Salmon River State Forest

Gilead Block

Forest Management Plan

Connecticut
Department of Energy & Environmental Protection
FORESTRY DIVISION

Forest Health and Diversity

The Gilead Block contains healthy and diverse forest ecosystems of dense hemlock stands, oak/hickory ridges, red maple bottomlands, and many wetlands and water courses. These landscape elements provide functional, valuable, and resilient habitats for plants and animals.

Climate Change Mitigation

Climate change is an important global issue. The management of the Gilead Block provides the opportunity to sequester and store carbon, through sustainable forest management, in vegetation and long-lived durable wood products.

Economic Benefits

The following plan outlines timber harvesting activity on 175 acres, 10 % of the block. Sustainably harvested forest products provide jobs and raw materials that are sold in the local forest-based, green economy.

Forest Protection

The Salmon River State Forest Gilead Block management plan addresses threats such as wildfire, extreme weather events, invasive plants and insects, and unauthorized use. Management strategies are outlined for each of these threats to protect this valuable public forestland asset.

Wildlife Habitat

The Gilead Block is located within an American woodcock focus area. Habitat loss and forest maturation have resulted in woodcock population declines. Conservation efforts such as habitat creation and enhancement will be implemented to maintain early successional forest growth, grassland, and shrubland habitats that are vital for the American woodcock.

Recreational/Health Benefits

The large areas of forestland, wetlands, meandering rivers, and tributaries within this block of land present many opportunities for solitude and wildlife-based recreation.

Encouraging Mature Forest Growth

24%, 430-acres of the Gilead Block is designated as an Old Forestland Management Site (OFMS) allowing this remote area of the forest to remain unaltered by vegetative management activities. This will encourage mature forest growth within this block of forestland.

STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION

Salmon River State Forest: Gilead Block

Bureau of Natural Resources

Division of Forestry

Salmon River State Forest:
Gilead Block
Forest Management Plan
2025 – 2035
1,767 Acres
Author: Nathan Piché

Approvals:

2/11/2025	
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1/21/2025	
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2/11/2025	
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Introduction

Connecticut is the 14th most forested state in the United States with approximately 60 % forested cover. It is also the 4th most-densely populated state in the country. These two factors create a unique and challenging environment to develop meaningful and effective resource management strategies that will meet the needs of its citizens while protecting and enhancing its natural and ecological resources.

The 2025 – 2035 Salmon River State Forest, Gilead Block Management Plan incorporates priorities and specific strategies developed for Connecticut's forests within the 2020 Connecticut Forest Action Plan, an implementation guide for broad statewide forest management strategies based on three national priorities;

1. Conserve and manage working forest landscapes for multiple values and uses;
2. Protecting forests from threats; and
3. Enhancing public benefits from trees and forests.

The following objectives were considered in the development of the Salmon River State Forest, Gilead Block Management Plan with considerable site-specific input provided by the DEEP, DEEP partners, and various user groups.

1. **Forest Ecosystem Health and Diversity** – The Gilead Block contains healthy and diverse forest ecosystems of dense hemlock stands, oak/hickory ridges, red maple bottomlands, and many wetlands and watercourses. These landscape elements provide functional, valuable, and resilient habitats for plants and animals.
2. **Wildlife Habitat** – The Gilead Block encompasses key properties in the protection of the Salmon River watershed and its associated forest and riparian habitats. Management recommendations presented in this plan aim to protect and enhance these habitats.
3. **Climate Change Mitigation** – Climate change is an important global issue. The management of the Gilead Block provides the opportunity to sequester and store carbon, through sustainable forest management, in vegetation and long-lived durable wood products.
4. **Encouraging Mature Forest Growth** – 24 %, 430 acres of the Gilead Block is designated as an Old Forestland Management Site (OFMS) allowing this remote area of the forest to remain unaltered by vegetative management activities. This will encourage mature forest growth within this block of forestland.
5. **Recreational/Health Benefits** – The large areas of forestland, wetlands, meandering rivers, and tributaries within this block of land present many opportunities for solitude and wildlife-based recreation.
6. **Economic Benefits** – The following plan outlines timber harvesting activity on 175 acres. Sustainably harvested forest products provide jobs and raw materials that are sold in the local forest-based, green economy.
7. **Forest Protection** – The Salmon River State Forest Gilead Block management plan addresses threats such as wildfire, extreme weather events, invasive plants and insects, and unauthorized use. Management strategies are outlined for each of these threats to protect this valuable public forestland asset.

DEEP welcomes questions and comments regarding the management of state forest lands and encourages public engagement in the management of state resources. The Division of Forestry may be contacted by e-mail at deep.forestry@ct.gov or by phone at 860-424-3630.

Salmon River State Forest
Wopowog Wildlife Management Area (WMA)

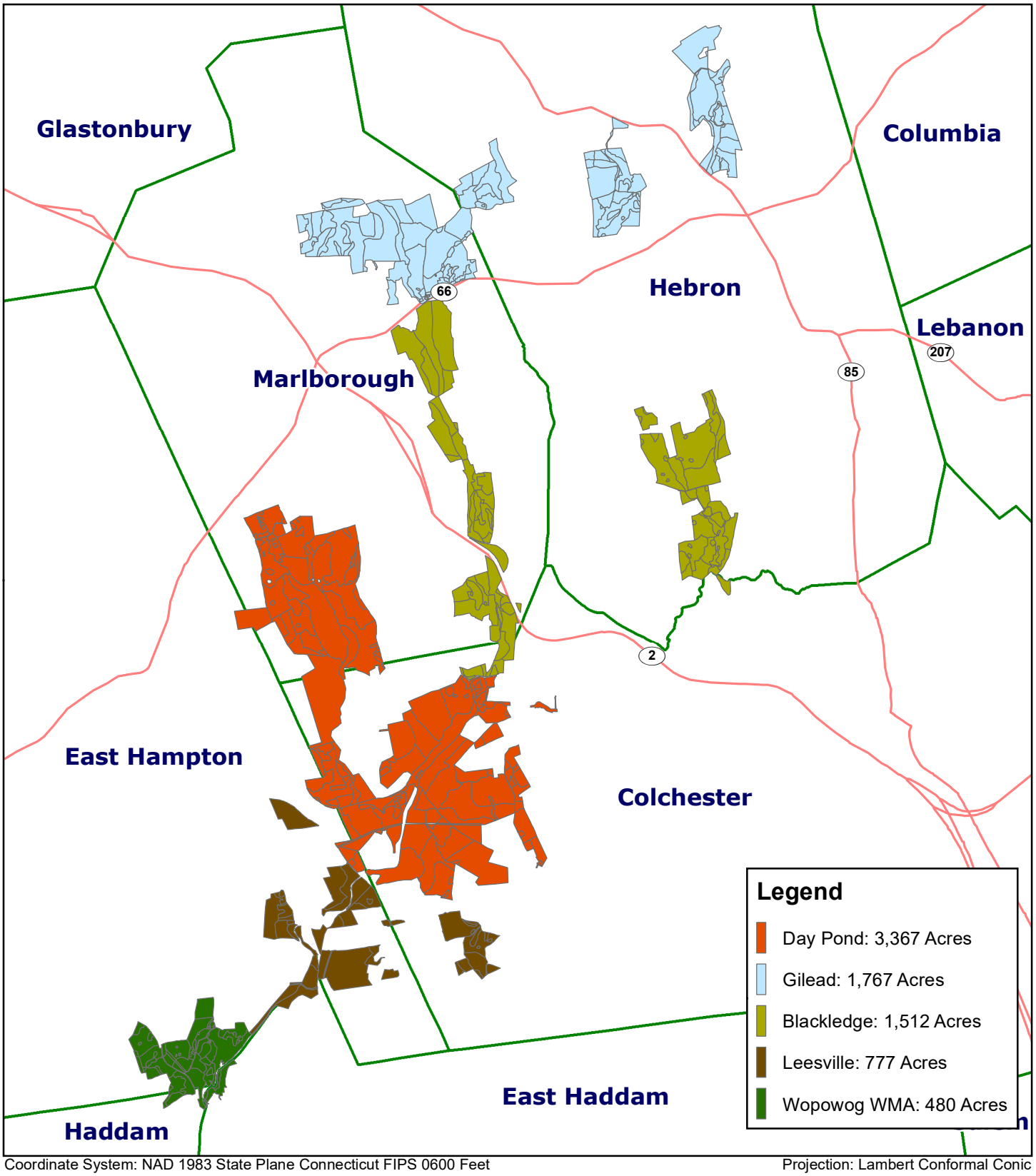
Location & Division of Forest Blocks

August 8, 2024

Map prepared by: Nathan Piché

0 4,000 8,000 16,000 Feet

Map Scale: 1 inch = 8,000 feet



Coordinate System: NAD 1983 State Plane Connecticut FIPS 0600 Feet

Projection: Lambert Conformal Conic

A. Executive Summary

The Gilead Block

The Gilead Block, 1,767 acres in size, is one of four blocks of forestland that make up the Salmon River State Forest. The other three forest blocks being known as Blackledge, Leesville, and Day Pond. Gilead is a village within the town of Hebron and is the namesake for this block of forestland, 857 acres of which falls within the town of Hebron with the remaining acreage residing within the town of Marlborough. For management planning purposes this block of forestland is divided into 14 different compartments. Compartment separations are determined by access and are numbered in a chronological order based on when that section of the forest was acquired. Additionally, each compartment is delineated into stands, or individual management units of similar forest composition, site quality, and age. This block contains 102 different and unique forest stands. Dividing lands into these compartments and stands aids land managers when making management decisions.

The last forest management plan for Salmon River State Forest was written in 1990. That plan covered the entire forest. Now, individual management plans will be prepared for each block separately to prioritize and schedule forest management tasks and activities over the course of the next management cycle. Since the preparation of the previous management plan, much has changed within this block of forestland. Additional lands were acquired, and the forest has continued to develop and mature. This management plan will focus on both short – and- long term objectives aimed at improving access to the forest for forest management, maintaining and diversifying wildlife habitat, supporting recreational activities, and ensuring the long-term health and productivity of the forest.

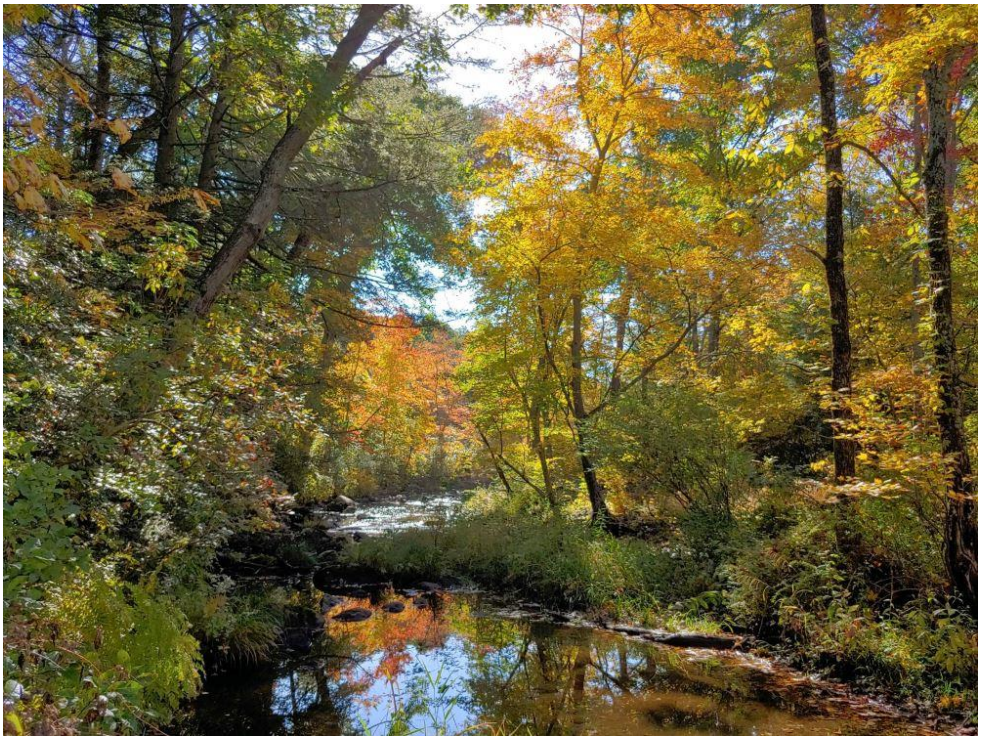


Photo 1.0. Photo of the Blackledge River flowing through the Gilead Block on a sunny autumn day.

B. History

Reason for Acquisition & Funding Sources

Recognizing the opportunity to protect and manage a significant portion of the Salmon River Watershed and its numerous tributaries, the State Board of Fisheries and Game purchased, in 1934, the first parcels of land which now make up the Salmon River State Forest. The forethought in obtaining these parcels was that they would allow the State to provide a suitable environment for trout and Atlantic salmon through the implementation of a long-term development program involving stream improvement and watershed management projects. In the 56 years from the first land purchase to the last management plan, the State acquired additional parcels of land to fulfill the goals set forth in the original development plan. In those 56 years, the forest grew to encompass 7,360 acres, which also included 1,300 acres originally leased from the U.S. Government. Additional acreage was acquired through a land utilization program made available by the Resettlement Administration.

Development of Resources Prior to & After State Acquisition

Prior to State acquisition, extensive timber harvesting was carried out throughout the forest with many areas being clearcut for charcoal production in the late 19th century. Widespread timber harvesting was done again during the salvage of the American chestnut in the 1920's in the wake of the chestnut blight. Heavy cuttings tended to favor black birch, a prolific seed producer whose seed is easily dispersed by the wind. The birch was often harvested to supply a birch oil extraction plant operated by the E.E Dickinson Company until 1930.

From 1935 to 1940 a Civilian Conservation Corps (CCC) camp, named "Camp Stuart", was operated in the forest. The CCC carried out forest improvement projects, built a dam at Day Pond, constructed truck roads and picnic areas, and performed many stream improvements on the rivers and streams within the Salmon River State Forest.

After the State acquired the parcels now making up the Salmon River State Forest, the forest has been managed to protect and diversify wildlife habitat, promote a healthy watershed for the Salmon River and its many tributaries as well as sustain a healthy and productive forest. This has been carried out through timber harvests that have removed dead, dying, diseased, poor quality and mature trees to provide growing space for young trees to become established, and by leaving other areas undisturbed, such as adjacent to rivers and streams so that the natural hydrology is not disrupted. Due to the States watershed management efforts in the last several decades, a healthy trout stocking program and easy access points, the Salmon River State Forest is one of the premier fishing destinations in Connecticut.

Cultural Resources

Much of this block of forestland was cleared for agricultural purposes during the colonial era. Old cellar holes, stone walls and stone piles remain as evidence of the work done by early settlers. As these fields and pastures were abandoned from agricultural uses the land gradually reverted to forest, sprouting an abundance of oak, birch, maple, hickory, and tulip trees throughout. This history has given the current forest a diversity of age classes and species compositions.

There is one historical cemetery located in the Gilead Block. This cemetery contains one grave site where Mr. John Nolton Rollo is buried. Mr. John Nolton Rollo, son of John Rollo and Mary Phelps, was born May 3rd, 1751 and died on March 20th, 1777. He fought as an American patriot in the Revolutionary War, attaining the rank of Corporal, before passing away from smallpox (Christine, 2006). The burial site is located on the south side of the discontinued portion of Slocum Road. The gravestone, shown in Photo 1.1, reads "Here Lies y Body of Mr. John Nolton Rollo who died with the Small Pox March the 20th 1777 my 26th Year of his Age." This site will be left undisturbed, as shown in Photo 1.1, out of respect for the final resting place of Mr. John Nolton Rollo.

Photo 1.1. Photos of the grave site of Mr. John Nolton Rollo.

During the early settlement, colonial era, damming ponds, and streams as a source of waterpower for grist mills, sawmills and tanneries was common. By the mid-19th century, the Salmon River and its tributaries had more mills trying to utilize the power of its flow than the available water sources could supply, especially during periods of dry weather and low water levels. In North Westchester, during periods of low water, grist mills operated at night and paper mills by day. The use of hydropower to power mills eventually declined as other power sources became available during the industrial revolution. In 2016 a dam on the Jeremy River in North Westchester was removed to permit migratory fish passage. However, dams remain to this day on the Holbrook Pond in Hebron and Day Pond in Westchester. The Holbrook Pond dam (DEEP Dam No. 6705), located within the Gilead Block, has a Class BB moderate hazard rating. This dam is managed by DEEP's Dam Safety Program within the Bureau of Water Protection and Land Reuse. The DEEP Parks Division monitors this dam to ensure it maintains structural integrity.

Changes Since the Last Management Plan

Since the last forest management plan expired in the year 2000, management efforts in this block of forestland have focused primarily on maintenance and follow-up silvicultural treatments that were initiated during the previous forest management plan. Maintenance efforts have consisted mainly of painting property boundary lines, done most recently in 2021 and 2022. A 95-acre shelterwood harvest was also completed in 2012, north of Route 66 in Marlborough, to regenerate a new cohort of oak and other northern hardwood tree species on the site. Additionally, a 207-acre property was acquired and incorporated into this block in 2020, located directly east of Jones Hollow Road in Marlborough. This property was acquired with the assistance of funds provided through the Federal Aid in Wildlife Restoration Program, most often referred to as the Pittman-Robertson Program (P-R Program). The P-R Program is administered by the U.S. Fish and Wildlife Service and is funded by excise taxes collected on firearms, ammunition, and archery equipment. The funds are distributed to state wildlife agencies to support wildlife restoration (land acquisition, management, and research) and Conservation Education/Firearms Safety programs.
This property acquisition effectively linked existing sections of the forest with Jones Hollow Road, adding access for management and wildlife-based recreation. All management actions taken on this property will be planned and coordinated with the Wildlife Division to ensure work is completed in congruence with the goals, standards, and objectives of the property acquisition funding source, the P-R Program.

C. Assessment of Resources and Infrastructure

Acres

The Gilead Block is comprised of 1,767 acres. These acres are divided into one of nine different land classifications which are active forest, old forest management site, natural area preserves, inaccessible areas, inoperable areas, recreational areas, open/non-forested areas managed for wildlife, wetlands, and developed areas.

Table 1.0. Acres of land that fall into each land classification category within the Gilead Block of Salmon River State Forest.

Land Classification	Acres
Active Forest	1064
Old Forest Management Site	430
Natural Area Preserves	0
Inaccessible Areas	31
Inoperable Areas	74
Recreational Areas	0
Open/Non-Forested Managed for Wildlife	20
Wetlands	138
Developed	10
Total	**1767**

Although there are nine different land classification categories that each acre of land falls into, these categories are not necessarily mutually exclusive. For example, land classified as “old forest management site” may have just as much wildlife benefit as land classified as an area “managed for wildlife.” Land is divided into these categories by a close analysis of their current physical condition and is done so to aid in management making decisions.

