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

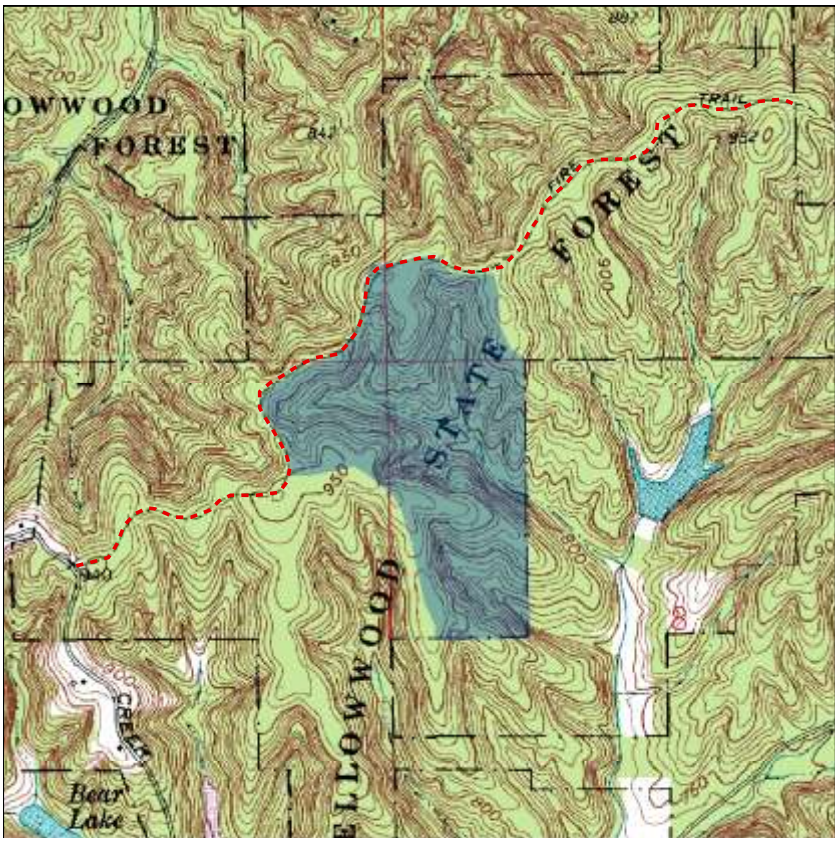
State Forest: **Yellowwood**
Tract Acreage: **131**
Forester: **Laurie Burgess**
Management Cycle End Year: **2028**

Compartment: **14** Tract: **12**
Commercial Forest Acreage: **131**
Date: **December 16, 2013**
Management Cycle Length: **15 years**

Location

Y1412 is located in Sections 5, 6, 7, and 8 of Township 10N, Range 2E of Brown County. The tract lies approximately 0.5 mile inside the west gate of Fire Trail #22 in Yellowwood State Forest. Firetrail #22 is approximately 1 mile north of Waycross on Upper Bear Creek Road.

Figure 1. Yellowwood SF Compartment 14 Tract 12



General Description

Y1412 is comprised of the following timber types: Mixed Oak, oldfield Mixed Hardwoods, CHO/Mixed Hardwoods, YEP/Mixed Hardwoods, BLW and an old Pine plantation. The forest resource ranges from small to large sawtimber in size. The overall timber quality of Y1412 is average. A summary of the forest resources in Y1412 in relation to species dominance is noted below in Table 1.

