

Quabbin Harvest Proposal PR-19-22

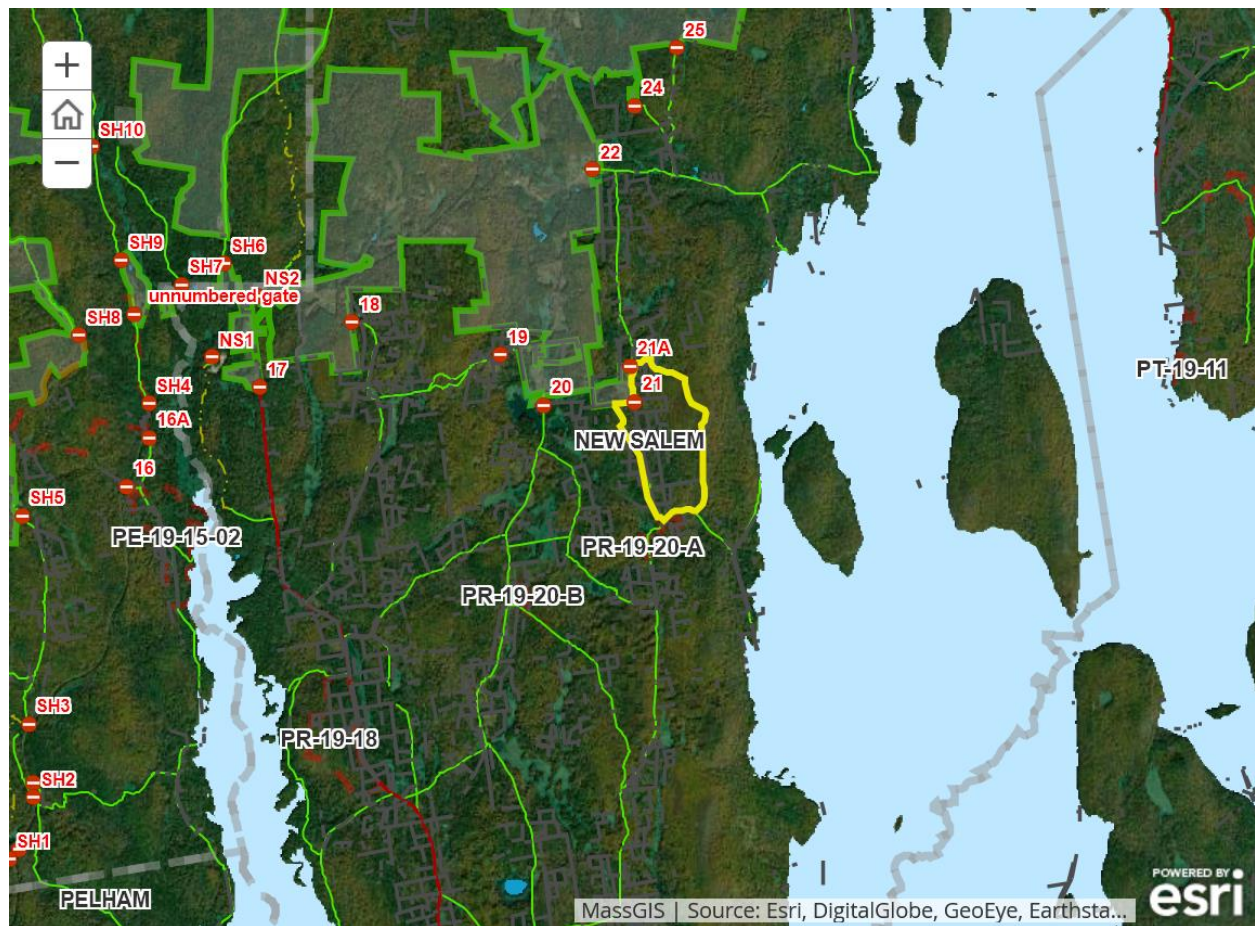
Proposal Goals

The purpose of the proposed project is to diversify forest structure and species. The majority of the area is fairly uniform high canopy forest. The proposed harvest will trigger a patchy young forest layer to development. A secondary goal is to further a long term DWSP research project that may inform future watershed forest management.

Proposal Location

The proposal area is located on the east side of Vaughn Rd (gate 21/gate 21A) south to intersection 21-1.

