest, post-harvest TSI is recommended to lower Sugar Maple / Beech stocking in areas with oak regeneration potential and for crop tree release.

Summary Tract Silvicultural Prescription and Proposed Activities

Given the recent severe wind damage, and the inventory and growth of the tract's forest resources, a managed timber harvest over the entire tract area is prescribed as soon as possible to salvage downed timber, enhance early successional habitatpromote forest growth and vigor. This harvest will yield an estimated 575-650 MBF.. Much of the white ash will also be removed due to Emerald Ash Borer infestations.

Invasives TSI is recommended for problem occurrences prior to timber harvest operations.

Recreational use of the area are to be considered in the design and implementation of any resource management activities on this tract.

Table 3. Overview of Sawtimber Volume Estimates in 0107 in June of 2016

Species	Harvest	Leave	Total
American Beech	8,110	3,130	11,240
Bitternut Hickory	2,580	0	2,580
Blackgum	1,640	0	1,640
Black Oak	57,000	48,700	105,690
Chestnut Oak	113,990	103,590	217,580
Northern Red Oak	16,850	27,300	44,140
Pignut Hickory	17,810	59,310	77,110
Post Oak	3,060	9,620	12,690
Red Maple	13,530	5,100	18,630
Scarlet Oak	2,670	2,710	5,380
Shagbark Hickory	0	11,960	11,960
Sugar Maple	1,400	800	2,190
White Ash	1,980	0	1,980
White Oak	50,540	164,960	215,510
Yellow Poplar	289,840	121,250	411,090
Tract Totals (Bd. Ft.)	**581,010**	**558,420**	**1,139,430**
Per Acre Totals (Bd. Ft./Ac.)	**4,760**	**4,580**	**9,340**

Proposed Management Activity	***Proposed Period***
Invasives TSI	CY2016-2017
DHPA timber sale project review	CY2016-2017
Timber Marking	CY2016-2017
Timber Sale	CY2016-2017
Postharvest recreation trail rehab as needed; including interpretive materials	CY2018-2019
Postharvest TSI, Prescribed Burn, & 3-year regen check	CY2019-2024
Follow-up croptree release in group selection openings	CY2030-2034
Reinventory and Management Guide	CY2034

To submit a comment on this document, go to: www.in.gov/dnr/forestry/8122.htm

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.

Note: Some graphics may distort due to compression.