RIDGE &VALLEY
Forest Management
SINCE 1978

managing healthy, productive, sustainable forests

FOREST STEWARDSHIP PLAN

Property Owner:	**LONGWOOD LAKE CABIN OWNERS ASSOCIATION**
Address:	PO Box 2551, Oak Ridge, NJ 07438
Telephone:	(646) 872-0493 / Richard Leigh
Location of Property:	Berkshire Valley Road, Oak Ridge, NJ 07438
Total Area:	640.087 +/- acres Woodland: +/- 612.797 acres
Tax Information:	Jefferson Township, Morris County, New Jersey Block 336 / Lot 43.01; Block 338 / Lot 2; Block 339 / Lot 2
Plan Prepared By:	Andrew Bennett – SAF, NJ Approved Forester Dylon L. Borger – SAF, NJ Approved Forester

Landowner Statement:

I certify that I am the owner of the property or am authorized by the owner to make this certification. I have read the within Forest Stewardship Plan and the information contained in the plan is true. To the best of my knowledge, the plan meets the requirements of the Forest Stewardship Program rules at N.J.A.C. 7:3-5 and applicable Federal and State law. The owner agrees to implement the plan, as approved or subsequently amended.

Eva-Lee Baird 9-1-22

Landowner Signature Eva-Lee Baird, LLCOA Secretary Date

Forester's Statement:

We prepared the attached Forest Stewardship Plan in consultation with the owner of the property. We certify that, to the best of our knowledge, the plan meets the requirements of the Forest Stewardship Program rules at N.J.A.C. 7:3-5 and applicable Federal and State law.

Forester Signatures 8/25/22

Date

Plan preparation date: August 25, 2022

******This plan will be submitted as part of an application for Farmland Assessment******

Do not write below this line (for NJFS only)

Date Received: 9/6/22
Plan Start Date: 9/6/22
NJFS ID#: A-246

Date of Approval: 9/6/22
Plan End Date: 9/6/2032
Owner requested start date: N/A

FOREST STEWARDSHIP

Certificate

Presented to

LONGWOOD LAKE CABIN OWNERS ASSOC.

For commitment to a land stewardship ethic that focuses on sustainable forests,
providing wood products, fish and wildlife habitat, water quality, soil productivity, aesthetics,
and recreation – as a valuable legacy for future generations.

Assistant Director, USDA Forest Service, NA

September 7, 2022
Date

New Jersey State Forester

Recommended By

Mike Hart, Regional Forester
Forest Service~Northern Region

The Forest Stewardship Program is administered by the
USDA Forest Service, in partnership with New Jersey State Forest Service.

State of New Jersey

PHILIP R. MURPHY
Governor

SHIELA Y. OLIVER
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
NORTHERN REGION OFFICE
240 MAIN STREET (ROUTE 206 NORTH)
ANDOVER, NJ 07821

SHAWN LATOURETTE
Commissioner

September 7, 2022

Dear LONGWOOD LAKE CABIN OWNERS ASSOCIATION:

On behalf of the NJ Forest Stewardship Coordinating Committee, it is our pleasure to welcome you into the NJ Forest Stewardship Program.

Forest Stewardship plans submitted under the NJ Forest Stewardship Program that prescribe activities within forest wetlands and/or flood hazard areas must be in compliance with the requirements of the 'New Jersey Forestry and Wetlands Best Management Practices Manual' and current regulations. All Best Management Practices (BMP's) described in the Forest Stewardship Plan and in the 'New Jersey Forestry and Wetlands Best Management Practices Manual' must be followed. Any deviation from the Forest Stewardship Plan and any conditions within this letter without prior authorization from this office will result in revoking of the Forest Stewardship Plan. For your information and guidance the 'New Jersey Forestry and Wetlands Best Management Practices Manual' can be downloaded by going to the following web address:

http://www.state.nj.us/dep/parksandforests/forest/nj_bmp_manual1995.pdf

This letter is to inform you that the submitted Forest Stewardship Plan along with the conditions of this letter is deemed sufficient to satisfy the 'Minimum Guidelines for Forest Stewardship Plan' requirements. Also, the proposed plan and corresponding field activities are consistent with national and State forestry criteria, and if applicable, complies with the freshwater wetlands/flood hazard standards. Therefore, this plan has been granted approval.

Cost share funding may be available on various Forest Stewardship Program management practices. Please contact your consultant or the Regional Forestry office to discuss Stewardship practices, funding availability, and cost-share application procedures.

In the near future, or accompanying this letter, you will be receiving a Forest Stewardship certificate and a sign that can be displayed on your property. If, in the meantime, you have any questions or concerns regarding the Forest Stewardship Program, cost-share, or any other forestry related matter, please feel free to contact our office.

Sincerely,

Mike Hart
Regional Forester

Cc: ANDY Bennett, Approved Forester

FOREST MANAGEMENT USE ONLY:

FOREST NO.:A0246
ASSOCIATION
COUNTY: MORRIS
PRIMARY BLOCK(S): 336; 338; 339

NAME: LONGWOOD LAKE CABIN OWNERS

MUNICIPALITY: Jefferson Twp
PRIMARY LOT(S): 43.01; 2; 2

RIDGE &VALLEY
Forest Management
SINCE 1979

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WOODLAND MANAGEMENT PLAN

Property Owner:	**LONGWOOD LAKE CABIN OWNERS ASSOCIATION**
Farm Number:	A-246
Address:	PO Box 2551, Oak Ridge, NJ 07438
Telephone:	(646) 872-0493 / Richard Leigh
Location of Property:	Berkshire Valley Road, Oak Ridge, NJ 07438
Total Area:	640.087 +/- acres Woodland: +/- 612.797 acres
Tax Information:	Jefferson Township, Morris County, New Jersey Block: 336 Lot: 43.01 Block: 338 Lot: 2 Block: 339 Lot: 2

Plan is written for a 10 year period – August 31, 2021 through August 31, 2031
****Plan was prepared on August 31, 2021****

This Woodland Management Plan has been designed as a guideline for the forest landowner to utilize and improve his/her woodlot, create and maintain diversity of species and ensure sustainability of various forestry products using sound forestry practices. Updates and changes to this plan may be made at any time after landowner/forester consultation.

Report Prepared By:

_____
Andrew Bennett – SAF, NJ Approved Forester

_____
Dylon L. Borger – SAF, NJ Approved Forester

Table of Contents

Farmland Assessment Filing Explanation

There is a direct relationship between this plan and the annual Farmland Assessment Application that is filed with both the local Tax Assessor and the NJ Forest Service. The acreage breakdown that is provided within this plan should match the acreage numbers being used on the Farmland Assessment Application (Form FA-1). The NJ Forest Service does not monitor the use of any acreage outside of woodland acres (*referred to as Non-Appurtenant Woodland on the FA-1*). **Therefore, the NJ Forest Service has neither reviewed nor approved anything in the table found below except the woodland acres, which match the woodland acres on the cover page of this plan.**

These numbers are not based on an actual land survey. Ridge & Valley Forest Management uses digital tax maps, aerial photos, GPS coordinates with mapping, and field observations in an attempt to ensure the numbers listed below accurately represent what exists on the ground at the property. This effort is made by Ridge & Valley Forest Management so that there is some consistency between the various forms used as part of the Farmland Assessment Filing. If a landowner changes the use of a portion of their property after this plan is complete, these numbers will no longer be accurate. However, this table should form a good baseline and reference point for the landowner, tax assessor, and consulting forester.

Breakdown of Property by Land Use Class (same as FA-1)

Township	Block	Lot	Acres Per Lot	Woodland *(Non-Appurtenant)*	Powerline ROW	Common Areas
Jefferson	336	43.01	146.297	144.797	1.500	---
	338	2	198.204	187.000	11.204	---
	339	2	295.586	281.000	9.586	5.000
		Total	***640.087***	***612.797***	***22.290***	***5.000***

NOTES:

- the acres represented by wetland (*if applicable*) will be classified as "Appurtenant Woodland or Wetland" when entered on the FA-1
- if property includes more than one lot, see parcel map in Appendix B for further information on acreage breakdown

Terminology

Age class - the intervals into which the range of tree ages are grouped, originating from a natural event or human-induced activity.

AGS - acceptable growing stock; trees that are of good form and quality, and those that would be satisfactory as 'crop trees' in a final forest stand on the site.

Aspect - the compass direction in which a slope faces.

Basal area - the cross-sectional area of a tree trunk at breast height (DBH); the total basal area per acre is the total amount of ground surface area which would be occupied by trees if every tree on that acre would be severed at DBH; average total basal area per acre is used by foresters to assess and regulate stand density in order to make timber harvesting and forest stand improvement recommendations.

Biodiversity - the variability among living organisms from all sources, including terrestrial and aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.

Board foot – the basic unit of measurement for estimating volume in trees with diameters at breast height of greater than twelve inches; its dimensions are 12" x 12" x 1".

Crop tree - any tree forming, or selected to form, a component in the final crop in a forest stand; generally this is a tree selected in a young stand to carry through to maturity; these trees are selected largely for their genetic vigor and consequential potential to develop into a high value forest product.

DBH - diameter at breast height; the diameter of a tree 4 ½ feet above ground level.

Even-aged stand - a forest stand in which all the trees are the same age, or at least of the same age class (within 20 years of one another in mature or nearly mature stands); these types of stands develop following drastic environmental changes such as fire, clearcutting, massive insect or disease outbreak, or historical abandonment from non-forest land use (i.e. abandoned pasture)

Forest Stand - a community of trees which possesses sufficient uniformity with regard to species composition and tree age, condition, and arrangement, to be distinguishable from adjacent tree communities; the stand is the basic forest management entity.

Forest Stand Improvement (FSI) - a term comprising all intermediate cuttings made to improve the composition, constitution, condition, resiliency, and/or growth of a forest stand.

Herbaceous – pertaining to or characteristic of an herb; a plant that does not have persistent woody growth.

Invasive plant - is a species that is not native to a specific location (an introduced species), and that has a tendency to spread to a degree believed to cause damage to the environment, human economy or human health.

Midstory - that portion of the trees, in a forest of more than one story, forming the middle stratum between the overstory and understory; typically these are trees in the intermediate crown class.

Non-Native plant – (aka - introduced species, alien species, exotic species, or non-indigenous species) is a species living outside its native distributional range, but which has arrived there by human activity, either deliberate or accidental.
Overstory - the portion of the trees, in a forest of more than one story, that form the uppermost canopy level.

Percent Stocking - in a forest, a more or less subjective indication of the number of trees as compared to the desirable number for optimal results; more precisely, it is a measure of the proportion of the available growing area actually occupied by trees.

Poletimber - trees which are not large enough to be sawn into lumber, but are well-suited as fenceposts or firewood; these trees are normally in the 6"-10" diameter class.

Sawtimber - trees which are large enough to be sawn into lumber; these trees are normally in the 12"+ diameter class.

Silvicultural - the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society such as wildlife habitat, timber, water resources, restoration, and recreation on a sustainable basis.

Site index - a term used to describe the productivity of a site; it is based on the height of the dominant overstory trees in the stand at a certain base age (usually 50 years); a high site index indicates a productive site; the site index for hardwoods in the Northeast United States generally ranges from 45 to 95.

Succession - the process whereby one natural plant community replaces another; in forest succession, trees which can thrive in full shade succeed trees which can thrive only in full or partial sunlight; over time, shade-intolerant species such as aspen and paper birch are replaced by shade-intermediate species such as oaks, which in turn, are replaced by shade-tolerant species such as hemlock, beech, and sugar maple.

UGS - Unacceptable Growing Stock. Trees which are not desired in the stand because of defect or poor form; these trees are typically only harvested for firewood or are left for wildlife habitat.

Understory - generally, trees or other woody species which are growing in the lowest stratum of a forest stand.

Uneven-aged stand - a forest stand comprised of trees that differ markedly in age.

Vigor - the capacity of an organism to resist strain or stress (any adverse conditions).

Vernal pool - a small depression in the landscape which seasonally holds water only during very wet periods, normally in the spring; they are most often, but not always, associated with forests.

Wetlands - areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. (NOTE: the NJDEP labels most wetlands on their hydrology maps, and therefore these areas are considered classified wetlands).

Property Background and Goals

A) Location

The Longwood Lake Cabin Owners Association property lies within Jefferson Township, Morris County, NJ. There is no physical address for the property and access can be gained into the property in several locations. The property lies on both the northwest and southeast sides of Berkshire Valley Road. There are several entrances to the property located on the southern side of Berkshire Valley Road. The property is located approximately 4.3 +/- driving miles to the northeast of the intersection of Berskshire Valley Road and NJ Route 15 *(see Appendix B for Property Location Map)*.

It is situated within the Highlands physiographic region of New Jersey. Characteristics of this region are discontinuous rounded ridges separated by deep narrow valleys. ***The property IS located within the Highlands Preservation Area.***

B) History

The property has been owned by the LLCOA for over 30 years (since 1990). The previous 10 year Woodland Management Plan (WMP) was developed by Duke Grimes (Forest Management Services) for the landowner in 2011. The plan expires in December of 2021; this plan was created to continue the forest management that has been in place for more than 30 years on this property.

Morris County has a long history of settlement and small family farms. Many of the valley soils within the county are conducive to row cropping, as well as hay and pasture for dairy herds. Soils that are wetter in nature or contain a significant amount of rock outcropping were generally restricted to pasture and woodland. This property was used for several agricultural purposes throughout its history. When its predominant use was as part of a farm, less-steep areas were managed for row crops and hay production, while other areas were used as pasture and wooded pasture. It is likely that the areas with the steepest topography and rocky outcroppings were not managed as farmland. All of these observations are further supported by the 1930 aerial map accompanying this plan. Additionally, the presence of stonewalls indicates that the property was used for agriculture. Through the past century, all of the land has been abandoned from farming purposes. This has allowed for the establishment of different age classes of trees in different portions of the property.

The property is made up of three lots in Jefferson Township**.** There are a limited number of areas that are treated as common areas by the owners of the LLCOA. These areas are scattered around the property on both sides of the lake. It is estimated that these areas make up less than 5 +/- acres of the property and therefore will not be included in the Farmland Assessed acres. All other acres are included in this plan within a forested stand and therefore will be included in the total number of Farmland Assessed acres.

Previous formal forest management has been active on portions of the property since at the least the 1980s when a plan was developed by Duke Grimes for the previous landowners (*Realty Transfer Company).* The property has a rich history of forest management; it has been actively managed over the past 30 years with a particular focus on the salvage of gypsy moth killed and weakened oaks. Additionally, the landowner has cooperated with the NRCS to create much needed habitat for the state endangered Golden-winged warbler. Several selective timber harvests occurred between 1986 and 1993, at which point the management focus turned to conducting many acres of Forest Stand Improvement thinnings. Beginning in 2015, two projects were conducted to create habitat for the aforementioned Golden-winged warbler. These areas totaled approximately 50 +/- acres collectively in size. Over the past couple of years, work has focused on the removal of standing dead oaks and white ash which have been severely weakened by EAB.

C) Wetlands Buffers, Riparian Zones, and Easements

The property contains wetlands and wetland transition areas in the central and northern portions of the property. Additionally, the Rockaway River traverses the central portion of the property and a tributary to the Rockaway River is located in the northern portion of the property; these features will be protected by the appropriate Riparian Zones along with Longwood Lake.

Details relating to transition areas (wetland buffers and riparian zones) can be found in the section titled "Hydrological Considerations" which is part of the Property Overview portion of the plan.

The property contains several easements. PSE&G holds an easement on the property for the powerline ROW. Additionally, AT&T holds an easement on the property for a ROW access. Lastly, an easement is in place along the common border with Picatinny Arsenal restricting the number of people who can congregate in that portion of the property. None of these easements will affect the forest management recommendations on the property.

D) General Property Goals

1) Manage the property in cooperation with professional consulting foresters so as to ensure the long term sustainability of the forest land
2) Manage the property in accordance with established best forest management practices.
3) Maintain and improve the health, biodiversity, and vigor of the woodlot through one or more of the following –

    A. Improve the woodlot through the use of silviculture activities such as Forest Stand Improvement (FSI) and/or Timber Harvesting.
    B. Control invasive non-native plants within all wooded areas of the property.
    C. Consider planting appropriate species of trees to assist in the regeneration process and/or shelter natural regeneration which is already present within the woodlot.
    D. Utilize prescribed fire to limit the growth of invasive species and to encourage the growth of native vegetation.

