

**pennsylvania**

DEPARTMENT OF CONSERVATION  
AND NATURAL RESOURCES

## 2022 CAP 106 Forest Management Plan for:

### Owner:

Conewago Rod and Gun Club  
c/o Scott Deiter  
1483 Turnpike Road  
Elizabethtown, PA 17022  
[treasurer@conewagogunclub.org](mailto:treasurer@conewagogunclub.org)  
717.689.2251

### TSP:

DTS Resource Management  
Floyd A. Ciccolini Jr.  
3342 Old Stage Road  
Lewistown, PA 17044  
[djcs2000@gmail.com](mailto:djcs2000@gmail.com)  
717.994.1730

### DCNR Service Forester:

John Nissen  
PA DCNR William Penn Forest Office  
845 Park Road  
Elverson, PA 19520  
610.582.9660

### NRCS:

Heather Grove  
USDA-NRCS  
1383 Arcadia Road, Room 200  
Lancaster, PA 17601-3149  
717.874.2558

## **SIGNATURES AND APPROVALS**

This Forest Management Plan (FMP) is provided as a guide to help landowners accomplish demonstrated objectives for their forest. This FMP will act as a guide for landowners in achieving the sustainable benefits of managing their forest resources for the next 10 years. With this FMP, the landowner automatically complies with the standards and benefits of the US Forest Service's Forest Stewardship Program (if the property is 5 acres or more), the American Forest Foundation's American Tree Farm System (10 acres or more), and is eligible for NRCS (Natural Resource Conservation Service) Cost Share Programs. This plan will need to be reviewed and approved by the local NRCS District Conservationist, DCNR (Department of Conservation and Natural Resources) Service Forester, Technical Service Provider, and the Forest Landowner.

The Forest Stewardship Program and American Tree Farm Program are designed to promote wise use and sustained benefits of forest resources. While participation in these programs can provide benefits of forest management information networks, national recognition, financial tax savings, and increased forest product income generation through select markets, by NRCS policy, the landowner is not required to participate in these programs. If the landowner wishes to participate in either of these programs, and is applicable given program acreage limitations above, please check the appropriate boxes and proceed to the Landowners Pledge.

### **Forest Stewardship Program Participation**

Yes:

No:

### **Tree Farm Program Participation**

Yes:


No:

### **Landowner's Pledge for Forest Stewardship/Tree Farm Program Status**

Since timber harvesting has a significant impact on my forest resources, I agree to complete commercial timber harvests recommended in the plan with the assistance of a professionally trained forester. I understand that the forester is to designate trees to be harvested based on a written prescription derived through a science-based stand analysis of the forested stands involved. This stand analysis could include methods derived through SILVAH, SILVOH, NED/SIPS, or a Treatment Unit Sustainability Assessment Form (TUSAF), among other methods.

I understand that a DCNR Service Forester or consulting forester will periodically review the implementation of my FMP to assist me in properly following the plan for my objectives. To enable him/her to carry out this responsibility, I will make available copies of plan amendments and/or timber harvesting prescriptions prior to carrying out a major activity. I understand that I am not obligated to obtain approval from the service forester but that he/she may advise me if prescriptions do not appear to serve the goals of my FMP or meet Forest Stewardship/Tree Farm Standards.

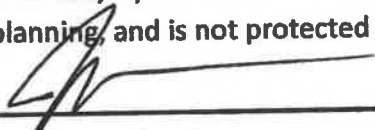
Inclusion in the Forest Stewardship Program or Tree Farm Program covers me for a minimum of 10 years. Should I choose to deviate from the guidelines in the FMP, I agree to return the applicable signs designating my property as a "Stewardship Forest" or "American Tree Farm" to the DCNR Service Forester.

  
\_\_\_\_\_  
Landowner Signature

11 July 2022  
Date

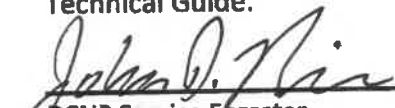
**Forest Stewardship/American Tree Farm/NRCS EQIP Program Certifications**

I am satisfied with the content and recommendations contained in this FMP, and will make an honest effort to follow them. I understand that the information within this plan may be used internally by the American Tree Farm System, as well as NRCS and DCNR for conservation planning, and is not protected by legal privacy acts for either governmental agency.

  
\_\_\_\_\_  
Landowner Signature

11 July 2022  
Date

I certify that this FMP meets the requirements of the federal Forest Stewardship Program, American Tree Farm Program, and the USDA Environmental Quality Incentives Program and or the Quality Criteria for Forest Management Plans in Section III of the USDA NRCS Field Office Technical Guide.

  
\_\_\_\_\_  
DCNR Service Forester

\_\_\_\_\_  
ATFS Inspector #

8/29/2022  
Date

  
\_\_\_\_\_  
Technical Service Provider

\_\_\_\_\_  
ATFS Inspector # (if applicable)

8/19/22  
Date

HEATHER GROVE  
Digitally signed by HEATHER GROVE  
Date: 2022.08.29 11:04:22 -0400

8/29/2022

\_\_\_\_\_  
NRCS District Conservationist

\_\_\_\_\_  
Date

\_\_\_\_\_  
PA Unique ID # (For DCNR Use Only)

\_\_\_\_\_  
Tree Farm #

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**PROPERTY OWNERSHIP**

Landowners: Conewago Rod and Gun Club  
\_\_\_\_\_

Mailing Address: P.O. Box 144, Elizabethtown, PA 17022  
\_\_\_\_\_  
\_\_\_\_\_

Phone: 717.689.2251

Email: treasurer@conewagogunclub.org

Ownership Type: (LLC, Sole Proprietorship, Trust, etc.) Private ownership

**Landowners Representative (if applicable):** Scott Deiter

Mailing Address: 1509 Turnpike Road, Elizabethtown, PA 17022  
\_\_\_\_\_

Phone: 717.689.2251 Email: treasurer@conewagogunclub.org

Year of Property Acquisition by Current Owner: 1967

Plan Completion Date: \_\_\_\_\_ Plan Revision Dates: \_\_\_\_\_

**Please Note:** *Informal updates to the plan can be made with handwritten notes. Be sure to include a date and initial these notes throughout the management plan. Landowner should fill in the Plan Completion Date above when approval is received in writing from the USDA NRCS office.*

## **PROPERTY DESCRIPTION**

General Directions to the Property: From Elizabethtown, head west of Turnpike Road approximately 1 mile. Access is through a private driveway on the right, approximately 1/8 mile past Freys Lane. Lat: 40.147383, -76.642525.

Nearest City/Town Elizabethtown County Lancaster

Total Ownership Acreage 41 +/-

Forested Acreage 20+/- forested acres covered under the CAP 106 Forest Management Plan

Does Landowner Reside on Property?  Yes  No

### **Basic Topography:**

Complex Topography (e.g. many steep slopes and aspects)

Simple Topography (e.g. mostly gentle slopes and few aspects)

### **Entire Forest Property Access to Vehicles:**

Excellent (80% Accessible)  Good (50%)

Fair (25%)  Poor (10% or less)

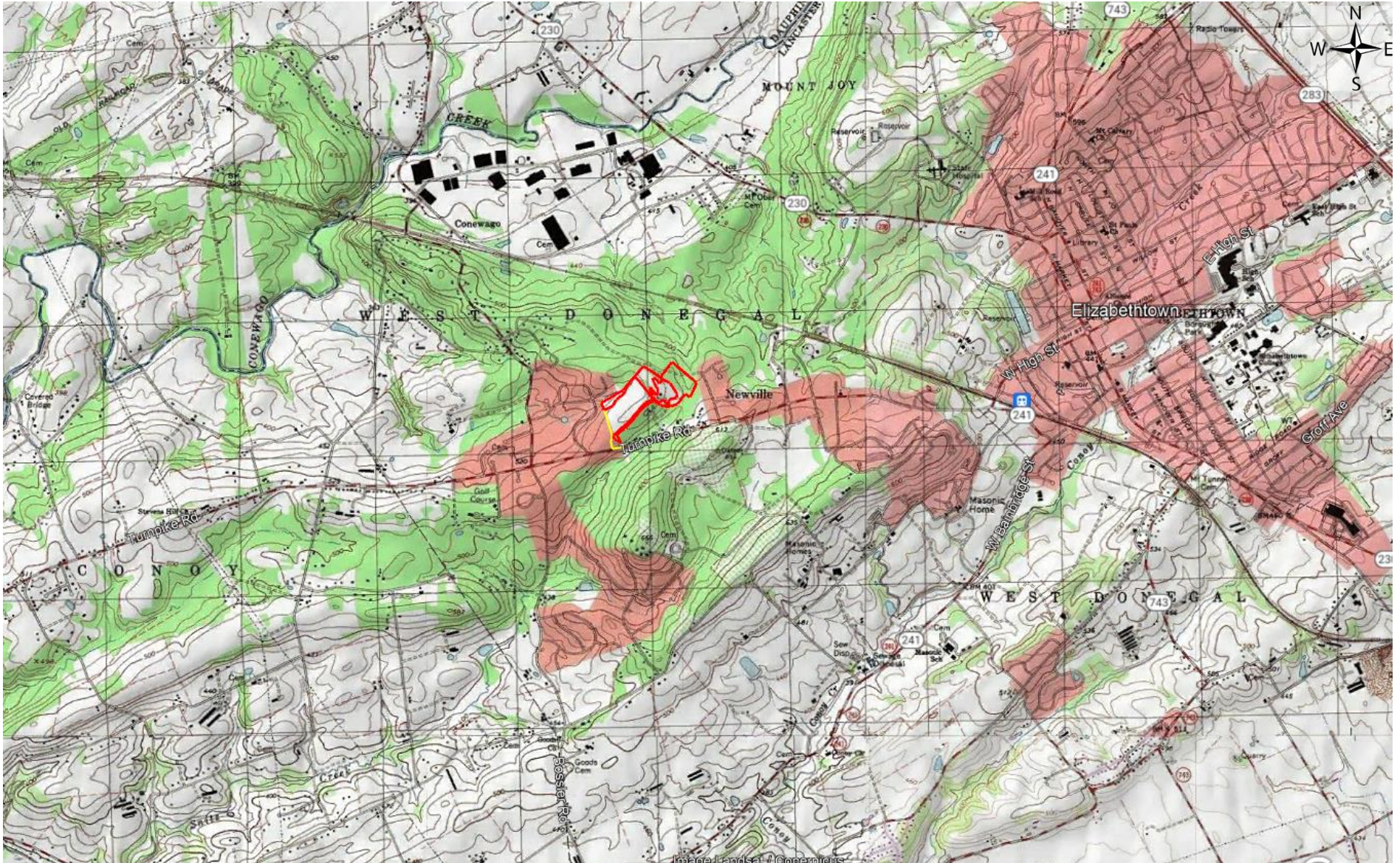
### **Property Located in Which Watershed:**

Chesapeake Basin  Delaware River Basin

Ohio River Basin  Great Lakes Basin

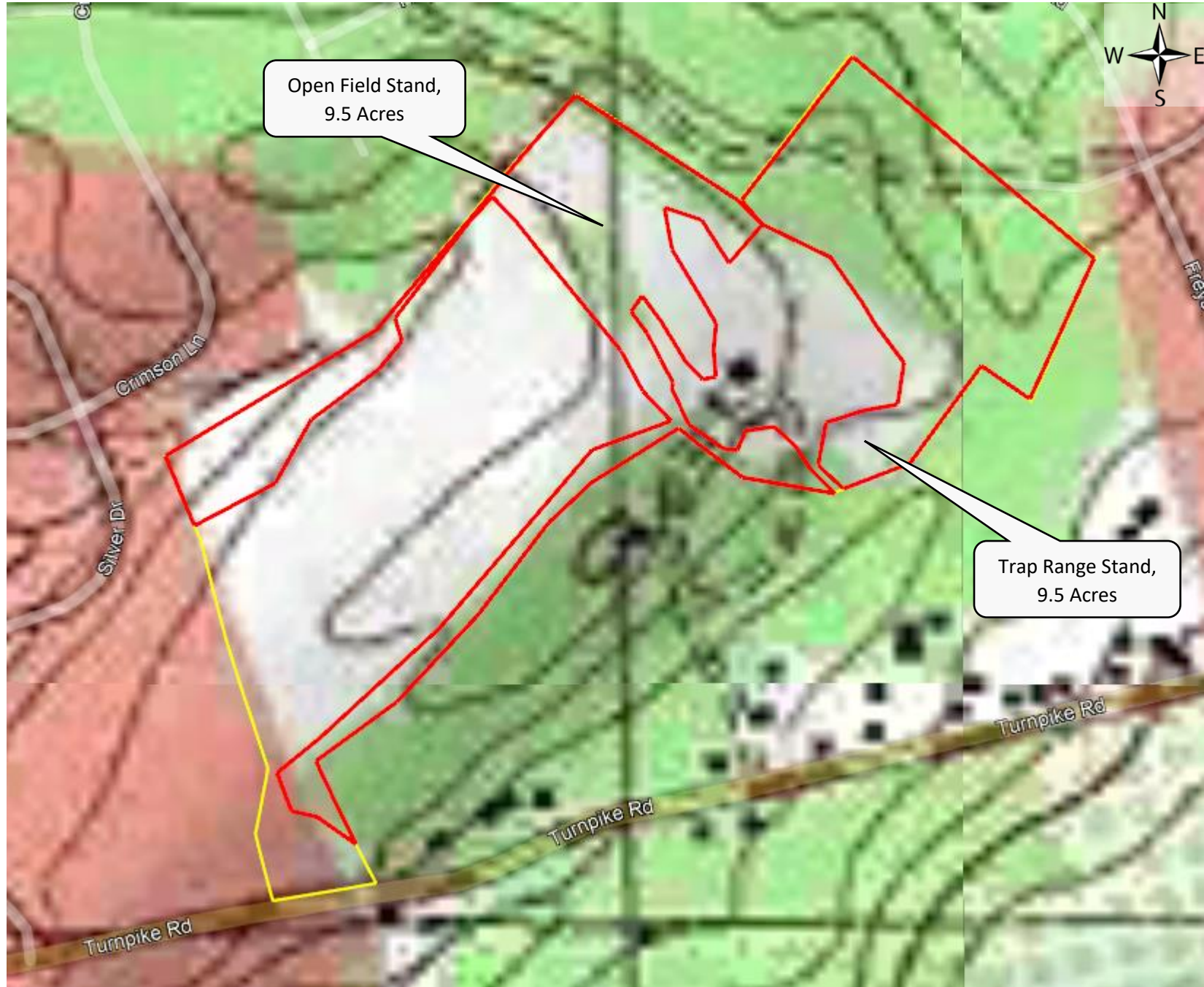


# Conewago Rod and Gun Club Forest Management Plan Landscape Map, 19 acres +/-





# Conewago Rod and Gun Club Forest Management Plan Topo and Stand Map, 19 acres +/-





# Conewago Rod and Gun Club Forest Management Plan Topo and Stand Map, 19 acres +/-





# Conewago Rod and Gun Club Forest Management Plan Practices Addendum



## **FOREST MANAGEMENT GOALS**

1. Maintain and increase property value for all wildlife species.
2. Improve health and diversity of the existing stand of timber.

## **PROPERTY HISTORY**

The portions of this property that are currently wooded have remained so since approximately the era of the 1950s. In the 1940s much of the 41 acres was in some form of pastureland and/or cropland use. In the 1950s the property began to be used for both recreational purposes as well as maintaining grass cropping activities on the open acreage. The property has been used since that time for the primary purpose of controlled recreational shooting sports throughout the property, open grassland cover type management of the open fields, and timber production in the forested areas.

There does not appear to have been any commercial timber harvesting done in the past 75 years. Some very limited tree removal has occurred on occasion, primarily along the field edges, but has not significantly affected the composition of the forest.

## **PROPERTY MAPS**

1. **Topographic Maps (2)** - Landscape map showing property boundaries only and surrounding landscape for 2-mile radius. Property map showing: property boundaries, forest stands (NRCS Fields), special sites (wetlands, cultural features, natural features favored by landowner, etc.) water resources, roads, map scale, and a directional arrow.
2. **Aerial Photograph (1)** - Color Aerial Photo showing: property boundaries, forest stands (NRCS Fields), special sites (wetlands, cultural features, natural features favored by landowner, etc.) water resources, roads, map scale, and a directional arrow. Aerial photos can be derived through GIS, county assessment offices, DCNR PAMAP program online, or the following website. <http://earth.google.com/>
3. **Soils Map (1)** - including legend, interpretations, etc. Soil maps are available from NRCS Web Soil Survey: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm> or from your local NRCS office [see Appendix I].



## **OVERALL FOREST NATURAL RESOURCES ENHANCEMENT/ PROTECTION**

### **PROTECTION OF SPECIAL SITES AND SOCIAL CONSIDERATIONS**

#### **Special Sites:**

Aside from the obvious value as a historic shooting sports recreational property, there do not appear to be any special cultural resource-specific special sites on the property to the knowledge of the plan writer.

As a property that is actively engaged in shooting sports, a special site consideration may be that the wooded areas behind the shooting ranges should be managed in such a way as to encourage a higher-than-average basal area (density of trees) for purposes of secondary safety as a backstop.

#### **Adjacent Stand or Ownership Concerns:**

Neighboring activities and interests should have very little negative impact on any management activities the landowner wishes to undertake. The exception is that some of the adjacent properties and neighboring properties have invasive plant seed sources present that include all or some of the invasive plants found on the landowner's property.

#### **Recreation (Optional):**

Most recreational activity on the property is related to shooting sports and organizational activities focused on outdoor sports and conservation. Limited hunting occurs on the property. Hiking, nature walks, and similar activities also occur in a very limited capacity on the property in areas away from the shooting ranges.

#### **Timber Trespass Prevention:**

Property lines are fairly easily identified and followed on all boundaries; most times clearly marked with orange blazes. There should be low risk of any accidental trespass concerns or issues, although any future management activities near property lines should be careful to determine exact line locations prior to starting work.

## **AIR, WATER, AND SOILS PROTECTIONS**

### **Forest Soils Protection:**

The forest soils on the property appear healthy, with enough downed woody material and organic matter for continued soil health. The forest soils do not appear to be at risk for soil erosion.

Soils in the wooded areas are a mix of Holly Silt Loam, Brecknock gravelly silt loam, Lansdale loam, Ungers extremely stony loam (totaling around 95% of the wooded areas). These are relatively productive forest soils, with site indexes for yellow poplar being approximately 75 to 85 feet. A few other soil types found in the wooded areas include Lehigh silt loam and Mount Lucas very stony silt loam (the highest timber growth site index of all the soils found on site).

### **Access Roads/Trails:**

There are a few fragments of very narrow woods trails in the wooded areas of the property, primarily around the boundary and near the field edges. The trail networks do not appear to allow for easy general access to much of the forested acres due to the dense understory. Some maintenance and improvement activities could access the wooded areas from the fields and range areas. It is likely that any management work done within the wooded areas, in particular with ATV-mounted spray equipment, would benefit from increased trails and access points.

### **Streams, Wetlands, Vernal Pools:**

There are no streams, wetlands, or significant vernal pool areas found on the property.

## **FISH, WILDLIFE, AND BIODIVERSITY**

### **Fish and Wildlife:**

The property has a very dense understory which makes for very attractive resting and nesting habitat for wildlife. The Open Field Stand is essentially a wooded edge cover on the north, east, and south side of a maintained grass field. In several locations in the stand along the field edge one can find paw paw trees and mulberry trees. The Trap Range Stand has an equally dense understory which provides very good cover for all forms of avian and terrestrial wildlife (although much of the “cover” is provided by invasive and noxious plants). Invasive plant communities should be controlled to allow for more native and wildlife-valued species to grow in the understory as well; currently, in some parts of both stands of timber the understory is almost a monoculture of invasive and less than desirable species.

Both different stands of timber provide plenty of hard and soft mast crops. Dominant seed sources on the property include various oaks, red maple, hickories, yellow poplar, black gum, and black cherry. Mid canopy cover is consistent and average or above average density for the habitat requirements of most bird species. Mid canopy cover and protection could be improved by encouraging the growth of, and planting more, evergreens (white pine, white spruce, blue spruce, red cedar, etc.) which are noticeably lacking as a cover type, in particular for those areas where dead or dying ash and other trees are found (some dead trees are due to treatment of invasive/ noxious species).

The abundance of dead trees, snags, and live trees with cavities for wildlife is lower than optimal for wildlife. As such is the case, the use of wildlife boxes would provide added avian and small mammal habitat benefits to the property.

More details will be discussed within each stand in the “Discussion” section of this document.

### **State and Federal Threatened or Endangered Species-Plants and Animals:**

PNDI (Pennsylvania Natural Diversity Inventory) searches are computerized database searches that attempt to identify where threatened, endangered, or sensitive features, plants, and animals are found in the state. The attached PNDI shows there are no restrictions placed on this landowner. However, the Pennsylvania Game Commission and the U.S. Fish and Wildlife Service provided voluntary avoidance measures that should be considered by the landowner regarding endangered bat species. Generally summarized, as they apply to the timber management outlined in this plan, the voluntary recommendations are:

- Retain dead trees as den trees over 12” in diameter (good for all wildlife, not just bats).
- Retain shagbark hickory trees.
- Maintain a 60% canopy cover for the forest.

### **MANAGEMENT OF FOREST RESOURCES**

#### **Protection from Pests:**

There is a very long list of invasive and noxious plant species located on and near the property: Cork wood, privet, stiltgrass, ailanthus, barberry, vine honeysuckle, oriental bittersweet, mile-a-minute, and Japanese angelica. For creating a health forest and improving wildlife habitat, controlling the invasive plants might be the most significant challenge with which the owner must contend. The Appendix and Stand Recommendation sections contain further suggestions for managing invasive plants.



As one may expect, any ash trees that are on the property have either died or are in the process of decline due to the Emerald Ash Borer. Only one hemlock tree was noted during the site visit and it appeared to be deteriorating in health likely from the hemlock woolly adelgid.

### **Reforestation and Afforestation:**

Planting of trees to reforest an area or to promote more valued species or to increase species diversity is always a positive practice. If tree plantings are conducted, it is recommended that invasive plants be controlled prior to planting, at a minimum those areas immediately surrounding the location of the plantings. Tree tubes and cages for plantings are highly advisable based on potential deer impact. Tree plantings would add increased wildlife value to the property for game and non-game species as well as provide competition against the invasive plant communities. More details are found in the Stand Recommendations section.

### **Prescribed Fire (Optional):**

Prescribed fire is generally not a recommended activity for most woodlots. Additionally, there remains some debate as to its value, as fire does help kill invasive plants that are present but also removes desirable herbaceous cover in the process. Prescribed fire also doesn't often destroy enough of the invasive seed source in the soil. This is not a recommended practice for this property.

### **Forest Management Plan Implementation Constraints:**

As the landowner's goals are to improve the health of the forest for the benefit of all wildlife and to maintain and improve the health of the current timber stand, there really are no issues on the property or in the immediately adjacent lands that will prohibit these goals from being met. The one noted exception would be the invasive plant communities both on and adjacent to the property will need to be considered when conducting management activities.

**Carbon Sequestration:** N/A at this time.

### **PROFESSIONAL ASSISTANCE:**

DCNR BOF John Nissen, PSU Extension Forester, NRCS field office (Heather Grove),  
[www.timbertax.org](http://www.timbertax.org)

### **OTHER:**

**Agroforestry:** N/A at this time.

## **STAND LEVEL INFORMATION SECTION**

The Conewago Gun Club goals for the property are to improve the wildlife value of the property and to maintain and increase the forest health. The order in which the landowner undertakes management practices will be crucial in reaching those goals in the most cost-effective manner.

Removal of or the natural mortality of overstory/ shade producing trees in the canopy causes an increase in the amount of sunlight to reach the forest floor, thus allowing for increased growth in the understory for seed sources present on site. Any changes to the forest that will cause increased daylight to reach the forest floor will likely result in the increased footprint and abundance of the invasive plant community previously mentioned. Controlling these invasive and competing species should be the first step toward achieving a healthier and more diverse forest. Given the importance of the sequencing of activities, the Objectives listed in this section for each stand, and the Action Items listed later, are provided in such an order as to increase the likelihood of meeting the previously stated Landowner Goals.

This 41-acre property (20+/- wooded) was transect surveyed with a 10-factor prism for standard overstory and understory data based on the USFS Silvah 7.0 stand regeneration model. In June 2022 there were 23 understory and 12 overstory plots recorded. Overstory plots recorded all live tree species 2" DBH (diameter at 4.5 feet above ground) and greater. From the Silvah field data, field observations, historical land use, soil types, and topography it would appear that the property requires two separate stand descriptions. Management recommendations though should be consistent and similar in both stands and will be discussed in detail later; both stands can be managed nearly the same way even though their overstory species composition varies slightly. Limited if any harvest activity in the stands appears to have occurred over the past 80-90 years.

The Open Field Stand, so named due to the prominent 15+ acre field occupying the western portion of the stand, is approximately 80 years old stand of timber. With an overall average stand diameter of 11 inches and an average sawtimber diameter of approximately 14+ inches, this stand is a slightly undersized diameter stand for the age of the timber.

The Trap Range Stand appears to be a bit older at an estimated 85+ years and is comprised of the forestland generally east of the trap range and facilities. This stand is noticeably different in size distribution of trees, tending to be larger in diameter, though the species present remain consistent with the other forested areas of the property. Average stand diameter is 15 inches while sawtimber trees average nearly 18" in diameter.

## Stand Level Information:

**Stand #:** Open Field Stand      **Acres:** 9.5

**Forest Type, Size, Stocking:** AR22, 11" ave. stand DBH, fully stocked

**Stand Age:** Stand is approximately 80 years old on average with dominant tree heights of approximately 70-80 feet.

**Age Structure:** Even-aged.

### Stand Description:

The stand consists of wooded field edges (approximately 30-40 feet wide) and a few acres of timber around the shooting ranges located on site. The overstory maintains a closed canopy in all areas except for a few areas along the field edge where dead trees (either through natural mortality or intentional invasive treatment activity) provided for near full sunlight to reach the forest floor. There are about 5 or more snag trees and living cavity trees available for wildlife per acre on average. Basal area (density) is dominated by black cherry (25%), ailanthus (16%), sassafras (16%), and hickories (8%). Other species found in the overstory include: mulberry, hickories, scarlet oak, black walnut, white oak, yellow poplar, black locust, black and red oak, and red maple. Norway spruce are disproportionately represented in the sample plots, as they are found only on the northern border of the open field; those small patches of spruce by chance appeared at the previously-established sample plot locations. Spruce are the only evergreens noted in the stand. Trees are generally in the large pole (9-12" DBH) and small and medium (12-18" DBH) size sawtimber size classes.

**Understory:** Competing understory vegetation and shrubs are very dense throughout the stand, often covering nearly 100% of the forest floor and 6 foot and under vegetation stratum. Unfortunately not many native and high-quality species are found; most are on the DCNR invasive and noxious weed lists. This stand contains the only noted location of mile-a-minute (primarily along the field edge) on the property.

**Tree Regeneration:** There was zero hardwood regeneration observed in the sample plots. A few hardwood seedlings were observed near some of the sample plots though not immediately in the sample plots. Quality seedling regeneration when observed appeared to be hickories, a couple oaks, and a few sassafras and yellow poplar.

**Tree Site Index/ Ht:** black oak, 76'.

**Average, Product DBH:** 12" DBH, large sapling-small pole timber.



**Overstory Growth Rate, 10 year period:** mixed oak, 2.5" DBH .

**Stem Quality:** average quality (likely due to epicormic branching and field border affects).

**TPA:** 625 TPA; likely high due to the number of saplings of non-native and invasive species.

**Dominant Species:** black cherry, 175 TPA.

**BA:** 134 (black cherry, 34).

**Primary Soils:** See attached NRCS soils report.

**Water features:** See Air, Water, and Soils section.

**Topography:** Gentle slopes; see attached topographic maps.

**Wildlife Habitat:** See Fish and Wildlife section.

**Endangered Species:** PNDI endangered species report attached.

**Recreation/ Aesthetics:** See Recreation Section.

**Fire Risk:** Low

**Cultural and Unique Features:** None

**Existing Practices:** Active invasive plant control and mowing.

**Neighboring Property Influences:** None, other than as a source of invasive plant species. One positive influence is the neighbor to the south of this property and that neighbor's active participation in managing invasive plants.

## **Stand Level Information:**

**Stand #:** Trap Range Stand                      **Acres:** 9.5

**Forest Type, Size, Stocking:** AR21, 15" ave. stand DBH, fully stocked

**Stand Age:** Stand is approximately 85-90 years old on average with dominant tree heights of approximately 80-90 feet.

**Age Structure:** Even-aged.

**Stand Description:**

This stand consists of the most contiguous wooded portion of the property located primarily east of the trap shooting facilities. The overstory is a closed canopy of mature trees that generally are in the medium to large (16" DBH and greater) sawtimber size class. There are about 3-5 snag trees and living cavity trees available for wildlife per acre on average. Basal area (density) is dominated by yellow poplar (42%), red maple (18%), black cherry (13%), and black locust (9%). Other overstory species include: black and scarlet oak, black gum, sassafras, beech, black walnut, hickories, Japanese angelica, and ailanthus. No evergreen cover exists in the stand. Trees are generally in the medium and large (16"+ DBH) size sawtimber size classes.

**Understory:** The understory vegetation and shrub component of this stand is very similar to the Open Field stand in composition of species and abundance, covering 50-70% of the forest floor and ground level growing space. Again, many of the species found (privet, ailanthus, and spicebush) are not native and/ or are not high-quality, wildlife valuable desirable species. Some greenbrier was present as well.

