Indiana Department of Natural Resources
Division of Forestry
DRAFT

RESOURCE MANAGEMENT GUIDE

State Forest: **Ferdinand**
Tract Acreage: **158**
Forester: **A. Smith**

Compartment: **01** Tract: **09**
Commercial Forest Acreage: **157**
Date: **8/6/2015**

Location

Tract 0109 is located in Dubois County, Section13 and 18, T3S, R3W and R4W in Ferdinand Township. It is located roughly 4.2 miles northeast of Ferdinand and 5.9 miles southwestof Birdseye. The tract is accessible by the Main Forest Road, firelane 3, and firelane 9.

General Description

Tract 0109 consists of approximately 158 acres with roughly 27.0 acres of planted eastern white pine, 63.5 acres of mixed hardwoods, 58.5 acres of oak-hickory forest, 8.0 acres of planted yellow poplar, and 1.0 acre in recreational use. A summary of the forest resources in tract 0109in relation to species dominance is noted below in Table 1.

Table 1.Overview of Forest Resources in Tract 0109

Overstory Sawtimber Layer	Understory Poletimber Layer	Regeneration Layer
Eastern White Pine	Sugar Maple	American Beech
White Oak	Yellow Poplar	Sugar Maple
Yellow Poplar	Eastern White Pine	White Ash
Northern Red Oak	White Oak	White Oak
American Beech	American Beech	Blackgum
Pignut Hickory	Pignut Hickory	Eastern White Pine
Shagbark Hickory	Red Elm	Yellow Poplar
Sugar Maple	Bitternut Hickory	Red Elm
White Ash	Shagbark Hickory	American Elm
Bitternut Hickory	Black Walnut	Bluebeech
Black Walnut	Northern Red Oak	Dogwood
American Sycamore	White Ash	Sassafras
Black Oak	Black Oak	Sweetgum
Eastern Cottonwood	Blackgum	Red Maple
Black Cherry	Persimmon	Basswood
Red Maple	Red Maple	Black Cherry
Sweetgum		Northern Red Oak
Blackgum		Pignut Hickory
American Elm		Black Walnut
		Shagbark Hickory
		Black Oak
		Eastern Red Cedar

History

The original land area that includes tract 0109(see Figure 1) was deeded to the State of Indiana in multiple sections. John and Elizabeth Kemper sold 10.0 acres to the State of Indiana on January 11, 1934. Delphina and Alois Niehaus and Stephen Linder sold 10.0 acres to the State on May 23, 1934. Henry and Agnes Tretter sold 100.0 acres to the State on June 15, 1934. Edwin and Lucille Berg sold 6.75 acres to the State of Indiana on August 27, 1934. The last portion of tract 0109 (77.1 acres) was acquired on May 8, 1968 from Alois and Pauline Tretter.

The early planting records are generally missing; however, most of the pines were planted during the Civilian Conservation Corp days in the mid to late 1930's. Records indicate that 3,850 yellow poplar and 850 northern red oaks were planted on the land acquired from Henry Tretter in 1944.

A timber sale was conducted in 1965 over 28 acres between tract 0109 and tract 0206. An estimated 69,000 BdFt was removed in 244 trees. Post-harvest TSI was conducted in the 1965 sale area during the winter of 1966-1967. Black walnuts were planted in a portion of the 1965 harvest area in March of 1967. Five-hundred Chinese chestnut trees were planted around the yellow poplar plantation on the Tretter acquisition for wildlife in 1969. Fifteen-hundred eastern white pines were planted along the north side of the main forest road in 1973. Two-thousand yellow poplars were planted on the 1968 acquisition on April 14, 1975. Eight-hundred red pine were planted along the main forest road in the 1968 acquisition on April 1, 1976.

Ben Hubbard conducted a forest resource inventory on April 14, 1976 (estimated 3,567 BdFt/acre total volume on 100 hardwood acres). A veneer timber sale was conducted on January 20, 1977 east of the yellow poplar plantation. It removed an estimated 14,251 BdFt in 37 trees and sold for $10,136.00. A reinforcement planting of the yellow poplar plantation was conducted on April 5, 1978. One-thousand yellow poplar and 1,400 autumn olive plants were planted at this time. Ben Hubbard conducted a timber sale east of the yellow poplar plantation on January 16, 1979. An estimated 143,368 BdFt in 379 trees were sold. Three-hundred black alders were planted near firelane 3 on March 31, 1981. Five-hundred more yellow poplars were planted in the yellow poplar plantation to fill in the open spaces on March 29, 1982.

