

STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL
PROTECTION



Bureau of Natural Resources

Division of Forestry

FOREST MANAGEMENT PLAN

2011 through 2020

Meshomasic State Forest
Mountain Block

6,270 acres

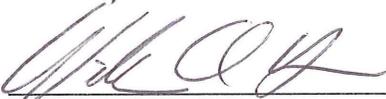
East Hampton, Portland
Glastonbury & Marlborough

Approvals:



Christopher Martin, Director
Division of Forestry

Jan 26, 2012
Date



William Hyatt, Chief
Bureau of Natural Resources

12/28/11
Date



Susan Frechette, Deputy Commissioner
Outdoor Recreation and Natural Resources

Jan. 4, 2012
Date

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Bureau of Natural Resources
DIVISION OF FORESTRY

Memorandum

9/22/2011

To: Susan W. Frechette
From: Christopher Martin, Director/State Forester
RE: 10-year Management Plan – Meshomasic State Forest, Mountain Block

The State Forest System is managed by the staff of the Division of Forestry's State Lands Management Program. Each of the six field foresters is responsible for the management of the vegetation found on the State Forest Lands assigned to them. The foundations for that work are comprehensive 10-year natural resource management plans that are developed for the forester's assigned area.

These plans set the management priorities for DEEP foresters to follow as they work to maintain dynamic ecosystems by increasing species diversity and age class diversity in forest stands. The management of state-owned lands aims to be responsive to the social and economic needs of Connecticut's population, while providing for these needs in a responsible, sustainable manner. The management of state-owned forested lands by the Division of Forestry first and foremost seeks to improve the health and vigor of the forest-respecting water quality, wildlife needs, and recreational opportunities while maintaining a sustainable timber and fuelwood resource.

A statistically reliable sample inventory covering all stands within the forest is completed at ten-year intervals. When combined with map analysis, this inventory information helps to identify forest stands that would benefit from active management versus forest stands that would serve better when left in a natural condition. For those stands that would benefit from management, the information gained from the stand inventory allows the forester to develop and prioritize potential stand treatments geared to meet the primary objective of improved forest health and vigor. The forester then holds discussions with other

DEEP biologists, environmental analysts, recreation managers, and occasionally local interest groups to establish management objectives from a broader, ecosystem-wide perspective. The forester structures the final vegetation management plan for the next 10-year period, proposing improvement work to provide for as many of those objectives as possible. The improvement work mimics the natural processes of forest development and change, but in small increments, thereby minimizing the chance of widespread change via natural catastrophe.

INFORMATION SPECIFIC TO THIS PLAN:

- UNIT: Meshomasic State Forest, Mountain Block
(Connecticut's first State Forest)
- PLAN ACRES: 6,270
- PLAN LIFESPAN: 2011 - 2020
- GENERAL INFO: This is the fourth consecutive plan for this area.
There are significant changes to objectives from the previous plans:
- 1) A 1,316 acre Old Forestland Management Site is established – page 8.
 - 2) Control non-native invasive plant species – pages 9 & 13.
 - 3) Improve access; re-establish 3 roads, fish passage culvert repairs - pages 5, 6 & 9.
 - 4) Expanded Fisheries and Wildlife section – pages 9, 10 & 11.
 - 5) Internet capable. Possible posting on DEEP Forestry Website.

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History

“The State Forest Acquisition program began in 1903 when Walter Mulford, Experiment Station Forester and ex-officio State Forester, acting under the authority granted by Chapter 175 of the Public Acts of 1901 purchased 627 acres of land in the town of Portland at a cost of \$964.16.”¹ With the objectives of “demonstrating how to grow timber and control forest fires”² Meshomasic State Forest became the first of 32 state forests established in Connecticut and the first established in New England. The forest is located in Middlesex and Hartford counties, and has been divided into two large forest blocks separated by CT Route 2. The southwestern section, known as the Mountain Block will be the focus of the following plan. The second Meshomasic Forest Block not included in this plan is the Diamond Lake Block located northeast of Route 2 in Glastonbury.

Today, the Mountain Block consists of 6,270 acres with management objectives of continuing as a working forest, protecting the habitat of known state endangered species, protecting the watershed of the Portland Reservoir, and providing passive recreation opportunities for the citizens of Connecticut and our visitors.



Among the numerous species that are known to utilize the cover and resources that the forest provides, one species of special note in this region is the [timber rattlesnake](#). It has been of common occurrence here since the earliest of times, and is mentioned in the writings of all periods. According to one version, Meshomasic is an Indian name for a “place of many snakes”.³ The timber rattlesnake is on the [State of Connecticut Endangered Species List](#), and management practices in this area are largely influenced by the presence of the snakes.

In spite of the fact that most of this land is very rocky with ledge outcrops, much of it was cleared for farming during the colonial period. Old cellar holes, wild apple trees, stone walls and stone piles remain as evidence of the work done by early settlers. As these fields were abandoned they gradually reverted back to forest growth and were cut over again and again by the valley farmers who owned them. At the time when land purchases were first made by the State, much of the area was covered with a remarkable sprout growth of chestnut, birch, hickory, tulip, and oak.

Under the direction of the first forest warden in Meshomasic, John Cordella “Del” Reeves, silvicultural work began in the forest around 1905. The focus was on thinning stands for cordwood, which was then sold to charcoal burners, an active industry at the turn of the 20th century.

In the Mountain Block there was only an occasional natural group of coniferous tree species. The planting program implemented was concentrated on pines and spruces to increase the

¹ The Wooden Nutmeg, State Forest Fire Warden, P.O. Drawer 1402 Hartford CT “History of Acquisition of Connecticut State Forest”

²“History of the State Forest”; Eugene C. Winch, April 16, 1954

³“History of the State Forest”; Eugene C. Winch, April 16, 1954

percentage of softwood species in the forest. At one time, there were nearly 900 acres of softwood plantations. The earliest softwood plantation was established in 1906, known as the “Big Pines” plantation (compartment 8 stand 4 (c8s4)), when 5000 white pine and 3000 Norway spruce were planted. In 1908 the white pine were destroyed by fire while land was being cleared for additional plantings. That same year the burned area was replanted and planting was completed on the additional area. Between 1983 and 1987, 193 acres of softwoods were harvested to salvage dying red pines due to an insect infestation of [Red Pine Scale](#). Approximately 920,000 board feet of red pine was removed and the stands were converted to mixed hardwood. Hardwood ingrowth contributed to the loss of the other plantations. Today there are only 320 acres of conifers within the forest. Plantations are approximately 5% of the total forest cover.

Chestnut blight was first identified in the forest in 1910 and after two years it became evident that destruction of the chestnut was imminent. As Chestnut constituted more than half of the stands in Meshomasic, the loss from this disease was a tremendous set back to the growth of this area. Following the death of the chestnut, the forest was dominated by various oak species. On the better sites, mixed stands developed containing considerable birch, tulip, ash, and hickory.

Numerous small wildland fires have occurred in the forest over the past century; however there has been only one significant fire in the Mountain Block. Between May 4th and 6th, 1930, 2,300 acres of forest burned in Marlborough and East Hampton. This fire later became known as the “Ten Curves Fire”. Damage from the fire is still evident in trees that are harvested from the burned over area.

In 1933, President Roosevelt created the Civilian Conservation Corp, (CCC), “to relieve the poverty and unemployment of the depression.” The US Army supervised the camps which contained between 200 and 250 men each.⁴ Two camps were created in what is now Meshomasic State Forest. Camp Jenkins (1933-1936) in Cobalt, and Camp Buck (1935-1941) in Portland, served as home to many such men. In these years, new plantations were established, older plantations were weeded, thinned and pruned, and acres upon acres of forest stands were tended through improvement cutting operations. The CCC’s also surveyed, marked, and brushed out the forest boundary lines. The forest was cruised and type mapped, and waterholes were constructed for fire control. New roads were built, insect pest control work was carried out, and recreation areas were developed. Remnants of Camp Jenkins are still found today within the forest (c33s8), and the Maintenance Depot of the Department of Energy and Environmental Protection uses the buildings formerly occupied by CCC Camp Buck.

In the 1950’s Meshomasic was briefly home to a Department of Defense Nike Hercules Missile site. During this period, significant improvements were made to the forest roads and drainage system. Today, remnants of the launch pad can be seen off of North Mulford Road and remnants of the enlisted quarters can be found off of Del Reeves Road. For a short period in the 1960’s, the abandoned enlisted barracks was used by the Connecticut Department of Corrections, then again in the 1970’s by the Young Adult Conservation Corp.

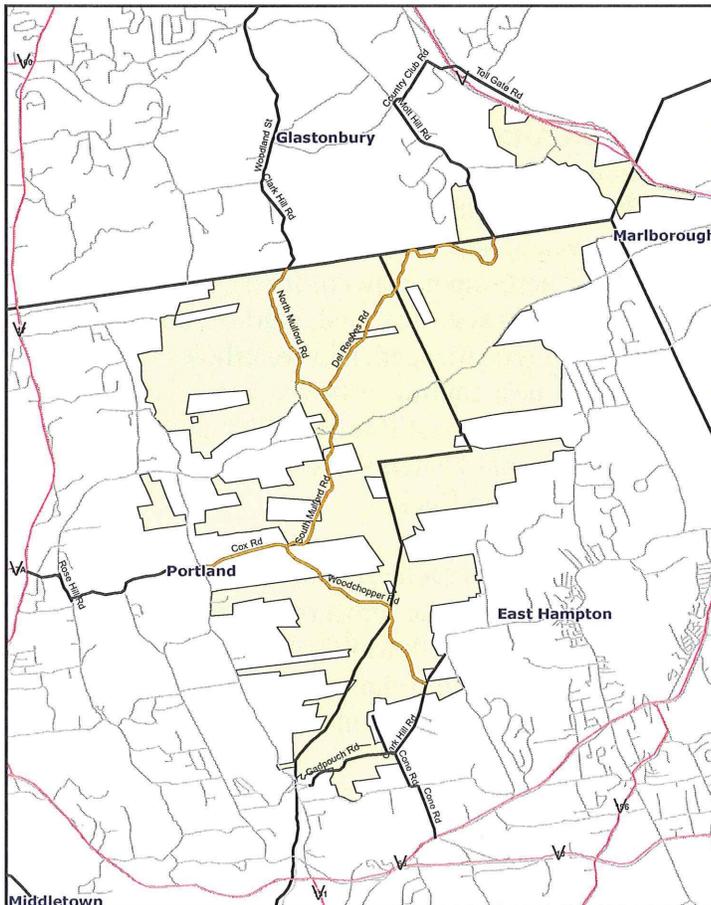
⁴ http://www.ccstories.com/connecticut_ccc.html

Since the exit of the CCC and because of the scarcity of help brought on by the war, up until 1974 forestry work in Meshomasic consisted chiefly of upkeep of the improvements left by the CCC's; care of older plantations, and in continuing the planting program on a smaller scale. In 1974 the forest was placed under a management program by DEEP. Since then, approximately 4,300 acres have been harvested by thinnings, shelterwoods, and final harvests. Today, the forest is currently stocked with approximately 13 million board feet and 26,000 cords of wood, worth approximately \$2,500,000.