**Tree Regeneration:** No desirable hardwood seedlings were observed in or near sample plots, although a few hickories and poplar were noted between sample plot locations. More than a few ailanthus seedlings/ small saplings were noted as well. With the closed canopy situation and the competing understory vegetation (primarily non-native species), it is unlikely that much if any quality hardwood regeneration could occur at this time.

**Tree Site Index/ Ht:** black oak, 82'.

**Average, Product DBH:** 18" DBH, medium to large sawtimber.

**Overstory Growth Rate, 10 year period:** mixed oak, 2.5" DBH .

**Stem Quality:** average to better than average stem height and quality.

**TPA:** 277 TPA.

**Dominant Species:** yellow poplar, 53 TPA.

**BA:** 110 (yellow poplar, 45).

**Primary Soils:** See attached NRCS soils report.

**Water features:** See Air, Water, and Soils section.

**Topography:** Gentle slopes; see attached topographic maps.

**Wildlife Habitat:** See Fish and Wildlife section.

**Endangered Species:** PNDI endangered species report attached.

**Recreation/ Aesthetics:** See Recreation Section.

**Fire Risk:** Low

**Cultural and Unique Features:** None

**Existing Practices:** Active invasive plant control and mowing.

**Neighboring Property Influences:** None.

## **STAND MANAGEMENT RECOMMENDATIONS:**

### **Overview**

The Natural Resource Conservation Service (NRCS) has federally available cost-share programs that will provide some technical assistance and even financial assistance to landowners looking to improve recreational opportunities, forest health and diversity, road and trail systems (to reduce erosion), and increase wildlife habitat on their property. Development of this Plan will allow you to be eligible to apply for such programs. Landowners are encouraged to seek technical and financial assistance from both the Bureau of Forestry and the Natural Resources Conservation Service programs (EQIP, CSP, or similar) as program opportunities may change over time. It may be possible that those practices already planned (such as spraying of invasive plants, tree plantings, nest boxes, etc.) could be cost-shared through NRCS.

I want to stress two things before the discussion of stand improvement recommendations: the no-harvest option and the poor harvest option. As a landowner, when we are inundated with helpful information about timber management, we must remember that we always have the option to pass—to not harvest at this time and see how the woodlot changes in the coming couple years, giving us time to ponder our options and/ or seek additional advice. I can't stress enough to avoid selling timber based on either: a certain size tree and larger, or selling only those highest value trees (often called a "selective" type harvest). The Appendix has a great article on why high-grading or diameter limit cutting are such a poor harvest option.

### **Landowner Objectives for the property, All Forest Stands, 19+/- acres:**

1. Control the invasive plant species



2. Improve trail and road access throughout the property for increased management options and increased ease of invasive control.
3. Field border and meadow improvements through vegetative management and/ or tree and shrub plantings (i.e. establish pollinator habitat along forest-field edges)
4. Install nest boxes, create brush piles for wildlife, if desired by the landowner, for increased habitat availability for small mammal and avian species
5. Forest stand improvements, Timber Stand Improvements (TSI)

## **Invasive Plants**

Regarding any changes to the timber and land resources on the property, the most important *first* step to take is to manage and control the invasive plant species community. This property's invasive community is significant enough to warrant active treatment but is by no measure an insurmountable task. It is likely that the owner will benefit greatly from additional guidance and cost-share funding from NRCS. Creating more trails and access to more parts of the property, not to mention the activity of spraying invasive plants, can become costly when conducted without assistance. Spraying and invasive plant treatment should be done prior to any other timber stand improvements, but at a minimum should be done at least simultaneously with any improvements.

The invasive species list, indicated earlier in the Protection from Pests section, includes some very aggressive plants that directly out-compete native tree and shrub species valued by wildlife of all types. At times listed as noxious and/ or invasive plants (depending on which state or federal list one searches), there are also several species that are equally problematic in that they outcompete desirable species (like raspberry). Privet, ailanthus, cork, and in some areas even spicebush have grown so dense that no growing space is available for hardwood seedlings and/ or native shrub and herbaceous species. I would recommend picking areas that are manageable in size and working to "clear" those areas of invasive plants first and then expand the control work from there; perhaps picking a particular section within a stand of timber. The good news is that both stands of timber, and in particular the Trap Range Stand, have a density of overstory trees that will allow limited sunlight to the forest floor; this in turn will help create a growing environment less favorable for invasive plants to re-populate after spraying. While the landowner can begin treatment in whichever stand(s) is most practical, I would suggest starting with the Open Field Stand as this stand has the highest non-native variety and density of seed source on the property. Try to avoid any mowing or trail improvement activities after August as stiltgrass will likely be going to seed at this time and driving back and forth may simply spread the seed.

For species with longer seed life, such as stilt grass, mile-a-minute, and oriental bittersweet, I would suggest that any spraying be done with the inclusion of a pre-emergent such as Oust™. While including a pre-emergent would be recommended, if done at the proper time, spraying such annuals with only glyphosate can also provide reduction in the invasive plant community. Such glyphosate-only spraying must be done early in the growing season before the plants go to seed. A systemic woody plant product with the active ingredient triclopyr would be used for basal, stump, and foliar spraying for woody species (ailanthus, barberry, autumn olive, etc.). Given the severity of the invasive plant community, it is very likely that some form of commercial, truck or ATV mounted spray equipment will be needed to make a practical impact on the invasive plant community. The local Bureau of Forestry office and the local NRCS office should be able to provide the landowner with a list of contractors in the area who specialize in such work.

Much more information about the specifics of invasive plant treatment can be found in the Appendix section.

## **Road Maintenance**

Access roads and trails on the property are minimal but do appear to be well maintained. Adding trails and roads through the woods would provide easier access to managing forest resources (such as treating invasive plants, tree plantings, nest box installation, etc.). Concurrent with spraying invasive plants, road and trail improvements could be undertaken to make the management options more cost-effective. The access roads and trails will need to be evenly distributed throughout the stand to gain access to all parts of the stands. The invasive plants are not found in a few isolated pockets on the property, but are found widely through the timber; treatment will require managing nearly the entire 19+ acres of timber and some of the adjacent field edges to gain full control of the invasive plant community.

## **Forest Diversity and Health**

*Desired species to regenerate: hardwoods*

The property's timber diversity and health can of course be improved upon by treatment of the invasive plant community. Control of invasive plants will also provide more opportunity for various native herbaceous plants such as blueberry, raspberry, and similar.

Retain and encourage regeneration of evergreen species if found on the property, as they establish well in a shaded environment and help provide competition against invasive plant species. As stated previously in this FMP, in those areas that are effectively overrun with invasive plants, shrub and tree plantings could be used to provide food and/ or cover for

wildlife as well as a competitive *dis*-advantage to the invasive plants, but only *after* a few years of controlling the invasive plants.

## **Habitat Creation**

*Desired species to plant:* pollinator species of herbaceous, shrub, and/ or tree species

In light of the fact that the property already provides excellent habitat for wildlife, I would not suggest wide-spread changes to the existing property (other than removal of invasive plants).

Pollinator plantings of any kind can be done on the property if desired. There are areas along the field edge within the Open Field Stand that show limited valuable species for wildlife which could be improved by the planting of many pollinator species of herbaceous and woody vegetations. The landowners should consider some of the following species: various asters, spiderwort, milkweed, joe-pye, redbud, dogwoods, winterberry, and similar to name but a few. The planting of trees would be a value-added step, though not necessarily a drastic improvement in wildlife value since currently, even with the invasive community, the property has a very high wildlife-use value. All decisions regarding species selection should be coordinated with the NRCS office and local Bureau of Forestry office for their input and expertise on the topic.

Evergreen species could be planted in either stand on the property to increase the local tree species diversity. White pine, white spruce, or blue spruce are each a good choice of species for wildlife. Fruit trees, if caged or similarly protected from deer, could be planted by the landowner if desired as well.

Additionally, any number of nesting boxes for wildlife, including bat boxes, would add value to the property for both game and non-game species. An additional “value-added” wildlife habitat benefit from the removal of undesirable understory vegetation could be the creation of brush piles for wildlife. With the landowner’s interest in removing invasive and less desirable plant species in the understory and the desire to provide a healthier forest ecosystem on the property, it is likely that the mechanical removal of woody material could be used to create brushpiles. Brushpiles are a very useful cover feature for small bird and mammal populations.

The above habitat improvements recommended for all stands of timber will increase the growth and abundance of native plants (raspberries, blackberries, poplar, oak, and hickory seedlings, etc.). Such actions will also provide more nesting/ resting options for wildlife.

## **Non-commercial Timber Stand Improvement**

Once the invasive plant communities are controlled on this property, work could be done to reduce the density of UGS (undesirable growing stock) category trees found in the pole size class. I would recommend very little cutting of any trees in the sawtimber (12" DBH+) size class in the next 5-10 years. TSI, or thinning from below as it is sometimes called, would take the form of felling for firewood, or simply felling and leaving on the forest floor, those trees generally in the 4-12" DBH size range that are not desirable species and/ or those stems in direct competition for resources with more valuable trees. Some of the red maple, black gum, and sassafras in direct competition with oaks, hickories, and black cherry could be thinned at this time if invasive plants are being adequately managed. Poor form red maple and black gum can be hinge cut (see Appendix for hinge cutting information) to increase ground cover for wildlife. Cutting activities to thin the less desirable stems, or TSI cuts, should be done uniformly throughout the stand.

## **Commercial Harvesting**

I would suggest waiting 10 years before undertaking any commercial timber harvesting due to the density of invasive plants found on site. This will provide enough time to adequately address the invasive plant problem and do some understory thinning if desired. Once the invasive plant communities are more managed/ manageable, I would suggest that the landowner could consider a commercial timber sale.

Two very good options exist for conducting a timber sale on the property both of which are discussed below. One option would be in the form of a shelterwood harvest (see Appendix for a more expansive explanation). The second option would be harvesting as an un-even aged forest. Given the invasive plant seed sources on the property and the neighboring properties, care would need to be taken to ensure that the canopy is not opened up too much at any one time which may make the un-even aged approach more favorable. Regardless of which option is chosen, one common principle should be that the first harvest should focus on removing the least valuable timber resources on the property first, essentially all pulpwood trees (12" and less DBH) and the least valuable of the remaining sawtimber trees. This type of approach would promote retention of the best quality seed sources for regeneration of the next forest. I would suggest the landowner consider reaching out to the local Bureau of Forestry Service Forester in 5 to 10 or so years to discuss these steps in detail at that time.

## **Even-aged Approach**

The landowner has indicated a desire to improve the health of the current timber stand. Often times in Pennsylvania this involves managing the forest as an "even-aged" forest, such as the look of the stand currently. More details are found in the Appendix on this, but briefly, this



approach essentially means that as a forest, most of the mature trees in the canopy are within 10 or so years of being the same age. Even-aged management, often a type of harvest termed “shelterwood” harvest, can be the most successful at regenerating a new forest with hickories, oaks, and cherries, those species who establish best in direct sunlight. Even-aged management means promoting the growth and health of the mature, overstory trees in the woodlot.

However, during the overstory removal stages of a shelterwood harvest process, there will be times when the new, young forest will be formed and growing. This young forest should contain a high stem density (hopefully of desirable species, like poplar, cherry, hickories, oaks, and white pines), leaving the impression of a “thicket” or “clearcut” as opposed to a “forest” or “woods” to some viewers. It must be very clearly noted though, that just because a forest is young and looks “like a clearcut” looks, does not mean that it is an unhealthy forest; it may just be a very young forest. It may, if managed well, be a very healthy, yet young forest full of high-quality hardwood species.

I would suggest that the landowner visit some of the Bureau of Forestry timber sales in the area to see first-hand what uneven-aged harvests, shelterwood harvests, and even-aged harvests look like before choosing an approach. The Bureau of Forestry Service Forester is a great, free resource to landowners looking to understand and make a decision about what type of harvest strategy they may want to consider in their forest. A good consultant can also provide a similar service as an educational component but come with the unfortunate condition of expecting payment for services. I would advise one use quality, free resources as available and then use quality services of a consultant when needed.

The first step if an even-aged harvest strategy is chosen, would be removing the worst, poorest quality timber trees in the stand. Step one would be to remove nearly all of the pulpwood trees (under 12” DBH) in the stand as well as some (30% or so) of the smaller or poor quality sawtimber (12” DBH and larger) trees. Pulpwood trees can be retained if they are found to be younger trees growing in light gaps from mortality of dominant canopy trees.

The second and usually final step in creating a new, young, and healthy forest occurs about 5-10 years after the first phase, and this would be a small commercial harvest that would remove the remaining overstory trees in the forest. These should be the most valuable timber trees that were retained during the previous thinning and first step harvest activities.

### **Timber Stand Improvement, Uneven-aged Management**

If the owners choose to retain a more mature forest “feel” for the aesthetics of the multiple use of the property, I feel it is worth having a discussion on the value and use of an uneven-aged forest management strategy. Uneven-aged management can be described simply as a

management/ regeneration technique used to create a forest with tree species ranging in age from seedlings to mature. This in a sense more closely mimics how an “old growth” or natural forest develops over time, where young trees are found in the space where older trees have died and/ or fallen. Note, the key is a variety of trees of different ages, which is not necessarily the same as saying different sizes/ diameters. The uneven-aged approach should provide several benefits for the landowner. The stand health will be maintained/ improved, the harvest would still allow for the woods to retain a forest-like feel, and the lack of sunlight on the forest floor (when compared to an even-aged regeneration harvest) will benefit the management of invasive plant species.

An uneven-aged harvest would involve removing trees from all age classes and species distribution, creating small openings in the canopy where regeneration takes place. This will provide some monetary return while at the same time minimizing the change in appearance of the forest. It is likely that uneven-aged management will promote more poplar and red maple than hickory, black cherry, or oak regeneration. This type of harvest must be done very carefully though since this type of harvest means, loosely speaking, cutting a few very large overstory trees, more than a few medium size (14-18” DBH) sawtimber trees, and even a higher number of smaller trees (12” and under) per acre on average. Those trees selected should be the “worst” quality of trees in that given size class and category, leaving the best quality trees to grow. If one is not careful and diligent, this type of harvest can very quickly become a high-grade harvest (more on that in the Appendix) where more of the higher quality trees are taken out than should be, while poorer quality trees are left behind.

Uneven-aged harvests are not always easy, as they face the challenges of being harder to market commercially (lower volumes per sale) and of having less-favorable conditions for shade intolerant species (red oak family, black cherry, hickories). The reason I feel this idea should at least be considered is that it will allow for a more “forest-like” feel as an aesthetic consideration while also allowing for some forest stand management and improvement harvesting. Many very large poplar, oak, and red maple trees (over 24” DBH) have already showed signs of hollow spots and broken limbs. This approach would also allow the landowner to harvest in the short term some of the very large (sometimes 24-26” DBH) trees that have reached financial maturity and may otherwise end up dying or succumbing to wind damage.

## MANAGEMENT ACTIVITY SCHEDULE AND TRACKING

Stand/Field	Acres	Priority	Recommended Activity Description	NRCS Program Code	Proposed Start Date	Completion Date	Incentive Payment Used?
All stands	19	1	Invasive plant control (stilt grass, et al: see Protection from Pest section )	315, high volume spray	As soon as resources and time allow	2027	
All stands	19	1	Invasive plant control (stilt grass, et al: see Protection from Pest section )	315, medium volume spray	As soon as resources and time allow	2027	
All stands	19	1	Invasive plant control (stilt grass, et al: see Protection from Pest section )	315, low volume spray	As soon as resources and time allow	2027	
All stands	19	1	Invasive plant control (cork, privet, et al: see Protection from Pest section )	314, high volume spray	As soon as resources and time allow	2027	
All stands	19	1	Invasive plant control (cork, privet, et al: see Protection from Pest section )	314, medium volume spray	As soon as resources and time allow	2027	
All stands	19	1	Invasive plant control (cork, privet, et al: see Protection from Pest section )	314, low volume spray	As soon as resources and time allow	2027	
All stands	0.5 miles	2	Trail/ road improvements, as needed for access for invasive plant treatment	655	Anytime	2022-2027	
All stands	19	3	Timber Stand Improvement	666	Anytime after invasive plant control is achieved	2027	
Any stand	41	4	Nest Boxes	645	Anytime	2022-2027	
Any stand	0.5	4	Fruit tree plantings	612	After invasive control	2022-2027	
Any stand	0.5	4	Evergreen plantings: 10'	612	After invasive control	2022-2027	

			spacing, approx. 450-500 trees per acre				
<b>Any stand</b>	<b>19</b>	<b>4</b>	<b>Brush pile creation</b>	<b>645/649</b>	<b>After invasive control</b>	<b>2022-2027</b>	
<b>Meadow and field edges</b>	<b>1</b>	<b>4</b>	<b>Pollinator improvement plantings</b>	<b>386</b>	<b>Anytime</b>	<b>2022-2027</b>	
<b>All stands</b>	<b>19</b>	<b>5</b>	<b>Commercial Timber Sale</b>	<b>666</b>	<b>2032</b>	<b>2042</b>	

Note: these practices are identified as desirable activities for increased timber and wildlife value. Priority levels are based on which steps will allow for the most successful completion of successive steps. To be done “out of order” reduces the likelihood of being able to accomplish all intended objectives as successfully as possible. If priorities or objectives change over time, it should be noted that landowners may change any aspect of these recommendations and are advised to consider input from the Natural Resource Conservation Service and the Bureau of Forestry.

## **Forest Harvesting Activities Worksheet**

For CAP 106 and ATFS participants only (not participants in the Forest Stewardship Program), this sheet must be completed prior to conducting any timber harvesting on the property, and submitted to the local DCNR Service Forester. All stands in the treatment area must be listed on this document. If Landowner has indicated participation in the Forest Stewardship Program (Signature Page), a stand analysis and prescription for the activity are required as indicated.

**Stand # ('s)** \_\_\_\_\_

**Silviculture and Harvesting Treatments:** (Describe type of treatment to be undertaken, along with goals and intended outcomes. Treatment type could be even aged, multi aged, salvage, intermediate treatment, cleaning, pulpwood, etc.)

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**Best Management Practices for Timber Harvesting:** (Consider BMP's for slash disposal, water quality, soil stabilization, wildlife, nutrient cycling, erosion and sedimentation, etc.)

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**Permits:** (List permits applied for and needed.)

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## **APPENDIX I**

- NRCS Implementation Requirement Sheets, USDA NRCS.
- PNDI Report (threatened and endangered species report), PA DCNR.
- Soil Survey Report, USDA NRCS.
- Silvah Reports, USFS.

## **APPENDIX II**

- Ailanthus Fact Sheet, Department of Conservation and Natural Resources.
- Stiltgrass Fact Sheet, Department of Conservation and Natural Resources.
- DTS Invasive Spray Suggestions, DTS Resource Management.
- Emerald Ash Borer, PSU Cooperative Extension.
- Even and Uneven-Aged Forest Management, Oklahoma Cooperative Extension.
- Guidelines for Applying Group Selection Harvesting, USDA Forest Service.
- Gypsy Moth Fact Sheet, Department of Conservation and Natural Resources.
- Hemlock Woolly Adelgid Fact Sheet, Department of Conservation and Natural Resources.
- Hinge Cutting, QDMA.
- Invasive Plant Tutorials, Department of Conservation and Natural Resources.
- Pollinator Species, Xerces Society.
- PSU #1, Forest Finance, PSU Cooperative Extension.
- PSU #3, Recordkeeping, PSU Cooperative Extension.
- PSU #4, Property Tax, PSU Cooperative Extension.
- PSU Ailanthus Fact Sheet, PSU Cooperative Extension.
- Say No to High Grading, Cornell University Cooperative Extension.
- Spotted Lanternfly, PA Department of Agriculture.
- Stewardship Series #5, Wildlife, PSU Cooperative Extension.
- Stiltgrass Fact Sheet, PSU Cooperative Extension.
- Successful Tree Plantings with Tree Shelters, Matt Kern, DCNR Service Forester
- Timber Stand Improvement, author unknown.
- Timber Taxation, Penn State University.
- Waterbar Detail, Department of Environmental Protection.

## PA314 - Brush Management Implementation Requirements

**Producer:** \_\_\_\_\_

**Project or Contract:** \_\_\_\_\_

**Farm Number:** \_\_\_\_\_

**County:** \_\_\_\_\_

**Tract Number:** \_\_\_\_\_

**Field Number(s):** \_\_\_\_\_

**Practice Purpose(s) (check all that apply):**

Create desired plant community consistent with ecological site or a desired state within the site description.

Restore or release desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality, or enhance hydrology. Maintain, modify, or enhance fish and wildlife habitat.

Improve forage accessibility, quality, and quantity for livestock and wildlife.

Manage fuel loads to achieve desired conditions.

Pervasive plant species are controlled to a desired level of treatment that will ultimately contribute to creation or maintenance of an ecological site description "steady state" addressing the need for forage, wildlife habitat, and/or water quality.

**Associated Practice(s):** This practice may be applied alone or in combination with other supporting conservation practice standards. The following practices are necessary, have been or will be implemented (check all that apply).

Prescribed Burning (338)

Fire Break (394)

Fuel Break (383)

Land Clearing (460)

Forage and Biomass Planting (512)

Prescribed Grazing (528)

Forest Stand Improvement (666) Wetland

Wildlife Habitat Management (644) Upland

Wildlife Habitat Management (645)

Integrated Pest Management (595)

Other: \_\_\_\_\_

No associated practices are necessary

**BRUSH MANAGEMENT SPECIFICATIONS**

Targeted Species for Control			
Field or Stand*	Species to be Controlled*	Current Percent Cover or Density	Planned Post-Treatment Percent Cover or Density

\* Map or additional narrative description of areas planned for treatment may be attached.

**General Specifications**

- ✓ Carry out activities so rutting, soil compaction and excessive disturbance to the soil is minimized.
- ✓ Vegetative material left on site after control activities shall not pose a fire or pest hazard or interfere with intended purpose of the practice or desired land use.
- ✓ Protect sensitive areas such as vernal pools, riparian areas, wetlands and cultural resources. Identify all areas to be protected on a map and/or with a detailed narrative description.

<b>Mechanical Treatment Methods</b>	
Acceptable mechanical treatment references	
Types of equipment to be used	
Dates of treatment	
Operating Instructions	
Techniques and procedures to be followed	

<b>Biological Treatment Methods*</b>	
Acceptable biological treatment references	
Kind of grazing animal to be used	
Timing, frequency, duration and intensity of grazing	
Desired degree of grazing or browsing use for effective control	
Maximum allowable degree of use on desirable non-target species	
Special mitigation, precautions or requirements	

**\* Producer must have a written Prescribed Grazing Plan specifying proper grazing management.**

<b>Chemical Treatment Methods*</b>	
Acceptable chemical treatment/references	
Acceptable dates or plant growth stage	
Evaluation and interpretation of herbicide risks	
Special mitigation, precautions or requirements to ensure safest most effective application	

**\* Follow all applicable Federal, State and Local laws and regulations; label instructions and precautions.**

**Additional Note:** NRCS Planners are prohibited from providing specific treatment recommendations, but may provide appropriate available references, such as PSU Agronomy Guide or other peer-reviewed references.

<b>Monitoring Plan</b>	
<b>Timing</b>	
<b>Frequency</b>	
<b>Method</b>	

## PA314 - Brush Management Implementation Requirements

Figure 1. NRCS PA Targeted Woody Plant Species Requiring Multiple Year Treatment (PA314)

Common Name	Scientific Name
Autumn olive	<i>Elaeagnus umbellata</i>
Bamboo, Giant Timber	<i>Phyllostachys bambusoides</i>
Bamboo, Golden	<i>Phyllostachys aurea</i>
Bamboo, Yellow Groove	<i>Phyllostachys aureosulcata</i>
Callery pear	<i>Pyrus calleryana</i>
Common privet	<i>Ligustrum vulgare</i>
Glossy buckthorn	<i>Frangula alnus</i>
Japanese barberry	<i>Berberis thunbergii</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Japanese knotweed	<i>Fallopia japonica</i>
Kudzu	<i>Pueraria montana</i>
Multiflora Rose	<i>Rosa multiflora</i>
Norway maple	<i>Acer platanoides</i>
Oriental bittersweet	<i>Celastrus orbiculatus</i>
Porcelain-berry	<i>Ampelopsis brevipedunculata</i>
Russian olive	<i>Elaeagnus angustifolia</i>
Tree-of-heaven	<i>Ailanthus altissima</i>
Tartarian honeysuckle	<i>Lonicera tatarica</i>
Wineberry	<i>Rubus phoenicolasius</i>

Second Treatment (1 <sup>st</sup> follow up treatment)			
Follow up treatment is only applicable for certain species (See list below of eligible species)			
Field or Stand	Species to be Controlled*	Current Percent Cover or Density	Planned Post-Treatment Percent Cover or Density
Third Treatment (2 <sup>nd</sup> follow up treatment)			
Follow up treatment is only applicable for certain species (See list below of eligible species)			
Field or Stand	Species to be Controlled*	Current Percent Cover or Density	Planned Post-Treatment Percent Cover or Density

**NRCS Use Only:**

Designed By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

**CERTIFICATION STATEMENT:** I certify that implementation of this conservation practice is complete, meets criteria for the stated purpose(s), and meets the NRCS conservation practice standard and specifications.

\_\_\_\_\_  
 Signature Designated Conservationist  
 or Technical Service Provider

\_\_\_\_\_  
 Date

**PA315 – Herbaceous Weed Treatment Implementation Requirements**

**Producer:** \_\_\_\_\_

**Project or Contract:** \_\_\_\_\_

**Farm Number:** \_\_\_\_\_

**County:** \_\_\_\_\_

**Tract Number:** \_\_\_\_\_

**Field Number(s):** \_\_\_\_\_

**Practice Purpose(s) (check all that apply):**

- Enhance accessibility, quantity, and/or quality of forage and/or browse.
- Restore or release native or desired plant communities for wildlife habitat.

- Protect soils and control erosion.
- Reduce fine fuel loads and wildlife hazard.
- Control pervasive plant species to a desired level of treatment.

**Associated Practice(s):** This practice may be applied alone or in combination with other supporting conservation practice standards. The following practices are necessary, have been or will be implemented (check all that apply).

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>Conservation Cover (327)</li> <li>Cover Crop (340)</li> <li>Critical Area Planting (342)</li> <li>Wildlife Habitat Planting (420)</li> <li>Forage Harvest Management (511)</li> </ul> | <ul style="list-style-type: none"> <li>Pasture and Hay Planting (512)</li> <li>Prescribed Grazing (528)</li> <li>Pest Management Conservation System (595)</li> <li>Tree/Shrub Establishment (612)</li> <li>Other: _____</li> <li>No associated practices are necessary</li> </ul> |
|--|--|

**HERBACEOUS WEED TREATMENT- MANAGEMENT SPECIFICATIONS**

Targeted Species for Control			
Field or Stand*	Species to be Controlled*	Current Percent Cover or Density	Planned Post-Treatment Percent Cover or Density

\* Map or additional narrative description of areas planned for treatment may be attached.

**General Specifications**

- ✓ Carry out activities so rutting, soil compaction and excessive disturbance to the soil is minimized.
- ✓ Vegetative material left on site after control activities shall not pose a fire or pest hazard or interfere with intended purpose of the practice or desired land use.
- ✓ Protect sensitive areas such as vernal pools, riparian areas, wetlands and cultural resources. Identify all areas to be protected on a map and/or with a detailed narrative description.



**PA315 – Herbaceous Weed Treatment Implementation Requirements**

<b>Mechanical Treatment Methods</b>	
Acceptable mechanical treatment references	
Types of equipment to be used	
Dates of treatment	
Operating Instructions	
Techniques and procedures to be followed	

<b>Biological Treatment Methods*</b>	
Acceptable biological treatment references	
Kind of grazing animal to be used	
Timing, frequency, duration and intensity of grazing	
Desired degree of grazing or browsing use for effective control	
Maximum allowable degree of use on desirable non-target species	
Special mitigation, precautions or requirements	

\* **Producer must have a written Prescribed Grazing Plan specifying proper grazing management.**

<b>Chemical Treatment Methods*</b>	
Acceptable chemical treatment/references	
Acceptable dates or plant growth stage	
Evaluation and interpretation of herbicide risks	
Special mitigation, precautions or requirements to ensure safest most effective application	
<b>* Follow all applicable Federal, State and Local laws and regulations; label instructions and precautions.</b>	

**Additional Note:** NRCS Planners are prohibited from providing specific treatment recommendations, but may provide appropriate available references, such as PSU Agronomy Guide or other peer-reviewed references.

<b>Monitoring Plan</b>	
<b>Timing</b>	
<b>Frequency</b>	
<b>Method</b>	



**PA315 – Herbaceous Weed Treatment  
Implementation Requirements**

**NRCS Use Only:**

Designed By: \_\_\_\_\_

Date: \_\_\_\_\_

Approved By: \_\_\_\_\_

Date: \_\_\_\_\_

**CERTIFICATION STATEMENT:** I certify that implementation of this conservation practice is complete, meets criteria for the stated purpose(s), and meets the NRCS conservation practice standard and specifications.

\_\_\_\_\_  
Signature Designated Conservationist  
or Technical Service Provider

\_\_\_\_\_  
Date



Producer: Conewago Rod and Gun Club

Project or Contract: Click here to enter text.

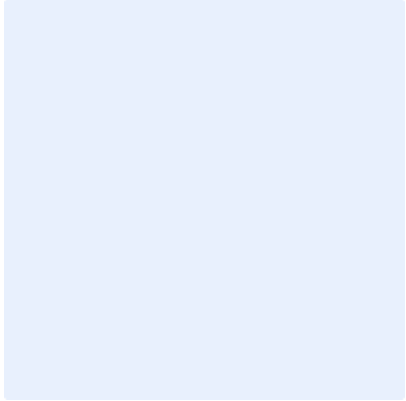
Location: Click here to enter text.

County: Lancaster

Farm Name: Click here to enter text.

