

Indiana Department of Natural Resources
Division of Forestry
Draft
RESOURCE MANAGEMENT GUIDE

State Forest: **Pike State Forest**
Tract Acreage: **78**
Forester: **Evan McDivitt**

Compartment: **09** Tract: **08**
Commercial Forest Acreage: **78**
Date: **04/07/2017**

Location

Tract 0908 is located in Pike County, Section 36, T1S, R7W in Pike State Forest, Marion Township and has good access. It is bounded to the south by E CR 300 S; to the west by 775 E; to the north by E CR 250 S; and the boundary to the east is private land. There is sign of a small gravel parking area off 775 E. This was used as a log yard for the 1982 hardwood harvest. There are no roads into the tract.

General Description

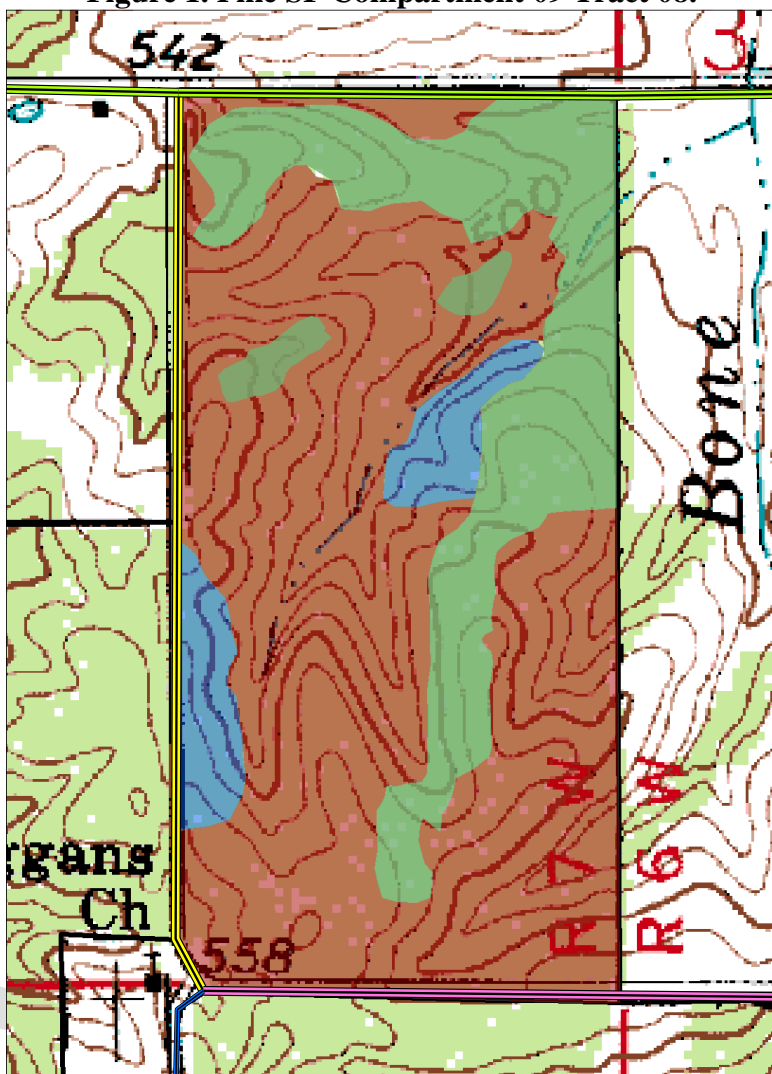
Tract 0908 contains 78 forested acres. Most of the tract is composed of a combination of mixed hardwoods and older white pine plantation. There are a few oak-hickory patches throughout the tract as well. Below is a table summarizing tree species identified during the inventory.

