



**Massachusetts Department of Conservation and
Recreation**

*Silviculture Prescription
Washington Mountain Spruce Lot*

*Massachusetts Department of Conservation and Recreation
Bureau of Forestry*

*Central Berkshire District
October Mountain State Forest
Washington, MA*

Prepared by:

*Kristopher Massini - Management Forester – Central Berkshire District
Massachusetts Department of Conservation and Recreation
P.O. Box 1433, 740 South Street, Pittsfield - MA 01004
kris.massini@state.ma.us – 413 442 8928 x121*

July 2019

Approved by:

Management Forestry
Program Supervisor

William N. Hill, CF

Date: July 19, 2019

Overview:

The Washington Mt. Norway Spruce Removal Forest Management project is located on October Mountain State Forest adjacent to Washington Mt Road near the intersection of West Branch Rd. It comprises of approximately fifteen acres of declining non-native Norway spruce plantation with small amounts of native red spruce, white pine and northern hardwoods dispersed throughout. Currently this plantation is in decline from root rot fungus (*Armillaria* spp.) and is suffering from continuous wind damage.

The conditions that led to selecting this project for forest management are:

- Portions of the Norway spruce plantation are in decline and suffering from a root rot fungus (*Armillaria* spp.).
- Public safety concerns of spruce blowing down across publicly traveled roads and trails (Washington Mt. Road and the Appalachian Trail.).
- The current mix of native species adjacent and within this stand present an opportunity to convert this stand to a native mixed-wood stand consisting of white pine, red spruce, hemlock and northern hardwoods.
- Further decline in the present Norway spruce overstory will result in continued loss of economic value.
- This project area offers an excellent opportunity to demonstrate and fulfill objectives for DCR Woodlands including the restoration of a native forest ecosystems.

The Washington Mt Norway Spruce Removal Forest Management Project proposes to:

- Remove an overstory of mature non-native Norway spruce to establish an understory of native tree species with small amounts of Norway spruce.
- Remove/reduce the costs and safety concerns of damaged or declining Norway spruce along traveled roads and trails.
- Demonstrate harvesting techniques and best management practices that protect forest productivity, soil and water resources.
- Fulfill management approaches for Woodlands as directed by the Forest Futures Visioning Process (2010) and subsequent Management Guidelines (2012) including the restoration of a native forest ecosystem.

Site Data:

Topography: This proposed project area is located near the top of Washington Mt. at an elevation of approximately 2000 feet. This portion of the forest that is generally flat, with little change in topography. The slopes within the stand do not exceed 10% and there is a 2.3-acre wetland matrix which begins adjacent to Washington Mt. Road traveling west then branching to end along the southern and western stand edge.

Soil: The soils on this site are of the Pillsbury and Peru-Marlow Association. These associations generally have very deep soils that are moderately to poorly drained, moderately to extremely stony soil on slightly sloping areas. Both soils have a moderate productivity for forest growth, slight erosion hazard, and slight to severe equipment limitations. (Excerpts from “Soil Survey of Berkshire County Massachusetts”, NRCS 1988)

Climate: The project location lies in an area of mild summers and moderate winters with year round precipitation possible. Winds generally come from the west. Although major weather events can happen in any given year, the chances of hurricanes, tornadoes, ice storms or other forest changing events are seldom but do occur. The figures below (Table 1) are excerpt from the National Weather Service 2012 Climatological Report for Pittsfield, MA. The climate period used to determine normal value is 1981 through 2010.