Tract Number: Click here to enter text.

**Practice Location Map**  
*(showing detailed aerial view of where practice is to be installed on farm/site, showing all major components, stationing, relative location to any landmarks, and survey benchmarks)*



Exact location to be determined by landowner at time of contract signing

**Index**

- Cover Sheet
- Specifications
- Drawings
- Cost Estimate and Projected Bid Form
- Operation & Maintenance

Utility Safety/  
One-Call System  
Information

Click here to enter text.

**Description of work:**

Landowner wishes to retain the option of pollinator plantings along the edge of the fields and open areas but is not certain at this time if/ and when funding would be available to consider these practices. They need to remain in the FMP as an option for future funding opportunities.

**NRCS Review Only**

<b>Designed By:</b>	Click here to enter text.	<b>Date</b>	Click here to enter a date.
<b>Checked By:</b>	Click here to enter text.	<b>Date</b>	Click here to enter a date.
<b>Approved By:</b>	Click here to enter text.	<b>Date</b>	Click here to enter a date.



## PA386 – Field Border Implementation Requirements

**Practice Purpose(s):** (check all that apply)

- Reduce erosion from wind and water.
- Protect soil and water quality.
- Provide wildlife food, cover, and pollinator habitat.
- Increase carbon storage.
- Improve air quality.

**Field number/location:** TBD      **Acres installed:** TBD      **Seeding date:** date

**Average Width:** av. width      **Minimum Width:** min. width      **Field Border Length** border length

**Site preparation:** site prep

**Planting method:** TBD

**Planting Description** (e.g., shrubs established on outside edge of area, etc.):

TBD

### Seeding Rates and Species (woody species units are plants/linear ft)

Plant species	lbs/acre of seed (PLS)	Total lbs of seed for planned acreage
1 plant species	lbs/acre seed	total lbs seed
2 plant species	lbs/acre seed	total lbs seed
3 plant species	lbs/acre seed	total lbs seed
4 plant species	lbs/acre seed	total lbs seed
5 plant species	lbs/acre seed	total lbs seed
6 plant species	lbs/acre seed	total lbs seed
7 plant species	lbs/acre seed	total lbs seed
8 plant species	lbs/acre seed	total lbs seed
9 plant species	lbs/acre seed	total lbs seed
10 plant species	lbs/acre seed	total lbs seed
<b>TOTALS =</b>	<b>0</b>	<b>0</b>

\*To figure pure live seed (PLS) rates, multiply the percent purity by the percent germination. Divide the seeding rate by the percent PLS to find the bulk seed needed per acre.

For example: 98% purity X 60% germination = 0.588% PLS 10 lbs/acre X 0.588% PLS = 17 lbs/acre.

### Fertilizers and Amendments

Fertilizer Element	Fertilizer Form	Fertilizer Amount (lbs/acre)
N	e.g., DAP	lbs/acre as N
P	e.g., DAP	lbs/acre as P <sub>2</sub> O <sub>5</sub>
K	e.g., K <sub>2</sub> SO <sub>4</sub>	lbs/acre as K <sub>2</sub> O
S	e.g., K <sub>2</sub> SO <sub>4</sub>	lbs/acre as S
Lime	form	lbs/acre
Gypsum	form	lbs/acre

## PA386 – Field Border Implementation Requirements

**Operation and Maintenance:** (check all that apply)

- Repair storm damage.
- Remove sediment from above or within the field border when accumulated sediment either alters the function of the field border or threatens the degradation of the planted species' survival.
- Shut off sprayers and raise tillage equipment to avoid damage to field borders.
- Shape and reseed border areas damaged by animals, chemicals, tillage, or equipment traffic.
- Maintain desired vegetative communities and plant vigor by liming, fertilizing, mowing, disking, or burning and controlling noxious weeds to sustain effectiveness of the border.
- Repair and reseed ephemeral gullies and rills that develop in the border.
- Minimally invasive tillage (e.g., paraplowing) may be performed in rare cases where compaction and vehicle traffic have degraded the field border function. The purpose of the tillage is strictly to decrease bulk density and increase infiltration rates so as to provide a better media for reestablishment of vegetation and field border function.
- Maintenance activities that result in disturbance of vegetation should not be conducted during the nesting season of grass-nesting birds.
- Avoid vehicle traffic when soil moisture conditions are saturated.

### **Certification Statement:**

I certify that implementation of this conservation practice is complete, meets criteria for the stated purpose(s), and meets the NRCS conservation practice standard and specifications.

X

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Planner/Technical Service Provider



**Producer:** \_\_\_\_\_  
**Location:** \_\_\_\_\_  
**Farm Number:** \_\_\_\_\_

**Project or Contract:** \_\_\_\_\_  
**County:** \_\_\_\_\_  
**Tract Number:** \_\_\_\_\_

**DEFINITION:** Establishing woody plants by planting seedlings or cuttings, by direct seeding, and/or through natural regeneration.

**PURPOSE(s):** (Check at least one and all that apply)

- Maintain or improve desirable plant diversity, productivity, and health by establishing woody plants.
- Create or improve habitat for desired wildlife species compatible with ecological characteristics of the site.
- Improve water quality. Reduce excess nutrients and other pollutants in runoff and groundwater.
- Control erosion.
- Sequester and store carbon.
- Restore or maintain native plant communities.
- Develop renewable energy systems.
- Conserve energy.
- Provide for beneficial organisms and pollinators.

**Associated Practice(s):** This practice may be applied alone or in combination with other supporting Pennsylvania conservation practice standards. The following practices are necessary, and or have been or will be implemented: (check all that apply)

- Brush Management (314)
- Herbaceous Weed Treatment (315)
- Tree/Shrub Site Prep (490)
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- No associated practices are necessary

**WOODY PLANT MATERIALS INFORMATION:** Attach additional sheets as necessary.

Field #	Acres	Kind of Stock <sup>1</sup>	Plant Species	Shelter or Protection Type	Plants per Acre <sup>2</sup>	Spacing between Plants	Total no. of Plants (multiply by no. of acres)	

1. Bareroot, container, cutting, balled and burlapped, etc. Include size, caliper, height, and age as applicable.  
 2. Refer to 612 Planting Rate Worksheet for planting rate calculations.

**REGENERATION AREA PROTECTION:** Refer to the 612 Practice Guide

Total Acres: \_\_\_\_\_ Total Footage: \_\_\_\_\_ Fence Height: \_\_\_\_\_ Wire Type: \_\_\_\_\_  
 Number of 16 ft. Equipment Gates: \_\_\_\_\_ Base Securing: \_\_\_\_\_

<b>Posts:</b>	Corner Posts:	In-Line Posts:
Type:		
Diameter (in):		
Length (ft):		
Post Spacing (ft):		

## PA 612 Tree /Shrub Establishment Implementation Requirements

**ADDITIONAL SPECIFICATIONS:** Provide all necessary additional details here to meet all Criteria and all documentation requirements in the 612 Conservation Practice Standard. Include any necessary site preparation and planting methods information. Attach and reference additional information, standard drawings, references, etc., as needed.

**OPERATION AND MAINTENANCE** (Check all that apply)

- Maintain the health of the plant community by controlling competing vegetation, as needed, until the desired trees and shrubs area established. Do not conduct maintenance practices and activities during the primary reproductive period of wildlife.
- Control access by vehicles and/or equipment during or after tree/shrub establishment to protect new plants and minimize erosion, compaction and other site impacts.
- Inspect the site \_\_\_\_\_ (frequency) following planting, seeding, and/or natural regeneration for \_\_\_\_\_ (duration) to determine whether the survival rate for tree and shrubs meets practice and client objectives. Replant or provide supplemental planting when survival is not adequate. Maintain at least 70% (inclusive of natural regeneration) of the original plant stocking for the entire practice lifespan.
- Inspect the trees and shrubs \_\_\_\_\_ (frequency), and protect them from adverse impacts of insects, diseases, competing vegetation, fire, livestock, wildlife, and non-functioning tree shelters and/or weed barriers.
- Inspect and maintain installed plant protection structures (regeneration area protection fencing and tree shelters).
- Control plant species on the Federal or State invasive species and noxious weed lists using mechanical or chemical methods.
- Other (specify) \_\_\_\_\_

**NRCS Use Only**

<b>Designed By:</b>	<b>Date</b>	
<b>Checked By:</b>	<b>Date</b>	
<b>Approved By:</b>	<b>Date</b>	

**Certification Statement:**

I certify that implementation of this conservation practice is complete, meets criteria for the stated purpose(s), and meets the NRCS conservation practice standard and specifications.

X \_\_\_\_\_  
Planner/Technical Service Provider

Date: \_\_\_\_\_





Producer: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Farm Name: \_\_\_\_\_

Project or Contract: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Tract Number: \_\_\_\_\_

**DEFINITION:** A temporary or infrequently used route, path, or cleared area.

**PURPOSE(s):** (Check at least one and all that apply)

- Provide routes for temporary or infrequent travel by people or equipment for management activities.
- Provide periodic access for removal and collection of forest products

**ASSOCIATED PRACTICE(s):** This practice may be applied alone or in combination with other supporting Pennsylvania conservation practice standards. The following practices are necessary, and or have been or will be implemented: (check all that apply)

- Access Road (PA560)
- Critical Area Planting (PA342)
- Forage and Biomass Planting (PA512)
- Structure for Water Control (PA587)
- Stream Crossing (PA578)
- Road/Trail/Landing Closure and Treatment (PA654)
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- No associated practices are necessary

**DESIGN:** Note: The Design section must be completed after the engineering design package is developed, and prior to practice installation. The design package should include additional details such as number, type, spacing, size of erosion control structures, stream crossing details, cut and fills, and other earthwork, structures, etc. Segments with similar characteristics, e.g., soil type, slope, design, anticipated use, required treatment, etc., may be grouped together:

Segment ID	Length (ft.)	Width (ft.)	Slope%	Design Package attached?
				Y <input type="checkbox"/> N <input type="checkbox"/>
				Y <input type="checkbox"/> N <input type="checkbox"/>
				Y <input type="checkbox"/> N <input type="checkbox"/>
				Y <input type="checkbox"/> N <input type="checkbox"/>

**PLANT MATERIALS INFORMATION:** Refer to the Conservation Cover (PA327) and Critical Area Planting (PA342) Conservation Practice Standards for species recommendations, seeding rates, etc. Attach PA327 and/or PA 342 Implementation Requirements as necessary.

## PA655 Forest Trails and Landings Implementation Requirements

**ADDITIONAL SPECIFICATIONS:** Provide all necessary additional details here to meet all Criteria and all documentation requirements (from the Plans and Specifications section) in the 655 Conservation Practice Standard. Attach and reference additional information, standard drawings, references, etc., as needed.

### OPERATION AND MAINTENANCE (Check all that apply)

- Regular and timely inspections for adverse effects will be conducted at least annually with trails and landings and associated measures maintained or restored as necessary
- Take corrective actions as needed to replace damaged control measures and make other repairs as needed.
- Access to trails and landings must be controlled when and where needed for erosion abatement, safety and liability, and reduced maintenance costs.
- Other (specify)

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### NRCS Use Only

<b>Designed By:</b>		<b>Date</b>	
<b>Checked By:</b>		<b>Date</b>	
<b>Approved By</b>		<b>Date</b>	

### Certification Statement:

I certify that implementation of this conservation practice is complete, meets criteria for the stated purpose(s), and meets the NRCS conservation practice standard and specifications.

X \_\_\_\_\_

Planner/Technical Service Provider

Date: \_\_\_\_\_



Producer: [ ]
Location: [ ]
Farm Name: [ ]

Project or Contract: [ ]
County: [ ]
Tract Number: [ ]

DEFINITION: The manipulation of species composition, stand structure, or stand density by cutting or killing selected trees or understory vegetation to achieve desired forest conditions or obtain ecosystem services.

PURPOSE(s): (Check at least one and all that apply)

- Improve and sustain forest health and productivity.
Reduce damage from pests and moisture stress.
Initiate forest stand regeneration.
Increase or maintain carbon storage.
Reduce fire risk and hazard and facilitate prescribed burning.
Restore or maintain natural plant communities.
Improve wildlife and pollinator habitat.

ASSOCIATED PRACTICE(s): This practice may be applied alone or in combination with other supporting Pennsylvania conservation practice standards. The following practices are necessary, and or have been or will be implemented: (check all that apply)

- Brush Management (PA314)
Herbaceous Weed Treatment (PA315)
Integrated Pest Management (PA595)
Structure for Water Control (PA587)
Forest Trails and Landings (PA655)
Road/Trail/Landing Closure and Treatment (PA654)
Other:
Other:
No associated practices are necessary

PLANS AND SPECIFICATIONS: The following are required for implementation of this practice:

- Practice location(s) is/are shown on the conservation plan map.
Forest management plan that contains the following:
Description of existing conditions, including desired tree and understory species and species to be removed;
Expected outcomes/desired future condition
Planned treatment specifications, including stocking rates in terms of basal area, spacing, or trees per acre by species and size class distribution, or by a professionally accepted density or stocking protocol.
Recommended methods for treatments
Harvest regeneration strategy (identify below)
Any associated practices, including Best Management Practices required by Pennsylvania forestry regulations, that must be implemented with this practice.

HARVEST REGENERATION STRATEGY (check one Management System on first line and check specific system below the system)

- Uneven-aged Management System
Single-tree selection,
Group selection,
Coppice selection
Other
Even-aged Management System
Seed-tree
Shelterwood,
Coppice
Other

TYPE OF FOREST STAND IMPROVEMENT (check one and write in type, i.e. hand, chemical, mechanical, other-specify, and acres)

Pre-commercial Thinning Type: Acres:
Thinning for Wildlife Type: Acres:
Thinning for Forest Health Type: Acres:

## PA666 Forest Stand Improvement Implementation Requirements

Competition Control  
Type: \_\_\_\_\_ Acres: \_\_\_\_\_

Crop/Mast Tree Release  
Type: \_\_\_\_\_ Acres: \_\_\_\_\_

Patch Cut/Group Selection  
Type: \_\_\_\_\_ Acres: \_\_\_\_\_

**ADDITIONAL SPECIFICATIONS:** Provide all necessary additional details here to meet all Criteria and all documentation requirements in the 666 Conservation Practice Standard. Attach and reference additional information, standard drawings, references, etc., as needed.

**OPERATION AND MAINTENANCE** (Check all that apply)

- Regular and timely periodic inspections, at least annually, for assessment of insects, disease, and other pests, storm damage, and damage by trespass.
- Control undesirable plants as needed to achieve management goals;
- The trees or shrubs will also be protected from fire
- The trees will be protected from livestock or wildlife damage.
- Other (specify)

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**NRCS Use Only**

<b>Designed By:</b>		<b>Date</b>	
<b>Checked By:</b>		<b>Date</b>	
<b>Approved By:</b>		<b>Date</b>	

**Certification Statement:**

I certify that implementation of this conservation practice is complete, meets criteria for the stated purpose(s), and meets the NRCS conservation practice standard and specifications.

X \_\_\_\_\_  
Planner/Technical Service Provider

Date: \_\_\_\_\_

## 1. PROJECT INFORMATION

Project Name: **Lancaster\_T25**  
Date of Review: **5/14/2020 04:11:23 PM**  
Project Category: **Forest Stewardship Plan**  
Project Area: **29.17 acres**  
County(s): **Lancaster**  
Township/Municipality(s): **WEST DONEGAL**  
ZIP Code: **17022**  
Quadrangle Name(s): **MIDDLETOWN**  
Watersheds HUC 8: **Lower Susquehanna; Lower Susquehanna-Swatara**  
Watersheds HUC 12: **Conewago Creek; Hartman Run-Susquehanna River**  
Decimal Degrees: **40.148091, -76.642956**  
Degrees Minutes Seconds: **40° 8' 53.1287" N, 76° 38' 34.6426" W**

## 2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	<b>Conservation Measure</b>	<b>No Further Review Required, See Agency Comments</b>
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	<b>Conservation Measure</b>	<b>No Further Review Required, See Agency Comments</b>

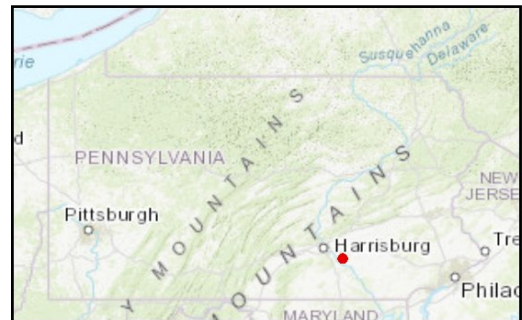
Pennsylvania Natural Diversity Inventory (PNDI) records indicate that while threatened and endangered and/or special concern species and resources are in the project vicinity and that recommended Conservation Measures should be implemented in their entirety to avoid and minimize impacts to these species, no further coordination is required with the jurisdictional agencies. If a DEP permit is required for this project, DEP has the discretion to incorporate one or more Conservation Measures into its permit. This response does not reflect potential agency concerns regarding potential impacts to other ecological resources, such as wetlands.



# Lancaster\_T25



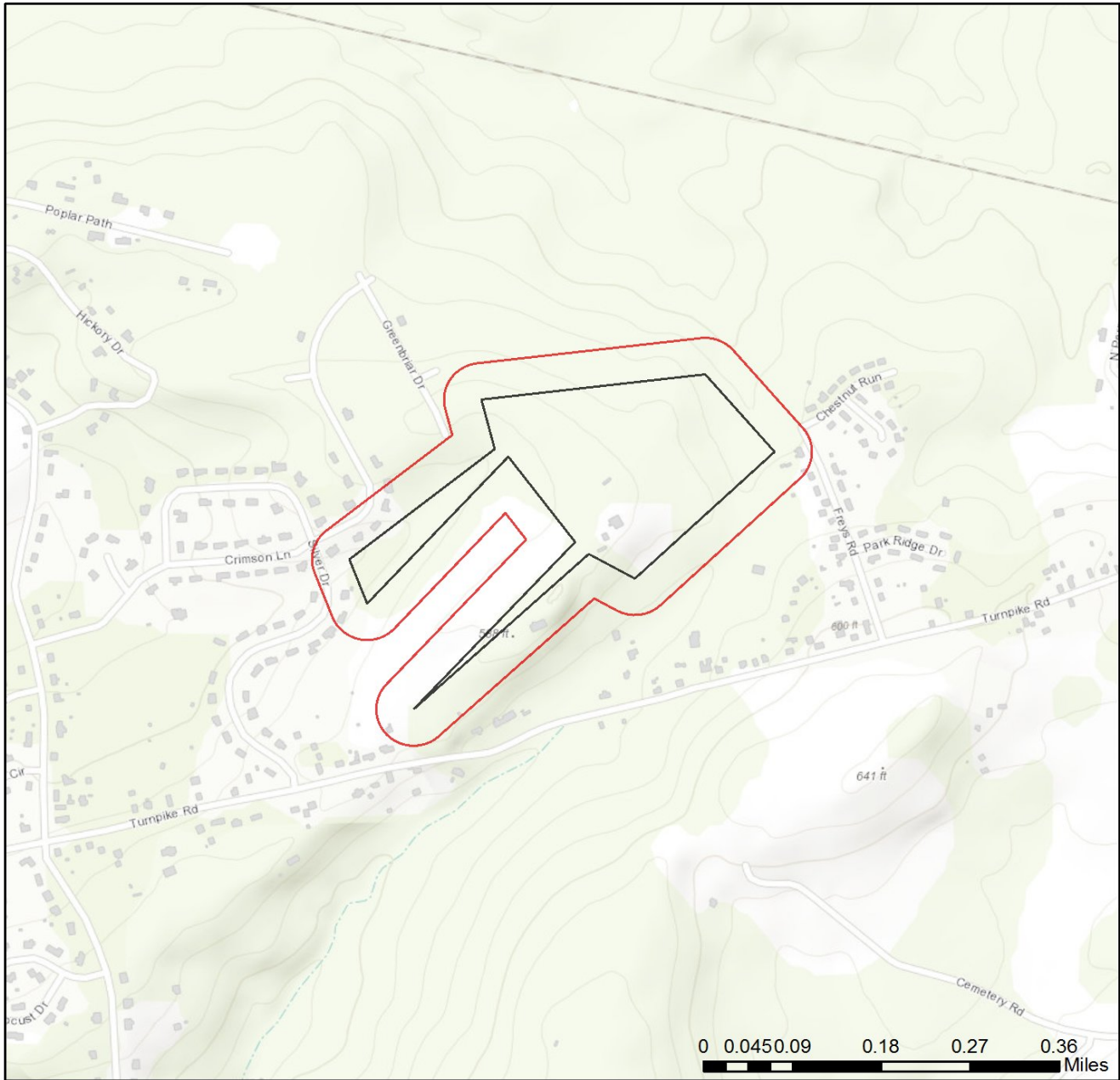
- Project Boundary
- Buffered Project Boundary



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community  
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community



# Lancaster\_T25



- Project Boundary
- Buffered Project Boundary



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS,

### 3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

#### PA Game Commission

##### RESPONSE:

Conservation Measure: Potential impacts to state and federally listed species which are under the jurisdiction of both the Pennsylvania Game Commission (PGC) and the U.S. Fish and Wildlife Service may occur as a result of this project. As a result, the PGC defers comments on potential impacts to federally listed species to the U.S. Fish and Wildlife Service. No further coordination with the Pennsylvania Game Commission is required at this time.

#### PA Department of Conservation and Natural Resources

##### RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

#### PA Fish and Boat Commission

##### RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

#### U.S. Fish and Wildlife Service

##### RESPONSE:

Conservation Measure: Voluntary implementation of the following recommendation(s) will contribute to the conservation and recovery of endangered and threatened species. To conserve foraging and roosting habitat for endangered bats, while also carrying out the proposed conservation, restoration, or stewardship project/activity, conserve and protect forested areas. Emphasis should be placed on retaining (or restoring, if not already present) mature forests with at least 60% canopy closure. Also, retain all hickory trees, and large diameter (>12 inches d.b.h.) snags, dying, and injured trees to ensure a continuing supply of potential roost trees for bats. If agricultural lands are proposed for inclusion in the conservation project/activity, use Integrated Pest Management, with an emphasis on avoiding or minimizing the use of chemical pesticides, and review this project under the appropriate "Agriculture/Farming" project categories. If any timber harvesting or tree cutting is proposed, review this project under the category "Timber harvesting and Vegetation Management" -- "Timber sale/harvest."

## 4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at <https://conservationexplorer.dcnr.pa.gov/content/resources>.



## 5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page ([www.naturalheritage.state.pa.us](http://www.naturalheritage.state.pa.us)). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

## 6. AGENCY CONTACT INFORMATION

### PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section  
400 Market Street, PO Box 8552  
Harrisburg, PA 17105-8552  
Email: [RA-HeritageReview@pa.gov](mailto:RA-HeritageReview@pa.gov)

### PA Fish and Boat Commission

Division of Environmental Services  
595 E. Rolling Ridge Dr., Bellefonte, PA 16823  
Email: [RA-FBPACENOTIFY@pa.gov](mailto:RA-FBPACENOTIFY@pa.gov)

### U.S. Fish and Wildlife Service

Pennsylvania Field Office  
Endangered Species Section  
110 Radnor Rd; Suite 101  
State College, PA 16801  
Email: [IR1\\_ESPenn@fws.gov](mailto:IR1_ESPenn@fws.gov)  
NO Faxes Please

### PA Game Commission

Bureau of Wildlife Habitat Management  
Division of Environmental Planning and Habitat Protection  
2001 Elmerton Avenue, Harrisburg, PA 17110-9797  
Email: [RA-PGC\\_PNDI@pa.gov](mailto:RA-PGC_PNDI@pa.gov)  
NO Faxes Please

## 7. PROJECT CONTACT INFORMATION

Name: \_\_\_\_\_  
Company/Business Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City, State, Zip: \_\_\_\_\_  
Phone:(\_\_\_\_\_) \_\_\_\_\_ Fax:(\_\_\_\_\_) \_\_\_\_\_  
Email: \_\_\_\_\_

## 8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

\_\_\_\_\_  
applicant/project proponent signature

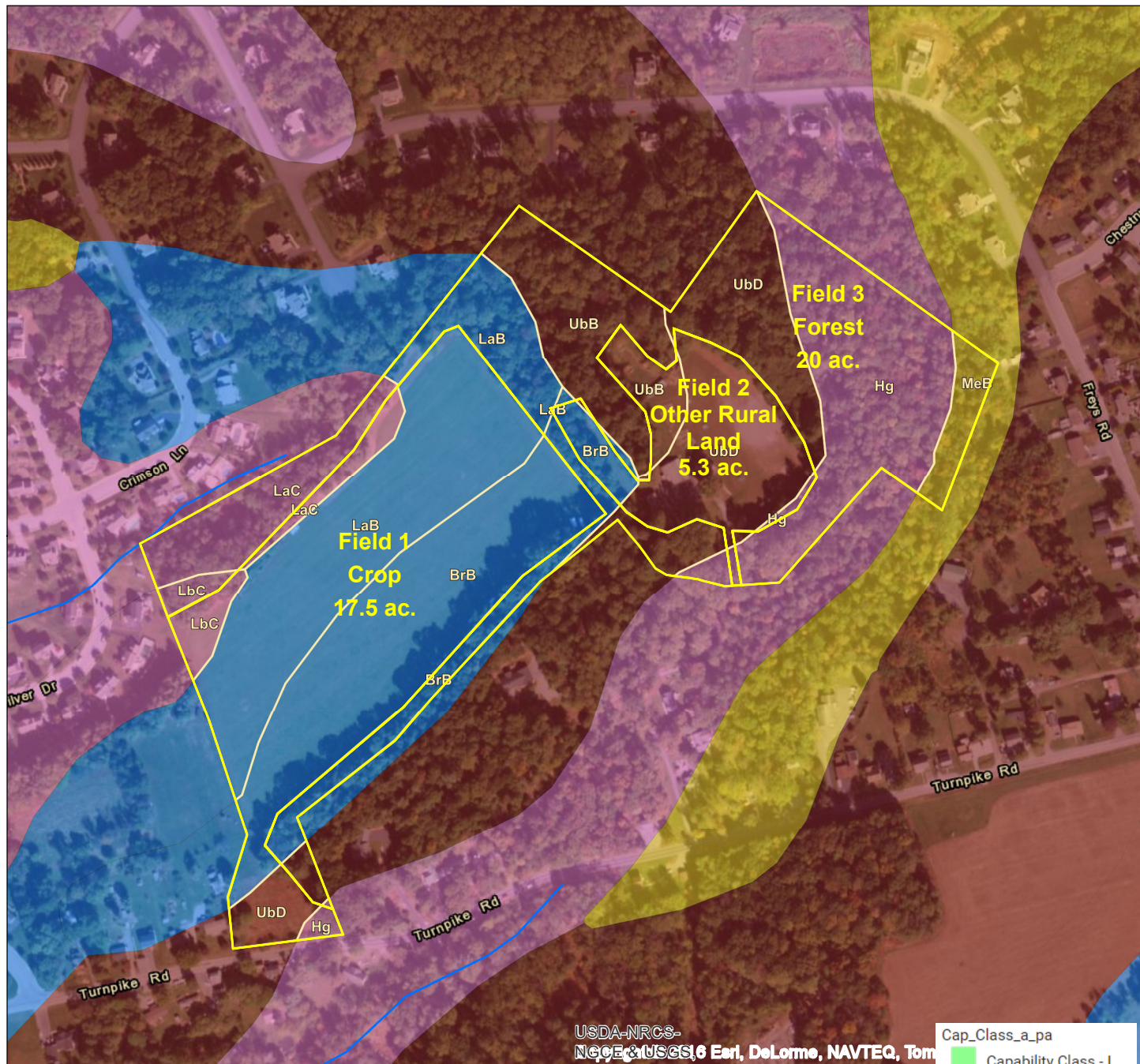
\_\_\_\_\_  
date



# Soils Map

Client(s): CONEWAGO ROD AND GUN CLUB  
Location: T25  
West Donegal Township  
Lancaster County, Pennsylvania

Assisted By: HEATHER GROVE  
USDA - NRCS, Lancaster Field Office



USDA-NRCS-  
NGCE & USGS, 6 Earl, DeLorme, NAVTEQ, Tom

Cap_Class_a_pa	
[Green Box]	Capability Class - I
[Blue Box]	Capability Class - II
[Pink Box]	Capability Class - III
[Cyan Box]	Capability Class - IV
[Yellow Box]	Capability Class - V
[Orange Box]	Capability Class - VI
[Brown Box]	Capability Class - VII
[Purple Box]	Capability Class - VIII



Practice Schedule  
PLUs

**Soils**

Soil Mapunit



## Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

### Report—Map Unit Description (Brief, Generated)

#### Lancaster County, Pennsylvania

**Map Unit:** BrB--Brecknock gravelly silt loam, 3 to 8 percent slopes

**Component:** Brecknock (90%)

The Brecknock component makes up 90 percent of the map unit. Slopes are 3 to 8 percent. This component is on nearly level to very steep hills, low ridges, uplands. The parent material consists of red metamorphosed residuum weathered from sandstone and shale and/or residuum weathered from porcellanite. Depth to a root restrictive layer, bedrock, lithic, is 42 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Component:** Lehigh (6%)

Generated brief soil descriptions are created for major soil components. The Lehigh soil is a minor component.

**Component:** Ungers (2%)

Generated brief soil descriptions are created for major soil components. The Ungers soil is a minor component.

**Component:** Mount Lucas (1%)

Generated brief soil descriptions are created for major soil components. The Mount Lucas soil is a minor component.

**Component:** Bucks (1%)

Generated brief soil descriptions are created for major soil components. The Bucks soil is a minor component.