Active forestland is land actively being managed for its forest resource or wildlife habitat. Not all active forestland is prescribed to receive a management treatment in this management plan, such as a silvicultural or invasive treatment. However, this plan does prescribe management treatments to occur on 175 acres of active forestland, with the remaining acres of active forestland being left to grow and further develop. Old forest management site is a land classification that has been established to set aside a portion of land to allow for the natural processes of forest stand development to occur without the influence of active forest management. Natural Area Preserves are state lands designated by the Governor as “natural areas.” The Gilead Block does not contain any designated Natural Area Preserves. Inaccessible areas are areas that cannot be accessed due to the deterioration of access roads or due to being landlocked behind un-crossable geographical features such as wetlands, rivers, or steep terrain. Inoperable areas are lands that contain physical features such as steep slopes and excessively rocky terrain that prevents active management from taking place. Recreational Areas are areas within the forest that contain features that are of significant recreational value and are managed to maintain those recreational opportunities. These areas may include campgrounds, picnic areas, and/or sports fields and are primarily managed by the Division of Parks. Open/Non-Forested Managed for Wildlife are designated acreage where the primary objective of any management activity will be for the benefit of wildlife habitat and diversity. These areas consist of old fields maintained for early successional habitat, lands acquired through Pittman-Roberson Program funding, and/or wetland impoundments. Within the Gilead Block these areas include old fields, recently abandoned from agricultural use, where forest succession has not advanced to the point at which the area can be considered forested. As a result, these areas will be maintained to benefit wildlife that depend on early successional stage habitat. The Wildlife Division is responsible for leading the management of designated areas managed for wildlife. Wetlands are low lying areas that either consistently hold water or feature poorly drained soils that grow wetland associated vegetation. Lastly, the Developed category in the Gilead Block is land containing office buildings, garages, shops/maintenance facilities, and parking lots associated with the DEEP Eastern District Headquarters located on Route 66 (Hebron Road) in Marlborough.

Access: Roads for Public, Truck Roads & Gates

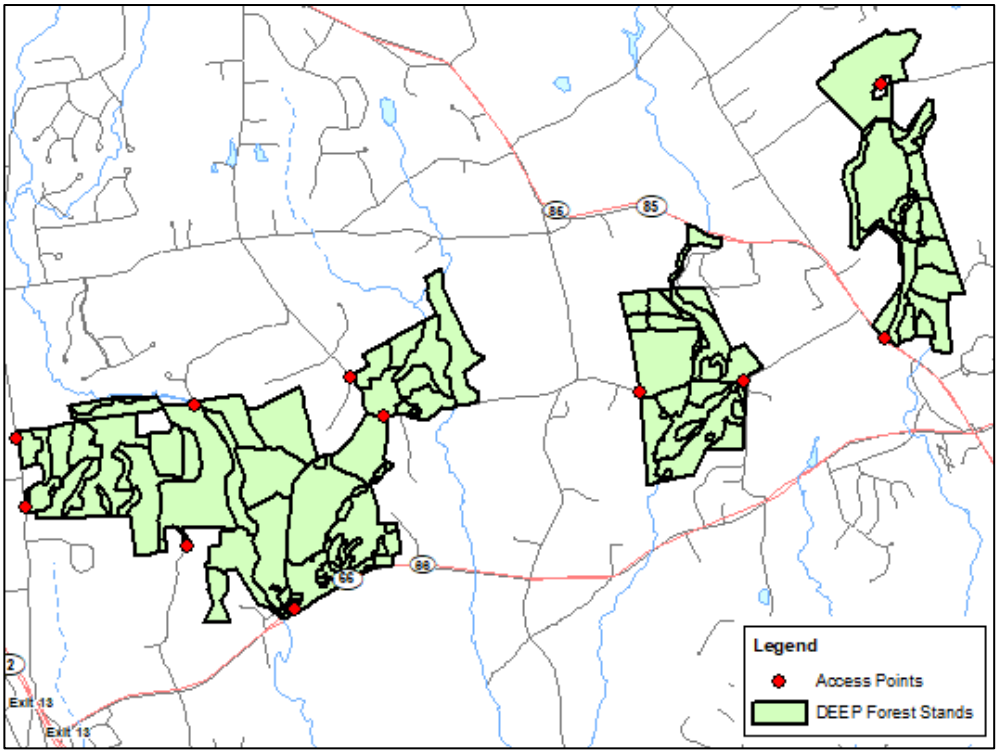


Figure 1.0. Map showing the various access points and forest roads within the Gilead Block.

Much of the Salmon River State Forest, including the Gilead Block, occupies long and narrow sections of land adjacent to the rivers and streams that define this state forest. Much of the terrain along these rivers and streams is steep and is located behind residential neighborhoods. These factors make access for active forest management purposes difficult. Over the years, land acquisition efforts have increased access points to the forest. However, many of these access points are in a state of disrepair and it must be made a priority to improve these access points for the future management of the forest. Access improvements discussed in this management plan will largely focus on improvements for forest management purposes. The forest is also managed for public access. However, currently the public access opportunities are adequate with many parking and walk in areas located at various points.

There are three major sections of land that make up the Gilead Block. The western most portion is the largest of the three sections, occupying large swathes of land on either side of the Blackledge River. This section of land is accessible from Jones Hollow Road, Parker Road, North Parker Road, Route 66 (Hebron Road), Old Slocum Road, and West Street.

The section of land that lies in the middle of the Gilead Block three sections is defined by the Fawn Brook which flows from north to south through the middle of this property. This section is accessible from Old Slocum Road and at the intersection of Slocum Road and Blackman Road.

The eastern most section of the Gilead Block is centered around Holbrook Pond which is part of the headwaters of the Jeremy River. This section of land is accessible from Holbrook Pond Road, which is a state-maintained road off Route 85 (Gilead Street), and Skinner Lane.

Inaccessible Areas

Two percent of the Gilead Block, comprised of 31 acres, is categorized as inaccessible. Inaccessible areas are locations within the forest that cannot be accessed for forest management purposes due to the deterioration of access roads or due to being landlocked behind un-crossable geographical features such as wetlands, rivers, steep terrain, or highways. It must be noted that much more than two percent of the block is considered inaccessible, however, much of the inaccessible land has been categorized under the "Old Forestland Management Site" or "Inoperable Areas" categories. There are two forest stands that are specifically designated as "Inaccessible Areas" both of which are sections of forestland that are separated from the rest of the property by a wetland or waterbody.

Right-of-Ways

There are no right-of-ways located within the Gilead Block of Salmon River State Forest.

Boundary Conditions, Issues & Total Miles to Maintain

There is a total of 20.21 miles of boundary line in the Gilead Block. Boundary lines are generally in good condition, easily located, and well-marked, as they were marked over the course of 2021 and 2022. Boundary line marking and maintenance includes re-painting boundary trees, replacing old State Land signs where necessary and collecting GPS data on all points and features along each boundary line.

Acquisition Goals

Future acquisition efforts should be prioritized by the following three guidelines:

1. All interior parcels should be acquired if made available to the State. This will reduce boundary line maintenance as well as strengthen DEEP state land use policies.
2. Any parcel which currently abuts state land on two or three sides. Acquisition of properties such as these would allow the forest to expand along its bounds, reducing maintenance issues, strengthening DEEP state land use policies and will create a large, protected forest corridor.
3. Any parcel which may provide improved access to existing town roads should be acquired for management and emergency access purposes.

D. Special Use Areas

Lakes & Ponds

There are no lakes within the Gilead Block, however, there is one pond. Holbrook Pond is a 73-acre pond located east of Route 85, one mile north of the junction with Route 66 in Hebron. This pond is open to the public for boating, hunting, and fishing.

Rivers & Streams

The rivers and streams are the defining features of the Salmon River State Forest. The Gilead Block contains many of the upland, headwaters of the Salmon River watershed. Holbrook Pond in Hebron flows to the south, forming the Jeremy River. The Fawn Brook flows out the Gilead Block in Hebron until it connects with the Blackledge River to the south in the town of Marlborough. The Daniels Brook and a small stream flowing out of Warner Pond combine within the Gilead Block, forming the West Branch. The West Branch flows southward, connecting with the Fawn Brook and, eventually, the Blackledge River. Lastly, the Blackledge River flows through the western portion of the Gilead Block in the town of Marlborough.

Cultural Sites

There are no National Heritage sites or areas within this block of state forestland. There are no specific sites that have significant cultural importance. However, there are many stone walls and stone cellar holes that can be found throughout this block. These elements on the landscape are cultural reminders of our not-so-distant past, a past where farmers cleared land and deposited excess stone in walls to rid the land of them and establish their land ownership boundaries. Stone cellar holes give clues of how our ancestors lived, how they worked the land and the often-harsh realities under which they lived their lives. Although cultural landmarks such as stone walls and cellar holes are commonplace throughout Connecticut, they shall not be forgotten nor destroyed. During forest management operations all actions necessary will be made to avoid the destruction of stone walls to preserve these cultural landmarks within the state forest.

Recreation & Scenic Sites – Trails & Signs

The Gilead Block is open to the public for recreation and is most frequently used for hiking, fishing, boating, hunting**,** trapping and wildlife observation. The Blackledge River is a destination for trout fisherman. Holbrook Pond is a popular location for canoeing, kayaking, hunting, and fishing. A public boat launch and parking area are located at the southern end of Holbrook Pond off Holbrook Pond Road; there is an 8-mph speed limit for boats. DEEP Support Services monitors this boat launch area.

There is a wooden bridge parallel with and directly downstream of the Holbrook Pond dam. This is a foot traffic only bridge and is often used by the public when recreating around Holbrook Pond. This bridge is in a state of disrepair. As a result, DEEP Engineering and Support Services will be consulted and a plan will be drafted and executed to repair and/or replace this bridge.

A kiosk for signage is located at Holbrook Pond. Any applicable public notices or land use regulations are posted at this kiosk.

The unmaintained and abandoned town roads that traverse this block of land, such as Parker Road, Old Willimantic Turnpike, Slocum Road, and Skinner Lane are also well used hiking paths. There are no designated authorized trails or specific scenic sites within the Gilead Block.

Natural Area Preserves

Natural Area Preserves (NAP) are state lands designated by the Governor as “natural areas”. An NAP is defined in the Connecticut State Statutes as “…an area of land or water, or land and water, containing or potentially containing plant or animal life or features of biological, scientific, educational, geological, paleontological or scenic value worthy of preservation in their natural condition.” No state-designated NAPs are present within the Gilead Block.

Old Forestland Management Sites

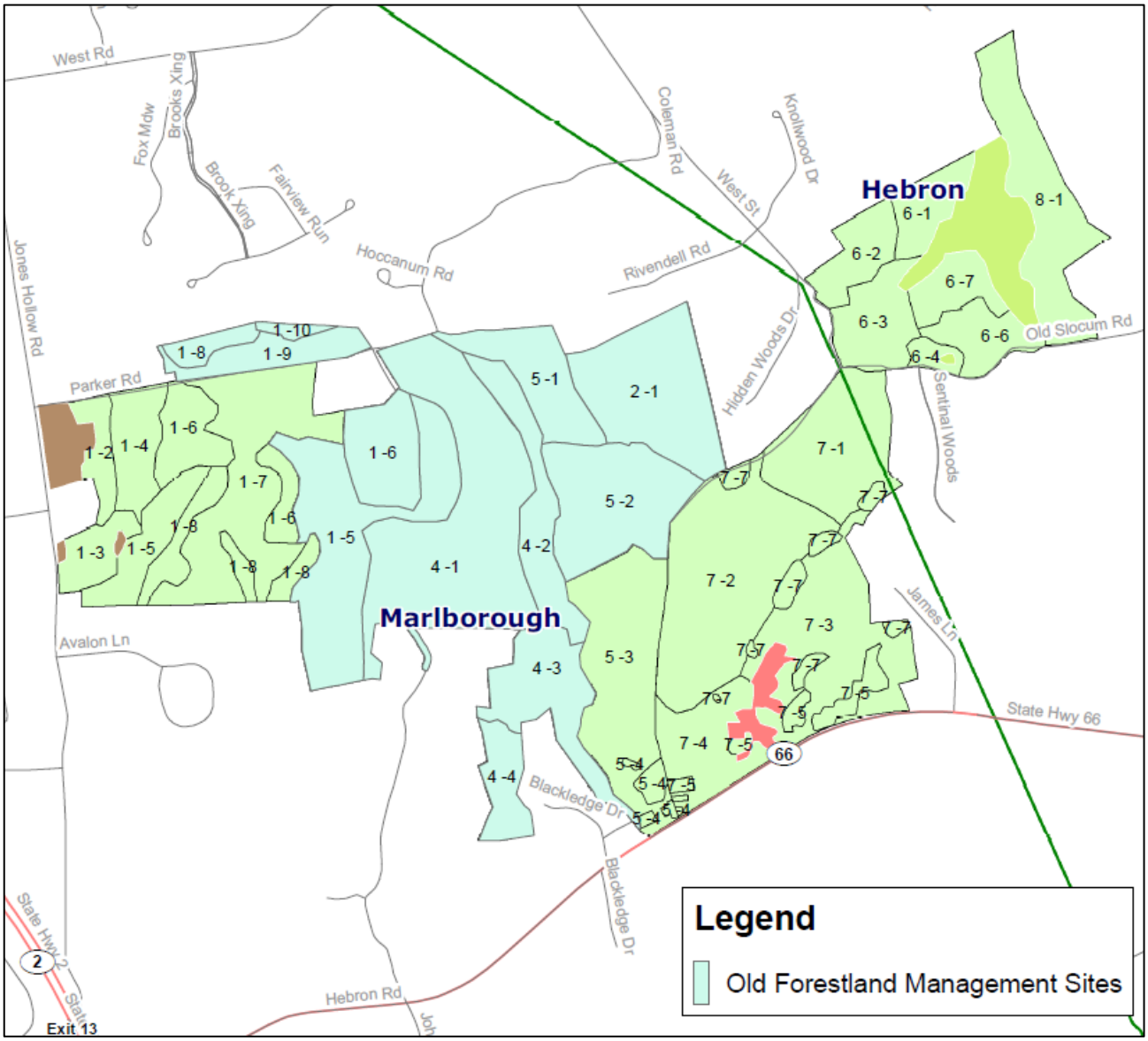


Figure 1.1. Map showing the location of Old Forestland Management Sites (OFMS) within the Gilead Block of Salmon River State Forest. The designated OFMS is the area shaded in blue.

The Old Forestland Management Site (OFMS) land classification has been established to set aside a portion of land to allow for the natural processes of forest stand development to occur without the influence of active forest management. One OFMS has been designated within the Gilead Block consisting of 430 acres, 24 % of the total acreage within the block. This OFMS is located within the eastern edge of compartment one, compartment four, the northern extent of compartment five, and compartment two. This area encompasses riparian areas on either side of the Blackledge River and a large upland area. This area was chosen for its diversity. Within these 430 acres there are riparian areas, red maple bottomland/wetlands, upland stands of oak and hickory, several stands of white pine, as well as several areas of northern hardwoods dominated by sugar maple, beech, and birch. This diversity encompasses many of the forest types that are common throughout Connecticut and therefore much can be learned about how different forest compositions develop and change overtime by leaving this area to develop old forest characteristics in the absence of active forest management. This area also has a low density of invasive species, compared with other areas of this block of forestland. Therefore, overtime this area of land will be able to naturally regenerate trees and sustain a forest without actively managing invasive shrubs that would inhibit natural regeneration.

Research Areas

No research areas are currently present within the Gilead Block. However, on occasion the forest has been utilized for research projects and will continue to be available for research proposals. DEEP partners and collaborators may apply to the CT DEEP for a permit to conduct research for scientific and educational purposes (Scientific Collector Permits).

Miscellaneous (Sugarbush, homeowner firewood, water mains, aquaducts, etc.)

There have been several miscellaneous uses of the Gilead Block. Sugar maples along the Holbrook Pond Road have been utilized for maple sap and syrup production during the spring sugaring season. When available after timber harvesting and/or hazard tree mitigation work, firewood has been sold to local residents. These activities are conducted under the forest products harvest permit system, administered by the Division of Forestry.

E. Forest Ecosystem Health and Diversity

Landscape Context

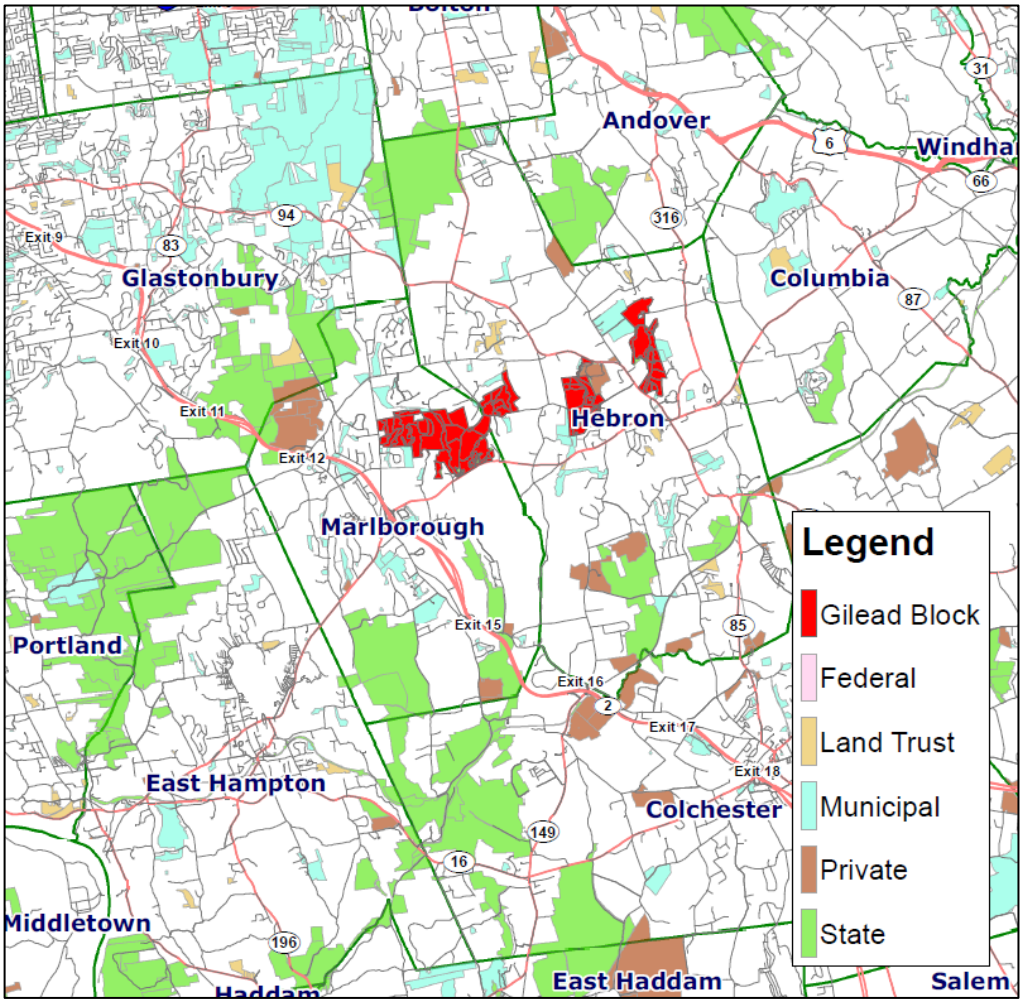


Figure 1.2. Location map showing federal, land trust, municipal, private, and state protected lands in the vicinity of the Gilead Block.