Table 1:

	2012 Annual	2011 Annual	Normal Annual Value	Normal Winter	Normal Spring	Normal Summer	Normal Fall
Annual Maximum Temp	58.4	56.5	55.3	31.7	54.3	76.7	57.9
Annual Minimum Temp	39.2	37.4	35.4	15.4	32.9	55	38
Annual Mean Temp	50	50.2	48.3	23.6	43.6	65.8	48
Total Precipitation (in)	36.36	59.46	45.38	8.6	11.44	12.74	12.6
Days with >= .01 Precipitation	144						
Average Wind Speed	6.1						

Stand Information: The project area consists of approximately 15 acres of Norway spruce plantation which was established in 1938. In 1960 this stand received a release treatment to remove competition from native hardwoods. Within this stand the dominant tree species that were observed are Norway spruce (*Picea abies*) with small amounts of red spruce, (*Picea rubens*) white pine (*Pinus strobus*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), black birch (*Betula lenta*), white birch (*Betula papyrifera*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), American beech (*Fagus grandifolia*) and quaking aspen (*Populus tremuloides*). These native species are more prevalent along the edges of the plantation and make up the surrounding forest stands. The Norway spruce present in the stand is mature and has been in a state of decline over the past 10 years. Within the plantation there are areas of high mortality and/or wind throw that have become heavily stocked with regeneration of white, pine, hemlock (*Tsuga canadensis*), red spruce, balsam fir (*Abies balsamea*) and hardwoods such as black cherry, yellow birch and sugar maple. Portions of the plantation that are undisturbed have a thick duff layer that is prohibiting regeneration.

Disease and Insects: Since 1960 there has been no active management in this stand and currently the plantation is overstocked. Much of the stand is in decline due to trees competing for limited resources. There have been several major wind events including the 2008 ice storm and 2012 hurricane related storms that have resulted in many stems with broken tops and heart rot from broken branches. Portions of the plantation are also in decline and suffering from a root rot fungus (*Armillaria* spp.).

Streams and Wetlands: This project area is located in the Housatonic River Watershed. Water from this plantation runs off and travels south west into Sandwash Reservoir (City of Pittsfield Reservoir). From there it exits into Roaring brook which then flows to the Housatonic in Lenox.

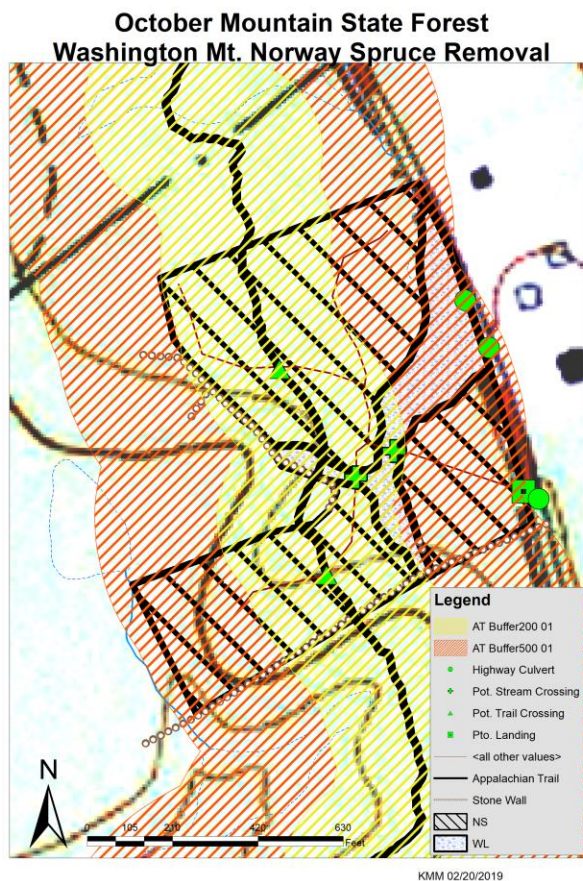
Within the plantation there is 2.3 acres of forested wetland, Norway spruce is the primary species. This wetland complex is a matrix of wetlands and uplands originating from culverts along Washington Mt Road and crossing the plantation and exiting to the west and south. The Norway spruce within this wetland complex has suffered more mortality than in the remainder of the plantation, approximately 70% mortality. This project will file a Request for Determination of Applicability with the local conservation commission to remove all the Norway spruce from this portion of the plantation, all native trees and shrubs will be retained. Harvesting in this area will only be allowed during frozen or snow-

covered conditions. Two wetland crossing will be utilized following guidelines in the “Massachusetts Forestry Best Management Practices Manual”.

