Massachusetts Department of Conservation and Recreation
Bureau of Forest Fire Control and Forestry
Forest Management Proposal
Name: Garnet Hill Lot

Date Posted: **February 16, 2017**
End of Comment Period: **April 2, 2017**

Region:	**West**
Recreation District:	**Lakes**
Forest Management District:	**Central Berkshires**
State Forest:	**Peru State Forest**
Closest Road:	**Curtain Road - Garnet Hill Road**
Town	**Peru**

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Overview:
The Garnet Hill Lot Forest Management project is on the western portion of the Peru State Forest (see Locus Map) along Garnet Hill Road which is accessed from Curtin Road in the town of Peru. It comprises approximately two hundred and eighty acres of red pine plantation, Norway spruce plantation, northern hardwoods, hemlock-hardwood and wetlands.

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

- Significant portions of the project area have been affected by biotic (red pine scale) agents that are causing mortality in the overstory red pine trees.
- Portions of the project area have been affected by biotic agents such as beech bark disease, black knot and sugar maple borer causing structural defects in overstory trees in the northern hardwood stands.
- Significant portions of the project area have been affected by abiotic (ice) agents repeatedly, with major damage from the December 2008 ice storm.
- This project will provide an opportunity to repair drainage and erosion issues on Garnet Hill Road.
- Will provide an opportunity to demonstrate regeneration cuttings in both northern hardwoods and plantations.
- Desire to capture monetary value of offsite red pine trees prior to mortality of the entire stand.
- This project offers an opportunity to demonstrate and fulfill an ecosystem services approach to forest management on DCR Woodlands including the restoration of native vegetation communities.

The Garnet Hill Forest Management Project proposes to:

- Remove/salvage an overstory of dying red pine stand and release an existing understory .
- Demonstrate several regeneration techniques in northern hardwood forest types.
- Remove/reduce the costs and safety concerns of the dying red pine stands along traveled roads.
- Demonstrate harvesting techniques and best management practices that protect forest productivity, soil and water resources.
- Repair drainage and erosion issues along portions of Garnet Hill Road.
- Create and provide ecosystem services from this Woodland as directed by the Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines (2012) including:
    - Ecological restoration of degraded natural community types
    - Provide locally grown forest products to the local economy
    - Create a more diverse forest structure that is resilient to disturbance
    - Sequester carbon in retained overstory trees, permanent forest products produced from the harvest, and in the vigorous regenerating forest.
    - Provide the conditions for early seral or regenerating forest that will support diverse species.

Stand Description:

Stand Information: The proposed project area consists of approximately 280 acres of red pine plantations (4), Norway spruce plantation (1) and northern hardwoods forest types. Throughout the project area the dominant tree species that were observed are red pine (Pinus resinosa), Norway spruce (Picea abies), sugar maple (Acer saccharum), red maple (Acer rubrum), yellow birch (Betula alleghaniensis), white birch (Betula papyrifera), white ash (Fraxinus americana), black cherry (Prunus serotina), American beech (Fagus grandifolia), quaking aspen (Populus tremuloides), white pine (Pinus strobes) and Hemlock (Tsuga canadensis).

The DCR Management Guidelines of 2012 stated that forest stands will be "classed . . . and considered for silvicultural treatments that generally fit their productivity, structural complexity (or potential thereof) and diversity". The current species compositions and the GIS analysis of the Garnet Hill site history (land use; agriculture/logging) and conditions (soil types, productivity; vegetation cover) suggests a range of site complexity from moderate to high indicating that un-even age methods of regeneration may be appropriate at this location for the existing northern hardwoods forest type.

There are three major forest types in this project area. They are red pine plantation, Norway spruce plantation, and northern hardwoods.