The Gilead Block is located within rural eastern Connecticut. These properties are at the northern and eastern most extent of the Salmon River watershed and are part of the much larger Salmon River State Forest. Throughout the region there are many smaller parcels, owned by the federal government, land trusts, municipalities or private individuals or conservation organizations that are designated as protected open space, as shown in Figure 1.2. Efforts by the state and other entities have been vital in protecting the rural fabric of the communities that this forest lies within. The present-day conditions are recognized as good landscape level habitat, with a diversity of cover types including forestland of varying age classes, actively managed agricultural land, wetlands, ponds, and lakes as well as open land containing a diversity of herbaceous early successional plant growth. However, a much greater amount of land in this landscape is unprotected and is increasingly under the stress of development. Therefore, management strategies for the Gilead Block will need to be reviewed on a 10-year cycle to ensure habitat goals are met as landscape level habitat is lost due to development and habitat fragmentation.

Current Vegetative Condition

A forest inventory of the Gilead Block was completed to gather data to be used in the forest management planning and decision-making process. This inventory collected information on trees throughout the area such as species, diameter, merchantability, health, and quality. To accompany these quantitative data, qualitative data was also collected regarding the composition of understory vegetation, presence or absence of invasive species, infrastructure condition, boundary line condition, operability, and land use history evidence. The quantitative forest inventory data was analyzed using NED II forestry software. Data is organized at the forest stand level. Each stand is categorized into a size class and forest cover group to gain a greater understanding of how much land is considered maturing forest, young forest, or anywhere in between, and what is the composition of the forest in each stand.

Size classes are divided into the following diameter ranges.

- Seedling/Sapling: 1 inch – 4.5 inches
- Pole Timber: 4.6 inches – 10.5 inches
- Saw/Pole Timber: 10.6 inches – 13.5 inches
- Saw Timber: 13.6 inches +

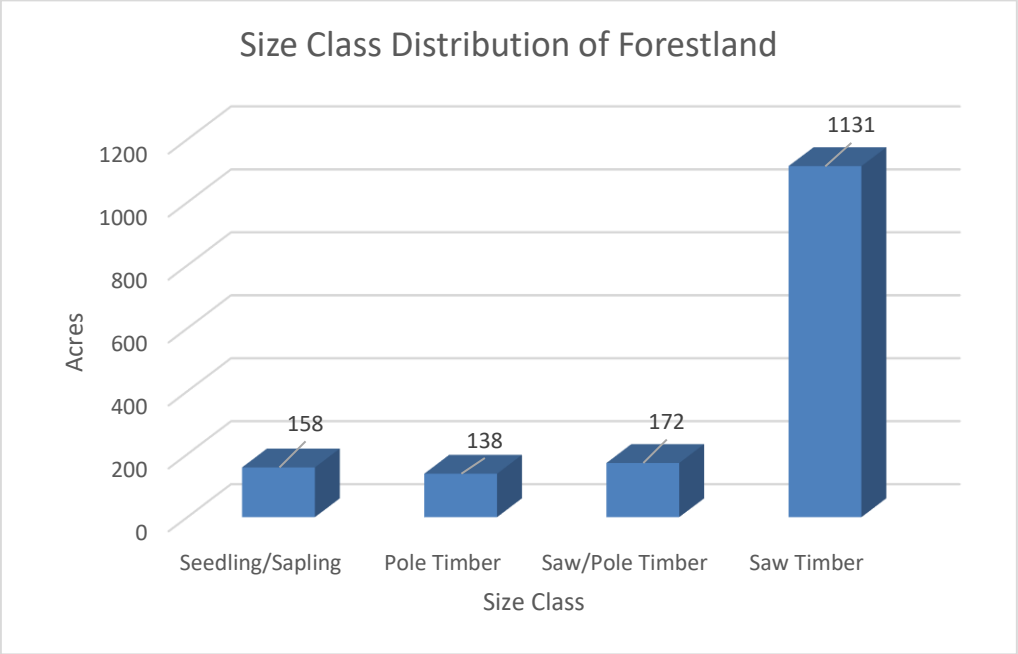


Figure 1.3. Size class distribution of forestland within the Gilead Block of Salmon River State Forest. This chart excluded areas of the block which are developed, wetlands, rights-of-way, or open land.

The Gilead Block of Salmon River State Forest is comprised of a diversity of different forest types. Oak and northern hardwoods is the most dominant forest cover found throughout these properties. However, stands of red maple lowlands, white pine, and hemlock are also common. Forest stocking, or density, varies greatly with forest type, age, site conditions, soil types and a complex of past and present forest health issues.

Each forest stand is categorized into one of the following seven forest cover groups.

Elm-Ash-Red Maple

The Elm-Ash-Red Maple group makes up 6 % of the Gilead Block, encompassing 95 acres. These areas are characterized as having wet, saturated, and/or poorly drained soils. As a result, forest composition is made up of tree species that do well in wet conditions such as American elm, black ash, white ash, tulip, black gum, and red maple. Often these stands are referred to as red maple lowlands.

Photo 1.2. Photo of the typical stocking levels and forest structure within the Elm-Ash-Red Maple group.

Maple-Beech-Birch

The Maple-Beech-Birch group makes up 9 % of the Gilead Block, encompassing 141 acres. This group is dominated by sugar maple, American beech, yellow birch, and black birch. Other species can be found within this group at lower densities, such as hemlock, white pine, white ash, and red oak. These stands are often referred to as northern hardwoods.

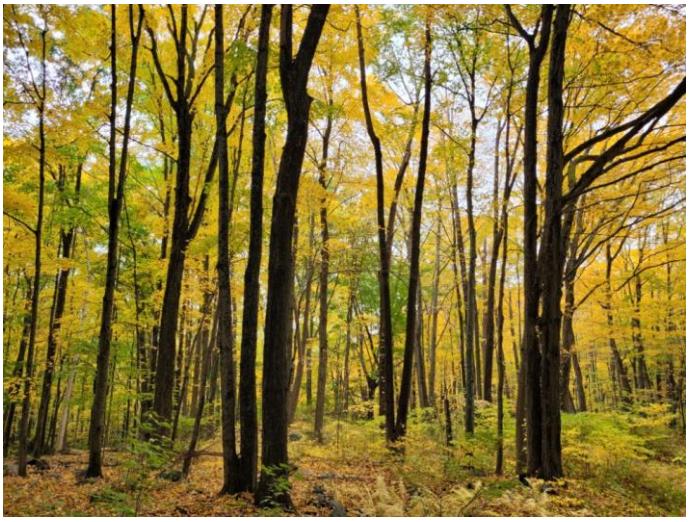


Photo 1.3. Photo of the typical stocking levels and forest structure within the Maple-Beech-Birch group.

Oak-Hickory

The Oak-Hickory group makes up 63 % of the Gilead Block, encompassing 1,016 acres. This is the most common forest type throughout the Gilead Block. The dominant species found within this group are red oak, black oak, scarlet oak, chestnut oak, shagbark hickory, pignut hickory, black birch, and red maple. Within this group there are several sub-groups, referred to as forest types or stand types that are commonly found on these properties. One of these forest types is upland oak, characterized by a poor-quality upland/ridge-top site growing mostly chestnut oak, scarlet oak, pignut hickory, black birch, and red maple. Another one of these forest types is the mixed upland hardwoods, characterized as having a medium quality site that is typically located mid-slope that is growing all the species found within the Oak-Hickory group but is primarily dominated by red oak, white oak, black oak, shagbark hickory, black birch, and red maple.

Photo 1.4. Photo of the typical stocking levels and forest structure within the Oak-Hickory group.

Oak-Pine

The Oak-Pine group makes up 19 % of the Gilead Block, encompassing 308 acres. This group consists of stands of white pine, hemlock, red oak, white oak, black oak, scarlet oak, black birch, and red maple. This forest type adds significant diversity to an otherwise deciduous broadleaf forest, with dense conifer canopies mixed with hard mast producing oaks.

Photo 1.5. Photo of the typical stocking levels and forest structure within the Oak-Pine group.

Spruce-Fir

The Spruce-Fir group makes up 1 % of the Gilead Block, encompassing 14 acres. Often when this forest group is found in New England it is comprised of red spruce and balsam fir, two species that are uncommon in Connecticut. The areas that are considered Spruce-Fir within the Gilead Block are stands of Norway Spruce, a European species which was planted by the CCC in the 1930's.

Photo 1.6. Photo of the typical stocking levels and forest structure within the Spruce-Fir group.

White-Red-Jack Pine

The White-Red-Jack Pine group makes up 2 % of the Gilead Block, encompassing 24 acres. All the stands of trees that fall into this category are dominated by white pine. Similarly, to the Spruce-Fir group, many of the stands characterized as White-Red-Jack Pine were planted by the CCC. Pure stands of conifer tree species are uncommon within this block of forestland, making these stands of white pine important for the diversification of the forest and its habitats.

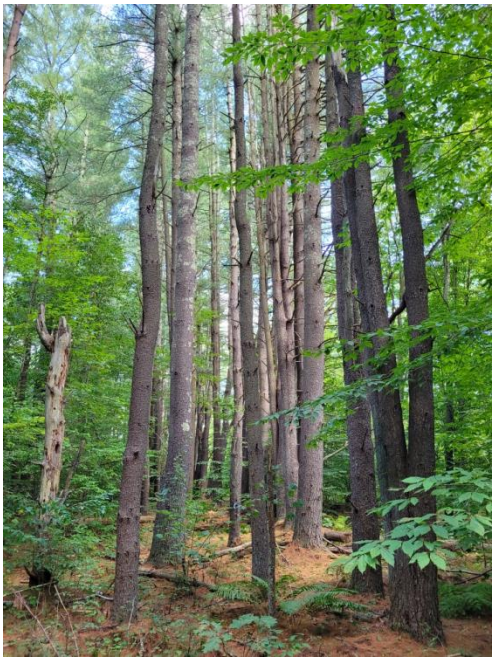


Photo 1.7. Photo of the typical stocking levels and forest structure within the White-Red-Jack Pine.

Pinyon Juniper

The Pinyon-Juniper group is not present within the Gilead Block.

Table 1.1. Acres of forestland by size class and forest type within the Gilead Block. This table excludes acres of forest which are developed, wetlands, rights-of-way, or open land.

Acres of Forestland by Size Class & Forest Type					
Forest Cover Group	**Seedling/Sapling**	**Pole Timber**	**Saw/Pole Timber**	**Saw Timber**	**Total**
Elm-Ash-Red Maple	0	5	5	85	95
Maple-Beech-Birch	0	19	0	122	141
Oak-Hickory	93	114	138	671	1016
Oak-Pine	65	0	29	214	308
Spruce-Fir	0	0	0	14	14
White-Red-Jack Pine	0	0	0	24	24
				Grand Total Acres	**1599**

Forest Health: Diseases

Chestnut blight is a fungal infection caused by the *Cryphonectria parasitica* fungus. This fungus was accidentally introduced to the United States, from nursery stock from Asia, in the early 1900's. Quickly after its identification it became evident that the mortality of the chestnut species was imminent. The fungus causes diffuse cankers to form underneath the bark of chestnut trees, ultimately cutting off the flow of water and nutrients up and down the stem of the tree. The American chestnut likely once constituted a large portion of all the trees present in the Gilead Block. The root systems of these trees persist in the forest; however, the fungus also remains alive in the soil as well. Chestnut trees sprout from these roots, grow to sapling or pole sized, and then get infected with the fungus again, killing the tree. This process then repeats itself. As a result, the American chestnut that was once a common dominant tree across the landscape has been reduced to an understory tree in a constant cycle of sprouting, fungal infection, and mortality. The loss of this species from this disease was a tremendous set back to the health, diversity, and quality of the forest in these areas.

Photo 1.8. Photo of a diffuse canker on an American chestnut caused by the chestnut blight.

Nectria canker, caused by *Nectria galligena* fungus, is another common disease found on these properties, often creating what are known as “target cankers” on black birch trees. Nectria fungus typically does not result in the mortality of affected individuals, however, it does significantly affect the quality of wood products produced from trees with it.

Photo 1.9. Photo of nectria canker on a black birch.

Armillaria fungus, *Armillaria mellea*, is a third disease that can be found sporadically throughout these properties. This disease is often called “shoestring root rot” because the fungus has a shoestring like appearance growing on the roots of affected trees. Branch dieback and crown thinning are common symptoms. Affected trees will typically not die from this fungus alone, however, it does act as a secondary pathogen which will develop on trees already under stress from a variety of other biotic and abiotic factors.

Photo 2.0. Photo of shoestring root rot on a standing dead tree.

Beech bark disease is commonly found on American beech individuals throughout these properties. The disease results when the beech scale insect punctures the bark of a beech tree to feed, which creates a wound where the nectria fungus can enter the tree. Once the nectria fungus is within the tree the fungus causes cankers to form, ultimately resulting in the mortality of the tree. To compound the issue, American beech sprouts prolifically from cut stumps and from roots. Furthermore, American beech is very shade tolerant, meaning it grows well in high shade conditions such as the forest floor. Therefore, as American beech individuals succumb to disease, they sprout new stems from their roots and continue the cycle of growth and disease. For long term forest management, the difficulty is establishing desirable regeneration such as red oak in an understory already dominated by disease prone beech sprouts. Silvicultural treatments will focus on even aged management techniques which will allow high amounts of sunlight to the forest floor, thereby favoring shade intolerant and intermediate shade tolerant species over the shade tolerant beech. Treating beech stumps in recently harvested areas with an herbicide to prevent re-sprouting may be recommended as another way to favor the regeneration of more desirable species.

Photo 2.1. Photo of an American beech with beech bark disease. Notice the blistering bark caused by cankers forming underneath the bark.

Beech leaf disease (BLD) is a novel disease affecting American beech. This disease has been found in several states, including Connecticut, as well as one Canadian Province. This disease is associated with a subspecies of the anguinid nematode, *Litylenchus crenatae mccannii*, which may be present in the buds and leaves of beech trees of all age classes. Nematode infection mechanisms are not fully understood currently. Symptoms of BLD include dark stripes between lateral veins of leaves. Affected leaves also can become shrunken, crinkled, and have a leathery texture. Tree mortality can result from the disease. No treatments are currently available for BLD. Research is currently being done by The Connecticut Agricultural Experiment Station (CAES) to better understand the short- and long-term implications that this disease may have on the forests of Connecticut. American beech trees throughout the Gilead Block are being heavily affected by BLD. Management efforts will focus on monitoring this disease and salvaging dead individuals, if deemed necessary and/or feasible.

Photo 2.2. Photo of an American beech with BLD. Notice the dark stripes in the leaves.

Forest Health: Insects

Spongy moth caterpillar, previously known as gypsy moth, is a non-native moth introduced to North America that defoliates many tree species, oak species in particular. Successive years of spongy moth caterpillar defoliation and drought like conditions in 2016 and 2017 has resulted in the mortality of thousands of trees across eastern Connecticut. Damage varies greatly by locality. In the Gilead Block spongy moth effects vary greatly by species and site location. Although white oak, red oak, black oak, chestnut oak, and scarlet oak all have been heavily affected, the mortality of white oak seems to be the highest. Also, ridgetops and hilltops generally have a higher proportion of mortality, likely due to the trees already being drought stressed due to the shallow, course textured, rocky soils. Individuals that may have been partially defoliated are also more susceptible to secondary pathogens such as two-lined chestnut borer and shoestring root rot. Overall, spongy moth has had a major impact on some stands within the Gilead Block. However, effected stands do not show signs of widespread, near 100 percent oak mortality that was common in many other forests throughout eastern Connecticut. Silvicultural treatments will aim to salvage spongy moth killed individuals where possible. Where it is not possible to salvage dead individuals, standing dead snags create good vertical habitat structure and diversity which is important for many wildlife species.

Photo 2.3. Photo of oak mortality caused by spongy moth defoliation.

Two-lined chestnut borer is an insect that is common from southern Canada through the eastern United States. The insect bores galleries underneath the bark of many species of oaks. These galleries can eventually cut off the flow of water and nutrients up and down the stem of a tree, thereby resulting in its mortality. Tree mortality rarely occurs due solely from the efforts of two-lined chestnut borer. The insect primarily attacks trees that are weakened by drought, defoliation, soil compaction or any number of other stressors. Two-lined chestnut borer, in combination with other stressors is what results in mortality. Silvicultural treatments will aim to thin overstocked stands to increase vigor and capture natural mortality caused by competition. These actions are the best ways, on a state forest wide scale, to prevent excessive two-lined chestnut borer damage.

Hemlock woolly adelgid, named for its white woolly appearance and for its preferred host, is an insect native to eastern Asia that was inadvertently introduced to the United States in 1950. Juvenile hemlock woolly adelgid feed on eastern hemlock trees by inserting their mouthparts into the base of the needles of a host tree. These insects feed on the tree's stored starches and they remain on the same needles for their entire lives. This insect has no natural predators in North America. Therefore, population levels increase exponentially and excessive feeding on infected host trees eventually results in the mortality of the host. Several predators of the hemlock woolly adelgid from Asia have been evaluated, approved, and successfully introduced into the forests of Connecticut. Salmon River State Forest was one of the original sites selected to release these predators due to the extensive stands of hemlock adjacent to the Salmon River and its tributaries. These efforts have been quite successful, and the hemlock stands along the Salmon River are currently in fair condition.

Photo 2.4. Photo of hemlock woolly adelgid.

Emerald Ash Borer (EAB) is present throughout the forests of Connecticut. This beetle, native to northeastern Asia, feeds on all species of ash. Females lay eggs in the bark of ash trees and larvae feed underneath the bark until they mature into adults. Once they mature into adults they bore through the bark, fly to another host tree and the cycle continues. Signs of the emerald ash borer are horizontal galleries underneath the bark created by the larvae feeding as well as D shaped holes in bark created when adults bore through the bark. The larvae feeding underneath the bark cuts off the flow of water and nutrients to the rest of the tree and results in the mortality of the affected individual. Salvaging affected trees during timber harvesting operations is the only way to minimize the spread of this insect on a state forest wide scale. Fortunately, ash species make up a very low percentage of all the trees present within the Gilead Block. Therefore, this beetle has had a relatively low impact on these properties.

Photo 2.5. Photo of the galleries underneath the bark of a white ash tree caused by EAB which leads to the mortality of ash trees.

In areas dominated by white pine, the white pine weevil has influenced their quality. This insect lays its eggs in the topmost bud of white pine individuals. These eggs hatch and the larvae feed on the bud, thereby killing it and causing other branches to take over as the terminal leader. This results in a tree with three or more main stems. The quality of white pine with multiple stems due to this insect is typically degraded from sawlog quality to no more than pulpwood quality. This insect prefers high sunlight conditions. As a result, open grown trees are the most affected. The white pine stands in the interior of the forest that regenerated under partial shade are much less affected.

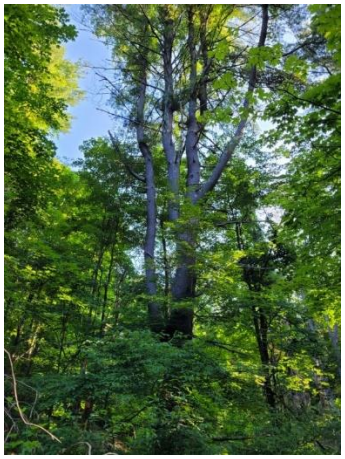


Photo 2.6. Photo of a white pine with multiple leaders, caused by white pine weevil damage.