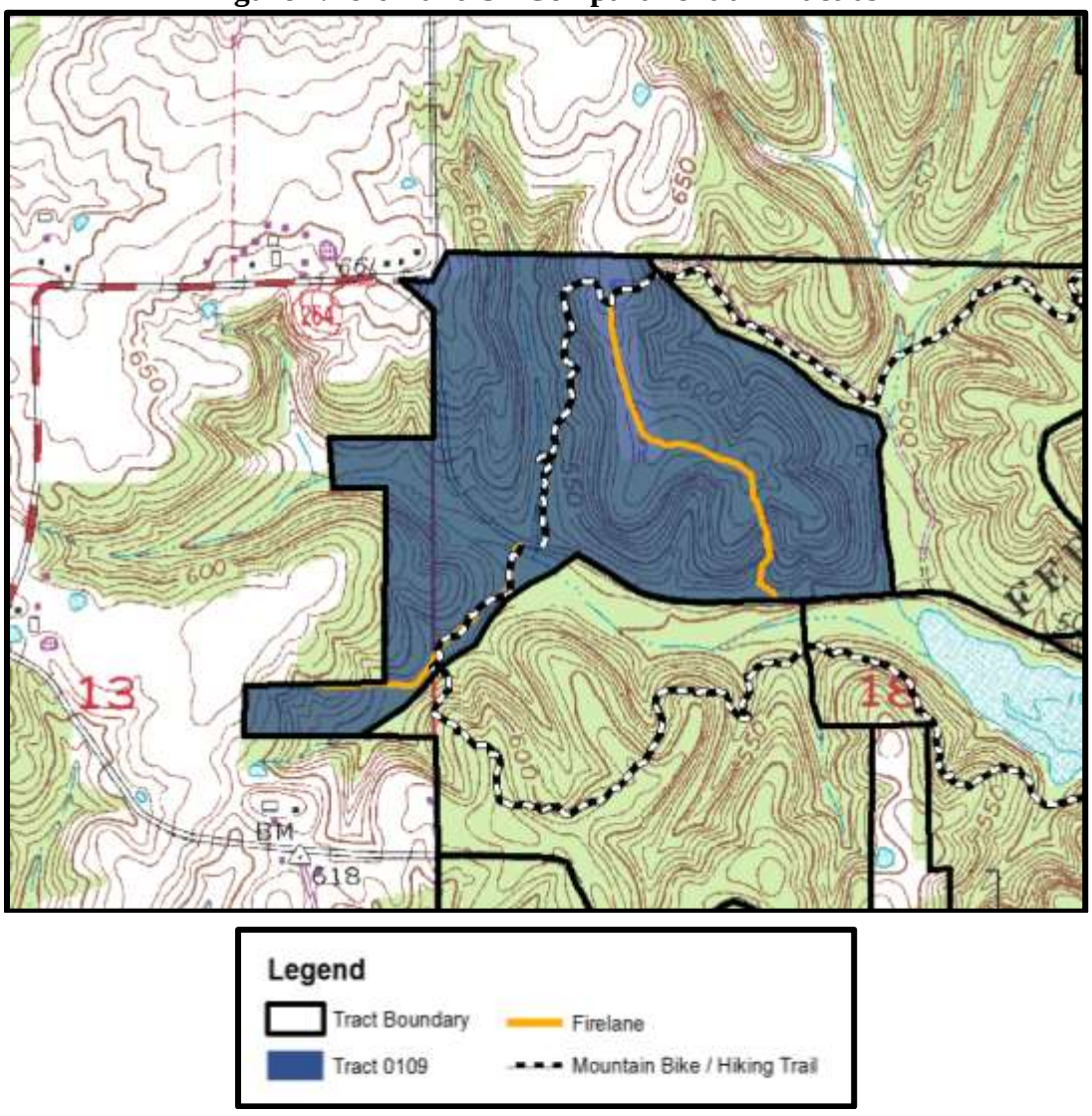
Doug Brown completed a resource inventory and resource management guide on December 1, 1995 (929,607.7 BdFt total volume estimated). Doug Brown conducted a timber sale on April 15, 1997 during which an estimated 241,530 BdFt in 808 trees and 63 culls were sold from 83 acres. A 10 acre area of the yellow poplar plantation was under planted with 300 red oak and 300 black oak seedlings in May, 1997 by Doug Brown. Post-harvest TSI was completed on the 83 acre harvest area by CR&R forester on April 4, 2000. The current tract resource inventory was completed on November 25, 2014 by Amanda Smith.