Mixed Hardwoods(61 total acres): This tract contains 61 acres of mixed hardwoods. They are found throughout the tract on various sites. They consist primarily of yellow-poplar. Some of the mixed hardwoods are intermingled with white pine in portions close to, and often inside, the old pine plantation. The understory contains a variety of species but most of the overstory consists of yellow poplar, sugar maple, blackgum, shagbark hickory, and black oak. Species in the understory include blackgum, red maple, paw-paw, white ash, sweetgum, dogwood, sugar maple, and some scattered oaks.








Oak-Hickory(7 total acres): This type is found primarily along the west end of the tract along the edge. Oak-hickory is found along one central portion as well. The primary species that dominate the overstory are white oak, black oak, northern red oak, and pignut hickory. In these areas, most of the understory consists of beech-maple or has little vegetation besides leaf litter or greenbrier.

White Pine(10 total acres): About 10 acres of this tract consists of an overstory of mostly white pine. White pine is found along the northern portion and along hilltops in the south-central portion of this tract. Most of the understory contains a composition of vigorous beech-maple growth with other competing mixed hardwoods, spicebush, and pawpaw patches.

Figure 1. Pike SF Compartment 09 Tract 08.



Legend

-  E Co Rd 325 S
-  E Co Rd 300 S
-  E Co Rd 250 S
-  775E
-  OH
-  PINE
-  MXDHW

**Table 1. Overview of Tree Species in 0908 –
(Total # Trees in Tract-Most abundant to least).**

Overstory Sawtimber Layer	Understory Poletimber Layer	Regeneration Layer
Yellow Poplar	Sugar Maple	Yellow Poplar
Eastern White Pine	Yellow Poplar	Sweetgum
Sugar Maple	Sweetgum	Sugar Maple
Blackgum	Blackgum	American Beech
Shagbark Hickory	Norway Spruce	Blackgum
Black Oak	Red Maple	Redbud
Pignut Hickory	White Ash	Pawpaw
Red Pine	Red Pine	Dogwood
American Sycamore	American Beech	Shagbark Hickory
Shortleaf Pine	American Elm	Black Oak
Red Maple	Black Cherry	American Elm
Sweetgum	Eastern White Pine	Black Cherry
Northern Red Oak	Sassafras	White Ash
White Oak	Virginia Pine	White Oak
Pin Oak	Black Oak	
Black Cherry	Pignut Hickory	
Silver Maple	Shagbark Hickory	
Black Walnut	Shortleaf Pine	
Norway Spruce	Silver Maple	
American Beech	White Oak	
White Ash	American Sycamore	
Chinkapin Oak		
Scarlet Oak		
American Elm		
Virginia Pine		
Red Elm		

History

According to the 1938 deed record map, this tract was deeded to the State in 1935 along with other tracts in sections 1 and 12 totaling 480 acres.

Resource Management History

The 1936 Pike County State Forest property map (redrawn 1970) shows five conifer plantings in this tract (sec. 36, T1S, R7W) in the 1930s: Norway spruce in 1935, white pine and eastern hemlock in 1936, and jack and red pine in 1938.

A large portion of the north 40 and some of the south 40 were planted to Norway spruce in May 1935 where the present white pine and mixed pine stands are located (listed as plantation 9, 10, 11, 12, and 13 on the old property map). This planting evidently failed and almost all of the spruce are gone. The spruce were reinforced with white pine planted in April 1936 in the same locations. The property map says, "50% or more replanted," but lists no quantities given for any species.

Eastern hemlock seedlings were planted in May 1936 in the southwest corner of the tract (plantation 42 on the map). It appears that these were erroneously listed as being in section 1 instead of the correct section 36. Only a few post and pole hemlock have survived and were observed in the March 2017 inventory.

Four acres of jack and red pine were planted east of the hemlock in 1938 (plantation 67). It appears that the jack pine is gone and some red pine has survived.

The tract was inventoried in 1971 by Bill Hahn who estimated 576 bd.ft. per acre in harvest volume and 2,920 bd.ft. per acre total volume on 46 hardwood acres. At that time, there were small oak-hickory and yellow poplar, pole size white pine, and post size red pine. He recommended pre-commercial TSI in the central area of hardwoods, a pole or pulp sale to thin the pines, and a hardwood timber sale around 1981.