Red pine scale is an exotic invasive insect originating from Asia that was first discovered in Easton Connecticut in 1946 and quickly became very detrimental to red pine plantations (Doane, 1959). Red pine plantations were common in state forests during that time period as a result of CCC planting efforts. The red pine scale feeds on the inner bark of host trees, eventually resulting in mortality. Some affected stands in the Gilead Block were salvaged in the 1980's and 1990's and are now young, pole sized mixed hardwood stands. Stands that were not salvaged are now most easily identifiable by red pine snags, or standing dead red pine trees, that were killed by red pine scale.

Photo 2.7. Photo of a red pine plantation that was killed by red pine scale. Notice the dead red pine stems have fallen over and are now rotting away on the forest floor while a stand of mixed hardwoods has naturally regenerated and taken the place of the red pine.

Forest Health: Invasives

Invasive plant species such as multi-flora rose, Japanese barberry, honeysuckle, Japanese stilt grass, Japanese knotweed, oriental bittersweet, and burning bush, sometimes called "winged euonymus" due to its twigs having a winged appearance, are commonly found in the Gilead Block. Invasive plants can threaten to displace native understory vegetation and can overtop young trees, suppressing their growth. These shrubs tend to be most dense on disturbed sites such as roadsides or on sites that are partially daylighted from adjacent openings such as on property boundary lines and field edges. There are typically lower densities of invasive plants in undisturbed, interior portions of the forest. Unfortunately, invasive species are so common throughout Connecticut and the rest of the northeast that eradication is not a realistic goal. However, efforts can and should be made to reduce invasive species density. Therefore, each timber harvest that is prescribed in this management plan will address invasive species. If levels are considered high enough to hinder the establishment of regeneration or will overtop advance regeneration, a treatment of the invasive plants in that area will be warranted prior to completing the silvicultural activity.

Also, within the Gilead Block there are areas where the combination of invasive insects causing tree mortality and high densities of invasive shrubs in the understory is resulting in a condition where if no action is taken, over time the forest will transition away from an area of trees to an area of invasive shrubs. This trend of forestland to invasive shrubland is a significant threat to forestland and must be addressed. In areas such as these, a combination of mechanical and chemical treatments of the invasive plants is a necessary first step towards sustaining the forest for future generations.

Photo 2.8. Photo of a stand within the Gilead Block with a dense understory of invasive shrubs. The invasive shrub issue is exacerbated within this stand due to the mortality of overstory ash trees, resulting from EAB, allowing full sunlight to the shrubs.

Forest Health: Wildlife Impacts

The impact of white-tailed deer on the productivity of forestland can be substantial. A staple in the diet of a deer is the buds and twigs of young trees. Once young trees have been browsed, they will then grow with a poor form and will be stunted from their full potential. Deer impact is a function of deer density, expressed in deer per square mile, and forage availability such as young trees and herbaceous vegetation (browse), acorns, and agricultural crops. Deer densities greater than 20 deer per square mile can have significant negative impacts on forest vegetation. Herbivory is of highest concern when conducting a regeneration harvest because even a moderate to low density of deer in a given area can have a high impact on the regeneration within a recently harvested forest stand, stunting its growth, quality, and potential for decades to come. As a result, when conducting regeneration harvests on these properties strategies will be employed to reduce browsing impacts. These strategies may include leaving high volumes of down woody material to make it difficult for deer to traverse the harvested area or fencing in sprouts of desirable regeneration to protect them from browsing when they’re most vulnerable (< 6 feet tall and at deer eye level).

Photo 2.9. Photo of a heavily browsed white pine seedling. Heavy browsing such as this hinders the future growth potential of affected trees.

Forest Health: Abiotic Factors

The primary abiotic factor that has a significant effect on forest health is weather. Extreme weather events such as tornados, hurricanes, ice storms and micro-bursts cannot be planned for. However, this management plan aims to be adaptive. After significant weather events, areas that were heavily affected will be re-assessed. If any immediate action would be advantageous to mitigate forest health impacts, those actions will be taken at that time.

A secondary abiotic factor that can impact forest health is fire. Fire is part of the natural disturbance regime of a forest. Some tree species are adapted to this disturbance and can benefit from the occurrence of a fire. An example of a tree species that is well adapted to fire is pitch pine which features thick bark that is able to withstand fire and serotinous cones that only open to release their seeds through the heat of a fire. Other tree species are less adapted to fire, such as red maple and black birch, which feature thin bark. Tree species such as this could be killed during a fire event. Frequent, low intensity fires are often part of a healthy forest disturbance regime and the flush of herbaceous growth after a fire can be beneficial to a variety of wildlife species. Connecticut has a very humid climate, making natural fires (caused by natural events such as lightening) rather uncommon. However, human caused fires, intentionally set prescribed fire as well as unintentionally set fires, are common across the state. No prescribed fires are scheduled for the Gilead Block during this management cycle. The DEEP Forest Protection program along with support staff from various other DEEP divisions are available to provide assistance in the event of a wildfire situation in these state lands.

Photo 3.0. Photo of storm damage within the forest. This white pine was uprooted and fell as a result of a high wind weather event.

F. Silvicultural Strategies and Climate Change Mitigation

Forest Carbon Science

With the understanding that rising atmospheric carbon dioxide levels are a primary cause of ever-increasing global temperatures, generally referred to as climate change, forests are often looked at as a way to offset climate change impacts. This is due to the fact that forests take in an enormous amount of carbon dioxide from the atmosphere through photosynthesis, using it to maintain themselves and grow (Catanzaro & D'Amato, 2019). Forests sequester and store carbon. However, the rate at which they do these is largely influenced by a variety of factors such as forest age and natural and/or anthropogenic disturbances. Carbon sequestration is greatest in young forests, peaking when the forest is around 30 to 70 years old, but will continue to sequester carbon throughout its entire life span (Catanzaro & D'Amato, 2019). A forests carbon storage level increases with its age in the form of live and dead aboveground biomass such as trees, down woody material, and soil (Catanzaro & D'Amato, 2019). As a result, in the context of forest carbon, there is a place for both forest reserves (areas that go unmanaged and/or not harvested that serve as carbon sinks) and other areas that receive management (through silvicultural treatments aimed at regenerating the forest, creating early successional habitat, and creating a forest that is sequestering high amounts of carbon from the atmosphere). This management plan aims at striking this balance by designated 430 acres as an Old Forestland Management Site as well as 994 forested acres that will not be actively managed in the next 10 years that will serve as a forest reserve and carbon sink, maximizing carbon storage. This plan balances this by scheduling silvicultural activity to be done on 175 acres in order to regenerate the forest, capture natural tree mortality, improve the growing conditions for residual trees, enhance and diversify wildlife habitat, and increase the forests carbon sequestration rate.

Rotations & Cutting Cycles

The Gilead Block is made up of undulating terrain, creating great contrast between riparian areas densely stocked with hemlock and white pine and upland areas filled with oak and northern hardwood species. In riparian areas either no management or uneven aged management will be recommended. This will maintain the natural hydrology of these areas and avoid sedimentation and erosion issues which could affect the water quality of the Salmon River watershed. Un-even aged treatments will use 25 year cutting cycles. During this plan period, 40 acres of un-even aged silvicultural treatments are scheduled.

In upland oak and northern hardwood sites un-even aged management typically results in the regeneration of undesirable, shade tolerant species, primarily beech that is prone to beech bark disease and beech leaf disease. As a result, even aged silvicultural treatments will be the primary focus of the management activities prescribed for this forest type. Even aged management will use 100-year rotations. During this plan period 135 acres of the forest will be scheduled to receive even aged silvicultural treatments.

The cutting cycle length and rotation age prescribed above are extended beyond the timeframes that have been historically recommended. This has been done to increase the carbon sequestration and storage potential of actively managed forest stands.

Forest Resilience

Biotic and abiotic forest health concerns, as described in the forest health section of this plan, often result in tree mortality. Considering all these forest health threats, managing for forest resilience is vitally important. A resilient forest has healthy trees of desired phenotypic traits, representing several age classes and a diversity of species. When a forest has these resilience traits, even when a forest health issue arises that results in tree mortality, there are trees already present on the site ready and able to fill the void created. In this way, the composition of the forest may change overtime, but it remains a forest.

After tree mortality occurs there may be opportunities to salvage dead individuals. Salvaging can be used to recoup economic value from the dead trees as well as control how much light reaches the forest floor to encourage the regrowth of desirable tree species. Salvaging may also take place in high public use areas to remove hazardous trees that could fall and create a dangerous situation to the public. In areas where tree mortality has occurred at a low density with scattered dead individuals throughout the forest, salvaging may not be warranted because retaining dead standing trees can serve as good wildlife habitat and is an important element of a healthy forest.

Active management through timber harvesting, and/or removal of invasive species aids in forest resilience by favoring native vegetation, creating space for all age classes of trees to grow, and maintaining healthy trees of desirable phenotypic traits that can withstand disturbances. However, unmanaged areas play a role as well by filtering water in riparian areas, maintaining the habitat created by older age classes of trees, and allowing natural succession to create a complex forest structure where multiple tree species and age classes are represented. As a result, 80 % of the forested acreage within the Gilead Block will be passively managed during the ten-year time period covered by this management plan, encouraging mature forest growth and the development of a more complex forest structure.

Expectations: Next 100 years in Succession

Within the next 10-year planning cycle, management actions will be taken on sections of the forest that were acquired since the last forest management plan was written and follow up treatments will be made on previously treated areas where applicable. Employing this strategy provides the opportunity for recently acquired parcels, that may have previously gone unmanaged or had been poorly managed, to be set on a long-term path of sustainable management and previously treated areas will receive the attention needed so they may continue on a long-term path of sustainable management. By the end of this 10-year planning cycle, 135 acres will have been treated using even aged silvicultural techniques and 40 acres will have been treated using uneven aged silvicultural techniques. The primary even aged silvicultural technique used will be the shelterwood; 71 acres will be treated with this method. The goal of this method is to regenerate a new cohort of trees by removing all the current trees from the stand through two or three cuttings. The partial removal of trees allows sunlight to reach the forest floor, stimulating the growth and establishment of young trees under the shelter of remaining dominant canopy level trees. Once regeneration has become well established the remaining dominant canopy level trees can then be removed to release the established regeneration to full sunlight. This technique is effective at regenerating shade intolerant and intermediate shade tolerant species such as oak and white pine. 64 acres will be treated using the thinning techniques. The goal of this method is to remove individuals of poor-quality trees away from adjacent higher quality individuals. This provides additional growing space to higher quality trees which increases growth rate and

mast production. Quality determination is based on insect and disease damage, live crown ratio, storm damage, and/or mechanical damage. The 40 acres that will be treated using uneven aged silvicultural techniques will be done so using the selection method. This method removes individual trees or groups of trees throughout a stand to allow sunlight to the forest floor in the gaps created by the removed trees. Regeneration will them become established in those gaps, thereby creating a new age class within the stand. This type of management results in an uneven aged forest, with multiple age classes represented, and is well suited for regenerating shade tolerant tree species such as hemlock and American beech. Therefore, 10 percent of the total land area in the Gilead Block will be receiving a silvicultural treatment. This management plan also aims to be adaptive in the next 10 years. The remaining portions of the block, not actively managed, will be actively monitored. If conditions arise, that are unforeseeable at this time such as destructive weather events or insect outbreaks that pose a significant detrimental effect to the forest resource, silvicultural options will be assessed, and emergency actions will be taken as necessary.

Table 1.2. Acres to be managed through even and un-even aged silvicultural techniques within the Gilead Block of Salmon River State Forest.

Acres to be Actively Managed			
Forest Cover Group	**Regenerate-Even Aged: Clear cut/Seed tree/Shelterwood**	**Regenerate-Uneven Aged: Single tree/Group Selection**	**Thinning: Free/Crown/Low/ Mechanical/Selection**
Elm-Ash-Red Maple	0	0	0
Maple-Beech-Birch	0	40	0
Oak-Hickory	71	0	64
Oak-Pine	0	0	0
Spruce-Fir	0	0	0
White-Red-Jack Pine	0	0	0
Total Acres	**71**	**40**	**64**

The following 10-year planning cycle (2035-2045) will aim to continue the strategy outlined above. Areas that were harvested using regenerating techniques, as prescribed in this management plan, will have regenerated a mixture of species. Intermediate treatments, such as timber stand improvement may then be employed to favor the best quality individuals of the most desirable species. Also, areas that were thinned, as prescribed in this management plan, may have developed into stands favorable for regeneration harvests to continue producing the next generation of forests. During the next 10-year planning cycle each stand will once again be put under the management planning micro-scope and intensive management will be brought to stands previously left to grow where it would be advantageous to do so.

The current forest is a direct by-product of management actions taken, insect and disease problems arising, herbivore browsing, and competing vegetation being present within the last 100 years. All of these forest influencing factors from European settlement to current day has produced the forest as we now know it. With there being more and more insect and disease issues plaguing forests, a steady demand for forest products ever present, and a rising climate change issue, the forest resource is under greater stress than ever. The next 100 years of management will be critical. Due to the near complete suppression of fire on Connecticut's landscape, continual deer browsing and the competitiveness of black birch, American beech, and red maple, it is likely that our forests will transition to a more northern hardwoods forest type and away from an oak/hickory forest type. Also, as average annual temperatures rise due to global warming, some tree species may become less prominent due to a shifting in their native range. Extreme weather events that can cause severe damage to forest ecosystems such as ice storms and hurricanes are predicted to become more frequent. However, through sustainable management practices that will continually choose desired phenotypic traits, representing several age classes and a diversity of species, over undesirable traits and monocultures, Connecticut's forests will be as resilient and as diverse as they can possibly be, preparing them to not only survive, but thrive over the next 100 years.

Adaptive Forest Management

The Division of Forestry understands the nature of forest management as it occurs as part of a dynamic landscape. Management actions are often affected by outside variables which influence the outcome of resource decisions. The Division of Forestry reserves the right to reasonably change our management approach as environmental change and resource needs warrant. Some of these changes may be associated with biological factors such as insect and disease, or population outbreaks. Increased unauthorized motorized recreation which erodes trails and roads may require action unforeseen during the composition of this plan. Additionally, environmental conditions such as hurricanes or record-breaking precipitation may additionally affect resource condition and work requirements. The Division of Forestry and our colleagues in Parks, Wildlife, Fisheries, and Agency Support, evaluate circumstances and use an adaptive-management philosophy and additionally reserve the right to address unforeseen circumstances should they arise during the tenure of this forest management plan.

G. Wildlife Habitat

Habitat Management

The DEEP Wildlife Division has a mission to advance the conservation, use, and appreciation of Connecticut's wildlife resources; and the Wildlife Division supports the Forestry Division in planning and conducting management within State Forests. Maintaining sustainable populations of wildlife requires suitable habitat. State-owned conservation land provides large tracts of undeveloped space that contain a diversity of habitats, and habitat management can further sustain and enhance the condition of these spaces. A variety of techniques are employed by resource managers, including silviculture, which can play an important role in the conservation of biological diversity in forested ecosystems. Silvicultural treatments help maintain healthy forests for wildlife and can be used to provide specific conditions that certain wildlife of conservation concern require, such as young forest or pitch pine-oak woodland. Within this block, the silvicultural treatments carried out by the Division of Forestry have helped maintain a healthy and diverse forest, and future treatments outlined in this plan will create additional suitable habitat for a wide array of wildlife including game species and Species of Greatest Conservation Need (SGCN) identified by the Connecticut Wildlife Action Plan (DEEP, 2015) which guides wildlife conservation efforts.

Other forms of habitat management that occur within State Forests and Wildlife Management Areas include maintenance of early successional habitats, invasive plant control, and maintenance of wetland impoundments where water levels are managed to create shallow water and vegetative conditions suitable for waterfowl, wading birds, and other wetland-dependent wildlife. Early successional habitats including grassland, shrubland, and agricultural land provide important habitat diversity for wildlife within State Forests; many wildlife species rely on early successional habitats to survive or reproduce. The Wildlife Division coordinates management of these areas. At the Gilead Block, there are three patches of grassland and shrubland habitat totaling approximately 20 acres. Most grassland and shrubland patches are maintained by the practice of conservation mowing wherein vegetation is mowed once every two to five years to maintain early successional conditions important to a variety of wildlife species. Prescribed fire, selective cutting, and selective herbicide applications may also be used to sustain these habitats. Invasive plant control aims to reduce the abundance of invasive plants through mechanical and chemical methods to allow native plants to grow and proliferate to benefit native wildlife and support healthy ecosystems. There are no areas of agricultural land managed through agricultural license agreement within the Gilead Block. There are no wetland impoundments within the Gilead Block.

The Wildlife Division's Migratory Bird Program maintains five wood duck boxes at Holbrook Pond. These boxes provide nesting opportunities for wood duck and hooded merganser. Boxes are cleaned and inspected annually for evidence of nesting activity and replaced as necessary. Invasive plant control of *Phragmites* is an important component of wetland management as this species can displace native plants thereby degrading wildlife habitat and critical habitats. *Phragmites* control by mechanical and chemical means may occur within wetland habitats as deemed necessary by the Wildlife Division.

Habitat Conditions and Landscape Context

Landscape-level conservation of wildlife requires land managers to consider actions in a regional context. The Gilead Block intersects with significant tracts of undeveloped forestland composed of large (>500 acres) and medium (250-500 acres) core forest blocks (UConn, 2015) within the increasingly fragmented landscape of southern New England. From 1985 to 2015, Connecticut lost an estimated 115,181 acres of forestland due primarily to development (UConn, 2015); a significant habitat loss for wildlife associated with forests. The town of Marlborough has experienced a 512-acre (-4.2 %) change in forest cover, and the town of Hebron has experienced a 656-acre (-3.7%) change in forest cover, from 1985 – 2015 (UConn, 2015). Sustaining large tracts of healthy and resilient forests is important for efforts to maintain sustainable wildlife populations in the face of ongoing land use conversion.

Following historical land clearing practices, the forest has grown since the 1920's with limited disturbance resulting in a somewhat homogenous forest that lacks structural complexity. As noted, many wildlife species require or benefit from forests that are diverse in age and structure that is mostly lacking in Connecticut. In general, a goal of maintaining at least 10-15 % of a landscape in young forest habitat is considered beneficial to wildlife and is within the historical range of what was present on the landscape and to which wildlife have become adapted (DeGraff & Yamasaki, 2003, Dettmers, 2003). A 2021 mapping effort to assess the statewide extent of young forest and shrubland habitat (Connecticut Young Forest and Shrubland Vegetation GIS Layer) estimates Connecticut is composed of approximately 3 % young forest/shrubland habitat. The current forest inventory indicates 9.9 % of forest land within the Gilead Block to be in the seedling/sapling age-class. A portion of the silvicultural treatments planned within these blocks of land seek to increase and sustain the proportion of seedling/sapling age-class forest to provide more of this habitat type for declining wildlife that rely on these habitats. The Gilead Blocks also features other early successional habitats (grassland and shrubland) that have become less common in Connecticut over the past 100 years due to land use conversion and forest maturation. The Wildlife Division (in cooperation with other Divisions) will continue to maintain and sustain these patches of habitat using management practices described in the pervious section.

Wildlife benefit from a diversity of habitats. Harvesting creates greater structural complexity (the size, spacing, and arrangement of live and dead vegetation) within the forest. Complexity within a forest includes multiple canopy layers (mature trees, mid-story trees, understory trees, ground, and shrub vegetation), edges, down woody material, standing dead trees (snags), and young/early successional vegetation. Gaps in the forest canopy of various sizes and shapes also adds to the complexity of the forest habitat. This diversification of the forest creates more opportunity for a wider range of wildlife species to meet their needs (food, water, cover) within the forest.