Table 1. Species composition from the December 2013 inventory in Y1412

Overstory Sawtimber Layer	Understory Poletimber Layer	Regeneration Layer
White Oak	**Red Maple**	**Sugar Maple**
Yellow Poplar	**Sugar Maple**	**American Beech**
Chestnut Oak	**Chestnut Oak**	**Red Maple**
Black Oak	**Pignut Hickory**	**Blackgum**
Scarlet Oak	*Sassafras*	**Yellow Poplar**
Northern Red Oak	*Blackgum*	*Pignut Hickory*
Red Maple	*Shagbark Hickory*	*Ironwood*
Pignut Hickory	*White Oak*	*Chestnut Oak*
Sugar Maple	*White Ash*	*American Elm*
Largetooth Aspen	*Bitternut Hickory*	*Flowering Dogwood*
White Ash	*Scarlet Oak*	*White Oak*
Black Cherry	*American Beech*	*Northern Red Oak*
Shagbark Hickory	*Black Oak*	*Sassafras*
American Sycamore	*Black Cherry*	*Black Cherry*
American Beech	*Shortleaf & Virginia Pine*	
Bitternut Hickory	*Largetooth Aspen*	
Black Walnut	*Northern Red Oak*	

Bold – Species that comprise ≥ 10% of the total BA in each structural class
Italicized - Species that comprise ≤ 10% of the total BA in each structural class

History

Y1412 is part of a large block of land deeded by the United States Department of Agriculture on October 30, 1956 to Yellowwood State Forest. Historical aerial photography suggests that prior to government acquisition the valleys and ridgetops were farmed and the sideslopes likely to have been grazed. The last timber harvest in this tract occurred in 1994.

- 1950's(approx.) Virginia & Shortleaf Pine plantings completed in erosion areas.
- February 1981: Forest recon by Forester Sieg (did not include SE facing valley in southern portion of tract).
- July 1988: First forest resource inventory and management plan by Forester Unversaw.
- March 1988: Forest inventory and management plan by Forester Unversaw.
- March 1990: Management plan by Forester Unversaw.
- May 1990: Storm damage recon by Forester Unversaw.
- Sept.1992: Archeological roadwork review completed with Forester Duncan.
- Oct. 1992: Road and log yard construction for future harvest; Forester Eckart
- March 1993: Seeding of haul road and log yard; Forester Eckart
- April 1993: Skid trail laid out; Forester Eckart.
- April 1993: Good neighbor letters; Forester Eckart.
- Jan.-Feb. 1994: Harvest marking; Forester Eckart.
- July 1994: Timber sale 176,729 bd. ft. in 664 trees, 135 culls. Sold to Wright Timber for $53,940.
- July 1994: Timber harvesting started by Forester Eckart.
- August 1994: Harvest completed, overseen by Forester Eckart.
- Sept. 1994: TSI of regeneration openings completed by Forester Eckart.
- October 1994: Sale closeout complete. Including mulching yard and haul road by Forester Eckart.
- April 1995: TSI completed; Foresters Eckart and Allen.

- December 4, 2013: Second forest resource inventory completed by Forester Burgess.

Landscape Context
Private forested property borders much of the eastern portion of Y1412 and its southern tract boundary while other Yellowwood State Forest tracts border the west and north boundaries. A few small reservoirs exist within the landscape as well as residential areas and agricultural fields. The majority of the landscape is comprised of privately owned or State Forest timberlands.

Topography, Geology and Hydrology
Y1412 is situated on the east side of the major ridge and road network running from the southwest to the northeast known and defined by Fire Trail #22. Two spur ridges from Firetrail #22 extend south to southeastward to form the southwest and northeast tract boundaries. A mapped intermittent stream lies in between these 2 spur ridges and it drains into Bear Creek. The tract's topography ranges from 0 - 60% slopes with predominating aspects being northeast along with some south, east, and west aspects. The underlying soils range from 27-72 inches in depth to sandstone and/or shale bedrock. The tract contains several ephemeral drainages between finger ridges. Water resources from Y1412 drain into the Bear Creek/Bean Blossom Creek watershed.

Soils
<u>BgF- Berks-Trevlac-Wellston Complex, 20 to 70 percent slopes</u>
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. Slope considerations are needed 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.

<u>WeC2 - Wellston-Gilpin Silt Loams, 6 to 20 percent slopes, eroded</u>
These moderately sloping to moderately drained soils occur on sideslopes and ridgetops. They are well suited to woodland. This soil type presents slight risks for erosion hazard, equipment limitation, seedling mortality, and windthrow hazard. This soil type has a site index of 71 for Northern Red Oak and 90 for Yellow Poplar.