A small area near the midpoint of the west line had TSI completed as a demonstration area around 1973. Janet Eager noted in 1980 that it was not effective and produced deformed and damaged trees. The tract was inventoried again in 1980 by Janet Eager who estimated 994 bd.ft. harvest volume and 3,630 bd.ft. total volume on 54 hardwood acres. The white pine were pruned in 1981.

There was a hardwood timber sale in 1982 to remove overmature and damaged trees in the central part of the tract. There were 38,570 bd.ft. in 149 trees on 24 acres (1,607 bd.ft. per acre) sold to W.H. Worley. There was also a white pine sale in 1982: 14,156 bd.ft. in 270 trees on 10 acres in the north (1,416 bd.ft. per acre) sold to Leroy Lewis. This was a thinning from below in trees from 8 to 18 in. dbh done mainly to improve the stand. Post-harvest TSI on 25 acres was done in the hardwoods in 1982 and skid trails and log yard were seeded in 1983.

This tract was inventoried in 1996 by John Zvirblis who estimated 3,127 bd.ft. per acre in harvest volume and 8,359 bd.ft. per acre total volume on 78 acres.

There was a hardwood timber sale in 1998 on approximately 42 acres. There was 96,242 bd.ft. in 414 trees (2,291 bd.ft. per acre) sold to Kat Milling Dimensions.

This tract was inventoried in 2017 by Evan McDivitt who estimated 4,123 bd.ft. per acre in harvest stock and 8,705 bd.ft. per acre total volume on 78 acres. Broken down by strata the

following estimates were obtained: Mixed Hardwoods contained 3,563 bd.ft. per acre in harvest stock and 8,508 bd.ft. per acre total volume on 61 acres; Oak-Hickory contained 1,837 bd.ft. per acre in harvest stock and 8,804 bd.ft. per acre total volume on 7 acres; Pine Plantation contained 9,140 bd.ft. per acre in harvest stock and 9,835 bd.ft. total volume on 10 acres.