- Red Pine Plantation – There are approximately 58 acres of declining red pine plantation. These stands are approximately 95 years old and fully stocked. The soil types in these stands listed by dominance are Lyman-Turnbridge (LtE), Turnbridge-Lyman (TuC), and Pillsbury Loam (PoB) (see next section on soil description). These plantations are currently even-aged two story stands. The overstory which is dominated by red pine with small amounts of hardwood species is medium sized, or roughly an average of 12-14 inch diameters. The exotic red pine plantation portion of this project area has been shaped by rapid mortality in recent years caused by crown damage resulting from the 2008 ice storm (http://www.weather.gov/media/box/officePrograms/science/December_2008_Ice_Storm.pdf) followed by a rapidly expanding infestation of red pine scale (Matsucoccus resinosae)

(http://www.nhstateparks.org/uploads/pdf/RP_pestalert.pdf). The understory is currently stocked with sugar maple, red maple, American beech, black cherry and other northern hardwoods. This young emerging stand is approximately 20 feet tall with an average diameter of 1-4 inches.

- Norway Spruce Plantation - There are approximately 3 acres of Norway spruce plantation located within the project area. This stand is approximately 95 years old and fully stocked. The soil type in this stand is PoB (see next section on soil description). This plantation is currently even-aged and dominated by spruce with an occasional northern hardwood or white pine tree mixed. The stand is also composed of medium sized trees, or roughly an average diameter of 12-14 inches.
- Northern Hardwoods - The majority of the project area, approximately 205 acres, is in a mixed northern hardwood type. These stands are located in the TuC, Berkshire-Marlow (BmE), LtE, Peru-Marlow (PmC) and PoB soil types. Past land use and weather events have had a negative effect on the quality and heath of these stands. This forest type will be broken down into individual stands for management purposes based on dominant tree species, topography and soils to assist planning in proper management decisions. There are several inclusions up to 5 acres where hemlock and white pine are a component. The current size class in this forest type range from small to large diameter trees with an estimated average of 12 inches but ranging from 6-25 inches. The density of the northern hardwood stands is generally high but there are natural gaps in the forest canopy mostly caused by ice and wind damage. Throughout the project area white ash has been in decline for several years. It is anticipated that the emerald ash borer (EAB) will kill the remaining stressed trees upon its arrival. The stand age is approximately 80-100 years old.

Topography: This proposed project area is located in the western portion of the Peru State Forest adjacent and South of Garnet Hill Road. The project is bounded by Garnet Hill Road to the north, state forest boundary to the west and intermittent streams, wetlands and forest type changes to the south and east. Both the western and eastern edges of the project area have an elevation of approximately 1900'. From here the terrain rises to the middle portion of the project are to an elevation of 2175' at the peak of Garnet Hill.

The project area ranges from generally flat in the middle with gradual slopes to the east and more severe drops in elevation to the west. Just outside the project area to the west is extremely steep with exposed bedrock. Garnet Hill is also known for its views from the peak at the end of Garnet Hill Spur Road.

Soil: There are five soil types associated with this project area, ranging from very poorly drained flat bottom types to excessively drained upland soils. As with topography the forest composition changes with the soil types. The five types are described below (excerpts from "Soil Survey of Berkshire County Massachusetts", NRCS 1988).

- PmC - Peru-Marlow Association: (109.2 ac) This map unit consist of very deep, moderately well drained Peru soils and very deep, well drained Marlow soils. Peru soils are typically on the lower parts of slopes or in slightly concave areas and Marlow soils are on the upper parts of slopes on in convex areas.
- BmE – Berkshire-Marlow Association: (22.5 ac) This map unit consists of very deep, well drained Berkshire and Marlow soils. The soils are on the sides of hill and mountains.
- TuC – Tunbridge-Lyman Association: (19.2 ac) This map unit consists of moderately deep, well drained Tunbridge soils and shallow, somewhat excessively drained Lyman soils. These soils are on the sides and tops of hill and mountains.

