Indiana Department of Natural Resources
Division of Forestry
DRAFT

RESOURCE MANAGEMENT GUIDE

State Forest: **Ferdinand** Compartment: **07** Tract: **10**
Tract Acreage: **75** Commercial Forest Acreage: **75**
Forester: **K. Voiles, M. Vogel & A. Smith** Date: **8/27/2014**

Location

Tract 0710 is located in Perry County, Section 33, T4S, R4W in Clark Township. It is located roughly 1.75 miles southwest of Bristow and 5.0 miles southeast of Saint Meinrad. The tract is accessible by both Huffman and Clayborne Roads.

General Description

Tract 0710 consists of approximately 75 acres with roughly 5 acres of planted eastern white pine and Virginia pine and 70 acres of mixed hardwoods and oak-hickory forest. The pine area is located along the northern boundary of the tract. A mapped intermittent stream cuts under Huffman Road and then runs along the north side of the road. The sideslopes are mostly comprised of an oak-hickory mix with a mixed hardwoods composition mainly along the mapped intermittent stream. The overall timber quality of this tract is average and ranges from small to large sawtimber in size. A summary of the forest resources in tract 0710 in relation to species dominance is noted below in Table 1.

Table 1. Overview of Forest Resources in Tract 0710 in June, 2012

Overstory Sawtimber Layer	Understory Poletimber Layer	Regeneration Layer
White Oak	Sugar Maple	Sugar Maple
Sugar Maple	Bitternut Hickory	American Beech
Northern Red Oak	Blackgum	Bitternut Hickory
Bitternut Hickory	Northern Red Oak	Red Elm
American Sycamore	Virginia Pine	Red Maple
Sweetgum	White Oak	White Oak
Eastern White Pine	American Beech	
Yellow Poplar	Eastern White Pine	
American Beech	Sweetgum	
Black Oak	Shortleaf Pine	
White Ash	White Ash	
Pignut Hickory	Yellow Poplar	
Black Cherry	Red Maple	
Virginia Pine		
Shagbark Hickory		
Red Elm		
Red Maple		
Shortleaf Pine		
Sassafras		