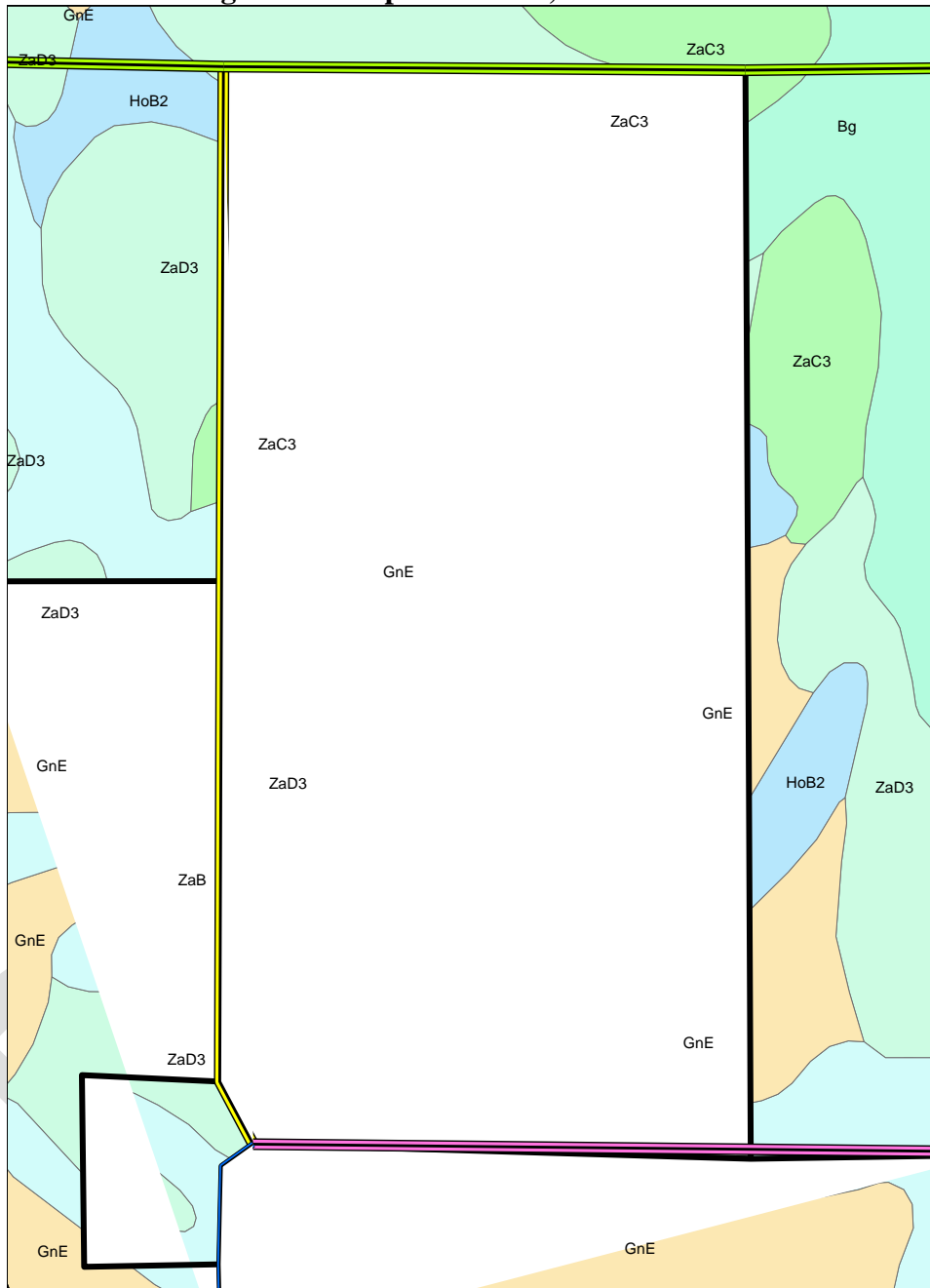
Landscape Context

The northeastern 16 acres of this tract lie within the Southwestern Lowlands Natural Region and the remaining 62 acres lie within the Southern Bottomlands Natural Region. The entire tract lies within the Boonville Hills physiographic province. Additionally, the entire tract lies within the Green River-Southern Wabash Lowlands ecoregion. Pre-settlement land cover for this tract has been classified as *Quercus-carya* vegetation type. Water from this tract drains into Bone Creek. Bone Creek runs north, and then eventually flows into the Patoka River southeast from this tract. Decaying pine dominates ridges throughout the tract, while mixed hardwoods dominate slopes and in the bottomlands. Clusters of oak-hickory canopy cover have been noted in a few locations. To the east, land within one mile of this tract is a half and half mixture of closed-canopy deciduous forest on private land and open fields. The south and western stretches are dominated by part of Pike State Forest. Other prominent land uses to the north of this tract include private agricultural, residential, and forestland.



Topography, Geology, and Hydrology

This tract contains relatively gentle terrain and one intermittent stream flowing from the south-central portion of the tract towards the northeastern corner. Slopes, predominantly north and northeast-facing with occasional west- and south-facing finger ridges, can be fairly steep. The majority of the tract has soils derived from loess deposits overtop siltstone, shale, and sandstone residuum. Some portions of the tract also have soils derived from underlying bedrock composed of nearly horizontal, interbedded gray/brown acid siltstone and shale.

Figure 2. Compartment 09, Tract 08 Soils.



Legend

-  E Co Rd 325 S
-  E Co Rd 300 S
-  E Co Rd 250 S
-  775E

Gilpin silt loam (GnE); (27 acres) is a moderately deep, well-drained soil type found on ridges and 15-30% side slopes. It is eroded and contains 1-3% organic matter. It is moderately permeable soil at 0.6 to 2 inches per hour above 60 inches and available water capacity is low at 3.9 inches above 60 inches, and can be subject to drought. The pH ranges from 3.6 to 5.5. Bedrock depth begins at 20-40 inches. This soil type has a site index of 95 for YEP. It is somewhat suited for growing black walnut. This type is moderately suited for harvest equipment operability.