Landscape Context

The ridgetops are mostly comprised of the yellow poplar plantation, oak-hickory, and eastern white pine. The sideslopes are mostly comprised of oak-hickory, mixed hardwoods, or eastern white pine. The tract is surrounded by private agriculture fields, some residential lots, and state hardwood forest. Privately owned agriculture fields and private residential lots lie to the westand north of the tract. State forest lies to the east and south of the tract. Water sources on the

tractinclude small and large ephemeral drainages as well as the mapped intermittent stream that forms the eastern boundary of the tract, a mapped intermittent stream that cuts north and south through the western side of the tract, and the mapped intermittent stream that cuts through the southern portion of the tract. All of the streams and drainages drain into Ferdinand Lake.

Figure 1.Ferdinand SF Compartment 01 Tract 09



Topography, Geology and Hydrology

The topography of this tract is varied consisting of three main finger ridges that are divided by mapped intermittent streams and the main forest road. The topography is characterized from gentle to steep with the steepest slopes being along the mapped intermittent stream in the northwest section of the tract.

Soils

Cuba silt loam (Cu) is a frequently flooded soil with a depth of more than 80 inches to the water table occurring on 0-2% slopes in flood-plain steps. It is moderately permeable at 0.6 to 2 inches per hour. Available water storage profile is high at about 10.9 inches.

Gilpin silt loam (GID2) is a well-drained soil with a depth of more than 40 inches to the water table occurring on 12-18% 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). Gilpin silt loam (GID3) 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 silt loam (GIE) is a well-drained soil with a depth of more than 40 inches to the water table occurring on 18-25% side slopes in upland areas. 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 95 for yellow poplar.

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 range and depth to bedrock are the same as the previously listed Gilpin soils. The site index for Gilpin soils is 95 for yellow poplar and the site index for Berks soils is 70 for black oak.

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.

Tilsit silt loam (TIB) is a moderately well-drained soil with a depth of 18 to 30 inches to the water table occurring on 2-6% slope. Available water storage is low at 5.9 inches. The site index is 100 for yellow poplar and 60 for white 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 2-3 feet 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.

Access
Management access is gained by using the Main Forest Road, which runs along the southeastern edge of tract 0109 and then cuts across the tract in the southwest corner and up the west side of the tract. Access within the tract is good. Firelane 3 provides access to the interior of the north part of the tract and firelane 9 accesses the southern portion of the tract.

Boundary
Most of the tract's boundaries are indicated in the field; however, the lines will need to be flagged prior to any future management activities. Metal fence posts can be found at most of the corners. A corner stone and county surveyors sign can be found on the northwest corner of the southwest section of the tract. The corner with the corner stone and county surveyors sign has a potential trespass issue with the neighboring farmer. The most southern boundary line needs to be better identified and marked in the field.

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

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 the typical dominant trees in a mesic upland forest. Other plants that are found in this community include pawpaw, Ohio buckeye, blue beech, bitternut hickory, red mulberry, and bladdernut. Tiger salamanders, wood frogs, and wood thrushes are some animals commonly found in Mesic Upland Forests.

Dry-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. The dominant trees found are white oak, red oak, and black oak. Other plants and animals characteristic of this community are: shagbark hickory, mockernut hickory, flowering dogwood, hop hornbeam, blackhaw, broad-headed skink, white-footed mouse, and eastern chipmunk.

Dry upland forests occur on steep ridges at the crests of river bluffs and at the edges of escarpments throughout Indiana, but are most common on bedrock outcrops in the Shawnee Hills and Highland Region. The 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 you would find in a Dry Upland Forest.

Hard mast is abundant in the oak-hickory areas and some soft mast is availablein areas with canopy gaps due to mortality or storm damage. Several good den trees were spotted. The ephemeral drainages and the mapped intermittent streamsprovide ephemeral water sources for wildlife during non-droughty periods of the year.

The Division of Forestry has institutedprocedures 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 0109 will be conducted in a manner that will maintain quality and diverse forest habitats for wildlife long term.