History

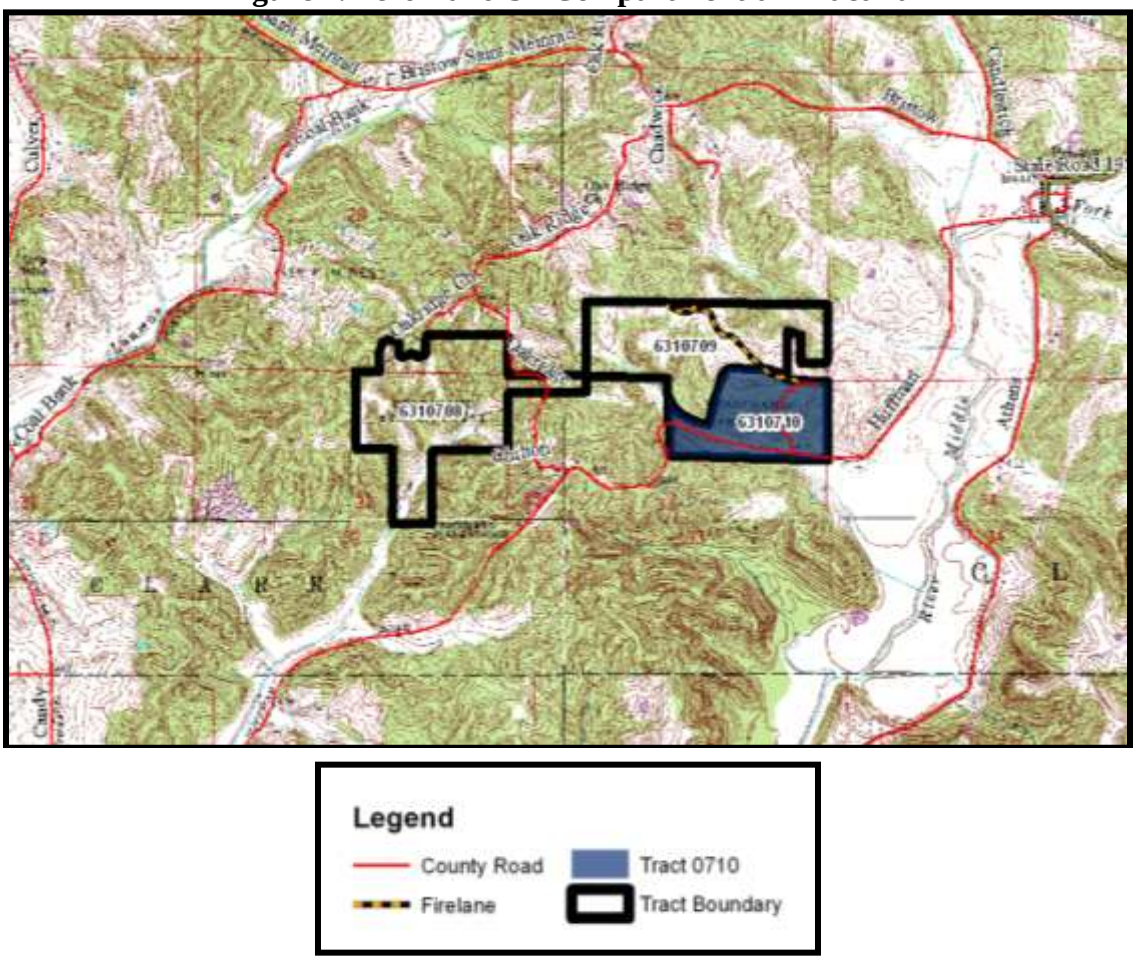
The land area that includes tract 0710 (see Figure 1) was deeded to the State of Indiana by Edward Bynon in 1954 and Earl W. and Olive Flamion in 1958; both for the price of $1.00. The first resource inventory was performed by forester Bill Hahn in 1973 (estimated 158,040 BdFt total volume). Forester Janet Eger conducted a resource inventory in 1986 (estimated 5,512.1 BdFt/acre total volume). Foresters Janet Eger and Ben Hubbard sold a combined timber harvest on tracts 0709 and 0710 on May 19, 1987 to Virgil Werner for $28,010.00 (estimated 161,573 BdFt from 110 acres). This harvest was completed on February 16, 1988. Post-harvest TSI was completed on all 110 acres on February 3, 1989 by Branchville Labor Line.

Forester Gretchen Herbaugh completed a forest resource inventory in May of 2005. She found there to be 3,988 board feet per acre total volume and she recommended a possible thinning but no harvest due to continued gaps in the canopy and small numbers of quality sawtimber sized trees. Kim Voiles completed a forest resource inventory in June of 2012 (estimated 11,139.33 BdFt/acre total volume). Kim's management guide was never submitted to the Central Office so the inventory was redone by Miranda Vogel in May of 2013. Miranda had equipment issues at the time of her inventory so this management guide has been completed using the 2012 inventory data and the field reviews from Kim Voiles, Miranda Vogel, and forester Amanda Smith. This tract was used for training purposes, which is why there were several inventories in a shorter time period than is typical for management cycles.

Landscape Context

The ridgetop along the northern edge of tract 0710 is comprised of planted pine that also covers a good section of tract 0709. The sideslopes are mostly comprised of an oak-hickory mix with a mixed hardwoods composition mainly along the mapped intermittent stream. This tract shares a boundary with tract 0709 to the north. The tract is surrounded by private woodlands, some open field, and state forest. There is privately owned farmland east of the tract. Farmland and rural homes lie scattered along SR-145 and along Huffman Road, heading towards the forest from Bristow. Bristow, IN is located approximately 1.2 miles northeast of the tract. Water sources on the tract include a mapped intermittent stream and small and large ephemeral drainages.

Figure 1. Ferdinand SF Compartment 07 Tract 10



Topography, Geology and Hydrology

This tract is characterized by dominantly south-facing slopes north of Huffman Road, varying from mild to moderately steep, and by north- and east-facing slopes south of Huffman Road. One intermittent stream, a tributary of the Middle Fork of the Anderson River, runs through the south-central part of the tract. Small sandstone outcrops can be found in the central part of the tract north of Huffman Road. Slope steepness and soil strength are limiting factors to consider during management.