Zanesville silt loam (ZaD3); (23 acres) is similar to ZaC3 and ZaB except that it occurs on 12-18% slopes and is severely eroded- a reflection of land use prior to State ownership. This type is moderately suited for harvest equipment operability.

Hosmer silt loam (HoB2); (13 acres) are deep, well-drained soils that develop on 2-6% eroded slopes. They have a fragipan, an altered subsurface soil layer that restricts water flow and root penetration, from 20-36 inches deep. These soils are deeper than Zanesville and are typically formed from a deeper loess cap. It is poorly suited for growing black walnut. This type is moderately suited for harvest equipment operability.

Zanesville silt loam (ZaC3); (8 acres) is similar to ZaD3 and ZaB except that it occurs on 6-12% slopes in upland areas and is severely eroded. This soil has a site index of 69 for white oak and 90 for yellow-poplar. This type is moderately suited for harvest equipment operability.

Zanesville silt loam (ZaB); (6 acres) is a widespread, moderately well-drained soil with a depth of 24-39 inches to the water table, seasonally. It occurs on 2-6% slopes in upland areas and is eroded, allowing a very high surface runoff rate. Organic matter content is moderately low at 1-2% and permeability is very slow. Available water capacity is around 8.2 inches above 60 inches. The pH ranges from 4.5 to 6.0. Bedrock begins at a depth of 50-90 inches. They can have a fragipan at 20-32 inches. It is poorly suited for growing black walnut. Site Index values are: 77 (Black Oak); 70 (White Oak); 88 (Yellow Poplar). This type is moderately suited for harvest equipment operability.

Belknap silt loam (Bg); (1 acre) is a very deep, somewhat poorly drained soil formed in acid, silty alluvium on flood plains. It is frequently flooded, having depth to the top of a seasonally high water table ranging from 12-24 inches. It is somewhat suited for growing black walnut. This type is moderately suited for harvest equipment operability.

Roads and Access

This tract has excellent access as it is surrounded on 3 sides by county roads, has pre-existing parking / log yard, and gentle slopes coming off of county roads and into tract. This tract is approximately 150 feet northeast from Spraggin's Church on S CR 325 S.

Boundary

The northern boundary is E CR 250 S; the western boundary is county road 775 E; the southern boundary is E CR 300 S; and the eastern boundary is private land. Approximately half of eastern boundary is forested private land whereas the northern half of the eastern boundary is open field.

Wildlife

A Natural Heritage Database Review was completed for tract 0908 as part of the management guide process. 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. Refer to appendix 1.

This tract has abundant signs of wildlife. This tract apparently receives high hunting pressure as well. This is evident by the number of deer stands located 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 for all size classes surpasses the optimal maintenance level, but Legacy Trees in the tract are less than the available maintenance for optimal Indiana Bat habitat in all size classes. All snags were selected to be retained during the inventory. Management practices conducted on 0908 will be conducted in a manner that will maintain the long-term and quality forest habitats for wildlife populations, and promote Legacy Tree development.

Table 2. Live Legacy Trees and Snags for 0908

	Maintenance Level	Optimal Level	Inventory	Available Above Maintenance
Legacy Trees *				
11"+ DBH	819		1761	942
20"+ DBH	273		461	188
Snags (all species)				
5"+ DBH	364	637	892	528
9"+ DBH	273	546	304	31
19"+ DBH	45.5	91	19	-26