In the last 15 years, the Forest has seen a surge in land acquisition. Purchases were funded largely through the Recreation and Natural Heritage Trust Fund, DEEP's primary program for acquiring land to expand the state's system of parks, forests, wildlife, and other natural open spaces. A property exchange between the State of Connecticut and the Town of Portland was completed in 1995. Portland acquired 63 acres of forestland for the protection of the Portland Reservoir. In exchange, the State added 378 acres to the Forest, the majority of the land being interior parcels, which filled in gaps, creating a larger contiguous block of state land.

Acres and Access

The name of the Forest comes from Meshomasic Mountain, which is a mountain included in the range that runs north/south through the forest. Most of the forest on the west slope of the mountain and the adjoining hills to the north compose the watershed for the Portland Reservoir. Elevations vary from 400 to 900 feet above sea level.



The Mountain Block of Meshomasic consists of 6,270 acres of which 2,995 acres are actively managed. Included are 130 acres protected by statutory legislation (Connecticut general Statutes section 23-5a to 23-5i) as State designated natural areas. In addition, 1,316 acres have been designated as Old Forest Land Management Sites (OFLMS) which are set aside for ecological reasons. Nearly the entire Block is forested, with one 77 acre water body (Great Hill Pond). The Algonquin Gas company has a right-of-way (c4s3) at the northwest corner of the forest and permission is required anytime a forest activity occurs that requires crossing the gas line.

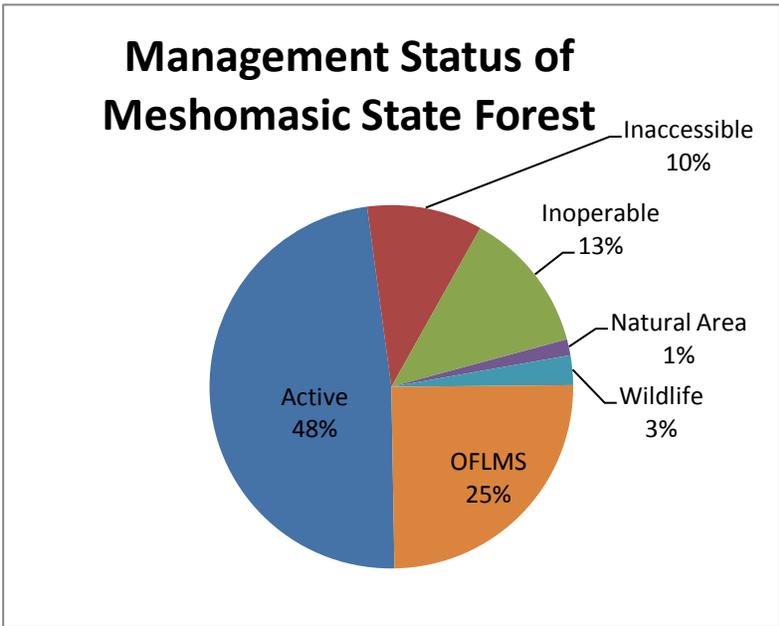
The forest block has approximately 40 miles of boundary line to maintain. Aside from minor forest encroachment issues, the forest does not have any

known boundary issues.

Existing Access to the forest may be obtained via Clark Hill Road to Woodchopper Road in East Hampton, Clark Hill Road to North Mulford Road in Glastonbury, or Mott Hill Road to Del Reeves Road in Glastonbury. Access can also be obtained by taking Cox Road to South Mulford Road in Portland.

Access has been lost from White Birch Road, Dickenson Road, Mott Hill Road, Isinglass Hill Road, and Portland Reservoir Road due to lack of funding for road surface material, and unauthorized road use by ATV's, motorcycles and Jeeps that have destroyed erosion control measures installed by the DEEP. This plan will propose the recovery of three roads: Dickenson, Mott Hill, and Isinglass.

For management purposes, the forest has been evaluated and categorized into groups affected by current physical conditions, policy, or management principles. The chart to the right illustrates the forest as it exists today. The category labeled Active is forestland that is actively managed for its resources. OFLMS is a contiguous block of land, interior to the forest that has been set aside to allow for the natural processes of stand development to occur without the influence of active forest management. Inoperable lands contain physical features such as steep slopes, excessively rocky terrain, or wetlands that prevent active management for resource protection or operator safety. Inaccessible areas are "landlocked" stands that cannot be accessed due to the deterioration of forest roads or inoperable conditions (i.e. wetlands).



The forest roads are maintained by the Parks Division and the Eastern District Operations Unit. Woodchopper Road, South Mulford Road, North Mulford Road, Del Reeves Road, and Cox Road roads are open to the public most times of the year and posted closed after the first snowfall until the spring thaw has drained. DEEP does not maintain the roads during the winter months. General maintenance such as culvert or sediment box clean out is done yearly, with the roads being re-graded as needed.

An evaluation of the forest roads was conducted in the summer of 2008. In summary, the condition of the forest roads were found to be passable by a two wheel drive vehicle. However; the eight miles of roads in the forest have not been maintained with an adequate amount of gravel to allow for proper road drainage. In addition, 132 culverts were evaluated during the study and 51 culverts do not have adequate fill for safe passage or culvert protection.



Recommendations set forth in the Connecticut Best Management Practices (BMP) guide section on Stream Crossings, state that “the top of the culvert should be covered with fill to a depth of at least one foot, or half the culvert’s diameter, whichever is greater, to protect the culvert from being crushed by vehicles.”⁵

In the spring of 2010, the Operations Division of the DEEP resurfaced Woodchopper Road and sections of South Mulford and Del Reeves roads with enough gravel to establish a crown and allow for road grading. Culvert condition and

BMP recommended coverage was not considered when resurfacing these roads and needs to be addressed.

It is estimated that a minimum of 40 tons of gravel per culvert (51) will be needed to raise and grade the road bed for safe passage. The total estimate of gravel required is 2,080 tons to cover all of the culverts. In addition, 7 culverts have been identified as broken and require replacement in the immediate future.

The picture above illustrates how exposed base material impacts the drainage of water during peak events. The cumulative effect of periodic rill or gully erosion will become increasingly more destructive unless roads are maintained with enough gravel to crown and grade the roads effectively.

Special Use Areas

Lakes, Ponds, & Streams

There are two waterbodies located within the Mountain Block of Meshomasic State Forest; Great Hill Pond and Del Reeves Marsh.

Great Hill Pond is a 76 acre pond located in Portland. Public access is by car-top/carry in only. There is minimal parking along Great Hill Pond Road and boats must be carried approximately 30 yards. Species that are found in the pond include largemouth bass, chain pickerel, yellow pickerel, calico bass, sunfish, brown bullhead, and white catfish. Motors 6 hp or less are permitted and there is a 12 mph speed limit.

Del Reeves Marsh was created in 1972. It is a 30 acre 50:50 mix of open water and emergent vegetation to benefit waterfowl and other wildlife that use emergent marsh habitat. The shallow water system provides recreational opportunities to forest users who frequently use the area for fishing and bird watching. Beavers often inhabit the area, damming the outflow structures of the marsh, thus requiring annual maintenance for public safety and habitat quality reasons.

⁵ Department of Environmental Protection. (2007). “Best Management Practices for Water Quality While Harvesting Forest Products” Connecticut BMP Field guide pg.35

The forest also naturally protects the watershed of two additional water bodies; Portland Reservoir, and Kelsey Pond, located outside of the forest boundaries. In fact, of the 2500 acres that encompass the Portland Reservoir watershed, approximately 2,000 acres are state forestland. Important streams within the Mountain Block include Buck Brook and Reservoir Brook, both which feed the Portland Reservoir, Carr Brook which feeds Kelsey Pond, and Mott Hill Brook which feeds into Cold Brook and ultimately Cold Brook Reservoir.

Cultural Sites

Meshomasic State Forest is the only eastern Connecticut state forest within whose boundaries mining operations are known to have been conducted. The first mining started in 1772 when Dr. John Sabastion Stephauney began mining with a crew of German laborers around Great Hill. In 1818 Seth Hunt followed, and in 1850-55 Edward Brown and associates also attempted mining operations. All were trying to commercially produce ore, without success. The Cobalt mines are located in c36s1-a. A mica quarry is located in c30s5. Another mica quarry, called the Case Berry Quarry, is located in C3s4a. All of these areas have slag piles that are still visible reminders of the land use history. Today, the sites serve as popular destinations for local schools, and mineral clubs. Special Use Permits are required to visit the sites with organized groups, and as standard policy for all property owned by state, no materials may be removed unless written permission has been obtained.