4) Sustainably harvest certain forest products which may include firewood, cedar posts, timber, mushrooms, maple syrup, etc.
5) Maintain and improve the aesthetic qualities of the property.
6) Establish and maintain woodland access throughout the property.
7) Improve wildlife habitat in conjunction with forest management activities.
8) Protect the soil and water resources on and near the property through the implementation of best forest management practices.
9) Qualify the property on an annual basis for the land-use property taxation provided for in New Jersey's Farmland Assessment Program.
10) This plan is not in coordination with any neighboring properties.

E) Monitoring and Recordkeeping – Statement

The landowner understands his responsibility and obligation to monitor and keep records of the various forest management activities that are performed on his land. It is recommended that the landowner record activities within the *'Journal of Forest Management Activities'* which is found in the back of this plan notebook. The prescriptions and recommendations within this Forest Stewardship Plan will make certain that excessive and unnecessary cutting does not occur and that all activities will ensure the sustainability of the forest land.

Property Overview

A) Boundaries and Infrastructure

The boundaries of this property are identified by the power line ROW, stonewalls, wire fencing, and posters. Some of the corners have been identified with flagging, paint, or posters.

The property contains **limited** woodland access throughout the property; any woodland roads or trails are depicted on the Forest Stand Map *(see Appendix B for Forest Stand Map*). Furthering and maintaining access should be one of the first objectives for this property; limited access could hinder the opportunity for successful forest management on the property.

B) Forest Use and General Overview

The forested portion of the property makes up approximately 612.797 +/- acres of the property. There is nothing planned at this point to either expand or reduce the footprint of the forested acres. The wooded portion of the property is divided into twelve different forest stands (Stands A-1, A-2, A-3, B-1, B-2, C-2, C-3, D-1, D-3, CFW-3, GWW-1, & GWW-3). These stands comprise all woodland acres of the property. These stands are described further within the management plan and are labeled on the Forest Stand Map which is found in Appendix B of this report.

C) Topography

The topography of the property varies from being mostly flat in some areas to extremely steep in other areas. It is situated between 740 and 1,280 feet above sea level. The high point occurs in the northern portion of the property. The low point occurs where the Rockaway River exits the central portion of the property. Due to the varying topography, the property does not have one distinct aspect; however, the majority of the property slopes towards the lake, so the predominant aspects on the property are southeast and northwest.

D) Hydrological Considerations

Protection of water quality will be an important consideration when executing any forest management practice on this property. Forest management in wetlands and along stream corridors, as well as in upland riparian buffer zones to these features, are regulated by the NJ Freshwater Wetlands Act (FWPA) and Flood Hazard Area Control Act (FHACA). Conducting forestry activities within these areas can be exempt from having individual permits issued from NJ Division of Land Use Regulation (DLUR), provided the following criteria are met –

1. The activities are prescribed in a Forest Management or Stewardship Plan that has been approved by the NJ Forest Service (NJFS) prior to the activities taking place.
2. The activities are conducted in accordance with the 'New Jersey Forestry and Wetlands Best Management Practices' (BMP) manual.
3. The activities do not impair the flow and circulation patterns of the freshwater wetlands and/or the activities do not reduce the extent of freshwater wetlands.
4. The activities do not have an adverse impact on a state or federally listed endangered or threatened species.

This section of the forest management plan seeks to address forest management concerns near streams, water bodies and wetlands as outlined in the 'New Jersey Forestry and Wetlands Best Management Practices Manual' (NJ Forest Service, 1995). Following the description of each of the major components of the BMPs is the recommendation related to this property.

As mentioned earlier, there are several areas of classified wetlands located throughout the property. There are also several tributary streams located on the property, some of which occur in conjunction with the wetland areas. Lastly, Longwood Lake does not occur on this property, but the Riparian Zone protecting the lake occurs in part on this property.

1) Wetland Buffers and Upland Transitional Areas

Forested wetlands are found throughout New Jersey and are considered one of the state's vital natural resources. They provide many benefits including: food storage capacity; flood velocity reduction; groundwater recharge opportunities; nutrient and sediment control; wildlife habitat; recreational opportunities; and timber supply. Freshwater wetlands provide essential breeding, spawning, nesting and wintering habitats for a major portion of New Jersey's fish and wildlife, including migratory birds, endangered species and commercially and recreationally important wildlife.

As mentioned earlier, the FWPA regulates forestry activities within forested wetlands and transitional areas. In addition to the wetland areas, their associated buffers are also under regulation of the FWPA. The width of the buffer area is based on the resource value of the wetland.

The classified wetlands on this property are characterized as having exceptional resource value as the site contains habitat that could be used by the state endangered bog turtle. Therefore, a ***150' wetland buffer*** *will be maintained around the wetlands on the property.*

2) Streamside Management Zones (SMZ) or Riparian Zones (RZ)

These are designed to protect areas adjacent to ponds, lakes, marshes or perennial and intermittent streams from negative impacts, which require specific management practices. The plants in these zones are living filters which among other things filter out sediments and pollutants; maintain stream temperature; provide a corridor for wildlife movement; and provide a visual buffer to minimize the visual impact of silvicultural activities. Determination of the width of an SMZ is a combination of factors including but not limited to topography, soil erodibility, depth of soil to water table, the degree of management being practiced, and the designation of the regulated water. The recommendations for the SMZ and the width of the SMZ are found on pages 2-3 of the NJFWBMPM. Determination of the width of an RZ is determined by the particular classification of a specific regulated stream or water body by the NJ DEP. The recommendations for the RZ and the width of the RZ are found on pages 43-50 of the FHACA manual. Both of these "zones" are critical when considering forest management and they are being handled together in this section because they overlap one another in relation to regulated waters. Often times only the RZ is mentioned because the recommended width of an RZ is usually greater than the recommended width of the SMZ, therefore the RZ width is what is enforced.

For all management activities alongside the Rockaway River, tributary streams, and Longwood Lake, an RZ shall be maintained. Equipment use will be limited or restricted in these areas and the forestry activities shall exclude clearcutting the vegetation. The recommended RZ listed below is based on several criteria as mentioned above.

- *Rockaway River – the Rockaway River traverses the central portion of the property (it flows through the center of Longwood Lake). The river occurs within the Rockaway River sub-watershed (HUC 14) and the larger Rockaway River Watershed (HUC11). The river is classified as FW2/NTC1 by the NJDEP; this means that it is classified as fresh water (FW) and it does not occur wholly within state or federal lands (FW2); it is designated as a Non-Trout Water (NT) which indicates the waterway does not have any carrying capacity for trout; most importantly, it is classified as a Category One Water (C1) which means it is further protected against degradation. Since the river is considered a C1 water, a **Riparian Zone of 300'** must be maintained along this waterway.*
- *Rockaway River tributary – a tributary to the Rockaway River is located in the northern portion of the property. This stream occurs within both the Rockaway River and Weldon Brook / Beaver Brook sub-watersheds (HUC 14) and the larger Rockaway River Watershed (HUC11). The river is classified as FW2/TPC1 by the NJDEP; this means that it is classified as fresh water (FW) and it does not occur wholly within state or federal lands (FW2); it is designated as a Trout Production water (TP) which indicates the waterway is used by trout for spawning or nursery purposes for their first summer; most importantly, it is classified as a Category One Water (C1) which means it is further protected against degradation. Since the tributary stream is considered a C1 water, a **Riparian Zone of 300'** must be maintained along this tributary.*
- *Longwood Lake – since the lake is associated with the aforementioned Rockaway River, a **Riparian Zone of 300'** must be maintained around the lake.*

3) Filter Strips

These are undisturbed areas consisting of natural vegetation and litter (leaves, brush, branches) located between a wetland or water course and forestry activities (truck roads, skid trails, harvest areas or loading areas). Filter strips reduce the velocity of water runoff so that any sediment is dropped into this strip rather than entering adjacent wetland or water course. Filter strips also help maintain water temperature and preserve wildlife habitat. The recommendations for the filter strips are found on page 4 of the NJFWBMPM.

No filter strips are recommended for the activities prescribed on the property.

4) Stream Crossings

Stream crossings represent the point at which a forest road or skid trail comes in contact with a body of water. The stream crossings should provide a stable bottom or surface that allows for equipment to cross intermittent or perennial streams without increasing stream sedimentation. Temporary crossings may not need a permit, only a letter of no jurisdiction from the DEP. Permanent crossings will need a Stream Encroachment Permit. The recommendations for stream crossings are found on pages 5-8 of the NJFWBMPM.

There are no stream crossings on this property. NOTE: there is a substantial crossing over the Rockaway River below the Longwood Lake dam which occurs off the property but will be supportive of forestry activities on the property. Additionally, there is also a public road crossing the Rockaway River upstream of Longwood Lake, which will be used for access by any heavy trucks.

5) Access Roads

Access to forest land is accomplished through the use of existing or newly constructed roads. These roads if not properly constructed can result in a major source of erosion which in turn can reduce fish and wildlife habitats. Access roads and trails should be designed to minimize the total number of roads, the miles or acres used in their construction, the size and number of landings, the number of skid trail, and the number of stream crossings. Permanent roads are used for year round access for forestry activities and fire protection and are a permanent part of the forested landscape. Temporary roads are constructed to provide access into a specific area for a particular forestry practice. Once the practice is completed temporary roads should be closed and/ or stabilized. The recommendations for access roads are found on pages 9-15 of the NJFWBMPM.

Existing access roads/trails will be maintained and improved for forestry activities. Additional woodland roads/trails will need to be constructed in order to gain access to certain portions of the property to execute forestry activities. These roads/trails will be temporary in nature and will be retired once the activity in that portion of the property is completed. These roads/trails may go through the aforementioned transition areas. Necessary remediation measures will be taken if any rutting or significant soil displacement were to occur – this would include grading the road/trail and spreading a seed mixture. These activities may occur within Stands A-1, A-2, A-3, B-1, B-2, C-2, C-3, D-1, D-3, CFW-3, GWW-1, & GWW-3.

6) Timber Harvests

The practice of applied forest management consists of intermediate and regeneration cuts. The objectives of intermediate cuts are to improve the existing stand, regulate tree growth, and provide early financial returns without any effort directed toward regeneration. Regeneration cuts are performed to harvest the timber crop and create environmental conditions favorable for forest regeneration. When properly carried out, the cutting of trees for a prescribed silvicultural purpose will minimize adverse impacts on the environment. Forest vegetation will be established naturally and soil disturbance will be limited. The recommendations for timber harvests are found on pages 16-19 of the NJFWBMPM.

Forest management activities in the form of intermediate and regeneration cuts may be carried out on this site within the transition areas. These activities may include the removal of dead, cull, diseased, storm damaged trees, crop trees, or thinning around individual crop trees. These activities may occur within Stands A-1, A-2, A-3, B-1, B-2, C-2, C-3, D-1, D-3, CFW-3, GWW-1, & GWW-3.

7) Site Preparation

Site preparation is a silvicultural tool used to prepare areas for the establishment of a desired tree species and to control the growth of undesirable vegetation. Areas recently harvested occasionally require site preparation in order to establish a new stand of trees. Site preparation consists of either mechanical or chemical means or a combination of both. The objectives of site preparation may include any of the following: amelioration of soil characteristics to enhance seedling establishment, allow newly established seedlings to get a growing head start over competing vegetation, improve access for planting, create additional planting micro-sites and clear a site of logging debris. The recommendations for site preparation are found on pages 20-21 of the NJFWBMPM.

Site preparation will not be needed on the property.

8) Forest Herbicides

Herbicides for forest purposes are valuable, practical tools when used in accordance with the labeling instructions. The use of pesticides is regulated on both the state and federal level. Restricted herbicides can only be applied by trained and certified applicators. The law requires certified applicators to use all chemical products only as directed in accordance with the label and in a careful and prudent manner. The recommendations for forest herbicides are found on page 22 of the NJFWBMPM.

Forest herbicides may be used within the transition areas. Herbicides will only be used according to the instructions on the product label. At the request of the landowner, the use of herbicides shall be very limited and only in scenarios where alternative methods are not reasonable. These activities may occur within Stands A-1, A-2, A-3, B-1, B-2, C-2, C-3, D-1, D-3, CFW-3, GWW-1, & GWW-3.

9) Reforestation

Reforestation includes the planting of tree seedlings and direct seeding. Hand planting and direct seeding do not normally cause any type of site disturbance that could produce adverse environmental impacts. However, machine planting can expose mineral soil, creating a slight concern for erosion. The recommendations for reforestation are found on pages 22-23 of the NJFWBMPS.

Natural regeneration should become established in any wetland areas after forestry activities; however, deer browse, plant competition from non-natives, or other problems may require reforestation to maintain stocking or to introduce some other wetland species for species diversity or wildlife habitat planting. These activities could occur within the transition areas. These activities may occur within Stands A-1, A-2, A-3, B-1, B-2, C-2, C-3, D-1, D-3, CFW-3, GWW-1, & GWW-3.

10) Forest Protection

This section refers to the use of prescribed burns to reduce the level of fuel so future wildfires will cause less damage and be easier to control. The recommendations for forest protection are found on pages 25-26 of the NJFWBMPS.

No prescribed burns are planned for this property at this time.

E) Ecology and Biodiversity

General Information - the woodlot's vegetative diversity, at the time of the forest inventory, consisted of at least 19 different tree species in the overstory, at least 20 different species of trees in the midstory, and at least 20 different species of trees occurring in the regeneration layer. The herbaceous layer consisted of over 45 different native species and non-native species. Approximately 9 non-native species were identified which have invasive qualities. The forest consists of a diversity of size classes of trees. There are currently 56.00 +/- acres of the property that are considered to be in early successional condition. Due to the history of forest management in some parts of the property, the overall forest is considered 'fully stocked' but is not nearing a point of being considered 'overstocked'. There are some portions of the property where the forest is obviously 'understocked' and other areas where the forest is 'overstocked'.

The property provides habitat for a diversity of wildlife species. In addition to the forested acres, the property contains slow moving water, seasonal creeks, open water, and an area of classified forested wetlands. There is an average layer of leaf litter and coarse woody debris within the forest which also create opportunities for populations of amphibians and reptiles. Thermal cover during the wintertime is provided for certain wildlife within more dense areas within all of the stands. In addition to the Threatened and Endangered Species which this property may support, the property likely hosts a variety of other species including - white-tailed deer, black bear, turkey, gray squirrel, chipmunk, coyote, fox, raccoon, opossum, rabbit, several species of turtles and snakes, bats, raptors, owls, and a variety of song birds.

The woodlot contains a very minimal amount of invasive plants and vines. Like most properties in NJ, there is an over population of white-tailed deer. One of the concerns related to the forest's long-term ability to maintain biodiversity is the stocking of the forest that is approaching an overstocked status in many areas which is not conducive to recruiting a new cohort of trees into the forest. Additionally, deer are negatively affecting the woodlot as was evidenced during the inventory by the lack of natural tree regeneration in certain areas. Due to the canopy cover, and deer browse, and scattered pockets of non-native brush, the future biodiversity of some parts of the forest may in fact decline.

Threatened and Endangered Species - the Endangered Species Act of 1973 defines 'Endangered' as any species which is in danger of extinction throughout all or a significant portion of its range. 'Threatened' is defined as any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. In many cases, declines in populations of plants and animals are caused by more than one event. Habitat degradation and destruction by humans are the most serious threats to wildlife and plants worldwide. Destruction occurs through development activities, environmental pollution, introduction of invasive and nonnative species, overharvesting of wild species, and conversion of habitat to other uses.

The presence or absence of certain species can be a reflection of overall environmental quality; when a species is threatened or endangered, it typically means the habitat it relies on to survive and procreate is being negatively impacted or degraded. Many times degradation of habitat that negatively impacts a specific species is most likely having a much wider impact on a greater

suite of species, included the resources that we also depend upon. For example, a mussel can act as a water quality indicator: when the mussel is threatened or endangered the quality of water that we depend upon is most likely degraded. In addition, each plant and animal is an important part of the balance of the entire community of living things. The loss of even one species can have a significant effect on many others. Species depend upon each other as well as the overall health and quality of habitat to survive and thrive.

