Forestry Practice Plan for Sparta Mountain Wildlife Management Area (WMA)
Stand 18: Young Forest Restoration

This practice plan addresses a general activity provided for in year 2017-2018 of the management schedule within the approved *Sparta Mountain Forest Stewardship Plan*

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Practice Plan being submitted on behalf of the New Jersey Department of Environmental Protection, Division of Fish and Wildlife, PO Box 420 MC 501-03, Trenton, NJ 08625

Property parcel data below as referenced in the approved Sparta Mountain Forest Stewardship Plan and on the original property deeds. Some township block and lot designations may have since changed.

Sparta Township Sussex County	Hardyston Township Sussex County	Borough of Ogdensburg Sussex County
Block 1, Lots 1.02, 1.03 & 2	Block 35, Lot 18	Block 1, Lot 1
Block 2, Lot 1	Block 59, Lot 1	Block 1, Lot 3
Block 3, Lots 1, 12, 13, 14 & 21	Block 60, Lot 1	Block 11, Lot 35
Block 7, Lots 2, 2.01, 16,17 & 90	Block 60, Lot 1.03, 2.01, 2.02, 3.02, 17	

Purpose

The management objective is to regenerate patches of oak-hickory forest within a maturing forest landscape by opening the canopy sufficiently to allow for intolerant and mid-tolerant vegetation that is associated with the oak-hickory forest type to germinate. In addition to new oak and hickory saplings, regrowth will target other associate trees, shrubs and herbaceous growth; such as aspen, sumac, blackberries, sedges, grasses and forbs. Because these habitat characteristics are currently underrepresented in the regional landscape, restoration activities will provide necessary breeding and/or foraging habitat for over 60 different bird species, including the endangered golden-winged warbler. Other mammals and reptiles are also expected to benefit under these objectives.

Site Description

Size: Approximately 18.5 acres, including some rock outcropping with lower than normal tree growth

Topography and Soils: The project area sits on undulating terrain that transitions between coves and rock outcrop features over short distances. Slopes average between 15% - 35%, and are not consistent over large expanses. As per USDA Natural Resources Conservation Service (NRCS) soil mapping, the entire project falls within the Rockaway Chatfield – Rock Outcrop Complex, which is a moderately productive soil type that contains a high proportion of cobble size and larger rock on the surface. Soil depth tends to be thin, especially along rock outcroppings; although as NRCS soil scientists who have examined the property have pointed out, much of the WMA soils have been extensively disturbed during the Edison miming era, and today's soil profiles may not actually be reflective of the typical Rockaway profile. For Rockaway soil, the off-road erosion hazard on exposed areas is moderate, but the hazard becomes severe on roads that are not properly maintained or retired. Rockaway soils can also be susceptible to compaction and rutting in places where the rock content is low.

Tree cutting will take place in the winter (between 11/16 and 3/31) when the ground is frozen to allow for use of heavy machinery with minimal rutting or compaction. If warm weather and excessive precipitation renders the site conditions unsuitable, work will be halted to avoid soil problems. At the close of the harvest, staging areas and skid roads will be stabilized with an appropriate seed mix, and the main access road will be re-graded and water diversions installed as needed and in accordance with the BMPs outlined in the NJ Forestry and Wetland Manual.

Location: The project area is on the north side of the east-west powerline that bisects the WMA, in an area referenced in the approved plan as Stand 18, roughly a quarter mile southeast of Beaver Lake. The project is within Hardyston Township.

Access: The project will be accessed from the existing powerline access road to the south. This road is not in great condition, but is regularly traveled by trucks and equipment used by the utilities to maintain the lines. The powerline access road returns into the woods along the southern end of the Right-of-Way near the 2013 project area (also known locally as the Edison Bog area). The access road continues roughly ¾ mile south where it meets the north side of Edison Road in Sparta Township. This is the same access point used for projects in 2013 and 2015. In 2013, a stone tracking pad was installed at the entrance from Edison Road to alleviate any excessive mud from being transported onto the pavement. The tracking pad was recently inspected and remains functional for use in this project.