There are no mapped certified or potential vernal pools by NHESP located in this project area. Outside of the project area to the west and south are additional wetlands which flow into the Sandwash Reservoir, these will not be impacted during this project. Any and all other water features found within the project area during implementation will be protected as well.

NHESP and Wildlife: According to the NHESP 2017 mapping there is no priority habitat for rare species located within the proposed harvest area. Care will be taken to properly report and address the needs and recommendations for any state-listed rare plant, wildlife species or priority natural community.

There is currently not an abundance of wildlife evidence due to the uniformity (low structural and species diversity) of the plantation. There is currently a large number of snags and a high volume of coarse woody debris due to the deteriorating Norway spruce providing habitat for species that use these features.



Recreation and Aesthetics: The Appalachian Trail (AT) traverses through the western portion of the project area in two segments totaling approximately 600'. Following guidelines set forth in the “Memorandum of Understanding Guidance Document for the Appalachian National Scenic Trail in the Commonwealth of Massachusetts” established in 2003, coordination between DCR and the Appalachian Mountain Club (AMC) Berkshire Chapter has occurred for project planning within the both the primary and secondary zones of the “Appalachian Trail Corridor”. Prior to the beginning of this operation DCR, AMC and Appalachian Trail Conservancy (ATC) will determine the best course of action for safety of trail users while the operation is active. The Massachusetts Appalachian Trail Management Committee has voted in support of this project. Both the AMC and ATC will be kept up to date on the progress of this project. Representatives of each group are invited to participate in the field work of marking trees and layout of trail crossings within the primary zone. It is anticipated that the AT will be crossed at two points.

There are no other formal trails or recreational within this project area. The project area is also open to all legal passive recreation activities that are allowed on DCR properties.

Cultural Resources: There are existing stone walls on the southern boundary and portions of western boundary of the plantation; these will not be affected by the project. Any additional stone walls,

foundations or other historic features will be protected to the standards outlined in the “Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines”.

Stand Data:

Norway Spruce Plantation: This stand currently has an average basal area/acre of 174 and an average of 198 trees per acre. Dead trees account for a basal area/acre of 60. Norway spruce makes up 72% of the total basal area, with red maple, red spruce, black cherry, and white pine making up the remaining 28%. The overstory quadratic mean diameter is 12.7 with measured trees reaching 26” dbh.

The understory of the stand is a mosaic ranging from dense regeneration to thick duff with no vegetation. The regeneration is dominated by Norway spruce, red spruce, balsam fir, white pine, red maple and yellow birch with an average of 1062 stems/acre, with most stems in the under 5” dbh class (Table 3). Shrub and understory species found in the stand were raspberry, ferns, grasses, and maple leaf viburnum.

Throughout the stand there was an average of 108 Norway spruce snags per acre. On average there was 1179 cu ft./acre of coarse woody debris (CWD). Most of this CWD is a result of the mortality from wind events and root rot. This figure is well above the recommended minimum of 256 cubic feet of CWD as required in the Landscape Designation Guidelines, however this amount is expected to increase post-harvest.



Table 2: Remnant Norway Spruce Plantation (Live trees greater than 5”dbh)

	All species	Norway spruce	Red Maple	Red Spruce	Black Cherry	White pine
Basal area (square feet/ac)	174.3	125.7	22.9	20	2.9	2.9
percentage of stand	100	72	13	11	2	2
Stems per unit area (stems per acre)	198	126.6	33.3	22.1	14.6	1.3
Quadratic Mean Diameter	12.7	13.5	11.2	12.9	6.0	20.0
Relative Density	100	71	14	12	2	1
Sawlog Gross Total (bf/ac)	29075.3	23628.1	1335.9	3442.3	0.0	669.9
Cords Gross Total (cds/ac)	64.1	48.4	7.0	6.9	0.5	1.2