- LtE – Lyman-Trunbridge Association: (14.6 ac) This map unit consists of shallow, somewhat excessively drained Lyman soils and moderately deep, well drained Tunbridge soils. These soils are on the mountainous uplands.
- PoB – Pillsbury Loam: (20.5 ac) This is a nearly level to gently sloping, very deep, poorly drained soil on foot slopes of drainage ways and in slightly concave areas of glacial till uplands.

Previous Silvicultural Treatments: Although not a lot of historic paper records exist for much of this forest, the past uses can be determined by historic ownership, a forestry stand map from 1926 and the current forest composition. Much of the Peru SF came into state ownership in the period of the early to mid 1920 from individual landowners. These properties ranged from 25 to 300+ acres were mostly family farms and came to the state in various stages of abandonment.

This project area and much of the surrounding state forest had been cleared for agricultural/grazing use and by the 1920 was in a state of abandonment. According to a 1926 forest stand map produced by the state, much of the project area had established hardwood stands consisting of cherry, ash, beech and maple in the 4-10" diameter range, those areas still in "brush" were planted with red pine or Norway spruce.

There are no records of silvicultural treatments within the project area; however there have been projects in other plantations and northern hardwood stands to the east and south, most recently in 2006 and 1991.

Aesthetic, Recreation, Wetlands, Cultural, Rare Species and Wildlife Considerations:

Aesthetics: Garnet Hill Road and the Garnet Hill Spur Road are unmaintained roads within the Peru State. Garnet Hill Road leaves Curtain Road and travels west through the state forest and private land and exits into a private lake community located off of Smith Road in Peru. Garnet Hill Spur Road leaves Garnet Hill Road and ends at the overlook on Garnet Peak. There are no private dwellings located along Garnet Hill road or the Spur Road, however there are several water holes, foundations and adjacent stonewalls.

Both roads are currently in poor condition and only accessible by high clearance 4x4 vehicles or by foot due to holes and rocks. Many water control features of the road have failed due to lack of maintenance causing erosion.

As per the "Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines", there will be a 50 foot buffer along these two roads where no more than 50% of live basal area will be harvested and no slash with in 25' of the road will remain. The Massachusetts Slash Law will be observed beyond the 25' no slash zone.

Recreation:

- Garnet Peak – This is an unmaintained recreation area used by hikers, horseback riders and ORV users to view the scenic vista, picnic and camp (not permitted). This area historically was popular for blueberry picking as well. Currently access is limited to OHV vehicles and foot traffic due to the poor condition of the Garnet Hill Road and the spur road. This area falls within the red pine plantations and is experiencing mortality of the trees within it.
- Plane Crash Site – There is a large 5 foot tall fieldstone memorial located near the eastern edge of the project area to honor the victims; 13 paratroopers who died and 3 who survived when Army plane which crashed on August 15, 1942. This site is accessible by foot on a poorly maintained trail, which was most likely was the unplanned path cut by the rescue party to access the crash. In the past DCR staff has assisted family members to gain access

to the site. More information about the memorial can be found by following the Berkshire Eagle Link below. http://www.berkshireeagle.com/localnews/ci_9374534

- The project area is also open to all legal passive recreation activities that are allowed on DCR properties.

Streams and Wetlands: Along with the intermittent streams along the south and east boundary of the project mentioned above there are several additional intermittent streams located in the project area. Streams to the east of the project area generally flow through wetlands and beyond to Cone Brook and Glendale Brook before crossing Curtin Road and eventually flowing to the Middle Branch of the Westfield River after crossing several more roads. The intermittent streams on the western portion of the project area generally flow across the skyline trail to Geer Brook to Factory Brook which empties into the West Branch of the Westfield River.

There are no mapped certified or potential vernal pools by NHESP. During site visits no vernal pools were noted either, however there may be other seasonal seeps, intermittent streams or small forested wetlands areas located throughout the project area not seen during initial site visits which could function as one.