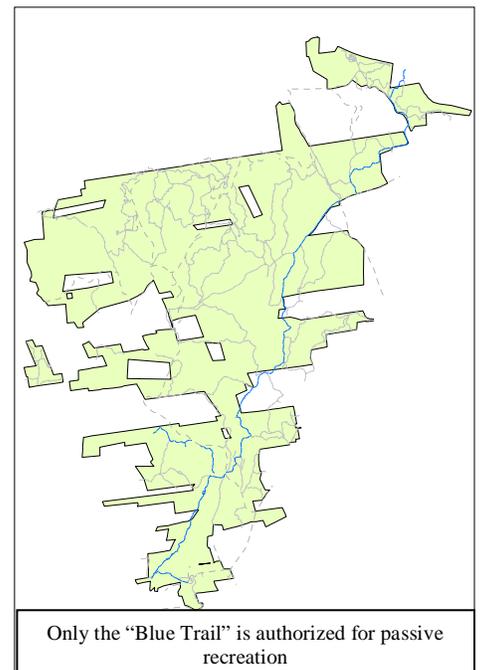
Other sites of cultural or historical value include numerous charcoal mounds located throughout the Forest, the foundation of the Town of Portland Pest House, the CCC Camp Jenkins and Camp Buck, an abandoned Army Nike Missile Silo Site, an abandoned Army enlisted headquarters, which also served as a Department of Corrections Camp in the 1970's, and lastly the remnants of a creosote plant south of the Portland Reservoir.

There are no National Heritage sites within the state forest although the Cobalt Mines are considered a local heritage site within the communities of Portland and East Hampton CT.

Recreation

Trails Located in Meshomasic S.F. The Connecticut Blue Blazed Shenipsit Trail which runs north/south along the eastern edge of the forest, is the only recognized public use trail in the forest. It is maintained by the Connecticut Forest and Park Association (CFPA). Information regarding the Connecticut Blue Blaze system can be obtained by contacting the Connecticut Forest and Park Association; <http://www.ctwoodlands.org>.

As depicted on the map to the right, there are also numerous woods roads and trails in the forest which people use for recreation. However, these trails are not maintained for recreation, and much of this use is illegal forest use including motorcycles, and all terrain vehicle (ATVs). Motorcycles are not permitted in the state forest unless registered with the Department of Motor Vehicles and then only permitted on forest roads open to all motor vehicles. Off road



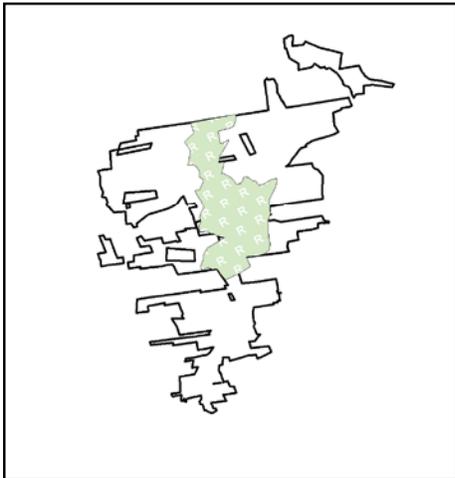
riding and ATV's are not permitted in the forest. Enforcement of illegal forest use is difficult. The result is significant degradation to forest roads and trails.

However, negative recreational impacts are greater than that. The purpose of state forest land is resource protection and management. This includes the soils, and all that grows and lives above or below the ground. Land acquisition efforts in Meshomasic have focused on protecting habitat of the state endangered timber rattlesnake. Forest management decisions are largely influenced to protect and promote a variety of wildlife habitat. Illegal trail use is an immediate and continuous threat to the state endangered snakes. These illegal trails also impact the forest ecosystem. An example is their presence in Natural Areas, OFLMS, and research areas. (see below)

Natural Areas

The forest contains three Natural Areas, designated by the state: Reeves Natural Area, Cox Natural Area, and the Cabin Lot. These three areas total 130 acres and are left in an unmanaged condition by administrative edict. The Connecticut Agricultural Experimental Station (CAES) located in New Haven, established permanent research plots on these sites in 1926 and 1927 to study the relationship between soil type and forest composition. These plots have been inventoried every decade except the 1940's, and is established as one of the oldest and largest sets of permanent plots in eastern hardwood forest. No harvesting is permitted in the natural areas or within a two chain (132 feet) buffer strip of the research plots. Information regarding the changes tracked in these forest stands can be obtained by contacting the CAES by using the following link; <http://www.ct.gov/caes>.

Old Forestland Management Site



An Old Forestland Management Site (OFLMS) has been established within the heart of the Meshomasic Mountain Block. The purpose of the OFLMS is to allow for the ecological complexity of old forestland to exist so the development of biodiversity that requires old forest may occur. It is necessary to distinguish this area from actively managed land because advanced ecological development may not be possible in areas where silviculture and sustainable forest management are practiced. This area is not considered old growth forest because it has been heavily influenced by man within the last century.

However, the area consists of 45 stands in various stages of development, some are mature forest stands 100 years old, and others are sapling sized, and less that 15 years of age.

Over time the forest will develop characteristics of old growth forests. While there are no known species of wildlife that depend on "old forest", there are mosses, lichens, fungi and insects that depend on these advanced systems. In an effort to provide an area for old forest development, 1,316 acres has been defined as OFLMS. This area will ultimately support a diversity of tree species of various age and size classes, as well as provide specialized habitat to organisms and wildlife invertebrates for decades as the increased presence of wind thrown trees, tipped root structures, and downed coarse woody debris increases over time.

Research Areas

The Connecticut Agricultural Experiment Station (CAES), located in New Haven, maintains six experimental research plots in Meshomasic. These include one American chestnut study plot, four oak regeneration study sites, and one forest health plot. Special use permits for these plots are managed by the Parks Division and renewed as necessary. The Division of Forestry encourages the use of state forestland for this purpose and benefits from the research that has been published as a result of this partnership.

Extensive Areas of Concern

There are two issues that need to be addressed to protect the health of the forest; illegal trail creation and use, and proactive invasive species control.

As stated above, the only recognized trail in Meshomasic State Forest is the Shenipsit Blue Blazed Trail. The pressure from non-passive, illegal recreational users continue to have detrimental impact on the soils which act as the foundation of the forest. To date, the DEEP has not been successful in controlling the illegal trail use. Based on information collected during the summer of 2004, there is over 1,282,000 square feet or 29 acres of unauthorized trails that have been created and that number is growing. In many sections, the soils have been compacted directly affecting seedling establishment and height growth of trees. Compacted soils take decades to repair themselves through natural biological and physiological processes.

Consideration should be given to creating a wilderness pass that could be sold or issued on an annual basis that would require recreational mountain bikers to register, authorizing users to ride “non-maintained” forest roads and trails, and would allow for enforcement of ethical trail use guidelines. Guidelines under this permit could include limited group sizes for organized rides (may require Special Use License), restricting trail use to existing natural features, and honoring trail closures during certain periods of the year due to high soil moisture content.

The forest is relatively free of invasive plant species except for a few locations. These areas include the Nike missile site and the Army Officers’ headquarters. Autumn Olive, multiflora rose, barberry, wisteria, and bittersweet can be found in and around these areas as well as on the boundaries of the forest that abut private lands. Currently, the invasive plants are considered manageable and should be eradicated prior to implementing forest operations. If the invasive species go unchecked, control will become cost prohibitive and productive forestland will be lost.

Wildlife and Fisheries Habitat

Forestry, wildlife, and fisheries management traditionally are complimentary functions. The abundance and distribution of forest associated wildlife is determined by the composition and structure of the forest habitat. Meshomasic State Forest is considered an interior forest, its core being the 1,316 acre OFLMS which has canopy closure throughout greater than 70%. It is an important forest within the state for the protection of the timber rattlesnake and forest interior birds.

Fisheries Resources

Major streams within Meshomasic State Forest Mountain Block include: Buck Brook, Mott Hill Brook, Carr Brook and Reservoir Brook. The upper portions or headwaters of all these streams originate in Meshomasic State Forest; thus, they have been protected from development. All of these streams support a high quality coldwater fish community primarily comprised of fairly robust native brook trout populations and in addition, they function to provide cold, clean and unpolluted waters to downstream areas of a watershed, which support increased diversity of aquatic organisms. While open to public fishing, these small headwater streams typically do not receive significant fishing pressure except for “niche-anglers” that target native brook trout populations and practice catch and release.

There is a substandard culvert that conveys Mott Hill Brook under Del Reeves Road that has scoured at its outlet resulting in perched conditions. This condition forms a barrier and blocks upstream fish passage for the native brook trout population. In an effort to correct and improve this fish passage, The Divisions of Fisheries and has begun planning the Mott Hill Brook Restoration Project. The main project goal is to restore upstream fish passage and instream habitats for the wild brook trout population and provide stream connectivity to over 1.68 miles of upstream habitats. Project objectives are: (1) remove an existing barrier (culvert) to fish passage and replace with a glued laminated clear span timber bridge, (2) restore and stabilize over 100 feet of instream and streambank habitats at and below the road crossing utilizing natural channel design techniques, and (3) monitoring of brook trout population response through pre and post project annual fish surveys. It is proposed to fund this project through the Eastern Brook Trout Joint Venture Program. The project will be managed and implemented by The Nature Conservancy in concert with a multiple unit DEEP Partnership.

Forest Wildlife Features

Streams and other riparian areas including ponds and seeps, provide landscape habitat features (water, food supply, specific vegetation) for over 80 percent of all wildlife species, as well as essential habitats for stream-specific species such as mink, spring salamanders, and wood ducks. DEEP Wildlife has installed and maintains structures such as wood duck nesting boxes in riparian areas to enhance habitat for targeted species.

There are numerous openings of various sizes within the Mountain Block. These range from individual tree blow downs to large forest stands that have recently been converted to the seedling sapling stage of development. Openings provide early succession-stage vegetation and habitat structure components for a number of species including chipping sparrows, meadow voles, and garter snakes. Additionally, openings provide one of many habitats utilized by generalist species such as white-tailed deer and red-tailed hawks.

Eight miles of forest roads are open to the public in the Mountain Block. Roads provide corridors of travel and access to interior forested areas for edge and early succession-stage wildlife such as indigo buntings and foxes. Roads also represent avenues of access for hunters into forests, where they may be instrumental in managing deer herd density. Meshomasic SF is open to public hunting including waterfowl, small game, turkey, and deer. Currently, the entire

property is open to firearms hunting. Public access maps for Meshomasic State Forest (#29 thru 29e) are available for viewing or printing on the [DEEP Public Hunting Areas in CT Webpage](#), or may be obtained by contacting the Eastern District Headquarters in Marlborough. Trapping is also allowed in Meshomasic under the state land trapping permit system. For information regarding hunting regulations, seasons, and fees please visit the [DEEP Hunting and Trapping webpage](#).