A pre-existing access road follows the southern project boundary, which will be used as the primary skid trail. This road appears to be an extension of the utility access road, although it may have been maintained by years of illegal off-road vehicle trespass from access points on private property.

Equipment to be used: Heavy equipment - all vehicle operators are aware of, and will be in compliance of, the DOT weight requirements for the roads they travel.

1) Skidder and/or shearing equipment, similar to typical construction equipment such as a backhoe, will be hauled on Edison Road to the access road on a trailer at the beginning of the project, left on-site during the project, and hauled out on a trailer at the end of the project.
2) Tri-axle log truck, similar to a garbage or propane truck, will transport approximately 325 cords, or roughly 35 truckloads of logs, out of the access road onto Edison Road over the course of 6-12 months.

Wetlands: The project boundaries were compared against NJDEP GIS 2012 wetland mapping, and the nearest mapped wetland is in excess of 175' away, which exceeds the maximum 150' transition buffer for *Exceptional Resource* wetlands. The entire project was also physically walked to field verify if unmapped wetlands exist, and none were found. This project will have no effect on wetland resources.

Vernal Pools: NJDEP GIS vernal pool data was also compared to the project boundaries, and the nearest vernal pool is in excess of 400' from the project boundary. The entire project was also physically walked to field verify if unmapped vernal pools exist, and none were found. This project will have no effect on vernal pools.

Streams and Water Bodies: The project boundaries were compared against NJDEP GIS stream and water body layers, and there are no classified or unclassified water bodies within 300' of the project, which is the maximum width of a riparian zone. Similarly, the project does not intersect with a flood hazard area. This project will have no effect on water resources.

Rare Plants: Review of information in the Natural Heritage (Biotics) Database, as well as review of the results of field surveys performed by the NJDEP Office of Natural Lands Management in the Sparta Mountain WMA during 2017 (but not currently documented in Biotics) has indicated no occurrences of State Endangered or rare plant species in the 18.5-acre area proposed for mechanical tree removal. This also applies to the area between the activity site and the ROW that is to be used for access.

Rare Wildlife: Review of information in NJDEP's Landscape Project (v3.3) has indicated the project area likely contains habitat for Indiana bat hibernacula, maternity roosts and foraging. The proposed tree felling period (Nov 16 – March 31) aligns with USFWS recommendations that all cutting of vegetation/trees with $\geq$ 5" DBH (using machinery and/or by hand/on foot) occur between October 1 and March 31 to minimize harm to roosting Indiana bats. Efforts will be made to retain trees and shrubs > 5 meters high with sloughing bark and/or bark with cavities/cracks/crevices as potential maternity roosts.

The proposed tree felling period also aligns with recommendations from NJ Fish and Wildlife's Endangered and Nongame Species Program to minimize harm to breeding songbird, raptor, reptile, and insect species of concern documented in the area. The area is >500 feet from documented raptor nests and >400 feet from documented vernal pools.

Forest Description

The project area falls within Stand 18 of the approved Forest Stewardship Plan. The stand is described as a large mixed oak stand, that is fully stocked and dominated by red and chestnut oaks, with a subordinate component of smaller diameter red maple. Sapling growth is dominated by red maple, and some locally concentrated serviceberry stems. The understory is fairly sparse and ordinary, containing witch hazel as a predominant shrub in coves, and huckleberries and lowbush blueberry on xeric areas. Advanced regeneration varies greatly, with some dense pockets of oak seedlings, and other areas having none whatsoever. The abundance of seedlings seems correlated with site conditions and not a function of herbivory pressure (or lack thereof). Leaf litter and forest duff are average for comparable sites.

To implement this project with a higher degree of site-specific certainty for the vegetation present, the subject area was re-inventoried in January 2018. Seventeen inventory plots were measured using a 10 BAF prism. The resulting data was calculated using a 90% CI, and represents the trees being removed from the site. Marked leave trees were tallied separately to determine residual BA. The Mean basal area is 88.2 plus or minus 12.4 square feet per (14.0% of mean). The mean net bd. ft. volume is 2349.0 plus or minus 787.8 board feet per acre (33.5% of mean) using the Scribner log rule, and the mean net pulpwood is 13.6 plus or minus 1.8 cords per acre (13.6% of mean).