Cultural Resources: There are no known pre-contact sites within the proposed project. There are several CCC era historic water holes, foundations and stone walls within the harvest area. These known features as well as any other features found within the project area will be protected from disturbance during any operation and will be treated according to guidelines set forth in the "Bureau of Forestry – Cultural Resource Management Protection Standards & Guidelines". During reconnaissance several stone walls were found. These walls and any additional walls found will be left intact during this project by utilizing existing bar ways where appropriate.

Rare and Endangered Species: According to the NHESP "Massachusetts Natural Heritage Atlas 13th Edition" there is no priority or estimated habitats located in the proposed harvest area. No rare plants have been identified in the field to date. Care will be taken to properly report and address the needs of any state-listed rare plant or wildlife species if found on the site.

Wildlife: No rare animals or critical habitat were noted upon the initial site visit. Large mammals noted by observed sign were moose, turkey, deer and coyote. Small mammals noted were squirrel and porcupine. It has been observed in previous forestry operations nearby that large herbivore pressure (moose) is a minor concern. Due to the deteriorating nature of the trees in the forest types in this project area, there is an abundance of large diameter coarse woody debris (CWD) and both live and dead wildlife trees (snags).

Sale Layout and Harvesting Limitations:

The timber sale will use subdivisions or units of the project/contract area to effectively control logging operations.

Project Access: Access to the proposed project area will be from Route 143 in the town of Peru, south onto Curtin Road then west on Garnet Hill Road. The project area begins approximately ½ mile from Curtin Road. Garnet Hill Road traverses the length of the project area and then continues off of state land.

Landings: There are no currently existing landing areas large enough to support a modern timber harvest operation. Currently three landing will be proposed off of Garnet Hill Road to support a Varity of equipment setups. Effort will be made to set the landing back approximately 50 feet from the road to ensure the required buffer strip is kept intact where feasible. Each of these proposed landing may be converted to parking areas after the forest products harvest is complete.

Skid Road and Trails: All forwarder and skidder trails will be designated during the timber marking of the project area by the forester. Any existing trails found will be utilized when possible and new trails will be laid out as directed in the "Massachusetts Forestry Best Management Practices Manual" and "Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines".

Wetland & Stream Crossing: There are three anticipated intermittent stream crossing within this project area. Every effort will be made to avoid further stream and wetland crossings if additional water features are found. All operations within regulated water features found in the area will at minimum follow the guidelines of the "Massachusetts Forestry Best Management Practices Manual".

Road and Trail Buffers: There will be no harvesting along any town or State DOT owned road. Residual Basal area along portions of Garnet Hill Road and the Spur Road containing red pine will be low; to alleviate this within 50 feet of the road edge all other species will be retained barring safety issues. As directed in the Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines" a 50 foot buffer where slash will be light and natural in appearance will be in place along these road where red pine is not present.

Equipment Limitations: At this time there is not any anticipated equipment limitations.

Excluded Areas: All wetland areas in the project area will be clearly marked and excluded from the harvest. Equipment will be excluded from areas of sustained 40% or greater slopes.

Erosion and Sedimentation: Unwanted movement of soil will be controlled by following recommendations in the "Massachusetts Forestry Best Management Practices Manual". All work will be limited to dry or frozen soil conditions. Restoration of existing roads and trails will help mitigate current and future erosion of the Garnet Hill Road, Spur Road and the Plane Trail.

Site Restoration: Upon completion of activity in the project area all roads, forwarder/skid roads and forwarder/skid trails will be left in a stable state by grading and installing water bars as needed. All landing will be clear of debris, graded and seeded with "Berkshire Conservation Mix" and straw.

Proximity to Designated Forest Reserves: The Middlefield State Forest is located approximately ¼ mile from the project area. The Peru and Middlefield State Forests are separated by private land and the Skyline Trail. The proposed project will have no effect on the Forest Reserve.

In-kind Services: Proposed in-kind services to be attached to this project to date.