Table 3: Remnant Norway Spruce Plantation (Live trees less than 5"dbh) Total stems

SPECIES	Size Class				Average	Stems/Acres
	1	2	3	4		
Red Spruce	6	0	0	0	0.43	128.57
Balsam Fir	3	0	9	2	1.00	300.00
Service Berry	2	1	0	0	0.21	64.29
Red Maple	2	1	7	0	0.71	214.29
Norway Spruce	7	4	3	3	1.21	364.29
White Pine	0	5	0	0	0.36	26.79
Black Cherry	2	0	0	0	0.14	10.71
Stripe Maple	1	0	1	0	0.14	10.71
Yellow birch	0	2	5	0	0.50	37.50
Hemlock	0	0	1	0	0.07	5.36
Total	24	15	29	9	4.77	1162.51

Evaluation of Data, Silviculture and Projected Results:

Primary/Secondary goals: The primary goals of treatment of this stand will be to ensure future diversity of age, size and species mixture by demonstrating several types of silviculture. These practices will help in ensuring diverse and resilient forests as directed in the goals of the "Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines". This is being accomplished by creating a well-planned and balanced science-based forestry plan.

Secondary goals of this project are to provide a safe recreational opportunity for Appalachian Trail users and to capture value of damaged and/or diseased trees and to provide raw materials to the forest products industry. This project will also assist the community by repairing the forest roads / trails and provide income to the town from the Forest Product Trust Fund. Portions of the proceeds of this project will provide materials for AT trail maintenance.

Silviculture Methods: Due to the current species composition, susceptibility to root rot and wind throw, even-aged silviculture will be utilized for this project. The harvest will convert the Norway spruce plantation to a mixed-wood stand of native conifers and northern hardwoods stand. Allowing the exotic Norway spruce trees to die "on the stump" will create a public safety issue for people using the state forest for recreation and result in the agency having to spend public funds to remove standing dead hazard trees. Proactively harvesting the planted trees while they still have market value will reduce costs for the Commonwealth, provide greater economic stimulus from higher value wood products (timber vs. chipwood), and foster better control of regeneration (active harvesting will put variable amounts of sunlight on the forest floor, which will in turn favor regeneration of a diversity of native trees species including both shade-intolerant species like cherry, birch, aspen, and oak in the more heavily cut portions of the treatment area, and sugar maple and hemlock in the less heavily cut portions of the treatment area).

An overstory removal with reserves of native trees will be utilized. All native trees and existing regeneration will be retained within the plantation will be retained. This will create a mosaic of tree size, height and density of existing trees. The area currently without understory vegetation is expected to be populated by Rubus spp. (raspberries, blackberries), ferns and grasses first, then succeeding to regeneration of conifer and hardwood species within several years. Existing areas of regeneration will flourish with the increased sunlight and nutrient supply. Smaller healthy Norway spruce (<12"dbh) which would be less susceptible to wind throw may be retained within portions of the primary zone of the Appalachian Trail where an adequate number of native trees are not present.

Prior to harvesting of this plantation, a "seek and destroy" invasive species project will be conducted. A qualified, licensed and insured contractor will locate and chemically treat all invasive species along the frontage of this parcel as well as the 15 acres of the project area.

Desired Future Conditions: By providing light conditions for rapid growth of regeneration this will become a two aged mixed-wood stand with small amounts of legacy Norway spruce. This mix will hopefully be comprised of the existing shade tolerant species and expected shade in-tolerant species established in the post-harvest conditions. This will result in a more heterogeneous forest which will by definition be more resistant to disease and disturbance than the previous plantation.

Anticipated Future Treatments: Both stands should be examined in approximately 5 years to ensure the advanced regeneration has survived and there has been additional regeneration of desired species. An invasive species inventory should be included as well to ensure potential roadside invasive species have not encroached into the stand. No further treatment is expected.