Soils

Adyeville-Wellston-Deuchars silt loams (AbvD2) occurs on 8 to 20 percent sideslopes in upland areas, and is eroded. Native vegetation for this soil type is hardwoods. The surface layer is a silt loam with moderately low to moderate organic matter content (1.0 to 3.0 percent). Water erosion and droughtiness can pose management concerns. Within the tract, AbvD2 is found along the top of the finger ridges in the northern half of the tract and in a small area in the southwest corner of the tract. The Adyeville soils are somewhat excessively drained and have a watertable at a depth greater than 40 inches. No site index is given for the Adyeville soils. Wellston soils are well drained with a watertable at a depth greater than 40 inches. Bedrock is at

a depth of 40 to 60 inches. Site index for Wellston soils is 81 for northern red oak. Deuchars soils are moderately well drained with a seasonal high watertable at two to three feet. Permeability is slow (.06 to 0.2 inches per hour) in the most restrictive layer above 60 inches. Bedrock is at a depth of 60 to 80 inches. Site index for Deuchars soils is 90 for northern red oak.

Adyeville-Wellston-Deuchars silt loam (AbvD3) occurs on 8 to 20 percent sideslopes in upland areas, and are severely eroded. Native vegetation for this soil type is hardwoods. The surface layer is a silt loam with moderately low to moderate organic matter content (0.5 to 2.0 percent). Water erosion and droughtiness can pose management concerns. Within the tract, AbvD3 is found along the eastern boundary and in a small area along the northern boundary. This soil type does not make up a significant portion of this tract. The Adyeville soils are somewhat excessively drained and have a watertable at a depth greater than 40 inches. No site index is given for the Adyeville soils. Wellston soils are well drained with a watertable at a depth greater than 40 inches. Bedrock is at a depth of 40 to 60 inches. Site index for Wellston soils is 81 for northern red oak. Deuchars soils are moderately well drained with a seasonal high watertable at two to three feet. Permeability is slow (.06 to 0.2 inches per hour) in the most restrictive layer above 60 inches. Bedrock is at a depth of 60 to 80 inches. Site index for Deuchars soils is 90 for northern red oak.

Adyeville-Tipsaw-Ebal complex (AccG) occupies the greatest area in the tract, in the oak-hickory and hardwoods stand types. It occurs on 20 to 50 percent slopes, in very rocky upland sideslope areas. The native vegetation is hardwoods. Adyeville soils are somewhat excessively drained with a watertable at a depth greater than 40 inches. Bedrock lies at a depth between 20 and 40 inches. They consist of a very fine sandy loam surface layer with a moderate or high organic matter content (2.0 to 6.0 percent). Water erosion and droughtiness can pose management concerns. No site index is given for the Adyeville soils. Tipsaw soils are similar to Adyeville soils in every respect except organic matter content, which is a little higher in Tipsaw soils, at 3 to 8 percent. Tipsaw soils are poorly suited to harvesting equipment because of slope. Tipsaw soils have a site index of 70 for black oak. Ebal soils occur on 20 to 30 percent slopes. They are moderately well drained. The water table is seasonally high, at 2 to 3 feet. Bedrock can be found at a depth of 50 to 80 inches. The surface texture is silt loam, with 2.0 to 6.0 percent organic matter. These soils have very slow water permeability and moderate available water capacity. The pH range is the same as the other two soils. Ebal soils are poorly suited to harvesting equipment because of low strength and slope. Ebal soils have a site index of 80 for black oak.

Apalona silt loam (AgrC2) is found in the area of the pine as well as two other areas in the northern portion of the tract, on 6 to 12 percent slopes. It is an eroded soil. Its drainage class is moderately well drained. The water table lies at a depth of 2 to 3 feet, seasonally. Bedrock is at a depth of 72 to 100 inches down. This soil has 1 to 3 percent organic matter. Permeability is very slow. Available water capacity is moderate. The pH ranges from 4.5 to 6. The site index is 60 for both white oak and black oak.