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

Communities

Tract 0908 contains moderately dry-mesic ridgetops, dry-mesic slopes, mesic slopes, and occasional bottomland ecosystem types. Oak-hickory forest communities were primarily found

along dry ridgetops and the dry-mesic slopes. These slopes were typically south-facing, receiving the most sunlight. Within these communities, associates include Virginia creeper, poison ivy, rattlesnake fern, greenbrier, other oaks, and hickories. Understory species consist of sugar maple, American beech, sweetgum, and blackgum with less frequent appearances of oaks and hickories. Mesic slopes contain a dominant overstory of yellow poplar, sugar maple and blackgum with scattered oaks and hickories. Though yellow-poplar tends to be the dominant component in these types, the understory characterized by shade-tolerant species of sugar maple and American beech as well as sweetgum and blackgum also is a large component. A dense layer of spicebush and other herbaceous plants usually occupy the ground floor. Bottomland sites include overstory associates such as sugar maple, American sycamore, pin oak, and yellow-poplar, with understory of beech-maple, elm, and ash.

Exotic Species

Invasive multiflora rose and Japanese honeysuckle are significant throughout the tract, and will need intensive management to control. These invasives should be treated as part of a regular invasive species control program.

Recreation

This tract is approximately 5 miles from Old Ben Boy Scout Camp, a nearby recreation facility, and is also within 3 miles of Pike State Forest horsecamp and family campground. The tract used to have a walk-thru, self-guided forestry demonstration and interpretive trail, however, no evidence of this remains today. Other likely recreational activities on this tract include hunting, bird watching, wildlife viewing, and mushroom hunting. Currently, there are no developed recreation trails within 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 Description and Silvicultural Prescription

Tract Summary Data

Total Trees/Ac. = **166 Trees/Ac.**

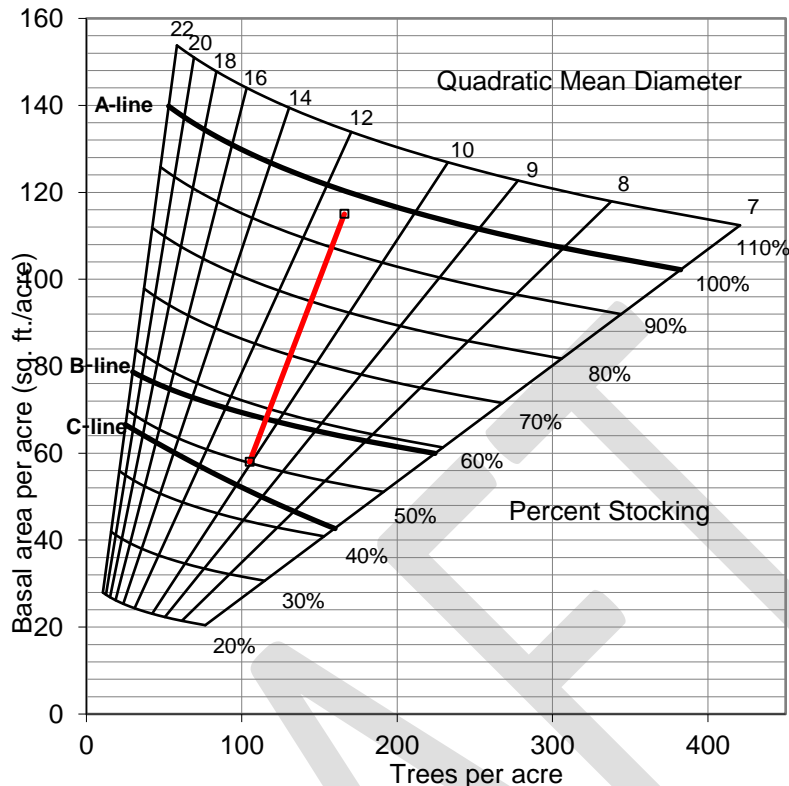
Basal Area = **115 Sq. Ft./Ac.**

Present Volume = **8,705 Bd. Ft./Ac.**

Overall % Stocking Hardwoods = **97%** (Fully Stocked)

Harvestable Trees = **60 Trees/Ac.**

Figure 3. Gingrich Stocking Level Chart for Tract 0908- Entire Tract.