Biodiversity

The Gilead Block supports a wide range of wildlife associated with forested habitat. Sections of the Gilead Block fall within the vicinity of known occurrences of state and/or federally listed threatened, endangered or of special concern species. The Wildlife Division maintains a spatial database of known locations of threatened, endangered and special concern species and important natural communities - the Natural Diversity Database (NDDB). As part of the planning process, a data request was submitted to inform this plan and future management, and a Determination was received May 11, 2023. This report identified three turtle

species of special concern, one snake species of special concern, one mammal species of special concern, one freshwater mussel species of special concern, and one fish species of special concern. These species can be negatively affected when forestland is fragmented, converted to other uses, forest management operations take place during their active or breeding season, or when forest management operations do not buffer riparian areas and/or vernal pools according to best management practices for water quality (DEEP, 2012). Any timber harvesting done in the Gilead Block will be limited to the dormant season of the listed species above and/or will use best management practices outlined by the NDDB Program for conducting work in the forest while minimizing adverse impacts to listed species. In many instances, timber harvesting activity can enhance habitat for both listed and non-listed species. The Gilead Block also supports a wide array of forest generalists such as white-tailed deer, bobcat, and wild turkey. Black bears are present but relatively uncommon when compared to other regions of Connecticut. Moose have not been documented recently in this area.

American woodcock is an important migratory game bird that has experienced population declines throughout the northeast due in part to habitat loss and forest maturation. A SGCN, it is associated with young forest and other early successional habitats, and the Wildlife Division has created Focus Areas to help direct conservation efforts such as habitat creation and enhancement where existing environmental conditions are suitable. The Gilead Block is located within a regional American woodcock Focus Area (see Figure 1.4).

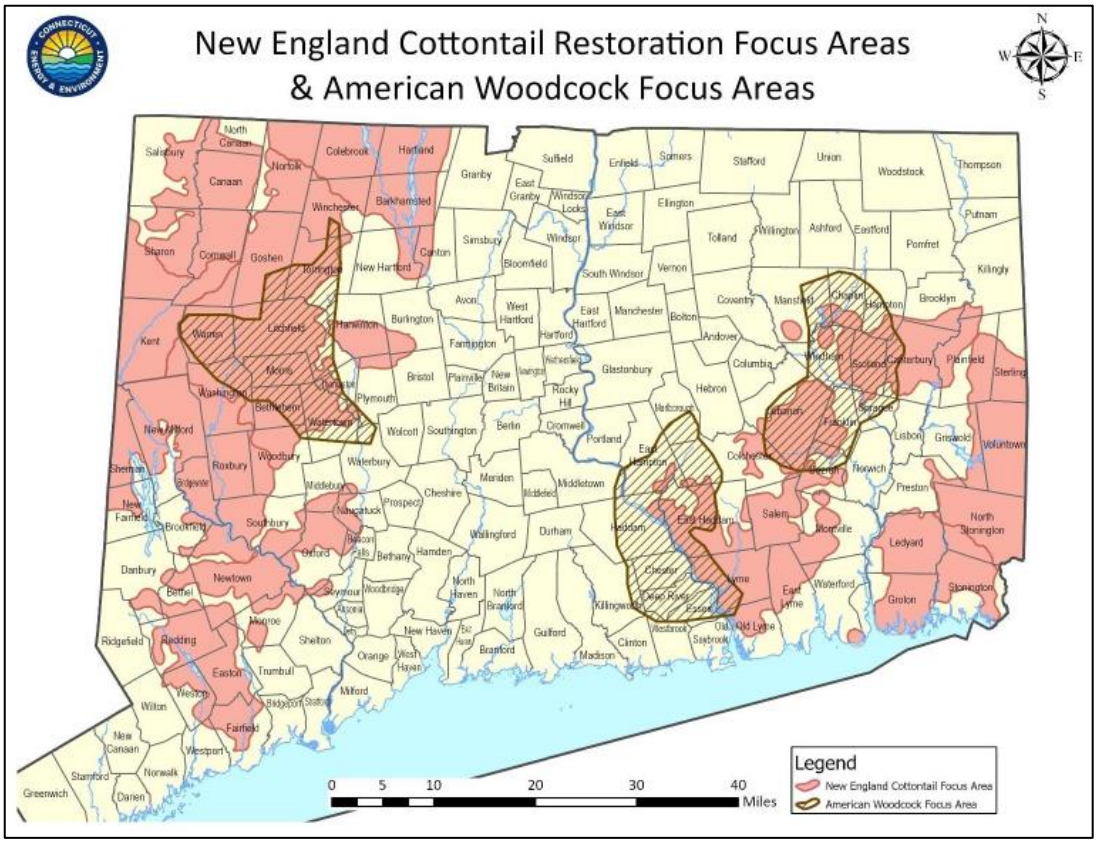


Figure 1.4. New England Cottontail Restoration Focus Areas and American Woodcock Focus Areas.

While American woodcock is a focal species for young forest habitat creation, over 50 SGCN rely on young forest or shrubland. This includes many birds such as eastern towhee, indigo bunting, prairie warbler, and chestnut-sided warbler; several State-listed reptiles known to occur here; and many invertebrates including pollinators. Also, many birds that nest within mature forest use areas of young forest for foraging and raising young. The silvicultural treatments indicated in this plan will benefit many species in this suite of disturbance dependent wildlife. Additionally, large tracts of sawtimber size class forest are important for many forest nesting birds such as ovenbird, worm eating warbler and wood thrush. Significant amount of suitable habitat will remain unmanaged in this planning period and be available to these species; and silvicultural practices that promote growth in the midstory and understory while retaining intermediate to high levels of canopy cover are consistent with maintaining or creating suitable habitat for these species. A list of bird species observed during the recent Connecticut Breeding Bird Atlas (2018-2021) in and around the Gilead Block are provided in the appendix of this management plan.

Wildlife-based Recreation

The Gilead Block is open to all forms of regulated hunting (archery and shotgun for small game, waterfowl, wild turkey, and white-tailed deer), fishing, and trapping. Regulated trapping is allowed with a State Lands Trapping Permit. Public access maps for these lands are available for viewing or printing on the DEEP Public Hunting Areas in CT Webpage which can be accessed through the CT DEEP Hunting and Trapping website. These maps may also be obtained by contacting the CT DEEP Eastern District Headquarters in Marlborough. For additional information pertaining to hunting, trapping, and fishing regulations, seasons and permits visit the CT DEEP Hunting and Trapping website and the CT DEEP Fishing Guide (ct.gov). Opportunities for wildlife-based recreation such as birding, wildlife photography, and wildlife viewing are available year-round throughout the entire property.

Fisheries Habitat and Best Management Practices

There are multiple significant fisheries resources within the Gilead Block, including the Blackledge River, the Fawn Brook, and Holbrook Pond. Efforts by the state to preserve and manage the forestland adjacent to these waterbodies have helped protect the quality of the fisheries resource. Watershed management efforts combined with fisheries efforts to protect, sustain, and diversify fish habitat have resulted in these water bodies being a vital habitat resource for a variety of fish species. In conjunction with these efforts to manage and protect streams, rivers, ponds, and adjacent forestland, is a robust stocking program aimed at enhancing and diversifying recreational fishing. The Blackledge River is stocked annually with thousands of brown trout, rainbow trout, among several other species creating great opportunities for anglers.

To protect the Blackledge River, Fawn Brook, Holbrook Pond, and the associated fisheries habitat from erosion and sedimentation resulting from land management activities, Best Management Practices (BMP's) for water quality will be followed before, during, and after all management activities, such as timber harvesting. These practices are outlined in Best Management Practices for water quality while harvesting forest products (DEEP, 2012). Practices include considerations for trail layout, landing/staging location, stream crossings, vernal pool buffers, silt fencing, water bar placement and spacing, as well as clean up and close out measures to take post-harvest.

H. Recreation

The Gilead Block offers many excellent recreational opportunities.

Fishing is a popular activity, particularly during the springtime, as the Blackledge River is well stocked with a variety of fish, and it flows directly through the block. The Fawn Brook and Holbrook Pond are also popular fishing destinations within the block.

Hunting is another popular activity within this block of forestland, particularly during the deer shotgun season within the month of November.

Holbrook Pond is a popular location for canoeing and kayaking.

Hiking trails are a vital tool for connecting people with nature and are highly valued by the public. Trails are a common feature on most DEEP properties and are some of our greatest recreational amenities. Trails can even help protect rare habitats and sensitive resources by concentrating use on designated, sustainable pathways. However, state forestland is intended to be managed for the ecological integrity of forest ecosystems. Unauthorized, user created trails often erode the intended management purpose of these properties and limit their management potential. Recreationalists are asked to obey by the rules and regulations that govern the use of these properties and to follow formal channels through DEEP for proposing the creation, use, and maintenance of trails (DEEP Policy/Procedure # 310, 2019).

Although there are no officially authorized trails within this block of forestland, the unmaintained and abandoned town roads that traverse this block of land, such as Parker Road, Old Willimantic Turnpike, Slocum Road, and Skinner Lane are well used hiking paths.

The primary recreational concern on these properties is the use of off-road vehicles such as motorcycles (dirt bikes), All-Terrain Vehicles (ATVs), and 4 x 4 Jeeps and trucks. Public lands in Connecticut are a finite resource that have a limited number of staff available for maintenance of trails and remediation of rutted and eroded areas of concern. Off-road vehicles create a visual and noise disturbance to wildlife and trails fragment and degrade habitat quality. Continued use of unmaintained trails by off-road vehicles often results in rutting, erosion, and sedimentation. As a result, the use of off-road vehicles on state lands is prohibited. Regardless, individuals continue to ride their off-road vehicles on state lands. There are many non-authorized off-road vehicle trails throughout the Gilead Block. Greater enforcement actions need to be taken to protect public lands in Connecticut from this incompatible, unauthorized use. Gates will be installed at commonly used motorized vehicle access points, as described in the Work Plans section of this plan, as a deterrent to this type of use. Gates do not deter all motorized vehicle users and many forest users may be unaware of what uses are not authorized. Therefore, signage will be posted at access points describing the authorized and non-authorized uses of the forest, keeping users well informed of what the intended use of the forest is.

I. Economic Benefits

According to the Forest Products Industries Economic Contributions: Connecticut 2020, the total output of Connecticut's Forest Products Industry was $ 3.96 billion. Of that, primary wood product manufacturing was $ 198 million, secondary wood product manufacturing was $ 402 million, wood furniture was $ 781 million, and paper manufacturing was $ 2.5 billion. Connecticut does not have pulp and paper mills and/or manufacturing facilities. As a result, the paper manufacturing economic contributions represents recycling of paper waste and cardboard, not the use of Connecticut grown wood fiber. Forestry and logging accounted for an additional $ 26 million in output (Public Sector Consultants & Emmerthal, 2020). State forestland in Connecticut is, collectively, the largest landholding in the state. The Division of Forestry, state lands management program has a diversity of goals for this landholding, one being to supply a sustainable source of forest products. According to the 2020 Annual Report Summary prepared by the Forestry Division's Forest Practices Act Program, between 2015 and 2018, Connecticut averaged 27.5 million board feet for sawtimber and veneer purchased from all lands in the state. Approximately 7.6% of this harvest came from state land during this time period which is below the average of 10.2% between 1997 and 2018.

This management plan prescribes silvicultural work to be completed on 175 acres, 10 % of the total acreage within the Gilead Block. Through this work, trees are removed to improve the growth and quality of residual trees and to allow for natural regeneration to become established. The trees removed are sold as a forest product and depending on their size, species, and/or quality they will be sawn for lumber, peeled for veneer, ground into wood chips, or burned as firewood. These products contribute to a local forest economy and support many individuals such as foresters, loggers, truckers, sawyers, and carpenters.

Photo 3.1. Timber harvesting operations such as the one shown in this photo contribute to the local forest economy while improving growing conditions for residual trees, regenerating a new cohort of young trees, and diversifying wildlife habitat within the forest.

J. Public Involvement

Public involvement and receiving stakeholder input are critical aspects of public lands management. Therefore, a preliminary draft of this forest management plan was shared with the towns that this forest resides within, Hebron and Marlborough as well as the Connecticut Horse Council, Connecticut Forest & Park Association (CFPA), the southeast Connecticut chapter of the New England Mountain Biking Association (NEMBA), the New England chapter of Backcountry Hunters & Anglers (BHA), the Connecticut Conservation Advisory Council, Audubon Connecticut, the Thames Valley Chapter of Trout Unlimited, and the Salmon River Watershed Partnership. These municipalities and organizations are considered major stakeholders in the management of this forest because collectively they represent the constituents of the community the forest is located within, recreational opportunity, trail stewardship, and the conservation of vital wildlife habitat. Theses stakeholders were asked to review the plan, over a month-long period, and provide any comments or concerns they might have. Through this process comments were received from the Salmon River Watershed Partnership, the New England chapter of Backcountry Hunters & Anglers, and one resident of Hebron. Revisions were made to the plan accordingly to reflect issues and concerns expressed in the comments received.

To increase transparency between DEEP and the public an additional outreach process has been adopted to provide the public with the opportunity to review management plans and submit comments, suggestions, and/or concerns. This involved posting a notice on DEEPs Public Notices website for a duration of one month. The notice stated that DEEP Division of Forestry intends to adopt with final approval the Salmon River State Forest: Gilead Block Forest Management Plan. The notice included contact information for the plans author, a map of the management plan area as well as the infographic included at the beginning of this plan. Interested individuals could then contact the author of the plan, requesting a copy of the plan to review. Through this process, comments were received from the New England chapter of BHA and the State of Connecticut Council on Environmental Quality (CEQ). These comments were incorporated into the plan before final approval and publishing on the CT DEEP website.

This plan will be made available to the public. State forest management plans are published on the CT DEEP website and can be found by following this link Forest Management on State Lands. Comments and questions regarding the plan are always encouraged. Also, this plan may serve as a resource for local municipalities and non-profit organizations that are actively planning for open space protection and conservation.

K. Management Goals

- Establish 430 acres of Old Forestland Management Sites
- Promote, enhance, and protect significant habitat
- Maintain areas of mature forest to serve as carbon storage
- Create young forest to increase the rate of carbon sequestration
- Create young forest and early successional habitat to diversify wildlife habitat
- Control invasive species to prevent them from suppressing native vegetation
- Support sustainable recreation while discouraging non-authorized uses that threaten the integrity of the forest resource
- Adaptive management principles will be utilized if damage to the forest is caused by events that are unforeseen at this time such as adverse weather and insects or disease infestations

L. Work Plans

Silvicultural Operations Schedule

Table 1.3. Table of the silvicultural activities scheduled for the next 10 years within the Gilead Block.

Year	Compartment	Stand	Acreage	Activity
2025	7	1	41	Shelterwood
2026	1	5	18	Shelterwood
2026	1	2	10	Thinning
2026	1	3	12	Thinning
2027	13	3	12	Shelterwood
2027	13	4	42	Thinning
2029	15	2	23	Selection
2029	15	3	17	Selection
Total Acreage			**175**	

Prescribed Fire

No prescribed fire is scheduled for this management cycle within the Gilead Block.

Forest Product Permits

Several forest products will be available to the public periodically on these properties throughout this management plans timeframe. These products are firewood, mountain laurel boughs and branches, witch hazel, and maple taps for sap collection. The harvesting of these products is conducted under the forest products harvest permit system. To learn more about forest products harvest permits or to acquire a permit, e-mail the Division of Forestry at DEEP.Forestry@ct.gov. Products are available on a first come, first serve basis, availability may be limited, and may only be available seasonally.

Invasive Treatments

In the Gilead Block invasive plants pose two significant risks to the forest. First, in stands where a silvicultural treatment is planned invasive plants can take advantage of the canopy gaps and disturbed soils. This would result in the suppression and overtopping of regeneration, rendering the silvicultural treatment ineffective at establishing a new cohort of native trees within the effected stand. As a result, invasive plants in stands scheduled for a silvicultural treatment must be addressed.

Secondly, there is a section of this block (Compartment 16, Stand 1) where the density of invasive plants has reached an extreme level. This has been exacerbated by emerald ash borer and spongy moth, both of which have resulted in the mortality of trees throughout the stand that have created canopy gaps, effectively daylighting the invasive shrubs that were already in the understory. This stand has little to no advance regeneration, with no prospects of developing regeneration due to the dense layer of invasive shrubs. As the overstory trees continue to die of insect and disease issues or age out, the stand will gradually be converted from forestland to shrubland. This is an increasingly common phenomenon as forest health issues become more numerous, causing tree mortality, while a wide variety of invasive plants wait in the understory to take advantage of newly open forest canopy gaps. High site index areas with deep, moist, rich soils are most susceptible as invasive shrubs thrive in these soil types. This site must be addressed to sustain the forest and to prevent the loss of forestland acres for future generations.

Chemical treatment, such as the use of herbicides, is the preferred invasive treatment method. This is because chemical treatments can target individual plants or large groups and they are effective at killing an entire plant, above and below ground. Also, from a time and economic management perspective, herbicide treatments are more efficient than alternative mechanical control methods. In very high-density areas of invasives it is often necessary to use a combination of mechanical and chemical treatments. This may include mowing or cutting and follow up herbicide applications. Areas that have received an invasive control treatment will be monitored on an annual basis, for three to five years post-treatment, to assess the effectiveness of the treatment and to plan for follow up treatments if necessary.

Holbrook Pond supports a very diverse and dense community of aquatic plants. The Office of Aquatic Invasive Species of the Connecticut Agricultural Experiment Station (CAES) conducted a survey of the waterbody in July of 2004. In this survey 23 plant species were found, including three invasive species (Capers & Selsky, 2004). The most abundant species found were white water lily, fanwort, yellow water lily, and watershield (Capers & Selsky, 2004). The invasive species that were found were fanwort, curlyleaf pondweed, and variable leaf watermilfoil hybrid (Capers & Selsky, 2004). Invasive aquatic plants displace native vegetation, alter the habitat and ecosystem of the waterbody, and can make most forms of recreation such as kayaking and fishing difficult. 20 years have elapsed between this survey and the writing of this management plan. As a result, it is recommended that during this plans timeframe the pond be resurveyed. This will help CAES and DEEP understand how the plant community is changing overtime within Holbrook Pond. Updated survey results will also help land managers develop a better understanding of how to best manage aquatic invasives within this pond.

Table 1.4. Table describing where, when, and the extent of invasive treatments planned in the next ten years within the Gilead Block.

Year	Compartment	Stand	Acreage
2025	1	2	10
2025	1	3	12
2025	1	4	19
2026	13	2	2
2026	13	4	42
2028	15	4	20
2028	17	1	24
2028	17	3	7
2030	16	1	92
		Total Acreage	**228**

Road Work

There is only one state forest road within the Gilead Block, Holbrook Pond Road that begins at Route 85 and ends at Holbrook Pond. This 0.7-mile-long road provides access to the forest around Holbrook Pond as well as the pond for boating, hunting, and fishing. Currently, this road is surfaced with broken-up asphalt and asphalt millings. This road has a generally neutral grade, and as a result, erosion is not a significant degradation factor. However, the condition of the road is poor with many potholes, largely due to high use with little maintenance. This road will be resurfaced and regraded during the duration of this management plan to improve its current condition and maintain it for public use in the future.