Structure

Five percent of the Forest is in the large sawtimber size class, having a stand DBH greater than 16.5 inches. Large sawtimber usually represents maturing timber, which provides microclimate features (temperature, humidity, and light) and vertical structure features (high canopy closure in midstory and overstory canopies) required by some wildlife species, such as red-backed salamanders, flying squirrels, and barred owls. Large sawtimber trees also die and become large snags and eventually large logs, which are habitat prerequisites for some wildlife species such as pileated woodpeckers, slimy salamanders, and fishers.

Sixty-nine percent of the Mountain Block Forest is in the small sawtimber size class, being between 10.5 and 16.5 inches DBH. Small sawtimber represents areas that will develop into mature timber, and are required by many wildlife species. Small sawtimber also represents vertical structure and canopy closure at heights required by a number of songbirds, including least flycatchers and black-throated green warblers.

Nineteen percent of the forest is in the pole size class, with tree diameters between 4.5 and 10.5 DBH. Pole size trees are in transition from sapling to small and large sawtimber. Canopy closure in the pole size class is sufficient to produce microclimate and vertical structure conditions on the forest floor and in low and mid canopy (0-20' above ground) structure required by most amphibians and many small mammals, as well as ground-nesting and low-mid-canopy nesting songbirds.

Five percent of the stands are in the regeneration/sapling stage. These trees are less than 4.5 inches DBH. The regeneration stage represents vegetation of early succession structure and species composition that are required habitats for some species such as field mice and song sparrows. Such stands also represent essential feeding areas for white-tailed deer and turkeys. Within a few years the stands evolve into saplings which provide a dense low-to-mid story vertical structure and high canopy closure that represent ideal hiding cover for white-tailed deer, and key foraging habitat for woodcocks and rattlesnakes.

Early successional habitat is lacking across the state and as a result, many shrubland obligate bird species are in decline. By increasing the percentage of regeneration/sapling stage stands, the benefits would (1) help restore balance to sustainable forest growth and (2) provide habitat to DEEP Wildlife Division targeted early successional species including Eastern towhee, prairie warbler, blue-winged warbler, and brown thrasher.

Deer Impact



The impact of white tailed deer in the forest is moderate. Deer impact is a function of deer density (deer/square mile) and forage availability (habitats that provide deer forage, such as recent clearcut or thinned areas, openings, and adjacent agricultural lands). The higher the deer density and the lower forage availability, the greater the impact on forest resources. At high deer densities, there will be virtually no tree seedlings, poor wildlife habitat, and reduced abundance and number of species of herbs, shrubs, and wildlife including songbirds and small mammals. At low deer densities, there will be plentiful tree seedlings, generally high quality and quantity of wildlife habitat, high levels species richness, and abundance of forest resources will be high. Deer densities >20 deer/sq mile can impact forest regeneration.

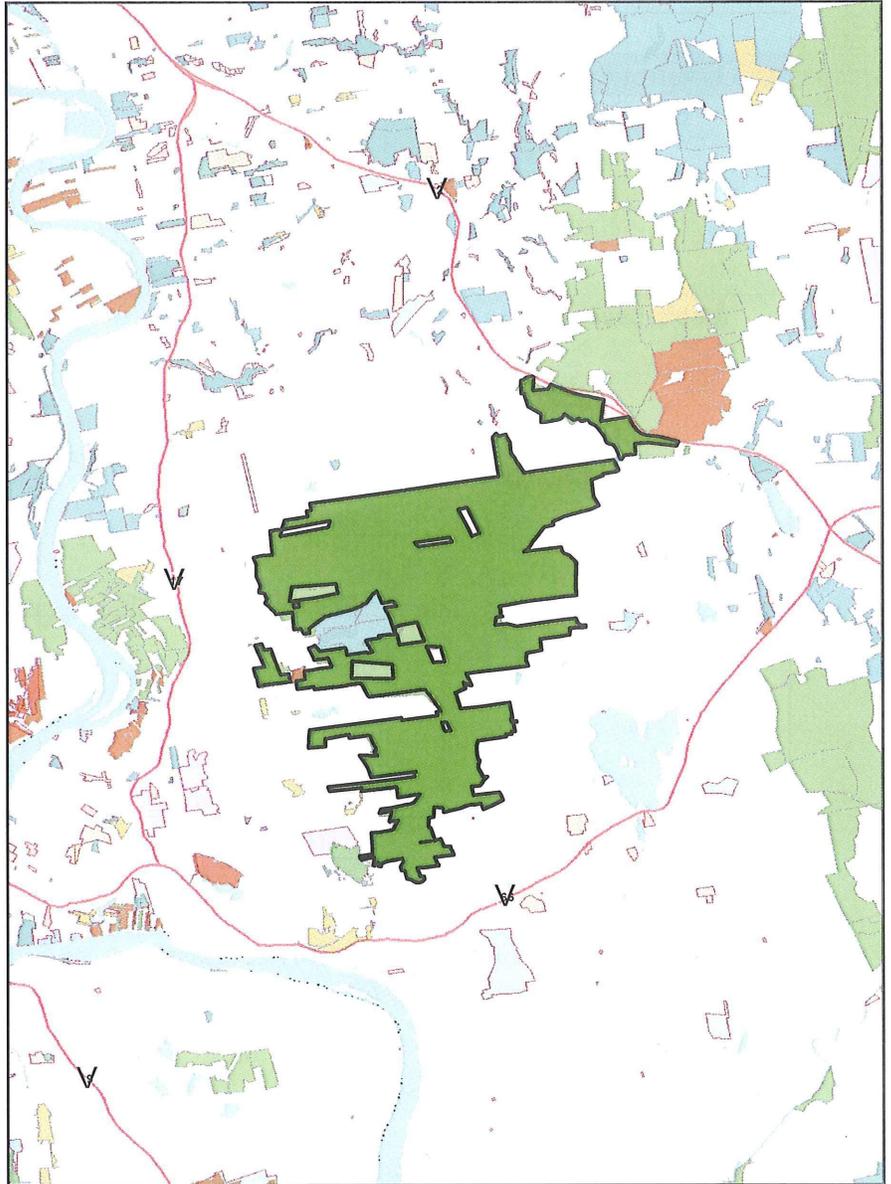
During the regulated deer hunting season, about 80 deer (5 deer/sq mile) are harvested from Meshomasic. Based on field observations conditions show that the deer browse desired species, including the various oaks; however, deer density has not reached a threshold where less palatable species such as black birch are being browsed.

Landscape context

Meshomasic State Forest provides an interior forest complex of significant ecological value. It is surrounded by a variety of privately owned properties which combined with the State Forest, create a diverse landscape region consisting of active farmland, fruit orchards, and both private and state owned forestland. In addition, less than two miles from the western edge of the forest flows the Connecticut River and less than a mile to the southeast is the 502 acre Lake Pocotopaug in East Hampton.

Of all of the land that abuts the forest, which helps in creating this diverse landscape, approximately 250 acres are classified as protected open space as illustrated on the map to the right. The shaded areas represent properties that are permanently protected open space owned by municipalities, state, or federal agencies or nonprofit organizations. The state routes which surround the forest, (the red loop consists of state routes 2, 17, and 66) do not contain a large amount of protected open space. The present day conditions are recognized as good landscape habitat, although the area itself is not protected. Management strategies of the forest will need to be reviewed on a ten year cycle to ensure habitat goals are met as landscape habitat loss occurs due to development.

(Mountain Block and surrounding Open Space Parcels)



Vegetative Condition

Approximately 86% of the forest stands are considered to be within the Oak-Hickory forest type group, according to US Forest Service Type codes. The remaining 14% consists of Maple-

Beech-Birch complex, Oak-pine, White Pine, forested wetlands, and developed areas. The following chart illustrates the current conditions of forest size class by forest type.

Forest Cover Type Expressed in Acres		
Forest Group	Size Class	Total Acres
Oak-Hickory	sapling	245
	pole	1,146
	small sawtimber	2,196
	medium sawtimber	1,296
	large sawtimber	243
Maple-Beech-Birch	pole	26
	small sawtimber	134
	medium sawtimber	82
	large sawtimber	32
Elm-Ash-Red Maple	small sawtimber	170
	medium sawtimber	17
Oak Pine	small sawtimber	91
	medium sawtimber	85
White Pine	sapling	12
	pole	16
	small sawtimber	47
	medium sawtimber	32
	large sawtimber	67
Exotic Softwoods	small sawtimber	3
Grand Total		5,937

Current Conditions of forest stands by Size Class.

This chart excludes areas of the forest which are considered developed, wetland areas, or ROW.

Forest Health

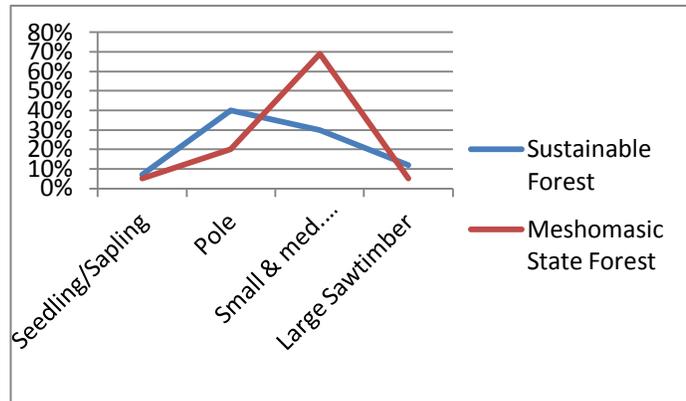
Meshomasic is considered to be an interior forest, and consists largely of an oak hickory forest type. Other than invasive plant species, there are no elevated levels of pests that are a concern at the current time. An outbreak of [Sudden Oak Death](#), [Asian Longhorned Beetle](#), or [Emerald Ash Borer](#) would change the characteristics of the forest unlike any disturbance that has been seen since the loss of the American Chestnut.