Stand and Stocking Tables (2018 inventory data)

Composition - BA, percent BA, trees per acre

	all species	all oaks	NRO	RM	CO	H	BO	OHW	WO	SB	SO	WA	SM
Total BA	**88.2**	**51.8**	22.9	17.6	15.9	7.6	7.1	6.5	3.5	2.9	2.4	1.2	0.6
Percent BA	**100**	**59**	26	20	18	9	8	7	4	3	3	1	1
Trees per acre	**358**	**86.8**	50.9	148.1	19.8	38.3	5.9	63.9	4.2	11.4	6.0	2.7	6.7

Diameters - inches

	all species	all oaks	NRO	RM	CO	H	BO	OHW	WO	SB	SO	WA	SM
Medial diameter	**12.0**	**14.8**	16.3	8.0	13.1	10.1	15.3	4.9	14.2	9.2	11.8	11.0	4.0

Quadratic mean diameter	**6.7**	**10.5**	9.1	4.7	12.1	6.1	14.8	4.3	12.4	6.9	8.5	9.0	4.0

Volumes (per acre) - Scribner Log Rule													
	all species	**all oaks**	**NRO**	**RM**	**CO**	**H**	**BO**	**OHW**	**WO**	**SB**	**SO**	**WA**	**SM**
Net Total Cords	**17.4**	**12.5**	5.4	2.5	3.9	1.3	1.8	0.4	0.9	0.5	0.5	0.3	0.0
Net Firewood Cords	**13.6**	**8.9**	3.2	2.5	3.6	1.1	1.2	0.4	0.5	0.5	0.4	0.2	0.0
Net Board-foot	**2349.0**	**2203.6**	1407.3	0.0	215.2	97.5	360.6	0.0	179.9	10.1	40.6	37.9	0.0

Overstory Species x Diameter Table: Basal area (2018 inventory data)

Basal area												
	all species	**NRO**	**RM**	**CO**	**H**	**BO**	**OHW**	**WO**	**SB**	**SO**	**WA**	**SM**
1	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	**2.4**	0.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	**2.9**	0.0	0.0	0.0	1.2	0.0	1.8	0.0	0.0	0.0	0.0	0.0
4	**3.5**	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.6
5	**5.3**	0.6	1.8	0.0	0.6	0.0	1.8	0.0	0.0	0.6	0.0	0.0
6	**4.1**	0.0	1.2	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0
7	**2.9**	1.2	0.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.0
8	**6.5**	0.6	2.4	1.2	0.6	0.0	0.0	0.6	1.2	0.0	0.0	0.0
9	**4.1**	0.6	2.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	**4.1**	0.0	1.2	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	**3.5**	0.0	0.6	1.8	0.6	0.0	0.0	0.6	0.0	0.0	0.0	0.0
12	**5.3**	0.0	0.6	2.4	0.6	0.6	0.0	0.0	0.6	0.6	0.0	0.0
13	**7.1**	2.4	0.6	1.8	0.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0
14	**5.9**	1.2	1.2	1.8	0.0	0.0	0.0	0.6	0.6	0.6	0.0	0.0
15	**5.3**	2.4	0.0	1.8	0.0	0.6	0.0	0.0	0.0	0.0	0.6	0.0
16	**5.3**	1.2	0.0	0.6	0.0	2.4	0.0	0.6	0.0	0.6	0.0	0.0
17	**5.9**	1.8	0.0	2.4	0.0	1.2	0.0	0.6	0.0	0.0	0.0	0.0
18	**2.4**	1.2	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