<u>WaD - Wellston-Berks-Trevlac Complex, 6 to 20 percent slopes</u>
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.

Access
Public and resource management access into Y1412 are available from the east off of Cook's Hill Road (which is off of Carmel Ridge Road) or from the west off of Bear Creek Road. Cable gates and public parking areas are available at each end of Firetrail #22. The proposed timber sale in this tract will utilize the access from Bear Creek Road. Approximately 1.5 miles of Firetrail #22 from Bear Creek Road will need additional stone to improve the management access. A road improvement project for this portion has been submitted.

Boundary
Private forested property borders much of the eastern portion of the tract and the southern tract boundary while other Yellowwood State Forest tracts in this Compartment border the west and north tract boundaries. The tract's private ownership boundaries have been marked by orange paint along the line for several years and are currently up to date.

Wildlife
Wildlife resources in Y1412 are abundant. This tract contains habitat suitable for a wide variety of wildlife species. The tract currently consists of closed canopy deciduous forest dominated by Mixed Hardwoods with the exception of two 0.2 acre log yards. Large areas of contiguous Oak-Hickory and Mixed Hardwood timberlands make up the adjacent Yellowwood SF tracts. These tracts supply abundant food resources that include soft and hard mast. A small wildlife waterhole is located near the intermittent creek in the central portion of Y1412.

A Natural Heritage Database Review was completed for Y1412 in 2013. If Rare, Threatened or Endangered species (RTE's) were identified for this tract, 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 live tree and snag tree densities are examined on a compartment and tract level basis in order to maintain long-term and quality forest habitats. Crown release performed during the planned timber harvest will stimulate the growth of the selected croptrees and will enhance the vigor of these sawtimber trees. Timber Stand Improvement (TSI) following the harvest is planned which will increase standing snag counts. Management practices will be conducted in a manner that will maintain the long-term and quality forest habitats for wildlife populations.

Communities
Y1412's ridgetops and sideslopes are comprised mostly of mesic upland hardwoods dominated by Mixed Oaks and Mixed Hardwoods. These overstory timber species include White Oak, Yellow Poplar, Chestnut Oak and Black Oak with some declining plantation Shortleaf Pine in the southern portion. The understory consists mainly of Sugar Maple, American Beech, Red Maple, Blackgum, and Yellow Poplar. The ground cover consists of mainly mesic to dry mesic species.

Exotic Species
No invasive or exotic species were noted during the resource inventory however there was a heavy snow cover at the time of inventory. Further monitoring is recommended during marking activities.

Recreation
Likely recreational activities on Y1412 could include hiking, bird watching, wildlife viewing, hunting, and mushrooming. Small public parking areas are located at the west gate on Firetrail #22 on Cooks Hill Road or across from the gate off Bear Creek Road.

Cultural Resources

A cultural resources review was completed during the forest resource inventory. Cultural resources may be present on Y1412 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 Y1412 is represented in the following Gingrich Stand and Stock Table (Table 2) that follows the individual Tract Summary.