- Repair and restoration of drainage features on Garnet Hill Road and Spur Road.
- Repair and restoration of illegal off-road vehicle damage of the Plane Trail, installation of water control devices to ease maintenance. An attempt to block access to illegal vehicles will be made.
- Conversion of landing sites to parking for recreational use.

Silviculture:

Red Pine Plantations: Due to the species composition and rapid mortality of these stands, even aged silviculture will be utilized to manage for improvement. The silvicultural practices in these stands will be an overstory removal with reserves of native hardwoods. These stands will be managed to change them from a planted red pine dominated overstory to natural northern hardwoods stands. Forest management efforts will also be aimed at creating and maintaining vertical (tree heights) and horizontal (down woody material) stand complexity.

Although the majority of the existing understory will remain intact and scattered native trees will remain in the overstory, this portion of the project will seek the approval from the DCR Commissioner as required in the "Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines" for harvest opening larger than 1/3 acre. Due to the varied density of existing native trees in the overstory, openings larger than 1/3 acre will occur in the overstory. The understory is anticipated to remain fully stocked with small 1-5 inch dbh native hardwood trees.

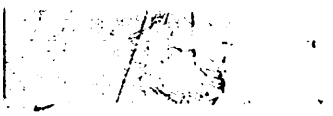
The primary goal of treatment in these stands is to remove the diseased red pine while retaining, protecting and releasing the advanced regeneration currently in place. The secondary goal of management in these stands is to capture the potential product and value of the red pine prior to total stand collapse.

- **Silviculture Methods:** An overstory removal also called single stage shelterwood with reserves will be prescribed for the red pine plantations. This will be the only step in converting these plantations to new native northern hardwoods stands. Within these stands all red pine will be removed except when needed to satisfy filter strip requirements. It is anticipated that all poplar will be harvested to promote the sprouting and retention of this species in the future. Trees of other species including white pine, cherry, maples and birches which make up approximately 5 percent of the current overstory will be retained permanently to provide structurally diversity in the stand. After this harvest releases the current understory dominated by cherry, maple, beech and birch a new age class will be established.
- **Desired Future Conditions:** By releasing the sapling sized stand of hardwoods by harvesting the diseased red pine, the resulting stand will provide habitat diversity in size and structure in the larger forest ecosystem for years to come.
- **Anticipated Future Treatments:** This stand should be examined in approximately 5 years to ensure the advanced regeneration has survived and additional regeneration is of desired species. No further treatment is expected until this stands reaches 40-50 year old, at which time commercial thinning may be conducted.

Norway Spruce Plantation: Due to the size (3 acres), location and age of this stand, a clearcut with reserves will be prescribed. The silvicultural practices in these stands will demonstrate an overstory removal with reserves of native hardwoods. Past plantation harvests in high wind locations have shown that thinning/ or shelterwood practices are not practical due to windthrow of the weakened residual stand. This will be a stand conversion from non-native Norway spruce to natural northern hardwoods. Forest management efforts will also be aimed at creating and maintaining vertical (tree heights) and horizontal (down woody material) stand complexity by retaining any native tree species within the plantation. This portion of the project will seek the approval from the DCR Commissioner as required in the "Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines" for harvest opening larger than 1/3 acre.

The current understory is not fully stocked throughout the three acres, however based on past practices it will most likely transition to a herbaceous successional type dominated by Rubus species (blackberry) and then transition into a shrub/sapling stage within 5-10 years.

The primary goal of treatment in these stands is to remove the non-native Norway spruce while retaining, protecting and releasing the advanced regeneration currently in place. This will also provide early successional habitat. The secondary goal of management in these stands is to capture the potential product and value of the Norway spruce.