19	**2.9**	1.8	0.0	0.0	0.0	0.6	0.0	0.6	0.0	0.0	0.0	0.0
20	**2.4**	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	**2.9**	2.4	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	**1.8**	1.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	**0.6**	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	**0.6**	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	**0.6**	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SAPS	**14.1**	1.2	5.9	0.0	1.8	0.0	3.5	0.0	0.6	0.6	0.0	0.6
POLE	**25.3**	2.4	8.8	4.7	3.5	0.0	2.9	1.2	1.2	0.0	0.6	0.0
SM SAW	**34.7**	8.8	2.4	10.6	1.2	6.5	0.0	1.8	1.2	1.8	0.6	0.0
MD SAW	**12.9**	9.4	0.6	0.6	1.2	0.6	0.0	0.6	0.0	0.0	0.0	0.0
LG SAW	**1.2**	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**88.2**	22.9	17.6	15.9	7.6	7.1	6.5	3.5	2.9	2.4	1.2	0.6
Percent		26.0	20.0	18.0	8.7	8.0	7.3	4.0	3.3	2.7	1.3	0.7

Overstory Species x Diameter Table: Number of trees (2018 inventory data)

Number of trees												
	all species	**NRO**	**RM**	**CO**	**H**	**BO**	**OHW**	**WO**	**SB**	**SO**	**WA**	**SM**
1	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	**107.9**	27.0	80.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	**59.9**	0.0	0.0	0.0	24.0	0.0	36.0	0.0	0.0	0.0	0.0	0.0
4	**40.4**	0.0	27.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	6.7
5	**38.8**	4.3	12.9	0.0	4.3	0.0	12.9	0.0	0.0	4.3	0.0	0.0
6	**21.0**	0.0	6.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0
7	**11.0**	4.4	2.2	0.0	2.2	0.0	0.0	0.0	0.0	0.0	2.2	0.0
8	**18.5**	1.7	6.7	3.4	1.7	0.0	0.0	1.7	3.4	0.0	0.0	0.0
9	**9.3**	1.3	6.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	**7.5**	0.0	2.2	2.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	**5.3**	0.0	0.9	2.7	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0
12	**6.7**	0.0	0.7	3.0	0.7	0.7	0.0	0.0	0.7	0.7	0.0	0.0
13	**7.7**	2.6	0.6	1.9	0.6	1.9	0.0	0.0	0.0	0.0	0.0	0.0

14	**5.5**	1.1	1.1	1.7	0.0	0.0	0.0	0.6	0.6	0.6	0.0	0.0
15	**4.3**	1.9	0.0	1.4	0.0	0.5	0.0	0.0	0.0	0.0	0.5	0.0
16	**3.8**	0.8	0.0	0.4	0.0	1.7	0.0	0.4	0.0	0.4	0.0	0.0
17	**3.7**	1.1	0.0	1.5	0.0	0.7	0.0	0.4	0.0	0.0	0.0	0.0
18	**1.3**	0.7	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	**1.5**	0.9	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0
20	**1.1**	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	**1.2**	1.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	**0.7**	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	**0.2**	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	**0.2**	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	**0.2**	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SAPS	**247.0**	31.3	120.8	0.0	28.3	0.0	48.9	0.0	6.7	4.3	0.0	6.7
POLE	**72.7**	7.4	24.6	9.5	8.0	0.0	15.0	2.6	3.4	0.0	2.2	0.0
SM SAW	**31.7**	7.5	2.5	9.9	1.4	5.6	0.0	1.3	1.3	1.7	0.5	0.0
MD SAW	**6.0**	4.3	0.2	0.3	0.6	0.3	0.0	0.3	0.0	0.0	0.0	0.0
LG SAW	**0.4**	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**357.9**	50.9	148.1	19.8	38.3	5.9	63.9	4.2	11.4	6.0	2.7	6.7
Percent		14.2	41.4	5.5	10.7	1.6	17.8	1.2	3.2	1.7	0.7	1.9