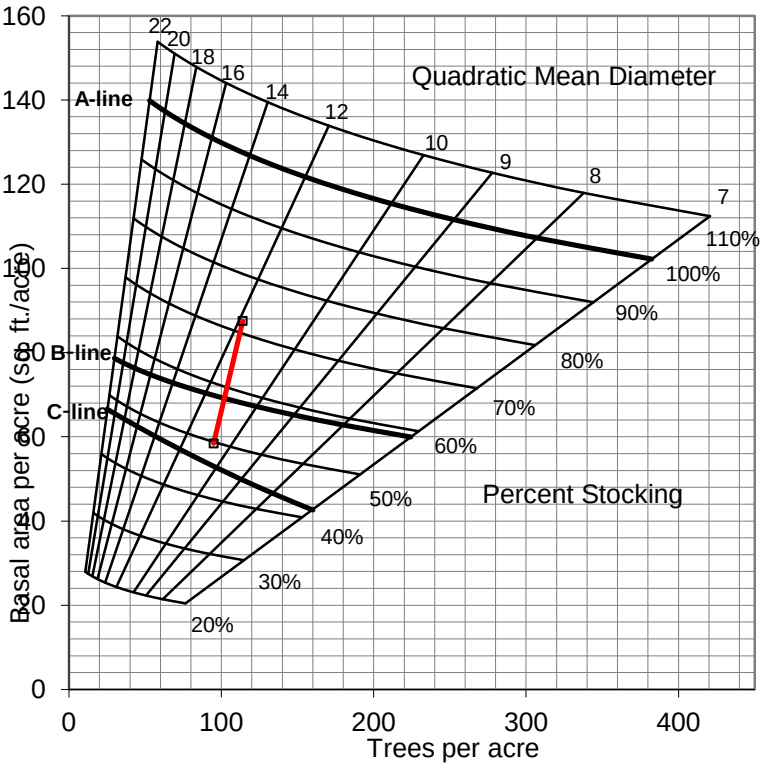
Tract Summary Data

Total Trees/Ac. = **114 Trees/Ac.** Overall % Stocking = **72% (Over Stocked)**

BA/A = **87.5 Sq. Ft./Ac.** Sawtimber & Quality Trees/Ac. = **27 Trees/Ac.**

Present Volume = **5,780 Bd. Ft./Ac.**

Table 2. Gingrich Stand and Stock Table for Y1412 in Dec. 2013

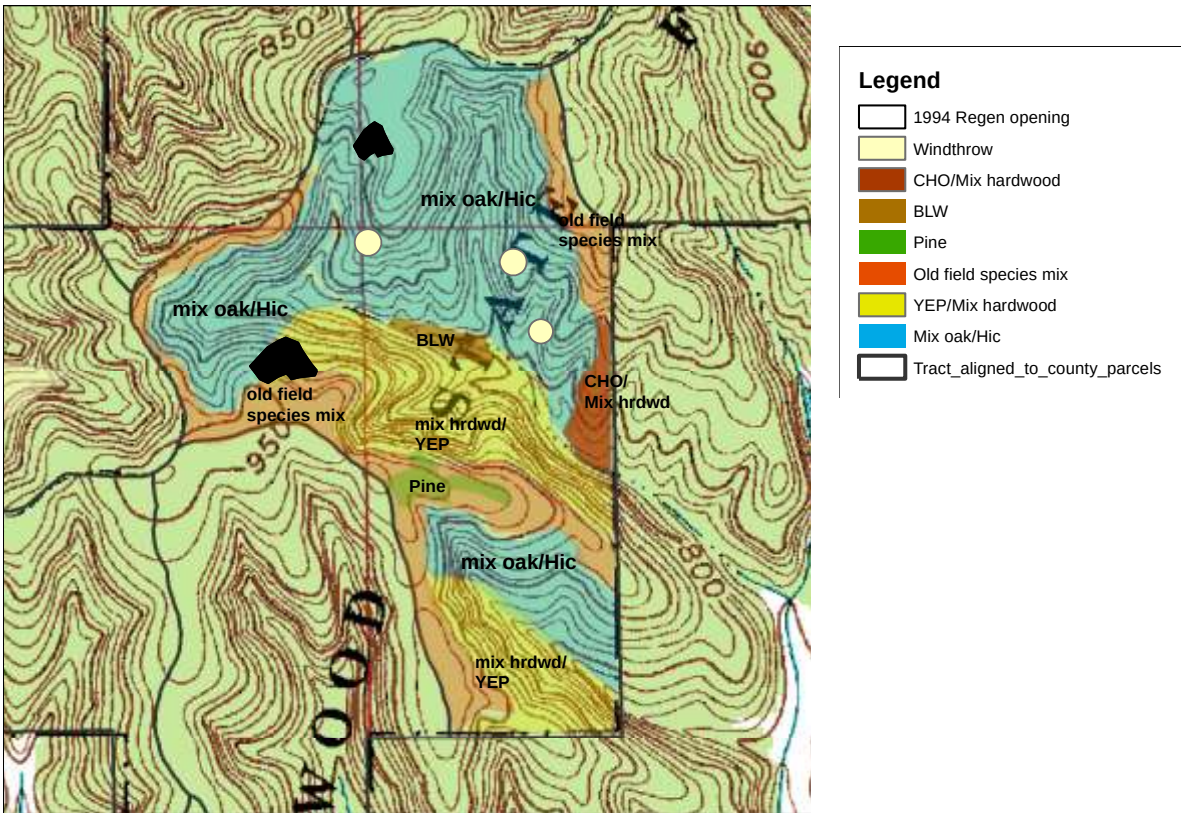


Summary Tract Silvicultural Prescription and Proposed Activities

The current forest resource inventory was completed on December 12, 2013 by Forester Laurie Burgess. 35 prism points were sampled over 131 acres (1 point for every 3.74 acres). A tract summary of the forest resource inventory is given above and a present volume by species breakdown of the summary is given in Table 3 below. Stocking is modestly variable across this tract. Basal area of sawtimber stems ranges from 20 sq.ft./acre to 90 sq.ft./acre with half of the plots tallying 50 sq.ft./acre or less. Some portions of Y1412 are overstocked and are prescribed a singletree selection cutting to thin and release desirable croptrees and to remove suppressed and poorly formed trees. Group selection cuttings are prescribed to regenerate areas of poor stocking,

excessive mortality and storm damage, or aggregations of timber with declining vigor. YEP is dominant in portions of this tract however a significant number of these trees show decline and dieback in the crown. Some of the YEP will have very little merchantable value due to the drought and scale damage that occurred in 2012. The ridgetops hold some remnants of plantation origin Shortleaf Pine as well as poletimber Sassafras and Red Maple. A managed timber harvest over the entire tract is prescribed. The tract's forest resource is composed of 5 Stratums as outlined in Figure 2 below based on the major timber types illustrated. There were two regeneration openings containing less than one half acre each that were created from the previous harvest in 1994. One is located in the Mixed Oak-Hickory Stratum and one in the Mixed Hardwood Stratums described below.