The New Jersey Office of Natural Lands Management (ONLM) Natural Heritage Program was consulted in order to determine if there are any state threatened and/or state endangered species on (or near) the property. Likewise, a report was generated from the US Fish and Wildlife Service which is known as an IPaC (Information for Planning and Consulting) to determine if there are any federally threatened or federally endangered species on (or near) the property. Both of these complete reports can be found in Appendix C. The following is a summary of the species which were listed –

State Threatened and Endangered Species

- *Bald eagle (endangered)*
- *Barred owl (threatened)*
- *Golden-winged warbler (endangered)*
- *Long-eared owl (threatened)*
- *Northern goshawk (endangered)*
- *Red-shouldered hawk (endangered)*
- *Bronze copper butterfly (endangered)*
- *Bobcat (endangered)*
- *Bog turtle (endangered)*
- *Timber rattlesnake (endangered)*
- *Wood turtle (threatened)*

Federally Threatened and Endangered Species

- *Indiana bat (endangered)*
- *Northern long-eared bat (threatened)*
- *Bog turtle (threatened)*
- *Small whorled pogonia (threatened)*
- ****According to the IPaC report, there is no critical habitat for any of these species found on the property***

It is important to note that the above-listed species have not necessarily all been sighted recently on or near the property, but rather that the property offers potential habitat for the listed species. Therefore, due consideration must be given to the habitat requirements of the listed species, but in order to best serve the widest possible range of species (and hence the widest possible range of biodiversity), consideration should be given to all potential habitat types when planning to meet objectives for the forest. For properties with multiple ownership objectives, it is a questionable practice to develop management strategies that focus on retaining or enhancing a single forest habitat type, or to encourage a single species or small group of species. Such a strategy does not take into account the dynamic character of forests and can lead to a long term loss of biodiversity. Rather, it is recommended that strategies be followed that help to create or sustain

the widest possible range of habitat types. Management practices such as well-planned and appropriate forest stand improvement, non-native plant control, and tree planting can help to ensure forest health and diversity. In order to be effective, these practices must be properly planned and executed with objectives clearly defined and potential outcomes understood in advance. All intensive management practices must be executed in accordance with best forest management practices. By adhering to forestry practices that are sustainable and scientifically sound, forest biodiversity can be increased which can provide high quality habitat for the widest possible range of wildlife species, including threatened and endangered species. A thoughtful approach to forest management that incorporates existing conditions, an understanding of ecological processes, and is carried out in accordance with accepted standards will produce positive benefits for both wildlife, the natural resource as a whole, and the landowner.

For further reading and more specific information on one or more of the aforementioned species on the threatened and endangered species list for this property, you can go the Conserve Wildlife Foundation of New Jersey's website. There you will find a field guide of sorts which can help you better understand these wildlife. http://www.conservewildlifenj.org/species/fieldguide/

An area to the northeast of this property has been identified as a Natural Heritage Priority Site. The site is known as the Green Pond Mountain Natural Heritage Priority Site (Morris County). The site has been given this designation because it contains a habitat for a concentration of state critically imperiled and rare plant species. The site consists of an extensive matrix of forests, talus slopes, wooded wetlands, and aquatic plant communities on Green Pond Mountain.

F) Threats to Sustainability

For thousands of years, fire was an integral part of the forested landscape, with natural wildfires occurring periodically throughout northern New Jersey. Some of these natural fires burned uncontrolled over thousands of acres creating a mosaic of forest structure and age classes across the region. In more recent history, both Native Americans and early settlers used fire to clear the land to make room for agriculture, maintain desired forest composition, and improve hunting opportunities. Over the last century, overly effective fire suppression has removed fire from the landscape, and in many cases created forest conditions that are homogenous in structure and composition. Additionally, in the absence of active management, fuel loads (understory vegetation and coarse woody debris on the ground) may be present in some forests which are conditions that can increase the future threat of a serious wildfire.

The current woodland on this property shows no evidence of any recent fire history. A moderate amount of ground fuels is present throughout this property which has the capacity to carry a low to medium intensity fire. If a wildfire was to occur, the township and county road systems along with the existing property trails would provide sufficient access to assist in extinguishing and containing a fire. These access points and trails also provide an opportunity to employ prescribed burning as a management activity if desired. Maintaining and improving the trail systems is always recommended and would further improve access in the case of a fire.

During the inventory, certain forest health issues were observed and noted which could pose a long-term threat to the sustainability of this forest. Historically, the most severe insect and disease infestations came primarily in the form of gypsy moth infestations occurring from the 1970s to the early 1990s. More recent gypsy moth infestations have occurred but not at the scale and intensity as in the past. More recently, the most severe insect infestation on the landscape has been the Emerald Ash Borer (EAB) which was introduced into the United States in 2002 and was first discovered in New Jersey back in 2014. The majority of the ash trees which were inventoried were found to already contain damage from EAB and are in sharp decline. The majority of the white ash component within the forest found on the property will suffer mortality from the insects in the near future. Some of the black birch and yellow birch on the property have been affected by nectria canker. The hemlock are in decline due to the presence of scale and wooly adelgid. Lastly, Spotted Lantern Fly (SLF) was found on the property. SLF is an invasive planthopper native to Asia; it feeds on sap from a myriad of different plants with a strong preference for economically important plants including grapevines, maples, and black walnut. For more information on this bug, please go to https://www.nj.gov/agriculture/divisions/pi/prog/spottedlanternfly.html

Weather events have had a significant effect on portions of the woodland through the years. Some older storm damage was observed as well as more recent damage which most likely occurred during the early ice storms in 2019 and more recent wind events. The storms have resulted in crown breakage and several fallen trees.

G) Stewardship Principles

1) Soils

Forests and forest soils play a broad, complex, and interactive role within the environment. Soils are an important component of any forest ecosystem as they help to regulate important ecosystem processes, such as nutrient uptake, decomposition, and water availability. Soils provide trees with anchorage, water, and nutrients. In turn, trees and other vegetation are an important factor in the creation of new soils as leaves and woody debris rot and decompose within the forest.

Soils and forests are intrinsically linked, with large impacts on each other and on the wider environment. Forest soils are a contributing factor to the ability of a forest to sequester carbon (discussed later) as they provide the necessary elements for vegetation to grow. Sustainably managed forests help to control soil erosion and therefore conserve soil. Forest cover on erosion-prone soils helps to control or reduce the risk of soil erosion. Forests and their soils are also a key component of watershed management. In summary, protecting the soils on the landscape is a critical component of stewardship, and therefore the forest needs to be managed responsibly.

The forestry activities conducted on the property will be conducted in such a way as to limit the disturbance to the soils. Most of the activities will be less intense in nature and therefore will have very little effect on the soils. If commercial timber harvesting activities become part of the recommended activities on this property, much thought and planning will occur in order to minimize soil disturbance. These activities will be carried out during seasons when soil rutting will be kept to a minimum. If any rutting does occur, remediation will take place at the end of the harvest to restore these areas to what they were like prior to the harvest.

On the following page is a summary table containing information related to the soils found on the property. The table highlights the important characteristics of these soils related to forest management. Within Appendix B of this report is a Soils Map.

Summary of Soils Information, Limitations, and Locations

Soil Name (Symbol)	Slope Class	Erosion Concerns	Harvesting Suitability	Seedling Mortality	Site Index	Species to Favor	Productivity Limits	Location by Stand
Catden muck , frequently flooded (CarAt)	0-2%	slight	poorly suited	high	<55	red maple, mixed oaks	excessive wetness	A-3, D-3, GWW-3, CFW-3
Hibernia loam, stony (HhmCa)	3-15%	slight	well suited	high	<55	red maple, elm, oaks	excessive wetness	A-3, C-3, D-3, GWW-3
Hibernia loam, very stony (HhmDb)	15-25 %	very severe	poorly suited	high	<55	mixed oaks, sugar maple	steep slope, surface fragments	A-1, A-2, C-2, C-3, D-1, GWW-3
Otisville gravelly loamy sand (OtsC)	3-15%	slight	moderately suited	low	60-80	red maple, mixed oaks	wet soils	C-2
Pompton sandy loam (PohB)	3-8%	moderate	moderately suited	high	60-80	red maple, mixed oaks	excessive wetness	B-1
Preakness sandy loam (PrkAt)	0-3%	slight	poorly suited	high	60-80	red maple, yellow poplar, oaks	surface fragment, slope	B-1, B-2, C-2, GWW-1
Preakness dark surface variant sandy loam, frequently flooded (PrsdAt)	0-3%	slight	poorly suited	high	<55	red maple, elm, hickory	excessive wetness	C-2
Riverhead gravelly sandy loam (RksB)	3-8%	moderate	moderately suited	low	60-80	red maple, mixed oaks	wet soils	B-1, B-2, C-2, GWW-1
Riverhead gravelly sandy loam (RksC)	8-15%	moderate	moderately suited	low	60-80	mixed oaks, red maple	wet soils	B-1, B-2, C-2, CFW, GWW-1

Rock outcrop-Rockaway complex (RNRE)	15-35%	not rated	not rated	not rated	50-70	oaks, hickory, sugar maple	steep slope, rock outcropping	A-1, A-2, C-2, D-1
Rockaway sandy loam, very stony (RobCb)	8-15%	slight	well suited	low	60-80	oaks, hickory, sugar maple	surface fragments	A-1, A-2, B-1, C-3
Rockaway sandy loam, very stony (RobDc)	8-15%	moderate	poorly suited	low	50-70	mixed oaks, red maple	surface fragments	A-1, A-2, C-3, D-1, GWW-1
Rockaway-Rock outcrop complex (RomC)	8-15%	moderate	moderately suited	low	50-70	oaks, hickory, sugar maple	surface fragments	A-2, A-3, D-3, GWW-3
Rockaway-Rock outcrop complex (RomD)	15-25%	severe	moderately suited	low	50-70	oaks, hickory, sugar maple	surface fragments, steep slopes	A-2, C-3, D-1, GWW-3

2) Forest Health, Biological Diversity, and Invasive Species

Healthy forests allow for a diverse array of benefits. They provide habitat for many wildlife species, improve water quality, filter pollutants from water and air, enhance outdoor recreational activities, provide wood products and supply jobs that support local economies. Forest management can fulfill an important role in shaping future forests. Where lands allow for active management to occur, active forest management can enhance forest resilience to fire, insects and diseases. Forest management also will continue to provide much-needed wood products and help diversify local economies. When we maintain a broad array of forest products markets, the economic value they provide assists us in meeting our desired future forest conditions in a cost-effective manner. Monetary value derived from a forest can be reinvested into the site to promote forest health.

Most forest management practices influence biological diversity to varying degrees. Knowledge of the interaction among biological, social, and silvicultural systems is necessary to plan and implement actions that will have the desired effect on biodiversity. Historically, human demands on natural systems have resulted in modification of many biological systems together with a loss of open space. Forest management practices can restore, maintain, or reduce biodiversity depending on how they are conducted.

Hundreds of species of non-native invasive forest insects, diseases, plants, and other organisms are established in the United States. Some of these species have become invasive, spreading rapidly and causing significant economic and ecological impacts to the nation's forest and urban trees. In NJ alone, there are several species having a significant effect on the forest health.

The current health of the forests on the property is considered average and is further explained within the "Forest Stand Information" portion of this report. Forest management activities recommended for this property will all seek to promote forest health and ecological diversity. Most of the activities on the property will simply maintain the biodiversity. On this site, there are several non-native invasive forest insects, diseases, and plants that are present or could become present. Further information related to invasive plants, diseases, and insects can be found in the "General Information on Forest Management Prescriptions" section of this plan.

3) Fish & Wildlife Resources

Wildlife and forest management are not only compatible but are interrelated. Developing a forest management plan allows you to place a special emphasis on wildlife species in which you are interested. Wildlife have four basic requirements: food, cover, water and space. Different wildlife species require different stages of forest growth to meet these needs. The arrangement and ratio of these stages dictates the kinds of wildlife that can live on a landscape. The key to wildlife diversity and abundance is habitat diversity. How a forest is managed contributes to the presence and arrangement of habitats, directly impacting the use of the land by wildlife.

Several aspects of a property determine how many species can live and thrive in the forest: plant cover, harvest operations, water resources, and topography. A forest may have streams, swamps,

rivers, ponds, and areas that adjoin fields, pastures, roads and other openings. Even managing these 'edges' of a forest is crucial to abundant populations of some wildlife species. Edge is easy to manage but some interior species can be harmed by creating edge habitat. The relationship between vegetation management and wildlife species habitat is well established. Understanding relationships is the first step in determining how the forest can be managed to promote the wildlife species one may want to attract.

For example, quail, many songbirds, and some small mammals feed on seeds of annual and perennial weeds and grasses that occur in young stands of timber, where sunlight reaches the forest floor. This is early successional habitat. Pileated woodpeckers, gray squirrels, and other songbirds depend on mature forests. This is late successional habitat. Still other wildlife prefer mid successional habitat, the stage between early and late succession.

This property is very diverse and provides habitat for many different species of wildlife. Areas of early successional hardwoods offer a tremendous opportunity for a variety of species including many bird species. The water resource on the property which includes the lake, streams, and wetlands, provide excellent habitat for certain fish, clams, reptiles in addition to providing necessary habitat for certain birds and mammals. The mature forest which makes up much of the forested acres on the property is yet another vital component of the habitat required by many species.

The forestry activities on this property will seek to promote and further the diversity of habitat and opportunities for wildlife. If thinning work is executed on this property, gaps will be created within the woodlot which will help to promote regeneration of certain trees, shrubs, and plants. By controlling the invasive species and promoting native vegetation, the presence of wildlife will be encouraged. If regeneration is planted (artificial regeneration) or protected (with tree tubes), a future forest is being grown which will benefit the wildlife in years to come.

4) Recreation & Aesthetics

Forest management planning is an ideal time to consider the recreational potential of your property - whether it is for self and family, groups, and/or public access. Further, the leasing of private lands for hunting or fishing privileges, trail riding, camping and non-timber forest products harvesting can provide income in some cases. Forest management practices can enhance these activities with proper planning. If public or fee-based recreation is to be allowed, special consideration needs to be given to liability and possible impacts to the forest. Addressing unauthorized recreation or use improves the security of your property and reduces trespass.

Different aspects of forest management may affect the aesthetic values of a property. Views, sunlight intensity, and privacy can all be impacted by forest management, both negatively and positively. Often the way the property will look after a harvest is not taken into account, both in the long and short term, and aesthetics can greatly impact a landowner's satisfaction. Aesthetics should be discussed during the planning stages and again prior to implementing harvest operations to ensure the landowner receives the desired property appearance.

The recreational use of this property is private and will be used by the landowners and other invited guests. Trails created by forestry activities will help provide the landowners with further opportunities to enjoy walking the property and observing the wildlife.

The aesthetics of the property are important to the landowner. If thinning the forest, a buffer of trees may be left in more sensitive areas near roads and structures. Recommendations to treat the invasive species found within the forest will certainly increase the aesthetic value of the property.

5) Cultural & Historical Resources

Cultural resources are an important part of our history and heritage. Often, cultural resources are difficult to identify and even more difficult to determine their purpose. Cultural resources help define our human history, remind us of our interdependence with the land, and show how cultures change over time. Cultural resources are in places where people lived everyday life, leaving structures and objects as evidence of how they lived, where important events occurred, and where traditional, religious, ceremonial, and social activities took place. Protecting cultural resources preserves human tradition, culture, and history.

Cultural resources can be found above or below ground. Therefore, when conducting forestry activities such as trail building, it is important to look for physical evidence that might indicate a past use of that area. If cultural resources are found either on or adjacent to an area where forestry activities are recommended, it does not mean these activities cannot be conducted. It does mean however that the activity should be performed in such a way as to minimize the disturbance on the cultural resource. Many times, an activity can be worked around these areas, rather than through them.

Historical sites and artifacts can include areas such as graves or cemeteries, old homesteads and foundations, cabins, barns, fences, stonewalls, saw mills, roads, weapons, pottery, bottles, or coins. They can also be places associated with an individual important to the history of a certain town, county, state, or even country. In certain cases, significant historical events might have occurred in a location, even though no physical evidence of the event remains.

Several stone walls occur on the property which attest to the property's former use in agriculture over much of the property. The 1930 aerial photograph included in Appendix B is another helpful tool in uncovering some of the historical use of the property. This photo confirms that these stone walls that are seen today were present 90 years ago and created as the land was used for certain farming purposes.

As indicated on the Cultural Resource Map, this property lies partially within the Upper Longwood Forge Historic District. Additionally, the Pennsylvania-New Jersey Interconnection Bushkill to Roseland Transmission Line traverses the entirety of the property.

Forest stewardship activities on the property will not disturb any historical or cultural resources.

6) Carbon Sequestration

Carbon sequestration is the process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils. The carbon stock in forests is the amount of carbon that has been sequestered from the atmosphere and is now being stored within the forest ecosystem, mainly within living biomass and soil and to a lesser extent also in dead wood and litter. Carbon sequestration helps to offset sources of carbon dioxide to the atmosphere, such as deforestation, forest fires, and fossil fuel emissions. Sustainable forestry practices can increase the ability of forests to sequester atmospheric carbon while enhancing other ecosystem services, such as improved soil and water quality. Planting new trees, improving forest health through thinning or timber harvesting, and prescribed burning are some of the ways to increase the forest's ability to sequester carbon in wood products and new forest growth. Certain forest management activities can affect the short term carbon stock of a forest, but in the long run (*>150 years*) a properly managed forest will hold more carbon than an unmanaged forest.