- **Silviculture Methods:** A clear cut is prescribed for this 3 acre Norway spruce plantations. This will be the only step in converting this plantation to new native northern hardwoods stands. Within these stands all Norway spruce will be removed except when needed to satisfy filter strip requirements. Trees of other species including white pine, cherry, maples and birches which make up less than 5 percent of the current overstory will be retained permanently to provide structurally diversity in the stand. After this harvest releases the current understory dominated by cherry, maple, beech and birch a new age class will be established.
- **Desired Future Conditions:** By harvesting the Norway spruce and allowing natural procession or succession to occur, the resulting stand will provide habitat diversity in size, structure and composition in the larger forest ecosystem for years to come.
- **Anticipated Future Treatments:** This stand should be examined in approximately 5-10 years to ensure the advanced regeneration has survived and additional regeneration is of desired species. No further treatment is expected until this stands reaches 40-50 year old, at which time commercial thinning may be conducted.

Northern Hardwood Stands: Although there is diversity in species composition over the 205 acres of this forest type it can all be considered one single age class. Due to environmental factors that include high elevation/wind, ice damage, beech bark disease, black knot and sugar maple borer, these stands are considered low quality. There are currently some small natural openings as a result of these factors. The silviculture within this forest type will utilize irregular shelterwood with opening that vary in size from approximately 1/3 acre up to 5 acres to begin transforming the single cohort, poor quality / high risk stands into uneven aged, irregular structured stands. This portion of the project will seek the approval from the DCR Commissioner as required in the "Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines" for harvest opening larger than 1/3 acre.

Within these northern hardwood stands there are inclusions of hemlock and white pine as both individuals and groups up to several acres. The density of the softwood inclusions is higher surrounding wetlands which will in most cases extend the no harvest buffer beyond the currently mapped wetlands. Care will be taken to retain the individual softwood species throughout the project area.

Due to crown loss in overstory trees there is a current understory of desirable species including cherry, maple and birch as well as undesirable beech. Retaining desirable understory trees will be a priority.

- **Primary/Secondary goals:** The primary goal of treatment in these stands will be to convert them to irregular structured, uneven aged northern hardwoods with diversity of the tree, shrub and herbaceous layers. Other goals of harvesting in this area are to provide areas of early succession habitat as well as structural diversity for wildlife species that depend on early seral forest.
- **Silviculture Methods:** These stands will be managed using an irregular shelterwood system. Initial cutting to create openings up to 5 acres will start the process of creating irregular structure across these stands. Small openings will favor more shade tolerant species such as sugar maple and yellow birch, particularly where established. The larger openings will be created where shade intolerant and mid tolerant species such as black cherry, black birch and white pine are present and favored. Consultation will be sought from the Division of Fish and Wildlife to determine the best location, size and composition

of retained vegetation for the openings. Openings will not cover more than 50% of this forest type. Between these openings the stands will be thinned at varying amounts based on health, stocking and quality removing up to 75% of the basal area. Chemical control of beech may be used in these stands to ensure other desirable native species can emerge after the harvest.

- **Desired Future Conditions:** Ten years after this treatment it is anticipated that these stands will have greater diversity in size and structure. The opening created will provide early successional habitat and species that require it will flourish.
- **Anticipated Future Treatments:** These stands will be monitored in approximately 7-10 years to determine regeneration success. Combinations of the "expanding gap" and "extended" irregular shelterwood variants will used depending on regeneration success; gaps are expanded from successfully regenerated areas and the overstory cohort is held or extended in the absence of successful regeneration. If the density of beech regeneration becomes a concern, chemical control may be prescribed.