Figure 2. Y1412 Stratums Type Map



1) Mixed Oak-Hickory Stratum

The Mixed Oak-Hickory timber type provides significant wildlife and timber resource values. The promotion of this Stratum is important in the Division's longterm forest management objective. This cover type occurs over approximately 60% of this tract's forest acreage. The overstory is dominated by WHO, CHO and BLO. The understory layer consists of mainly SUM, REM, PIH, CHO, and AMB. The regeneration layer consists of mainly REM, AMB, SAS, BLG, SUM, PIH, and Flowering Dogwood. This Stratum contains generally small to medium sized sawtimber trees with some large sawtimber trees sporadically dispersed. Windthrow damage was fairly extensive in a few areas and most of the larger trees in these areas have been wind thrown. The heavy snow present during the resource inventory made it difficult to see the species and condition of the trees. The medium to large sawtimber trees

likely were wind thrown from storms 5 to 10 or more years ago and beyond salvage capability. Storm damage was noted in the tract's history from May 1990 however this was noted as scattered damage. The currently observed windthrow was more concentrated and contained accumulations of trees in pockets.

A timber harvest is prescribed in this Stratum along with postharvest TSI. This management would benefit its future growth, development and quality. Singletree and selection cuttings are prescribed 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 fire-damaged, low-forking, leaning, overtopped and suppressed intermediates, epicormically sprouting, and deformed trees are planned to be marked for removal in an improvement cutting. Group selections may be prescribed in areas where aggregations of low quality, diseased/damaged, low basal area, or declining trees occur.