Other Infrastructure Improvements -culverts, gates, boundary surveys

The 207-acre property that was recently acquired and incorporated into this block has 2,100 feet of road frontage on Jones Hollow Road in the town of Marlborough. This road frontage includes two access points, one at the north end of the property where North Parker Road (unmaintained town road) meets Jones Hollow Road and another at the south end of the property where an old farm road comes out to Jones Hollow Road. Gates were installed at both access points to discourage motorized vehicular use within the forest. This property was acquired with funding from the Federal Aid in Wildlife Restoration Program. This property has one boundary line encroachment issue; a neighboring horse pasture extends onto what is now state-owned land. The office of Land Acquisition and Management (LAM) will be consulted to evaluate and resolve this pasture encroachment issue.

There is a wooden bridge parallel with and directly downstream of the Holbrook Pond dam. This is a foot traffic only bridge and is often used by the public when recreating around Holbrook Pond. This bridge is in a state of disrepair. As a result, DEEP Engineering and Support Services will be consulted and a plan will be drafted and executed to repair and/or replace this bridge.

Due to the use and deterioration of the unmaintained, discontinued and/or abandoned town roads that traverse this block of land, such as Parker Road, Old Willimantic Turnpike, Slocum Road, and Skinner Lane, the installation of five additional gates at the access points to these roads is recommended. These gates will aid it deterring off road motorized vehicle access to these roads and any associated trails throughout this block of land. Signage will also be posted at all gate locations informing users of the authorized and unauthorized uses of the forest.

These five locations are as follows:

1. Southern entrance to Parker Road
2. Southern termination of Old Willimantic Turnpike, intersection of Old Willimantic Turnpike and Route 66 (Hebron Road)
3. Western termination of Old Slocum Road, access point to Old Willimantic Turnpike
4. Intersection of Blackman Road and Slocum Road, eastern edge of the Fawn Brook section
5. Eastern termination of Old Slocum Road, western edge of the Fawn Brook section

Habitat Enhancement Work

The Wildlife Division will continue to coordinate periodic mowing and selective treatments as necessary to maintain non-forested upland areas. Fields will be evaluated annually and mowed once every two to five years to sustain grassland and shrubland habitat. Selective herbicide spot application and selective cutting may also be employed to maintain desired habitat conditions. The Wildlife Division will support forest habitat management as needed by funding certain non-commercial forest management practices that aim to enhance wildlife habitat. As needed, the State Lands Habitat Management Program will continue to aid in monitoring beaver activity within this block and address problems where public health and safety and/or important habitats are being threatened. Assistance from Agency Support Services, Parks, and the Wetlands Habitat and Mosquito Management Program in providing equipment and personnel may be requested.

Non-Commercial Forest Products Work

Non-commercial forest products work includes timber stand improvement and mowing/mulching projects. Timber stand improvement is an important step to take on a site where the goal is to grow healthy, quality trees of the species composition that is desired. Silvicultural regeneration efforts made within the Gilead Block in the last 40 years have resulted in an abundance of black birch, red maple, and American beech regeneration. To favor the growth of the best quality individuals of these species for future sawtimber production as well as to maintain an oak component within the forest, timber stand improvement is necessary. Timber stand improvement is analogous to weeding a vegetable garden, in that poor quality and/or undesirable individuals are removed to provide additional growing space to neighboring good quality, desirable individuals. Opportunities to conduct this work within the Gilead Block are available in several stands, most notably in stands that have had a regenerative silvicultural operation within the last 40 years and now have young growth of sapling to pole sized trees. These stands include Compartment 5 Stand 3 and Compartment 7 Stand 2, both of which had a shelterwood harvest completed in 2012.

Mowing/mulching is often employed to mechanically remove invasive shrub species, reclaim shrubland or grassland habitats, and/or to remove poor-quality trees of little commercial value to provide additional growing space to adjacent desired individuals. Mowing will be completed in Compartment 1 Stand 1 (13 acres of abandoned agricultural fields) once every two to five years to sustain grassland habitat. Mowing will also be used in Compartment 17 Stand 3, a 7-acre stand of autumn olive and honeysuckle, to remove these invasive shrubs in favor of native shrubs and herbaceous vegetation. The prescribed thinnings in Compartment 1, Stands 2 and 3 may also be completed non-commercially through mowing/mulching as these stands are mostly comprised of poor-quality timber of little commercial value but would be beneficial to complete to feather habitat edges and release pitch pine. Mowing may also be employed as part of the recommended invasive treatment in Compartment 16 Stand 1 to mechanically remove dense stands of Japanese barberry, honeysuckle, and multi-flora rose.

Timber stand improvement and mowing/mulching work within these stands will be worked on periodically throughout the duration of this management plan utilizing DEEP forestry staff and/or independent contractors as time and funding are available.

Hazardous Trees

With the plethora of forest health concerns described in this management plan, the mortality of some trees is inevitable. Although having some dead trees in the forest is part of a healthy forest ecosystem, too may dead trees can create potentially hazardous situations. Dead trees can shed branches or fall onto a target of value such as a vehicle, parking lot, road, gate, sign, or in a worst-case scenario, a person. As a result, hazard mitigation through the removal of dead or dying trees in areas where they could be hazardous has become part of the overall maintenance of state properties. Within the Gilead Block a contractor was hired to remove hazardous trees along Holbrook Pond Road and the Holbrook Pond boat launch. This was the primary area of concern within this block as this is the only state-maintained road within the block and the area is heavily used by the public. There are no significant hazard tree removal projects planned for this block of forestland in the next 10 years. Should additional hazard trees arise, they will be addressed by forestry, wildlife, and parks staff appropriately, paying consideration to public safety, DEEP employee safety, and impacts to associated natural and recreational resources.

Salmon River State Forest: Gilead Block Work Plan by Year						
Year	**Scheduled Activity**	**Forest Compartment**	**Forest Stand**	**Restrictions**	**Area**	**Project Lead**
2025	Address Encroachment Issue	1	1	None	0.37 Acres	Land Acquisition & Management
2025	Holbrook Pond Bridge Repair/Replacement	N/A	N/A	None	16 Feet	Engineering & Support Services
2025	Invasive Treatment	1	2	Seasonal	10 Acres	Forestry/Wildlife
2025	Invasive Treatment	1	3	Seasonal	12 Acres	Forestry/Wildlife
2025	Invasive Treatment	1	4	Seasonal	19 Acres	Forestry/Wildlife
2025	Shelterwood	7	1	TBD	41 Acres	Forestry
2026	Holbrook Pond Roadwork	N/A	N/A	Seasonal	0.7 Miles	Support Services
2026	Invasive Treatment	13	2	Seasonal	2 Acres	Forestry
2026	Invasive Treatment	13	4	Seasonal	42 Acres	Forestry
2026	Shelterwood	1	5	TBD	18 Acres	Forestry/Wildlife
2026	Thinning	1	2	TBD	10 Acres	Forestry/Wildlife
2026	Thinning	1	3	TBD	12 Acres	Forestry/Wildlife
2026	Gate Installation	N/A	N/A	Seasonal	4 Gates	Forestry/Support Services
2027	Holbrook Pond Aquatic Plant Survey	15	11	Seasonal	73 Acres	CAES
2027	Shelterwood	13	3	TBD	12 Acres	Forestry
2027	Thinning	13	4	TBD	42 Acres	Forestry
2028	Invasive Treatment	15	4	Seasonal	20 Acres	Forestry
2028	Invasive Treatment	17	1	Seasonal	24 Acres	Forestry
2028	Invasive Treatment	17	3	Seasonal	8 Acres	Forestry
2029	Selection	15	2	TBD	23 Acres	Forestry
2029	Selection	15	3	TBD	17 Acres	Forestry
2030	Invasive Treatment	16	1	Seasonal	92 Acres	Forestry
2030	Boundary Line Maintenance	N/A	N/A	None	20 Miles	Forestry
2030	Update Forest Management Plan	All Compartments	All Stands	None	1767 Acres	Forestry

DEEP Division of Wildlife will complete brush mowing, cutting of woody stems and/or trees, and selective herbicide treatments to maintain native early successional grassland and shrubland habitat within Compartment 1 Stand 1. DEEP Division of Forestry will complete timber stand improvement in Compartment 5 Stand 3 and Compartment 7 Stand 2 as time and funding allow.

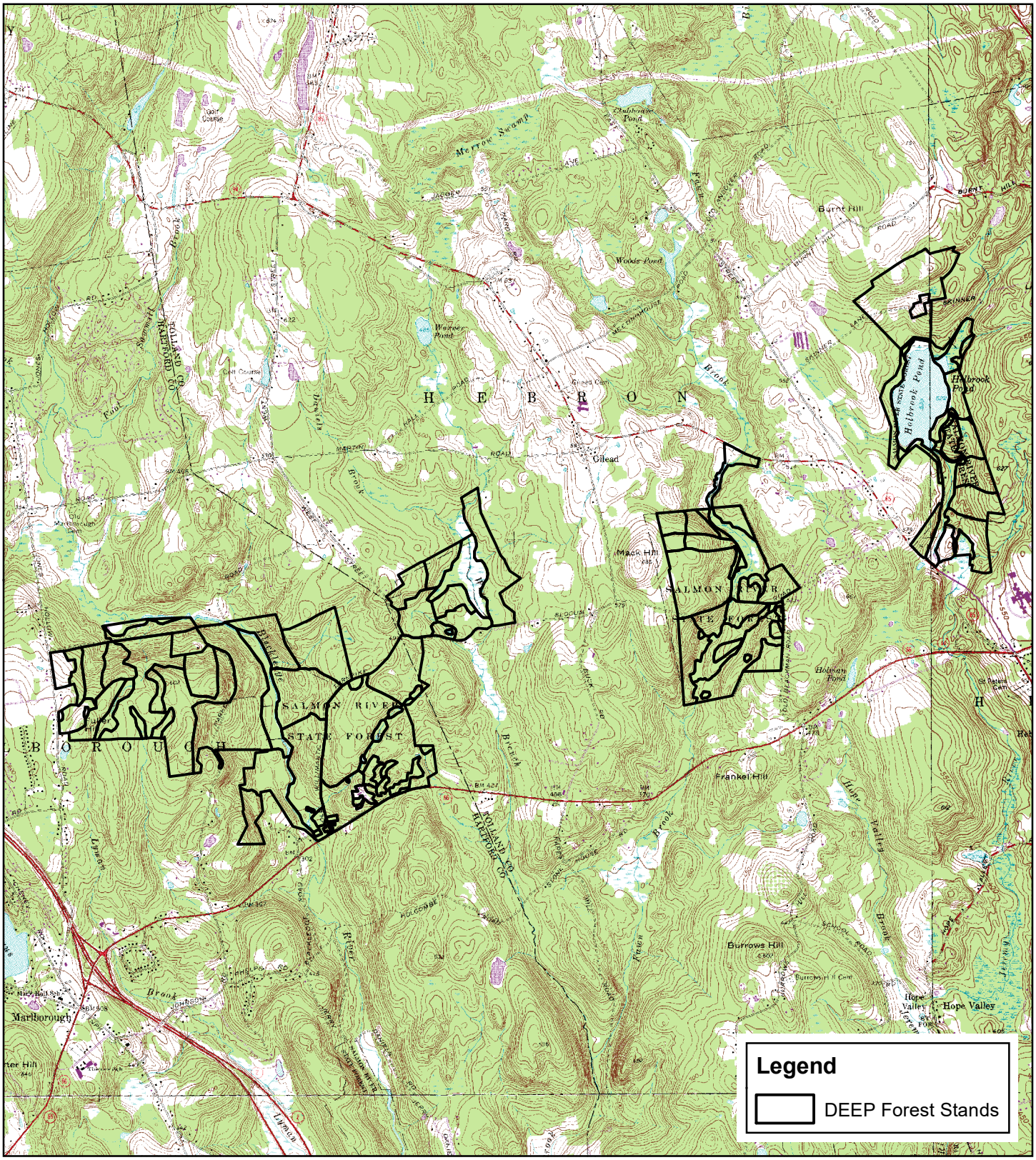
Map A - Topographic
Salmon River State Forest
Gilead Block

Marlborough & Hebron, Connecticut
1,767 Acres

Drafted by: Nathan Piché
3/15/2023

Map Scale: (1:45,000)

0 0.35 0.7 1.4 Miles



Coordinate System: NAD 1983 State Plane Connecticut FIPS 0600 Feet

Projection: Lambert Conformal Conic

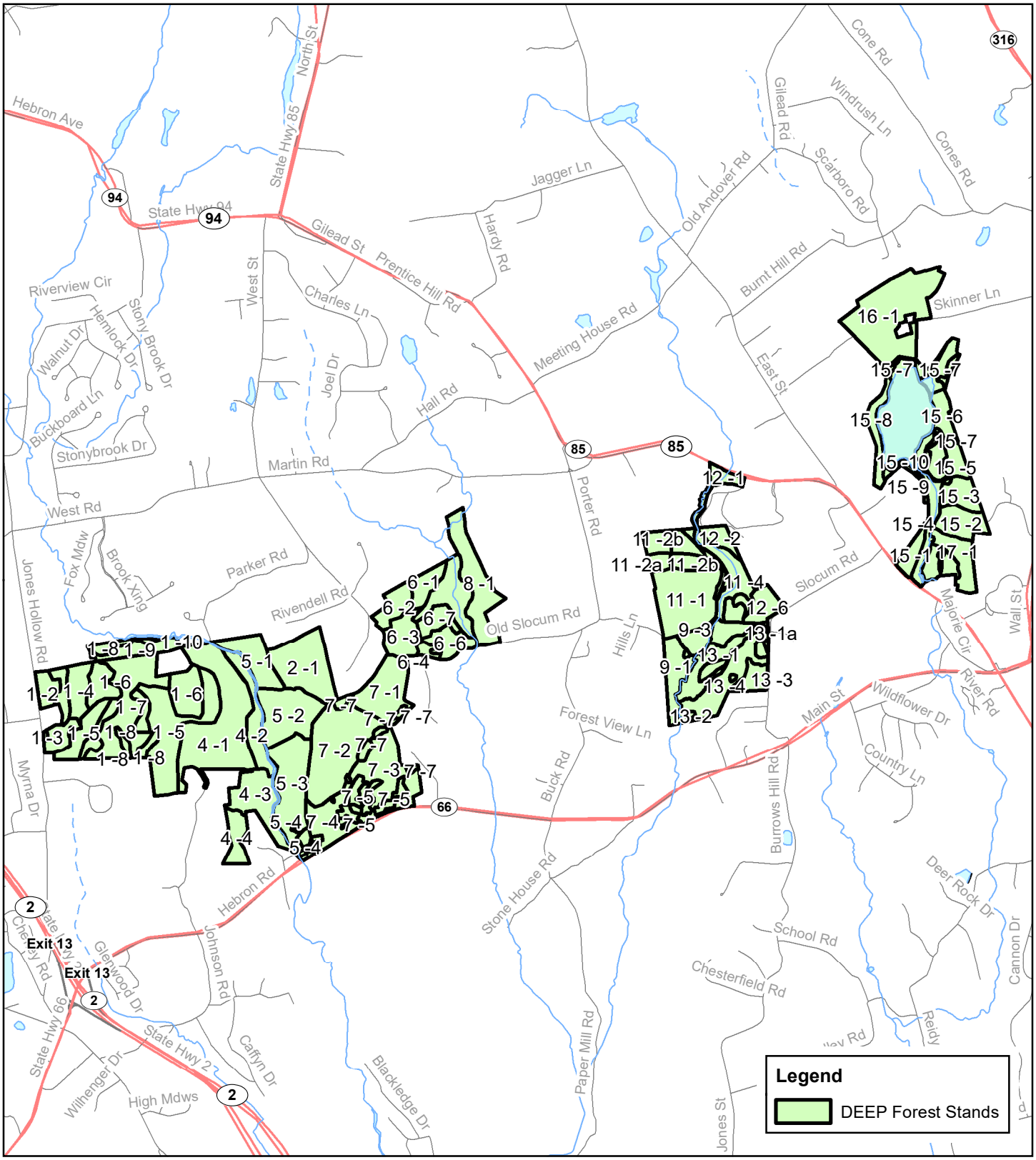
Map B - Base
Salmon River State Forest
Gilead Block

Marlborough & Hebron, Connecticut
1,767 Acres

Drafted by: Nathan Piché
3/15/2023

Map Scale: (1:45,000)

0 0.35 0.7 1.4 Miles



Coordinate System: NAD 1983 State Plane Connecticut FIPS 0600 Feet

Projection: Lambert Conformal Conic

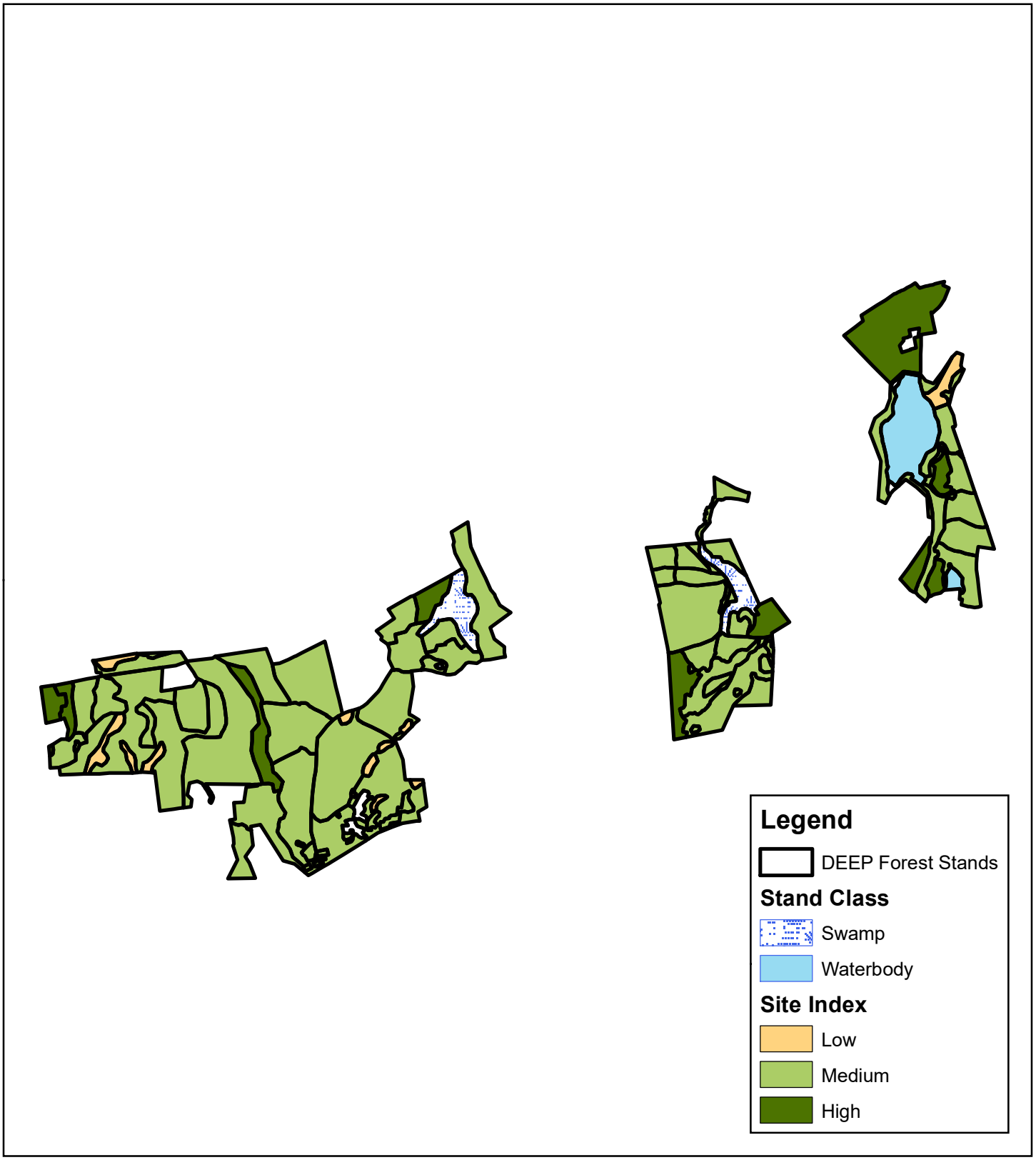
Map C - Site Quality
Salmon River State Forest
Gilead Block