The recommendations provided within this plan will have the long-term effect of maintaining (and hopefully enhancing) the ability of the forest to store carbon. Thinning activities that may be conducted on the property will help to foster a healthier, vibrant, and growing forest which will increase its ability to sequester carbon. Additionally, the planting (artificial regeneration) and/or the protecting (natural regeneration) of certain seedlings on the property will also increase the property's 'sink.'

7) Timber Resource

When they are well managed, forests provide clean air and water, homes for wildlife, beautiful scenery, places for recreation, and more than 5,000 products we all use every day. When they are not well managed, forests are often unhealthy and unproductive because of overcrowding, disease, insects, and competition for light, water and nutrients. To maintain or improve the health and productivity of a forest and to achieve the landowner's objectives for the property, foresters use a number of management techniques, including timber harvesting.

In forest management, trees are harvested for a variety of reasons including improving the health of the forest, controlling the types of trees that grow on the site, attracting certain wildlife species, providing a source of income for the landowner, improving access to the area, and producing paper, lumber and numerous other forest products. And just as there are many reasons for harvesting trees, there are many different harvesting methods. Each method has its benefits, drawbacks, and conditions under which it is the most suitable way to harvest trees. No one harvesting method is ideal for all situations. Methods include clearcutting, shelterwood and seed tree harvesting, single-tree selection, group selection.

Within the "Forest Stand Information" section of the report, the timber resource is described in some detail. Appendix A offers a comprehensive inventory of the forested stands on the property and gives the landowner and forester the information needed to manage the timber resource.

8) Agroforestry

Agroforestry is a system where trees and shrubs are deliberately used on the same land-management unit as agricultural crops and/or animals. In agroforestry systems there are both ecological and economical interactions between the different components. Agroforestry can also be defined as a dynamic, ecologically based, natural resource management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. Agroforestry systems are multifunctional systems that can provide a wide range of economic, sociocultural, and environmental benefits. Agroforestry systems are intentional, intensive, interactive, and integrated.

There are five basic types of agroforestry practices today in the North America: windbreaks, alley cropping, silvopasture, riparian buffers and forest farming. Within each agroforestry practice, there is a continuum of options available to landowners depending on their own goals (e.g., whether to maximize the production of interplanted crops, animal forage, or trees).

The landowners have no plan to practice agroforestry in the immediate future.

9) Estate Planning

Estate planning is the process of anticipating and arranging, during a person's life, for the management and disposal of that person's estate during the person's life and after death. Any land owned by this person is part of their estate and therefore should be part of their planning process. Depending on a particular landowner's objectives, there is likely a desire to see a tract of forested land preserved into the future and passed down to heirs.

The LLCOA hopes to keep the property long into the future.

Forest Stand Information

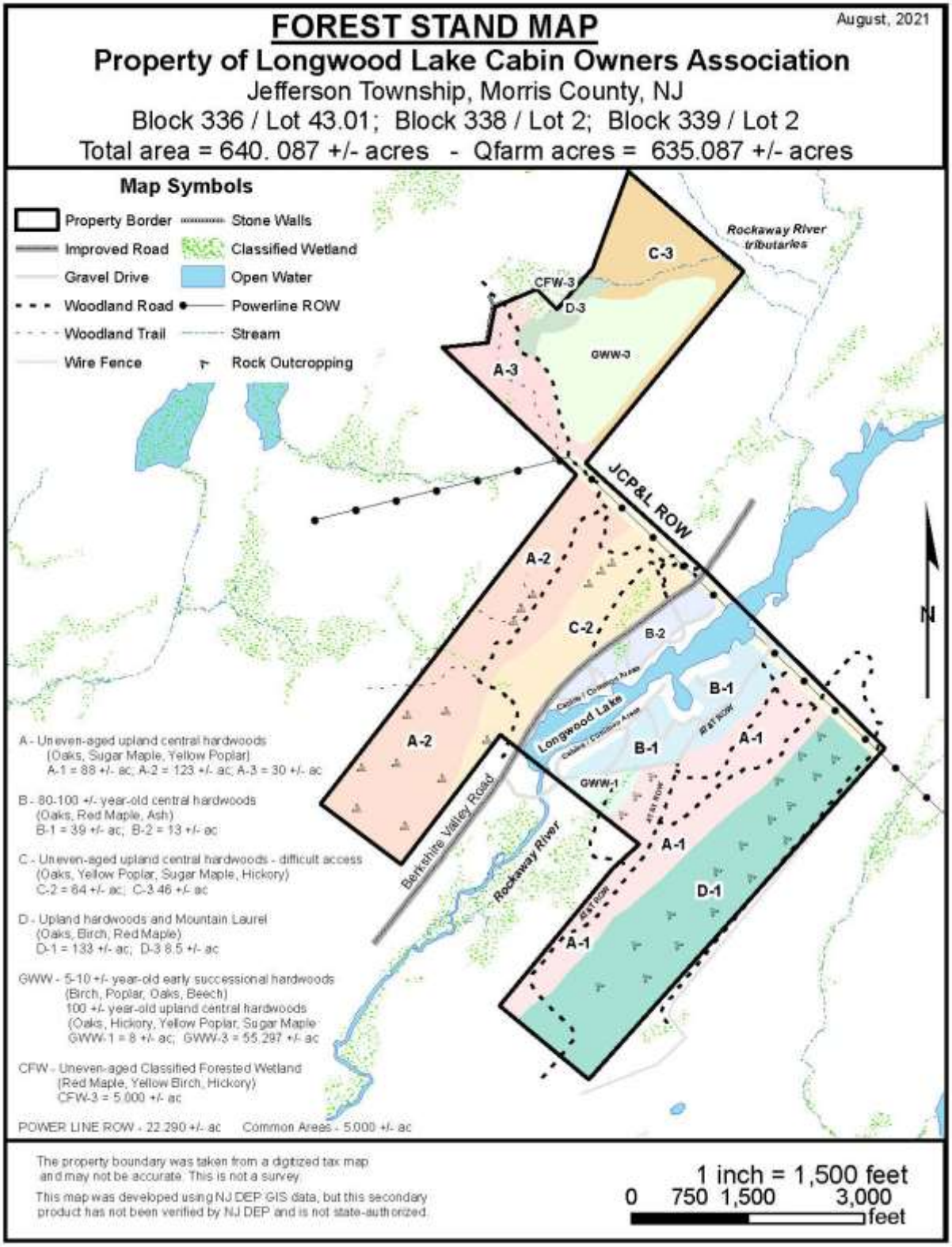
An Explanation of Sampling Procedures

Ideally, the best inventory of a forest or woodland would be to count and measure each tree within the confines of each component stand. Such a procedure is impractical and time consuming. In order to produce reliable results in a timely manner, a statistical sampling method was selected. The inventory utilized a point sampling procedure that is frequently used in forestry-related practices for quantifying forest stand characteristics. The point sampling procedure is a method for selecting trees on the basis of their size, rather than on the frequency of their occurrence. Under this sampling scheme, the probability of tallying any given tree is proportional to its size; larger trees are sampled more intensively than smaller trees, which is desirable from the standpoint of estimating the structure and composition of the forest stand.

Following the location and marking of property boundary lines, sample point centers were identified on 300 foot intervals. From each point, sample trees identified using a ten-factor prism were classified and tallied according to species, height, DBH (diameter at breast height), and quality. A reproduction survey was made, in which the presence or absence of seedlings and/or saplings of desirable species of trees were noted at each sample plot. Ground vegetation was also noted at each location along with the presence or absence of non-native invasive species.

Physiographic features such as stand boundaries, open water, wetlands, structures, steep areas, field edges, trails, and improvements were noted and mapped during travel between points and compared as possible with "scale" aerial photographs. This information appears on the following page on the Forest Stand Map (*this map is also included in Appendix B*). Work-up of the inventory cruise field data was completed using procedures standard to the forest products industry.

NOTE: data was collected during the field inventory which was conducted in August of 2021. This data will form a baseline which will be used to monitor the progress towards achieving the objectives laid out in the next section of the plan.


FOREST STAND MAP
August, 2021
Property of Longwood Lake Cabin Owners Association
Jefferson Township, Morris County, NJ
Block 336 / Lot 43.01; Block 338 / Lot 2; Block 339 / Lot 2
Total area = 640. 087 +/- acres - Qfarm acres = 635.087 +/- acres
Map Symbols
Property Border
Improved Road
Gravel Drive
Woodland Road
Woodland Trail
Wire Fence
Stone Walls
Classified Wetland
Open Water
Powerline ROW
Stream
Rock Outcropping
Rockaway River tributaries
C-3
CFW-3
D-3
GWW-3
A-3
JCP&L ROW
A-2
C-2
B-2
B-1
A-1
D-1
Longwood Lake
GWW-1
Berkshire Valley Road
Rockaway River
N
A - Uneven-aged upland central hardwoods
(Oaks, Sugar Maple, Yellow Poplar)
A-1 = 88 +/- ac; A-2 = 123 +/- ac; A-3 = 30 +/- ac
B - 80-100 +/- year-old central hardwoods
(Oaks, Red Maple, Ash)
B-1 = 39 +/- ac; B-2 = 13 +/- ac
C - Uneven-aged upland central hardwoods - difficult access
(Oaks, Yellow Poplar, Sugar Maple, Hickory)
C-2 = 64 +/- ac; C-3 46 +/- ac
D - Upland hardwoods and Mountain Laurel
(Oaks, Birch, Red Maple)
D-1 = 133 +/- ac; D-3 8.5 +/- ac
GWW - 5-10 +/- year-old early successional hardwoods
(Birch, Poplar, Oaks, Beech)
100 +/- year-old upland central hardwoods
(Oaks, Hickory, Yellow Poplar, Sugar Maple
GWW-1 = 8 +/- ac; GWW-3 = 55.297 +/- ac
CFW - Uneven-aged Classified Forested Wetland
(Red Maple, Yellow Birch, Hickory)
CFW-3 = 5.000 +/- ac
POWER LINE ROW - 22.290 +/- ac Common Areas - 5.000 +/- ac
The property boundary was taken from a digitized tax map and may not be accurate. This is not a survey.
This map was developed using NJ DEP GIS data, but this secondary product has not been verified by NJ DEP and is not state-authorized.
1 inch = 1,500 feet
0 750 1,500 3,000
feet

Stand A-1

A) Stand Description & Attributes

Stand A-1 encompasses approximately 88.00 +/- acres of the property; it occupies the central portion of the southeastern side of Longwood Lake (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the area occupied by the stand was likely used as wooded pasture and as a farm woodlot. It was probably at least partially cleared for use as pasture, but some trees were left standing. Stand A-1 was also selectively harvested during past management plans. These are some of the reasons for the different age classes of trees evidenced within the stand.

The table below contains a summary of some of the key attributes of Stand A-1. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	upland central hardwoods		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	60 – 130 (*sq. ft. per acre*) 92 (*sq. ft. per acre*)
Age Structure	uneven-aged		Stocking Percent Stocking Level	78% fully stocked
Age Class (years)	80 - 120 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	5,903 (*bd. ft. per acre*)
Diameter Range Average Diameter	6” – 32” +/- 10.4”		Sawtimber Growth (*per acre*)	101 (*bd. ft. per acre*)
Crown Class Distribution	suppressed - dominant		Cordwood Volume (*per acre*)	4.2 (*cords per acre*)
Size Class	small to large sawtimber		Cordwood Growth (*per acre*)	0.08 (*cords per acre*)
Site Index	*<55 (HhmDb)* 70 *(RNRE)* 80 *(RobCb)* 70 *(RobDc)*		Forest Health	average
Site Limitations	surface fragments, steep slopes, rocky outcroppings		Leaf Litter Layer	average
Coarse Woody Debris	average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand A-1)	Species Composition*
Overstory (12-20" + diameter trees)	sugar maple, black birch, red maple, yellow poplar, hickories, mixed oaks, white ash, Eastern red cedar, black cherry, American beech, Eastern hemlock
Midstory (6"-10" diameter trees)	black birch, sugar maple, red maple, hickories, yellow birch, American beech, yellow birch, serviceberry
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	black birch, mixed oaks, sugar maple, yellow poplar, hickories, hornbeam
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – *sparse*	black birch, mixed oaks, sugar maple, yellow poplar, hickories, hornbeam
Ground Vegetation (average % percent cover across stand) (*Ground vegetation ranges from moderate to dense)*	**Native (51%)** *Dominant* – ferns (25%), witch hazel (10%), spice bush (7%), rubus (5%), maple leaf viburnum (4%) *Other* – lowbush blueberry, mayflower, hog peanut cohosh, white snake root, sedge, solomons seal, warm season grasses, cleavers, jewelweed **Non-native (3%)** *Dominant* – Japanese stilt grass (3%) *Other* – winged euonymus, Japanese barberry, multiflora rose, garlic mustard
Vines (% of trees containing vines) *(vine competition is sparse)*	**Total (3%)** Grape (2%), poison ivy (1%), Virginia creeper (<1%), Oriental bittersweet (<1%)

Stand photos depict a portion of Stand A-1 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand A-1 is average. Many of the overstory trees consisting of the sugar maples, black birch, and red maple are considered Acceptable Growing Stock (AGS). About 20% of the stems in the midstory consisting of black birch, sugar maple, and red maple were considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand A-1 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. Though not a significant percentage of the trees inventoried, the white ash was found to be in decline due to the ongoing Emerald Ash Borer infestation. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand A-1 is stable in some places and increasing in others. In areas with gaps in the canopy, the overstory trees have room to continue their growth there. Additionally, the gaps in the canopy allow for light to reach the forest floor which creates beneficial conditions for the regeneration layer to grow. Areas with a more closed canopy block out the majority of the light from reaching the forest floor, which can hinder hardwood regeneration. The presence of non-native brush and vines is minimal, though higher percentages of invasive species were found in adjacent stands and care should be taken to make sure they don't spread into this stand.

Storm damaged trees were observed infrequently throughout Stand A-1. There was a small amount of damaged limbs and crowns that likely occurred during recent early snow and ice events, as well as high wind events over the last two years, but the amount of damage within the stand does not affect the overall health or quality of the forest. There was no other evidence of damage causing agents observed during the inventory.

Stand A-1 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is sparse within the stand, but this is average compared to many other properties in this area. This can be attributed to shading from the overstory, severe deer browse, and soil constraints.

B) Stand Objectives, Measurable Parameters, and Prescriptions

As mentioned earlier in this plan, the landowner's overall desire is to manage the forest sustainably. Improving the overall health and vigor of the forest are subsequent goals which play a major role in managing this forest towards sustainability. Within Stand A-1, the landowner hopes to remove diseased trees from the forest ensuring that healthy trees have space to grow.

In order to work towards these future conditions, certain activities must be planned and executed over the next 10 years. These activities must be based on current conditions. The table below contains the following: 1) objectives for the stand, 2) parameters which make the objectives measurable, and 3) prescriptions which will help to achieve the objectives.

Objective #1	increase the ratio of Acceptable Growing Stock (AGS) volume to Unacceptable Growing Stock (UGS) volume by 10% (or greater) while maintaining an average Basal Area of >75 sq.ft/acre across the stand
Baseline Parameter	the current AGS to UGS ratio is 10:1 for pulpwood and 4:1 for sawtimber; the current basal area is 92 square feet
Prescription	FSI → mark and cut 5 +/- cords of volume within the annual treatment area (3 +/- acres) **trees to be harvested will be predominantly EAB susceptible white ash and other UGS stems; the trees will measure approximately 4" – 16" DBH* **an emphasis will be placed on selecting healthy oaks, sugar maple, hickory, and AGS black birch as crop trees* **see further information on **FSI** within the section titled "General Information on Forest Management Recommendations"*

This stand will benefit from Forest Stand Improvement. White ash trees will be targeted for removal – those that are dead and those that are already obviously infested with EAB. Other UGS stems will be targeted for removal. If any nectria canker is found on black birch these trees should be harvested as well. These activities will help to ensure that the forest health is improving.

There are other activities which could also be executed within this stand as the previously mentioned work is being carried out. Continuing to establish access into the stand should be a high priority during the course of completing the FSI activities. Any occurrence of non-native shrubs or vines should be treated where they are found. Lastly, storm damaged trees could be harvested for firewood.

Other General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- salvage storm-damaged, standing dead, or fallen trees
- mark and preserve den and nest trees
- create wildlife brush piles from tree tops and tree branches (1-3 per acre)
- place nest boxes at various locations

Since Stand A-1 occurs within transition areas, some of the prescribed work will undoubtedly occur within these areas. Information related to the impact of the activities on regulated areas and protective measures being employed in these areas can be found within the section of the plan titled “Property Overview / Hydrological Considerations” (pages 10-14). Information related to the impact of the activities on threatened and endangered species and protective measures being employed to further protect these species can be found within the section of the plan titled “Property Overview / Ecological & Biodiversity” (pages 15-17).