Occasionally, the forest is susceptible to native insect outbreaks by the following insects: [Gypsy Moth](#), [Eastern Tent Caterpillar](#), [Two lined Chestnut Borer](#), [Orangestriped Oakworm](#) and diseases; [Nectria Canker](#), [Beech Bark Disease](#) and environmental extreme conditions such as drought, wind events and ice damage.

There are several sites in the forest that contain established populations of invasive species which will become more problematic over time. The plants noted during the last inventory include [Autumn Olive](#), [Japanese Stilt grass](#), [Japanese Barberry](#), [Multiflora Rose](#) Wisteria, and [Oriental Bittersweet](#). Invasive species threaten the health of the forest because the plants typically produce large seed crops, which stay viable for years in the seed bank, and they form monocultures over time which out compete native species for growing sites. All of the invasive species listed are considered controllable and should be eradicated.

Forest Sustainability

The distribution of size classes within the forest is not balanced. Some size classes are under-represented while others are over-represented. This condition does not allow for sustainable timber harvesting. The distribution of area in various size classes across the entire forest (excluding developed and wetland stands) is detailed in the following table.



Size Class	Balanced Range	Actual Range	Difference
Seedling/Sapling	05 to 10	5%	-
Pole	35 to 45	20%	-15
Small & med. Sawtimber	25 to 35	69%	+34
Large Sawtimber	10 to 15	5%	-5

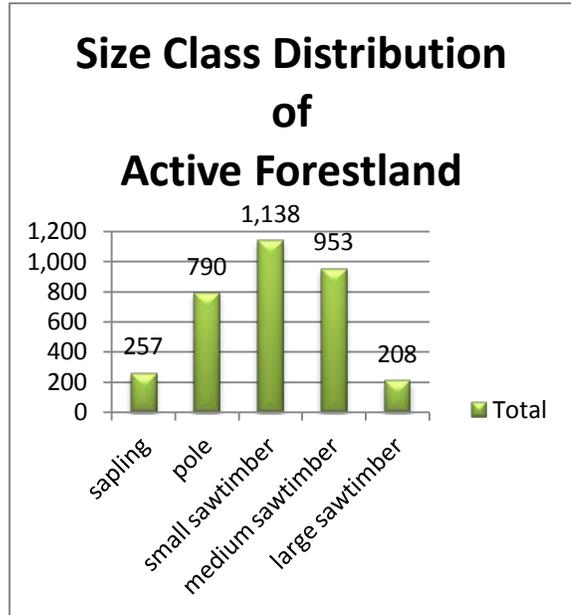
During previous management periods, it had been recognized that regeneration harvests need to occur to maintain a sustainable level of forest products. Silvicultural prescriptions have been planned with the objective to maintain sustainability; however, the timeframe between these treatments has been delayed due to lack of forestry staffing, infrequent seed years, consumption of mast by deer and turkey, and regeneration damage due to wildlife browsing. To create a high value, sustainable forest ecosystem supporting diverse native forest cover types, which provide for healthy wildlife populations, clean water, and productive soils, the silvicultural treatments leading to the final shelterwood harvest need to be initiated earlier. Adequate technical staffing could: (1) control invasive species and prevent the loss of growing space; (2) perform forest health treatments, such as pre and post harvest weeding; and (3) prepare seedbeds with prescribed fire.

As shown previously, 48% of the total forestland in Meshomasic has been classified as active forestland. The Graph shows the forest size classes and the acreage associated with all active land in the forest.

Size class has been determined by data analysis generated from Ned 2 forestry software. Size class has been broken out by the following diameters; stand and size classes:

- Regeneration <= 1.0"
- Sapling 1.0" <= 4.5"
- Pole 4.5" <= 10.5"
- Small Sawtimber 10.5" <= 13.5"
- Medium Sawtimber 13.5" <= 16.5"
- Large Sawtimber 16.5" and larger

(regeneration has been combined with the sapling size class.)



Relative density is a measure of tree crowding that accounts both for the size of each tree and the amount of space typically occupied by a tree of that size and species. It is an especially useful measure in mixed species stands. A relative density of 100 percent (overstocked) indicates that the growing space is fully occupied and trees must either slow their growth to survive, or be crowded out and die, making room for more vigorous trees. On most stocking charts, 100% relative density is represented as the A-line. If relative density is at least 60% and below 100% (fully stocked), trees can fully occupy the growing site. At 60%, or the B-line, maximum stand growth occurs near this level, and enough trees occupy the site to discourage detrimental effects on growth form. The C-line, at 40%, (under stocked), is the lower limit of stocking necessary to reach 60% (B-line) stocking in ten years on average sites.

Oak-Hickory Group

Dominant trees associated with this group include northern red oak, black oak, scarlet oak, white oak, chestnut oak, and all hickories. Associated trees include yellow poplar, red maple, black gum, black locust, dogwood, sassafras, and sweet birch. As highlighted above, this is the dominant cover type found in Meshomasic.

The following chart depicts the current condition of the oak-hickory forest group. These are stands that are considered actively managed, although treatments may not be prescribed during the next 10 year period.

Oak-Hickory Group Size Class by Acres

Size Class	Under Stocked stands in progression of shelterwood harvest	Fully Stocked Leave to Grow	Overstocked with Acceptable AGS	UGS stocking Dominant Regenerate
Seedling/Sapling	0	76	0	0
Poletimber	0	403	44	10
Sawtimber	82	1237	26	136
Total Acres	82	1716	70	146

Maple-Beech-Birch

Dominant trees associated with this group include sugar maple, red maple, and American beech. The associated species are: sweet birch, paper birch, American hornbeam, hickory, bitternut hickory, flowering dogwood, white ash, black ash, green ash, American witchhazel, butternut, black walnut, tulip-tree, hop-hornbeam, eastern white pine, bigtooth aspen, quaking aspen, pin cherry, black cherry, chokecherry, white oak, northern red oak, black oak, basswood, eastern hemlock, and elm.

The following chart depicts the current condition of the maple-beech-birch forest group. These are stands that are considered actively managed, although, treatments may not be prescribed during the next 10 year period.

Maple-Beech-Birch Group Size Class by Acres

Size Class	Under Stocked stands in progression of shelterwood harvest	Fully Stocked Leave to Grow	Overstocked with Acceptable AGS	UGS stocking Dominant Regenerate
Seedling/Sapling	0	0	0	0
Poletimber	6	0	0	19
Sawtimber	82	30	0	53
Total	88	30	0	72

Oak-Pine Group

The dominant species type groups associated with this group include oak-hickory and pine. There are no associated species. The following chart depicts the current condition of the oak-pine forest group. These are stands that are considered actively managed, although, treatments may not be prescribed during the next 10 year period.

Oak-Pine Group Size Class by Acres

Size Class	Under Stocked stands in progression of shelterwood harvest	Fully Stocked Leave to Grow	Overstocked with Acceptable AGS	UGS stocking Dominant Regenerate
Seedling/Sapling	0	0	0	0
Poletimber	0	0	0	0
Sawtimber	0	107	0	48
Total	0	107	0	48

White Pine Group

Any species that represents at least 80% of the stand basal area in a group is recognized as a pure type; the type name will be the species common name. Thus, this group contains stands with at least 80% of its basal area in white pine.

The following chart depicts the current condition of the white pine forest group. These are stands that are considered actively managed, although, treatments may not be prescribed during the next 10 year period.

White Pine Group Size Class by Acres

Size Class	Under Stocked stands in progression of shelterwood harvest	Fully Stocked Leave to Grow	Overstocked with Acceptable AGS	UGS stocking Dominant Regenerate
Seedling/Sapling	0	12	0	0
Poletimber	0	0	0	0
Sawtimber	0	74	2	0
Total	0	86	2	0

Exotic Softwoods Group

This group consists of plantations of Norway spruce which has been planted throughout the century although it is not native to the landscape of Connecticut. The intended purpose of these plantings are to break up the forest cover type by creating small softwood areas that provide winter cover for a number of wildlife species. Today, having experienced the devastating effect of an invasive species, both pests and the loss of species not native to an area such as red pine, new plantations are created using native species such as white pine or pitch pine.

The following chart depicts the current condition of the exotic softwood forest group. These are stands that are considered actively managed, although, treatments may not be prescribed during the next 10 year period.

Exotic Softwood Group Size Class by Acres

Size Class	Under Stocked stands in progression of shelterwood harvest	Fully Stocked Leave to Grow	Overstocked with Acceptable AGS	UGS stocking Dominant Regenerate
Seedling/Sapling	0	0	0	0
Poletimber	0	0	0	0
Sawtimber	0	3	0	0
Total	0	3	0	0

Specific Acquisition Desires

Future acquisition efforts should be prioritized by the following guidelines:

- (1) All interior parcels should be acquired if made available to the state. This will reduce boundary maintenance efforts as well as strengthen DEEP forest use policies. If all interior parcels were purchased the infrastructure of the forest would be protected. DEEP forest roads could be gated and locked at night and seasonally, eliminating the potential for illegal forest use and the hazardous situations that exist on the roads which are not plowed.
- (2) Any parcel which currently abuts the forest on two to three sides. These properties will allow the forest to expand along its eastern and western bounds, reducing maintenance issues, strengthening DEEP forest use policies, and will create a wider protected forest corridor or greenway.
- (3) Any parcel which may provide improved access to existing town roads should be acquired for management and emergency access purposes.

Public Involvement

The 10 year plan for Meshomasic may serve as a resource for surrounding towns and nonprofit organizations that are actively planning for open space protection.

10 Year Goals

- Create a sustainable forest and ecosystem.
- Establish approximately 1,300 acres of Old Forestland Management Sites.
- Control invasive species to prevent widespread establishment throughout the forest.
- Promote and protect significant or critical habitat.
- Re-establish DEEP forest roads that have deteriorated to improve access.
- Improve existing forest roads through culvert repair, bridge replacement, and addition of adequate gravel to roads for grading.
- Adaptive management principles will be utilized in the event of stand damage created by adverse weather, insect, or disease infestations.

