Indiana Department of Natural Resources
Division of Forestry
DRAFT

RESOURCE MANAGEMENT GUIDE

State Forest: **Yellowwood** Compartment: **07** Tract: **18**
Tract Acreage: **92** Commercial Forest Acreage: **78**
Forester: **Amanda Smith (for Sean Sheldon)** Date: **1/16/2013**

Location

Y0718 is located in Sections 19 and 30 of Township 9N, Range 2E of Brown County. It is located roughly northeast of Yellowwood Lake being approximately 4.8 miles west of Nashville. The tract is bounded by Yellowwood Lake Road on its south and west boundary. Access into the tract is available directly off of Yellowwood Lake Road.

General Description

Y0718 consists of a total of 92 acres of which 86 are forested. There are 6 acres of open area that was recently used to store sediment from the 2010-11 dredging operation of Yellowwood Lake. Of the 86 forested acres, 46 acres are of Oak-Hickory forest, 27.1 acres are of Mixed Hardwood forest, 8.4 acres of Pine, and 4.5 acres of Old Regeneration Openings. The Mixed Hardwoods is subdivided into a 19 acre Mixed Hardwoods Stratum and an 8.1 acre Riparian Management Stratum designated along the tract's perennial stream on the tract's SE bottomland. Overall, approximately 78 acres are considered commercial forest acreage. Y0718's timber resource ranges from small to large sawtimber in size. The overall timber quality of this tract is below average to average. A summary of the forest resources in Y0718 in relation to species dominance is noted below in Table 1.

Table 1. Overview of Forest Resources in Y0718 in October 2012

Overstory Sawtimber Layer	Understory Poletimber Layer	Regeneration Layer
White Oak	Sugar Maple	American Beech
Black Oak	American Elm	American Elm
Red Pine	Yellow Poplar	Bitternut Hickory
Virginia Pine	Pignut Hickory	Black Oak
Sugar Maple	American Beech	Blackgum
Pignut Hickory	Black Oak	Bluebeech
American Sycamore	Red Maple	Ironwood
Yellow Poplar	Red Pine	Largetooth Aspen
Chestnut Oak	White Oak	Ohio Buckeye
Black Walnut	Black Cherry	Pawpaw
American Beech	Black Walnut	Pignut Hickory
Northern Red Oak	Blackgum	Red Elm
Shagbark Hickory	Sassafras	Red Maple
Red Maple	Virginia Pine	Sassafras
Bitternut Hickory	Basswood	Shagbark Hickory
Chinkapin Oak	Bitternut Hickory	Sugar Maple
Basswood	Black Locust	White Ash
Black Cherry	Largetooth Aspen	White Oak
White Ash	Shagbark Hickory	Yellow Poplar
Red Elm		
American Elm		