Stand A-2

A) Stand Description & Attributes

Stand A-2 encompasses approximately 123.00 +/- acres of the property. Stand A-2 occupies the central and western portion of the northwestern side of Longwood Lake (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the area occupied by the stand was likely used as wooded pasture and as a farm woodlot. It was probably at least partially cleared for use as pasture, but some trees were left standing. Stand A-1 was also selectively harvested during past management plans. These are some of the reasons for the different age classes of trees evidenced within the stand.

The table below contains a summary of some of the key attributes of Stand A-2. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	mixed upland central hardwoods		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	50 – 120 (*sq. ft. per acre*) 95 (*sq. ft. per acre*)
Age Structure	uneven-aged		Stocking Percent Stocking Level	86% fully stocked
Age Class (years)	80 - 120 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	5,085 (*bd. ft. per acre*)
Diameter Range Average Diameter	6” – 28” +/- 8.6”		Sawtimber Growth (*per acre*)	88 (*bd. ft. per acre*)
Crown Class Distribution	suppressed - dominant		Cordwood Volume (*per acre*)	8.4 (*cords per acre*)
Size Class	small to large sawtimber		Cordwood Growth (*per acre*)	0.17 (*cords per acre*)
Site Index	<55 *(HhmDb)* 70 *(RNRE)* 80 *(RobCb)* 70 *(RobDc)* 70 *(RomC)* 70 *(RomD)*		Forest Health	average
Site Limitations	surface fragments, steep slopes, rocky outcroppings		Leaf Litter Layer	average
Coarse Woody Debris	average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand A-2)	Species Composition*
Overstory (12-20" + diameter trees)	black birch, sugar maple, red oak, black oak, chestnut oak, hickories, white oak, black walnut, white ash
Midstory (6"-10" diameter trees)	sugar maple, black birch, chestnut oak, hickories, red maple, American beech, basswood
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	black birch, hickories, sugar maple, hornbeam, basswood, hophornbeam, American beech, serviceberry
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – *moderate*	mixed oaks, American beech, sugar maple, white ash, yellow poplar, hickories, sassafras
Ground Vegetation (average % percent cover across stand) (*Ground vegetation ranges from sparse to dense)*	**Native (40%)** *Dominant* – witch hazel (10%), maple leaf viburnum (9%), ferns (8%), lowbush blueberry (6%), warm season grasses (5%), spice bush (2%) *Other* – cohosh, wintergreen, solomons seal, speckled alder, hod peanut, smilax, mountain laurel, highbush blueberry, sedge, cleavers, partridge berry **Non-native (15%)** *Dominant* – Japanese barberry (5%), Japanese stilt grass (2%) *Other* – multiflora rose, winged euonymus, autumn olive, garlic mustard
Vines (% of trees containing vines) *(vine competition is sparse)*	**Total (2%)** Grape (2%), poison ivy (<1%), Virginia creeper (1%), Oriental bittersweet (<1%)

Stand photos depict a portion of Stand A-2 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand A-2 is average. Many of the overstory trees consisting of the mixed oaks, sugar maple, and black birch are considered Acceptable Growing Stock (AGS). About 30% of the stems in the midstory consisting of the sugar maple, black birch and oaks were considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand A-2 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. Though not a significant percentage of the trees inventoried, the white ash was found to be in decline due to the ongoing Emerald Ash Borer infestation. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand A-2 is stable. Stand A-2 has not been managed recently due to the challenging topography found within large portions of the stand. Vigor will likely remain stable over time at its current state. Vigor is at risk to decline if any significant pest infestation or significant storm damage events occur. The forest will struggle to increase its vigor due to the current constraints on natural regeneration outlined below. Any management to improve forest health and forest regeneration can increase the vigor over time.

Storm damaged trees were observed frequently throughout Stand A-2. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years. Historical storm damage that has become unsalvageable over time likely occurred during Hurricane Sandy in 2012. There was no other evidence of damage causing agents observed during the inventory.

Stand A-2 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is moderate within the stand, which is above-average compared to many other properties in this area, though the growth within the regeneration layer of the stand tends to be hindered by shading from the overstory, severe deer browse, and the low-quality soils found in and among the rocky outcroppings that make up a significant percentage of the stand.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand A-2 from 2021 to 2031. The landowner may treat any of the invasives and vines each year if time permits. Additionally, the trail system which occurs within the stand may be maintained.

In future plan periods, a more concerted effort may be made to treat any invasives and vines occurring within this stand. Forest Stand Improvement and/or a selective timber harvest could be carried out in order to maintain a healthy stocking level. However, for the time being a fully stocked forest is preferred in this portion of the property in order to discourage the spread of non-native invasives. If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way)*. The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

Other General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- mark and preserve den and nest trees (2-3 per acre)
- girdle a few select trees to create 'snag' trees for wildlife (2-3 per acre)
- treat any occurrence of non-native invasive shrubs (mechanically and/or w/ herbicide)
- cut any occurrence of vines found growing in trees
- place nest boxes at various locations
- shelter natural regeneration of native species (shelter hardwoods)

Stand A-3

A) Stand Description

Stand A-3 encompasses approximately 30.00 +/- acres of the property; it occupies the western portion of the northernmost stand (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the areas occupied by the stand were likely used as a woodlot to support adjacent farmland. Very little, if any, management has occurred in this portion of the property.

The table below contains a summary of some of the key attributes of Stand A-3. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	mixed upland central hardwoods		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	70 - 120 (*sq. ft. per acre*) 92 (*sq. ft. per acre*)
Age Structure	even-aged		Stocking Percent Stocking Level	85% fully stocked
Age Class (years)	80 - 120 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	4,522 (*bd. ft. per acre*)
Diameter Range Average Diameter	6" – 28" +/- 8.2"		Sawtimber Growth (*per acre*)	80 (*bd. ft. per acre*)
Crown Class Distribution	suppressed-dominant		Cordwood Volume (*per acre*)	6.4 (*cords per acre*)
Size Class	small to large sawtimber		Cordwood Growth (*per acre*)	0.13 (*cords per acre*)
Site Index	<55 *(CarAt)* <55 *(HhmCa)* 70 *(RomC)* 70 *(RomD)*		Forest Health	average
Site Limitations	surface fragments, steep slopes, wet soils, rocky outcroppings		Leaf Litter Layer	average
Coarse Woody Debris	average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand A-3)	Species Composition*
Overstory (12 - 20" + diameter trees)	chestnut oak, black oak, red oak, hickories, white ash, white oak, red maple, yellow birch, sugar maple, black birch, sassafras, American beech
Midstory (6"-10" diameter trees)	hickories, red maple, chestnut oak, white oak, black oak, red oak, black birch, yellow birch, black walnut, sugar maple, sassafras, serviceberry, American beech
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	red maple, hickories, sugar maple, serviceberry, black birch, chestnut oak, black cherry, American beech
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – *moderate*	black birch, chestnut oak, hickories, sugar maple, white ash, yellow poplar, white oak, red oak, serviceberry, American beech
Ground Vegetation (average % percent cover across stand) (*Ground vegetation ranges from moderate to dense)*	**Native (57%)** *Dominant* – lowbush blueberry (19%), warm season grasses (12%), maple leaf viburnum (10%), ferns (7%), witch hazel (4%), rubus (3%), mountain laurel (2%) *Other* – may flower, solomon's seal, sedge, cohosh, highbush blueberry, partridge berry, goldenrod **Non-native (6%)** *Dominant* – Japanese stilt grass (6%) *Other-* ragwort, garlic mustard
Vines (% of trees containing vines) *(vine competition is very sparse)*	**Total (<1%)** Grape (<1%), Virginia creeper (<1%), poison ivy (<1%)

Stand photos depict a portion of Stand A-3 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand A-3 is average. Many of the overstory trees consisting of the mixed oaks and hickories are considered Acceptable Growing Stock (AGS). About 20% of the stems in the midstory consisting of the hickories, red maple, and oaks were considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand A-3 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. Some ash trees show crown decline as a result of the ash yellows disease. The white ash inventory are in sharp decline due to the ongoing Emerald Ash Borer infestation and should be salvaged while possible. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand A-3 is stable in some places and increasing in others. In areas with gaps in the canopy, the overstory trees have room to continue their growth there. Additionally, the gaps in the canopy allow for light to reach the forest floor which creates beneficial conditions for the regeneration layer to grow. Areas with a more closed canopy block out the majority of the light from reaching the forest floor, which can hinder hardwood regeneration. The presence of non-native brush and vines is minimal.

Storm damaged trees were observed infrequently throughout Stand A-3. There was a small amount of damaged limbs and crowns that likely occurred during recent early snow and ice events, as well as high wind events over the last two years, but the amount of damage within the stand does not affect the overall health or quality of the forest. There was no other evidence of damage causing agents observed during the inventory.

Stand A-3 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is moderate within the stand, which is above-average compared to many other properties in this area, though the growth within the regeneration layer of the stand tends to be hindered by shading from the overstory, severe deer browse, and soil constraints including surface fragments and steep slopes.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand A-3 from 2021 to 2031. The landowner may treat any of the invasives and vines each year if time permits. Additionally, the trail system which occurs within the stand may be maintained.

In future plan periods, a more concerted effort may be made to treat any invasives and vines occurring within this stand. Forest Stand Improvement and/or a selective timber harvest could be carried out in order to maintain a healthy stocking level. However, for the time being a fully stocked forest is preferred in this portion of the property in order to discourage the spread of non-native invasives. If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way)*. The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

Other General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- mark and preserve den and nest trees (2-3 per acre)
- girdle a few select trees to create 'snag' trees for wildlife (2-3 per acre)
- treat any occurrence of non-native invasive shrubs (mechanically and/or w/ herbicide)
- cut any occurrence of vines found growing in trees
- place nest boxes at various locations
- shelter natural regeneration of native species (shelter hardwoods)

Stand B-1

A) Stand Description

Stand B-1 encompasses approximately 39.00 +/- acres of the property. Stand B-1 occupies the forested stand closest to Longwood Lake, in the southeastern portion of the property (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the areas occupied by the stand were likely used as part of a farming operation. Some areas were used for row crops and hay production, while other areas were likely just used as open and wooded pasture. These areas were likely abandoned from agricultural production within the past 80 - 100 years. While they were a part of the farming operation, it is likely that some of the areas were completely cleared while others were partially cleared, allowing for the different age classes of trees to establish within the stand. Additionally, this stand has been selectively harvested historically.

The table below contains a summary of some of the key attributes of Stand B-1. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	mixed central hardwoods		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	70 - 120 (*sq. ft. per acre*) 86 (*sq. ft. per acre*)
Age Structure	even-aged		Stocking Percent Stocking Level	80% fully stocked
Age Class (years)	80 - 100 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	5,025 (*bd. ft. per acre*)
Diameter Range Average Diameter	6" – 32" +/- 7.9"		Sawtimber Growth (*per acre*)	89 (*bd. ft. per acre*)
Crown Class Distribution	suppressed-dominant		Cordwood Volume (*per acre*)	4.5 (*cords per acre*)
Size Class	small to large sawtimber		Cordwood Growth (*per acre*)	0.09 (*cords per acre*)
Site Index	80 *(PohB)* 80*(PrkAt)* 80 *(RksB)* 80*(RksC)* 80*(RobCb)*		Forest Health	average
Site Limitations	wet soils, slope, surface fragments		Leaf Litter Layer	average
Coarse Woody Debris	average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand B-1)	Species Composition*
Overstory (12 - 20" + diameter trees)	mixed oaks, red maple, white ash, sugar maple, aspen, hickories, American beech, Eastern hemlock, black cherry
Midstory (6"-10" diameter trees)	red maple, sugar maple, hickories, mixed oaks, aspen, sassafras, American beech, black cherry, white oak, white ash, hornbeam, serviceberry, Eastern hemlock
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	sugar maple, red maple, hickories, American beech, black birch, hophornbeam, basswood, sassafras, black cherry, serviceberry
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – *very sparse*	mixed oaks, sassafras, American beech, red maple, black cherry, sugar maple
Ground Vegetation (average % percent cover across stand) (*Ground vegetation ranges from moderate to dense)*	**Native (38%)** *Dominant* – spice bush (20%), witch hazel (10%), rubus (4%) ferns (2%), warm season grasses (2%) *Other* – jumpseed, maple leaf viburnum, highbush blueberry, cohosh, sedge, jewelweed, sweet pepper bush **Non-native (29%)** *Dominant* – Japanese barberry (10%), multiflora rose (7%), winged euonymus (6%), Japanese stilt grass (6%) *Other*- garlic mustard
Vines (% of trees containing vines) *(vine competition is sparse to moderate)*	**Total (5%)** grape (5%), poison ivy (<1%), Oriental bittersweet (<1%), Virginia creeper (<1%)

Stand photos depict a portion of Stand B-1 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand B-1 is average. Many of the overstory trees consisting of the mixed oaks, red and sugar maple, and white ash are considered Acceptable Growing Stock (AGS). About 20% of the stems in the midstory consisting of the red maple, sugar maple, hickories, and mixed oaks were considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand B-1 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. The ash trees within the stand were found to be in sharp decline due to the ongoing EAB infestation and should be salvaged, if desired. Most of the merchantable ash was harvested in 2014; the remaining ash is mostly firewood quality. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand B-1 is stable in some places and increasing in others. In areas with gaps in the canopy, the overstory trees have room to continue their growth there. Additionally, the gaps in the canopy allow for light to reach the forest floor which creates beneficial conditions for the regeneration layer to grow. Areas with a more closed canopy block out the majority of the light from reaching the forest floor, which can hinder hardwood regeneration. The presence of non-native brush and vines can create a problem in the future, since gaps in the canopy also create advantageous lighting conditions for undesirable invasive species to grow. Removing the non-native species will help ensure continued sustainable growth of the native hardwoods within the stand.

Storm damaged trees were observed frequently throughout Stand B-1. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years. Historical storm damage that has become unsalvageable over time likely occurred during Hurricane Sandy in 2012. There was no other evidence of damage causing agents observed during the inventory.

Stand B-1 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is very sparse within the stand, but this is average compared to many other properties in this area. This can be attributed to shading from the overstory, severe deer browse, soil constraints, and the presence of non-native shrubs and vines.

B) Stand Objectives, Measurable Parameters, and Prescriptions

As mentioned earlier in this plan, the landowner's overall desire is to manage the forest sustainably. Improving the overall health and vigor of the forest are subsequent goals which play a major role in managing this forest towards sustainability. Within Stand B-1, the landowner hopes to reduce the presence of non-native invasive shrubs. Additionally, the landowner hopes to encourage the growth of the overstory trees by limiting competition from vines.

In order to work towards these future conditions, certain activities must be planned and executed over the next 10 years. These activities must be based on current conditions. The table below contains the following: 1) objectives for the stand, 2) parameters which make the objectives measurable, and 3) prescriptions which will help to achieve the objectives.

Objective #1	remove all vines (*Oriental bittersweet, poison ivy, Virginia creeper, grape vines, etc*.) found climbing in trees *NOTE - leaving grape vines found growing in designated wildlife trees is suggested*
Baseline Parameter	approximately 5% of the trees contain vines
Prescription	cut vines found within the annual treatment area (2 +/- acres) *NOTE: in each year of the plan, the landowner should also go back through the areas that were treated in previous years and spot treat any reoccurrence of these vines* **see further details on **vine cutting** within the section titled "General Information on Forest Management Recommendations"*
Objective #2	reduce or control the presence of the following non-native invasive species so that they represent less than 5% of the herbaceous layer across the stand - Japanese barberry, multiflora rose, and winged euonymus
Baseline Parameter	the aforementioned invasive shrubs cover approximately 23% of the herbaceous layer on average
Prescription	mechanically and/or chemically treat the aforementioned invasives within the annual treatment area (2 +/- acres) *NOTE: in each year of the plan, the landowner should also go back through the areas that were treated in previous years and spot treat any reoccurrence of these invasives* **see further details on **invasive treatments** within the section titled "General Information on Forest Management Recommendations"*

This stand will benefit from vine and invasive species control. Non-native invasive species such as Japanese barberry, multiflora rose, and winged euonymus will be targeted through manual and herbicide applications. Additionally, all vines will be cut where they are found within the annual treatment area. Lastly, areas that have already been successfully treated will be revisited on an annual basis to spot treat any reoccurrences of invasives or vines. The goal of these activities is to decrease the competition on the forest floor so that natural regeneration of native plants and trees has the opportunity to occur. The removal of vines will ensure that midstory and overstory trees are able to grow more vigorously. These activities will help to ensure that the forest health is improving.