Marlborough & Hebron, Connecticut
1,767 Acres

Drafted by: Nathan Piché
3/15/2023

Map Scale: (1:45,000)

0 0.35 0.7 1.4 Miles



Coordinate System: NAD 1983 State Plane Connecticut FIPS 0600 Feet

Projection: Lambert Conformal Conic

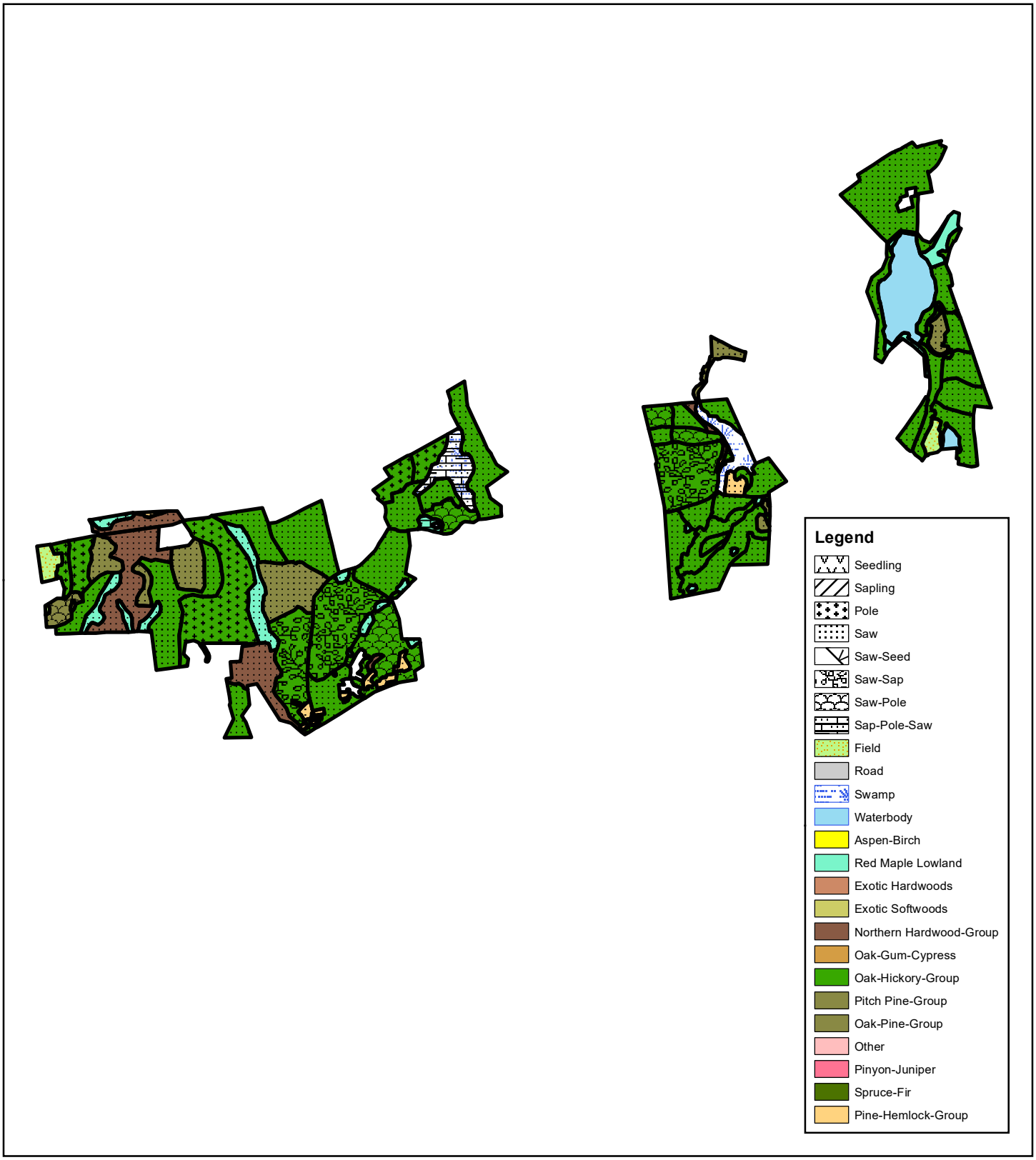
Map D - Forest Type & Size Class
Salmon River State Forest
Gilead Block

Marlborough & Hebron, Connecticut
1,767 Acres

Drafted by: Nathan Piché
3/15/2023

Map Scale: (1:45,000)

0 0.35 0.7 1.4 Miles



Coordinate System: NAD 1983 State Plane Connecticut FIPS 0600 Feet

Projection: Lambert Conformal Conic

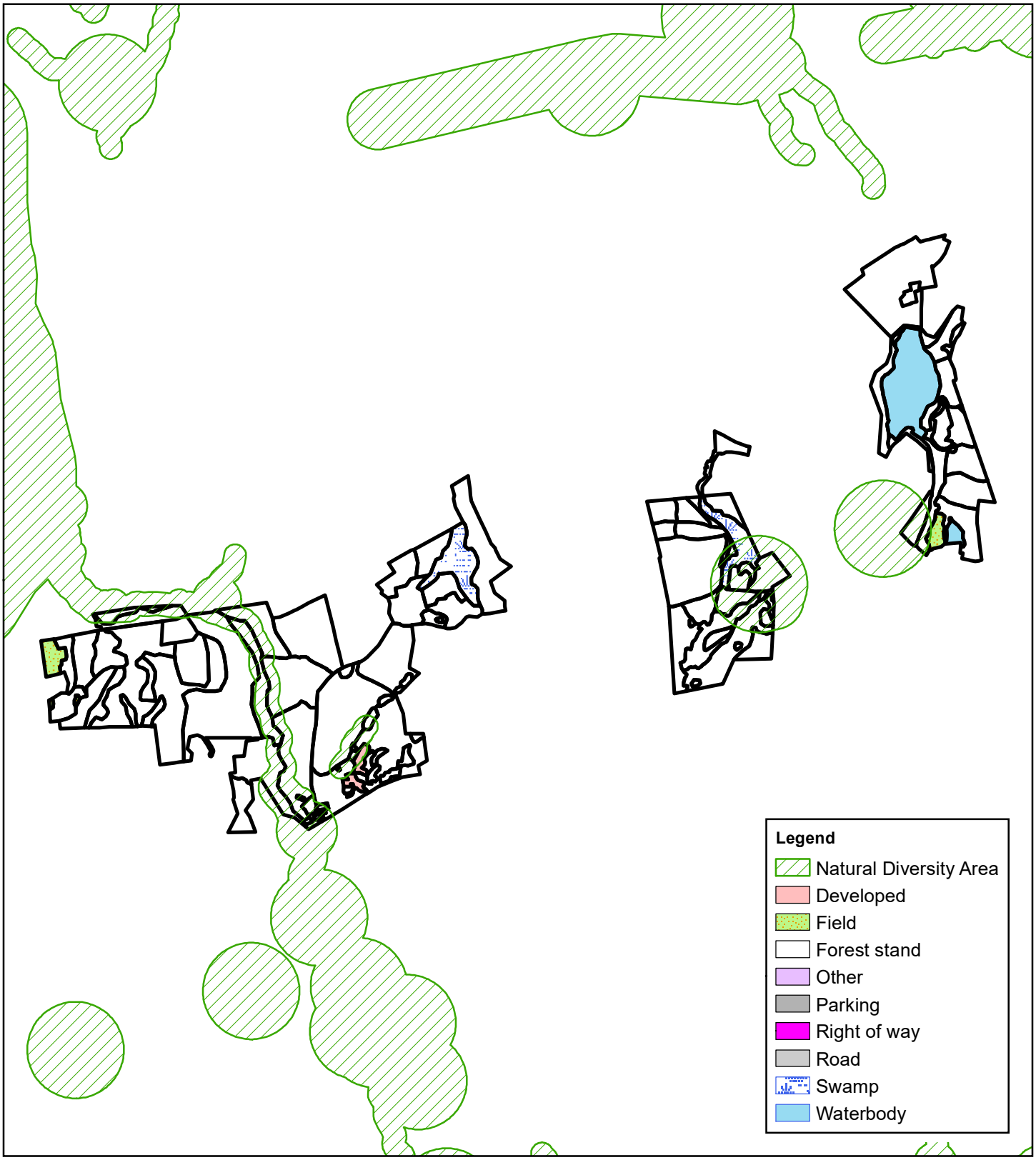
Map E - Special Features
Salmon River State Forest
Gilead Block

Marlborough & Hebron, Connecticut
1,767 Acres

Drafted by: Nathan Piché
3/15/2023

Map Scale: (1:45,000)

0 0.35 0.7 1.4 Miles



Coordinate System: NAD 1983 State Plane Connecticut FIPS 0600 Feet

Projection: Lambert Conformal Conic

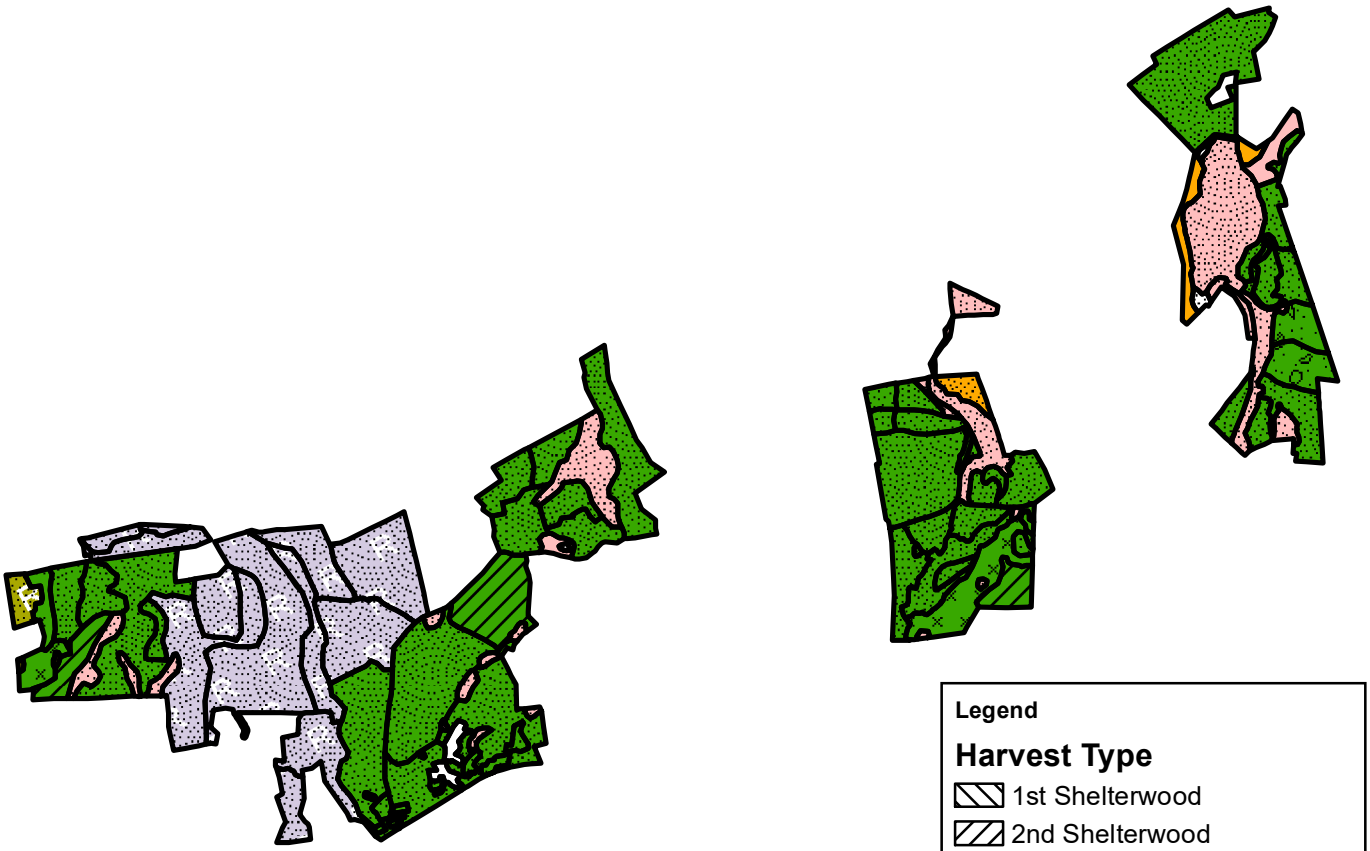
Map F - Work Plan
Salmon River State Forest
Gilead Block

Marlborough & Hebron, Connecticut
1,767 Acres

Drafted by: Nathan Piché
3/15/2023

Map Scale: (1:45,000)

0 0.35 0.7 1.4 Miles



Legend

Harvest Type
- 1st Shelterwood
- 2nd Shelterwood
- Clear Cut
- Final Shelterwood
- Irregular Shelterwood
- Selection Harvest
- Thin
- Timber Stand Improvement

Work Plan
- Growing

Management Status
- active
- inaccessible
- inactive
- inoperable
- wildlife
- Natural Area
- Old Forest Management Site
- Recreation Area

Coordinate System: NAD 1983 State Plane Connecticut FIPS 0600 Feet

Projection: Lambert Conformal Conic

Appendix A

Appendix Section

List of Tables, Figures & Photos

Salmon River State Forest Land Acquisition			
Grantor	**Town**	**Date Acquired**	**Acres**
Pettipaug Co.	Haddam	10/6/1933	0.34
Haraczkiewicz, Joe & Anto	Colchester	5/28/1952	5.00
Haraczkiewicz, Joe & Anto	Colchester	6/19/1952	63.00
Pettipaug Company	Haddam	10/6/1933	0.34
Carrier, Edgar A.	Colchester	7/19/1934	3.00
Clark, Fred B.	Colchester	11/14/1934	5.00
Gerhardt, William	Colchester	11/20/1934	25.00
E. Hampton Bank & Trust	East Hampton	12/1/1934	162.50
Adams & Phelps	East Hampton	1/1/1935	6.00
CL&P	East Hampton	1/1/1935	20.90
Partridge, William	East Hampton	1/7/1935	38.00
Partridge, William F.	East Haddam	1/17/1935	50.00
Adams, Elizabeth P.	East Hampton	2/7/1935	3.00
Phelps, William N.	East Hampton	2/7/1935	3.00
CL&P	East Hampton	5/7/1935	25.00
Pettipaug Company	Haddam	10/25/1935	0.30
Clark, William E.	Marlborough	12/27/1935	50.00
Bunce, James H.	East Haddam	3/8/1937	2.00
Markham, H.& A.	Colchester	12/8/1937	5.00
CL&P	East Haddam	12/28/1938	20.00
Brown, Howard Est.	East Hampton	9/11/1941	170.00
Larson, Andrew G.	Colchester	9/27/1941	240.00
Phelps, Flora C.	Colchester	9/27/1941	100.00
Brown, Curtis P.	East Hampton	9/30/1941	22.00
Clark, Guy	Colchester	11/28/1941	85.00
Ellsworth	East Hampton	1/1/1942	18.00
Williams Susan D.	Marlborough	1/16/1942	85.00
Williams, Susan D.	Colchester	1/16/1942	235.00
Rankl, John P.	Marlborough	1/30/1942	250.00
Williams, Susan D.	Colchester	3/6/1942	24.00
Lord, Leona	Marlborough	3/18/1942	115.00

Furlong, Frank P.	Marlborough	6/22/1942	260.25
Harrackieiwcz, A. T.	Colchester	7/14/1942	10.00
Ellsworth, Oliver B.	Colchester	9/8/1942	458.00
Phelps, Flora C.	East Hampton	9/9/1942	0.00
Ellsworth, Oliver B.	Marlborough	9/11/1942	106.10
Ellsworth, Oliver B.	East Hampton	9/19/1942	30.00
Christenson, Chris S.	Marlborough	6/16/1943	400.00
Kennedy, Robert C.	Marlborough	8/25/1943	112.00
Handley, Jesse J. Estate	Hebron	1/13/1944	40.00
Wilcox, J.&G.	Hebron	1/15/1944	115.00
Wilcox, J.&G.	Hebron	3/18/1944	115.00
Wimmer, John A.	Hebron	8/28/1944	90.00
Hewitt, John N.	Hebron	8/29/1944	136.00
Azcher, Edmond l.	Colchester	9/20/1944	7.00
Kellogg, Rachael	Hebron	9/21/1944	25.00
Zacher, L.E.	Hebron	9/21/1944	214.50
Ranel, John	Marlborough	9/27/1944	100.00
Rankl, John	Colchester	9/27/1944	20.00
Brown, Howard Est.	Hebron	9/30/1944	170.00
Tyler, Dorothy	East Haddam	9/8/1945	2.50
Murphy, Anna Mae	Hebron	9/12/1945	268.00
Murphy, Anna Mae	Marlborough	9/12/1945	75.00
Seliew, Ralph G.	Marlborough	3/18/1947	267.00
Savitsky, Stanley J.	Colchester	11/2/1950	3.00
Savitsky, Stanley J.	Colchester	11/2/1950	2.00
Carrier, Edgar A.	Colchester	3/28/1953	40.00
USA	East Hampton	1/1/1954	204.00
USA	Colchester	12/17/1954	294.70
USA	East Hampton	12/17/1954	204.10
USA	Marlborough	12/17/1954	106.10
USA	Hebron	12/18/1954	198.20
Brown Estate, H.C.	Colchester	9/10/1957	30.00
Brown Estate, H.C.	Colchester	11/6/1957	2.00
Connwood Inc.	Colchester	8/4/1961	50.00
Camp Raman	East Haddam	3/21/1969	2.00
DOT	Hebron	2/25/1981	0.21
Rossi Corp.	East Hampton	8/18/1986	27.00
DOT	East Hampton	2/2/1987	27.08