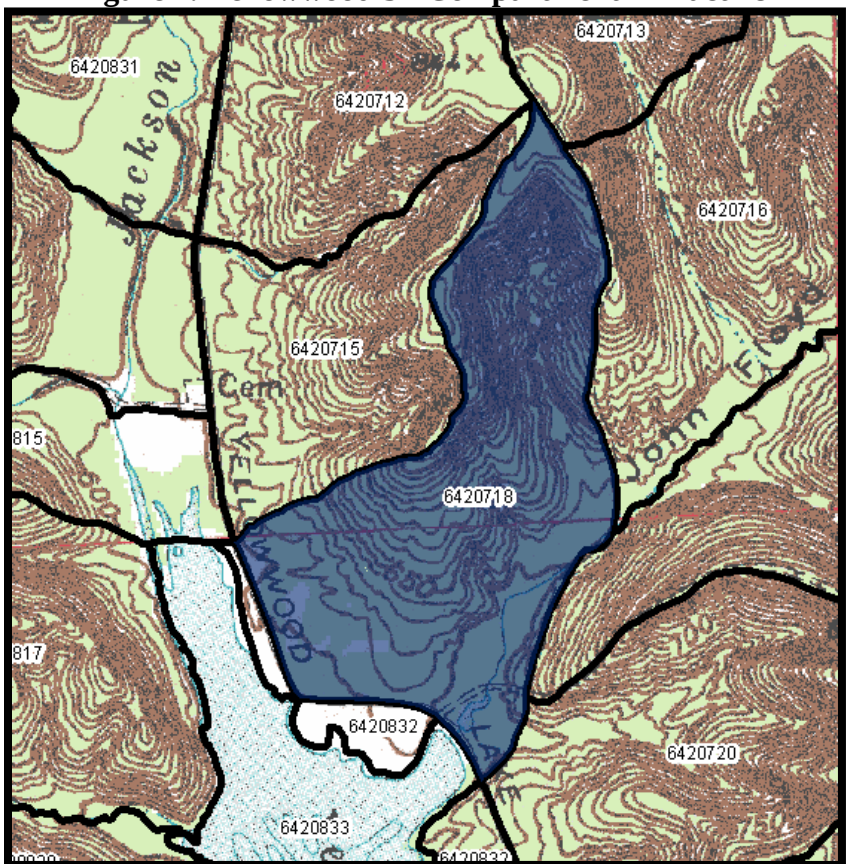
History

The land area that includes Y0718 (see Figure 1) was deeded to the State of Indiana in 1952 and 1953 by the United States Forest Service, Department of Agriculture. Historical aerial photography suggests that prior to government acquisition the valleys and ridgetops were farmed and the sideslopes likely to have been grazed. Tract 18 was created when Compartment 7 Tract 12 was split into tracts 6420715 and 6420718 in 1984. A 1990 inventory of Tract 18 was conducted by Forester Eckart to determine if adequate volume was present to sustain a timber harvest. A timber harvest was marked and sold in 1994 containing an estimated 158,450 BF from 46 acres of Tract 18. TSI was completed in 1994 and 1996 by a contracted TSI crew. A stump jump forest audit was completed on the Division of Forestry in February 5, 1996. The 2nd and current tract resource inventory was completed in October of 2012 by Forester Sean Sheldon. The results of that inventory are highlighted in the report below.

Landscape Context

The ridgetop and sideslopes of the northern half of the tract are mostly comprised of the dominant Oak-Hickory species known to occur in the Yellowwood/Morgan-Monroe State Forest ecosystem. The southern half of the tract is made up of planted Red and Virginia Pine, a recently disturbed open area, and a riparian stratum. The tract is surrounded by Yellowwood Lake and the dominantly closed forest canopy of Yellowwood State Forest with some maintained recreational openings and recreational buildings throughout the area. Yellowwood Lake lies across the southwest boundary of the tract and the northern headwaters and intermittently flooded marshes of Monroe Reservoir lie approximately 5 mile southwest of the tract providing stable habitats for migrating waterfowl as well as habitats for lowland mammals, herptiles, and birds.

Figure 1. Yellowwood SF Compartment 7 Tract 18



Topography, Geology and Hydrology
Tract 18 consists of predominantly southern sloping finger ridges that drain into the perennial stream at the south end of the tract. The ephemeral drainages drain into the perennial stream which then drains into Yellowwood Lake. In general, these upland soils were formed in residuum from sandstone, siltstone, and shale. The tract's topography ranges from 1 - 70% slopes with general south, east, and western aspects.

Soils

Ba- Bartle silt loam
This nearly level, deep, somewhat poorly drained soil found on flats on stream terraces. It is well suited to trees. It has a site index of 75 for White Oak and 85 for Yellow Poplar.

Be- Beanblossom channery silt loam, 1-3% slopes, occasionally flooded
This nearly level and gentle sloping, deep, moderately well drained soil is on flood plains, alluvial fans, and colluvial benches. It is fairly well suited to trees. Wet periods contribute to equipment use limitations. Rooting depth is somewhat restricted for some trees, i.e. Black Walnut, due to coarse fragments in subsoil. This soil has a site index of 95 for Yellow Poplar.

BgF- Berks-Trevlac-Wellston Complex, 20 to 70 percent slopes
These moderately steep to very steep well drained soils are on hillsides in the uplands. They are fairly well suited to trees. Erosion hazards and equipment limitations are the main management concerns due to slope. Consideration should be given during sale planning and implementation of Best Management Practices for Water Quality. This Complex has a site index of about 70 for northern Red Oak.

PeB- Pekin silt loam, 2 to 6 percent slopes
This gently sloping, deep, moderately well drained soil is on alluvial terraces. It is well suited to trees and has a site index of 70 for White Oak and 85 for Yellow Poplar.