2) Oldfield Mixed Hardwood Stratum

This Stratum occurs on Y1412's ridgetop acreage and is composed generally of smaller diameter, mostly poletimber sized trees of lower grade species composed of SUM, REM, SAS and LAA with and occasional mature YEP. This Stratum's growth overall is irregular as well as its tree composition and size. Most of this Stratum's timber species are not mast producers and consists of a generally low valued timber resource. An improvement cutting using mostly single tree selection to thin and release desirable croptrees and to remove suppressed and poorly formed trees is recommended. Trees selected for harvest should include fire-damaged, low-forking, leaning, mature, epicormically sprouting, overtopped/suppressed intermediates, or deformed trees. Harvesting these will relieve stand density and release the healthiest and most vigorous croptrees.

3) Mixed Hardwoods Stratum

The Mixed Hardwoods timber type can be very variable in their composition and thereby have more complicated prescriptions. Many of the YEP in this tract have suffered through a severe drought along with the Tulip Poplar Scale insect infestation that occurred in the late spring of 2012. This Stratum was separated into YEP/Mixed Hardwoods and CHO/Mixed Hardwoods groupings. The majority of the Mixed Hardwoods acreage is dominated by YEP. This Stratum comprises about 25% of the tract acreage. The overstory is comprised of YEP, WHO, CHO, LAA, and REO with an average basal area of 87.5 square feet per acre. The understory layer consists of primarily SUM, BLG, SAS, YEP, and AMB. The regeneration layer consists of predominately BLB, AMB, BLG, SUM, WHA, and SAS.

Advanced Sugar Maple borer damage was noted in SUM throughout both the Mixed Hardwoods and Oak-Hickory Stratums. In time this pest girdles the bole of the tree that results in the stem breakage during moderate and severe windstorms. Harvest of affected SUM trees will be addressed in a combination improvement and sanitation cutting.

Some REO, BLO, and YEP trees on the edges of the ridgetops as well as scattered throughout the tract appear to be declining in their crowns and should be harvested this management cycle in a selection cutting. Sawtimber White Ash should be marked for harvest in a sanitation cutting to slow the spread of the Emerald Ash Borer.

Portions of this Stratum were observed to have quality Oak-Hickory timber stocking however it is probable that these have been affected by past wildfire damage. Modest butt rot and damage to the lower boles of the trees were observed during the resource inventory. This lower damage weakens the tree and makes it susceptible to windthrow. The proposed timber harvest in this Stratum should focus on retaining high vigor Oak-Hickory croptrees while harvesting individual stems that are susceptible to windthrow.

Overall, marking objectives within this Stratum should consider Oak, Hickories and other species of significant timber and wildlife value as the preferred croptrees for release. An improvement cutting is prescribed to release quality stems of Oaks, Hickories and other valued trees from crown competition. It will also harvest low-forking, leaning, overtopped/suppressed intermediates, and deformed trees. Singletree selection cuttings are prescribed to remove lower quality stems and drought stressed timber. The longterm result of these prescribed cuttings will be to increase timber and wildlife habitat diversity. Group selections may be prescribed in areas where aggregations of low quality, disease/damaged stems, low basal area, or poor vigor are found. Regeneration openings are expected to return to mostly Mixed Hardwoods with a strong component of YEP however some increase in the Oak-Hickory component is expected.

4) Pine Plantation Stratum w/intermixed Mixed Hardwoods

Shortleaf Pine and some Virginia Pine were planted for erosion control purposes in Y1412 during the early management history of YSF. This Stratum has matured and its Pine plantings have declined due to age and natural succession. Opportunistic native hardwoods have become well established in the Stratum's understory and canopy gaps. This timber type covers approximately 2 acres with equal amounts of pole and sawtimber sized stems of Pine. The overstory is now dominated by a mixture of YEP, LAA, BIH, PIH, AMB, and poletimber SAS; only scattered Pine remain. Group selections would be appropriate to regenerate the Pine into native hardwoods in those areas where seedling Oaks, Hickories and other valued hardwoods have become established. Areas where poletimber Oaks, Hickories have already emerged and entered the Stratum's 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 some Oak regeneration on the drier aspects is expected. The enhancement of this Stratum's timber diversity by releasing high vigor Oaks and Hickories is important in establishing new areas of Oak-Hickory components within the tract. Overall, marking objectives within this Stratum should consider Oak and other valued species of significant wildlife value as the preferred croptrees for future conservation. Quality and vigorous Pine may be retained in areas where they remain vigorous as they do provide significant wildlife habitat diversity and winter cover.