The current forest resource inventory was completed by Evan McDivitt. 32 prism points were sampled over 78 acres (1 point for every 2.4 acres). A tract summary is provided in this guide. The stocking level is indicated by the chart provided above in Figure 3. The tract's forest resource is composed of 3 different strata.

Mixed Hardwoods Stratum

Mixed hardwoods tend to be variable in composition and thus may have more complicated prescriptions attached to them. This stratum occupies about 61 acres, covering roughly 78% of the acreage. The average total basal area for this stratum is around 108 square ft./acre. The overstory is dominated by yellow-poplar, with much of the mid-story growth being beech-maple. Some white pine and white oak are present in the overstory. Regeneration consists primarily of beech-maple, with an occasional oak species and yellow-poplar.

Pre-harvest invasive species control should be conducted if practicable to reduce competition by invasive species against desirable species such as oak and poplar in establishing a new cohort in the regeneration layer. Next, approximately one to two years following a good mast year for oaks, a mid-story removal (also called an oak shelterwood) is recommended. This mid-story removal is recommended because soils in this tract are considered intermediate to high-quality sites for oaks. The procedure should remove the mid-story shade tolerant species such as beech and maple, sweetgum, and blackgum while leaving dominant overstory completely intact. The mid-story removal may be accomplished through 1.) herbicide treatment (individual tree treatments such as tree injection, hack and squirt, or basal bark application only so as not to harm

oak advance reproduction); 2.) prescribed fire (which would give oak rootstock a competitive advantage upon resprouting); or 3.) a combination of both. Following the mid-story removal, once desirable oak advance regeneration has been allowed to reach approximately 3-4 feet in height, a regeneration harvest is recommended as soon as possible before advance oaks lose apical dominance. This mid-story removal may be restricted to places within the mixed-hardwood stratum where dominant oaks are present in the overstory. The mid-story removal should be utilized in areas where good oak regeneration can be expected and potentially where group openings are planned.

Single tree selection cuttings are prescribed to remove mature to over-mature trees and any cull trees in poor form. There are many yellow-poplar that are currently exceeding maturity that should be the main targets for removal, some ranging up to +30" DBH. These improvement cuttings will enable release of quality oaks and any oak regeneration occurring in the understory. Oak-hickory is the preferred stratum type and will require removal of crown competition for release of these valued species. The result will yield an increase in timber and wildlife diversity.

Oak-Hickory Stratum

The retention of species in this stratum is important to the Division's long-term timber and overall resource management objectives. This stratum occupies around 7 acres, covering roughly 9% of the acreage. The average total basal area for this stratum is around 108 square ft./acre. The overstory is dominated primarily by white oak, northern red oak, black oak, and pignut hickory, with much of the mid-story growth being beech-maple. There are a few sugar maple and yellow-poplar that make their way into the canopy layer along with an abundant layer of sweetgum and blackgum. Regeneration consists primarily of beech-maple, white ash, and some oak.

Pre-harvest invasive species control should be conducted if practicable to reduce competition by invasive species against desirable species such as oak and hickory in establishing a new cohort in the regeneration layer. Next, approximately one to two years following a good mast year for oaks, a mid-story removal (also called an oak shelterwood) could be conducted in sites appropriate to oak regeneration. This mid-story removal is recommended because soils in this tract are considered intermediate to high-quality sites for oaks. The procedure will remove the mid-story shade tolerant species such as beech and maple, sweetgum, and blackgum, while leaving the dominant overstory completely intact. The mid-story removal may be accomplished through 1.) herbicide treatment (individual tree treatments such as tree injection, hack and squirt, or basal bark application only so as not to harm oak advance reproduction); 2.) prescribed fire (which would give oak rootstock a competitive advantage upon resprouting); or 3.) a combination of both. Following the mid-story removal, once desirable oak advance regeneration has been allowed to reach approximately 3-4 feet in height, a regeneration harvest is recommended as soon as possible before advance oaks lose apical dominance. The mid-story removal should be utilized in areas where good oak regeneration can be expected and potentially where group openings are planned.