PeC2- Pekin silt loam, 6 to 12 percent slopes, eroded
This moderately sloping, deep, well drained soil is found on sideslopes adjacent to drainageways on alluvial terraces. It is well suited to trees and has a site index of 70 for White Oak and 85 for Yellow Poplar.

WaD- Wellston-Berks-Trevlac Complex, 6 to 20 percent slopes
These moderately sloping to moderately steep, well drained soils are on sideslopes and narrow ridgetops in the uplands. They are well suited to trees. Seedling mortality can be an issue on the south facing Berks soils due to droughty conditions. This Complex has a site index of about 70 for northern Red Oak.

WeC2- Wellston-Gilpin silt loams, 6 to 20 percent slopes, eroded
These moderately sloping to moderately steep, well drained soils are on sideslopes and ridgetops in the uplands. They are well suited to trees. These soils have a site index for northern Red Oak of 71 in the Wellston and 80 in the Gilpin.

Access
Y0718 is directly accessible from Yellowwood Lake Road and a public parking area is located across the roadway at Yellowwood Lake. A proposed roadwork project has been reviewed by the Division of Forestry Archaeologist prior to completing any timber sale roadwork improvements.

Boundary
Y0718 is bordered on all sides by State Forest and Yellowwood Lake. The east and west boundaries run along previously disturbed firetrails. The southern boundaries are denoted by Yellowwood Lake Road and the perennial stream that flows from John Floyd Hollow.

Wildlife
A Heritage Database Review was completed for this tract. 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.

The Division of Forestry has instituted procedures for conducting forest resource inventories so that the documentation and analysis of critical live tree (legacy) and snag tree densities are examined on a tract basis in order to maintain the long-term and quality forest habitats.

The resource inventory was conducted during the fall of 2012 so summer breeding bird residents were not present. Songbirds were heard and the following bird species were identified during the inventory:

Downy Woodpecker	Pileated Woodpecker	Tufted Titmouse
Hairy Woodpecker	Redbellied Woodpecker	Wild Turkey
Northern Cardinal	Red-tailed Hawk	

Other species or sign observed within the tract indicates use by White-tailed Deer, Grey Squirrel, Eastern Chipmunk, Raccoon, Opossum, Coyote and other small mammals. Multiple deer trails were also noted throughout the tract. Tract 18 has an abundant supply of food resources such as soft and hard mast. The perennial stream that runs along the southeast boundary of the tract provides a consistent water resource for the tract throughout most of the year with nearby Yellowwood Lake also providing habitats for aquatic wildlife as well as waterfowl such as wood ducks.

The Indiana Division of Forestry recognizes the potential to improve Indiana Bat habitat on its lands by implementing comprehensive management practices. These management practices include obtaining data on size, species, and numbers of snag trees (See Table 2). Snag trees and the presence of some specific species of trees are a vital part of the Indiana Bat policy as they provide prime roosting sites for maternal colonies. According to the Wildlife Habitat Feature Summary, the levels of snags and legacy trees are generally below target levels. An emphasis will be made during marking to retain larger diameter trees of specific species to allow for the stratum to move towards the maintenance level of 20"+ DBH legacy trees in the future. A Timber Stand Improvement (TSI) project following the completion of the proposed harvest will increase snag abundance.

Management practices conducted on Y0718 will be conducted in a manner that will maintain the long-term and quality forest habitats for Indiana Bat populations.

Table 2. Live Legacy Trees* and Snags inventoried October 2012 on Y0718

	Maintenance Level	Optimal Level	Inventory	Available Above Maintenance	Available Above Optimal
Legacy Trees *					
11"+ DBH	810		1,454	644	
20"+ DBH	270		248	**-22**	
Snags (all species)					
5"+ DBH	360	630	254	**-106**	**-376**
9"+ DBH	270	540	254	**-16**	**-286**
19"+ DBH	45	90	24	**-21**	**-66**

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

Communities

The ground cover of this tract consisted of mainly mesic to dry mesic species. Observed species included:

Appendaged Waterleaf	Gooseberry	Poison Ivy
Blackberry	Goldenseal	Red Raspberry
Black Locust	Grape Vine	Sedge spp.
Buttonbush	Grass spp.	Spicebush
Christmas Fern	Greenbrier	Squawroot
Clayton's Bedstraw	Hazelnut	Stickywilly
Cleavers	Japanese Honeysuckle	Stinging Nettle
Enchanter's Nightshade	Jewelweed	Virginia Creeper
False Mermaid	Multiflora Rose	Wild Strawberry
Giant Ragweed	Oriental Bittersweet	Wreath Goldenrod
Goldenrod	Pawpaw	

Squawroot (Conopholis americana) is a plant that is parasitic on the roots of oak trees.