**Map Unit:** Hg--Holly silt loam**Component:** Holly (94%)

The Holly component makes up 94 percent of the map unit. Slopes are 0 to 3 percent. This component is on flood plains, sandstone shale hills. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is frequently flooded. It is occasionally ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

**Component:** Linden (2%)

Generated brief soil descriptions are created for major soil components. The Linden soil is a minor component.

**Component:** Brinkerton (2%)

Generated brief soil descriptions are created for major soil components. The Brinkerton soil is a minor component.

**Component:** Gibraltar (2%)

Generated brief soil descriptions are created for major soil components. The Gibraltar soil is a minor component.

**Map Unit:** LaB--Lansdale loam, 3 to 8 percent slopes**Component:** Lansdale (92%)

The Lansdale component makes up 92 percent of the map unit. Slopes are 3 to 8 percent. This component is on rolling hillsides, hills. The parent material consists of residuum weathered from sandstone and/or residuum weathered from conglomerate. Depth to a root restrictive layer, bedrock, lithic, is 42 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Component:** Reaville (8%)

Generated brief soil descriptions are created for major soil components. The Reaville soil is a minor component.

**Map Unit:** LaC--Lansdale loam, 8 to 15 percent slopes**Component:** Lansdale (92%)

The Lansdale component makes up 92 percent of the map unit. Slopes are 8 to 15 percent. This component is on rolling hillsides, hills. The parent material consists of residuum weathered from sandstone and/or residuum weathered from conglomerate. Depth to a root restrictive layer, bedrock, lithic, is 42 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Component:** Reaville (8%)

Generated brief soil descriptions are created for major soil components. The Reaville soil is a minor component.

**Map Unit:** LbC--Lehigh silt loam, 8 to 15 percent slopes**Component:** Lehigh (85%)

The Lehigh component makes up 85 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillsides, hills. The parent material consists of residuum weathered from porcellanite. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Component:** Croton (8%)

Generated brief soil descriptions are created for major soil components. The Croton soil is a minor component.

**Component:** Brecknock (7%)

Generated brief soil descriptions are created for major soil components. The Brecknock soil is a minor component.

**Map Unit:** MeB--Mount Lucas very stony silt loam, 3 to 12 percent slopes**Component:** Mount Lucas (90%)

The Mount Lucas component makes up 90 percent of the map unit. Slopes are 3 to 8 percent. This component is on nearly level to moderately steep hillslopes, uplands. The parent material consists of residuum weathered from diabase. Depth to a root restrictive layer, bedrock, lithic, is 48 to 84 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

**Component:** Towhee (7%)

Generated brief soil descriptions are created for major soil components. The Towhee soil is a minor component.

**Component:** Ungers (1%)

Generated brief soil descriptions are created for major soil components. The Ungers soil is a minor component.

**Component:** Bucks (1%)

Generated brief soil descriptions are created for major soil components. The Bucks soil is a minor component.

**Component:** Brecknock (1%)

Generated brief soil descriptions are created for major soil components. The Brecknock soil is a minor component.

**Map Unit:** UbB--Ungers extremely stony loam, 3 to 8 percent slopes**Component:** Ungers (85%)

The Ungers component makes up 85 percent of the map unit. Slopes are 3 to 8 percent. This component is on mountain slopes. The parent material consists of residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 80 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter

content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

**Component: Penn (7%)**

Generated brief soil descriptions are created for major soil components. The Penn soil is a minor component.

**Component: Readington (5%)**

Generated brief soil descriptions are created for major soil components. The Readington soil is a minor component.

**Component: Bucks (3%)**

Generated brief soil descriptions are created for major soil components. The Bucks soil is a minor component.

**Map Unit: UbD--Ungers extremely stony loam, 8 to 25 percent slopes**

**Component: Ungers (85%)**

The Ungers component makes up 85 percent of the map unit. Slopes are 8 to 25 percent. This component is on mountain slopes. The parent material consists of residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 80 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

**Component: Penn (7%)**

Generated brief soil descriptions are created for major soil components. The Penn soil is a minor component.

**Component: Readington (5%)**

Generated brief soil descriptions are created for major soil components. The Readington soil is a minor component.

**Component: Bucks (3%)**

Generated brief soil descriptions are created for major soil components. The Bucks soil is a minor component.

## Data Source Information

Soil Survey Area: Lancaster County, Pennsylvania

Survey Area Data: Version 19, Jun 05, 2020

## Soils Inventory Report

Tract	Land Unit	Map Unit Symbol	Map Unit Name	Acres	Percent
25	1	BrB	Brecknock gravelly silt loam, 3 to 8 percent slopes	7.6	43%
25	1	Hg	Holly silt loam	0.2	1%
25	1	LaB	Lansdale loam, 3 to 8 percent slopes	7.9	45%
25	1	LaC	Lansdale loam, 8 to 15 percent slopes	0.6	3%
25	1	LbC	Lehigh silt loam, 8 to 15 percent slopes	0.6	3%
25	1	UbD	Ungers extremely stony loam, 8 to 25 percent slopes	0.8	5%
<b>Total</b>				<b>17.7</b>	<b>100%</b>

Tract	Land Unit	Map Unit Symbol	Map Unit Name	Acres	Percent
25	2	BrB	Brecknock gravelly silt loam, 3 to 8 percent slopes	0.6	11%
25	2	Hg	Holly silt loam	0.1	2%
25	2	LaB	Lansdale loam, 3 to 8 percent slopes	0.0	0%
25	2	UbB	Ungers extremely stony loam, 3 to 8 percent slopes	0.9	17%
25	2	UbD	Ungers extremely stony loam, 8 to 25 percent slopes	3.7	70%
<b>Total</b>				<b>5.3</b>	<b>100%</b>

Tract	Land Unit	Map Unit Symbol	Map Unit Name	Acres	Percent
25	3	BrB	Brecknock gravelly silt loam, 3 to 8 percent slopes	1.6	8%
25	3	Hg	Holly silt loam	6.2	31%
25	3	LaB	Lansdale loam, 3 to 8 percent slopes	1.8	9%
25	3	LaC	Lansdale loam, 8 to 15 percent slopes	2.2	11%
25	3	LbC	Lehigh silt loam, 8 to 15 percent slopes	0.3	1%
25	3	MeB	Mount Lucas very stony silt loam, 3 to 12 percent slopes	0.9	4%
25	3	UbB	Ungers extremely stony loam, 3 to 8 percent slopes	3.4	17%
25	3	UbD	Ungers extremely stony loam, 8 to 25 percent slopes	3.6	18%
<b>Total</b>				<b>20</b>	<b>100%</b>

**Grand Total**                      **43**                      **100%**

# Silvah-7 SILVICULTURE OF ALLEGHENY HARDWOODS AND OAK

Generated by: SILVAH-7 (version: 7.0.4.10)

SIL file: C:\Sonny\DJCSC Folder\Dad\ConsultingWork\Conewago rod and gun\Silvah\Open Field Stand.sil7 (version: 7.0.12)

DEF file: C:\Sonny\DJCSC Folder\Dad\ConsultingWork\Conewago rod and gun\Silvah\def.def7 (version: 7.0.3)

SCR file: Settings from SILVAH-7 (version: 7.0.5)

Report date: Jun 15, 2022

Owner/Agency: Conewago Rod and Gun Club

County/District: Lancaster County

Compartment/Unit: Open Field Stand

Stand name: Open Field Stand

Area: 9.5

Effective age: 74.0

Site index: 75 for YP

Equivalent black oak site index: 76

Forest type: Mixed Hardwood

Allegheny NF Forest type: Mixed upland hardwoods

Size class: small sawtimber

Relative density: 75.8

Trees to include: live only

## Contents:

- **2022: Original Stand Conditions**
  - [Cruise Information \(Type, Sampling Error, etc.\)](#)
  - [Site Characteristics and Regeneration Summary](#)
  - [Non-native Invasive Species](#)
  - [Narrative Summary and Analysis](#)
  - [Information on Wildlife Habitat](#)
  - [Silvah Recommended Prescription Decision Chart Trace](#)
  - [Timber Product x Species Volume and Value: per acre](#)
  - [Timber Product x Species Volume and Value: total stand](#)
  - [Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values](#)
  - [Tree List](#)
  - [Overstory Species x Diameter Table: Basal area \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Number of trees \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Net pulpwood cubic volume \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Net board-foot volume, Int. \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Dollar value \(live trees only\)](#)
  - **Initial treatment: SILVAH recommended prescription: Defer Cutting (low relative density)**
- **2027: Simulated Stand Conditions**
  - [Narrative Summary and Analysis](#)
  - [Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values](#)
  - **Future treatment: SILVAH recommended prescription: Defer Cutting (low relative density)**
- **2032: Simulated Stand Conditions**
  - [Narrative Summary and Analysis](#)
  - [Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values](#)
  - **Future treatment: SILVAH recommended prescription: Defer Cutting (low volume)**
  - **Final Stand Conditions**
    - [Narrative Summary and Analysis](#)

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## Overstory Cruise Information



Overstory data is from a prism cruise, using a 10 factor prism, and with trees tallied by 2 inch dbh classes, Overstory data is based on 5 plots. Only live trees are included in calculations.

Mean basal area is 134.0 plus or minus 32.7 sq.ft. per acre at 90% confidence (24.4% of mean).

- 8 additional plots needed to reach 15% of mean basal area.
- 25 additional plots needed to reach 10% of mean basal area.

Mean stems per acre is 624.8 plus or minus 637.3 stems per acre at 90% confidence (102.0% of mean).

- 226 additional plots needed to reach 15% of mean stems per acre.
- 515 additional plots needed to reach 10% of mean stems per acre.

Mean relative density is 75.8 plus or minus 16.3 percent per acre at 90% confidence (21.5% of mean).

- 5 additional plots needed to reach 15% of mean relative density.
- 18 additional plots needed to reach 10% of mean relative density.

Mean net bdf volume is 3473.4 plus or minus 3130.4 bd.ft. per acre at 90% confidence (90.1% of mean) using the International 1/4 inch log rule.

- 175 additional plots needed to reach 15% of mean net bdf volume.
- 401 additional plots needed to reach 10% of mean net bdf volume.

Mean net pulpwood is 13.7 plus or minus 6.8 cords per acre at 90% confidence (49.5% of mean).

- 49 additional plots needed to reach 15% of mean net pulpwood.
- 118 additional plots needed to reach 10% of mean net pulpwood.

Overstory statistics

plot	basal area (sq.ft./ac.)	stems per acre (stems/ac.)	relative density (percent/ac.)	net bdf volume (bd.ft./ac.)	net pulpwood (cords/ac.)
1	140.0	259.6	87.4	2687.6	12.2
2	150.0	330.7	90.4	6089.6	23.6
3	170.0	1788.0	67.6	1093.2	14.3
4	80.0	285.8	50.4	0.0	4.1
5	130.0	460.0	83.4	7496.7	14.5
<b>Minimum</b>	80.0	259.6	50.4	0.0	4.1
<b>Maximum</b>	170.0	1788.0	90.4	7496.7	23.6
<b>Mean</b>	134.0	624.8	75.8	3473.4	13.7
<b>Variance</b>	1130.0	428714.1	279.8	10344603.6	48.7
<b>Standard deviation</b>	33.6	654.8	16.7	3216.3	7.0
<b>Standard error</b>	15.0	292.8	7.5	1438.4	3.1
<b>Coefficient Of Variation</b>	25.1	104.8	22.1	92.6	50.9

## Understory Cruise Information

Data on competitive regeneration, site limitations and understory is from a weighted count regeneration cruise using 6-ft radius plots.

Understory data is based on 11 plots.

**Warning:** regeneration data is not based on an adequate number of plots. To give reliable results, at least 8 additional plots are needed for this stand.

# Site Characteristics and Regeneration Summary

Cruise type: 2= **Weighted counts**

Number of plots: **11**

Plot size: 1= **6-ft radius plot**

Deer impact: 4= **high**

## Field Counts

Field Counts

	plot count	percent plots	seedlings/acre*	Threshold values based on a deer index of 4 (high)
<b>Black cherry</b>	0	0	0	plots with at least 25 stems of black cherry NOTE: stocking standards are being reviewed and may change
<b>Yellow poplar/cucumber</b>	0	0	0	plots with at least 50 stems of yellow poplar/cucumber NOTE: stocking standards are being reviewed and may change
<b>Conifer</b>	0	0	0	plots with at least 25 stems of conifer
<b>New oak</b>	0	0	0	plots with at least 100 stems of new oak
<b>Established oak</b>	0	0	0	plots with at least 50 stems of established oak
<b>Competitive oak</b>	0	0	0	plots with at least 2 stems of competitive oak
<b>Total oak</b>	0	0	0	plots with at least 100 stems of oak
<b>Other desirable</b>	0	0	315	plots with at least 100 stems of other desirable NOTE: stocking standards are being reviewed and may change
<b>Undesirable</b>	0	0	0	plots with at least 1 stems of undesirable species at least as tall as the tallest desirable plant NOTE: stocking standards are being reviewed and may change.
<b>Established desirable</b>	0	0	315	plots with at least 100 stems of black cherry + yellow poplar/cucumber + conifer + new oak + established oak + competitive oak + other desirables
<b>Competitive desirable</b>	0	0	315	plots with at least 100 stems of black cherry + yellow poplar/cucumber + conifer + competitive oak + other desirables
<b>Residual</b>	11	100		plots with an recorded residual species
<b>Sapling</b>	10	91		plots with an recorded sapling species

\*seedlings/acre have been estimated from extended understory weighted plant counts. These estimates may be lower than actual values.

Summary Values - Ambient Deer Pressure

	Percent plots	Ambient Deer Pressure (4= high)
<b>Oak stump sprouts</b>	0	12 expected sprouts per acre
<b>Established regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, established oak, competitive oak, other desirables, established desirables or competitive desirables plus oak stump sprouts
<b>Competitive regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, competitive oak, other desirable or competitive desirables plus oak stump sprouts
<b>Competitive desirable or residual</b>	100	percent of plots passing the test for either competitive desirables or residuals plus oak stump sprouts
<b>Established or</b>	0	percent of plots passing the test for either established oak or competitive oak plus oak stump sprouts

<b>competitive oak</b>		
<b>Any oak</b>	0	percent of plots passing the test for either new oak, established oak, competitive oak or total oak plus oak stump sprouts

Summary Values - With Fencing/No Deer Pressure

	<b>Percent plots</b>	<b>With Fencing/No Deer Pressure</b>
<b>Oak stump sprouts</b>	0	12 expected sprouts per acre
<b>Established regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, established oak, competitive oak, other desirables, established desirables or competitive desirables plus oak stump sprouts
<b>Competitive regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, competitive oak, other desirable or competitive desirables plus oak stump sprouts
<b>Competitive desirable or residual</b>	100	percent of plots passing the test for either competitive desirables or residuals plus oak stump sprouts
<b>Established or competitive oak</b>	0	percent of plots passing the test for either established oak or competitive oak plus oak stump sprouts
<b>Any oak</b>	0	percent of plots passing the test for either new oak, established oak, competitive oak or total oak plus oak stump sprouts

## Factors Affecting Regeneration Difficulty

Deer impact: 4= **high**

Seed supply: 3= **low seed supply**

Acorn supply: 0= **not adequate**

Seed source Index

<b>Species</b>	<b>f</b>	<b>BA poles+</b>	<b>BA x f</b>
<b>black cherry</b>	2.0	24.0	48.0
<b>red maple</b>	1.5	2.0	3.0
<b>sugar maple</b>	2.4	0.0	0.0
<b>white ash</b>	1.5	0.0	0.0
<b>Total</b>			51.0

The following two nonnative invasive species were found in this stand: ailanthus and unspecified non-native shrub. These species have the potential to displace native vegetation, including desirable timber species. There are one invasives in the overstory and two in the understory plots.

## Interfering Understory

Interfering Understory

	<b>Plot count</b>	<b>Percent plots</b>	
<b>Tall woody interference</b>	9	82	Based on percent of plots with an identified tall woody interference species. Basal area of sapling/pole undesirables is (36.0 sq.ft.)
<b>Undesirable saplings/poles</b>		36	basal area of undesirable trees less than 12-inch dbh in the overstory plots
<b>Low woody interference</b>	7	64	plots with at least 30% cover; average cover= 41

<b>Fern interference</b>	0	0	plots with at least 30% cover; average cover= 0
<b>Grass interference</b>	1	9	plots with at least 30% cover; average cover= 16
<b>Any vegetative interference</b>	9	82	plots with tall woody, low woody, fern or grass interference
<b>Established oak no interference</b>	0	0	plots passing the test for established oak and with no vegetative interference
<b>Established desirables no interference</b>	0	0	plots passing the test for established desirables and with no vegetative interference
<b>Grapevines present</b>	6	55	average vines/acre= 40

#### Tall Woody Interfering Species Summary

<b>Species</b>	<b>Plot count</b>	<b>Percent of plots</b>
<b>unspecified non-native shrub</b>	3	27.3
<b>devil's walkingstick</b>	2	18.2
<b>ailanthus</b>	4	36.4

#### Low Woody Interfering Species Summary

<b>Species</b>	<b>Plot count</b>	<b>Percent of plots</b>
<b>unspecified non-native shrub</b>	8	72.7
<b>northern spicebush</b>	1	9.1
<b>ailanthus</b>	1	9.1

## Site Limitations for Regeneration

#### Site Limitations for Regeneration

	<b>Plot count</b>	<b>Percent of plots</b>
<b>Thick duff</b>	0	0
<b>Poor drainage</b>	0	0
<b>Rocky surface</b>	0	0
<b>Site limits</b>	0	0

## Site Information

#### Site Information

<b>Site index</b>	75 for YP Equivalent black oak site index: 76
<b>Site class</b>	high productivity
<b>Height adjustment</b>	1.000
<b>Elevation</b>	580
<b>Aspect</b>	300
<b>Slope</b>	5
<b>Topographic position</b>	ridge
<b>Operability</b>	no limitations
<b>Access</b>	road at edge of stand

## Non-native Invasive Species

Nonnative invasive (NNIS) species may interfere with management goals and thus require careful assessment of their current extent within the stand and in neighboring stands if possible. It is of critical importance to understand the current/potential impacts of nonnative species prior to any operations in the stand. Specific treatment options should consider the difficulty of control of each species as well as the economic, aesthetic, and ecological value of the areas currently or likely to be infested by nonnative invasive species.

### Overstory data

Overstory

Species	Basal area	% Basal area	Trees/Acre	Plot count	% plots	Plot list
<a href="#">ailanthus</a>	22.0	16.4	218.7	2	40.0	3 and 4
Totals	22.0	16.4	218.7			

### Understory plot data

Understory

Species	# plots	% plots	Plot list	off plot	near stand
<a href="#">ailanthus</a>	4	36.4	4, 5, 6 and 7	X	
<a href="#">unspecified non-native shrub</a>	8	72.7	2, 4, 6, 7, 8, 9, 10 and 11	X	
<a href="#">autumn olive</a>	0	0.0		X	
<a href="#">Japanese barberry</a>	0	0.0		X	
<a href="#">Japanese honeysuckle</a>	0	0.0		X	
<a href="#">Japanese stiltgrass</a>	0	0.0		X	
<a href="#">multiflora rose</a>	0	0.0		X	
<a href="#">Norway maple</a>	0	0.0		X	
<a href="#">oriental bittersweet</a>	0	0.0		X	
<a href="#">bush honeysuckle</a>	0	0.0			X

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## Ailanthus (*Ailanthus altissima* (P. Mill.) Swingle)

### Plant Description:

Medium-sized tree to 80 feet in height. Branches are stout, crooked, and forming an open crown. Bark: Light gray, thin, and smooth. Twigs: Stout, chestnut-brown, with very large heart-shaped leaf scars. Buds: Downy, somewhat spherical, and partially hidden by leaf stem. Leaves: Alternate, pinnately compound, about 1-3 feet in length with 10-41 leaflets. Leaflets with smooth margins, dark green with light green veins. Leaves have a disagreeable odor, sometimes likened to cashews. Reproduction: vegetatively by root sprouts, and by large, winged seeds with twisted tips, born in clusters, green turning to tan. Male and female flowers on separate trees, formed from April to June, in large clusters at end of twigs. Each cluster may contain hundreds of seeds.

### Plant Ecology:

Very rapid growth, up to eight feet in first year. Capable of producing seed in second year. Short-lived, to around 30-50

years. Colonizes by root sprouts, forming dense thickets, and by prolific seed dispersal. Seeds disseminated by wind and water. Shade-intolerant. Reported to have allelopathic affects on other native species.

**Response to Management:**

Highly tolerant of drought and urban environments. A single tree can rapidly invade adjacent areas. Typically invades disturbed sites but may also invade undisturbed sites. Very difficult to eradicate once established. Allelopathic effects may inhibit regeneration of desirable species.

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## **Nonnative shrub of unspecified species**

**Plant Description:**

One or more unknown species of plausibly nonnative shrubs may occur within this stand. Nonnative shrubs often have few natural enemies in the sites they invade. Many are aggressive colonizers, and often can out-compete native vegetation because they have traits that give them an advantage over native species. Without sufficient identification, it is very difficult to establish effective measures of control, or to know whether any control measures are necessary. Consult a local expert, such as county extension agent to get help identifying unknown species. Additional help with identification may be available at [www.plants.usda.gov](http://www.plants.usda.gov).

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## **Autumn-olive (*Elaeagnus umbellata* Thunb.)**

**Plant Description:**

Medium to large woody shrub, from 3 to 20 feet in height. Main branches olive drab and marked with lenticels, and with age the bark develops fissures exposing lighter colored inner bark. Twigs are slender, with silvery scales, and some lateral twigs developing into thorns. Buds: Small, narrow and pointed, light gray. Leaves: Alternate, 2-3 inches long, somewhat elongate, elliptic to broadly ovate, with entire, wavy margins. Bright green above and silvery scaly beneath. Reproduction: Numerous, round, juicy, roughly 1/2 inch drupes. Flowers born in axils of leaves along twigs, in clusters. Silver scales on fruit, twig and leaves.

**Plant Ecology:**

Prefers drier, open sites. Capable of producing fruit after 3 years. Abundant fruit consumed and dispersed by birds and small mammals. Fixes nitrogen.

**Response to Management:**

Can form thick cover in open areas. Does not readily invade dense forests.

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## **Barberry (*Berberis thunbergii* DC.)**

**Plant Description:**

Small, compact, dense, multi-branched, thorny shrub. Twigs are slender, brown, with grooves, and simple thorns. Buds: small, ovoid. Leaves: alternate, simple, about 1 inch long, often in clusters in axils of thorns. Variable shape, entire, tapering to wedge shape at the base. Reproduction: Numerous bright red, ellipsoid berries, persistent into winter. Reported to spread by rhizomes. Flowers appear from March to April.

**Plant Ecology:**

Adapts to a variety of sites. May establish under full shade. Seeds distributed by game birds.

**Response to Management:**

Does best in full sun, but can form thick cover in forests because it can tolerate full shade, and is avoided by deer. Widely sold by nurseries. Extensive populations can form in a relatively short time.



## Japanese honeysuckle (*Lonicera japonica* Thunb.)

### Plant Description:

Semi-evergreen woody vine, climbing up to 80 feet in length. Bark is brown, hairy, becoming tan with fissures and peeling with age. Leaves: Opposite, simple, 1.5-2.5 inches long, ovate to elliptic to oblong. Margins entire, early leaves are lobed. Dark green above, paler below. Persistent until late fall or early winter. Reproduction: Rooting at nodes and sprouting frequently. Produces spheroid, .25-inch glossy berries, green turning black. Flowers: April to August. Borne in leaf axils along the stem, on a stalk. Fragrant, white or pale yellow, tubular and flaring into four-lobed upper lip and single-lobed bottom lip.

### Plant Ecology:

Forms dense arbors in forest canopies, occurs at forest margins and under forest canopies. Shade tolerant. Persists by woody rootstocks, spreads by rooting at nodes and by animal-dispersed seeds.

### Response to Management:

Can invade a wide variety of sites, grows vigorously, replacing native vegetation. Found along forest margins as well as forest interiors and in forest canopies. Can girdle shrubs and young trees.

## Japanese stilt grass (*Microstegium vimineum* (Trin.) A. Camus; *Andropogon vimineus* Trin.; *Eulalia viminea* (Trin.) Kuntze)

### Plant Description:

Loosely-branching annual grass, growing up to 1 m (3 ft) in height. Often bending over and rooting at nodes, forming extensive mats. Leaves: mid-vein is offset from the center and marked by a silvery line on the upper surface. Longer than wide and widest below the middle. Reproduction: Annual. Flowers in late summer/early fall with terminal, branching inflorescences up to 7 cm (2 3/4 in) long. Seeds (2.8-3.0 mm (1/8 in) long) dispersed in late fall. Plants in the shade tend to be much smaller (often as short as 10 cm (1 1/4 in)) than plants growing in high light and have primarily closed flowers. *Leersia virginica*, a similar native species is often found along side *M. vimineum* (e.g., grows well in the same habitat), has the same general vegetative appearance as *M. vimineum*, except that it has very evident hairy nodes that may be swollen, and is a perennial grass. It also flowers earlier (early-mid-summer) and its flowers are smaller and more delicate in appearance.

### Plant Ecology:

Flood tolerant. Shade-tolerant, but also found in disturbed, open areas as well as relatively undisturbed, closed canopy forests. May prefer bare ground and areas with high soil moisture. Spreads along disturbance corridors, such as roads, drainages, streams, and trails along which seed-containing water may move rapidly. Smaller remote populations possibly established by animals (humans, deer), with seeds (or seeds within soil) attached to shoes, hooves, clothing, and fur. Seeds disperse very near the parent plant, with no evidence of wind dispersal. Viable in the soil for at least 3 years. Cold stratification (over-wintering) may be required for germination. Germination occurs in both high and low light conditions. This grass may alter soil conditions by increasing pH and nitrification. Mat-forming, ultimately forming slowly decomposing thatch over time -- a potential fire hazard depending on site conditions.

### Response to Management:

Responds positively to canopy gaps and removal of canopy trees by producing larger plants with abundant seed, especially if soil moisture remains relatively high. Nearby populations along roads, trails, and scattered forest-interior populations should be removed before harvesting forested sites. Equipment may become contaminated and be a new source of seed. May respond to increased light by growing taller and producing more seed, increasing the rate and distance of seed dispersal. This process may continue each year such that a front of *M. vimineum* could creep through the stand at a rate of about a 1 m (3 ft) a year, even without dispersal by water or animals. If the site is prone to flooding, the entire understory could be covered with *M. vimineum* after one significant flooding event with or without any canopy disturbance. Forests kept under natural conditions are still at risk of spread of this species, at a slower rate. Control treatments done before harvesting should continue for three or more years, based on estimated seed bank longevity.

## Multiflora rose (*Rosa multiflora* Thunb.ex Murr.)

### Plant Description:

Upright shrub, forming clumps, attaining a height of 6-13 feet in height. Stems slender, climbing, arching, or trailing, green with prickles. Older stems brown with streaks of green. Buds: small, ovoid. Leaves: Alternate, odd-pinnately compound, about 1-3 inches in length with 3-11 leaflets. Leaflets finely serrate. Reproduction: vegetatively by root sprouts, and layering (rooting from tips of branches that touch the ground), and by seed, producing a reddish (when ripe), ½ inch spheroid, fleshy rose hip containing several seeds. White to pinkish white flowers emerge in May through July.

### Plant Ecology:

Relatively slow growth for 1-2 years, followed by very rapid growth and expansion through layering and root sprouts. Prolific seed dispersal. A single shrub may produce 500,000 to 1,000,000 seeds, readily dispersed by birds and mammals. Seeds viable for 10-20 years in the soil. Adaptable to a variety of soil conditions, including dry and wet sites.

### Response to Management:

Originally and possibly still widely planted for wildlife or for "living fences". Forms a dense, impenetrable thicket once established. Grows in full sun or shade, but often invading gaps and open areas. Reported as susceptible to rose rosette disease, which kills infected plants within 2 years.

## Norway maple (*Acer platanoides* L.)

### Plant Description:

Medium to large tree, 40-60 ft high, similar to sugar maple. In the open, forming a broad, densely foliated crown. Bark is moderately thin, dark gray to black, and smooth, becoming closely fissured with shallow ridges of a regular pattern. Young twigs light brown to greenish, becoming gray. Buds: Broad, plump, end bud greenish or reddish brown, bud scales strongly keeled, exuding milky white sap when cut. Leaves: opposite, simple, palmate, 5-7 sharp-pointed lobes. Glabrous, shiny green above, paler below. Petiole exudes milky white sap when cut. Leaves retained longer than native maples. Reproduction: Large, paired, yellow-green samaras appearing in autumn. Seeds somewhat flattened. Wings are 2-3 inches long, and diverging by nearly 180 degrees. Flowers: May-June, appearing before or with leaves, in large, yellow-green clusters.

### Plant Ecology:

Hardy, grows on a variety of sites, tolerant of urban conditions and compacted soils. Very shade tolerant.

### Response to Management:

Once established it has the ability to shade out the native understory and out-compete the native tree species. Widely sold as an ornamental and planted as a street tree.

## Oriental bittersweet (*Celastrus orbiculatus* Thunb.)

### Plant Description:

Climbing woody vine up to 60 feet in tree crowns. May become shrub-like, forming thickets. Stems are slender, brown to olive drab with corky lenticels, up to 4 inches in diameter, with numerous twining, twisting and drooping branches. Buds: Small, gray, somewhat spherical, and without hairs. Leaves: Alternate, variable in shape, typically oval, round, or obovate, 1½ to 5 inches long. Base tapers to a 1-inch leaf stalk. Dark green, becoming bright yellow in fall. Reproduction: vegetatively by layering and root sprouts, and by a ½ - 1 inch waxy, spherical, green (ripening to reddish-orange) capsule containing 2-3 white seeds. Flowers born in dangling clusters in axils of leaves along the stem. Fruit persistent in winter.