Logging System Requirements:

The harvesting of these stands will be primarily accomplished with a cut-to-length harvester and forwarder to ensure protection of all advanced regeneration present in the stand. Whole tree harvesting and skidding lengths greater than 33 feet will not be allowed in this prescription area. Within the primary zone of the Appalachian Trail all slash will 100' from the centerline of trail, and under 2 feet in height though the remainder of the zone. Outside of the primary zone all trees felled will be processed or limbed within the stand leaving slash dispersed in the felled location except where needed for skid trail use. Harvesting in this manor will increase amounts of CWD by leaving more material in the woods and create habitat and greater structural diversity for small wildlife species such as rabbits and other rodents.

Project Access and landings: Access to the proposed project area will be from Washington Mountain road. This project is anticipated to utilize a roadside landing to keep logging infrastructure at a minimum. Final location of the landing will be determined / agreed upon with coordination of the Forester, Operator and Town Road Supervisor. Cleared portions that are not graveled will be seeded with "Berkshire Conservation Mix" grass seed and mulched with straw. Where possible, boulders will block access of illegal vehicles to the forwarder trails.

Forwarder Road and Skid Trails: Throughout the project area forwarder / skid trails will be laid out to utilize the two best crossing location for the existing wetland. These crossing will be designed at or above the standards of the "Massachusetts Forestry Best Management Practices" and used under frozen or snow-covered conditions. Primary skid trails and the wetland crossings will be laid out and marked prior to the project being advertised.

Upon completion of all harvesting activity all forwarder / skid road will be left in a stable state and water bars will be installed according the "Massachusetts Forestry Best Management Practices". The wetland crossing will be stabilized and entrances from the landing will be blocked to prevent illegal access.

Wildlife Resources: Current snags will be retained; however, operators have the right to remove any snag that poses a safety hazard to themselves or equipment. Operators will not be required to utilize cull trees, if left behind they will add to the amount of large diameter CWD. Limbs and tops (slash) will also be left in place to augment existing CWD and add soil nutrients through decomposition.

In-kind Services:

- Invasive control along the frontage and interior of the project area.
- Building materials for Appalachian Trail maintenance.

Prescription Documentation:

Project Marking Guidelines: Follow the directions below for marking instructions of sale and stand level features.

Sale Level:

1. Locate, flag (pink wetlands) and paint with red diagonal stripes the buffers and filter strips along all wetland and associated streams.
2. Locate, flag and paint with red diagonal stripes the remaining wooded project boundary line. This will not be done where the project boundary is a road.
3. Flag temporary layout of the primary skid trail network with orange flagging. Using orange paint mark small noncommercial stems or stems already marked for removal located along adjusted skid trails upon completion of marking (Orange).
4. Flag temporary layout of any unavoidable wetland and stream crossing with labeled orange flagging. Using Red paint mark and label each crossing upon completion of marking and any final adjustment to location.
5. Locate and mark perimeter of landing one red diagonal stripes.
6. General tree marking guide:

Marking type	Type of Tree	Tally Method	Mark Type
Leave Tree	Leave Tree	As needed	Red Horizontal Line
Cut Tree	Cut Saw Log	Individual tally DBH & height	Blue Horizontal Line
Cut Tree	Cut Pulp/Cord Wood	Individual tally DBH	Blue Dot
Cut Tree	Cut Live Cull Tree	No tally	Blue X
Cut Tree	Dead Tree Warning	No tally	Blue X

Stand 1: Overstory Removal with Hardwood Standards: Remove all live standing Norway spruce within the stand. Road buffer may be reduced below the 50% basal area restriction for removal of Norway spruce and hazards only.