Exotic Species

Black Locust, Japanese Honeysuckle, Multiflora Roase, and Oriental Bittersweet were observed during inventory mainly along the Yellowwood Lake Road and throughout the southern portion of the tract. Multiflora Rose has become naturalized among the Brown County landscape, therefore, only large concentrations will be considered for treatment, especially in areas of forest regeneration. Black Locust has also become naturalized in Indiana, however, an effort to remove it during marking and postharvest TSI is planned. Japanese Honeysuckle was observed in the southern portion of the tract along the perennial stream. Japanese Honeysuckle and Oriental Bittersweet are especially invasive species that have the potential to increase their population in short periods of time and should be treated as observed.

Multiflora Rose - *Rosa multiflora*

Multiflora rose is an exotic shrub that was once planted widely as a "living fence" to confine livestock. It is extremely prolific and can form impenetrable thickets that exclude native plant

species. If it is left to grow, it spreads throughout the understory of forested stratums making it difficult for trees to regenerate. Multiflora Rose has become naturalized among the Brown County landscape, therefore, only large concentrations should be considered for treatment. However, proposed regeneration openings should also be treated where infestations are present. Moderate infestations can be controlled with foliar spraying of vegetation with a mixture of 3% Glyphosate or Triclopyr and ½% non-ionic surfactant according to label instruction. The best window occurs during July through September. Follow up spraying is often needed.

Japanese honeysuckle- *Lonicera japonica*

Japanese honeysuckle is an invasive exotic evergreen vine. It grows in dense clumps often strangling host plants and shading out native vegetation. Moderate infestations can be controlled with foliar spraying of vegetation with a mixture of 3% Glyphosate or Triclopyr and ½% non-ionic surfactant according to label instruction. The best window occurs during October to March. Follow up spraying is often needed.

Oriental Bittersweet - *Celastrus orbiculatus*

Oriental bittersweet is an invasive exotic deciduous vine that tends to grow into the canopy of trees. It spreads into the tree canopy often inhibiting tree growth and cause damage from the increased weight. Broken pieces of the vine will fall to forest floor and shade out native vegetation before climbing into new trees. Foliar treatments of mixture of 3% Glyphosate or Triclopyr and ½ % non-ionic surfactant according to label can be effective. The best window is anytime during growing season from June to September. Cut surface treatments works best for larger vines. The surface can be treated with a 20% Glyphosate and 80% water mixture according to label. The best window for this is August through December. Follow up treatments are likely.

Old Growth and Representative Sample Area (RSA) Assessments

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. A Representative Sample Area (RSA) is an ecologically viable representative example of a natural community that is designated to establish and/or maintain an ecological reference condition, to create or maintain an under-represented ecological condition, or to serve as a refugia for species, communities, and community types. An area should be considered for Type 1 Old Growth classification if it contains 3 or more acres of forest land that appear to have never been harvested or disturbed by man. An area should be considered for Type 2 Old Growth classification if it contains 20 or more acres that have not been logged in the last 80 years and shows developing old growth characteristics. No representative stratums of Type 1 or Type 2 Old Growth appear to exist within Y0718 nor were any RSA's.

Recreation

Activities on this tract include hiking, bird watching, wildlife viewing, hunting, and mushrooming. Y0718 is accessible from Yellowwood Lake Road and a public parking area is located across the road at Yellowwood Lake. A posting for restricted access, in the event of a future timber harvest, is planned so as to reduce interaction with timber harvest and recreational values.

Cultural

Cultural resources may be present on this tract. If present their location is protected. Adverse impacts to noted significant cultural resources will be avoided during management or construction activities.