District Forester: _____ **Date:** 02/10/17

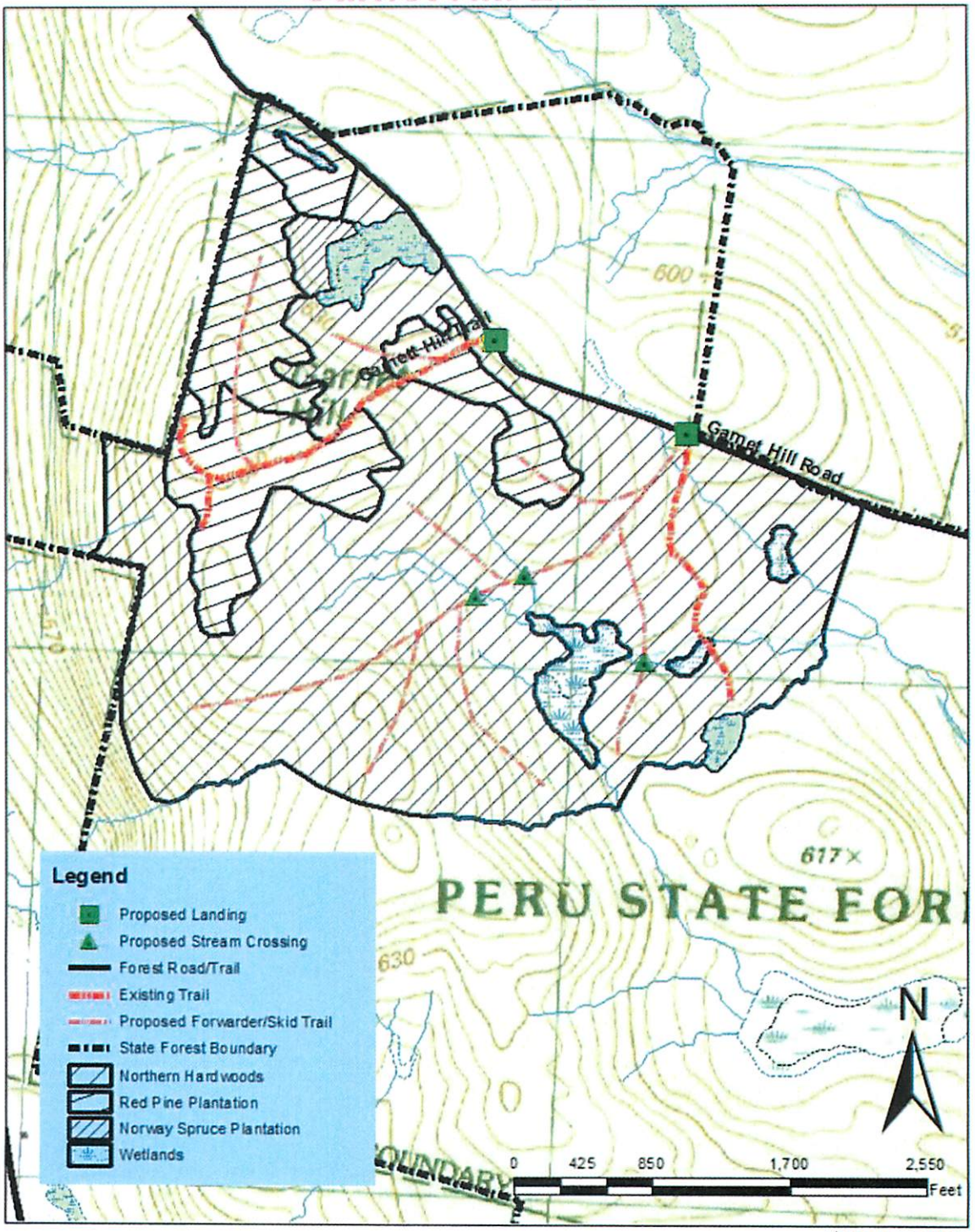
Field Operations Team Leader
Or Park Supervisor: _____ **Date:** 2/10/17

Regional Director: _____ **Date:** 2/10/17

Management Forestry
Program Supervisor: _____ **Date:** 2/15/2017

Attached: Topographic map showing project details. Locus map showing project location within regional context.

Peru State Forest
Garnet Hill Lot



KMM 12/22/2015

Heaphy-Richardson Lot - Locus Map
October Mountain State Forest