Treatment Description

Year 1 of the approved Forest Stewardship Plan for Stand 18 (see pages 50-52 and 65-67 in the plan) calls for a combination of shelterwood and seed tree (with wildlife reserves) harvesting methods used to regenerate vegetation and create early successional habitat. Rather than applying the two treatments as individual discrete areas in the project, a hybrid variable retention approach will be utilized to better replicate the natural heterogeneity that might occur under natural disturbance regimes. Chainsaws and/or heavy machinery will be used to mechanically fell trees. The average Basal Area (BA) retained will be about 30 sq. feet per acre overall, but with patches ranging between 10 and 50 sq. feet per acre. Retained trees are marked with orange paint slashes at eye level on the bole, and with dots on the stump. To conform with the approved management schedule, patches with a residual BA of 10 will not exceed 10 acres in size, but are expected to be much less. Trees to be retained will generally be the larger, most vigorous co-dominant stems of species that are predominant components of the oak-hickory overstory type (skewed towards retaining a diversity of oak species where possible), while selecting against

suppressed and intermediate stems of all species as well as co-dominant stems that are less desirable species for wildlife - or are less desirable due to their increasing abundance within the NJ forest understory (e.g. red maple, black birch, etc.). In some areas, particularly along rock outcrops where tree growth is suppressed because of harsh soil conditions, smaller more vigorous stems may be favored over larger diameter trees that have senesced. Where possible, representatives of tree species that are found infrequently in the area will be retained for diversity purposes. Existing cavity trees have been identified in the field and marked for retention also. All existing dead stems that do not present a hazard to workers will be retained. Branches, slash and some entire trees will be left on the ground for wildlife cover, while other trees may be removed. Tree felling will be conducted prior to April 1, 2018, but may resume after November 15, 2018. Non-native plants are non-existent in the project area, so herbicide treatments will not be needed.

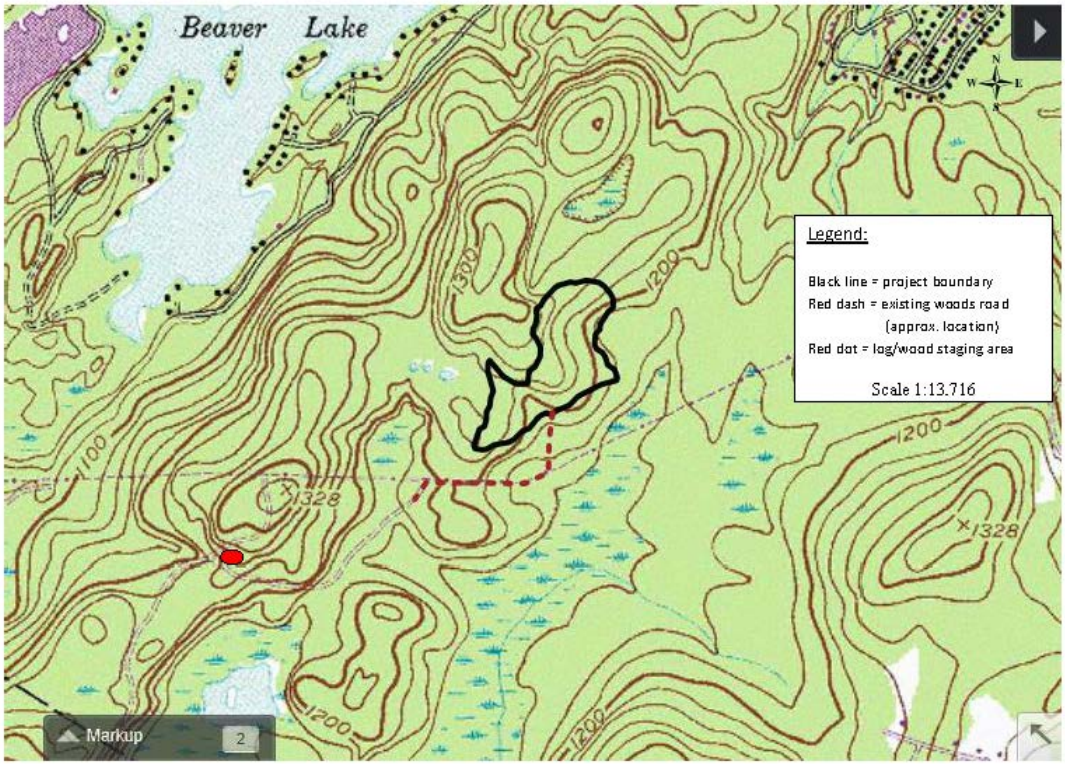
Project boundaries are marked with dots of orange paint at eye level on the boles. Boundary trees will be retained. An effort will be made to maintain the slash height limit recommended by NJ Forest Fire Service.