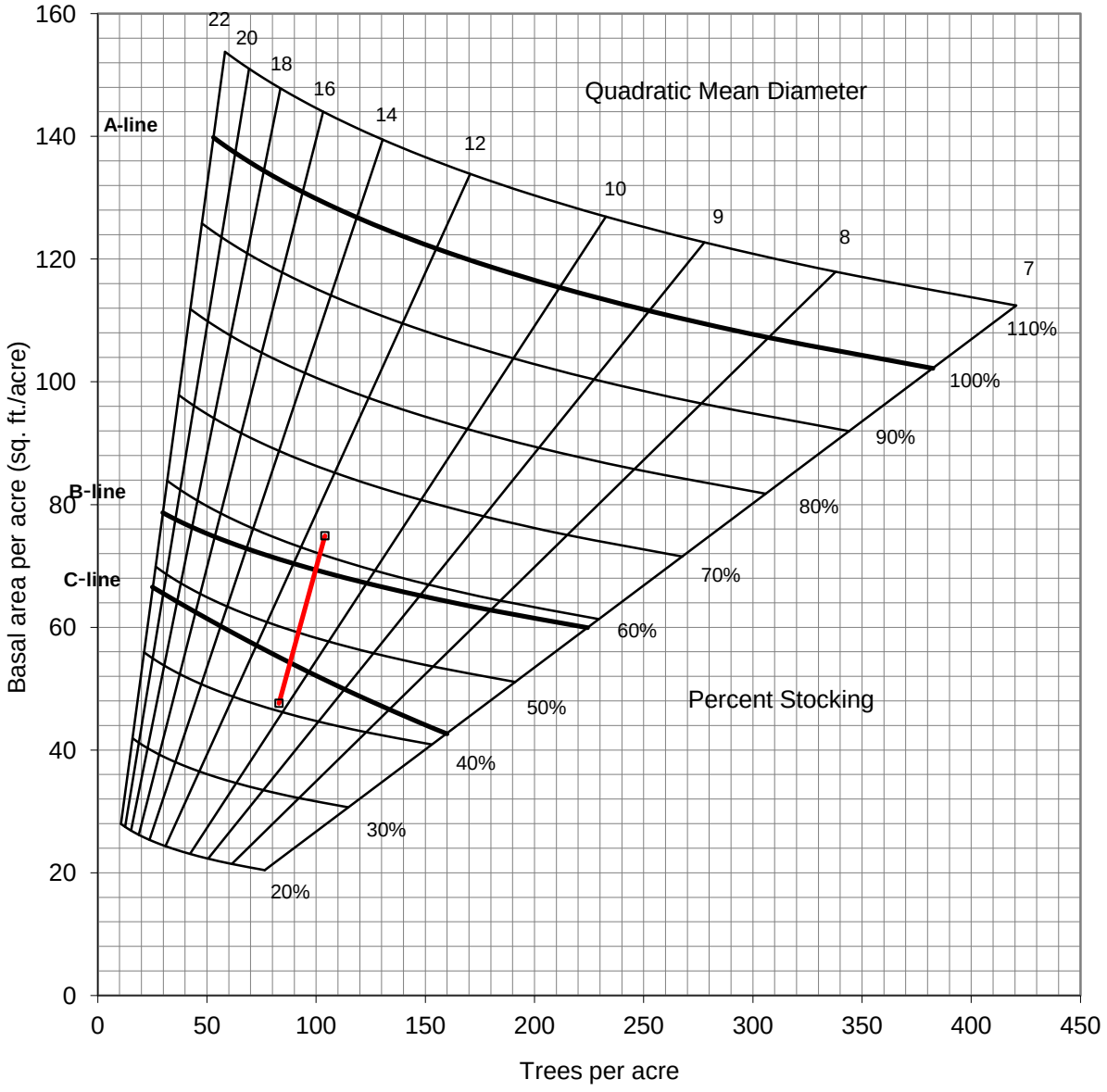
Tract Subdivision Description and Silvicultural Prescription

The overall stratum structure for this tract is represented in the following Gingrich Stratum and stock table that follows the individual stratum summary.