DOT	Lebanon	6/18/1987	0.00
Milton Arnold	Colchester	11/20/1987	55.00
DOT	Hebron	5/31/1988	34.41
DOT	Colchester	4/5/1990	0.68
Thereault, Robert & Carol	East Haddam	5/6/1991	2.80
Bernstein, Myron R.	East Haddam	12/23/1991	1.70
Bernstein, Myron R.	East Haddam	12/23/1991	1.40
Bernstein, Myron R.	East Haddam	12/28/1992	1.10
Bernstein, Myron R.	East Haddam	12/22/1993	1.10
Green, Carl	East Haddam	12/22/1993	9.35
Foot, Edward A. etal	Hebron	11/15/1994	59.60
Bernstein, Myron R.	East Haddam	12/19/1994	1.20
Martin, R.Y.	Colchester	12/5/1995	3.57
Epstein Pearl	Colchester	4/9/1996	15.12
Mailhot, Lionel	Hebron	8/6/1997	0.51
Jones, Robert L.	Hebron	6/19/2000	59.02
Holcombe, Thomas H.G.	Marlborough	10/10/2000	157.70
Campbell, W. & M.	Hebron	6/26/2001	92.31
Coropinski, John	Hebron	3/28/2002	46.28
DOT	East Hampton	11/10/2002	40.69
Fireman's Association	East Hampton	10/19/2006	8.00
Strong, Myron et al	Marlborough	4/13/2007	53.59
Reneson, Peter & Virginia	Colchester	6/16/2008	14.86
Rechovous Corp	East Hampton	12/20/2013	116.95
Regional Capital Management	Colchester	2/3/2015	60.03
Saner, Robert & Mary	Marlborough	4/27/2015	289.50
Lord, Arthur & Virginia	Marlborough	10/16/2020	207.68

Bird species observed as Probable or Confirmed breeding: CT Breeding Bird Atlas Blocks 69C, 69E (2018-2021).
*Species of Greatest Conservation Need (CT Wildlife Action Plan)

Acadian Flycatcher	Hooded Warbler
American Goldfinch	House Finch
American Redstart	House Sparrow
American Robin	House Wren
American Woodcock*	Indigo Bunting*
Baltimore Oriole*	Mallard
Barn Swallow	Mourning Dove
Barred Owl	Northern Cardinal
Black and white Warbler*	Northern Flicker*
Black capped Chickadee	Northern Mockingbird
Black throated Green Warbler	Northern Rough winged Swallow
Blue gray Gnatcatcher	Orchard Oriole
Blue Jay	Ovenbird*
Brown headed Cowbird	Pileated Woodpecker
Canada Goose	Pine Warbler
Carolina Wren	Prairie Warbler*
Cedar Waxwing	Red bellied Woodpecker
Chipping Sparrow	Red eyed Vireo
Common Grackle	Red shouldered Hawk
Common Merganser	Red tailed Hawk
Common Yellowthroat	Red winged Blackbird
Cooper s Hawk	Rose breasted Grosbeak*
Downy Woodpecker	Ruby throated Hummingbird
Eastern Bluebird	Scarlet Tanager*
Eastern Kingbird*	Song Sparrow
Eastern Phoebe	Tree Swallow
Eastern Towhee*	Tufted Titmouse
Eastern Wood Pewee*	Veery*
European Starling	Warbling Vireo
Field Sparrow*	White breasted Nuthatch
Gray Catbird	Wild Turkey
Great Crested Flycatcher	Wood Thrush*
Great Horned Owl	Worm eating Warbler*
Hairy Woodpecker	Yellow throated Vireo

Glossary

Acceptable Growing Stock: Saleable trees that are of good form, species and quality and would be satisfactory as crop trees.

Adaptive Management: A dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used to modify management on a continuing basis to ensure that objectives are being met (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Adverse Regulatory Actions: Written warning, citations or fines issued by law enforcement or regulatory bodies.

Aerial Photo: Photo taken from an elevated position like on an aircraft.

Afforestation: The establishment of a forest or a stand in an area where the preceding vegetation or land was not forest. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Age Class: A distinct aggregation of tree that originated at the same time, from a single natural event or regeneration activity or a grouping of trees (e.g. ten year age class) as used in inventory or management. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Aspect: The direction that a slope faces (north, south, etc.).

Basal Area: The cross-sectional area of a tree, in square feet, at 4.5 feet from the ground (at breast height). When the basal area of all the trees in a stand are added together, the result is expressed as square feet of basal area per acre, which is a measure of a stand's density.

Biomass: A renewable energy source of biological materials derived from living, or recently living organisms, such as wood, waste, and crop residues.

Biodiversity: The variety and abundance of life forms, processes, functions and structures of plants, animals and other living organisms, including the relative complexity of species, communities, gene pools and ecosystems at spatial scales that range from local through regional to global (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Board Feet: A unit for measuring wood volumes. It is commonly used to express the amount of wood in a tree, sawlog, or individual piece of lumber. A piece of wood 1 foot long, 1 foot wide, and 1 inch thick (144 cubic inches).

Broadcast: To spread or apply seed, fertilizer, or pesticides more or less evenly over an entire area. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Canopy: The more or less continuous cover of branches and foliage formed collectively by the tops, or crowns of adjacent trees.

Carbon Sequestration**:** The process of removing carbon from the atmosphere for use in photosynthesis. This results in the maintenance and growth of plants and trees. Generally, carbon sequestration rates are greater in younger (20-70 years old) forests. It is expressed as a rate. It is expressed as a negative value because it indicates the removal of CO2 from the atmosphere.

***Carbon Leakage*:** This is a situation that can occur when there is an increase in greenhouse gas emissions in one geographic area as a result of a reduction of emissions in another geographic area. For example, due to costs related to climate policies in one geo-political area (state, province, country, etc.), a business transfers production to another geo-political area with more relaxed climate policies. This situation could lead to an increase in total emissions. Regulatory bans on forestry in CT results in leakage – the reliance of wood products from further away, in unregulated systems has a greater carbon footprint associated with it than sourcing our wood locally.

***Carbon Storage*:** The amount of carbon in a defined area (tree, acre of forest, cord of wood, etc.). This term is typically used in reference to the carbon stored in aboveground woody biomass, 50% of which is carbon. It is stored in multiple pools in the forest, above and below ground. It is expressed as an amount per defined area (usually mega ton or tons per acre/hectare, etc.). Carbon storage is most often greatest in older, structurally complex forests.

Chip: A small piece of wood used to make pulp or wood composite or fuel. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Clearcut:
1. A stand in which essentially all trees have been removed in one operation – note depending on management objectives, a clearcut may or may not have reserve trees left to attain goals other than regeneration.
2. A regeneration or harvest method that removes essentially all trees in a stand. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Contour Map: A map where each line represents a change in elevation.

Crop Tree: A tree identified to be grown to maturity for the final harvest cut, usually on the basis of its location with respect to other trees and its timber quality.

Cull: A tree, log, lumber or seedling that is rejected because it does not meet certain specifications for usability or grade. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Culvert: A device used to channel water. It may be used to allow water to pass underneath a road, railway, or embankment for example. Culverts can be made of many different materials; steel, polyvinyl chloride (PVC) and concrete are the most common. Formerly, construction of stone culverts was common.

Cutting Cycle: The time interval between harvesting operations when uneven-aged methods are employed using group or single tree selection.

Den Tree: A living tree with a cavity large enough to shelter wildlife.

Desired Species: Those species of flora and fauna designated in the landowner's management plan and not known to cause negative impacts on the local environment.

Diameter Breast Height (DBH): The diameter of a tree at 4.5 feet above the ground.

Down Woody Material: Any piece(s) of dead woody material (e.g. dead tree trunk, limbs, large root ball) on the ground in the forest or in streams. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Endangered Species: Any species of plant or animal defined through the Endangered Species Act of 1976 as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Even-Aged Management: Forest management with periodic harvest of all trees on part of the forest at one time or over a short period to produce stands containing trees all the same or nearly the same age or size.

Forest Health: The production of forest conditions by which the resilience, recurrence, persistence, and biophysical processes occur, leading to sustainable ecological conditions. An understanding of forest health is greatly dependent on spatial scale as well as the forests ability to satisfy human needs (USDA Forest Service, Science and Technology, Forest Health).

Forest Owner: Landowner or designated representative such as, but not limited to, professional resource manager, family member, trustee, etc.

Forest Product: Any raw material yielded by a forest. Generally defined in Forest Acts or Ordinances, and subdivided conventionally into major forest products, i.e. timber and fuelwood, and minor forest products, i.e. all other products including leaves, fruit, grass, fungi, resins, gums, animal parts, water, soil, gravel, stone and other minerals on forest land (F. C. Ford –Robertson, Terminology of Forest Science Technology, Practice, and Products, Society of American Foresters, 1971).

Forest Stand Improvement: See timber stand improvement.

Forest Type: A category of forest usually defined by it trees, particularly its dominant tree species as based on percentage cover of trees, e.g. spruce fir, white pine, northern red oak.

Forest vitality: The health and sustainability of a forest.

Fuel Management: The act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire in support of land management objectives. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Group Selection: Trees are removed and new age classes are established in small groups. The width of groups is commonly approximately twice the height of the mature trees with smaller openings providing microenvironments suitable for tolerant regeneration and large openings providing conditions suitable for more intolerant regeneration. The management unit or stand in which regeneration, growth and yield are regulated consists of an aggregation of groups. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Girdling: Completely encircling the trunk of a tree with a cut that severs the bark and cambium of the tree. Herbicide is sometimes injected into the cut to ensure death of the tree.

GPS (Global Positioning System) Coordinates: A commonly hand held, satellite based navigational device that records x, y, z coordinators and other data allowing users to determine their location on the surface of the earth. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Hack-n-Squirt: A tree treatment method where an axe or hatchet is used to make “hacks” (injections) into the tree’s cambium layer. A plastic “squirt” bottle is used to spray a specific amount of herbicide into the cuts placed around the tree.

Harvesting: The felling skidding, on-site processing, and loading of trees or logs onto trucks. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

High conservation value forests (HCVF): Forests of outstanding and critical importance due to their environmental, social, biodiversity or landscape values. Due to the small scale and low-intensity of family forest operations, informal assessment of HCVF occurrence through consultation with experts or review of available and accessible information is appropriate.

High-Grading: Cutting only the high-value trees from a forest property, leaving a stand of poor quality with decreased future timber productivity.

Incentive Programs: State and federal agencies will offer landowners the opportunity to apply for incentive programs that will provide support and financial assistance to implement forestry and agroforestry related practices through conservation programs. Assistance can also provide for multi-year and permanent easements to conserve forest land to meet program goals.

Integrated Pest Management: The maintenance of destructive agents, including insects, at tolerable levels by planned use of a variety of preventative, suppressive, or regulatory tactics and strategies that are ecologically and economically efficient and socially acceptable (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Intermediate Cut: Removing immature trees from the forest sometime between establishment and stand harvest to improve the quality of the remaining forest stand. Contrast this technique with a harvest cut.

Invasive species: Non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112 (Feb. 3, 1999). Invasive Species: is a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., insects, microbes, etc.). Human actions are the primary means of invasive species introductions. (Invasive Species Definition Clarification and Guidance White Paper Submitted by the Definitions Subcommittee of the Invasive Species Advisory Committee (ISAC), Approved by ISAC Apr 27, 2006.)

Ladder Fuel**:** This is a wildland firefighting term used to describe live or dead vegetation that allows a fire to climb up from ground level or the forest floor into the tree canopy.

Landings: A cleared are in the forest to which logs are yarded or skidded for loading onto trucks for transport. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Landowner: Entity that holds title to the property for which the management plan is being written.

Large Woody Debris: Any piece(s) of dead woody material, e.g. dead boles, limbs and large root masses, on the ground in the forest stands or in streams. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Log Rules: A table showing estimated amount of lumber that can be sawed from logs of given lengths and diameters. The log rule commonly used in Connecticut is the International ¼ -inch Rule. The International ¼-inch Rule is a formula rule allowing 1/2 – inch taper for each 4 feet of length and 1/16-inch shrinkage for each one-inch board. This measure approximates the actual sawmill lumber tally.

Management Plan: Documents that guide actions and that change in response to feedback and changed conditions, goals, objectives and policies. Management plans may incorporate several documents including, but not limited to, harvest plans, activity implementation schedules, permits and research.

Mast: Nuts of trees, such as oak, walnut, and hickory, that serve as food for many species of wildlife.

Mature Tree: A tree that has reached the desired size or age for its intended use.

MBF: Abbreviation for 1,000 board feet.

Noxious Plant (weed): A plant specified by law as being especially undesirable, troublesome and difficult to control (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Nutrient Cycle: The exchange or transformation of elements among the living and nonliving components of the ecosystem. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Overstocked: A forest stand condition where too many trees are present for optimum tree growth.

Overstory: That portion of the trees in a stand forming the upper crown cover.

Overstory Removal: The cutting of trees constituting an upper canopy layer to release trees or other vegetation in an understory. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Pesticide: Pesticides include chemicals commonly known as herbicides and insecticides.

Pole Timber: Trees from 6 inches to 12 inches in diameter at breast height.

Prescribed Burn/Fire: To deliberately burn natural fuels under specific weather conditions, which allows the fire to be confined to a predetermined area and produces the fire intensity to meet predetermined objectives. A fire ignited by management to meet specific objectives (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Pruning: Removing live or dead branches from standing trees to improve wood quality.

Pulpwood: Wood cut primarily for manufacture of paper, fiberboard, or other wood fiber products.

Qualified Contractor: Forest contractors who have completed certification, licensing, recommended training and education programs offered in their respective states.

Qualified Natural Resource Professional: A person who by training and experience can make forest management recommendations. Examples include foresters, soil scientists, hydrologists, forest engineers, forest ecologists, fishery and wildlife biologists or technically trained specialists in such fields.

Rare species: A plant or animal or community that is vulnerable to extinction or elimination.

Reforestation: The reestablishment of forest cover either naturally (by natural seeding, coppice, or root suckers) or artificially (by direct seeding or planting) – note reforestation usually maintains the same forest type and is done promptly after the previous stand or forest was removed. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Regeneration: The number of seedlings or saplings existing in a stand. The process by which a forest is renewed by direct seeding, planting, or naturally by self-sown seeds and sprouts.

Regeneration Cut: Any removal of trees intended to assist regeneration already present or to make regeneration possible.

Release: To free trees from competition by cutting, removing, or killing nearby vegetation.

Riparian: Related to, living or located in conjunction with a wetland, on the bank of a river or stream but also at the edge of a lake or tidewater – note the riparian community significantly influences and is significantly influenced by, the neighboring body of water. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Riparian Zone: The area adjacent to or on the bank of rivers and streams.

Rotation Age: The age at which a stand is considered ready for harvest under the adopted plan of management or the culmination of mean annual increment.

Sapling: Trees from 2 inches to 6 inches in diameter at breast height.

Sawtimber: Trees at least 12 inches in diameter at breast height from which a sawed product can be produced.

Scale: The extent of forest operations on the landscape/certified property.

Seedling: A young plant.

Seed-Tree Harvest: A harvest and regeneration method where nearly all trees are removed at one time except for scattered trees to provide seed for a new forest.

Selection Harvest: Harvesting trees to regenerate and maintain a multi-aged structure by removing some trees in all size classes either singly or in small groups.

Shelterwood Harvest: A harvesting and regeneration method that entails a series of partial cuttings over a period of years in the mature stand. Early cuttings improve the vigor and seed production of the remaining trees. The trees that are retained produce seed and also shelter the young seedlings. Subsequent cuttings harvest shelterwood trees and allow the regeneration to develop as an even-aged stand.

Single Tree Selection: Individual trees of all size classes are removed more or less uniformly throughout the stand, to promote growth of remaining trees and to provide space for regeneration. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Site Index: An expression of forest site quality based on the height of a free-growing dominant or co-dominant tree at age 50 (or age 100 in the western United States).

Skid: 1. To haul a log from the stump to a collection point (landing) by a skidder. 2. A load pulled by a skidder. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Skid Trail: A road or trail over which equipment or horses drag logs from the stump to a landing.

Skidding: Pulling logs from where they are cut to a landing or mill.

Slash: The residue, e.g., treetops and branches, left on the ground after logging or accumulating as a result of storm, fire, girdling, or delimbing. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Snag: A standing, generally un-merchantable dead tree from which the leaves and most of the branches have fallen – note for wildlife habitat purposes, a snag is sometimes regarded as being at least 10 inches in diameter at breast height and at least 6 feet tall; a hard snag is composed primarily of sound wood, generally merchantable, and a soft snag is composed primarily of wood in advanced stages of decay and deterioration. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Soil Compaction: The process by which the soil grains are rearranged, resulting in a decrease in void space and increasing bulk density. Can occur from applied loads, vibration or pressure from harvesting or site preparation equipment. Compaction can cause decreased tree growth, increased water runoff and soil erosion. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Soil Map: A map showing the distribution of soils or other soil map units in relation to prominent physical and cultural features of the earth's surface. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Special Sites: Those areas offering unique historical, archeological, cultural, geological, biological or ecological value.
Special Sites include:
A. Historical, archaeological, cultural and ceremonial sites or features of importance to the forest owner;
B. Sites of importance to wildlife such as rookeries, refuges, fish spawning grounds, vernal ponds and shelters of hibernating animals;
C. Unique ecological communities like relic old-growth, springs, glades, savannas, fens and bogs; and
D. Geological features such as terminal moraines, cliffs and caves.

Stand: A group of trees with similar characteristics, such as species, age, or condition that can be distinguished from adjacent groups. A stand is usually treated as a single unit in a management plan.

Stand Density: A measure of the stocking of a stand of trees based on the number of trees per area and diameter at breast height of the tree of average basal area.

Stand Management Recommendations: The recommended management activities that should be done in that stand, based on the landowner's goals and objectives.

Stand Structure: The horizontal and vertical distribution of plants in the forest, including the height, diameter, crown layers, and stems of trees, shrubs, understory plants, snags and down woody debris. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

State Forestry Best Management Practice(s) (BMPs): Forestry BMPs are generally accepted forest management guidelines that have been developed by state forestry agencies with broad public stakeholder input.
Stocking: An indication of the number of trees in a stand in relation to the desirable number of trees for best growth and management.

Sustainability: The capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity and overall integrity, in the long run, in the context of human activity (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Sustainable Forest Management: The practice of meeting the forest resource needs and values of the present without compromising the similar capability of future generations (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998). Note – AFF's Standards of Sustainability reflect criteria of sustainability based on the Montreal Process, 1993, and the PanEuropean Operational- Level Guidelines (PEOLGs).

Thinning: A cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality. Types of thinning include: chemical, crown, free, low, mechanical, selection. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Threatened Species: A plant or animal species that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future. A plant or animal identified and defined in the Federal Register in accordance with the Endangered Species Act of 1976. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Timber Stand Improvement (TSI): A thinning made in immature stands to improve the composition, structure, condition, health, and growth of the remaining trees.

Undesirable Growing Stock (UGS): Trees of low quality or less valuable species that should be removed in a thinning.

Understocked: Insufficiently stocked with trees.

Understory: All forest vegetation growing under an overstory. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Uneven-Aged Management or Stand: A stand of trees containing at least three age classes intermingled on the same area.

Visual Quality Measures: Modifications of forestry practices in consideration of public view, including timber sale layout, road and log landing locations, intersections with public roadways, distributing logging residue, tree retention, timing of operations and other factors relevant to the scale and location of the project.

Volume: The amount of wood in a tree, stand of trees, or log according to some unit of measurement, such as board foot, cubic foot, etc.

Watershed: The area of land where all of the water that is under it or drains off of it goes into the same place. For example, the Mississippi River watershed includes all the land that drains into the Mississippi River. This watershed is the fourth largest in the world and includes water from 31 states.

Wetland: A transitional area between water and land that is inundated for periods long enough to produce wet soil and support plants adapted to that environment. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Wolf Tree: A very large, over-mature tree that is or was open grown. These trees tend to have large full crowns and numerous branches.

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