There are other activities which could be carried out within the plan period in this stand. Though few remain, any remaining merchantable white ash could be harvested for sawtimber. Any of the smaller diameter white ash could be harvested for use as firewood. A formal FSI project could be laid out to include the removal of sawtimber and firewood. Existing trails should be maintained and new access could be created.

The landowner will document any executed treatments on the annual WD-1 form and a monitoring spreadsheet (*spreadsheet can be found in Appendix C; landowner is encouraged to take progress photos along the way).* The forester and owner will inspect the completed treatment area in years 3, 6, and 9 of this plan to ensure management activities are satisfactory. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

Other General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- **salvage storm-damaged, standing dead, or fallen trees**
- **proactively harvest white ash trees before infestation of EAB**
- place nest boxes at various locations

Since Stand B-1 occurs within transition areas, some of the prescribed work will undoubtedly occur within these areas. Information related to the impact of the activities on regulated areas and protective measures being employed in these areas can be found within the section of the plan titled “Property Overview / Hydrological Considerations” (pages 10-14). Information related to the impact of the activities on threatened and endangered species and protective measures being employed to further protect these species can be found within the section of the plan titled “Property Overview / Ecological & Biodiversity” (pages 15-17).

Stand B-2

A) Stand Description

Stand B-2 encompasses approximately 13.00 +/- acres of the property. Stand B-2 occupies the forested stand closest to Longwood Lake, in the northwestern portion of the property (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the areas occupied by the stand were likely used as part of a farming operation. Some areas were used for row crops and hay production, while other areas were likely just used as open and wooded pasture. These areas were likely abandoned from agricultural production within the past 80 - 100 years. While they were a part of the farming operation, it is likely that some of the areas were completely cleared while others were partially cleared, allowing for the different age classes of trees to establish within the stand.

The table below contains a summary of some of the key attributes of Stand B-2. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	mixed central hardwoods		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	60 - 130 (*sq. ft. per acre*) 86 (*sq. ft. per acre*)
Age Structure	even-aged		Stocking Percent Stocking Level	85% fully-stocked
Age Class (years)	80 - 100 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	3,519 (*bd. ft. per acre*)
Diameter Range Average Diameter	6" – 24" +/- 6.6"		Sawtimber Growth (*per acre*)	64 (*bd. ft. per acre*)
Crown Class Distribution	dominant-suppressed		Cordwood Volume (*per acre*)	6.9 (*cords per acre*)
Size Class	small to medium sawtimber		Cordwood Growth (*per acre*)	0.14 (*cords per acre*)
Site Index	80 *(PrkAt)* 80 *(RksB)* 80 *(RksC)*		Forest Health	average
Site Limitations	surface fragments, slope, wet soils		Leaf Litter Layer	average
Coarse Woody Debris	average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand B-2)	Species Composition*
Overstory (12 - 20" + diameter trees)	black oak, red oak, red maple, white oak, white ash
Midstory (6"-10" diameter trees)	black oak, red oak, red maple, black birch, serviceberry, beech, black cherry
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	black birch, red maple, hornbeam, chestnut oak, serviceberry, yellow poplar
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – *moderate*	black birch, sassafras, mixed oaks, hornbeam, Eastern white pine, yellow poplar
Ground Vegetation (average % percent cover across stand) (*Ground vegetation is moderate)*	**Native (14%)** *Dominant* – highbush blueberry (8%), lowbush blueberry (4%), ground pine (2%) *Other* – may apple, may flower, wintergreen, maple leaf viburnum, mountain laurel, false strawberry, partridge berry **Non-native (<1%)** *Dominant* – n/a *Other*- multiflora rose, Japanese barberry
Vines (% of trees containing vines) *(vine competition is very sparse)*	**Total (<1%)** poison ivy (<1%)

Stand photos depict a portion of Stand B-2 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand B-2 is average. Many of the overstory trees consisting of the mixed oaks and red maple are considered Acceptable Growing Stock (AGS). Less than 10% of the stems in the midstory consisting of the oaks, red maple, and black birch are considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand B-2 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand B-2 is stable in some places and increasing in others. In areas with gaps in the canopy, the overstory trees have room to continue their growth there. Additionally, the gaps in the canopy allow for light to reach the forest floor which creates beneficial conditions for the regeneration layer to grow. Areas with a more closed canopy block out the majority of the light from reaching the forest floor, which can hinder hardwood regeneration. The presence of non-native brush and vines is minimal.

Storm damaged trees were observed infrequently throughout Stand B-2. There was a small amount of damaged limbs and crowns that likely occurred during recent early snow and ice events, as well as high wind events over the last two years, but the amount of damage within the stand does not affect the overall health or quality of the forest. There was no other evidence of damage causing agents observed during the inventory.

Stand B-2 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is moderate within the stand, which is above-average compared to many other properties in this area, though the growth within the regeneration layer of the stand tends to be hindered by shading from the overstory, severe deer browse, and soil constraints including surface fragments and wet soils.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand B-2 from 2021 to 2031. The landowner may treat any of the invasives and vines each year if time permits.

In future plan periods, a more concerted effort may be made to treat any invasives and vines occurring within this stand. Forest Stand Improvement and/or a selective timber harvest could be carried out in order to maintain a healthy stocking level. However, for the time being a fully stocked forest is preferred in this portion of the property in order to discourage the spread of non-native invasives. If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way)*. The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

Other General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- salvage storm-damaged, standing dead, or fallen trees
- proactively harvest white ash trees for firewood prior to mortality from EAB
- mark and preserve den and nest trees (2-3 per acre)
- girdle a few select trees to create 'snag' trees for wildlife (2-3 per acre)
- treat any occurrence of non-native invasive shrubs (mechanically and/or w/ herbicide)
- cut any occurrence of vines found growing in trees
- place nest boxes at various locations
- shelter natural regeneration of native species (shelter hardwoods)

Stand C-2

A) Stand Description

Stand C-2 encompasses approximately 64.00 +/- acres of the property. Stand C-2 occupies the area closest to Berkshire Valley Road, in the northwestern section of the property (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the area was most likely used as wooded pasture and open pasture, with the more steep areas relegated to use as a woodlot due to difficult access. Very little forest management has occurred within this stand over the past 30 +/- years.

The table below contains a summary of some of the key attributes of Stand C-2. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	mixed upland central hardwoods with difficult access		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	60- 130 (*sq. ft. per acre*) 90 (*sq. ft. per acre*)
Age Structure	unven-aged		Stocking Percent Stocking Level	79% fully stocked
Age Class (years)	80 - 120 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	5,957 (*bd. ft. per acre*)
Diameter Range Average Diameter	6" – 32" +/- 9.9"		Sawtimber Growth (*per acre*)	102 (*bd. ft. per acre*)
Crown Class Distribution	suppressed-dominant		Cordwood Volume (*per acre*)	5.2 (*cords per acre*)
Size Class	small to large sawtimber		Cordwood Growth (*per acre*)	0.10 (*cords per acre*)
Site Index	80 *(OtsC)* <55 *(PrsdAt)* 80 *(PrkAt)* 80 *(RksB)* 80 *(RksC)* 80 *(RobCb)* 70 *(RobDc)* 70 *(RomC)* 70 *(RomD)*		Forest Health	average
Site Limitations	wet soils, surface fragments, slope		Leaf Litter Layer	average
Coarse Woody Debris	below average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand C-2)	Species Composition*
Overstory (10" + diameter trees)	black oak, red oak, sugar maple, yellow poplar, black birch, hickories, white oak, chestnut oak, white ash, red maple, yellow birch
Midstory (4"-8" diameter trees)	hickories, sugar maple, red maple, black birch, black oak, red oak, yellow birch, American beech, serviceberry, hornbeam, hickories
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	sugar maple, black birch, serviceberry, yellow birch, hornbeam, American beech, hickories, sassafras, basswood, hophornbeam, red maple
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – sparse *to moderate*	mixed oaks, red maple, sugar maple, white ash, yellow poplar, black birch, basswood, sassafras, America beech
Ground Vegetation (average % percent cover across stand) (*Ground vegetation ranges from moderate to dense)*	**Native (27%)** *Dominant* – witch hazel (10%), ferns (9%), maple leaf viburnum (4%), warm season grasses (2%), high and lowbush blueberry (2%) *Other* – spice bush, hog peanut, sedge, goldenrod, white snake root, smilax, speckled alder, solomon's seal, partridge berry, jumpseed, trillium rubus **Non-native (18%)** *Dominant* – Japanese stilt grass (7%), Japanese barberry (5%), multiflora rose (4%), winged euonymus (2%) *Other* – autumn olive, multiflora rose
Vines (% of trees containing vines) *(vine competition is sparse)*	**Total (3%)** grape (3%), poison ivy (2%), Virginia creeper (<1%), Oriental bittersweet (<1%)

Stand photos depict a portion of Stand C-2 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand C-2 is average. Many of the overstory trees consisting of the yellow poplar, mixed oaks, and sugar maple considered Acceptable Growing Stock (AGS). Around 20% of the stems in the midstory consisting of the hickories, sugar maple, and black birch are considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand C-2 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. A small percentage of the black birch within the stand was found to contain nectria canker, which can be removed through FSI efforts. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand C-2 is stable. Much of stand C-2 has not been managed recently due to the challenging topography found within large portions of the stand. Vigor will likely remain stable over time at its current state. Vigor is at risk to decline if any significant pest infestation or significant storm damage events occur. While the trees found within Stand C-2 tend to be of high quality and generally healthy, it is likely that growth is slow due to the large amount of surface fragments and rocky outcroppings present in the stand. Any management to improve forest health and forest regeneration can increase the vigor over time.

Storm damaged trees were observed frequently throughout Stand C-2. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years. Historical storm damage that has become unsalvageable over time likely occurred during Hurricane Sandy in 2012. There was no other evidence of damage causing agents observed during the inventory.

Stand C-2 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is moderate within the stand, which is above-average compared to many other properties in this area, though the growth within the regeneration layer of the stand tends to be hindered by shading from the overstory, severe deer browse, and soil constraints including surface fragments, rocky outcroppings, and wet soils.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand C-2 from 2021 to 2031. The landowner may treat some of the invasives and vines each year if time permits. Additionally, the trail systems which go through the stand may be maintained.

In future plan periods, a more concerted effort may be made to treat invasives and vines within this stand. Forest Stand Improvement and/or a selective timber harvest could be carried out in order to maintain a healthy stocking level. However, for the time being a fully stocked forest is preferred in this portion of the property in order to discourage the spread of non-native invasives. If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way)*. The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

Other General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- salvage storm-damaged, standing dead, or fallen trees
- mark and preserve den and nest trees (2-3 per acre)
- girdle a few select trees to create 'snag' trees for wildlife (2-3 per acre)
- treat any occurrence of non-native invasive shrubs (mechanically and/or w/ herbicide)
- cut any occurrence of vines found growing in trees
- place nest boxes at various locations
- shelter natural regeneration of native species (shelter hardwoods)

Stand C-3

A) Stand Description

Stand C-3 encompasses approximately 46.00 +/- acres of the property. Stand C-3 occupies areas in the northernmost portion of the property (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the area occupied by Stand C-3 was likely used as farm woodlot to support activities on the adjacent farmland. Very little, if any, management has occurred within this stand historically.

The table below contains a summary of some of the key attributes of Stand C-3. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	upland central hardwoods		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	40 - 120 (*sq. ft. per acre*) 92 (*sq. ft. per acre*)
Age Structure	uneven-aged		Stocking Percent Stocking Level	89% fully stocked
Age Class (years)	80 - 120 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	5,244 (*bd. ft. per acre*)
Diameter Range Average Diameter	6" – 32" +/- 7.7"		Sawtimber Growth (*per acre*)	98 (*bd. ft. per acre*)
Crown Class Distribution	suppressed - dominant		Cordwood Volume (*per acre*)	6.3 (*cords per acre*)
Size Class	small to large sawtimber		Cordwood Growth (*per acre*)	0.13 (*cords per acre*)
Site Index	<55 *(HhmCa)* <55 *(HhmDb)* 80 *(RobCb)* 80 *(RobDc)* 70 *(RomD)*		Forest Health	average
Site Limitations	wet soils, steep slopes, surface fragments		Leaf Litter Layer	average
Coarse Woody Debris	average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand C-3)	Species Composition*
Overstory (12 - 20" + diameter trees)	black oak, red oak, chestnut oak, sugar maple, red maple, hickories, American beech, white ash, yellow poplar
Midstory (6"-10" diameter trees)	sugar maple, hickories, black oak, red oak, chestnut oak, black cherry, black birch, American beech, red maple, black cherry
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	black birch, sugar maple, red maple, black cherry, hornbeam, yellow poplar, serviceberry, American beech, hickories
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – *very sparse*	black birch, yellow poplar, chestnut oak, American beech, black oak, red oak, white ash
Ground Vegetation (average % percent cover across stand) (*Ground vegetation is moderate to dense)*	**Native (41%)** *Dominant* – warm season grasses (12%), lowbush blueberry (10%), ferns (10%), witch hazel (5%), maple leaf viburnum (4%) *Other* – may flower, sedge, partridge berry **Non-native (2%)** *Dominant* –Japanese stilt grass (2%) *Other*- Japanese barberry
Vines (% of trees containing vines) *(vine competition is very sparse)*	**Total (<1%)** poison ivy (<1%), grape (<1%)

Stand photos depict a portion of Stand C-3 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand C-3 is average. Many of the overstory trees consisting of the mixed oaks and maples are considered Acceptable Growing Stock (AGS). Less than 10% of the stems in the midstory consisting of the sugar maple, hickories, and mixed oaks are considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain slower growth rates.

Overall, the stand health within Stand C-3 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. Though not a large percentage of the inventory, the white ash found within the stand are in sharp decline due to the ongoing emerald ash borer infestation. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand C-3 is increasing throughout much of the stand. Areas with storm damage that have resulted in gaps in the canopy show strong regeneration. The areas directly adjacent to the golden wing warbler cut with ideal light conditions show especially good regeneration. The very low percentage of invasive shrubs and vines coupled with lighting conditions on the forest floor that foster hardwood regeneration have resulted in a stand that is diverse, healthy, and vigorously growing.

Storm damaged trees were observed frequently throughout Stand C-3. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years. Historical storm damage that has become unsalvageable over time likely occurred during Hurricane Sandy in 2012. There was no other evidence of damage causing agents observed during the inventory.

Stand C-3 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration ranges from moderate to dense within the stand, which is above-average compared to many other properties in this area. Future FSI to ensure the quality of the trees, as well as ensure room for vigorous growth into the future will help maintain the health and diversity of the stand.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand C-3 from 2021 to 2031. Access into this stand is difficult due to the topography, terrain, and a stream which would need to be crossed. The proximity of this stand to good access will limit any opportunities for meaningful activity.

If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way)*. The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

Stand D-1

A) Stand Description

Stand D-1 encompasses approximately 133.00 +/- acres of the property. Stand D-1 occupies the area in the southernmost portion of the property along the shared property line with Picatinny Arsenal (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the areas occupied by the stand were likely used as a woodlot, if used at all. The steep topography found within the stand would have made access difficult throughout history.

The table below contains a summary of some of the key attributes of Stand D-1. A more detailed inventory of the stand can be found within Appendix A of this plan.