Live Legacy Trees* and Snags inventoried November, 2014 on 0109

	Maintenance Level	Optimal Level	Inventory	Available Above Maintenance	Available Above Optimal
Legacy Trees *					
11"+ DBH	1,422		3,920	2,498	
20"+ DBH	474		1,136	662	
Snags (all species)					
5"+ DBH	632	1,106	2,677	2,045	1,571
9"+ DBH	474	948	1,348	874	400
19"+ DBH	79	158	281	202	123

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

Communities

Tract 0109 is composed of mesic to dry-mesic upland hardwoods dominated by oak-hickory, mixed hardwoods, a yellow poplar plantation, and pine plantings. The ground cover consists of mainly mesic to dry mesic species.

During the current resource inventory all portions of the tract were reviewed and evaluated for old growth potential as well as for Representative Sample Areas. No old growth areas appear to exist within this tract.

Exotic Species

Multiflora rose, Japanese honeysuckle, garlic mustard, Japanese stiltgrass, autumn olive, amur honeysuckle, black alder, periwinkle, and callery pear were found on tract 0109. The callery pear was located near the firelane on the south side of the main forest road. The callery pear needs to be controlled as soon as possible to prevent further spread into the tract area. The invasives are very heavy in several parts of the tract and need to be treated before any timber

harvest activities occur, especially in and around areas of planned regeneration openings. There were a couple of areas of good oak regeneration noted during the inventory that were also very heavy with Japanese honeysuckle. The garlic mustard was treated in 2014 and 2015 but may need to be treated again in the future.

Recreation

Both the Foxey Hollow Trail and the South Ridge Trail run through tract 0109. Other likely recreational activities on this tract include hunting, bird watching, wildlife viewing, and mushrooming. These are important recreation features on the property and will be given consideration during resource management planning and implementation. Trails may be temporarily closed or rerouted during active management periods.

Cultural

Cultural resources may be present but their location(s) are protected. Adverse impacts to significant cultural resources noted will be avoided during property management activities. A lot of private trash has been dumped over the years on the northwest corner of this tract just off from private property.

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.

Tract Summary Data

Total Trees/Ac.= **101Trees/Ac.** Overall % Stocking Hardwoods= **86%** (Fully Stocked)
BA/A = **109.9Sq. Ft./Ac.** Sawtimber & Quality Trees/Ac. = **37 Trees/Ac.**
Present Volume = **11,328Bd. Ft./Ac.**