### Plant Ecology:

Occurs on a variety of sites and mainly along edges where it can form dense thickets. Can establish under full shade. High

rate of seed germination. Seeds disseminated by birds and small mammals. Colonizes by prolific vine growth, 1-12 feet per year for several years, with little additional growth after 7 years.

**Response to Management:**

Showy fruit, often collected by humans. Climbing vines severely damage native vegetation by constricting and girdling stems. Vines can shade, suppress, and ultimately kill native vegetation. Hybridizes with native American bittersweet (*Celastrus scandens*).

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## **Bush honeysuckle (*Lonicera maackii* (Rupr.) Maxim. *Lonicera tatarica* L.)**

**Plant Description:**

Tall woody shrubs with arching branches, attaining 10-30 feet in height. Bark is generally smooth to moderately textured with ridges. Twigs are slender, brown to reddish, with empty, brown pith. Leaves: Opposite, simple, 1-2 inches long, ovate to oblong. Margins entire, dark green above, paler below. Persistent until late fall or early winter. Reproduction: Produces abundant, red, round, roughly 1/2 inch berries, paired on stalks in axils of leaves, persistent into winter; may colonize by root sprouts. Flowers in May through June, insect-pollinated, white, changing to yellow.

**Plant Ecology:**

Form dense thickets in open forests and edges. Relatively shade tolerant. Seeds dispersed by birds and small mammals, and reported to remain viable in soil for several years. May produce an allelopathic chemical that suppresses growth of surrounding vegetation.

**Response to Management:**

Will invade openings created by cutting, wind throw or insect defoliation. Commonly found growing under trees, tall shrubs, and along fence rows that act as perch sites for birds.

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## **Recommended Invasive Plants Resource Materials**

- **Mistaken Identity? Invasive Plants and their Native Look-Alikes.** 2008. Sarver, M. et al. Delaware Department of Agriculture. A wonderful color photo guide with side by side comparisons of native and invasive plants are difficult to distinguish. View or download publication at: [https://www.nybg.org/files/scientists/rmaczi/Mistaken\\_Identity\\_Final.pdf](https://www.nybg.org/files/scientists/rmaczi/Mistaken_Identity_Final.pdf)
- **Invasive Plant Responses to Silvicultural Practices in the South.** 2006. Evans, C.W. et al. The University of Georgia, Bugwood Network. A guide to assist foresters and managers in southern US in developing management plans to reduce invasive plants. Good overview of integrating vegetation management guidelines and control techniques with silvicultural practices for other eastern US regions. View or download publication at: <http://www.invasive.org/silvicsforinvasives.pdf>
- **A Field Guide for the Identification of Invasive Plants in Southern Forests.** 2010. Miller, J.H. et al. USDA FS SRS General Technical Report SRS-119, Asheville NC. Update of 2003 edition. Guide displays distinguishing plant features throughout the year for accurate identification of 56 problematic invasive plants. Many species are found through the eastern region. View or download publication at: <http://www.treearch.fs.fed.us/pubs/35292>
- **A Management Guide for Invasive Plants in Southern Forests.** 2010. Miller, J.H. et al. USDA FS SRS. General Technical Report SRS-131. A companion to the Southern Forests Field ID guide described above. Provides great information on current management strategies and procedures for 56 invasive plants in a variety of habitats. Good overview on organizing, planning and enacting invasive plant management, and prevention programs. View or download publication at: <http://www.treearch.fs.fed.us/pubs/36915>
- **Join a Regional Invasive Plants Listserv to stay informed** such as the [Midwest Invasive Plant Network](#) or the [Mid-Atlantic Exotic Pest Plant Council](#).

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## **Narrative Summary and Analysis (2022 inventory data)**

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mixed Hardwood stand is dominated by Black Cherry, Non Comm. Species, Spruce and Hickory which together comprise 88 percent of the basal area.

This is a small sawtimber stand, with average medial diameter of 11.1 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 34 years. Effective stand age is about 74 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 76 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 134 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 18.8 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 13.7 cords of pulp wood and 3473.4 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 779 dollars per acre.

Trees of acceptable quality for future growing stock provide a fully stocked stand by themselves. Non-commercial saplings and poles represent 36 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Competitive seedlings are not abundant; they will provide adequate natural regeneration only if supplemented with residual stems retained from the present overstory.

Undesirable understory plants may interfere with development of regeneration. Undesirable plants in this stand include dense low woody cover, dense tall woody cover and dense grass cover.

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## **Information on Wildlife Habitat**

### **Mast, Forage and Browse resources**

Hard mast such as hickory nuts, acorns and beech nuts are foods that can be consumed immediately or stored for use during the winter season. They are required by many wildlife species, including bears, squirrels and mice. The stand has 12.0 sq.ft. of trees that produce high-quality hard mast (scarlet oak, white oak, northern red oak and shagbark hickory), and 56.0 sq.ft. of other hard mast producers (black cherry, Norway spruce, yellow poplar, black locust and red maple). The understory data has four species that produce hard mast (black cherry, black locust, Norway spruce and yellow poplar), but none of these species produce high quality hard mast.

Soft mast (fruits), such as cherries and berries are high energy foods required by many wildlife species including bears and many species of migrating songbirds where high energy sources are of key importance during fall migration. The stand has two species that produce high-quality soft mast totaling a basal area of 56.0 sq.ft. (black cherry and sassafras) and no other soft mast producing trees. The understory data has four species that produce high-quality soft mast (black cherry, devil's walkingstick, northern spicebush and sassafras) and no other soft mast producing species.

Browse is a critical food resource for herbivores such as deer, rabbits, and cottontails. Because most herbivores of concern are ground foragers, only understory vegetation is considered in this report. This stand contains eight species that produce browse (ailanthus, black cherry, black locust, devil's walkingstick, hickory, northern spicebush, sassafras and yellow poplar), none of these species produce high quality browse. The distribution of browse across the stand is good, 100.0 percent of plots have at least one browse species.

This stand has five species that provides exceptional additional wildlife food in the form of insects and nectar totaling a basal area of 46.0 sq.ft. (black cherry, white oak, yellow poplar, black locust and shagbark hickory). Another three species totaling 28.0 sq.ft. provide some additional food value (sassafras, scarlet oak and northern red oak). The understory has three species that provides exceptional additional wildlife food in the form of insects and nectar (black cherry, black locust and yellow poplar). Another three species provide some additional food value (devil's walkingstick, northern spicebush and sassafras). These additional food resources support many songbirds and pollinators.

## Snags Cavities and Dens

Snags and den trees provide shelter for a wide variety of wildlife including owls, ducks, woodpeckers, songbirds, squirrels, fishers, and other mammals. They are also used for foraging by various birds, mammals and amphibians. There are no snags recorded in your data. Research suggests a minimum of 3 snags per acre of varying diameter and stage of decay. To create snags (by girdling), this stand has 22.0 sq.ft. of sawtimber size trees that have exceptional value as snags (sassafras, white oak, black locust and shagbark hickory).

## Stand Structure and Composition

Structurally diverse forests support a greater diversity of wildlife. Understory structure provides foraging and nesting substrate, and escape and roosting cover for birds and mammals. Evergreen and ericaceous species provide thermal cover, structural complexity, nesting and foraging substrate, and compositional (or habitat) diversity for deer, grouse, turkey, black-throated green and -blue warblers, and other species. The stand has one evergreen trees with a basal area of 14.0 sq.ft. (Norway spruce) and no ericaceous trees. The understory has one evergreen species (Norway spruce) and no ericaceous species.

Structure is contributed both by the attributes of individual trees and species (branching habit, foliage type) and by the distribution of trees horizontally and vertically in a stand. So-called "wolf trees" with large trunks and large, low, horizontal branches are selected by several canopy-nesting bird species. Horizontal diversity can be promoted with reserve islands and variable-retention harvests. While most users of SILVAH do not collect height data, height and diameter are closely related, so we can infer the vertical structure of a stand by the proportion of trees in each diameter class.

High Stand Structure Value Species by Size Class

	Basal Area	Percent BA	Species List
<b>Saplings</b>	0.00	0.00	
<b>Poles</b>	8.00	5.97	Norway spruce
<b>Small sawtimber</b>	6.00	4.48	Norway spruce
<b>Medium sawtimber</b>	2.00	1.49	yellow poplar
<b>Large sawtimber</b>	2.00	1.49	yellow poplar
<b>Total</b>	18.00	13.43	Norway spruce and yellow poplar

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## Silvah Recommended Prescription Decision Chart Trace (2022)

Recommended prescription: **Defer Cutting (low relative density)**

### Decision Chart Parameters

Primary management objective: **Wildlife Conservation**  
Secondary management objective: **Timber Production**  
Management goal or intention: **Improve Existing Stand**  
Desired future forest type: **retain current forest type**  
Type of uneven-aged management: **Single-tree selection**  
Deer impact: **high**

## Decision Chart Trace

- begin Chart A- Start
- Primary Management Objective: 3= Wildlife Conservation
- Secondary Management Objective: 1= Timber Production
- Current Forest Type: 4= Mixed Hardwood
- What is your Goal or Intention for this stand? 3= Improve Existing Stand
- go to Chart C- Thinning Prescriptions
  
- begin Chart C- Thinning Prescriptions
- Is Relative Density high enough to permit partial cutting? No (Rel. Den.= 75.8)
- return **Defer Cutting (low relative density)**

## Warnings

- The relative density (75.8) is just below the 80% decision point in Chart C; A Thinning Prescription may be appropriate.

## Prescription Description

The relative density is 75.8% which is below the 80% threshold considered necessary for a partial cut. Immature or all-aged stands that are within or below the optimum range of stand density do not need any sort of partial cutting. In such a stand, the best prescription is to leave the stand alone for 10 or 15 years, and then re-examine it to see what treatment is appropriate at that time.

This stand has 54.5 percent of the understory plots stocked with grapevines. Grapevines that grow into the crowns of trees can cause extensive damage by interfering with growth and seed production, and by breaking out the tops of the trees. Damage can be especially severe in young, even-aged stands. In stands with more than 30 percent of the understory plots stocked with grapevines, it is usually advisable to treat the vines. This can be done by cutting the vines close to the ground. Canopy shade will usually prevent the sprouts from surviving. Where canopy density is low, or where harvest cutting will occur within a few years, cut the vines and treat the cut stumps with an herbicide.

The invasive species *Ailanthus* was reported on 2 overstory plots and on 4 understory plots. Highly tolerant of drought and urban environments. A single tree can rapidly invade adjacent areas. Typically invades disturbed sites but may also invade undisturbed sites. Very difficult to eradicate once established. Allelopathic effects may inhibit regeneration of desirable species.

The invasive species unspecified non-native shrub was reported on 8 understory plots.

The invasive species autumn olive was reported on the stand but not on any plots. Can form thick cover in open areas. Does not readily invade dense forests.

The invasive species Japanese barberry was reported on the stand but not on any plots. Does best in full sun, but can form thick cover in forests because it can tolerate full shade, and is avoided by deer. Widely sold by nurseries. Extensive populations can form in a relatively short time.

The invasive species Japanese honeysuckle was reported on the stand but not on any plots. Can invade a wide variety of sites, grows vigorously, replacing native vegetation. Found along forest margins as well as forest interiors and in forest canopies. Can girdle shrubs and young trees.



The invasive species Japanese stiltgrass was reported on the stand but not on any plots. Responds positively to canopy gaps and removal of canopy trees by producing larger plants with abundant seed, especially if soil moisture remains relatively high. Nearby populations along roads, trails, and scattered forest-interior populations should be removed before harvesting forested sites. Equipment may become contaminated and be a new source of seed. May respond to increased light by growing taller and producing more seed, increasing the rate and distance of seed dispersal. This process may continue each year such that a front of *M. vinineum* could creep through the stand at a rate of about a 1 m (3 ft) a year, even without dispersal by water or animals. If the site is prone to flooding, the entire understory could be covered with *M. vinineum* after one significant flooding event with or without any canopy disturbance. Forests kept under natural conditions are still at risk of spread of this species, at a slower rate. Control treatments done before harvesting should continue for three or more years, based on estimated seed bank longevity.

The invasive species multiflora rose was reported on the stand but not on any plots. Originally and possibly still widely planted for wildlife or for "living fences". Forms a dense, impenetrable thicket once established. Grows in full sun or shade, but often invading gaps and open areas. Reported as susceptible to rose rosette disease, which kills infected plants within 2 years.

The invasive species Norway maple was reported on the stand but not on any plots. Once established it has the ability to shade out the native understory and out-compete the native tree species. Widely sold as an ornamental and planted as a street tree.

The invasive species oriental bittersweet was reported on the stand but not on any plots. Showy fruit, often collected by humans. Climbing vines severely damage native vegetation by constricting and girdling stems. Vines can shade, suppress, and ultimately kill native vegetation. Hybridizes with native American bittersweet (*Celastrus scandens*).

The invasive species bush honeysuckle was reported near the stand. Will invade openings created by cutting, wind throw or insect defoliation. Commonly found growing under trees, tall shrubs, and along fence rows that act as perch sites for birds.

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## Timber Product x Species Volume and Value: per acre values

Net log volume (International 1/4 inch) - MBF per acre

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Veneer</b>	<b>0.2</b>	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Grade 1</b>	<b>1.6</b>	0.4	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.1
<b>Grade 2</b>	<b>0.9</b>	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2
<b>Grade 3</b>	<b>0.8</b>	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
<b>Pallet</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>3.5</b>	1.5	0.0	0.0	0.6	0.0	0.0	0.1	0.1	0.4	0.0	0.3	0.2	0.3

Net bulk volume - cords per acre

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Boltwood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pulpwood</b>	<b>13.7</b>	4.8	1.1	1.8	2.2	0.4	0.6	0.6	0.8	0.6	0.4	0.1	0.3	0.1
<b>Firewood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>13.7</b>	4.8	1.1	1.8	2.2	0.4	0.6	0.6	0.8	0.6	0.4	0.1	0.3	0.1

Value - dollars per acre

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Veneer</b>	<b>130.9</b>	89.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	33.1	2.9	0.6
<b>Grade 1</b>	<b>326.2</b>	207.4	0.0	0.0	3.4	0.0	0.0	0.0	0.0	25.4	0.0	74.1	12.7	3.3
<b>Grade 2</b>	<b>168.0</b>	108.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.1	42.9	3.7	3.4

<b>Grade 3</b>	<b>132.6</b>	119.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	0.0	0.0	0.0	0.4	-0.0
<b>Pallet</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>757.6</b>	525.4	0.0	0.0	3.4	0.0	0.0	0.0	0.0	12.3	39.4	0.1	150.1	19.7	7.3
<b>\$/MBF</b>	<b>218.1</b>	510.3	0.0	0.0	1343.4	0.0	0.0	8602.6	10176.4	2043.9	16860.0	2197.1	3932.1	2451.8	
<b>Boltwood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pulpwood</b>	<b>20.9</b>	9.5	0.0	0.0	4.4	0.0	1.2	1.2	1.6	1.2	0.8	0.2	0.5	0.2	
<b>Firewood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>20.9</b>	9.5	0.0	0.0	4.4	0.0	1.2	1.2	1.6	1.2	0.8	0.2	0.5	0.2	
<b>\$/cord</b>	<b>1.5</b>	4.4	19.9	11.5	9.5	54.7	35.3	34.5	25.5	35.0	49.6	197.5	77.5	253.9	
<b>Total</b>	<b>778.6</b>	534.9	0.0	0.0	7.8	0.0	1.2	1.2	13.9	40.6	0.9	150.3	20.2	7.5	

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## Timber Product x Species Volume and Value: total stand values

Net log volume (International 1/4 inch) - MBF

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Veneer</b>	<b>1.7</b>	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.3	0.2	0.1
<b>Grade 1</b>	<b>15.2</b>	4.2	0.0	0.0	5.4	0.0	0.0	0.0	0.0	2.1	0.0	1.7	1.1	0.8
<b>Grade 2</b>	<b>8.3</b>	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	1.3	0.5	2.0
<b>Grade 3</b>	<b>7.7</b>	6.0	0.0	0.0	0.0	0.0	0.0	0.8	0.7	0.0	0.1	0.0	0.1	0.0
<b>Pallet</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>33.0</b>	14.1	0.0	0.0	5.4	0.0	0.0	0.8	0.7	3.5	0.4	3.3	1.8	2.9

Net bulk volume - cords

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Boltwood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pulpwood</b>	<b>130.4</b>	45.3	10.0	17.3	20.9	3.6	5.6	5.8	7.8	5.7	4.0	1.0	2.6	0.8
<b>Firewood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>130.4</b>	45.3	10.0	17.3	20.9	3.6	5.6	5.8	7.8	5.7	4.0	1.0	2.6	0.8

Value - dollars

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Veneer</b>	<b>1243.8</b>	853.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.6	0.0	314.9	27.2	5.5
<b>Grade 1</b>	<b>3098.8</b>	1970.0	0.0	0.0	32.1	0.0	0.0	0.0	0.0	241.2	0.0	703.6	120.6	31.3
<b>Grade 2</b>	<b>1595.6</b>	1028.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.5	0.6	407.9	35.2	32.7
<b>Grade 3</b>	<b>1259.3</b>	1138.6	0.0	0.0	0.0	0.0	0.0	0.0	116.7	0.0	0.0	0.0	4.0	-0.0
<b>Pallet</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>7197.5</b>	4991.0	0.0	0.0	32.1	0.0	0.0	0.0	116.7	374.3	0.6	1426.3	187.0	69.6
<b>\$/MBF</b>	<b>218.1</b>	510.3	0.0	0.0	1343.4	0.0	0.0	8602.6	10176.4	2043.9	16860.0	2197.1	3932.1	2451.8
<b>Boltwood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pulpwood</b>	<b>198.9</b>	90.5	0.0	0.0	41.9	0.0	11.3	11.5	15.6	11.4	8.0	2.0	5.1	1.6

<b>Firewood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>198.9</b>	90.5	0.0	0.0	41.9	0.0	11.3	11.5	15.6	11.4	8.0	2.0	5.1	1.6	
<b>\$/cord</b>	<b>1.5</b>	4.4	19.9	11.5	9.5	54.7	35.3	34.5	25.5	35.0	49.6	197.5	77.5	253.9	
<b>Total</b>	<b>7396.4</b>	5081.5	0.0	0.0	74.0	0.0	11.3	11.5	132.3	385.7	8.7	1428.3	192.1	71.1	

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## Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values: (2022 inventory data)

### Composition - BA, percent BA, trees per acre

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Total BA</b>	<b>134.0</b>	<b>10.0</b>	34.0	22.0	22.0	14.0	12.0	10.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0
<b>Percent BA</b>	<b>100</b>	<b>7</b>	25	16	16	10	9	7	3	3	3	1	1	1	1
<b>Trees per acre</b>	<b>625</b>	<b>19.5</b>	174.5	218.7	47.9	29.1	45.5	84.7	12.7	6.2	1.5	1.9	0.5	0.9	0.6

### Quality - percent in AGS

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Saplings</b>	<b>100</b>	<b>0</b>	100	100	100	0	100	100	0	0	0	0	0	0	0
<b>Poles</b>	<b>74</b>	<b>100</b>	60	40	100	100	100	50	100	100	0	0	0	0	0
<b>Small sawtimber</b>	<b>57</b>	<b>50</b>	63	0	63	100	100	0	0	100	0	0	0	0	0
<b>Medium sawtimber</b>	<b>75</b>	<b>0</b>	100	0	0	0	0	0	0	0	0	0	0	100	0
<b>Large sawtimber</b>	<b>100</b>	<b>100</b>	0	0	0	0	0	0	0	0	100	0	100	0	100
<b>All sizes</b>	<b>72</b>	<b>80</b>	71	36	73	100	100	80	50	100	50	0	100	100	100

### Diameters and Ages - inches, years

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Medial diameter</b>	<b>11.1</b>	<b>13.2</b>	10.8	9.3	11.6	10.9	9.0	5.2	9.0	11.0	24.0	14.0	26.0	20.0	24.0
<b>Merchantable medial diameter</b>	<b>12.3</b>	<b>13.2</b>	11.9	10.9	12.4	10.9	10.0	7.0	9.0	11.0	24.0	14.0	26.0	20.0	24.0
<b>Quadratic mean diameter</b>	<b>6.3</b>	<b>9.7</b>	6.0	4.3	9.2	9.4	7.0	4.7	7.6	10.9	21.8	14.0	26.0	20.0	24.0
<b>Years to maturity</b>	<b>34</b>	<b>30</b>	31	47	37	48	53	73	60	47	0	27	0	0	0
<b>Effective age</b>	<b>74</b>	<b>79</b>	59	73	83	72	67	47	60	73	120	93	130	100	160

### Structure

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Q factor</b>	<b>1.62</b>	<b>1.33</b>	1.55	1.49	0.99	1.50	1.25	1.78	1.59	1.44	1.19	0.00	0.00	0.00	0.00

## Relative density - percent

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Rel. Density</b>	<b>76</b>	<b>8</b>	21	0	14	9	9	10	3	4	1	1	1	1	1
<b>AGS only</b>	<b>62</b>	<b>6</b>	16	0	11	9	9	8	2	4	0	0	1	1	1

## Volumes and Values (per acre) - International 1/4 inch Log Rule

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Gross Total Cords</b>	<b>23.5</b>	<b>2.8</b>	8.6	1.3	2.3	3.8	0.5	0.7	0.9	1.2	1.4	0.6	0.7	0.7	0.7
<b>Net Total Cords</b>	<b>18.8</b>	<b>2.2</b>	6.9	1.1	1.8	3.0	0.4	0.6	0.7	0.9	1.1	0.5	0.6	0.6	0.5
<b>Net Pulpwood Cords</b>	<b>13.7</b>	<b>1.5</b>	4.8	1.1	1.8	2.2	0.4	0.6	0.6	0.8	0.6	0.4	0.1	0.3	0.1
<b>Gross Board-foot</b>	<b>4464.0</b>	<b>552.0</b>	1896.2	0.0	0.0	717.5	249.2	0.0	103.2	92.1	388.9	107.3	356.7	222.2	330.8
<b>Net Board-foot</b>	<b>3473.4</b>	<b>507.4</b>	1484.8	0.0	0.0	563.9	0.0	0.0	88.1	74.5	370.7	44.9	344.8	192.7	309.0
<b>Dollars</b>	<b>778.6</b>	<b>165.5</b>	534.9	0.0	0.0	7.8	0.0	1.2	1.2	13.9	40.6	0.9	150.3	20.2	7.5

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## Tree List: (2022 inventory data)

In order to make calculations and simulations more efficient, the original user-entered trees are manipulated so that similar trees are lumped into single records. The new tree list is for the entire stand and individual tree records can no longer be attributed to plots. During simulation, the dbh is increased by the SILVAH growth model and the stems-per-acre is reduced by the SILVAH natural mortality model.

Tree List

Species	DBH	Quality	Stems	Basal area	Rel dens	Saw ht	Pulp ht	Net saw cuft	Net pulp cuft	Net cuft	Net bdft
RM	20.000000	AGS	0.916732	2.000000	0.978152	3.000000	2.889401	23.042936	21.601011	44.643947	192.681022
AIL	2.000000	AGS	183.346494	4.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
AIL	6.000000	AGS	10.185916	2.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
AIL	8.000000	UGS	5.729578	2.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
AIL	10.000000	AGS	3.666930	2.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
AIL	10.000000	UGS	7.333860	4.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
AIL	12.000000	UGS	5.092958	4.000000	0.000000	2.000000	0.000000	0.000000	38.322809	38.322809	0.000000
AIL	14.000000	UGS	1.870883	2.000000	0.000000	2.000000	0.000000	0.000000	19.387025	19.387025	0.000000
AIL	16.000000	UGS	1.432394	2.000000	0.000000	3.000000	0.000000	0.000000	26.550639	26.550639	0.000000
YP	18.000000	UGS	1.131768	2.000000	0.668325	1.000000	4.719974	11.228925	32.484189	43.713114	90.077659
YP	30.000000	AGS	0.407437	2.000000	0.499486	4.000000	2.402849	32.149092	15.352452	47.501544	280.610550
NS	6.000000	AGS	10.185916	2.000000	1.764303	0.000000	2.305599	0.000000	18.927413	18.927413	0.000000
NS	8.000000	AGS	5.729578	2.000000	1.514637	0.000000	3.585989	0.000000	30.556702	30.556702	0.000000
NS	10.000000	AGS	7.333860	4.000000	2.696499	0.000000	4.354224	0.000000	71.642168	71.642168	0.000000

NS	12.000000	AGS	2.546479	2.000000	1.230413	2.000000	2.866380	13.085643	25.834799	38.920441	109.323075
NS	14.000000	AGS	1.870883	2.000000	1.142859	4.000000	1.232206	25.927123	15.083742	41.010865	212.940176
NS	16.000000	AGS	1.432394	2.000000	1.075342	4.000000	1.506575	28.283764	14.254181	42.537945	241.685044
WO	10.000000	AGS	3.666930	2.000000	1.940009	0.000000	4.373276	0.000000	35.946760	35.946760	0.000000
WO	12.000000	AGS	2.546479	2.000000	1.907106	1.000000	3.878651	9.268668	29.727837	38.996505	74.450196
NRO	26.000000	AGS	0.542445	2.000000	0.885677	5.000000	1.239276	38.101458	8.480075	46.581533	344.838697
BL	14.000000	UGS	1.870883	2.000000	1.142859	1.000000	3.858598	4.995060	33.749540	38.744600	44.936747
SGH	24.000000	AGS	0.636620	2.000000	0.911631	5.000000	0.676232	36.809976	6.595562	43.405537	309.008188
H	4.000000	AGS	68.754935	6.000000	6.479878	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
H	6.000000	AGS	10.185916	2.000000	1.764303	0.000000	2.242169	0.000000	18.317280	18.317280	0.000000
H	8.000000	UGS	5.729578	2.000000	1.514637	0.000000	3.386857	0.000000	29.064154	29.064154	0.000000
BC	2.000000	AGS	91.673247	2.000000	4.296331	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BC	4.000000	AGS	22.918312	2.000000	2.196695	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BC	6.000000	AGS	10.185916	2.000000	1.530463	0.000000	2.487838	0.000000	20.658033	20.658033	0.000000
BC	6.000000	UGS	20.371833	4.000000	3.060927	0.000000	2.487838	0.000000	41.316067	41.316067	0.000000
BC	8.000000	AGS	5.729578	2.000000	1.203657	0.000000	3.722481	0.000000	31.563429	31.563429	0.000000
BC	10.000000	AGS	3.666930	2.000000	1.009591	0.000000	4.511414	0.000000	36.851483	36.851483	0.000000
BC	12.000000	AGS	7.639437	6.000000	2.643167	2.000000	3.069344	39.256928	81.247372	120.504300	327.969225
BC	12.000000	UGS	5.092958	4.000000	1.762111	2.000000	3.069344	26.171285	54.164915	80.336200	218.646150
BC	14.000000	AGS	1.870883	2.000000	0.789656	3.000000	2.490657	20.661693	21.875905	42.537598	173.242389
BC	14.000000	UGS	1.870883	2.000000	0.789656	2.000000	3.490657	15.101107	27.436490	42.537598	130.117903
BC	16.000000	AGS	1.432394	2.000000	0.721332	3.000000	2.823714	22.592934	21.767939	44.360874	195.882983
BC	18.000000	AGS	1.131768	2.000000	0.668325	2.000000	4.096026	17.778400	28.052864	45.831264	159.557446
BC	20.000000	AGS	0.916732	2.000000	0.626003	4.000000	2.324483	30.879008	16.176732	47.055740	279.381540
SO	6.000000	AGS	10.185916	2.000000	1.764303	0.000000	2.351776	0.000000	19.369079	19.369079	0.000000
SO	12.000000	UGS	2.546479	2.000000	1.230413	1.000000	3.878651	9.789595	29.206911	38.996505	88.070659
SAS	4.000000	AGS	22.918312	2.000000	2.159959	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
SAS	10.000000	AGS	7.333860	4.000000	2.696499	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
SAS	12.000000	AGS	2.546479	2.000000	1.230413	1.000000	0.000000	0.000000	11.469941	11.469941	0.000000
SAS	12.000000	AGS	5.092958	4.000000	2.460826	2.000000	0.000000	0.000000	38.322809	38.322809	0.000000
SAS	12.000000	UGS	2.546479	2.000000	1.230413	1.000000	0.000000	0.000000	11.469941	11.469941	0.000000
SAS	14.000000	AGS	1.870883	2.000000	1.142859	2.000000	0.000000	0.000000	19.387025	19.387025	0.000000
SAS	14.000000	AGS	1.870883	2.000000	1.142859	3.000000	0.000000	0.000000	26.525787	26.525787	0.000000
SAS	14.000000	UGS	3.741765	4.000000	2.285717	2.000000	0.000000	0.000000	38.774049	38.774049	0.000000
ONC	4.000000	AGS	22.918312	2.000000	2.159959	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
ONC	6.000000	AGS	10.185916	2.000000	1.764303	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
ONC	10.000000	AGS	7.333860	4.000000	2.696499	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
ONC	12.000000	AGS	2.546479	2.000000	1.230413	1.000000	0.000000	0.000000	11.469941	11.469941	0.000000
ONC	12.000000	AGS	2.546479	2.000000	1.230413	2.000000	0.000000	0.000000	19.161405	19.161405	0.000000