Single tree selection is prescribed to remove mature and over-mature, undesirable trees to release the growing stock of high quality stems, as well as promote regeneration of the oak-hickory

stratum. Most of the higher quality, seed trees should be left in the stand, but more of the co-dominant trees should be targeted for removal, such as beech-maple. Damaged trees that can be considered as cull trees are suggested for removal in the stand to promote a healthy forest. Most likely, regeneration will be comprised of mixed hardwoods, mainly beech-maple unless some TSI is implemented, with a component of oak. Areas with an abundance of oak regeneration should be considered for release through a group selection cut.

Eastern White Pine Stratum

The pine plantations were found to be overstocked and in decline. Number of trees per acre was found to be 229 and basal area was found to be 166 sq.ft. per acre. Pines were typically planted for erosion control purposes during the first half of the 20th century. As these pines have matured and slowly declined, native hardwoods have become established in canopy gaps and have to an extent reached the overstory where most of the pines are now. This stratum occupies approximately 10 acres, covering roughly 13% of the acreage. The overstory is dominated by mature white pine, shortleaf pine, some Norway spruce, and some large yellow-poplar which probably recruited in at the time of planting, but portions of the pine plantation are also mixed with hardwoods where pine mortality has been severe. Understory growth is composed of beech-maple, sweetgum, and blackgum for the most part, with other occasional hardwood species.

For this tract, some white pine could be retained for wildlife and the rest removed so native hardwoods can return to the site. The main goal is to promote native hardwood regeneration with an oak-hickory component in these areas if possible, and thus, harvesting the pine is prescribed. Most of the white pine in this plantation are on the decline and have succumbed to over-maturity, resulting in large snags that can be preserved along with downed woody debris. This has provided canopy gaps, in which there is an opportunity for TSI of invasives and understory beech-maple. Overall, group openings are an option for management in these areas for long-term forest regeneration and sustainability. Areas where pole-sized hardwoods have emerged and entered the canopy should be prescribed TSI for croptree release if not adequately released during the timber harvest.

Proposed Activities

Invasive species control is recommended prior to timber harvest operations. The beech-maple and sweetgum/blackgum understory may require TSI to promote oak-hickory regeneration (mid-story removal). Postharvest TSI should be performed along with invasives follow-up in large gap openings. A prescribed burn may help with setting back invasives and promoting oak regeneration as part of the post-harvest TSI. A regeneration review should be conducted three years after conducting all treatments. The tract should be reinventoried in 15-20 years.

Based on this information, a managed timber harvest over the entire tract area is prescribed within the next 5 years. Table 3 below provides estimated inventory volumes associated with each tree species. The prescribed harvest is projected at 200,000-300,000 board feet.

Table 3. Overview of Sawtimber Estimates in Tract 0908 in March 2017.

Species	Total
American Beech	3,660
American Elm	1,300
American Sycamore	27,620
Black Cherry	6,380
Black Gum	11,390
Black Oak	53,830
Black Walnut	5,960
Chinkapin Oak	3,020
Eastern White Pine	50,920
Northern Red Oak	16,810
Norway Spruce	4,190
Pignut Hickory	22,950
Pin Oak	9,340
Red Elm	1,500
Red Maple	12,650
Red Pine	8,720
Scarlet Oak	4,330
Shagbark Hickory	15,780
Shortleaf Pine	15,220
Silver Maple	5,110
Sugar Maple	26,050
Sweetgum	14,460
Virginia Pine	2,090
White Ash	6,660
White Oak	22,540
Yellow Poplar	326,250
Tract Totals (bd. Ft.)	678,720
Per Acre Totals (bd. Ft./Ac.)	8,705

Proposed Activities Listing

Proposed Management Activity

Pre-harvest Invasive Control
 Timber Sale
 Post-harvest TSI
 Regeneration Opening Review
 Reinventory and Management Guide

Proposed Period

CY2017-2019
 CY2019-2022
 Following harvest
 3-5 Years Postharvest
 CY2034-2039

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