5) Black Walnut (a component of the Yellow Polar/Mixed Hardwoods Stratum)

This is only a small area within Y1412 (1-2 acres) of Black Walnut but it is noteworthy. This timber resource contains pole and small sawtimber sized stems. Other species within this Stratum contains SYC, YEP, and REM. A proposed improvement cutting and postharvest TSI would be the best management approach to release and favor the Walnut resource.

Summary Tract Silvicultural Prescription and Proposed Activities

The prescription for Y1412 is a combination improvement and selection cutting type of harvest over most of the tract acreage. The Indiana guidelines for Best Management Practices (BMP's) will be

followed during the timber harvest and closeout activities to maintain water quality. The prompt installation of water diversions in conjunction with seed and straw following harvesting will be employed to minimize any effects to neighboring water resources. The proposed harvest will entail both singletree and group selection cuttings. Singletree selection will remove low grade, poorly formed, and declining overstory individuals so that spacing of croptrees is improved to increase the growth of the residual stand. Group selections will be prescribed in aggregations of timber that are inadequately stocked, contain poor quality, or contain stockings with declining vigor. Group selections are planned to regenerate the plantation origin Pine into native hardwoods in those areas where seedling Oaks, Hickories and other valued hardwoods have become established.

A riparian area exists along the banks of the mapped intermittent stream that comprises the central drainage within Y1412. The management within this area will be prescribed according to current Division of Forestry guidelines.

Portions of or all of Y1412 will be submitted for a postharvest Timber Stand Improvement (TSI) project along with any invasive work if deemed appropriate by the administering forester. A field review for regeneration opening success is planned 3-4 years after opening TSI completion. Wild grapevine TSI and croptree release is prescribed for the old regeneration openings. Abundant grapevines have overtaken the regeneration in some of these openings resulting in crown deformities and mortality in the regenerated trees. Overall, Yellow Poplar has regenerated well in these openings along with Black Cherry, Elm spp., and Sassafras.

Given the recent inventory and growth of Y1412's forest resources, this tract is suitable for a 15 year management cycle wherein growth and development of the tract's forest resource is evaluated by a forest inventory every 15 years. The current inventory indicates a possible harvest of between 150 to 250 MBF. A timber sale is proposed for FY2014-15.

Table 3. Estimated Present Volumes from December 2013 inventory in Y1412

Species	Total
White Oak	169,020
Scarlet Oak	118,780
Black Oak	116,880
Northern Red Oak	86,900
Chestnut Oak	72,510
Scarlet Oak	36,470
Largetooth Aspen	24,390
Pignut Hickory	23,120
Red Maple	22,780
White Ash	21,850
Sugar Maple	18,460
American Sycamore	8,630
Shagbark Hickory	7,740
Black Cherry	7,400
Shortleaf Pine	7,050
Basswood	5,080
Bitternut Hickory	3,910
Black Walnut	3,180
American Beech	2,740
Tract Totals (Bd. Ft.)	**756,890**
Per Acre Totals (Bd. Ft./Ac.)	**5,780**

Proposed Activities Listing

Proposed Management Activity	***Proposed Period***
DHPA Timber Sale Project Review	CY2014-2015
Access Roadwork Rehabilitation	CY2014-2015
Timber Marking & Invasive Evaluation	CY2014-2015
Timber Sale	FY2014-2015
Postharvest TSI & Invasives Follow-up	Within 2 years of harvest
Regeneration Opening Review	Within 3-4 years of Postharvest TSI
Reinventory and Management Guide	CY2028

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