Meshomasic Mountain Block Work Plan

Fiscal Year	Scheduled Activity	Forest Stand	Restrictions	Acres
2011	Final Harvest	c01_s001	none	18
	Final Harvest	c03_s003	none	19
	Final Harvest	c06_s007	none	21
	Final Harvest	c06_s002	none	18
	Second Shelterwood	c03_s005	none	48
	Replace Bridge, Gravel and Grade Road	c03_s005	none	
	Invasive Species Control; 4 acres	c33_s010	Seasonal	
	Wildlife Project, Field Creation; 2 acres	c33_s010	Seasonal	
	Invasive Species Control; 4 acres	c33_s010	Seasonal	
2012	Second Shelterwood	c12_s004	none	28
	Del Reeves Road, Evaluate Culverts, include culvert and gravel expense in sale			
	First Shelterwood	c38_s001	none	38
	Convert to Pitch Pine	c38_s002	none	19
	Begin Dickenson Rd work, expand access with sale c38_s001; install gate.			
2013	Final Harvest	c24_s003b	none	6
	Thinning	c24_s004	none	15
	Thinning	c24_s001a	none	3
	Begin Mott Hill Improvement Work with C24 operation			
	Second Shelterwood	c30_s003	seasonal	10
	Wildlife Project, Field mowing; 2 acres	c33_s010	Seasonal	
	Begin Boundary Work; 20 miles			
2014	Final Harvest	c15_s001	none	53
	Thinning	c38_s004	none	5
	Thinning	c41_s001	none	15
	Continue Dickenson Rd improvement work and turn around.			
	Complete Boundary work; 20 miles			
2015	Final Harvest/ Irregular	c04_s004	none	38
	Second Shelterwood	c04_s002a	none	22
	Second Shelterwood	c04_s005	none	61
	Second Shelterwood	c05_s004	none	20
2016	First Shelterwood	c24_s003a	none	109
	First Shelterwood	c24_s002a	none	14
	Continue Mott Hill Rd Improvement			
	Wildlife Project, Field mowing; 2 acres	c33_s010	Seasonal	
2017	First Shelterwood	c16_s001	none	29
	First Shelterwood	C16_s002	none	29
	First Shelterwood	c16_s002a	none	4
	First Shelterwood	c16_s003	none	5

	First Shelterwood Complete Dickenson Road Improvement	c16_s008	none	31
2018	First Shelterwood	c14_s004	none	36
	Irregular Shelterwood/final harvest	c12_s002	seasonal	20
2019 & 2020	Re-inventory Forest		none	
			Total acres:	734

Additional Resource Needs:

Item

Work with Fisheries Division to remove culvert and install bridge to allow for fish passage at Mott Hill Brook on Del Reeves Road.

c10_s002a Inspect for regeneration and remove overstory if necessary to release seedlings

c28_s004 Inspect for regeneration and remove overstory if necessary to release seedlings

c33_s007 Inspect for regeneration and remove overstory if necessary to release seedlings

Conduct Timber Stand Improvement work in sapling and pole stands.

Control Invasive species as detected.

Appendix

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Glossary

This glossary contains a list of commonly used forestry terms.

- **abiotic factors** The non-living components that make-up or interact with a community or ecosystem.
- **acre** A unit of measure describing surface area. One acre contains 43,560 square feet. A football field (without the end zones) is 45,000 square feet -- slightly larger than an acre. The inside of a professional baseball diamond is about 1/4 of an acre.
- **advance regeneration** Young trees that have become established naturally in a forest before regeneration methods are applied. In other words, the regeneration is present in advance of any treatment.
- **aesthetics** The science or study of beauty, as well as the theory or understanding of the perception of the environment by all the senses.
- **age class** The trees in a stand that became established at, or about, the same time. The range of tree ages in a single age class is usually less than 20 percent of the expected age of that class.
- **association** A naturally occurring collection of plants and animals with similar needs for sunlight, warmth, moisture, shelter, and nutrients growing together. They function together to cycle energy, nutrients, and water; also called a community.
- **basal area** The area of the cross section of a tree's stem at 4 1/2 feet above ground, or breast height, in square feet. Basal area of a forest stand is the sum of the basal area's of the individual trees in the stand. It is usually reported in square feet of BA per acre and is used as a measure of stand stocking, stand density, and stand volume.
- **board-foot volume** The amount of wood products expressed as the number of boards 1 foot wide by 1 foot long and 1 inch thick that are sawn from logs.
- **biological diversity** The variety and abundance of species, their genetic composition, and the communities, ecosystems, and landscapes in which they occur. Also, the variety of ecological structures and functions at any one of these levels.
- **biotic factors** The living components of a community or ecosystem.
- **Best Management Practices** Procedures and treatments that lessen soil erosion, sedimentation, stream warming, movement of nutrients, and visual quality during or following activities that alter the land.
- **buffer strip** An area of land that is left relatively undisturbed to lessen impacts of treatments next to it. Common examples include visual buffers used to screen the view from roads, and stream side buffers used to protect water quality.
- **canopy** The continuous cover of branches and foliage formed collectively by the crowns of trees.
- **Clean Water Act** A Federal Law passed in 1972 and since amended, designating forests and silvicultural activities such as logging as nonpoint sources of water pollution. To comply with the Act, most states have established Best Management Practices to control erosion and sedimentation, stream warming, and movement of nutrients into forest streams.

- **clearcutting** An even-aged silvicultural technique involving the removal of all stems in the stand. Strip cutting is a form of clearcutting.
- **commercial treatment** Any activity producing forest products that have at least enough value to cover the direct costs of the activity.
- **conifer** Trees, mostly evergreens, bearing cones and needle-shaped or scale-like leaves.
- **corridors** Corridors are usually linear patches or connections between similar patches, that differ from the elements on either side. Corridors can function as habitat for some species (especially species that live in edge habitats), serve as conduits or routes of movement between patches, or act as barriers to movement across the matrix.
- **crop tree** Any tree selected to provide a specific benefit such as mast, dens, veneer, or sawtimber. Crop trees are usually selected when they are young.
- **crown** The part of a tree or woody plant bearing living branches and foliage.
- **cubic-foot volume** The amount of wood products expressed as the number of cubes 1 foot wide by 1 foot long and 1 foot high that are in a log or stem.
- **cumulative effects** An effect initiated by an event that was tied in time or space to other events (e.g., one straw broke the proverbial camel's back, but only because many straws had already been piled on). Cumulative events can be additive (e.g., straws on the camel's back) or compounded (involving more than one process). For example, increased frequencies of high flood events, debris torrents, and dam-break floods can adversely affect aquatic habitats and bury low-gradient stream reaches in debris. The occurrence of such events are not only due to severe storm conditions but to the effects of land management activities such as timber harvesting practices, road density, construction and maintenance standards, and conversion of land cover from forests to other land uses.
- **cutting cycle** The planned interval between treatments in forest stands.
- **damaging agent** Any one of various factors that injure trees. They include some insects, diseases, wildlife, abiotic factors, and human activities.
- **dbh** Diameter at breast height; the diameter of the trunk of a tree measured at 4-1/2 feet above ground level. It is measured on the uphill side of the tree.
- **dead and down material** Any dead branches, tree trunks, or stumps that are on the ground.
- **den tree** A living tree that has holes in the trunk, or stem, from broken branches and decay, or hollow trunks; a cavity tree.
- **diameter class** An interval of sizes of trees or logs; or the trees and logs themselves that fall into such an interval.
- **dieback** The death of branch tips and loss of foliage in the upper and outer areas of tree crowns. Trees usually recover in several years by producing new branches. Various damaging agents can cause tree crowns to die back.
- **disease** Any departure from the normal functioning of a plant caused by some type of persistent damaging agent.

- **drought** A period of dryness that is associated with low soil moisture and inability of plant roots to obtain adequate water for growth. Droughty conditions often predispose trees to other problems that also cause damage.
- **escape cover** The cover used to avoid a predator or other danger.
- **evapotranspiration** The conversion of water into water vapor which is then released into the air. The water can pass from plants (usually leaves) into the air or be evaporated from open water or the soil. Plants convert water to vapor to cool the surface of leaves.
- **even-aged stand** A stand containing trees in the main canopy that are within 20 years of being the same age. Even-aged stands sometimes are designated by age-class (10-year-old stand, 40-year-old stand) or broad size-class: seedling stand (most trees are <1 inch d.b.h.); sapling stand (trees 1-4 inches d.b.h.); poletimber stand (trees 5-10 inches d.b.h.); and sawtimber stand (trees > 10 inches d.b.h.).
- **even-aged system** A planned sequence of treatments designed to maintain and regenerate a stand with one age class.
- **felling** Cutting or uprooting standing trees, causing them to fall to the ground.
- **forest** A plant association characterized by trees and other woody vegetation, growing more or less closely together. Also, a group of stands under one ownership or manager. Forest management includes silviculture, and also involves activities such as road construction, fire protection, pest management, regulating the cut of timber products, maintenance of wildlife habitat conditions, inventory, boundary maintenance, and recreational and aesthetic planning.
- **forest benefit** Any of the things that you receive from a plant community dominated by trees that increase the community's value to you. These things may include beauty, solitude, biological diversity, habitats for species of special concern, water quality or quantity, wildlife, wood products, and income.
- **forest community** A naturally occurring collection of plants dominated by trees, and the animals associated with them, that have similar needs for sunlight, warmth, moisture, shelter, and nutrients growing together. They function together to cycle energy, nutrients, and water.
- **forest condition** Generally, the current characteristics of forested land including but not limited to cover type, age arrangement, stand density, understory density, canopy density, and forest health.
- **forest cover type** A category of forests based on the kind of trees growing there, particularly the composition of tree species. Forest cover types are often referred to as forest types, cover types, stand types, or types.
- **forest developmental stage** The age, condition, and degree of maturity of a forest community. For example, even-aged stands develop from seedlings to saplings to poles to large diameter trees, and the community changes as the trees grow. Uneven-aged stands have at least three different developmental stages in each stand.
- **forest health** The condition of a community of trees in relation to past, present and potential effects of damaging insects, diseases, abiotic factors, wildlife and human activities.