Tract Summary Data

Total Trees/Ac. = **104 Trees/Ac.**
Overall % Stocking = **63%** (Fully Stocked)
BA/A = **74.9 Sq. Ft./Ac.**
Sawtimber & Quality Trees/Ac. = **41 Trees/Ac.**
Present Volume = **4,495 Bd. Ft./Ac.**
Harvest Volume = **1,514 Bd. Ft./Ac.**
Residual Volume/Ac. = **2,981 Bd. Ft./Ac.**

Table 3. Gingrich Stratum and Stock Table without sub-merchantable data for Y0718



Summary Tract Silvicultural Prescription and Proposed Activities
The current forest resource inventory was completed in October of 2012 by Forester Sean Sheldon. 34 prism points were sampled over 92 acres (1 point for every 2.7 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. This tract is fully stocked and parts of the tract could benefit from a timber harvest. The proposed timber sale on this tract would likely yield 90 – 140 MBF. A joint sale with tracts 6420712 and 6420715 would be most beneficial for the area, the firetrail access, and the log yard locations. The tract's forest resource is composed of 5 different stratums (Figure 2) based on the 3 major timber types and size classes mentioned below.

Oak-Hickory Stratum
As the Oak-Hickory component of the Eastern Hardwood Ecosystem provides the most significant wildlife, timber resource, and value the retention of these stratums is important in the Property's longterm management program. The Oak-Hickory timber type covers roughly 50% of the tract or about 46 acres. The overstory is dominated by WHO, BLO, and PIH with an average basal area of 81.2 square feet per acre. Singletree and selection cutting are 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 should be prescribed to create regeneration openings where there is an abundance of advanced regeneration of oak and hickory seedlings or where the overstory has too low of stocking to carry the stratum through the current cutting cycle.

Mixed Hardwoods Stratum
The Mixed Hardwoods component of the Eastern Hardwoods Ecosystem can be very variable in their composition and thereby have more complicated prescriptions. The Mixed Hardwoods timber type covers roughly 29.5% of the entire tract or about 27.1 total acres, however roughly 8.1 acres of the Mixed Hardwoods are located within 100 feet of a perennial stream and will be managed as a Riparian Management Area. Therefore, the Mixed Hardwoods Management Stratum covers roughly 20.7% of the tract or 19 acres. The overstory is dominated by YEP, SUM, AMB, and BLO with an average basal area of 68.3 square feet per acre. Singletree and 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. The long-term result of these prescribed cuttings will increase timber diversity as well as enhance wildlife habitat as most of the species within the Mixed Hardwood component are not heavy mast producers nor tend to provide valuable timber resources. Improvement cuttings in this stratum will also be applied to remove low-forking, leaning, overtopped/suppressed intermediates, epicormically sprouting, and deformed trees. The Mixed Hardwood stratum is often where most of these goals are applied as they tend to have lower Oak-Hickory elements. Planned regeneration openings will most likely return to mixed hardwoods with a strong component of YEP. Overall, marking objectives within this component will consider oak and other species of significant wildlife value as the best croptrees for future conservation. This year a fair amount the tract's YEP 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. The affected YEP will need careful review when the tract is marked as modest mortality is expected. Sugar Maple borer damage was noted in understory SUM throughout both the Mixed Hardwoods stratum and the Oak-Hickory stratum. In time this pest girdles the bole of the tree that result in the stem breaking apart during moderate and severe windstorms. The removal of these stems would be classified as a combination improvement and sanitation cutting.

Riparian Management Area

The Riparian Management Stratum covers roughly 8.8% of the entire tract or about 8.1 acres. The overstory is dominated by SYC, BLW, and YEP with an average basal area of 74.9 square feet per acre. No active management activities will occur at this time. This stratum is designated as lying within 100 feet of either side of the perennial stream (see Figure 2).

Early Successional Regeneration Area

The past harvest regeneration openings covers roughly 6.0% of the tract or about 5.5 acres. These stratums are dominated mostly by YEP, LAA, AMB, and REM with an average basal area of 53.8 square feet per acre. The YEP regeneration appeared to be in modest decline as a result of the past two years of drought and the Tulip Poplar Scale insect infestation that occurred in the late spring of 2012. These affected YEP will be reviewed prior to the planned postharvest timber stand improvement project as modest mortality is expected. All old regeneration openings should be scheduled for a croptree release and grapevine removal in the planned postharvest timber stand improvement project.