Gatchel loam (GacAW) is found on 0 to 2 percent slopes on floodplains and is occasionally flooded for a very brief duration. It is a somewhat excessively drained soil with a watertable depth greater than 40 inches. Available water capacity is moderate. It has moderately low

organic matter content and because of the flooding hazard, this soil has a severe limitation for most non-agricultural uses. No site index value was given for this soil type.

Access
Access to the tract is good and can be accomplished from Huffman Road near the southern tract boundary and by Clayborne Road off of Huffman Road. Both roads would provide easy access points. Clayborne Road dead-ends near the top of the hill; a private driveway is present with the firelane 28 gate leading off to the left. Firelane 29 used to go north into the tract from Huffman Road; however maintenance of this firelane has been discontinued. Across the road from old firelane 29 is a small parking area.

Boundary
Boundary stones and carsonite posts were identified at each of the corners of this tract. The southwest corner has a stone present and two surveyor's posts with attached flagging. There is a private property line along the eastern boundary marked by fencing running most of the length of the boundary. There is also private property along a short section of the northeastern boundary. The rest of the northern boundary is the tract boundary between 0709 and 0710.

Wildlife
A Natural Heritage Database Review was completed for tract 0710 in 2014. 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.

Songbirds, crows, deer, box turtles, turkeys, and squirrels were observed in the tract during the inventory. Hard mast is abundant in the oak-hickory areas and some soft mast is available along the edges and among the pines. The mapped intermittent stream and the ephemeral drainages provide an ephemeral water source for wildlife during non-droughty periods of the year.

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 except for snags in the 19"+ size class. Management activities will include retaining several large diameter trees from the species listed below to allow for future large snag creation. Management practices conducted on 0710 will be conducted in a manner that will maintain the long-term and quality forest habitats for wildlife populations.

Live Legacy Trees* and Snags inventoried June, 2012 on 0710

	Maintenance Level	Optimal Level	Inventory	Available Above Maintenance	Available Above Optimal
Legacy Trees *					
11"+ DBH	675		3,045	2,370	
20"+ DBH	225		795	570	
Snags					

(all species)					
5"+ DBH	300	525	579	279	54
9"+ DBH	225	450	414	189	-36
19"+ DBH	37.5	75	31	-6	-44

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

Communities

Tract 0710 is composed of mesic to dry-mesic upland hardwoods dominated by oak-hickory, mixed hardwoods, and pine plantings. The dominant overstory timber species include White oak, sugar maple, northern red oak, bitternut hickory, and American sycamore. The understory contains mainly sugar maple, bitternut hickory, blackgum, northern red oak, and Virginia pine. The ground cover of tract 0710 consists of mainly mesic to dry mesic species.

Exotic Species

Japanese stilt grass, Japanese honeysuckle, Amur honeysuckle, and multiflora rose were observed during the inventory. Patches of these invasive exotic species are scattered throughout the tract, and are more prevalent where deteriorating pine is giving way to medium and large sawtimber-size hardwood species and in the presence of dead down debris. Control measures may be warranted if populations are located in future regeneration openings.

Recreation

Likely recreational activities on this tract include hunting, hiking, bird watching, wildlife viewing, and mushroom hunting.

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.

Tract Summary Data

Total Trees/Ac. = **193 Trees/Ac.** Overall % Stocking Hardwoods = **99%** (Fully Stocked)
BA/A = **117.6 Sq. Ft./Ac.** Sawtimber & Quality Trees/Ac. = **54 Trees/Ac.**
Present Volume = **11,179 Bd. Ft./Ac.**