- **forest opening** An area where trees have been or will be absent from the plant community.
- **fungi** Organisms that reproduce by spores, and are not able to produce their own food. Fungi obtain nutrients from other living or dead organisms.
- **geographic range** The area, or region, where a native species occurs naturally.
- **groundwater** Water found in unblocked pores and fractures in bedrock and other geologic material. Groundwater can occur in soils that are permanently saturated. Groundwater may be held in place for long periods of time or move slowly down slope by gravity. Groundwater is usually obtained from wells and may contribute to streamflow by surfacing at lower elevations.
- **group selection** An uneven-aged silvicultural technique involving the removal of trees in groups usually 1/10 to 2/3 acre in size, but sometimes up to 1 to 2 acres on large properties. Group selection can be applied in combination with single-tree selection between groups.
- **growth loss** A reduction in expected height and/or diameter increase. Many factors influence tree growth including available growing space, water, nutrients, amount of shading, and effects from damaging agents.
- **hardwoods** Woody angiosperms, broadleaf trees, that are distinguished from softwoods (gymnosperms) by the presence of vessels in the wood and broad leaves; hardwood is the wood of broad-leaved trees.
- **herbaceous plants** Plants with non-woody stems that normally live only one growing season. Herbaceous perennials have persisting root systems or other underground structures such as bulbs. These plants can sprout stems each growing season for several years. In forest understories, these include wildflowers and ferns.
- **herbicide** Any chemical preparation used to kill or inhibit the growth of certain plants, particularly herbs, or their spores or seeds. This term generally includes arboricides which are specific for trees and other woody plants.
- **home range** The area in which an individual animal normally confines itself to obtain food and cover.
- **horizontal diversity** The degree of complexity of the arrangement of plant and animal communities, and other habitats across a large area of land.
- **hydrologic function** The ability of vegetation, soils, and bedrock to accept rain water and snowmelt and convert it to soil water, runoff, groundwater, or evaporation. The hydrologic function in well established forest communities is excellent and provides a maximum opportunity for storing moisture and minimal overland flow.
- **hydrology** The study of the movement and storage of water in the natural and disturbed environment. Also, the condition of the water resource at some specified point in time.
- **improvement cut** A cut in an uneven-aged stand, designed to upgrade the quality or species composition. No rotation age is specified for uneven-aged stands. Instead, a very general maximum tree size is chosen, and residual stands after cutting are

defined by maximum tree size, stand density, and stand structure - diameter distribution, proportion of sawtimber, etc.

- **insect** Insects associated with forests are represented by numerous species, and have a wide range of ecological roles. Most insects do not damage trees, but some do. They eat leaves, suck sap, bore through bark and wood, and introduce microorganisms that cause diseases.
- **interior species** Species found only or primarily away from the perimeter of a landscape element. Species commonly requiring or associated with interior habitat conditions.
- **intermediate cuttings** Silvicultural cuttings applied in the culture of even-aged stands and are normally noncommercial (no products sold) or commercial thinnings (timber sold), designed to favor certain species, sizes, and qualities of trees by removal of competitors. Thinnings designed to grow quality timber commonly maintain a closed canopy; however, low-density thinning (50-70% residual crown cover) can be used to hasten diameter growth and stimulate understory development for wildlife purposes. At rotation age, the stand is considered to be mature, and a regeneration cutting is applied to produce a new stand.
- **intermediate product** Any wood product recovered from intermediate treatments.
- **intermediate treatment** Any treatment or "tending" designed to enhance growth, quality, vigor, and composition of the stand after seedlings are established and before mature trees are regenerated. For example, thinning is an intermediate treatment.
- **landing** A cleared area in the woods where logs are gathered to load onto trucks for shipment to a processing plant. Usually, it is along a road.
- **landscape elements** The basic, relatively homogeneous ecological elements or units, whether they are of natural or human origin. Examples include forests, rivers, fields, roads, wetlands, hedgerows, lakes, and farmyards.
- **leaf litter** Fallen organic matter including recognizable leaves, needles, branches, bark, and stems, that accumulate on the forest floor. Leaf litter protects the underlying organic and mineral soils against the impacts of raindrops. It prevents erosion and promotes rapid infiltration of rain and snowmelt into the soils.
- **logging** The felling and removal of logs and other wood products from forest stands.
- **lop** Cutting branches of trees that are standing, felled, or fallen.
- **maintenance costs** Costs that are associated with owning and caring for a piece of land. They include taxes, and upkeep of other resources such as roads.
- **management unit** A group of forest stands managed as a unit to provide a single package of benefits.
- **mast tree** A tree that produces nutlike fruits such as acorns, beechnuts, hickory nuts, seeds of certain pines, cherries, apples, samaras. Hard mast include acorns, beechnuts, and hickory nuts. Soft mast include cherries, apples, and samaras (on maple and ash trees).

- **matrix** The matrix is the dominant landscape element on a landscape in which smaller differentiated elements (patches) are embedded. It is commonly highly connected throughout the landscape.
- **mature tree** A tree that has reached the age where its growth declines or decay begins to increase. Also, a tree is mature when the benefits begin to decline, as in its ability to produce mast or the value of its wood.
- **mortality** The death of trees. In forests, it is a normal process that occurs when trees are old, crowded, or when they have been severely damaged by some agent. Mortality of some trees offer benefits to remaining trees and to wildlife. However, extensive mortality in a forest interferes with its expected development and desired uses.
- **native plant** A species that naturally occurs in a given location where its requirement for light, warmth, moisture, shelter, and nutrients are met.
- **natural forces** The factors that influence the development of a forest, including the soil, climate, and damaging agents.
- **NED** A computerized decision support model developed by the US Forest Service for forest managers to provide assistance on integrated resource management. NED is a tool to incorporate wildlife habitats, visual and scenic qualities, wood production, water quality and quantity, and ecological aspects in forest planning and development of silvicultural treatments. In early versions of the software, including NED/SIPS and NED-1, the NED acronym was rooted in the concept of a "Northeastern Decision Model". As the geographic scope as well as our set of collaborators expanded, the name has remained but with expanded applicability that includes the temperate forest zone of the eastern United States.
- **NED/SIPS** NED/SIPS was the initial product of the development of NED. The computer program, subtitled Stand Inventory Processor and Simulator (SIPS), provided an effective means of creating, managing, and analyzing forest inventory records at the stand level. Its user-friendly interface relieved the pain of entering and editing stand inventory data, and once data are entered, a host of analytical tools were available to help understand the data. A variety of reports could be generated describing the vegetation structure, timber value, and economics of the stand. The user could apply any of a set of standard treatments to the stand or design a customized cutting scheme, and utilize one of the four incorporated stand growth simulators to show what the stand may look like in the future. Major SIPS features included access to four growth and yield simulators using the same data file format (NE TWIGS, SILVAH, OAKSIM, and FIBER), overstory summary tables for common measures of stand characteristics (i.e. density, species composition, volume, etc.), and economic analyses of incomes and expenses over the planning horizon.
- **net present value** The gross value minus costs at one point in time, generally the present.
- **non-commercial treatment** Any activity that does not produce at least enough value to cover the direct costs of that treatments.
- **nonpoint source pollution** Pollution that stems from a source that is spread out over the land. Nonpoint sources include runoff from silvicultural treatments, agricultural

activities, waste water management and some construction activities. The actual pollutants may vary considerably.

- **nutrient** Elements, and other chemical substances, that enhance biological activity. Nitrogen, phosphorus, potassium, and sulfur are some of the nutrients necessary for plants to grow.
- **old growth** A forest community that is very old, generally with several age classes older than 80 years.
- **outbreak** Unusually large populations of insects or diseases that cause damage. Outbreaks vary in size, frequency and duration depending on the particular insect or disease and environmental conditions.
- **overland flow** The portion of rain or snowmelt that flows over the surface until it reaches a stream channel. It is not absorbed by the soil. Overland flow in forests is rare unless leaf litter and organic horizons of the soil have been severely disturbed or mineral soils have been compacted.
- **overmature** A stage in a tree's life when it has declined in vigor and is no longer growing due to old age.
- **overtopped** A condition or position where a tree's crown is completely covered by the crowns of one or more of its neighboring trees. An overtopped tree's crown is entirely below the general level of the canopy and does not receive any direct sunlight either from above or from the sides.
- **patch** A patch is a relatively homogeneous area that differs in some way from its surroundings (e.g., woodlot in a corn field, conifer plantation in a mixed-deciduous forest).
- **peak water flow** The instantaneous maximum flow of water, often occurring as the result of an intense storm, snowmelt, or a combination of both.
- **pest suppression program** A collection of methods used by forest managers to control outbreaks of damaging insects and diseases. These methods usually involve aerial spraying of pesticides or biological materials to reduce pest populations and minimize damage to the forest resources.
- **photosynthesis** The formation of starches and other carbohydrates from carbon dioxide, water, and sunlight in cells containing chlorophyll, or green colored cells in plants.
- **plantation** A forest stand in which most trees are planted or established from seed sown by people. Typically, planted trees are in rows, with equal spacing between each tree in a row and between rows.
- **pole** A tree, usually young, that is larger than 4 inches dbh and smaller than 8 to 11 inches dbh.
- **pollutant** A resource out of place.
- **prescribed burn** The application of fire in forested or other areas, usually under specific conditions of weather and fuel moisture, to control vegetation for silvicultural purposes or to reduce hazards.