Table 2.Gingrich Stand and Stock Table for Hardwoods for 0109

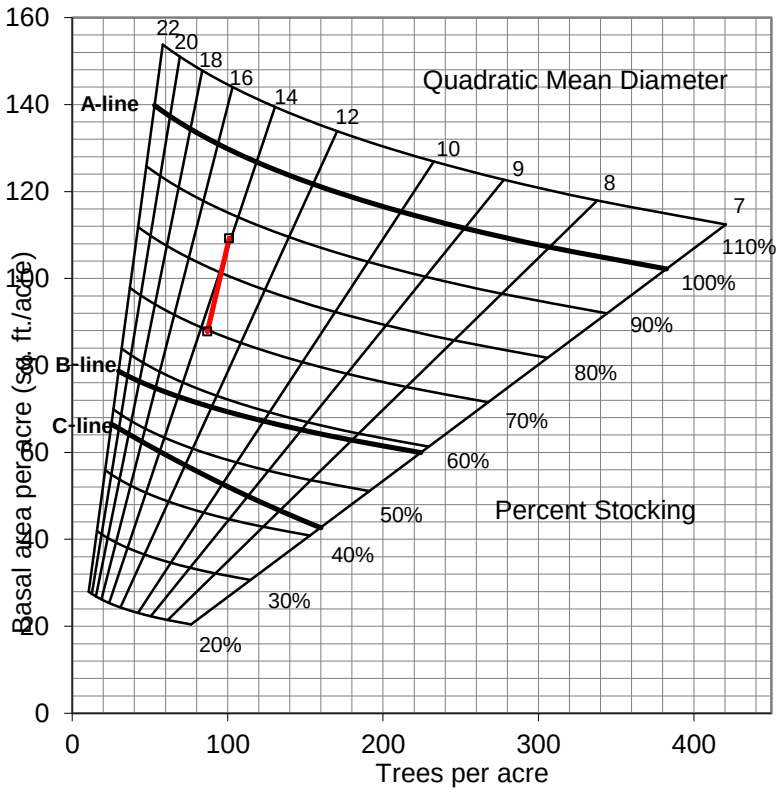
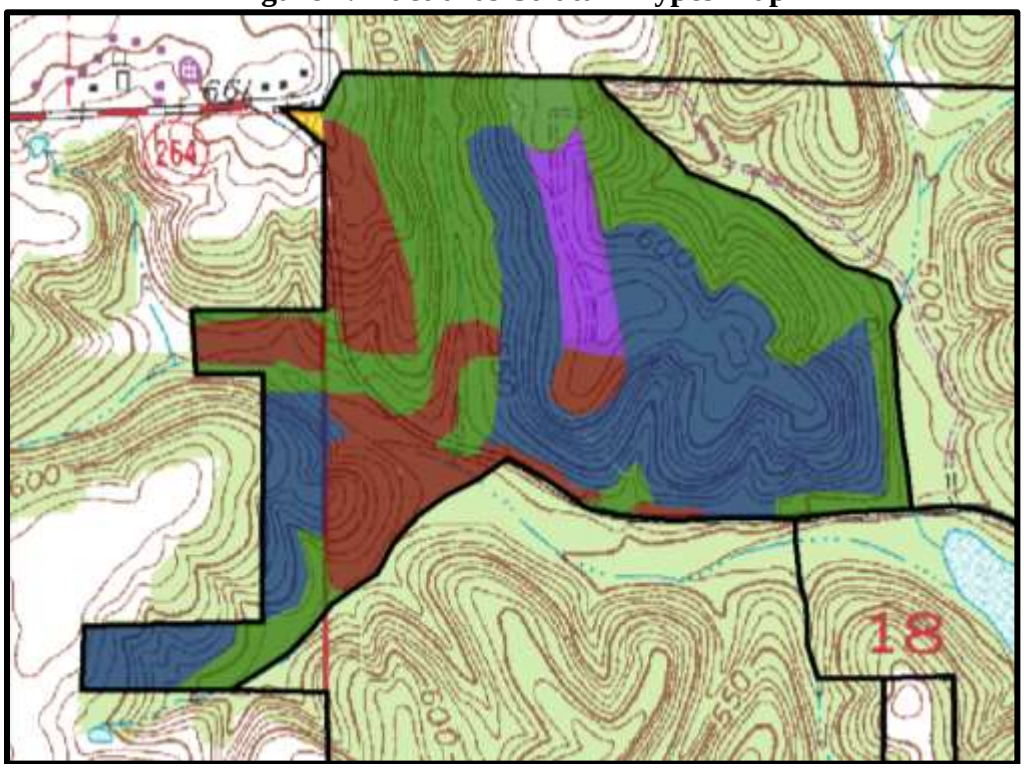
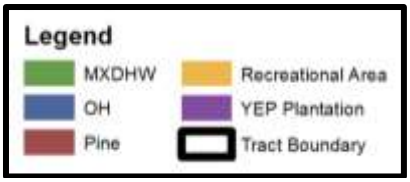


Figure 2.Tract 0109 Stratum Types Map





The current forest resource inventory was completed by Amanda Smith. Forty-two prism points were sampled over 158 acres (1 point for every 3.8 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 four different stratums based on the three major timber types and size classes mentioned below.

Oak 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 37.0% of the tract or about 58.5 acres. The overstory is dominated by white oak, northern red oak, pignut hickory, eastern white pine, and shagbark hickory with an average basal area of 108.8 square feet per acre. The understory layer consists of mainly sugar maple, white oak, pignut hickory, eastern white pine, and American beech. The regeneration layer consists of mainly sugar maple, American beech, white oak, eastern white pine, white ash, and sassafras.

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 crop tree spacing. Lower quality trees that include low-forking, leaning, overtopped/suppressed intermediates, epicormic 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 considered for release through group selection or shelterwood siliviculture.

Mixed Hardwoods

The mixed hardwoods timber type can be very variable in composition and thereby have more complicated prescriptions. The mixed hardwoods type covers roughly 40.2% of the tract or about 63.5 acres with an average basal area of 100 square feet per acre. The overstory ranges from small to large sawtimber in size.The overstory is dominated by yellow poplar, white oak, American beech, northern red oak, and sugar maple. The understory consists of mainly yellow poplar, American beech, sugar maple, and red elm. The regeneration layer consists of mainly sugar maple, American beech, bluebeech, and red elm.