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	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
2	275.0	91.7	183.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	137.5	22.9	0.0	22.9	0.0	22.9	68.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	81.5	30.6	10.2	0.0	10.2	10.2	10.2	10.2	0.0	0.0	0.0	0.0	0.0	0.0
8	22.9	5.7	5.7	0.0	5.7	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	40.3	3.7	11.0	7.3	7.3	7.3	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0
12	40.7	12.7	5.1	10.2	2.5	5.1	0.0	2.5	2.5	0.0	0.0	0.0	0.0	0.0
14	16.8	3.7	1.9	7.5	1.9	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0
16	4.3	1.4	1.4	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	2.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
20	1.8	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
26	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
SAPS	412.5	114.6	183.3	22.9	0.0	22.9	68.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
POLE	144.7	40.0	26.9	7.3	23.2	17.5	15.9	10.2	3.7	0.0	0.0	0.0	0.0	0.0
SM SAW	61.9	17.9	8.4	17.7	5.8	5.1	0.0	2.5	2.5	0.0	1.9	0.0	0.0	0.0
MD SAW	4.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.9	0.0
LG SAW	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.5	0.0	0.6
Total	624.8	174.5	218.7	47.9	29.1	45.5	84.7	12.7	6.2	1.5	1.9	0.5	0.9	0.6
Percent		27.9	35.0	7.7	4.7	7.3	13.6	2.0	1.0	0.2	0.3	0.1	0.1	0.1

Number of trees (live trees only) acceptable growing stock only

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
SAPS	412.5	114.6	183.3	22.9	0.0	22.9	68.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
POLE	105.6	19.6	13.9	7.3	23.2	17.5	10.2	10.2	3.7	0.0	0.0	0.0	0.0	0.0
SM SAW	35.8	10.9	0.0	11.4	5.8	5.1	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0
MD SAW	3.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
LG SAW	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.5	0.0	0.6
Total	558.5	147.2	197.2	41.6	29.1	45.5	78.9	10.2	6.2	0.4	0.0	0.5	0.9	0.6

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## Overstory Species x Diameter Table: Net pulpwood cubic volume (live trees only) (2022 inventory data)

Net pulpwood cubic volume (live trees only)

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	118.6	62.0	0.0	0.0	18.9	0.0	18.3	19.4	0.0	0.0	0.0	0.0	0.0	0.0



<b>8</b>	<b>91.2</b>	31.6	0.0	0.0	30.6	0.0	29.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>10</b>	<b>144.4</b>	36.9	0.0	0.0	71.6	0.0	0.0	0.0	35.9	0.0	0.0	0.0	0.0	0.0
<b>12</b>	<b>350.4</b>	135.4	38.3	61.3	25.8	30.6	0.0	29.2	29.7	0.0	0.0	0.0	0.0	0.0
<b>14</b>	<b>202.2</b>	49.3	19.4	84.7	15.1	0.0	0.0	0.0	0.0	0.0	33.7	0.0	0.0	0.0
<b>16</b>	<b>62.6</b>	21.8	26.6	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>18</b>	<b>60.5</b>	28.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	0.0	0.0	0.0	0.0
<b>20</b>	<b>37.8</b>	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0
<b>22</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>24</b>	<b>6.6</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6
<b>26</b>	<b>8.5</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0
<b>28</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>30</b>	<b>15.4</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4	0.0	0.0	0.0	0.0
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>354.2</b>	130.4	0.0	0.0	121.1	0.0	47.4	19.4	35.9	0.0	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>615.2</b>	206.5	84.3	145.9	55.2	30.6	0.0	29.2	29.7	0.0	33.7	0.0	0.0	0.0
<b>MD SAW</b>	<b>98.3</b>	44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	0.0	0.0	21.6	0.0
<b>LG SAW</b>	<b>30.4</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4	0.0	8.5	0.0	6.6
<b>Total</b>	<b>1098.1</b>	381.1	84.3	145.9	176.3	30.6	47.4	48.6	65.7	47.8	33.7	8.5	21.6	6.6
<b>Percent</b>		34.7	7.7	13.3	16.1	2.8	4.3	4.4	6.0	4.4	3.1	0.8	2.0	0.6

Net pulpwood cubic volume (live trees only) acceptable growing stock only

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>283.8</b>	89.1	0.0	0.0	121.1	0.0	18.3	19.4	35.9	0.0	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>336.1</b>	124.9	0.0	95.7	55.2	30.6	0.0	0.0	29.7	0.0	0.0	0.0	0.0	0.0
<b>MD SAW</b>	<b>65.8</b>	44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0
<b>LG SAW</b>	<b>30.4</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4	0.0	8.5	0.0	6.6
<b>Total</b>	<b>716.2</b>	258.2	0.0	95.7	176.3	30.6	18.3	19.4	65.7	15.4	0.0	8.5	21.6	6.6

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## Overstory Species x Diameter Table: Net board-foot volume, Int. (live trees only) (2022 inventory data)

Net board-foot volume, Int. (live trees only)

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>2</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>4</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>6</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>8</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>10</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>12</b>	<b>818.5</b>	546.6	0.0	0.0	109.3	0.0	0.0	88.1	74.5	0.0	0.0	0.0	0.0	0.0



<b>20</b>	<b>176.3</b>	156.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2	0.0
<b>22</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>24</b>	<b>7.5</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5
<b>26</b>	<b>150.3</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.3	0.0	0.0
<b>28</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>30</b>	<b>32.8</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.8	0.0	0.0	0.0	0.0
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>8.9</b>	3.3	0.0	0.0	3.0	0.0	1.2	0.5	0.9	0.0	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>307.8</b>	288.4	0.0	0.0	4.8	0.0	0.0	0.7	13.0	0.0	0.9	0.0	0.0	0.0
<b>MD SAW</b>	<b>271.2</b>	243.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	0.0	20.2	0.0
<b>LG SAW</b>	<b>190.7</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.8	0.0	150.3	0.0	7.5
<b>Total</b>	<b>778.6</b>	534.9	0.0	0.0	7.8	0.0	1.2	1.2	13.9	40.6	0.9	150.3	20.2	7.5
<b>Percent</b>		68.7	0.0	0.0	1.0	0.0	0.2	0.2	1.8	5.2	0.1	19.3	2.6	1.0

Dollar value (live trees only) acceptable growing stock only

	all species	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>7.1</b>	2.2	0.0	0.0	3.0	0.0	0.5	0.5	0.9	0.0	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>225.1</b>	207.3	0.0	0.0	4.8	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0
<b>MD SAW</b>	<b>263.5</b>	243.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2	0.0
<b>LG SAW</b>	<b>190.7</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.8	0.0	150.3	0.0	7.5
<b>Total</b>	<b>686.3</b>	452.8	0.0	0.0	7.8	0.0	0.5	0.5	13.9	32.8	0.0	150.3	20.2	7.5

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## Narrative Summary and Analysis (2027 simulated data)

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. The presence of nonnative invasive species should be re-evaluated in 2027. The 2022 inventory data recorded nonnative invasive species in or near this stand. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mixed Hardwood stand is dominated by Black Cherry, Spruce, Non Comm. Species and Hickory which together comprise 87 percent of the basal area.

This is a small sawtimber stand, with average medial diameter of 12.0 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 29 years. Effective stand age is about 79 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 79 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 148 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 18.4 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 11.9 cords of pulp wood and 4417.1 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 1089 dollars per acre.

Trees of acceptable quality for future growing stock provide a fully stocked stand by themselves. Non-commercial saplings and poles represent 39 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Collect site, understory and competitive regeneration data in 2027 to ensure continuity of forest cover.

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## Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values: (2027 simulated data)

### Composition - BA, percent BA, trees per acre

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Total BA</b>	<b>147.8</b>	<b>11.8</b>	36.9	23.9	24.6	15.6	13.2	10.5	4.7	4.7	4.4	2.3	2.4	2.3	2.3
<b>Percent BA</b>	<b>100</b>	<b>8</b>	25	16	17	11	9	7	3	3	3	2	2	2	2
<b>Trees per acre</b>	<b>572</b>	<b>19.3</b>	137.3	207.5	47.2	28.9	44.6	82.3	12.6	6.2	1.5	1.9	0.5	0.9	0.6

### Quality - percent in AGS

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Saplings</b>	<b>100</b>	<b>0</b>	100	100	100	0	100	100	0	0	0	0	0	0	0
<b>Poles</b>	<b>74</b>	<b>100</b>	62	40	100	100	100	49	100	100	0	0	0	0	0
<b>Small sawtimber</b>	<b>57</b>	<b>50</b>	62	0	62	100	100	0	0	100	0	0	0	0	0
<b>Medium sawtimber</b>	<b>75</b>	<b>0</b>	100	0	0	0	0	0	0	0	0	0	0	100	0
<b>Large sawtimber</b>	<b>100</b>	<b>100</b>	0	0	0	0	0	0	0	0	100	0	100	0	100
<b>All sizes</b>	<b>71</b>	<b>80</b>	70	34	72	100	100	79	50	100	48	0	100	100	100

### Diameters and Ages - inches, years

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Medial diameter</b>	<b>12.0</b>	<b>14.4</b>	12.1	10.1	12.4	11.6	9.6	5.5	9.8	12.0	24.8	14.9	28.3	21.4	25.5
<b>Merchantable medial diameter</b>	<b>13.1</b>	<b>14.4</b>	12.9	11.6	13.2	11.6	10.6	7.4	9.8	12.0	24.8	14.9	28.3	21.4	25.5
<b>Quadratic mean diameter</b>	<b>6.9</b>	<b>10.6</b>	7.0	4.6	9.8	10.0	7.4	4.8	8.3	11.8	22.9	14.9	28.3	21.4	25.5
<b>Years to maturity</b>	<b>29</b>	<b>23</b>	26	43	32	43	49	71	55	40	0	21	0	0	0
<b>Effective age</b>	<b>79</b>	<b>86</b>	64	77	88	77	71	49	65	80	124	99	141	107	170

## Structure

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Q factor</b>	<b>1.57</b>	<b>1.29</b>	1.44	1.41	0.99	1.41	1.24	1.76	1.41	1.20	1.23	0.00	0.00	0.00	0.00

## Relative density - percent

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Rel. Density</b>	<b>79</b>	<b>9</b>	20	0	16	10	10	10	3	5	1	1	1	1	1
<b>AGS only</b>	<b>65</b>	<b>8</b>	15	0	12	10	10	8	2	5	1	0	1	1	1

## Volumes and Values (per acre) - International 1/4 inch Log Rule

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Gross Total Cords</b>	<b>23.0</b>	<b>3.5</b>	10.3	0.0	0.0	4.4	0.0	0.9	1.2	1.4	1.6	0.7	0.9	0.8	0.8
<b>Net Total Cords</b>	<b>18.4</b>	<b>2.8</b>	8.2	0.0	0.0	3.6	0.0	0.7	0.9	1.2	1.3	0.6	0.7	0.6	0.6
<b>Net Pulpwood Cords</b>	<b>11.9</b>	<b>1.9</b>	5.4	0.0	0.0	2.6	0.0	0.7	0.7	0.9	0.4	0.4	0.3	0.3	0.3
<b>Gross Board-foot</b>	<b>5275.7</b>	<b>690.0</b>	2422.1	0.0	0.0	782.8	0.0	0.0	196.6	175.5	627.2	221.5	317.9	264.9	267.3
<b>Net Board-foot</b>	<b>4417.1</b>	<b>623.9</b>	1980.4	0.0	0.0	635.9	0.0	0.0	171.1	145.4	593.4	102.2	307.4	229.7	251.6
<b>Dollars</b>	<b>1088.7</b>	<b>186.8</b>	793.1	0.0	0.0	12.8	0.0	1.4	1.4	37.5	58.5	1.0	148.0	26.2	8.8

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## Narrative Summary and Analysis (2032 simulated data)

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. The presence of nonnative invasive species should be re-evaluated in 2032. The 2022 inventory data recorded nonnative invasive species in or near this stand. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mixed Hardwood stand is dominated by Black Cherry, Spruce, Non Comm. Species and Hickory which together comprise 87 percent of the basal area.

This is a small sawtimber stand, with average medial diameter of 12.9 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 24 years. Effective stand age is about 84 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 83 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is higher than optimum for best individual tree growth. At this relative density, growth rate of the biggest trees is probably moderate, while growth rate of the medium and smaller-sized trees is probably fair and mortality due to crowding moderate.

Thinning to provide more growing space for the better stems is desirable if it will at least pay the cost of harvesting.

Total growing stock amounts to 161 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 21.2 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 13.0 cords of pulp wood and 5637.7 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 1480 dollars per acre.

Trees of acceptable quality for future growing stock provide a fully stocked stand by themselves. Non-commercial saplings and poles represent 42 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Collect site, understory and competitive regeneration data in 2032 to ensure continuity of forest cover.

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## Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values: (2032 simulated data)

### Composition - BA, percent BA, trees per acre

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Total BA</b>	<b>161.4</b>	<b>13.7</b>	39.7	25.8	27.2	17.3	14.3	10.9	5.4	5.5	4.8	2.5	2.8	2.6	2.5
<b>Percent BA</b>	<b>100</b>	<b>8</b>	25	16	17	11	9	7	3	3	3	2	2	2	2
<b>Trees per acre</b>	<b>528</b>	<b>19.2</b>	108.9	196.3	46.4	28.7	43.7	79.7	12.4	6.2	1.5	1.9	0.5	0.9	0.6

### Quality - percent in AGS

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Saplings</b>	<b>100</b>	<b>0</b>	100	100	100	0	100	100	0	0	0	0	0	0	0
<b>Poles</b>	<b>75</b>	<b>100</b>	64	39	100	100	100	49	100	100	0	0	0	0	0
<b>Small sawtimber</b>	<b>56</b>	<b>50</b>	57	0	62	100	100	0	0	100	0	0	0	0	0
<b>Medium sawtimber</b>	<b>71</b>	<b>0</b>	100	0	0	100	0	0	0	0	0	0	0	100	0
<b>Large sawtimber</b>	<b>100</b>	<b>100</b>	0	0	0	0	0	0	0	0	100	0	100	0	100
<b>All sizes</b>	<b>71</b>	<b>80</b>	70	32	72	100	100	78	49	100	45	0	100	100	100

### Diameters and Ages - inches, years

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Medial diameter</b>	<b>12.9</b>	<b>15.6</b>	13.3	10.8	13.2	12.2	10.2	5.7	10.6	12.9	25.4	15.8	30.5	22.7	27.0
<b>Merchantable medial diameter</b>	<b>14.0</b>	<b>15.6</b>	13.9	12.3	13.9	12.2	11.2	7.7	10.6	12.9	25.4	15.8	30.5	22.7	27.0
<b>Quadratic mean diameter</b>	<b>7.5</b>	<b>11.4</b>	8.2	4.9	10.4	10.5	7.8	5.0	9.0	12.8	23.9	15.8	30.5	22.7	27.0
<b>Years to maturity</b>	<b>24</b>	<b>15</b>	21	38	27	38	45	69	49	34	0	15	0	0	0
<b>Effective age</b>	<b>84</b>	<b>93</b>	69	82	93	82	75	51	71	86	127	105	153	113	180

### Structure

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Q factor</b>	<b>1.54</b>	<b>1.29</b>	1.44	1.34	0.99	1.37	1.16	1.74	1.57	1.44	1.19	0.00	0.00	0.00	0.00

### Relative density - percent

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Rel. Density</b>	<b>83</b>	<b>10</b>	20	0	17	11	10	10	4	5	1	1	1	1	1
<b>AGS only</b>	<b>67</b>	<b>9</b>	14	0	12	11	10	8	2	5	1	0	1	1	1

### Volumes and Values (per acre) - International 1/4 inch Log Rule

	all species	all oaks	BC	AIL	SAS	NS	ONC	H	SO	WO	YP	BL	NRO	RM	SGH
<b>Gross Total Cords</b>	<b>26.5</b>	<b>4.2</b>	11.9	0.0	0.0	5.1	0.0	1.0	1.5	1.7	1.7	0.8	1.0	0.9	0.9
<b>Net Total Cords</b>	<b>21.2</b>	<b>3.4</b>	9.5	0.0	0.0	4.1	0.0	0.8	1.2	1.4	1.4	0.6	0.8	0.7	0.7
<b>Net Pulpwood Cords</b>	<b>13.0</b>	<b>2.3</b>	6.0	0.0	0.0	2.5	0.0	0.8	0.9	1.1	0.4	0.5	0.3	0.3	0.3
<b>Gross Board-foot</b>	<b>6698.3</b>	<b>851.7</b>	2934.2	0.0	0.0	1348.1	0.0	0.0	248.2	221.6	690.8	258.1	381.8	308.5	306.9
<b>Net Board-foot</b>	<b>5637.7</b>	<b>776.2</b>	2476.3	0.0	0.0	1043.2	0.0	0.0	219.6	187.4	656.7	128.3	369.2	267.5	289.6
<b>Dollars</b>	<b>1480.3</b>	<b>237.1</b>	1113.3	0.0	0.0	16.9	0.0	1.6	1.7	51.1	66.2	1.9	184.4	32.4	11.0

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## Narrative Summary and Analysis (2032 residual data)

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. The presence of nonnative invasive species should be re-evaluated in 2032. The 2022 inventory data recorded nonnative invasive species in or near this stand. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mixed Hardwood stand is dominated by Black Cherry, Spruce, Non Comm. Species and Hickory which together comprise 87 percent of the basal area.

This is a small sawtimber stand, with average medial diameter of 12.9 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 24 years. Effective stand age is about 84 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 83 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is higher than optimum for best individual tree growth. At this relative density, growth rate of the biggest trees is probably moderate, while growth rate of the medium and smaller-sized trees is probably fair and mortality due to crowding moderate.

Thinning to provide more growing space for the better stems is desirable if it will at least pay the cost of harvesting.

Total growing stock amounts to 161 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 21.2 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 13.0 cords of pulp wood and 5637.7



board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 1480 dollars per acre.

Trees of acceptable quality for future growing stock provide a fully stocked stand by themselves. Non-commercial saplings and poles represent 42 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Collect site, understory and competitive regeneration data in 2032 to ensure continuity of forest cover.

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# Silvah-7 SILVICULTURE OF ALLEGHENY HARDWOODS AND OAK

Generated by: SILVAH-7 (version: 7.0.4.10)

SIL file: C:\Sonny\DJCSC Folder\Dad\ConsultingWork\Conewago rod and gun\Silvah\Trap Range Stand.sil7 (version: 7.0.12)

DEF file: C:\Sonny\DJCSC Folder\Dad\ConsultingWork\Conewago rod and gun\Silvah\def.def7 (version: 7.0.3)

SCR file: Settings from SILVAH-7 (version: 7.0.5)

Report date: Jun 21, 2022

Owner/Agency: Conewago Rod and Gun Club

County/District: Lancaster County

Compartment/Unit: Trap Range Stand

Stand name: Trap Range Stand

Area: 9.5

Effective age: 85.5

Site index: 85 for YP

Equivalent black oak site index: 82

Forest type: Mesic Hardwood

Allegheny NF Forest type: Mixed upland hardwoods

Size class: medium sawtimber

Relative density: 56.9

Trees to include: live only

## Contents:

- **2022: Original Stand Conditions**
  - [Cruise Information \(Type, Sampling Error, etc.\)](#)
  - [Site Characteristics and Regeneration Summary](#)
  - [Non-native Invasive Species](#)
  - [Narrative Summary and Analysis](#)
  - [Information on Wildlife Habitat](#)
  - [Silvah Recommended Prescription Decision Chart Trace](#)
  - [Timber Product x Species Volume and Value: per acre](#)
  - [Timber Product x Species Volume and Value: total stand](#)
  - [Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values](#)
  - [Tree List](#)
  - [Overstory Species x Diameter Table: Basal area \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Number of trees \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Net pulpwood cubic volume \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Net board-foot volume, Int. \(live trees only\)](#)
  - [Overstory Species x Diameter Table: Dollar value \(live trees only\)](#)
  - **Initial treatment: SILVAH recommended prescription: Defer Cutting (low relative density)**
- **2027: Simulated Stand Conditions**
  - [Narrative Summary and Analysis](#)
  - [Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values](#)
  - **Future treatment: SILVAH recommended prescription: Defer Cutting (low relative density)**
- **2032: Simulated Stand Conditions**
  - [Narrative Summary and Analysis](#)
  - [Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values](#)
  - **Future treatment: SILVAH recommended prescription: Defer Cutting (low relative density)**
  - **Final Stand Conditions**
    - [Narrative Summary and Analysis](#)

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## Overstory Cruise Information

Overstory data is from a prism cruise, using a 10 factor prism, and with trees tallied by 2 inch dbh classes, Overstory data is based on 7 plots. Only live trees are included in calculations.

Mean basal area is 108.6 plus or minus 26.5 sq.ft. per acre at 90% confidence (24.4% of mean).

- 12 additional plots needed to reach 15% of mean basal area.

- 35 additional plots needed to reach 10% of mean basal area.

Mean stems per acre is 276.9 plus or minus 113.4 stems per acre at 90% confidence (41.0% of mean).

- 45 additional plots needed to reach 15% of mean stems per acre.

- 110 additional plots needed to reach 10% of mean stems per acre.

Mean relative density is 56.9 plus or minus 11.7 percent per acre at 90% confidence (20.6% of mean).

- 6 additional plots needed to reach 15% of mean relative density.

- 23 additional plots needed to reach 10% of mean relative density.

Mean net bdf volume is 7257.4 plus or minus 1734.4 bd.ft. per acre at 90% confidence (23.9% of mean) using the International 1/4 inch log rule.

- 11 additional plots needed to reach 15% of mean net bdf volume.

- 33 additional plots needed to reach 10% of mean net bdf volume.

Mean net pulpwood is 13.7 plus or minus 5.2 cords per acre at 90% confidence (38.1% of mean).

- 38 additional plots needed to reach 15% of mean net pulpwood.

- 94 additional plots needed to reach 10% of mean net pulpwood.

Overstory statistics

plot	basal area (sq.ft./ac.)	stems per acre (stems/ac.)	relative density (percent/ac.)	net bdf volume (bd.ft./ac.)	net pulpwood (cords/ac.)
1	40.0	581.9	29.4	2937.6	1.7
2	100.0	223.0	61.2	7752.1	11.5
3	120.0	109.1	52.6	9679.4	13.9
4	130.0	216.9	58.6	9258.1	17.5
5	90.0	331.9	47.7	5431.2	9.1
6	140.0	179.2	75.8	7984.7	22.3
7	140.0	296.2	73.1	7758.6	19.7
<b>Minimum</b>	40.0	109.1	29.4	2937.6	1.7
<b>Maximum</b>	140.0	581.9	75.8	9679.4	22.3
<b>Mean</b>	108.6	276.9	56.9	7257.4	13.7
<b>Variance</b>	1281.0	23439.8	250.1	5481652.1	49.2
<b>Standard deviation</b>	35.8	153.1	15.8	2341.3	7.0
<b>Standard error</b>	13.5	57.9	6.0	884.9	2.7
<b>Coefficient Of Variation</b>	33.0	55.3	27.8	32.3	51.4

## Understory Cruise Information

Data on competitive regeneration, site limitations and understory is from a weighted count regeneration cruise using 6-ft radius plots.

Understory data is based on 12 plots.

**Warning:** regeneration data is not based on an adequate number of plots. To give reliable results, at least 7 additional plots are needed for this stand.

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## Site Characteristics and Regeneration Summary

Cruise type: 2= **Weighted counts**

Number of plots: **12**

Plot size: 1= **6-ft radius plot**

Deer impact: 4= **high**

### Field Counts

Field Counts

	plot count	percent plots	seedlings/acre*	Threshold values based on a deer index of 4 (high)
<b>Black cherry</b>	0	0	0	plots with at least 25 stems of black cherry NOTE: stocking standards are being reviewed and may change
<b>Yellow poplar/cucumber</b>	0	0	0	plots with at least 50 stems of yellow poplar/cucumber NOTE: stocking standards are being reviewed and may change
<b>Conifer</b>	0	0	0	plots with at least 25 stems of conifer
<b>New oak</b>	0	0	0	plots with at least 100 stems of new oak
<b>Established oak</b>	0	0	0	plots with at least 50 stems of established oak
<b>Competitive oak</b>	0	0	0	plots with at least 2 stems of competitive oak
<b>Total oak</b>	0	0	0	plots with at least 100 stems of oak
<b>Other desirable</b>	0	0	160	plots with at least 100 stems of other desirable NOTE: stocking standards are being reviewed and may change
<b>Undesirable</b>	0	0	0	plots with at least 1 stems of undesirable species at least as tall as the tallest desirable plant NOTE: stocking standards are being reviewed and may change.
<b>Established desirable</b>	0	0	160	plots with at least 100 stems of black cherry + yellow poplar/cucumber + conifer + new oak + established oak + competitive oak + other desirables
<b>Competitive desirable</b>	0	0	160	plots with at least 100 stems of black cherry + yellow poplar/cucumber + conifer + competitive oak + other desirables
<b>Residual</b>	12	100		plots with an recorded residual species
<b>Sapling</b>	10	83		plots with an recorded sapling species

\*seedlings/acre have been estimated from extended understory weighted plant counts. These estimates may be lower than actual values.

Summary Values - Ambient Deer Pressure

	Percent plots	Ambient Deer Pressure (4= high)
<b>Oak stump sprouts</b>	0	1 expected sprouts per acre
<b>Established regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, established oak, competitive oak, other desirables, established desirables or competitive desirables plus oak stump sprouts
<b>Competitive regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, competitive oak, other desirable or competitive desirables plus oak stump sprouts

<b>Competitive desirable or residual</b>	100	percent of plots passing the test for either competitive desirables or residuals plus oak stump sprouts
<b>Established or competitive oak</b>	0	percent of plots passing the test for either established oak or competitive oak plus oak stump sprouts
<b>Any oak</b>	0	percent of plots passing the test for either new oak, established oak, competitive oak or total oak plus oak stump sprouts

Summary Values - With Fencing/No Deer Pressure

	<b>Percent plots</b>	<b>With Fencing/No Deer Pressure</b>
<b>Oak stump sprouts</b>	0	1 expected sprouts per acre
<b>Established regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, established oak, competitive oak, other desirables, established desirables or competitive desirables plus oak stump sprouts
<b>Competitive regeneration</b>	0	percent of plots passing the test for black cherry, yellow poplar/cucumber, conifer, competitive oak, other desirable or competitive desirables plus oak stump sprouts
<b>Competitive desirable or residual</b>	100	percent of plots passing the test for either competitive desirables or residuals plus oak stump sprouts
<b>Established or competitive oak</b>	0	percent of plots passing the test for either established oak or competitive oak plus oak stump sprouts
<b>Any oak</b>	0	percent of plots passing the test for either new oak, established oak, competitive oak or total oak plus oak stump sprouts

## Factors Affecting Regeneration Difficulty

Deer impact: 4= high

Seed supply: 3= low seed supply

Acorn supply: 0= not adequate

Seed source Index

<b>Species</b>	<b>f</b>	<b>BA poles+</b>	<b>BA x f</b>
<b>black cherry</b>	2.0	10.0	20.0
<b>red maple</b>	1.5	18.6	27.9
<b>sugar maple</b>	2.4	0.0	0.0
<b>white ash</b>	1.5	0.0	0.0
<b>Total</b>			47.9

The following two nonnative invasive species were found in this stand: ailanthus and unspecified non-native shrub. These species have the potential to displace native vegetation, including desirable timber species. There are one invasives in the overstory and two in the understory plots.

## Interfering Understory

Interfering Understory

	<b>Plot count</b>	<b>Percent plots</b>	
<b>Tall woody interference</b>	7	70	Set to 70% because basal area of sapling/pole undesirables is at least 10 (10.0 sq.ft.). There are 58 percent of plots where a tall woody species was identified

<b>Undesirable saplings/poles</b>		10	basal area of undesirable trees less than 12-inch dbh in the overstory plots
<b>Low woody interference</b>	10	83	plots with at least 30% cover; average cover= 50
<b>Fern interference</b>	0	0	plots with at least 30% cover; average cover= 2
<b>Grass interference</b>	0	0	plots with at least 30% cover; average cover= 6
<b>Any vegetative interference</b>	11	92	plots with tall woody, low woody, fern or grass interference
<b>Established oak no interference</b>	0	0	plots passing the test for established oak and with no vegetative interference
<b>Established desirables no interference</b>	0	0	plots passing the test for established desirables and with no vegetative interference
<b>Grapevines present</b>	11	92	average vines/acre= 85

#### Tall Woody Interfering Species Summary

<b>Species</b>	<b>Plot count</b>	<b>Percent of plots</b>
<b>ailanthus</b>	2	16.7
<b>unspecified non-native shrub</b>	3	25.0
<b>northern spicebush</b>	2	16.7

#### Low Woody Interfering Species Summary

<b>Species</b>	<b>Plot count</b>	<b>Percent of plots</b>
<b>unspecified non-native shrub</b>	3	25.0
<b>northern spicebush</b>	9	75.0

## Site Limitations for Regeneration

#### Site Limitation

	<b>Plot count</b>	<b>Percent of plots</b>
<b>Thick duff</b>	0	0
<b>Poor drainage</b>	0	0
<b>Rocky surface</b>	0	0
<b>Site limits</b>	0	0

## Site Information

#### Site Information

<b>Site index</b>	85 for YP Equivalent black oak site index: 82
<b>Site class</b>	high productivity
<b>Height adjustment</b>	1.000
<b>Elevation</b>	540
<b>Aspect</b>	85
<b>Slope</b>	5
<b>Topographic position</b>	ridge



<b>Operability</b>	no limitations
<b>Access</b>	road at edge of stand

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## Non-native Invasive Species

Nonnative invasive (NNIS) species may interfere with management goals and thus require careful assessment of their current extent within the stand and in neighboring stands if possible. It is of critical importance to understand the current/potential impacts of nonnative species prior to any operations in the stand. Specific treatment options should consider the difficulty of control of each species as well as the economic, aesthetic, and ecological value of the areas currently or likely to be infested by nonnative invasive species.