Since tree cutting will take place in the winter (between 11/16 and 3/31), the ground will typically be frozen and resist the negative effects of equipment use. However, if warm weather and excessive precipitation occur and render the site conditions unsuitable, work will be halted to avoid soil problems. As was done during the implementation of similar projects in 2012, 2013, 2014 & 2015, regular monitoring of the contractor and weather allows for rapid closing of the project during unfavorable periods.

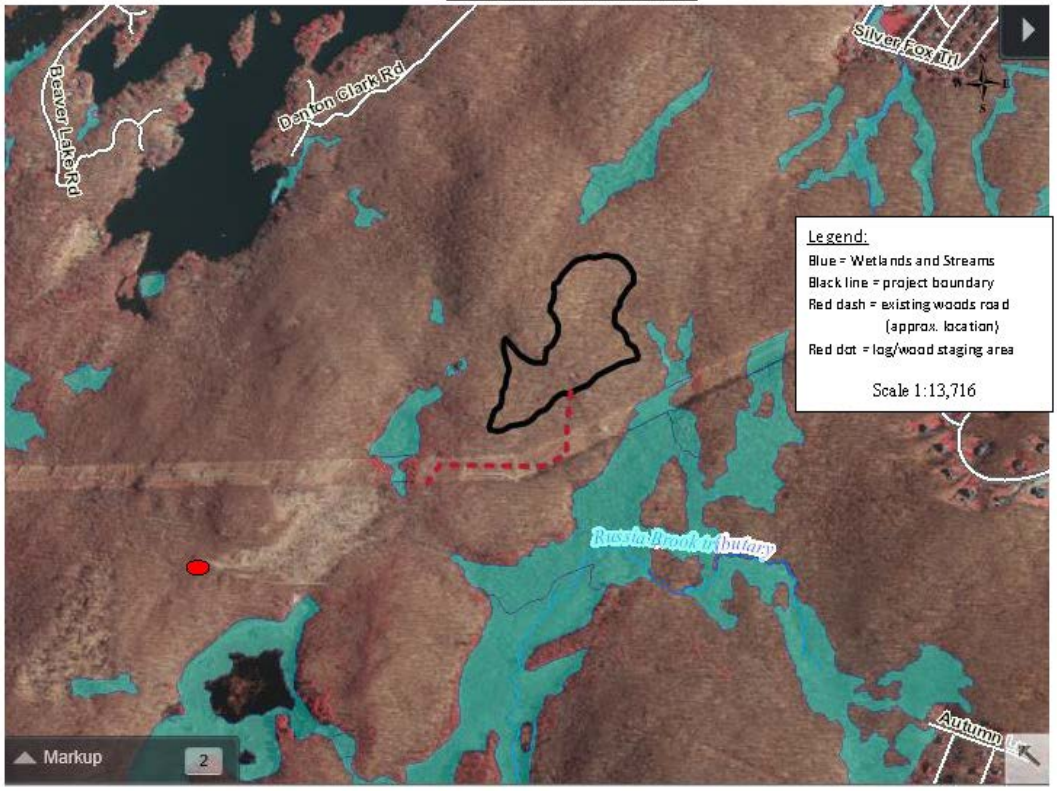
Logs may temporarily be staged in a small area within the utility right-of-way during the work day, but will normally be skid to the staging areas that were used during the 2013 and 2015 projects. These staging areas are approximately 50’ x 50’, and are located along the access road on the south side of the utility line (at the intersection of the two primary access roads leaving the right-of-way). At the close of the harvest, staging areas and skid roads will be stabilized with an appropriate seed mix, and the main access road will be re-graded and water diversions installed as needed and in accordance with the BMPs outlined in the NJ Forestry and Wetland Manual. Equipment will not be allowed into any wet areas.

Treatment Maps

Project Location and Topography



Project Location on 2015 IR



Project Area on 2015 IR with Soils

Project Area – Wetlands, Streams and Vernal Pools