Old Pine Plantation Area w/intermixed Mixed Hardwoods

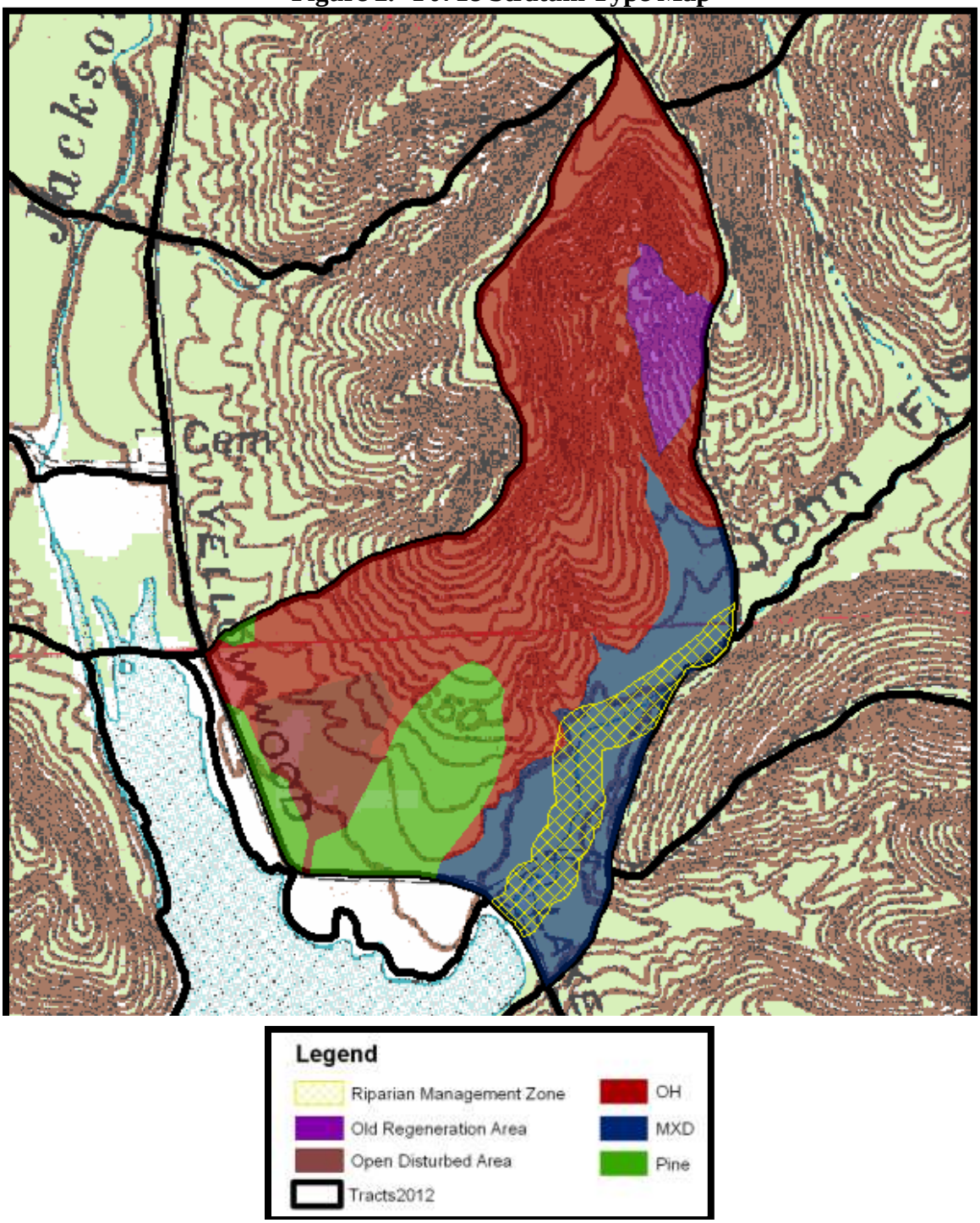
Virginia Pine and Red Pine were planted for erosion control purposes during the early management history of YSF. As these stratums have matured and individual trees have declined native hardwoods have become established especially in the plantation's understory and canopy gaps. This timber type covers roughly 9.1% of the tract or about 8.4 acres of Y0718 with an average basal area of 176.7 square feet per acre. The overstory is dominated by REP and VIP with some intermixed YEP, SUM, REM, SAS, and AME. Group selections would be appropriate to regenerate the pine into native hardwoods in those stratums where seedling oaks, hickories and Yellow Poplar have become established. Areas where poletimber oaks, hickories and Yellow Poplar have emerged and entered the stratum canopy should be prescribed TSI for croptree release. Planned regeneration openings will most likely return to mixed hardwoods with a strong component of YEP however a continued presence of oak on the drier aspects is expected. Singletree selection is prescribed in quality VIP and REP stratums for thinning with the removal of lower quality stems and the release of occasional hardwoods that have good vigor. The enhancement of these pine stratums by releasing oaks and hickories is valuable in retaining the Oak-Hickory component within the tract. Overall, marking objectives within this component should consider oak and other species of significant wildlife value as the best croptrees for future conservation. Quality and vigorous pine may be retained as they provide significant wildlife habitat diversity and cover.