### Overstory data

Overstory

Species	Basal area	% Basal area	Trees/Acre	Plot count	% plots	Plot list
<a href="#">ailanthus</a>	1.4	1.3	16.4	1	14.3	5
Totals	1.4	1.3	16.4			

### Understory plot data

Understory

Species	# plots	% plots	Plot list	off plot	near stand
<a href="#">ailanthus</a>	2	16.7	1 and 8	X	
<a href="#">unspecified non-native shrub</a>	8	66.7	1, 3, 6, 7, 8, 10, 11 and 12	X	
<a href="#">autumn olive</a>	0	0.0		X	
<a href="#">Japanese barberry</a>	0	0.0		X	
<a href="#">Japanese honeysuckle</a>	0	0.0		X	
<a href="#">Japanese stiltgrass</a>	0	0.0		X	
<a href="#">multiflora rose</a>	0	0.0		X	
<a href="#">Norway maple</a>	0	0.0		X	
<a href="#">oriental bittersweet</a>	0	0.0		X	
<a href="#">bush honeysuckle</a>	0	0.0			X

## Ailanthus (*Ailanthus altissima* (P. Mill.) Swingle)

### Plant Description:

Medium-sized tree to 80 feet in height. Branches are stout, crooked, and forming an open crown. Bark: Light gray, thin, and smooth. Twigs: Stout, chestnut-brown, with very large heart-shaped leaf scars. Buds: Downy, somewhat spherical, and partially hidden by leaf stem. Leaves: Alternate, pinnately compound, about 1-3 feet in length with 10-41 leaflets. Leaflets with smooth margins, dark green with light green veins. Leaves have a disagreeable odor, sometimes likened to cashews. Reproduction: vegetatively by root sprouts, and by large, winged seeds with twisted tips, born in clusters, green turning to tan. Male and female flowers on separate trees, formed from April to June, in large clusters at end of twigs. Each cluster may contain hundreds of seeds.

**Plant Ecology:**

Very rapid growth, up to eight feet in first year. Capable of producing seed in second year. Short-lived, to around 30-50 years. Colonizes by root sprouts, forming dense thickets, and by prolific seed dispersal. Seeds disseminated by wind and water. Shade-intolerant. Reported to have allelopathic affects on other native species.

**Response to Management:**

Highly tolerant of drought and urban environments. A single tree can rapidly invade adjacent areas. Typically invades disturbed sites but may also invade undisturbed sites. Very difficult to eradicate once established. Allelopathic effects may inhibit regeneration of desirable species.

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## Nonnative shrub of unspecified species

**Plant Description:**

One or more unknown species of plausibly nonnative shrubs may occur within this stand. Nonnative shrubs often have few natural enemies in the sites they invade. Many are aggressive colonizers, and often can out-compete native vegetation because they have traits that give them an advantage over native species. Without sufficient identification, it is very difficult to establish effective measures of control, or to know whether any control measures are necessary. Consult a local expert, such as county extension agent to get help identifying unknown species. Additional help with identification may be available at [www.plants.usda.gov](http://www.plants.usda.gov).

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## Autumn-olive (*Elaeagnus umbellata* Thunb.)

**Plant Description:**

Medium to large woody shrub, from 3 to 20 feet in height. Main branches olive drab and marked with lenticels, and with age the bark develops fissures exposing lighter colored inner bark. Twigs are slender, with silvery scales, and some lateral twigs developing into thorns. Buds: Small, narrow and pointed, light gray. Leaves: Alternate, 2-3 inches long, somewhat elongate, elliptic to broadly ovate, with entire, wavy margins. Bright green above and silvery scaly beneath. Reproduction: Numerous, round, juicy, roughly 1/2 inch drupes. Flowers born in axils of leaves along twigs, in clusters. Silver scales on fruit, twig and leaves.

**Plant Ecology:**

Prefers drier, open sites. Capable of producing fruit after 3 years. Abundant fruit consumed and dispersed by birds and small mammals. Fixes nitrogen.

**Response to Management:**

Can form thick cover in open areas. Does not readily invade dense forests.

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## Barberry (*Berberis thunbergii* DC.)

**Plant Description:**

Small, compact, dense, multi-branched, thorny shrub. Twigs are slender, brown, with grooves, and simple thorns. Buds: small, ovoid. Leaves: alternate, simple, about 1 inch long, often in clusters in axils of thorns. Variable shape, entire, tapering to wedge shape at the base. Reproduction: Numerous bright red, ellipsoid berries, persistent into winter. Reported to spread by rhizomes. Flowers appear from March to April.

**Plant Ecology:**

Adapts to a variety of sites. May establish under full shade. Seeds distributed by game birds.

**Response to Management:**

Does best in full sun, but can form thick cover in forests because it can tolerate full shade, and is avoided by deer. Widely

sold by nurseries. Extensive populations can form in a relatively short time.

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## Japanese honeysuckle (*Lonicera japonica* Thunb.)

### Plant Description:

Semi-evergreen woody vine, climbing up to 80 feet in length. Bark is brown, hairy, becoming tan with fissures and peeling with age. Leaves: Opposite, simple, 1.5-2.5 inches long, ovate to elliptic to oblong. Margins entire, early leaves are lobed. Dark green above, paler below. Persistent until late fall or early winter. Reproduction: Rooting at nodes and sprouting frequently. Produces spheroid, .25-inch glossy berries, green turning black. Flowers: April to August. Borne in leaf axils along the stem, on a stalk. Fragrant, white or pale yellow, tubular and flaring into four-lobed upper lip and single-lobed bottom lip.

### Plant Ecology:

Forms dense arbors in forest canopies, occurs at forest margins and under forest canopies. Shade tolerant. Persists by woody rootstocks, spreads by rooting at nodes and by animal-dispersed seeds.

### Response to Management:

Can invade a wide variety of sites, grows vigorously, replacing native vegetation. Found along forest margins as well as forest interiors and in forest canopies. Can girdle shrubs and young trees.

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## Japanese stilt grass (*Microstegium vimineum* (Trin.) A. Camus; *Andropogon vimineus* Trin.; *Eulalia viminea* (Trin.) Kuntze)

### Plant Description:

Loosely-branching annual grass, growing up to 1 m (3 ft) in height. Often bending over and rooting at nodes, forming extensive mats. Leaves: mid-vein is offset from the center and marked by a silvery line on the upper surface. Longer than wide and widest below the middle. Reproduction: Annual. Flowers in late summer/early fall with terminal, branching inflorescences up to 7 cm (2 3/4 in) long. Seeds (2.8-3.0 mm (1/8 in) long) dispersed in late fall. Plants in the shade tend to be much smaller (often as short as 10 cm (1 1/4 in)) than plants growing in high light and have primarily closed flowers. *Leersia virginica*, a similar native species is often found along side *M. vimineum* (e.g., grows well in the same habitat), has the same general vegetative appearance as *M. vimineum*, except that it has very evident hairy nodes that may be swollen, and is a perennial grass. It also flowers earlier (early-mid-summer) and its flowers are smaller and more delicate in appearance.

### Plant Ecology:

Flood tolerant. Shade-tolerant, but also found in disturbed, open areas as well as relatively undisturbed, closed canopy forests. May prefer bare ground and areas with high soil moisture. Spreads along disturbance corridors, such as roads, drainages, streams, and trails along which seed-containing water may move rapidly. Smaller remote populations possibly established by animals (humans, deer), with seeds (or seeds within soil) attached to shoes, hooves, clothing, and fur. Seeds disperse very near the parent plant, with no evidence of wind dispersal. Viable in the soil for at least 3 years. Cold stratification (over-wintering) may be required for germination. Germination occurs in both high and low light conditions. This grass may alter soil conditions by increasing pH and nitrification. Mat-forming, ultimately forming slowly decomposing thatch over time -- a potential fire hazard depending on site conditions.

### Response to Management:

Responds positively to canopy gaps and removal of canopy trees by producing larger plants with abundant seed, especially if soil moisture remains relatively high. Nearby populations along roads, trails, and scattered forest-interior populations should be removed before harvesting forested sites. Equipment may become contaminated and be a new source of seed. May respond to increased light by growing taller and producing more seed, increasing the rate and distance of seed dispersal. This process may continue each year such that a front of *M. vimineum* could creep through the stand at a rate of about a 1 m (3 ft) a year, even without dispersal by water or animals. If the site is prone to flooding, the entire understory could be covered with *M. vimineum* after one significant flooding event with or without any canopy disturbance. Forests

kept under natural conditions are still at risk of spread of this species, at a slower rate. Control treatments done before harvesting should continue for three or more years, based on estimated seed bank longevity.

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## **Multiflora rose (*Rosa multiflora* Thunb.ex Murr.)**

### **Plant Description:**

Upright shrub, forming clumps, attaining a height of 6-13 feet in height. Stems slender, climbing, arching, or trailing, green with prickles. Older stems brown with streaks of green. Buds: small, ovoid. Leaves: Alternate, odd-pinnately compound, about 1-3 inches in length with 3-11 leaflets. Leaflets finely serrate. Reproduction: vegetatively by root sprouts, and layering (rooting from tips of branches that touch the ground), and by seed, producing a reddish (when ripe), ½ inch spheroid, fleshy rose hip containing several seeds. White to pinkish white flowers emerge in May through July.

### **Plant Ecology:**

Relatively slow growth for 1-2 years, followed by very rapid growth and expansion through layering and root sprouts. Prolific seed dispersal. A single shrub may produce 500,000 to 1,000,000 seeds, readily dispersed by birds and mammals. Seeds viable for 10-20 years in the soil. Adaptable to a variety of soil conditions, including dry and wet sites.

### **Response to Management:**

Originally and possibly still widely planted for wildlife or for "living fences". Forms a dense, impenetrable thicket once established. Grows in full sun or shade, but often invading gaps and open areas. Reported as susceptible to rose rosette disease, which kills infected plants within 2 years.

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## **Norway maple (*Acer platanoides* L.)**

### **Plant Description:**

Medium to large tree, 40-60 ft high, similar to sugar maple. In the open, forming a broad, densely foliated crown. Bark is moderately thin, dark gray to black, and smooth, becoming closely fissured with shallow ridges of a regular pattern. Young twigs light brown to greenish, becoming gray. Buds: Broad, plump, end bud greenish or reddish brown, bud scales strongly keeled, exuding milky white sap when cut. Leaves: opposite, simple, palmate, 5-7 sharp-pointed lobes. Glabrous, shiny green above, paler below. Petiole exudes milky white sap when cut. Leaves retained longer than native maples. Reproduction: Large, paired, yellow-green samaras appearing in autumn. Seeds somewhat flattened. Wings are 2-3 inches long, and diverging by nearly 180 degrees. Flowers: May-June, appearing before or with leaves, in large, yellow-green clusters.

### **Plant Ecology:**

Hardy, grows on a variety of sites, tolerant of urban conditions and compacted soils. Very shade tolerant.

### **Response to Management:**

Once established it has the ability to shade out the native understory and out-compete the native tree species. Widely sold as an ornamental and planted as a street tree.

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## **Oriental bittersweet (*Celastrus orbiculatus* Thunb.)**

### **Plant Description:**

Climbing woody vine up to 60 feet in tree crowns. May become shrub-like, forming thickets. Stems are slender, brown to olive drab with corky lenticels, up to 4 inches in diameter, with numerous twining, twisting and drooping branches. Buds: Small, gray, somewhat spherical, and without hairs. Leaves: Alternate, variable in shape, typically oval, round, or obovate, 1½ to 5 inches long. Base tapers to a 1-inch leaf stalk. Dark green, becoming bright yellow in fall. Reproduction: vegetatively by layering and root sprouts, and by a ½ - 1 inch waxy, spherical, green (ripening to reddish-orange) capsule containing 2-3 white seeds. Flowers born in dangling clusters in axils of leaves along the stem. Fruit persistent in winter.

**Plant Ecology:**

Occurs on a variety of sites and mainly along edges where it can form dense thickets. Can establish under full shade. High rate of seed germination. Seeds disseminated by birds and small mammals. Colonizes by prolific vine growth, 1-12 feet per year for several years, with little additional growth after 7 years.

**Response to Management:**

Showy fruit, often collected by humans. Climbing vines severely damage native vegetation by constricting and girdling stems. Vines can shade, suppress, and ultimately kill native vegetation. Hybridizes with native American bittersweet (*Celastrus scandens*).

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## **Bush honeysuckle (*Lonicera maackii* (Rupr.) Maxim. *Lonicera tatarica* L.)**

**Plant Description:**

Tall woody shrubs with arching branches, attaining 10-30 feet in height. Bark is generally smooth to moderately textured with ridges. Twigs are slender, brown to reddish, with empty, brown pith. Leaves: Opposite, simple, 1-2 inches long, ovate to oblong. Margins entire, dark green above, paler below. Persistent until late fall or early winter. Reproduction: Produces abundant, red, round, roughly 1/2 inch berries, paired on stalks in axils of leaves, persistent into winter; may colonize by root sprouts. Flowers in May through June, insect-pollinated, white, changing to yellow.

**Plant Ecology:**

Form dense thickets in open forests and edges. Relatively shade tolerant. Seeds dispersed by birds and small mammals, and reported to remain viable in soil for several years. May produce an allelopathic chemical that suppresses growth of surrounding vegetation.

**Response to Management:**

Will invade openings created by cutting, wind throw or insect defoliation. Commonly found growing under trees, tall shrubs, and along fence rows that act as perch sites for birds.

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## **Recommended Invasive Plants Resource Materials**

- **Mistaken Identity? Invasive Plants and their Native Look-Alikes.** 2008. Sarver, M. et al. Delaware Department of Agriculture. A wonderful color photo guide with side by side comparisons of native and invasive plants are difficult to distinguish. View or download publication at: [https://www.nybg.org/files/scientists/rmaczi/Mistaken\\_Identity\\_Final.pdf](https://www.nybg.org/files/scientists/rmaczi/Mistaken_Identity_Final.pdf)
- **Invasive Plant Responses to Silvicultural Practices in the South.** 2006. Evans, C.W. et al. The University of Georgia, Bugwood Network. A guide to assist foresters and managers in southern US in developing management plans to reduce invasive plants. Good overview of integrating vegetation management guidelines and control techniques with silvicultural practices for other eastern US regions. View or download publication at: <http://www.invasive.org/silvicsforinvasives.pdf>
- **A Field Guide for the Identification of Invasive Plants in Southern Forests.** 2010. Miller, J.H. et al. USDA FS SRS General Technical Report SRS-119, Asheville NC. Update of 2003 edition. Guide displays distinguishing plant features throughout the year for accurate identification of 56 problematic invasive plants. Many species are found through the eastern region. View or download publication at: <http://www.treesearch.fs.fed.us/pubs/35292>
- **A Management Guide for Invasive Plants in Southern Forests.** 2010. Miller, J.H. et al. USDA FS SRS. General Technical Report SRS-131. A companion to the Southern Forests Field ID guide described above. Provides great information on current management strategies and procedures for 56 invasive plants in a variety of habitats. Good overview on organizing, planning and enacting invasive plant management, and prevention programs. View or download publication at: <http://www.treesearch.fs.fed.us/pubs/36915>
- **Join a Regional Invasive Plants Listserv to stay informed** such as the [Midwest Invasive Plant Network](#) or the [Mid-Atlantic Exotic Pest Plant Council](#).

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## **Narrative Summary and Analysis (2022 inventory data)**

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mesic Hardwood stand is dominated by Yellow-poplar, Red Maple, Black Cherry, Non Comm. Species and which together comprise 88 percent of the basal area.

This is a medium sawtimber stand, with average medial diameter of 15.1 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 10 years. Effective stand age is about 86 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 57 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 109 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 24.6 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 13.7 cords of pulp wood and 7257.4 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 810 dollars per acre.

Trees of acceptable quality for future growing stock provide enough stocking by themselves to warrant stand management. Non-commercial saplings and poles represent 10 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Competitive seedlings are not abundant; they will provide adequate natural regeneration only if supplemented with residual stems retained from the present overstory.

Undesirable understory plants may interfere with development of regeneration. Undesirable plants in this stand include dense low woody cover and dense tall woody cover.

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## **Information on Wildlife Habitat**

### **Mast, Forage and Browse resources**

Hard mast such as hickory nuts, acorns and beech nuts are foods that can be consumed immediately or stored for use during the winter season. They are required by many wildlife species, including bears, squirrels and mice. The stand has 7.1 sq.ft. of trees that produce high-quality hard mast (black oak, American beech, black walnut and scarlet oak), and 94.3 sq.ft. of other hard mast producers (yellow poplar, red maple, black cherry, black locust and blackgum). The understory data has one species that produce high-quality hard mast (scarlet oak) and six of other hard mast producers (black cherry, black locust, blackgum, red maple, white pine and yellow poplar).

Soft mast (fruits), such as cherries and berries are high energy foods required by many wildlife species including bears and many species of migrating songbirds where high energy sources are of key importance during fall migration. The stand has four species that produce high-quality soft mast totaling a basal area of 22.9 sq.ft. (black cherry, blackgum, sassafras and devil's walkingstick) and no other soft mast producing trees. The understory data has four species that produce high-quality soft mast (black cherry, blackgum, northern spicebush and sassafras) and no other soft mast producing species.



Browse is a critical food resource for herbivores such as deer, rabbits, and cottontails. Because most herbivores of concern are ground foragers, only understory vegetation is considered in this report. This stand contains one species that produce high-quality browse (blackgum) and ten species that produce lesser quality browse (ailanthus, black cherry, black locust, hickory, northern spicebush, red maple, sassafras, scarlet oak, white pine and yellow poplar). The distribution of browse across the stand is good, 100.0 percent of plots have at least one browse species.

This stand has three species that provides exceptional additional wildlife food in the form of insects and nectar totaling a basal area of 70.0 sq.ft. (yellow poplar, black cherry and black locust). Another seven species totaling 15.7 sq.ft. provide some additional food value (blackgum, black oak, sassafras, American beech, black walnut, devil's walkingstick and scarlet oak). The understory has three species that provides exceptional additional wildlife food in the form of insects and nectar (black cherry, black locust and yellow poplar). Another five species provide some additional food value (blackgum, northern spicebush, sassafras, scarlet oak and white pine). These additional food resources support many songbirds and pollinators.

## Snags Cavities and Dens

Snags and den trees provide shelter for a wide variety of wildlife including owls, ducks, woodpeckers, songbirds, squirrels, fishers, and other mammals. They are also used for foraging by various birds, mammals and amphibians. There are no snags recorded in your data. Research suggests a minimum of 3 snags per acre of varying diameter and stage of decay. To create snags (by girdling), this stand has 7.1 sq.ft. of sawtimber size trees that have exceptional value as snags (black locust, sassafras and American beech).

## Stand Structure and Composition

Structurally diverse forests support a greater diversity of wildlife. Understory structure provides foraging and nesting substrate, and escape and roosting cover for birds and mammals. Evergreen and ericaceous species provide thermal cover, structural complexity, nesting and foraging substrate, and compositional (or habitat) diversity for deer, grouse, turkey, black-throated green and -blue warblers, and other species. There are no evergreen or ericaceous species in the overstory. The understory has one evergreen species (white pine) and no ericaceous species.

Structure is contributed both by the attributes of individual trees and species (branching habit, foliage type) and by the distribution of trees horizontally and vertically in a stand. So-called "wolf trees" with large trunks and large, low, horizontal branches are selected by several canopy-nesting bird species. Horizontal diversity can be promoted with reserve islands and variable-retention harvests. While most users of SILVAH do not collect height data, height and diameter are closely related, so we can infer the vertical structure of a stand by the proportion of trees in each diameter class.

High Stand Structure Value Species by Size Class

	Basal Area	Percent BA	Species List
<b>Saplings</b>	1.43	1.32	yellow poplar
<b>Poles</b>	10.00	9.21	yellow poplar, blackgum and American beech
<b>Small sawtimber</b>	7.14	6.58	yellow poplar
<b>Medium sawtimber</b>	22.86	21.05	yellow poplar and blackgum
<b>Large sawtimber</b>	10.00	9.21	yellow poplar
<b>Total</b>	51.43	47.37	yellow poplar, blackgum and American beech

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## Silvah Recommended Prescription Decision Chart Trace (2022)

Recommended prescription: **Defer Cutting (low relative density)**

### Decision Chart Parameters

Primary management objective: **Wildlife Conservation**  
Secondary management objective: **Timber Production**  
Management goal or intention: **Improve Existing Stand**  
Desired future forest type: **retain current forest type**  
Type of uneven-aged management: **Single-tree selection**  
Deer impact: **high**

## Decision Chart Trace

- begin Chart A- Start
- Primary Management Objective: 3= Wildlife Conservation
- Secondary Management Objective: 1= Timber Production
- Current Forest Type: 3= Mesic Hardwood
- What is your Goal or Intention for this stand? 3= Improve Existing Stand
- go to Chart C- Thinning Prescriptions
  
- begin Chart C- Thinning Prescriptions
- Is Relative Density high enough to permit partial cutting? No (Rel. Den.= 56.9)
- return **Defer Cutting (low relative density)**

## Prescription Description

The relative density is 56.9% which is below the 80% threshold considered necessary for a partial cut. Immature or all-aged stands that are within or below the optimum range of stand density do not need any sort of partial cutting. In such a stand, the best prescription is to leave the stand alone for 10 or 15 years, and then re-examine it to see what treatment is appropriate at that time.

This stand has 91.7 percent of the understory plots stocked with grapevines. Grapevines that grow into the crowns of trees can cause extensive damage by interfering with growth and seed production, and by breaking out the tops of the trees. Damage can be especially severe in young, even-aged stands. In stands with more than 30 percent of the understory plots stocked with grapevines, it is usually advisable to treat the vines. This can be done by cutting the vines close to the ground. Canopy shade will usually prevent the sprouts from surviving. Where canopy density is low, or where harvest cutting will occur within a few years, cut the vines and treat the cut stumps with an herbicide.

The invasive species ailanthus was reported on 1 overstory plot and on 2 understory plots. Highly tolerant of drought and urban environments. A single tree can rapidly invade adjacent areas. Typically invades disturbed sites but may also invade undisturbed sites. Very difficult to eradicate once established. Allelopathic effects may inhibit regeneration of desirable species.

The invasive species unspecified non-native shrub was reported on 8 understory plots.

The invasive species autumn olive was reported on the stand but not on any plots. Can form thick cover in open areas. Does not readily invade dense forests.

The invasive species Japanese barberry was reported on the stand but not on any plots. Does best in full sun, but can form thick cover in forests because it can tolerate full shade, and is avoided by deer. Widely sold by nurseries. Extensive populations can form in a relatively short time.

The invasive species Japanese honeysuckle was reported on the stand but not on any plots. Can invade a wide variety of sites, grows vigorously, replacing native vegetation. Found along forest margins as well as forest interiors and in forest canopies. Can girdle shrubs and young trees.

The invasive species Japanese stiltgrass was reported on the stand but not on any plots. Responds positively to canopy gaps and removal of canopy trees by producing larger plants with abundant seed, especially if soil moisture remains relatively high. Nearby populations along roads, trails, and scattered forest-interior populations should be removed before harvesting forested sites. Equipment may become contaminated and be a new source of seed. May respond to increased light by growing taller and producing more seed, increasing the rate and distance of seed dispersal. This process may continue each year such that a front of *M. vinineum* could creep through the stand at a rate of about a 1 m (3 ft) a year, even without dispersal by water or animals. If the site is prone to flooding, the entire understory could be covered with *M. vinineum* after



<b>Boltwood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pulpwood</b>	<b>27.0</b>	9.9	7.1	3.8	3.6	0.9	0.5	0.0	0.0	0.6	0.3	0.0	0.0	0.3
<b>Firewood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>27.0</b>	9.9	7.1	3.8	3.6	0.9	0.5	0.0	0.0	0.6	0.3	0.0	0.0	0.3
<b>\$/cord</b>	<b>2.0</b>	5.4	7.6	14.2	14.8	61.3	107.1	157.6	0.0	95.0	208.8	0.0	0.0	166.9
<b>Total</b>	<b>810.4</b>	394.8	91.1	293.4	4.3	2.4	17.2	0.0	0.0	0.6	6.2	0.0	0.0	0.3

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## Timber Product x Species Volume and Value: total stand values

Net log volume (International 1/4 inch) - MBF

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Veneer</b>	<b>5.7</b>	3.8	0.7	0.6	0.0	0.1	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0
<b>Grade 1</b>	<b>32.2</b>	21.6	3.9	3.5	0.2	0.3	1.6	0.0	0.0	0.0	1.2	0.0	0.0	0.0
<b>Grade 2</b>	<b>28.0</b>	17.8	3.2	0.6	1.2	1.5	2.0	0.0	0.0	0.0	0.4	0.0	0.0	1.3
<b>Grade 3</b>	<b>3.1</b>	0.0	1.3	1.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pallet</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>68.9</b>	43.2	9.1	5.8	2.1	1.9	3.9	0.0	0.0	0.0	1.8	0.0	0.0	1.3

Net bulk volume - cords

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Boltwood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pulpwood</b>	<b>129.7</b>	47.2	33.5	18.0	17.3	4.2	2.4	1.6	0.0	2.7	1.2	0.0	0.0	1.5
<b>Firewood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>129.7</b>	47.2	33.5	18.0	17.3	4.2	2.4	1.6	0.0	2.7	1.2	0.0	0.0	1.5

Value - dollars

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Veneer</b>	<b>1194.1</b>	370.5	98.7	699.7	0.6	1.0	15.9	0.0	0.0	0.0	7.7	0.0	0.0	0.0
<b>Grade 1</b>	<b>4292.1</b>	2099.7	437.2	1612.5	3.4	5.7	90.0	0.0	0.0	0.0	43.7	0.0	0.0	0.0
<b>Grade 2</b>	<b>1698.9</b>	1186.4	227.4	216.6	2.3	8.0	52.8	0.0	0.0	0.0	5.4	0.0	0.0	0.0
<b>Grade 3</b>	<b>257.7</b>	-0.0	35.3	222.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pallet</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>7442.8</b>	3656.6	798.6	2751.2	6.3	14.7	158.7	0.0	0.0	0.0	56.8	0.0	0.0	0.0
<b>\$/MBF</b>	<b>108.0</b>	172.4	820.1	1290.1	3619.5	3990.5	1925.9	0.0	0.0	0.0	4126.1	0.0	0.0	5581.4
<b>Boltwood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pulpwood</b>	<b>256.1</b>	94.4	67.1	36.0	34.6	8.4	4.8	0.0	0.0	5.4	2.5	0.0	0.0	3.1
<b>Firewood</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>256.1</b>	94.4	67.1	36.0	34.6	8.4	4.8	0.0	0.0	5.4	2.5	0.0	0.0	3.1
<b>\$/cord</b>	<b>2.0</b>	5.4	7.6	14.2	14.8	61.3	107.1	157.6	0.0	95.0	208.8	0.0	0.0	166.9
<b>Total</b>	<b>7699.0</b>	3751.0	865.7	2787.2	40.9	23.0	163.5	0.0	0.0	5.4	59.3	0.0	0.0	3.1



<b>Rel. Density</b>	<b>57</b>	<b>2</b>	17	12	9	7	3	1	2	0	1	1	2	2	1
<b>AGS only</b>	<b>44</b>	<b>2</b>	15	5	9	5	3	1	2	0	1	1	0	2	1

## Volumes and Values (per acre) - International 1/4 inch Log Rule

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Gross Total Cords</b>	<b>30.7</b>	<b>1.5</b>	14.9	6.2	3.4	2.7	0.9	1.0	0.2	0.0	0.4	0.5	0.0	0.0	0.5
<b>Net Total Cords</b>	<b>24.6</b>	<b>1.2</b>	11.9	5.0	2.8	2.1	0.8	0.8	0.2	0.0	0.3	0.4	0.0	0.0	0.4
<b>Net Pulpwood Cords</b>	<b>13.7</b>	<b>0.4</b>	5.0	3.5	1.9	1.8	0.4	0.3	0.2	0.0	0.3	0.1	0.0	0.0	0.2
<b>Gross Board-foot</b>	<b>8380.7</b>	<b>590.8</b>	4880.2	1254.0	702.4	514.3	220.1	432.0	0.0	0.0	0.0	218.9	0.0	0.0	158.9
<b>Net Board-foot</b>	<b>7257.4</b>	<b>547.2</b>	4545.0	955.3	607.3	216.5	196.3	406.8	0.0	0.0	0.0	189.9	0.0	0.0	140.4
<b>Dollars</b>	<b>810.4</b>	<b>17.5</b>	394.8	91.1	293.4	4.3	2.4	17.2	0.0	0.0	0.6	6.2	0.0	0.0	0.3

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## Tree List: (2022 inventory data)

In order to make calculations and simulations more efficient, the original user-entered trees are manipulated so that similar trees are lumped into single records. The new tree list is for the entire stand and individual tree records can no longer be attributed to plots. During simulation, the dbh is increased by the SILVAH growth model and the stems-per-acre is reduced by the SILVAH natural mortality model.