SUMMARY OF STAND ATTRIBUTES				
Forest Type	mixed hardwoods and mountain laurel		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	70 - 120 (*sq. ft. per acre*) 98 (*sq. ft. per acre*)
Age Structure	uneven-aged		Stocking Percent Stocking Level	95% fully stocked
Age Class (years)	80 - 120 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	2,575 (*bd. ft. per acre*)
Diameter Range Average Diameter	6" – 30" +/- 5.7"		Sawtimber Growth (*per acre*)	48 (*bd. ft. per acre*)
Crown Class Distribution	dominant – suppressed		Cordwood Volume (*per acre*)	11.6 (*cords per acre*)
Size Class	small to largesawtimber		Cordwood Growth (*per acre*)	0.23 (*cords per acre*)
Site Index	<55*(HhmDb)* 70 *(RNRE)* 70 *(RobDc)* 70 *(RomD)*		Forest Health	average
Site Limitations	surface fragments, steep slopes		Leaf Litter Layer	average
Coarse Woody Debris	average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand D-1)	Species Composition*
Overstory (12 - 20" + diameter trees)	chestnut oak, black birch, black oak, red oak, red maple
Midstory (6"-10" diameter trees)	black birch, red maple, chestnut oak, black oak, red oak, white ash, hickories, sugar maple, serviceberry, sassafras, black cherry
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	black birch, red maple, chestnut oak, black oak, red oak, sassafras, white ash, serviceberry
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration – *moderate*	sassafras, mixed oaks, black birch, red maple
Ground Vegetation (average % percent cover across stand) (*Ground vegetation is dense)*	**Native (7%)** *Dominant* – ferns, (20%), mountain laurel (17%), witch hazel (10%), lowbush blueberry (10%) *Other* – maple leaf viburnum, warm season grasses, wintergreen, solomons seal **Non-native (<1%)** *Dominant* –n/a *Other*- Japanese barberry
Vines (% of trees containing vines) *(vine competition is very sparse)*	**Total (<1%)** Virginia creeper (<1%)

Stand photos depict a portion of Stand D-1 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand D-1 is average. Many of the overstory trees consisting of the sugar maple, mixed oaks, black birch, and red maple are considered Acceptable Growing Stock (AGS). About 40% of the stems in the midstory consisting of the black birch, red maple, and mixed oaks are considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand D-1 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand D-1 is stable throughout much of the stand. Due to the difficult access, the stand has not been managed and is reaching a level of stocking that will soon be overstocked. The high elevation and rocky topography creates less than ideal growing conditions for the trees in the stand. Any work that can be done in the stand to thin UGS stems will help create more vigorous growth in the residual trees in the future.

Storm damaged trees were observed frequently throughout Stand D-1. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years. Historical storm damage that has become unsalvageable over time likely occurred during Hurricane Sandy in 2012. There was no other evidence of damage causing agents observed during the inventory.

Stand D-1 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is moderate within the stand, which is above-average compared to many other properties in this area, though the growth within the regeneration layer of the stand tends to be hindered by shading from the overstory, severe deer browse, high elevation, and rocky outcroppings.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand D-1 from 2021 to 2031. Access into this stand is extremely difficult due to topography and terrain.

If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way).* The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

Stand D-3

A) Stand Description

Stand D-3 encompasses approximately 28.50 +/- acres of the property. Stand D-3 encompasses the area directly north of the northern golden-winged warbler cut in the far northern section of the property (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the areas occupied by the stand were likely used as a woodlot, if used at all. The steep topography found within the stand would have made access difficult throughout history.

The table below contains a summary of some of the key attributes of Stand D-3. A more detailed inventory of the stand can be found within Appendix A of this plan.

Forest Type	upland hardwoods and mountain laurel		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	70 - 130 (*sq. ft. per acre*) 93 (*sq. ft. per acre*)
Age Structure	uneven-aged		Stocking Percent Stocking Level	73 % fully stocked
Age Class (years)	80 - 120 +/- 40 - 60 +/- 10 - 20 +/-		Sawtimber Volume (*per acre*)	7,837 (*bd. ft. per acre*)
Diameter Range Average Diameter	6 – 32 +/- 13.8”		Sawtimber Growth (*per acre*)	130 (*bd. ft. per acre*)
Crown Class Distribution	suppressed – dominant		Cordwood Volume (*per acre*)	2.8 (*cords per acre*)
Size Class	small to large sawtimber		Cordwood Growth (*per acre*)	0.06 (*cords per acre*)
Site Index	<55 *(CarAt)* <55 *(HhmCa)* *70 (RomC)*		Forest Health (*vigor*)	average
Site Limitations	extreme wetness, surface fragment, slope		Leaf Litter Layer	average
Coarse Woody Debris	below average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand D-3)	**Species Composition***
Overstory (12-20" + diameter trees)	white oak, chestnut oak, black oak, red oak, yellow birch, sugar maple, red maple, black birch, hickories, yellow poplar
Midstory (1"-4" diameter trees)	yellow birch, sugar maple, red maple, white ash, yellow poplar, black cherry, serviceberry
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *moderate*	black birch, sugar maple, American chestnut, yellow birch
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration - *moderate*	yellow birch, black birch, mixed oaks, white ash, American chestnut
Ground Vegetation (average % percent cover across stand) (*Ground vegetation is moderate to dense)*	**Native (74%)** *Dominant-* mountain laurel (33%), witch hazel (17%), ferns (16%), lowbush blueberry (6%), highbush blueberry (2%) *Other-* cohosh, solomons seal, warm season grasses, may flower, maple leaf viburnum **Non-native (<1%)** *Dominant* –n/a *Other*- multiflora rose, garlic mustard
Vines (% of trees containing vines) *(vine competition is very sparse)*	**Total (<1%)** Virginia creeper (<1%)

Stand photos depict a portion of Stand D-3 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand D-3 is average. Many of the overstory trees consisting of the mixed oaks and yellow birch are considered Acceptable Growing Stock (AGS). About 20% of the stems in the midstory consisting of the yellow birch, sugar maple, and red maple are considered Unacceptable Growing Stock (UGS) stems. Many of the suppressed trees contain some sweep and slower growth rates.

Overall, the stand health within Stand D-3 is considered to be average. A few overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. Though not a significant percentage of the trees found within the stand, the white ash present is in sharp decline due to ongoing emerald ash borer pressure. A small percentage of the yellow and black birch inventoried were found to contain nectria canker, which can be removed through FSI efforts. The majority of the overstory contains little to no signs of disease.

The vigor of the trees within Stand D-3 is stable throughout much of the stand. The heavy underbrush consisting of native mountain laurel and witch hazel fully shades the forest floor, creating conditions not conducive to natural regeneration. Along the shared border with the golden-winged warbler cut, more light reaches the forest floor and the regeneration layer is responding positively as a result. TSI and brush removal within the stand will help create more vigorous growth into the future.

Storm damaged trees were observed frequently throughout Stand D-3. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years. Historical storm damage that has become unsalvageable over time likely occurred during Hurricane Sandy in 2012. There was no other evidence of damage causing agents observed during the inventory.

Stand D-3 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is moderate within the stand, which is above-average compared to many other properties in this area, though the growth within the regeneration layer of the stand tends to be hindered by shading from the overstory, severe deer browse, and soil constraints.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand D-3 from 2021 to 2031. The landowner may treat some of the invasives each year if time permits. Additionally, the nearby trail system may be maintained around the stand.

In future plan periods, a more concerted effort may be made to treat any invasives within this stand. Mountain laurel and witch hazel also may be targeted for treatment due to the intense layer of shade they create in the shrub layer. If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way)*. The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- treat any occurrence of non-native invasive shrubs (mechanically and/or w/ herbicide)
- cut any occurrence of vines found growing in trees
- place nest boxes at various locations
- shelter natural regeneration of native species (shelter hardwoods)

Stand GWW-1

A) Stand Description

Stand GWW-1 encompasses approximately 8.00 +/- acres of the property. Stand GWW-1 encompasses an area in the west-central portion of the property, on the southern side of Longwood Lake (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the areas occupied by the stand were likely used as part of a farming operation being utilized for hay production or other row crops. The area was abandoned from farming approximately 80-100 +/- years ago. This portion of the property was part of at least one selective timber harvest historically. A seed tree harvest was performed in cooperation with the NRCS in 2017.

The table below contains a summary of some of the key attributes of Stand GWW-1.

Forest Type	early successional hardwoods with scattered overstory trees		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	10 -30 (overstory) n/a (understory) (*sq. ft. per acre*) 15 (*sq. ft. per acre*)
Age Structure	two-aged		Stocking Percent Stocking Level	<25% understocked
Age Class (years)	80 - 100 +/- 5-10 +/-		Sawtimber Volume (*per acre*)	<250 (*bd. ft. per acre*)
Diameter Range Average Diameter	14 – 24" +/- 1 – 4" n/a		Sawtimber Growth (*per acre*)	declining (overstory) increasing (understory)
Crown Class Distribution	dominant (overstory) n/a (early successional)		Cordwood Volume (*per acre*)	1 +/- (*cords per acre*)
Size Class	large sawtimber / seedlings/saplings		Cordwood Growth (*per acre*)	declining (overstory) increasing (understory)
Site Index	80 *(PrkAt)* 80 *(RksB)* 80 *(RksC)* 70*(RobDc)*		Forest Health (*vigor*)	above average
Site Limitations	surface fragments, slope, wet soils		Leaf Litter Layer	above average
Coarse Woody Debris	above average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand GWW-1**)**	**Species Composition***
Overstory (14 - 24" + diameter trees)	mixed oaks, red maple, white ash, sugar maple, aspen, hickories, American beech, Eastern hemlock, black cherry
Midstory (1"-4" diameter trees)	n/a
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *dense*	black birch, yellow poplar, red maple, sugar maple, mixed oaks, aspen, hickories, white ash, American beech, black cherry
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration - *dense*	black birch, yellow poplar, red maple, sugar maple, mixed oaks, aspen, hickories, white ash, American beech, black cherry
Ground Vegetation (average % percent cover across stand) (*Ground vegetation is sparse to moderate)*	**Native (12%)** *Dominant-* spice bush (7%), rubus brambles (5%) *Other-* warm season grasses, witch hazel, arrowood viburnum **Non-native (11%)** *Dominant* –multi flora rose (5%), winged euonymus (2%), Japanese stilt grass (2%), Japanese barberry (2%) *Other*- Japanese honesuckle
Vines (% of trees containing vines) *(vine competition is very sparse)*	**Total (<1%)** grape (<1%), poison ivy (<1%), Oriental bittersweet (<1%)

Stand photos depict a portion of Stand GWW-1 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand GWW-1 is average. Of the residual overstory trees left behind during the seed tree harvest, 50% are considered Acceptable Growing Stock (AGS). The selection of the remaining seed trees during the harvest was based on benefits to wildlife and potential seed production, not timber quality. The frequent understory trees are too young to decipher between AGS and UGS at the time of the inventory.

Overall, the stand health within Stand GWW-1 is considered to be below average within the overstory and above-average within the understory. Some of the residual overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. The white ash present are in sharp decline due to ongoing Emerald Ash Borer infestations. Additionally, damage from past logging operations has weakened some of the residual overstory trees. The health of the early successional understory is above average. Young trees that are growing vigorously are less susceptible to pests and disease.

The vigor of the trees within Stand GWW-1 is decreasing in the overstory and increasing in the understory. It is expected that the overstory trees will decline due to the aforementioned reasons, while the understory continues to grow. As the forest continues to regenerate, vigor will increase over time. Threats posed to future vigor can be the spread of non-native invasive shrubs and vines, known diseases, pest infestations, and thus-far unknown pests and diseases in the future. As the stand develops over time, the vigor is expected to increase.

Storm damaged trees were observed frequently throughout Stand GWW-1; occurring mostly in the weakened overstory layer. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years. Portions of the stand are located in low-lying areas that could be susceptible to seasonal flooding.

Stand GWW-1 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is very dense within the stand, which is above-average compared to many other properties in this area. The regeneration could be hindered by increasing non-native invasive shrubs and vines.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand GWW-1 from 2021 to 2031. The landowner may treat some of the invasives each year if time permits. Additionally, a trail system may be created and maintained within the stand in order to prepare the stand for future forest management activity.

In future plan periods, a more concerted effort may be made to treat invasives within this stand. If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way).* The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- treat any occurrence of non-native invasive shrubs (mechanically and/or w/ herbicide)
- place nest boxes at various locations

Stand GWW-3

A) Stand Description

Stand GWW-3 encompasses approximately 55.297 +/- acres of the property. Stand GWW-3 encompasses the central area of the far northern section of the property (*see Forest Stand Map which accompanies this report within Appendix B*). Historically, the area occupied by the stand was likely used as a farm woodlot or wooded pasture due to its remote access from most farmland. This portion of the property was part of at least one selective timber harvest historically. A seed tree harvest was performed in cooperation with the NRCS in 2017.

The table below contains a summary of some of the key attributes of Stand GWW-3.

Forest Type	early successional hardwoods with scattered overstory trees		Basal Area Range (*per acre*) Basal Area Average (*per acre*)	0 - 20 (overstory) n/a (understory) (*sq. ft. per acre*) 10 (*sq. ft. per acre*)
Age Structure	two-aged		Stocking Percent Stocking Level	<25% under-stocked
Age Class (years)	100 - 120 +/- 5 - 10 +/-		Sawtimber Volume (*per acre*)	<250 (*bd. ft. per acre*)
Diameter Range Average Diameter	14 – 24" +/- 1 – 4" n/a		Sawtimber Growth (*per acre*)	declining (overstory) increasing (understory)
Crown Class Distribution	dominant (overstory) n/a (early successional)		Cordwood Volume (*per acre*)	1 +/- (*cords per acre*)
Size Class	large sawtimber / seedlings/saplings		Cordwood Growth (*per acre*)	declining (overstory) increasing (understory)
Site Index	<55 *(CarAt)* <55 *(HhmCa)* <55 *(HhmDb)* 70 *(RomC)* 70 *(RomD)*		Forest Health (*vigor*)	above average
Site Limitations	surface fragments, slope		Leaf Litter Layer	above average
Coarse Woody Debris	above average			

The table below represents the different species present within the stand separated by vegetation stratum. The species are listed from what is found most frequently to least frequently within the stratum listed.

Vegetation Stratum (Stand GWW-3)	**Species Composition***
Overstory (14 - 24" + diameter trees)	chestnut oak, black oak, red oak, hickories, white ash, white oak, red maple, yellow birch, sugar maple, black birch, sassafras, American beech, Eastern hemlock
Midstory (1"-4" diameter trees)	n/a
Regeneration layer Sapling (1" - 4" diameter, > 4' tall) Status of Sapling Regeneration - *dense*	black birch, yellow poplar, black gum, aspen, mixed oaks, hickories, white ash, black cherry, American chestnut
Seedling (< 1" diameter, < 4' tall) Status of Seedling Regeneration - *dense*	black birch, yellow poplar, black gum, aspen, mixed oaks, hickories, white ash, black cherry, American chestnut
Ground Vegetation (average % percent cover across stand) (*Ground vegetation is sparse to moderate)*	**Native (9%)** *Dominant-* rubus brambles (5%), spice bush (2%), warm season grasses (2%) *Other-* witch hazel, arrowood viburnum **Non-native (2%)** *Dominant –* Japanese stilt grass (2%), *Other*- Japanese honeysuckle, multiflora rose, winged euonymus, Japanese barberry
Vines (% of trees containing vines) *(vine competition is very sparse)*	**Total (<1%)** grape (<1%), poison ivy (<1%)

Stand photos depict a portion of Stand GWW-3 that is representative of the stand as a whole and aim to capture the most common tree species and ground vegetation within the stand, as well as accurately portray the average stocking level found across the stand.

The overall quality of Stand GWW-3 is average. Of the residual overstory trees left behind during the seed tree harvest, 50% are considered Acceptable Growing Stock (AGS). The selection of the remaining seed trees during the harvest was based on benefits to wildlife and potential seed production, not timber quality. The frequent understory trees were too young to decipher between AGS and UGS at the time of the inventory.

Overall, the stand health within Stand GWW-3 is considered to be below average within the overstory and above average within the understory. Some of the residual overstory oaks have been weakened over the years from gypsy moth defoliations. Gypsy moth egg mass counts are currently low and not a concern at the present time. Additionally, damage from past logging operations has weakened some of the residual overstory trees. Eastern hemlock are weakened from hemlock wooly adelgid and are in severe decline. The American chestnut was found to contain chestnut blight and will decline before reaching maturity. The health of the early successional understory is above average. Young trees that are growing vigorously are less susceptible to pests and disease.

The vigor of the trees within Stand GWW-3 is decreasing in the overstory and increasing in the understory. It is expected that the overstory trees will decline due to the aforementioned reasons, while the understory continues to grow. As the forest continues to regenerate, vigor will increase over time. Currently, there are very few threats posed to the vigor of this stand. As the stand develops over time, the vigor is expected to increase.

Storm damaged trees were observed frequently throughout Stand GWW-3; mostly in the weakened overstory layer. Many broken limbs and crowns as well as fallen trees were present in the stand. The recent damage likely occurred during early snow and ice events as well as high wind events in the last two years.

Stand GWW-3 contains average biodiversity within the overstory, midstory, and understory. Hardwood regeneration is very dense within the stand, which is above average compared to many other properties in this area.

B) Stand Objectives, Measurable Parameters, and Prescriptions

No specific prescription will be carried out within Stand GWW-3 from 2021 to 2031. The landowner may treat some of the invasives each year if time permits. Additionally, a trail system may be created and maintained within the stand in order to prepare the stand for future forest management activity.

In future plan periods, a more concerted effort may be made to treat invasives within this stand. If conditions warrant management or the landowner's goals for this stand change, a revision will be made to this plan prior to the implementation of any activities.