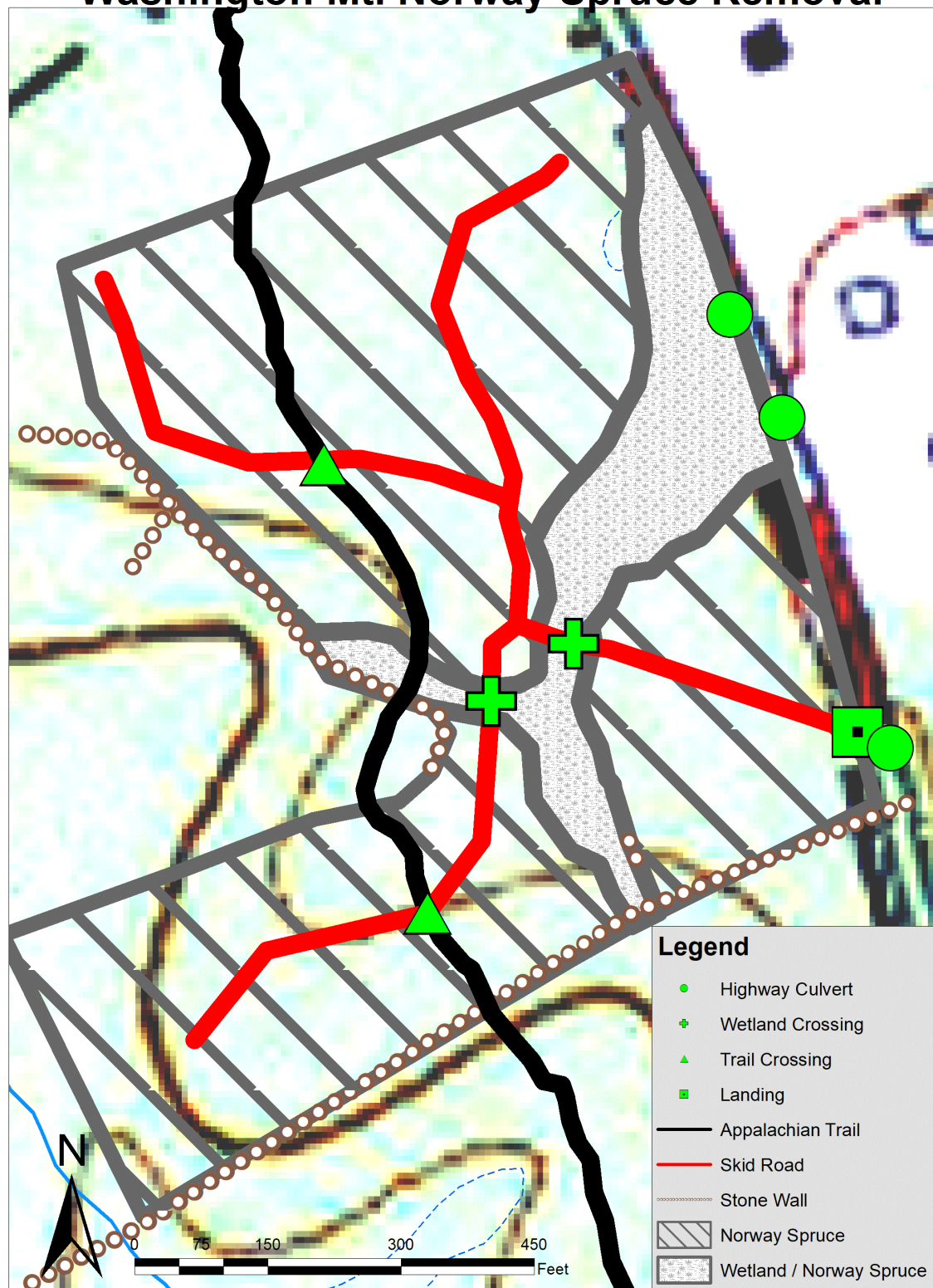
1. All Norway spruce
2. Unacceptable \ Diseased White Ash
3. Other Hazard Trees along Washington Mt Road

All acceptable hardwoods will be retained as crop trees. Advanced regeneration of all species will avoided and protected as much as possible to ensure a healthy next crop. Retention of mature seed producing red oak, small diameter white ash, red spruce and hemlock within the stand is desirable.

Attached:

- Stand Map
- Locust Map

October Mountain State Forest Washington Mt. Norway Spruce Removal



October Mt. State Forest Washington Mt. Spruce Lot