Singletree selection cuttings are prescribed to remove lower quality stems and mature to overmature trees which will help to improve croptree spacing. An improvement cutting is prescribed to release quality oaks, hickories and walnuts from crown competition of lesser-valued timber species. Overall, marking objectives within this component should consider oak, hickory, walnut, and other species of significant timber and wildlife value as the preferred

croptrees to release. Improvement cuttings in this area will also be applied to remove low-forking, leaning, overtopped/suppressed intermediates, epicormic 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 YEP. Areas with a higher volume of oak-hickory regeneration will return with a heavier component of oak-hickory.

Yellow Poplar Plantation
The yellow poplar plantation covers roughly 5.1% of the tract or about 8.0 acres with an average basal area of 72.6 square feet per acre. The plantation is dominated by yellow poplar with some black oak, white oak, and northern red oak mixed in. Crop tree release work would improve the spacing between the better quality trees and overall tree vigor. Invasives TSI is also needed in and around the plantation.

Eastern White Pine Stratum
Pines were commonly planted for erosion control purposes during the first half of the 20th century. As these pines have matured and individual trees have declined native hardwoods have become established especially in the stratum's understory and canopy gaps. This timber type covers roughly 17.1% of the tract or about 27.0 acres of the tract with an average basal area of 144 square feet per acre.

The pine is located along the main forest road extending into the tract. The trees are medium to large sawtimber size. The areas with degrading pine have heavier hardwood regeneration including: yellow poplar, American sycamore, red maple, and white ash. While, overall the pine is in decline, pine along the main road could be retained as an aesthetic buffer- but these too will eventually be lost. Pines farther into the tract can be managed in this rotation depending on their current stand structure. Group selections are options for management in these areas and in areas of low quality, disease/damaged stems, low basal area, or maturity to help maintain long-term forest regeneration and sustainability. Areas where pole size hardwoods have emerged and entered the stratum canopy should be prescribed TSI for croptree release if not adequately released during the prescribed timber harvest. Overall, marking objectives within this component should consider oak and other species of significant wildlife value as the preferred croptrees for future conservation. Some quality and vigorous pine may be retained as they provide wildlife habitat diversity and cover.

Summary Tract Silvicultural Prescription and Proposed Activities
Invasives TSI is recommended prior to timber harvest operations.

Given the recent inventory and growth of tract 0109's forest resources, a managed timber harvest over the entire tract area is prescribed within the next five years and will yield an estimated 359,330 BdFt.

Table 3. Overview of Sawtimber Volume Estimates in 0109

Species	Harvest	Leave	Total

Eastern White Pine	75,220	542,400	617,620
White Oak	101,720	347,800	449,520
Yellow Poplar	55,190	213,450	268,640
Northern Red Oak	29,580	73,470	103,050
American Beech	37,450	53,830	91,280
Pignut Hickory	2,240	51,590	53,830
Shagbark Hickory	0	39,190	39,190
Sugar Maple	17,790	18,990	36,780
White Ash	23,520	6,710	30,230
Bitternut Hickory	2,180	18,920	21,100
Black Walnut	0	16,690	16,690
American Sycamore	2,280	11,510	13,790
Black Oak	7,160	6,430	13,590
Eastern Cottonwood	0	11,690	11,690
Red Maple	2,760	4,350	7,110
Black Cherry	0	6,810	6,810
Sweetgum	0	5,340	5,340
Blackgum	2,240	0	2,240
American Elm	0	1,400	1,400
Tract Totals (Bd. Ft.)	**359,330**	**1,430,570**	**1,789,900**
Per Acre Totals (Bd. Ft./Ac.)	**2,274**	**9,054**	**11,328**

Proposed Activities Listing

Proposed Management Activity	***Proposed Period***
Pre Harvest Invasives TSI	CY2016-2018
DHPA timber sale project review	CY2017-2021
Timber Marking	CY2017-2021
Timber Sale	CY2017-2021
Postharvest TSI & Invasives Follow-up	CY2021-2025
Regeneration Opening Review	3 Years Post Harvest
Reinventory and Management Guide	CY2030

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.