Table 2. Gingrich Stand and Stock Table for Hardwoods for 0710 in June, 2012

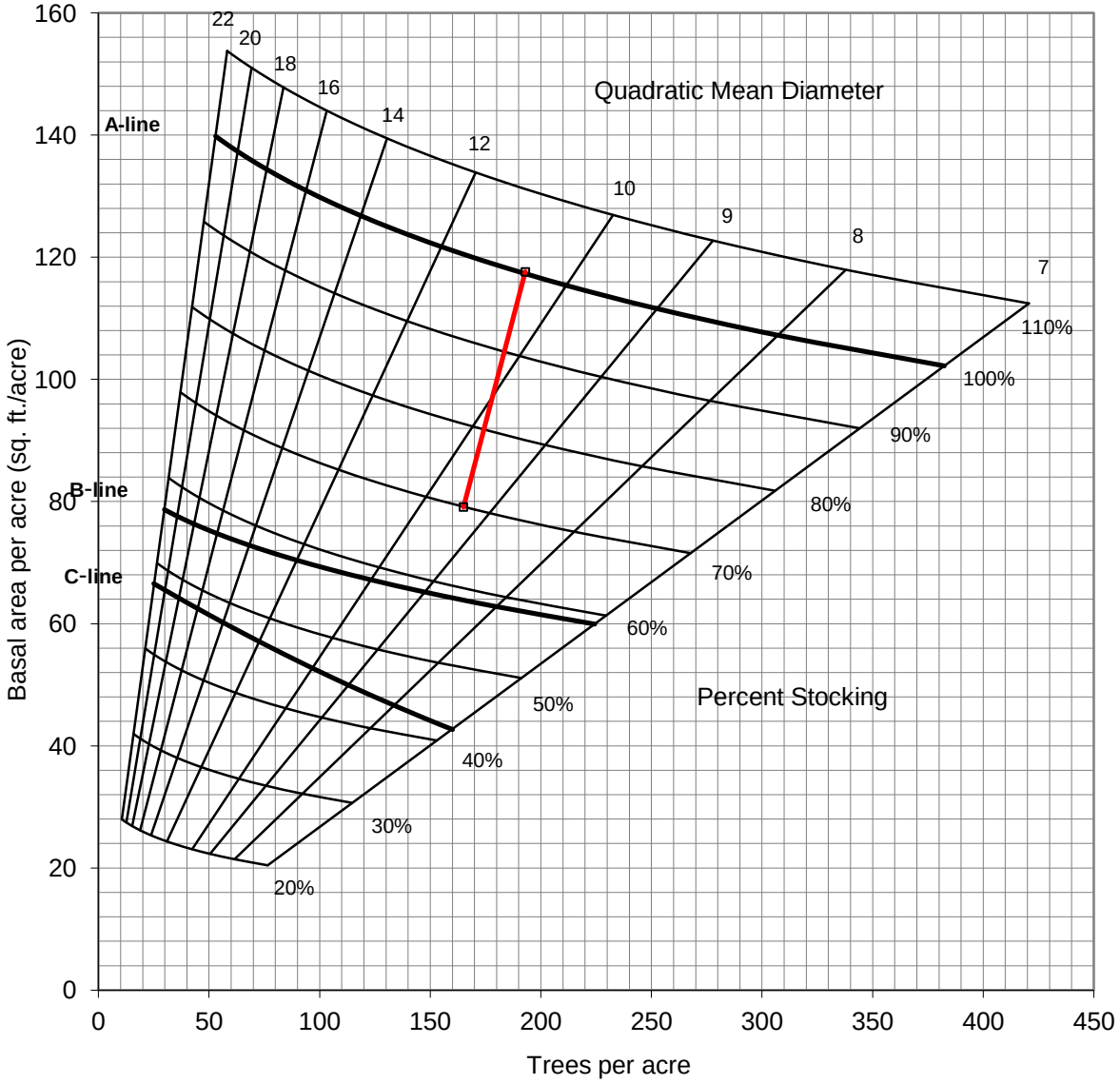
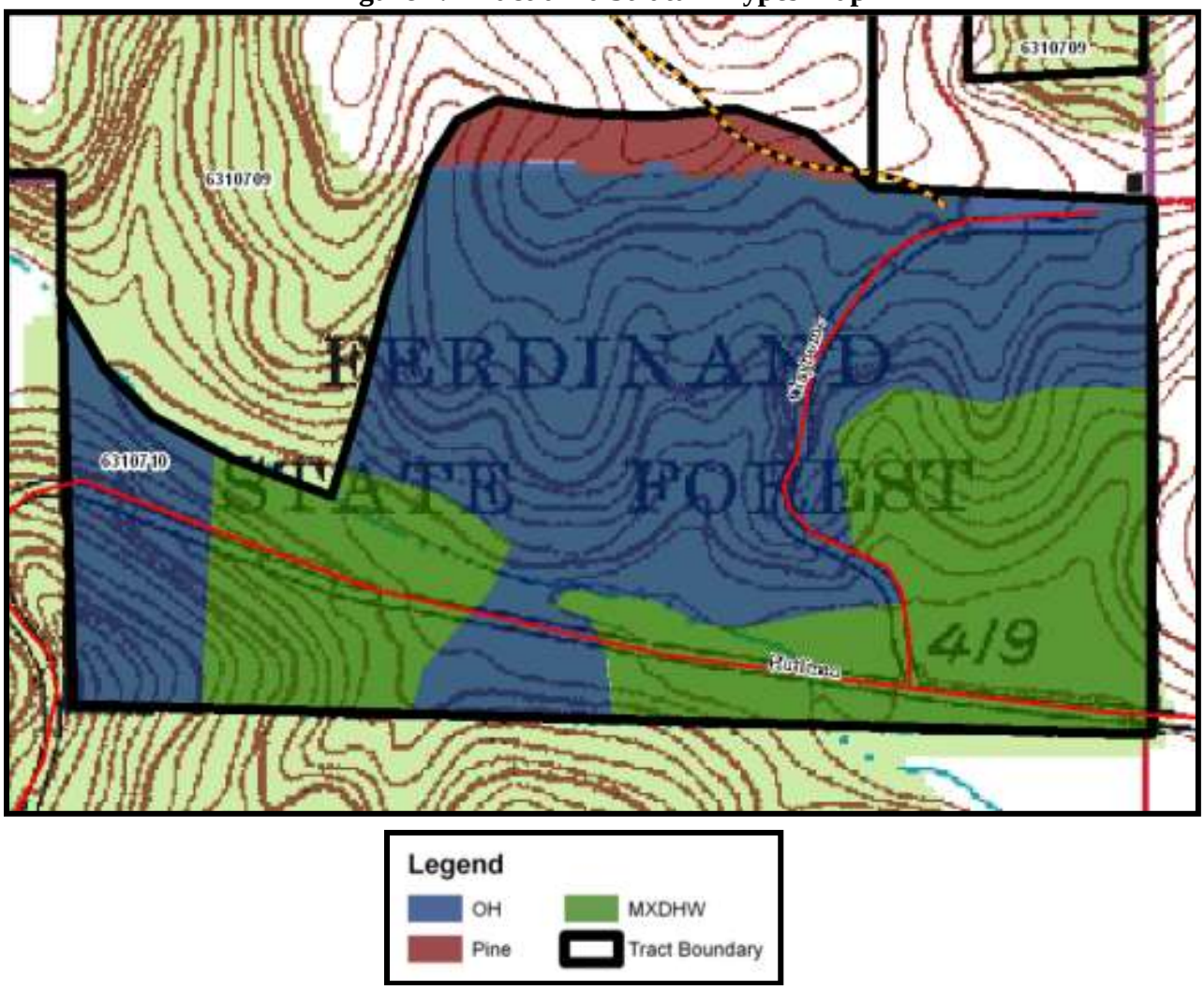