- **prescription** The specific instructions for controlled applications of silvicultural treatments based on information about the stands to which they apply.
- **quarantine regulation** Federal, state and local laws that restrict the movement of plants or their products that may contain or promote damaging insects and diseases. These restrictions are intended to limit the spread of pests outside their current range.
- **regeneration** The seedlings and/or saplings in a new forest stand or age class. Natural regeneration originated from seeds, sprouts, or root suckers.
- **regeneration method** A cutting method by which a new age class is created. These methods include clearcutting, seed tree, shelterwood, single-tree selection, and group selection; also called reproduction method.
- **regeneration cuttings** Silvicultural cuttings designed to naturally regenerate the stand by providing for seedling (or vegetative stems) establishment or development, or both. Two even-aged techniques; clearcutting and shelterwood, and two uneven-aged techniques; single-tree selection and group selection.
- **relative density** An index of crowding for forest stands, also called the tree-area ratio; a measure of the absolute stand density expressed as a ratio to the density of some reference level. The reference level is usually the stand density of a fully stocked stand for a particular species composition, site, and method of treatment.
- **residual spacing** The distance between trees that remain in the forest after a silvicultural treatment.
- **resting cover** The cover used when animals are roosting or sleeping.
- **riparian area** The area where the transition between streams, or other bodies of water, and forest vegetation occurs. Riparian areas usually have unique plants, animals, and soil characteristics. The boundaries of riparian areas are not always clearly defined. Riparian areas require special care to protect the quality and habitats of streams.
- **roost** To sit, rest, or sleep on a pole, tree, or protected place on the ground. Roosting is a term used mostly in reference to birds.
- **rotation** The planned interval of time between treatments that regenerate a stand.
- **runoff** Surface streamflow leaving a watershed. Sources of runoff are precipitation falling in the channel, overland flow (rare in forested areas), and subsurface water exiting from soils and bedrock. In this Guide, runoff is synonymous with streamflow.
- **sapling** A tree, usually young, that is larger than a seedling but smaller than a pole-sized tree. Size varies by region, but a sapling is usually taller than 6 feet and between 1 and 4 inches in dbh.
- **sawlog** A log suitable in size and quality to be milled in to lumber of any size. Usually sawlogs are at least 8 inches in diameter after the bark is removed.
- **sawtimber** Trees large enough to be cut into sawlogs.
- **scale** A reference to the relative size of things. Or, size in comparison with its environment, a human figure, or the landscape. The human scale, or the size of people, is a standard reference for the size of all things in our culture.

- **scenic quality** The positive and negative visual characteristics of the natural landscape.
- **sedimentation** The accumulation of organic and mineral soil particles and rocks in streams and water bodies due to erosion. Sedimentation often accompanies flooding. The application of Best Management Practices will usually protect against sedimentation during and after treatments.
- **seed tree** A tree that produces seed. Seed trees are usually mature and high in quality.
- **seedling** A tree grown from a seed. Usually the term is restricted to trees smaller than saplings, or less than 6 feet tall or smaller than 1 inch dbh.
- **semi-woody plant** Plants with stems that reach nearly full size and become somewhat woody in one growing season; subshrubs. They commonly grow additional shoots but not additional layers of wood in following years. Such stems normally live only a few years, and are replaced by new stems growing from a persistent root system. These include brambles.
- **shade intolerance** The relative inability of a plant to become established and grow in the shade.
- **shade tolerance** The relative capacity of a plant to become established and grow in the shade.
- **shelterwood** An even-aged silvicultural technique involving the removal of the understory and lower crown canopy trees to allow the new stand to regenerate under shade. Subsequent removal of the overstory in one or several cuts.
- **silvicultural system** A planned process whereby a stand is tended, and re-established. The system's name is based on the number of age classes (for example even-aged or two-aged), and/or the regeneration method used (for example, shelterwood, crop-tree, or selection).
- **silvicultural treatment** A process or action that can be applied in a controlled manor according to the requirements of a prescription or plan to a forest community to improve real or potential benefits.
- **silviculture** The art, science, and practice of establishing, tending, and reproducing forest stands with desired characteristics.
- **single-tree selection** An uneven-aged silvicultural technique involving the removal of trees singly or in groups of 2 or 3, which maintains a continuous canopy and an uneven-aged or uneven-sized mixture.
- **site** The combination of biotic, climatic, topographic, and soil conditions of an area; the environment at a location.
- **site conditions** The site conditions representative of a stand are sometimes designated by soil factors (parent material, texture, drainage, or soil series), or by direct measurements such as site index - the height of the dominant/codominant trees at a base age of usually 50 years.
- **skid trail** A path or minor road in the woods that is followed when skidding logs from the stump to the landing.

- **skidding** The act of moving felled logs from their stumps to a landing by dragging or sliding.
- **slash** Branches, twigs, and leaves of trees left on the ground after a treatment.
- **snag** A standing dead tree without branches, or the standing portion of a broken-off tree. Snags may provide feeding and/or nesting sites for wildlife.
- **softwoods** A term describing both the wood and the trees themselves that in most cases have needles or scale-like leaves (the conifers); gymnosperms.
- **soil properties** The combination of chemical and physical factors which influence the movement of moisture into, through, and out of soils. Examples include infiltration capacity, porosity, bulk density, soil depth, and water-holding capacity.
- **soil water** Water held between soil mineral and organic particles. This water is susceptible to evaporation, plant uptake, lateral flow into streams, and downward flow into groundwater.
- **species composition** The collection of plant species found in an area. Composition is expressed as a cover type, or a percentage of either the total number, the density, or volume of all species in that area.
- **species diversity** The number of different plants and animals, and other life forms, coexisting in a community.
- **species richness** The number of different species present in an area.
- **stand** An area of trees of a certain species composition (cover type), age class or size class distribution and condition (quality, vigor, risk), usually growing on a fairly homogeneous site. The trees are sufficiently uniform in spacing, condition, age arrangement and/or forest type to be distinguished from neighboring stands. The conditions of the site are relatively uniform, including soil properties, water drainage, slope, exposure to weather, and productivity. Stands of 5 acres and larger commonly are recognized, though minimum stand size depends upon size of ownership and intensity of management.
- **stand composition** The collection of plants, particularly trees, that are found in a stand.
- **stand condition** The number, size, species, quality, and vigor of trees in a forest stand.
- **stand density** A quantitative measure of the proportion of area in a stand actually occupied by trees. This is an absolute measure rather than a relative measure, or percentage.
- **stand structure** The arrangement of trees of different sizes and ages in a stand.
- **stewardship** The wise management and use of forest resources to ensure their health and productivity for the future with regard for generations to come.
- **stocking** A subjective indication of the number of trees present on a stand compared to the optimum number for your desired outcomes expressed as a percentage.
- **stream flow** Flowing surface water formed by a combination of precipitation intercepted by the stream channel, and moisture passing over or through soils and

bedrock. Stream flow is generally confined to a well defined channel, except during flooding or in exceptionally flat topography.

- **stream warming** The heating of stream water by sunlight. The forest canopy covering streams can be managed to either protect against or encourage stream warming.
- **succession** A gradual and continuous replacement of one kind of plant and animal community by a more complex community. The environment is modified by the life activities of the plants and animals present thereby making it unfavorable for themselves. They are gradually replaced by a different group of plants and animals better adapted to the new environment.
- **sustainable** The indefinite and steady supply of something.
- **terrestrial** Of or pertaining to the land as distinct from air or water.
- **territory** A defended area in the home range of an animal, particularly during the breeding season.
- **thinning** The removal of some trees to improve and enhance the vigor and growth of other trees. Thinning enhances forest health and allows you to recover any excess of potential mortality.
- **thinning interval** The period of time between successive thinning treatments, usually used in connection with even-aged stands.
- **threatened and endangered species** Plant or animal species with limited abundance and distribution and in danger of disappearing due to lack of suitable habitat and/or other factors.
- **travel cover** The cover that allows animals to move from one area to another without being detected.
- **understory** The small trees, shrubs, and other vegetation growing beneath the canopy of forest trees and above the herbaceous plants on the forest floor.
- **uneven-aged stand** A stand with trees in three or more distinct age classes, either intermixed or in small groups, growing on a uniform site; a stand containing trees of several 20-year age-classes. These stands generally contain trees of many sizes (seedling through sawtimber) due to the range in age as well as differences in growth rate among species.
- **uneven-aged system** A planned sequence of treatments designed to maintain and regenerate a stand with three or more age classes.
- **vertical diversity** The extent to which plants are layered within an area. The degree of layering is determined by three factors: 1. the arrangement of different growth forms (trees, shrubs, vines, herbs, mosses and lichens); 2. the distribution of different tree and shrub species having different heights and crown characteristics; and 3. the number of trees of different ages.
- **virus** Microorganisms that are not able to produce their own food. They obtain nutrients from other living or dead organisms. The study of tree viruses is relatively new, but several have been identified. They infect leaves or roots, and may contribute to tree death.

- **visual and scenic qualities** A category of aesthetic factors associated with forests that includes qualities like big tree appearance, plants with special characteristics, permanent openings, and concern for the visual effects of disturbance and slash after treatments.
- **visual quality** The positive and negative visual characteristics of anything you see.
- **warm-water fish** Fish are tolerant of high water temperatures often found in larger bodies of water, such as rivers and lakes. An example is large-mouth bass.
- **water quality and quantity** A category of factors associated with forests that includes intensive protection of water quality, riparian areas, wetlands, and fisheries; and the amount of water that flows from the forest.
- **water yield** The distribution and total quantity of runoff, usually considered over some specified period of time. Water yield may be characterized by total volume of runoff and flow duration curves.
- **watershed** An area of land through which precipitation is redistributed into components of the hydrologic cycle, including evaporation, groundwater, and streamflow. A watershed is all the land giving rise to streamflow at a selected point in a stream channel; the area drained by a river or stream and its tributaries.
- **wetland** In the absence of a single, universally recognized definition, a wetland is a land/water ecosystem characterized by periodic inundation. The soils developed under the influence of saturation. It supports plants and animals adapted to these conditions.
- **wildlife cover** Hiding places that provide animals with protection from weather, predators, or other dangers. Specialized types of cover include breeding cover, escape cover, resting cover, and travel cover.
- **wildlife habitat** The combination of environmental factors, such as food, water, cover, and their spatial distribution that a given species needs to survive and reproduce in a given area. Each species has unique habitat requirements.
- **wildlife pest** Animals that cause excessive damage to trees by eating leaves, twigs, buds, bark, or roots.
- **woody debris** The larger woody branch and stem wood (greater than 1 inch in diameter) that has fallen either naturally or as a result of logging. Woody debris in water is an important layer for aquatic organisms and a source of shelter for fish.
- **woody plants** Plant species with persistent stems capable of growing an additional sheath, or layer, of wood and bark each year for the life of the plant. These include trees, shrubs, and woody vines (grapevines).

Meshomasic State Forest Mountain Block Base Map