Open Disturbed Stratum

The Open Disturbed Stratum covers roughly 5.4% of the entire tract or about 6 acres. This area was recently cleared and the sediment material from the Yellowwood Lake dredge project was stockpiled here during the summer and fall of 2012. The stratum currently consists of early

succession annual plants. This area will undergo limited management activities such as exotic invasive species treatment at this time until a long term use and restoration plan is developed.

Figure 2. Y0718 Stratum Type Map



Given the recent inventory, this tract is suitable for a 15 year cutting cycle wherein growth and development of the tract is reevaluated by a forest inventory every 15 years. The current inventory indicates a possible harvest of between 90 - 140 MBF over the commercial forest acreage within the tract. To facilitate this management, a joint timber sale is proposed for this tract in FY12-13 along with tracts 6420712 and 6420715.

Table 3. Overview of Sawtimber Volume Estimates in Y0718 in October of 2012

Species	Harvest	Leave	Total
White Oak	16,820	75,230	92,050
Black Oak	31,460	36,200	67,660
Red Pine	29,170	24,140	53,310
Virginia Pine	13,750	26,970	40,720
Sugar Maple	24,940	7,450	32,390
Pignut Hickory	1,670	29,210	30,880
American Sycamore	0	28,930	28,930
Yellow Poplar	9,180	18,850	28,030
Chestnut Oak	7,920	6,220	14,140
Black Walnut	0	9,680	9,680
American Beech	0	8,430	8,430
Northern Red Oak	2,130	4,690	6,820
Shagbark Hickory	0	6,500	6,500
Red Maple	4,410	0	4,410
Bitternut Hickory	1,570	2,760	4,330
Chinkapin Oak	0	4,230	4,230
Basswood	0	2,710	2,710
Black Cherry	0	2,130	2,130
White Ash	1,980	0	1,980
Red Elm	0	1,120	1,120
American Elm	0	790	790
Tract Totals (Bd. Ft.)	**145,000**	**296,240**	**441,240**
Per Acre Totals (Bd. Ft./Ac.)	**1,576**	**3,220**	**4,796**

Proposed Activities Listing

Proposed Management Activity	***Proposed Period***
DHPA timber sale project review	Spring CY2013
Invasives Treatment	Summer CY2013
Roadwork Rehabilitation	Spring CY2013
Timber Marking	Spring CY2013
Timber Sale (combined with T12&15)	FY2012-13
Postharvest TSI Project	CY2014-2018
Reinventory and Management Guide	CY2027

Attachments (Included in Tract File)

- Topo Map of Tract Features

- Tract Soils Map
- Aerial Photo of Tract
- INHD Review Map
- Stocking Guide Chart
- Printed TCruise Reports

Work Cited

Federally Threatened and Endangered Species:

Service, U. S. (2012). *Threatened and endangered Species*. Retrieved January 2, 2013, from Environmental Conservation Online System: http://ecos.fws.gov/ecos/indexPublic.do

Invasive Exotic Species:

Least Wanted: Alien Plant Invaders of Natural Areas. 19 April 2012. Plant Conservation Alliance's Alien Plant Working Group. 3 October 2012 <http://www.nps.gov/plants/alien/fact.htm>

Representative Sample Area (RSA) Assessments

Indiana Department of Natural Resources, D. o. (2012). *Establishment and Management of Representative Sample Areas on State Forests.*

State Threatened and Endangered Species:

Resources, I. D., & Wildlife, D. o. (2012). *Nongame and Endangered Wildlife*. Retrieved January 2, 2013, from IN.gov: http://www.in.gov/dnr/fishwild/2356.htm

To submit a comment on this document, click on the following link:
http://www.in.gov/surveytool/public/survey.php?name=dnr_forestry

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.