The landowner will document any executed treatments on the annual WD-1 form and in the *'Journal of Forest Management Activities'* (*NOTE: journal can be found in the back sleeve of the plan notebook; landowner is encouraged to take progress photos along the way).* The forester and owner will inspect the completed treatment area in year 9 of this plan. The inspection will consist of a thorough walk through of the stand by the forester who will make estimates of certain forest data and when appropriate a prism will be used to estimate basal area. These findings will be recorded on the monitoring spreadsheet.

General Forest Stewardship Recommendations to consider within the stand:

- create and maintain access trails to improve access
- treat any occurrence of non-native invasive shrubs (mechanically and/or w/ herbicide)
- place nest boxes at various locations

Description of Non-inventoried Stands on the Property

Stand CFW-3 (5.00 +/- acres)

Stand CFW-3 makes up approximately 5.00 +/- acres of the property. It is located in the far north central portion of the property, along the northwestern property border (*see Forest Stand Map which accompanies this report in Appendix B).*

The wetland is considered forested because trees are present in the internal portions of the stand. The most common species of trees found within the wetlands are red maple, white oaks, yellow birch, black birch, and elm.

The vegetation found within the stand consists of tussock sedge, mountain laurel, wetland forbs and grasses, high bush blueberry, and Japanese stilt grass. The percent ground cover within these areas are greater than 75%.

These wetlands make a great contribution to the property at large and more specifically create habitat for a variety of wildlife. These wetlands create potential habitat for several different species including those mentioned in the Threatened and Endangered Species section of this plan. There will be no activities prescribed within this area and a buffer will be maintained around this wetland to ensure it is protected.

Description of Unforested Areas on the Property

NOTE: The NJ Forest Service does not monitor the use of any acreage outside of woodland acres (referred to as Non-Appurtenant Woodland on the FA-1). Therefore, the NJ Forest Service has neither reviewed nor approved anything in this portion (Description of Unforested Areas) of the plan. The acreages listed in the descriptions below were derived during the inventory process. These numbers could fluctuate depending on landowner activities so they should be considered as simply estimates.

Common Areas (5.00 +/- acres)

While the majority of the property has remained forest or has reverted back to forest over the years, some areas are used as "Common Areas". These areas are mostly located adjacent to the lake and include an open field, vacant house lots, a storage facility, and the community trash disposal area. The open field is seasonally mowed and is used for community social events and annual meetings.

General Information on Forest Management Recommendations

Management of this property over the next ten years will be concentrated on some or more of the following - salvage of storm damaged trees, forest stand improvement (FSI) work, non-native plant control, prescribed burning, tree planting, protections of natural regeneration, and access establishment and maintenance. A variety of wildlife management practices can be accomplished in the course of carrying out FSI and other forestry practices. *Also, periodic marking of property lines is a forest management priority as it is required in order to maintain farmland tax abatement*.

The text which follows provides information on the various forest management practices that are available to ownership during the period covered by this plan.

Forest Stand Improvement (FSI)

Forest Stand Improvement (FSI) involves the harvest of poor quality, suppressed, and diseased trees and trees of undesirable species in order to improve tree species composition, enhance visual aesthetics, preserve and improve wildlife habitat, reduce the incidence and chance for the spread of harmful tree disease, and enhance the diameter growth rates of vigorous, high quality (AGS) trees. *NOTE: at any point in the course of the ten years that this plan covers, salvaging downed and damaged trees is an acceptable activity and a recommended practice as long as the removal and felling can be performed safely.*

It is estimated that five years can be spent on the silvicultural improvement of a five acre area. When marking the FSI, the forester will need to be very mindful of any accessibility issues created by rock outcropping, steep slopes, wetter soils, and/or open water. These harvesting activities will provide firewood that may be necessary to qualify the property under the farm income provision of the Farmland Assessment Act.

FSI will be aimed at enhancing forest health and tree species composition, as well as improving the environment for the establishment and development of natural hardwood regeneration. Undesirable species such as red maple, diseased black birch, and hophornbeam (ironwood), as well as unhealthy ash and oak, will be discriminated against in order to encourage the growth and development of desirable mixed upland oaks, hickories, sugar maple, yellow poplar, and healthy black birch. Of course, no singular species will be discriminated against to a point where it is completely eliminated from the stand. Plenty of high quality individuals of all species will be retained in order to preserve current tree species diversity. Additional benefits will result from FSI work. Visual aesthetics will be enhanced, and the incidence and chance for the spread of harmful tree disease will be reduced.

FSI will concentrate mostly on smaller diameter trees (<14" DBH), but occasional poor quality larger diameter trees will also be removed, unless the trees provide wildlife habitat, in which case they will be marked for preservation. In the course of executing FSI, invasive vines should be severed wherever they are found to be in competition with high quality 'crop trees'. However, if native grape vines are growing in poorly formed or dead trees, they can be allowed to remain on the site so as to continue to provide wildlife food. In addition to the thinning activities and vine control, non-native brush control will be of importance in the FSI program. Non-native plant control will be discussed in detail in a later section of the report.

For further information on FSI, visit our website –
http://www.ridgeandvalleyforest.com/forest-stand-improvement.html

Wildlife Management

The management recommendations set forth in this plan will result in the protection and enhancement of wildlife habitat. A significant amount of wildlife habitat improvement can be accomplished during the 10-year period covered by this plan.

FSI recommendations set forth in this plan will result in an enhancement of wildlife habitat by encouraging expansion of the crowns of acorn and nut producing trees (oaks and hickories). This will lead to increased fruit production, and by making food available from the tops of trees harvested. FSI will also contribute to wildlife habitat by creating small openings in the forest canopy that encourages growth on the forest floor.

Den and perch trees can be identified and preserved in the course of cuttings. Occasional trees marked for harvest can be 'girdled' rather than felled so that they may eventually serve as 'snags' that will be used by hawks and owls for hunting and perching, by cavity-nesting birds and mammals for denning and rearing young, and by insect-eating mammals and bark-gleaning birds for foraging. By 'girdling' some poor quality trees near the margins of open areas or along the power line right away, good habitat can be produced for foraging bats, hawks, and owls. As many as two to five trees can be 'girdled' per acre in certain areas of the woodlot. It is best if trees over a range of diameter classes are 'girdled'.

Brush piles can be created using the small diameter branches from the tops of marked trees and salvaged wind thrown trees. These piles can serve as temporary shelters for small mammals and woodland birds. Brush piles must be properly constructed and located if they are to be of maximum benefit. Larger diameter (6"+) material should be crisscrossed at the base of the pile, with smaller diameter branches piled on top. Piles should be as many as six feet high and fifteen to twenty feet or more across at the base. Brush piles are of greatest value when they are constructed on rocky ground or on top of stone walls. Brush piles would be of specific benefit on this property since white-tailed deer have browsed away some of the native woody ground vegetation which previously provided cover and nesting sites for an array of small mammals and birds. One brush pile for every one acre of woodland on the property would provide significant additional wildlife habitat.

In order to further enhance nesting opportunities for a number of wildlife species, artificial nesting boxes could be placed at key areas around the property. Screech owl boxes can be placed in trees 15'-30' up the trunk in a shady, south-facing location. Bluebird boxes should be free-standing on poles no closer than 25 feet to a woodland margin and at least 100 feet from one another. Bat boxes can be placed in large trees in locations near any wetlands or open water sources. By encouraging bats in this way, the local mosquito population can be reduced. Wood duck boxes could be placed along any of the wetlands and/or streams within the property in areas containing slow moving open water. The property forester can provide ownership with nest boxes that are constructed in accordance with New Jersey Forest Service specifications, and can place boxes in the field at proper locations. Box construction specifications can also be provided by the property forester.

For further information on Wildlife Management, visit our website –
http://www.ridgeandvalleyforest.com/wildlife-management.html

Deer Management

The problems posed by deer have been mentioned previously, but bear repeating because of the profound negative effect they exert on the woodlands of the region. White-tailed deer are desirable as a wildlife species when present in numbers that can be supported by the environment. But this species is very adaptable and resilient, and can exert a significant negative influence on the life cycles of many other species when present in numbers that cannot be sustained by the environment. The current local deer herd is large enough to have a significant detrimental influence on tree regeneration on this property. Newly established hardwood seedlings are heavily browsed by deer, and this threatens the long-term sustainability of the woodland. Very little hardwood regeneration is established in the woodlot. Some deer simply pass through the property on the way from one area to another, feeding on whatever can be found along the way. But there is also a resident deer population which spends significant time on the property. The impact of white-tailed deer is also resulting in a reduction in habitat for other wildlife species. An effective way to counter these trends is to implement a quality deer management (QDM) program that concentrates on harvesting antlerless (female) deer. This will have the long-term effect of balancing the buck-to-doe ratio, leading to a genetically stronger and better-balanced herd, as well as a reduced birth rate.

Non-Native Plant Management

Non-native plant species are considered to pose a significant biological threat in this region of the country for a number of reasons. Perhaps the most important of which is that they tend to replace native species in the environment, thereby upsetting native predator/prey relationships.

Over the next 10 years, ownership will have a good opportunity to reduce the current abundance and control the further spread of invasive plants. Fortunately, these plants can be controlled rather easily by mechanical and/or chemical means. Control can be gained by removing individual plants mechanically by the roots, but this is a labor-intensive process. Spraying Japanese barberry and multiflora rose with a 3% solution of Roundup (glyphosate) herbicide with a spray adjuvant added to the tank mixture can result in a high degree of control. Perhaps

the best way to control non-native shrubs is to cut the shrubs early in the growing season, then spray the re-sprouted plants late in the growing season or the following growing season with a post-emergent herbicide. A much higher degree of control is obtained by spraying smaller re-sprouted plants, and the volume of herbicide used is much lower than if larger uncut shrubs are sprayed. According to the manufacturers, when its instructions are followed, Glyphosate is an environmentally safe herbicide; it is a plant enzyme inhibitor – it does not affect insects, birds, or mammals. But it must not be applied on or near open water bodies. If herbicide is not used as a control measure, non-native plants will have to be periodically re-cut until the sugar reserves in the root systems are finally exhausted and the plants 'give up' and die. *NOTE: when using any herbicide, caution must be taken by the user and the instructions on the label must be followed.*

Non-native vines should continue to be cut where ever found. Cutting vines helps release crop trees, producing more shade to compete with the vines. Applying herbicide (glyphosate) to cut vines as described above, on non-native shrubs, is an affect measure as well.

It is recommended that a non-native and invasive plant control program be incorporated into this management program. Such a program can be successful in containing the spread of these plants, and gradually reducing their abundance and the potential for seed dispersal. There is no need to establish a formal framework for such a program, or to prioritize areas of the property for treatment. Non-native shrubs and vine can be cut wherever they are encountered on the woodlot, either in combination with TSI work, or as a separate forestry activity.

For further information on Invasive Species, visit our website –
http://www.ridgeandvalleyforest.com/invasive-species-control.html

Reforestation

Reforestation can occur naturally or through artificial means managed by people. Natural reforestation occurs without human intervention and is the most common method of regrowth a forest will have experienced throughout its history. This regrowth is often referred to as natural regeneration. Most of the forests that we view here in Northern NJ came into existence through natural regeneration. The other method of reforestation happens artificially and involves the physical planting of trees in an effort by humans to assist the forest in regrowing. This method of reforestation can simply be referred to as artificial reforestation.

There are several obstacles that have presented themselves in recent times which have stymied the forest's ability to naturally regenerate itself. The suppression of fire in our forests has eliminated one of the main naturally occurring phenomena that created a disturbance within the forest which promoted natural regeneration. Many forests are overstocked and therefore seedlings don't receive enough sunlight and don't have space to grow, which curbs the opportunity for natural regeneration. More and more, invasive species are becoming a major presence on many properties and if left unmitigated, these invasive species will almost completely choke out natural regeneration. Lastly, the presence of high deer populations leaves natural regeneration vulnerable to repeated browsing which can prevent the seedling from ever growing to sapling size. If they do manage to grow beyond the seedling stage, regularly browsed

saplings are typically malformed. For these reasons and more, natural regeneration often struggles to gain traction throughout Northern New Jersey.

In light of the issues affecting natural regeneration, artificial reforestation should be considered. Artificial reforestation involves the planting of seedlings within the existing forest to encourage vigorous growth of the forest into the future. Multiple-aged forests which are also high in diversity withstand damage-causing agents such as disease, pests, and storms better than single-aged forests with less diversity. Typically, artificial reforestation is accomplished through planting well-established seedlings in prepared areas free from invasive brush and vine pressure where more light tends to be available on the forest floor. Choosing well-prepared sites will help ensure the seedlings' success.

In addition to reforestation, afforestation should be considered on properties where the eventual goal is increased forested acres. Afforestation is the process of artificially changing non-forested land into forest by planting and maintaining seedlings. The succession of land from open acres to forested acres as land is abandoned from agriculture, faces the same challenges as natural regeneration; if things are allowed to occur naturally in these locations, invasive species will almost always lay hold of these areas and prevent a future forest from becoming established on these sites. In these situations, it is important to create conditions where desirable tree species can become the dominant vegetation on the landscape and lead to the establishment of a healthy and diverse forest.

Prescribed Fire (RxB)

As previously described in this plan, natural wildfires have been part of the landscape for thousands of years, even in upland hardwood forests. The most recent scientific literature estimates that fire frequency in northern NJ was somewhere between 10-20 years intervals. Although seemingly counterintuitive, the presence of a natural disturbance like wildfires can have positive, long-term effects on forested ecosystems. Low to moderate intensity fires help to maintain or promote structural heterogeneity, increase species diversity, and allow for important nutrient cycling into the soil.

Prescribed fire (RxB) is a management tool currently being incorporated by foresters and landowners throughout the state to meet management objectives. Legislation was passed in NJ in 2018 known as the *Prescribed Burn Act* which codified the limit of liability for landowners operating under an approved prescribed burn, memorialized landowner's rights to prescribed burns, strengthened protections for practitioners, and expanded acceptable uses of prescribed fire to include forestry and ecological needs.

The New Jersey Forest Fire Service (NJFFS) is a resource that can be engaged and utilized for relatively low costs to help private landowners plan and administer RxB activities on a property. RxB can be used to control heavy non-native plant infestations, mimic light thinning practices, and/or promote the establishment and perpetuation of desired tree species such as oak and hickories.

Additional information about RxB through NJFFS can be found at -

https://www.state.nj.us/dep/parksandforests/fire/aboutus.html

Additional information on the history of fire on the landscape and the benefits of prescribed fire can be found in the following publication produced by the US Forest Service - **https://www.nrs.fs.fed.us/pubs/46252**

Natural Resources Conservation Service (NRCS) Practices

The NRCS provides cost share funding to landowners who are interested in implementing certain forestry practices through the EQIP (Environmental Quality Incentives Program) program. Below is a list of some possible practices that might be applicable to the management objectives of this property. Since NRCS practices and standards can vary from year to year, this listing is not intended to be inclusive of all possible cost share elements that could meet the management objectives.

NRCS Practice Title	*NRCS Code*	*Could practice occur within 10 year plan?*	*Which Stand?*
Forest Stand Improvement	666	YES	All
Forest Trails and Landings	655	YES	All
Stream Crossing	578	YES	All
Road/Trail/Landing Closure and Treatment	654	YES	All
Riparian Forest Buffer	391	YES	All
Tree and Shrub Site Preparation	490	YES	All
Tree and Shrub Establishment	612	YES	All
Fencing	382	YES	All
Structure for Wildlife	649	YES	All
Upland Wildlife Habitat Management	645	YES	All
Early Successional Habitat Management	647	YES	All
Brush Management	314	YES	All
Fuel Break	383	YES	All
Fire Break	394	YES	All
Prescribed Burning	338	YES	All

Management Schedule / Productivity Statement

Year	Stand(s)	Activity	Extent (Acres)	Prescription Goal (measurable)
2022–2032	All	Periodically re-mark all property boundaries with posters and/or long-lasting paint.	All	-
2022–2032	All	Create new access and/or maintain woodland access on existing roads and trails	All	-
2022-2032	B-1	Vine Cutting	2 *(annually)*	cut 100% of vines
2022-2032	B-1	Control non-native shrubs *(focused on Japanese barberry)*	2 *(annually)*	Reduction of non-native composition to <2%
2022-2032	A-1	Forest Stand Improvement *(focused on white ash)*	3 *(annually)*	Firewood (3 +/- cords) Reduction of Average Basal Area to range of 75-80 sq.ft/acre average
2032	All	Prepare new 10 year plan *(includes new inventory, new mapping, and new forest management prescriptions)*	All	-

*Changes may be made after consultation between the landowner and forester. This may occur as the result of change in ownership objectives, insect infestation, disease, storm damage, etc.