Figure 2. Tract 0710 Stratum Types Map



Kim Voiles completed a forest resource inventory in June of 2012 (1 point for every 2.5 acres). This management guide has been completed using the 2012 inventory data and the field reviews from Kim Voiles, Miranda Vogel, and forester Amanda Smith. A tract summary of the 2012 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 3 different stratums based on the 3 major timber types and size classes mentioned below.

Mixed Hardwoods & Oak-Hickory Stratums

This inventory has combined the oak-hickory stratum and the mixed hardwood stratum in TCruise. The tract contains approximately 70 acres of mixed hardwoods, on slopes and in flat bottomland areas in the southern part of the tract around the drainage. It is mainly an oak-hickory overstory with a beech-maple understory. The inventory found a substantial number of sawtimber sized white oaks and several could be selected for thinning purposes. The presence of spicebush and pawpaw throughout the tract indicates many fertile, well-drained sites. There are 194 trees per acre with a basal area of 115.3 and a 99% stocking level (fully stocked). With the

proposed harvest recommendation, this stand would be taken down to 169 trees per acre, a basal area of 81.2 and a 70% stocking level (fully stocked).

A fair amount the tract's yellow poplar appeared to be in modest decline as a result of the past three years of drought and the Tulip Poplar Scale insect infestation that occurred in the late spring of 2012. Affected yellow poplar will need careful review when the tract is marked as mortality is expected.

Sugar maple borer damage was noted in understory SUM throughout both the Mixed Hardwoods and Oak-Hickory stratum. In time this pest girdles the bole of the tree that results in the stem breaking apart during moderate and severe windstorms. Removal of affected trees will be classified as a combination improvement and sanitation cutting.

A single tree selection harvest is 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. This is an important change in the Mixed Hardwood component as these timber species tend not to be heavy mast producers nor tend to provide valuable timber resources. 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, 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 composition.

Pine Plantation 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. Pine makes up about 5 acres, located in the northern part of the tract. The average diameter is approximately 8.5 inches. There are 185 trees per acre in this stand, with a basal area of 150. A dense layer of shrubs and vines including poison ivy, spicebush, multiflora rose, greenbrier, Japanese honeysuckle, and Amur honeysuckle occur throughout the pine stratum wherever the overstory canopy is thin or open due to blowdown or mortality. Invasive exotics located in or near a prescribed group selection opening may need to be treated either prior to harvest or during the post-harvest TSI operation.

Pine areas can be selectively thinned to capture mortality and to increase the understory regeneration where needed. Group selections are options for management in areas of low quality, disease/damaged stems, low basal area, or maturity to help maintain long-term forest regeneration and sustainability. Group selections may be appropriate to regenerate the pine into native hardwoods. Areas where poletimber 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
Given the recent inventory and growth of tract 0710's forest resources, a managed timber harvest over the entire tract area is prescribed within the next five years and will yield an estimated 300-400MBF. Tract 0710 and tract 0709 could be harvested together easily due to similar timber type, topography, and access; firelane 28 cuts across tract 0710 and into tract 0709.

Much of the tract, especially in the bottomland areas just north and south of the road, and on some of the south-facing slopes, could be improved by thinning. Multiflora rose and Japanese stilt grass are thick in some areas, particularly the southeast corner. Treatment of these invasives would allow for better regeneration of timber species. Firelane 28 is in need of maintenance as it is overgrown.

The Indiana guidelines for Best Management Practices (BMP's) will be followed during timber harvest activities to maintain water quality. Portions, or all, of the tract will be submitted for postharvest TSI and/or invasives work if deemed appropriate by the administering forester. A field review for regeneration opening success is planned 3-4 years after opening TSI completion.

Table 3. Overview of Sawtimber Volume Estimates in 0710 in June of 2012

Species	Harvest	Leave	Total
White Oak	63,960	182,950	246,910
Sugar Maple	50,340	70,390	120,730
Northern Red Oak	47,610	50,060	97,670
Bitternut Hickory	0	49,820	49,820
American Sycamore	38,730	8,200	46,930
Sweetgum	21,720	21,330	43,050
Eastern White Pine	36,570	0	36,570
Yellow Poplar	30,090	5,740	35,830
American Beech	31,210	4,300	35,510
Black Oak	11,670	20,000	31,670
White Ash	16,320	8,730	25,050
Pignut Hickory	0	16,890	16,890
Black Cherry	7,970	6,890	14,860
Virginia Pine	1,020	8,200	9,220
Shagbark Hickory	0	8,730	8,730
Red Elm	0	8,120	8,120
Red Maple	2,930	1,330	4,260
Shortleaf Pine	0	2,610	2,610
Sassafras	1,020	0	1,020
Tract Totals (Bd. Ft.)	**361,160**	**474,290**	**835,450**
Per Acre Totals (Bd. Ft./Ac.)	**4,815**	**6,324**	**11,139**

Proposed Activities Listing

Proposed Management Activity	***Proposed Period***
DHPA timber sale project review	CY2015-2018
Rehabilitate Firelane 28	CY2015-2020
Timber Marking & Invasives Evaluation	CY2015-2020
Timber Sale	CY2015-2020
Postharvest TSI & Invasives Follow-up	CY2016-2021
Regeneration Opening Review	CY2019-2024
Reinventory and Management Guide	CY2028

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