Tree List

Species	DBH	Quality	Stems	Basal area	Rel dens	Saw ht	Pulp ht	Net saw cuft	Net pulp cuft	Net cuft	Net bdft
RM	6.000000	UGS	7.275655	1.428571	1.260216	0.000000	2.432281	0.000000	14.381408	14.381408	0.000000
RM	8.000000	UGS	4.092556	1.428571	1.081883	0.000000	3.695719	0.000000	22.405066	22.405066	0.000000
RM	10.000000	AGS	2.619236	1.428571	0.963035	0.000000	4.453781	0.000000	26.053862	26.053862	0.000000
RM	10.000000	UGS	2.619236	1.428571	0.963035	0.000000	4.453781	0.000000	26.053862	26.053862	0.000000
RM	12.000000	AGS	1.818914	1.428571	0.878866	1.000000	3.959156	4.146247	24.063405	28.209652	34.303696
RM	14.000000	UGS	1.336345	1.428571	0.816328	1.000000	4.320138	5.409652	24.257586	29.667237	44.755813
RM	14.000000	UGS	1.336345	1.428571	0.816328	2.000000	3.320138	8.794390	20.872848	29.667237	69.687223
RM	16.000000	AGS	1.023139	1.428571	0.768101	3.000000	2.590875	13.878635	16.855205	30.733841	110.659839
RM	16.000000	UGS	1.023139	1.428571	0.768101	2.000000	3.590875	10.203503	20.530338	30.733841	82.731663
RM	18.000000	AGS	1.616812	2.857143	1.459616	4.000000	1.801448	38.284272	24.827034	63.111306	310.498517
RM	18.000000	UGS	0.808406	1.428571	0.729808	2.000000	3.801448	11.300232	20.255421	31.555653	93.267640
RM	20.000000	UGS	0.654809	1.428571	0.698680	1.000000	4.969906	7.746288	24.465999	32.212287	63.952541
RM	28.000000	AGS	0.334086	1.428571	0.616621	3.000000	3.403085	16.469321	17.450773	33.920093	145.445966
AIL	4.000000	UGS	16.370223	1.428571	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
AB	10.000000	AGS	2.619236	1.428571	1.385721	0.000000	3.757574	0.000000	22.698873	22.698873	0.000000
BW	22.000000	AGS	0.541164	1.428571	0.672885	4.000000	1.645133	20.548458	10.331817	30.880275	189.876825
YP	4.000000	AGS	16.370223	1.428571	1.569068	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
YP	6.000000	AGS	7.275655	1.428571	1.093188	0.000000	2.379034	0.000000	14.020561	14.020561	0.000000
YP	8.000000	AGS	8.185111	2.857143	1.719509	0.000000	3.659425	0.000000	44.428574	44.428574	0.000000



YP	10.000000	AGS	2.619236	1.428571	0.721137	0.000000	4.427659	0.000000	25.931639	25.931639	0.000000
YP	14.000000	AGS	2.672689	2.857143	1.128080	2.000000	3.305641	23.503800	35.707817	59.211617	180.820771
YP	14.000000	AGS	2.672689	2.857143	1.128080	3.000000	2.305641	32.158456	27.053161	59.211617	240.749519
YP	14.000000	UGS	1.336345	1.428571	0.564040	1.000000	4.305641	7.228891	22.376917	29.605809	58.065024
YP	18.000000	AGS	0.808406	1.428571	0.477375	2.000000	3.793409	12.695745	18.827252	31.522997	101.733642
YP	18.000000	AGS	0.808406	1.428571	0.477375	3.000000	2.793409	17.203865	14.319132	31.522997	136.733713
YP	18.000000	AGS	1.616812	2.857143	0.954750	4.000000	1.793409	43.012157	20.033837	63.045994	338.682793
YP	20.000000	AGS	1.309618	2.857143	0.894290	4.000000	1.964128	43.948069	20.430177	64.378245	355.022716
YP	20.000000	AGS	1.309618	2.857143	0.894290	5.000000	0.964128	52.228763	12.149482	64.378245	419.637459
YP	22.000000	AGS	0.541164	1.428571	0.422451	3.000000	3.103807	17.912915	14.822794	32.735710	147.975422
YP	22.000000	AGS	0.541164	1.428571	0.422451	4.000000	2.103807	22.359419	10.376291	32.735710	184.474022
YP	22.000000	AGS	2.164658	5.714286	1.689805	5.000000	1.103807	106.280354	24.662484	130.942838	874.530762
YP	22.000000	UGS	0.541164	1.428571	0.422451	1.000000	5.103807	8.485343	24.250366	32.735710	67.958426
YP	24.000000	AGS	0.454728	1.428571	0.401900	5.000000	1.220206	26.954354	6.239293	33.193647	226.273337
YP	24.000000	UGS	0.454728	1.428571	0.401900	3.000000	3.220206	18.178610	15.015037	33.193647	152.364495
YP	24.000000	UGS	0.454728	1.428571	0.401900	5.000000	1.220206	26.954354	6.239293	33.193647	226.273337
YP	26.000000	AGS	0.387461	1.428571	0.384530	4.000000	2.318697	22.959532	10.624131	33.583663	195.690415
YP	28.000000	UGS	0.334086	1.428571	0.369656	3.000000	3.403119	18.406694	15.513530	33.920225	157.820921
YP	30.000000	AGS	0.291026	1.428571	0.356776	4.000000	2.476284	22.963637	11.250121	34.213758	200.436107
YP	32.000000	AGS	0.255785	1.428571	0.345513	6.000000	0.540304	31.354197	3.117775	34.471972	279.736723
BG	6.000000	AGS	14.551309	2.857143	2.520432	0.000000	2.432281	0.000000	28.762815	28.762815	0.000000
BG	18.000000	AGS	0.808406	1.428571	0.729808	5.000000	0.801448	25.149944	6.405709	31.555653	196.328769
BO	18.000000	AGS	0.808406	1.428571	0.729808	4.000000	1.801448	21.907975	9.647678	31.555653	193.206695
BO	24.000000	AGS	0.454728	1.428571	0.651165	4.000000	2.222594	22.711763	10.491274	33.203037	213.598388
BL	6.000000	AGS	7.275655	1.428571	1.260216	0.000000	2.315133	0.000000	13.584841	13.584841	0.000000
BL	8.000000	UGS	4.092556	1.428571	1.081883	0.000000	3.459820	0.000000	21.153066	21.153066	0.000000
BL	10.000000	AGS	2.619236	1.428571	0.963035	0.000000	4.146633	0.000000	24.598502	24.598502	0.000000
BL	12.000000	AGS	1.818914	1.428571	0.878866	2.000000	2.604508	4.135670	22.491627	26.627296	34.551161
BL	14.000000	AGS	1.336345	1.428571	0.816328	3.000000	1.931562	7.936082	20.058618	27.994701	66.541781
BL	14.000000	UGS	1.336345	1.428571	0.816328	1.000000	3.931562	3.567900	24.426801	27.994701	32.097677
BL	16.000000	AGS	1.023139	1.428571	0.768101	3.000000	2.176852	9.603271	19.390005	28.993276	83.261315
DWS	2.000000	UGS	65.480891	1.428571	1.798236	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
H	4.000000	AGS	16.370223	1.428571	1.542828	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BC	4.000000	AGS	32.740445	2.857143	3.138136	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BC	6.000000	AGS	7.275655	1.428571	1.093188	0.000000	2.594080	0.000000	15.465404	15.465404	0.000000
BC	8.000000	AGS	4.092556	1.428571	0.859755	0.000000	3.828723	0.000000	23.098408	23.098408	0.000000
BC	10.000000	AGS	5.238471	2.857143	1.442273	0.000000	4.617657	0.000000	53.627880	53.627880	0.000000
BC	12.000000	AGS	1.818914	1.428571	0.629325	2.000000	3.175587	9.346888	19.804730	29.151618	78.087911
BC	16.000000	AGS	1.023139	1.428571	0.515237	3.000000	2.929957	16.137810	15.976652	32.114463	139.916416
BC	18.000000	AGS	0.808406	1.428571	0.477375	4.000000	2.202268	21.511349	11.643586	33.154936	189.708847
BC	20.000000	AGS	0.654809	1.428571	0.447145	4.000000	2.430726	22.056434	11.965221	34.021655	199.558243

SO	14.000000	AGS	1.336345	1.428571	0.816328	3.000000	2.320138	16.741019	12.926218	29.667237	140.368661
SAS	10.000000	AGS	2.619236	1.428571	0.963035	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
SAS	12.000000	AGS	1.818914	1.428571	0.878866	2.000000	0.000000	0.000000	13.686718	13.686718	0.000000

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## Overstorey Species x Diameter Table: Basal area (live trees only) (2022 inventory data)

Basal area (live trees only)

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
4	7.1	1.4	0.0	2.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	1.4	0.0
6	8.6	1.4	1.4	1.4	1.4	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	7.1	2.9	1.4	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	11.4	1.4	2.9	2.9	1.4	0.0	0.0	1.4	0.0	1.4	0.0	0.0	0.0	0.0
12	5.7	0.0	1.4	1.4	1.4	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0
14	14.3	7.1	2.9	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
16	5.7	0.0	2.9	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	14.3	5.7	4.3	1.4	0.0	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	8.6	5.7	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	11.4	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0
24	5.7	4.3	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	2.9	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SAPS	8.6	1.4	0.0	2.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0	1.4	1.4	0.0
POLE	27.1	5.7	5.7	5.7	4.3	2.9	0.0	1.4	0.0	1.4	0.0	0.0	0.0	0.0
SM SAW	25.7	7.1	7.1	2.9	5.7	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	1.4
MD SAW	34.3	21.4	5.7	2.9	0.0	1.4	1.4	0.0	0.0	0.0	1.4	0.0	0.0	0.0
LG SAW	12.9	10.0	1.4	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	108.6	45.7	20.0	14.3	10.0	4.3	2.9	2.9	1.4	1.4	1.4	1.4	1.4	1.4
Percent		42.1	18.4	13.2	9.2	3.9	2.6	2.6	1.3	1.3	1.3	1.3	1.3	1.3

Basal area (live trees only) acceptable growing stock only

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
SAPS	5.7	1.4	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0
POLE	21.4	5.7	1.4	5.7	2.9	2.9	0.0	1.4	0.0	1.4	0.0	0.0	0.0	0.0
SM SAW	18.6	5.7	2.9	2.9	4.3	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	1.4
MD SAW	30.0	20.0	2.9	2.9	0.0	1.4	1.4	0.0	0.0	0.0	1.4	0.0	0.0	0.0
LG SAW	8.6	5.7	1.4	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	84.3	38.6	8.6	14.3	7.1	4.3	2.9	2.9	0.0	1.4	1.4	0.0	1.4	1.4

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## Overstory Species x Diameter Table: Number of trees (live trees only) (2022 inventory data)

Number of trees (live trees only)

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
2	65.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.5	0.0	0.0
4	81.9	16.4	0.0	32.7	0.0	0.0	0.0	0.0	16.4	0.0	0.0	0.0	16.4	0.0
6	43.7	7.3	7.3	7.3	7.3	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	20.5	8.2	4.1	4.1	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	21.0	2.6	5.2	5.2	2.6	0.0	0.0	2.6	0.0	2.6	0.0	0.0	0.0	0.0
12	7.3	0.0	1.8	1.8	1.8	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
14	13.4	6.7	2.7	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
16	4.1	0.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	8.1	3.2	2.4	0.8	0.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	3.9	2.6	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	4.3	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
24	1.8	1.4	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.7	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SAPS	147.3	16.4	0.0	32.7	0.0	0.0	0.0	0.0	16.4	0.0	0.0	65.5	16.4	0.0
POLE	85.1	18.1	16.6	16.6	14.0	14.6	0.0	2.6	0.0	2.6	0.0	0.0	0.0	0.0
SM SAW	24.7	6.7	6.5	2.8	5.5	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	1.3
MD SAW	16.3	9.6	3.1	1.5	0.0	0.8	0.8	0.0	0.0	0.0	0.5	0.0	0.0	0.0
LG SAW	3.4	2.6	0.3	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	276.9	53.4	26.6	53.7	19.5	15.4	1.3	4.4	16.4	2.6	0.5	65.5	16.4	1.3
Percent		19.3	9.6	19.4	7.0	5.5	0.5	1.6	5.9	0.9	0.2	23.6	5.9	0.5

Number of trees (live trees only) acceptable growing stock only

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
SAPS	65.5	16.4	0.0	32.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	0.0
POLE	67.0	18.1	2.6	16.6	9.9	14.6	0.0	2.6	0.0	2.6	0.0	0.0	0.0	0.0
SM SAW	18.4	5.3	2.8	2.8	4.2	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	1.3
MD SAW	14.3	9.1	1.6	1.5	0.0	0.8	0.8	0.0	0.0	0.0	0.5	0.0	0.0	0.0
LG SAW	2.2	1.4	0.3	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	167.4	50.3	7.4	53.7	14.1	15.4	1.3	4.4	0.0	2.6	0.5	0.0	16.4	1.3

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## Overstory Species x Diameter Table: Net pulpwood cubic volume (live trees only) (2022 inventory data)

Net pulpwood cubic volume (live trees only)

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>2</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>4</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>6</b>	<b>86.2</b>	14.0	14.4	15.5	13.6	28.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>8</b>	<b>111.1</b>	44.4	22.4	23.1	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>10</b>	<b>179.0</b>	25.9	52.1	53.6	24.6	0.0	0.0	0.0	0.0	22.7	0.0	0.0	0.0	0.0
<b>12</b>	<b>80.0</b>	0.0	24.1	19.8	22.5	0.0	0.0	13.7	0.0	0.0	0.0	0.0	0.0	0.0
<b>14</b>	<b>187.7</b>	85.1	45.1	0.0	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9
<b>16</b>	<b>72.8</b>	0.0	37.4	16.0	19.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>18</b>	<b>126.0</b>	53.2	45.1	11.6	0.0	6.4	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>20</b>	<b>69.0</b>	32.6	24.5	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>22</b>	<b>84.4</b>	74.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0
<b>24</b>	<b>38.0</b>	27.5	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>26</b>	<b>10.6</b>	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>28</b>	<b>33.0</b>	15.5	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>30</b>	<b>11.3</b>	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>32</b>	<b>3.1</b>	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>376.3</b>	84.4	88.9	92.2	59.3	28.8	0.0	0.0	0.0	22.7	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>340.5</b>	85.1	106.6	35.8	86.4	0.0	0.0	13.7	0.0	0.0	0.0	0.0	0.0	12.9
<b>MD SAW</b>	<b>279.4</b>	159.9	69.5	23.6	0.0	6.4	9.6	0.0	0.0	0.0	10.3	0.0	0.0	0.0
<b>LG SAW</b>	<b>95.9</b>	68.0	17.5	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>1092.1</b>	397.4	282.5	151.6	145.7	35.2	20.1	13.7	0.0	22.7	10.3	0.0	0.0	12.9
<b>Percent</b>		36.4	25.9	13.9	13.3	3.2	1.8	1.3	0.0	2.1	0.9	0.0	0.0	1.2

Net pulpwood cubic volume (live trees only) acceptable growing stock only

	all species	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>292.3</b>	84.4	26.1	92.2	38.2	28.8	0.0	0.0	0.0	22.7	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>228.0</b>	62.8	40.9	35.8	61.9	0.0	0.0	13.7	0.0	0.0	0.0	0.0	0.0	12.9
<b>MD SAW</b>	<b>210.4</b>	135.6	24.8	23.6	0.0	6.4	9.6	0.0	0.0	0.0	10.3	0.0	0.0	0.0
<b>LG SAW</b>	<b>59.2</b>	31.2	17.5	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>789.9</b>	314.0	109.3	151.6	100.1	35.2	20.1	13.7	0.0	22.7	10.3	0.0	0.0	12.9

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## Overstory Species x Diameter Table: Net board-foot volume, Int. (live trees only) (2022 inventory data)



<b>4</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>6</b>	<b>2.2</b>	0.4	0.4	0.4	0.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>8</b>	<b>2.8</b>	1.1	0.6	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>10</b>	<b>4.5</b>	0.6	1.3	1.3	0.6	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
<b>12</b>	<b>16.6</b>	0.0	1.2	14.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>14</b>	<b>36.9</b>	27.5	8.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
<b>16</b>	<b>84.0</b>	0.0	15.5	67.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>18</b>	<b>181.3</b>	41.6	34.7	97.4	0.0	1.7	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>20</b>	<b>179.5</b>	59.9	8.2	111.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>22</b>	<b>117.5</b>	111.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0
<b>24</b>	<b>69.2</b>	57.7	0.0	0.0	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>26</b>	<b>20.5</b>	20.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>28</b>	<b>39.4</b>	18.1	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>30</b>	<b>23.5</b>	23.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>32</b>	<b>32.7</b>	32.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>9.4</b>	2.1	2.2	2.3	1.5	0.7	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>137.5</b>	27.5	24.7	82.2	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
<b>MD SAW</b>	<b>478.3</b>	212.8	42.9	208.9	0.0	1.7	5.8	0.0	0.0	0.0	6.2	0.0	0.0	0.0
<b>LG SAW</b>	<b>185.2</b>	152.4	21.3	0.0	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>810.4</b>	394.8	91.1	293.4	4.3	2.4	17.2	0.0	0.0	0.6	6.2	0.0	0.0	0.3
<b>Percent</b>		48.7	11.2	36.2	0.5	0.3	2.1	0.0	0.0	0.1	0.8	0.0	0.0	0.0

Dollar value (live trees only) acceptable growing stock only

	<b>all species</b>	<b>YP</b>	<b>RM</b>	<b>BC</b>	<b>BL</b>	<b>BG</b>	<b>BO</b>	<b>SAS</b>	<b>AIL</b>	<b>AB</b>	<b>BW</b>	<b>DWS</b>	<b>H</b>	<b>SO</b>
<b>SAPS</b>	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>POLE</b>	<b>7.3</b>	2.1	0.7	2.3	1.0	0.7	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
<b>SM SAW</b>	<b>117.8</b>	23.4	9.6	82.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
<b>MD SAW</b>	<b>453.8</b>	205.8	25.4	208.9	0.0	1.7	5.8	0.0	0.0	0.0	6.2	0.0	0.0	0.0
<b>LG SAW</b>	<b>130.6</b>	97.9	21.3	0.0	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>709.5</b>	329.2	57.0	293.4	3.1	2.4	17.2	0.0	0.0	0.6	6.2	0.0	0.0	0.3

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## Narrative Summary and Analysis (2027 simulated data)

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. The presence of nonnative invasive species should be re-evaluated in 2027. The 2022 inventory data recorded nonnative invasive species in or near this stand. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mesic Hardwood stand is dominated by Yellow-poplar, Red Maple, Black Cherry, Non Comm. Species and Misc Comm. Species which together comprise 88 percent of the basal area.

This is a medium sawtimber stand, with average medial diameter of 16.1 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 6 years. Effective stand age is about 91 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 59 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 117 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 27.2 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 14.6 cords of pulp wood and 8443.3 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 977 dollars per acre.

Trees of acceptable quality for future growing stock provide enough stocking by themselves to warrant stand management. Non-commercial saplings and poles represent 10 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Collect site, understory and competitive regeneration data in 2027 to ensure continuity of forest cover.

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## Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values: (2027 simulated data)

### Composition - BA, percent BA, trees per acre

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Total BA</b>	<b>116.6</b>	<b>5.1</b>	49.3	21.8	14.5	10.8	4.5	3.4	3.1	1.4	1.5	1.6	1.3	1.4	1.7
<b>Percent BA</b>	<b>100</b>	<b>4</b>	42	19	12	9	4	3	3	1	1	1	1	1	1
<b>Trees per acre</b>	<b>257</b>	<b>2.6</b>	48.7	26.2	45.7	19.2	15.0	1.3	4.4	15.6	2.6	0.5	60.8	15.6	1.3

### Quality - percent in AGS

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Saplings</b>	<b>64</b>	<b>0</b>	100	0	100	0	0	0	0	0	0	0	0	100	0
<b>Poles</b>	<b>79</b>	<b>0</b>	100	25	100	67	100	0	100	0	100	0	0	0	0
<b>Small sawtimber</b>	<b>72</b>	<b>100</b>	80	40	100	75	0	0	100	0	0	0	0	0	100
<b>Medium sawtimber</b>	<b>88</b>	<b>100</b>	93	50	100	0	100	100	0	0	0	100	0	0	0
<b>Large sawtimber</b>	<b>67</b>	<b>100</b>	56	100	0	0	0	100	0	0	0	0	0	0	0
<b>All sizes</b>	<b>78</b>	<b>100</b>	84	43	100	71	100	100	100	0	100	100	0	100	100

### Diameters and Ages - inches, years



	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Medial diameter</b>	<b>16.1</b>	<b>20.5</b>	19.8	15.7	12.0	12.0	10.6	23.0	11.5	4.1	10.3	23.1	2.0	4.1	15.3
<b>Merchantable medial diameter</b>	<b>17.0</b>	<b>20.5</b>	20.2	15.7	13.5	12.0	10.6	23.0	11.5	0.0	10.3	23.1	0.0	0.0	15.3
<b>Quadratic mean diameter</b>	<b>9.1</b>	<b>19.0</b>	13.6	12.3	7.6	10.2	7.5	22.3	11.4	4.1	10.3	23.1	2.0	4.1	15.3
<b>Years to maturity</b>	<b>6</b>	<b>0</b>	0	12	23	40	49	0	43	0	51	0	0	0	18
<b>Effective age</b>	<b>91</b>	<b>136</b>	101	78	67	80	71	153	77	0	69	154	0	0	102

## Structure

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Q factor</b>	<b>1.43</b>	<b>1.24</b>	1.29	1.28	1.34	1.38	1.61	1.21	1.43	0.00	0.00	0.00	0.00	0.00	0.00

## Relative density - percent

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Rel. Density</b>	<b>59</b>	<b>3</b>	18	13	8	7	3	2	2	0	1	1	2	2	1
<b>AGS only</b>	<b>45</b>	<b>3</b>	15	5	8	5	3	2	2	0	1	1	0	2	1

## Volumes and Values (per acre) - International 1/4 inch Log Rule

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Gross Total Cords</b>	<b>34.1</b>	<b>1.8</b>	16.5	7.0	3.8	3.0	1.1	1.2	0.0	0.0	0.4	0.5	0.0	0.0	0.6
<b>Net Total Cords</b>	<b>27.2</b>	<b>1.4</b>	13.2	5.6	3.1	2.4	0.9	1.0	0.0	0.0	0.3	0.4	0.0	0.0	0.5
<b>Net Pulpwood Cords</b>	<b>14.6</b>	<b>0.7</b>	5.0	3.7	2.1	2.0	0.6	0.4	0.0	0.0	0.3	0.2	0.0	0.0	0.2
<b>Gross Board-foot</b>	<b>9674.4</b>	<b>604.2</b>	5735.0	1611.4	757.5	601.6	164.6	437.0	0.0	0.0	0.0	200.2	0.0	0.0	167.2
<b>Net Board-foot</b>	<b>8443.3</b>	<b>566.6</b>	5362.3	1256.3	665.9	270.3	148.2	416.3	0.0	0.0	0.0	173.6	0.0	0.0	150.3
<b>Dollars</b>	<b>977.1</b>	<b>22.9</b>	472.8	122.7	341.9	5.1	3.7	22.4	0.0	0.0	0.6	7.2	0.0	0.0	0.5

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## Narrative Summary and Analysis (2032 simulated data)

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. The presence of nonnative invasive species should be re-evaluated in 2032. The 2022 inventory data recorded nonnative invasive species in or near this stand. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mesic Hardwood stand is dominated by Yellow-poplar, Red Maple, Black Cherry, Non Comm. Species and Misc Comm. Species which together comprise 88 percent of the basal area.

This is a large sawtimber stand, with average medial diameter of 17.1 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 1 years. Effective stand age is about 95 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 60 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 124 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 30.0 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 15.8 cords of pulp wood and 9588.1 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 1164 dollars per acre.

Trees of acceptable quality for future growing stock provide enough stocking by themselves to warrant stand management. Non-commercial saplings and poles represent 11 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Collect site, understory and competitive regeneration data in 2032 to ensure continuity of forest cover.

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## Overstory Summary- Quality, Diameters, Age, Structure, Density, Volumes, Values: (2032 simulated data)

### Composition - BA, percent BA, trees per acre

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Total BA</b>	<b>124.2</b>	<b>6.1</b>	52.6	23.6	14.8	11.6	4.8	4.1	3.3	1.4	1.6	1.7	1.3	1.4	2.0
<b>Percent BA</b>	<b>100</b>	<b>5</b>	42	19	12	9	4	3	3	1	1	1	1	1	2
<b>Trees per acre</b>	<b>239</b>	<b>2.6</b>	44.4	25.9	38.6	18.9	14.5	1.3	4.4	14.9	2.6	0.5	56.2	14.9	1.3

### Quality - percent in AGS

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
<b>Saplings</b>	<b>60</b>	<b>0</b>	100	0	100	0	0	0	0	0	0	0	0	100	0
<b>Poles</b>	<b>78</b>	<b>0</b>	100	26	100	67	100	0	100	0	100	0	0	0	0
<b>Small sawtimber</b>	<b>73</b>	<b>100</b>	80	40	100	75	0	0	100	0	0	0	0	0	100
<b>Medium sawtimber</b>	<b>88</b>	<b>100</b>	100	50	100	0	100	100	0	0	0	0	0	0	0
<b>Large sawtimber</b>	<b>77</b>	<b>100</b>	71	100	0	0	0	100	0	0	0	100	0	0	0
<b>All sizes</b>	<b>78</b>	<b>100</b>	84	43	100	71	100	100	100	0	100	100	0	100	100

### Diameters and Ages - inches, years

	all species	all oaks	YP	RM	BC	BL	BG	BO	SAS	AIL	AB	BW	DWS	H	SO
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<b>Medial diameter</b>	<b>17.1</b>	<b>22.2</b>	20.7	16.4	13.2	12.6	11.2	25.0	12.0	4.2	10.7	24.2	2.0	4.2	16.7
<b>Merchantable medial diameter</b>	<b>17.8</b>	<b>22.2</b>	21.0	16.4	14.4	12.6	11.2	25.0	12.0	0.0	10.7	24.2	0.0	0.0	16.7
<b>Quadratic mean diameter</b>	<b>9.8</b>	<b>20.7</b>	14.7	12.9	8.4	10.6	7.8	24.3	11.8	4.2	10.7	24.2	2.0	4.2	16.7
<b>Years to maturity</b>	<b>1</b>	<b>0</b>	0	8	18	36	45	0	40	0	49	0	0	0	9
<b>Effective age</b>	<b>95</b>	<b>148</b>	105	82	72	84	75	167	80	0	71	161	0	0	111

## Structure

	<b>all species</b>	<b>all oaks</b>	<b>YP</b>	<b>RM</b>	<b>BC</b>	<b>BL</b>	<b>BG</b>	<b>BO</b>	<b>SAS</b>	<b>AIL</b>	<b>AB</b>	<b>BW</b>	<b>DWS</b>	<b>H</b>	<b>SO</b>
<b>Q factor</b>	<b>1.39</b>	<b>1.20</b>	1.24	1.27	1.33	1.28	1.50	1.21	1.19	0.00	0.00	0.00	0.00	0.00	0.00

## Relative density - percent

	<b>all species</b>	<b>all oaks</b>	<b>YP</b>	<b>RM</b>	<b>BC</b>	<b>BL</b>	<b>BG</b>	<b>BO</b>	<b>SAS</b>	<b>AIL</b>	<b>AB</b>	<b>BW</b>	<b>DWS</b>	<b>H</b>	<b>SO</b>
<b>Rel. Density</b>	<b>60</b>	<b>3</b>	18	13	8	7	3	2	2	0	2	1	2	1	1
<b>AGS only</b>	<b>46</b>	<b>3</b>	16	5	8	5	3	2	2	0	2	1	0	1	1

## Volumes and Values (per acre) - International 1/4 inch Log Rule

	<b>all species</b>	<b>all oaks</b>	<b>YP</b>	<b>RM</b>	<b>BC</b>	<b>BL</b>	<b>BG</b>	<b>BO</b>	<b>SAS</b>	<b>AIL</b>	<b>AB</b>	<b>BW</b>	<b>DWS</b>	<b>H</b>	<b>SO</b>
<b>Gross Total Cords</b>	<b>37.5</b>	<b>2.2</b>	18.0	7.7	4.2	3.3	1.2	1.5	0.0	0.0	0.4	0.6	0.0	0.0	0.7
<b>Net Total Cords</b>	<b>30.0</b>	<b>1.7</b>	14.4	6.1	3.4	2.6	0.9	1.2	0.0	0.0	0.3	0.5	0.0	0.0	0.6
<b>Net Pulpwood Cords</b>	<b>15.8</b>	<b>0.8</b>	5.4	4.0	2.3	2.2	0.7	0.5	0.0	0.0	0.3	0.2	0.0	0.0	0.3
<b>Gross Board-foot</b>	<b>10860.6</b>	<b>751.4</b>	6329.7	1815.7	877.6	676.8	185.3	539.5	0.0	0.0	0.0	224.2	0.0	0.0	211.8
<b>Net Board-foot</b>	<b>9588.1</b>	<b>709.8</b>	5957.4	1453.6	781.8	323.0	168.1	516.4	0.0	0.0	0.0	194.4	0.0	0.0	193.3
<b>Dollars</b>	<b>1164.4</b>	<b>33.4</b>	544.8	150.1	415.8	6.3	4.6	30.5	0.0	0.0	0.7	8.7	0.0	0.0	2.9

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## Narrative Summary and Analysis (2032 residual data)

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. The presence of nonnative invasive species should be re-evaluated in 2032. The 2022 inventory data recorded nonnative invasive species in or near this stand. There was one invasive in the overstory (ailanthus), two invasives in the overstory (ailanthus and unspecified non-native shrub), and ten that were found outside the plots (ailanthus, unspecified non-native shrub, autumn olive, Japanese barberry, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, Norway maple, oriental bittersweet and bush honeysuckle).

This Mesic Hardwood stand is dominated by Yellow-poplar, Red Maple, Black Cherry, Non Comm. Species and Misc Comm. Species which together comprise 88 percent of the basal area.

This is a large sawtimber stand, with average medial diameter of 17.1 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 1 years. Effective stand age is about 95 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species are adaptable to selection cutting.

Relative stand density is 60 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 124 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 30.0 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 15.8 cords of pulp wood and 9588.1 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 1164 dollars per acre.

Trees of acceptable quality for future growing stock provide enough stocking by themselves to warrant stand management. Non-commercial saplings and poles represent 11 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Collect site, understory and competitive regeneration data in 2032 to ensure continuity of forest cover.

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