Total Acres: 170



General Description

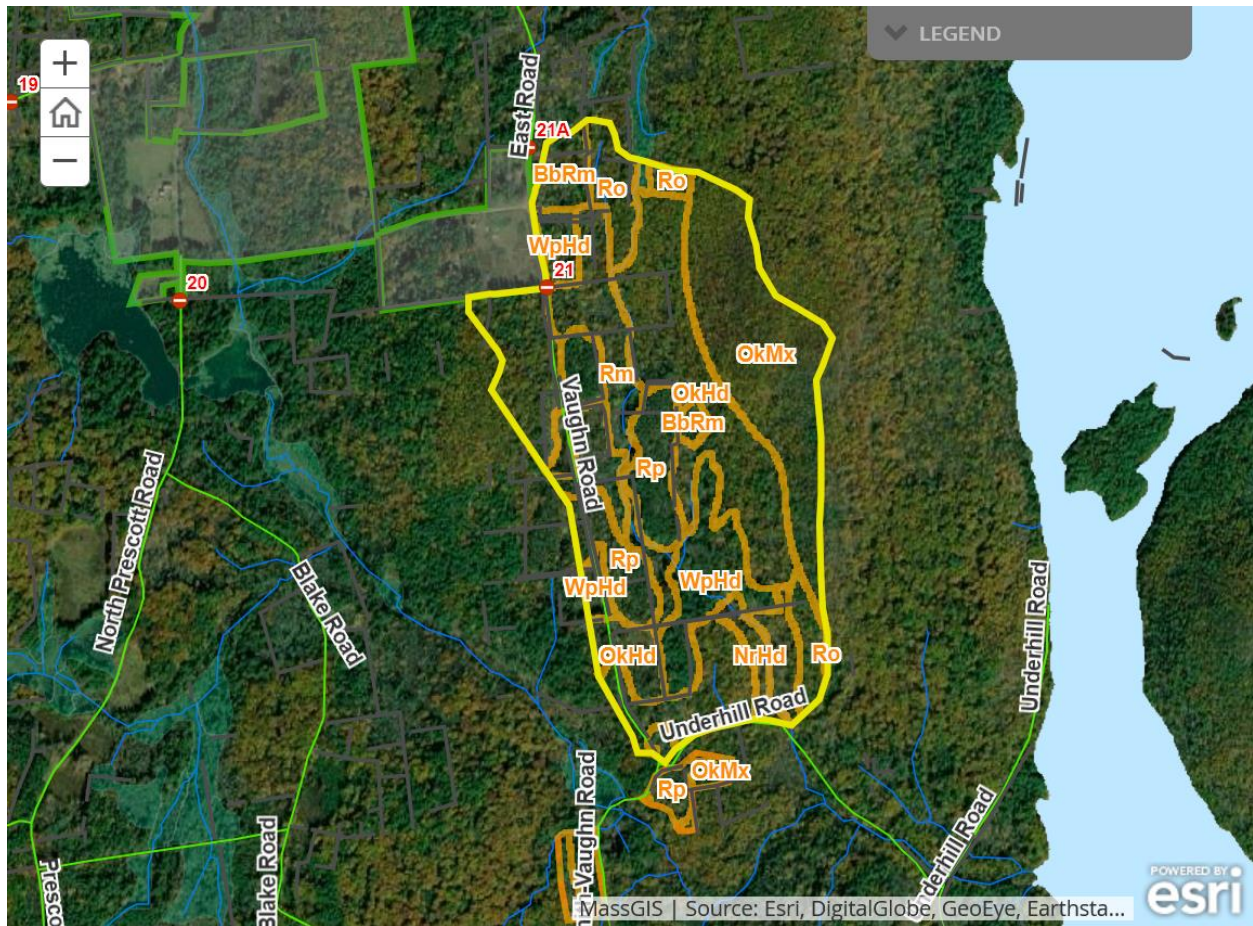
	Overstory Type(s)	Acres
Dominant	Oak, mixed - dry site	66
Secondary	Oak/hardwood	48
Other	Mixed hardwoods	26

	Understory Type(s)
Dominant	Dry site - blueberry/huckleberry

Secondary	Mesic site - witch hazel, highbush blueberry
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Description of forest composition/condition:

Recorded past land use (from real estate taking sheets) indicate about 27 acres of the sub watershed as arable (tillable). This area is aggregated along Smith Vaughn Rd, extending east to either side of the east branch of Underhill Brook. Sproutland, a designation ranging from cut off woodlands to improved pasture, covers the remainder of the watershed. Prior use has had a significant influence on present forest composition. Most of the arable land was open at the time of taking (1920-30s) and reforested via soft wood plantation (red pine, white pine, spruce or a mix). Sproutlands have naturally regenerated to a suite of native species(the oaks, maples, birches, ash, hickory and white pine) that vary by natural disturbance, soil type/topography and forest management. Scattered large oak along the toe of the west facing slope, survivors of the '38 hurricane, have large uphill basal scars indicative of fire damage. The fire(s) may have been instrumental in maintaining the area as an oak community(red, black, scarlet, white) which dominate the mid and upper slope. The lower slope has a mix of red/black oak, white pine, red maple, white ash, black birch, hickory and quaking aspen. Aspen is concentrated west of the brook along the publicly maintained portion of Smith Vaughn road. Vertical forest structure, given site variability, is tall/high canopy except for 3 sections of red pine (3, 2.5 and 2 acres) clearcut in 1980 and '86. Thinning in red pine during the same period, spurred what is now a sapling/pole size understory of black birch.



Soils

Drainage Class	%
Excessively Drained	9
Well Drained Thin	35
Well Drained Thick	10
Moderately Well Drained	37
Poorly to Very Poorly Drained	9

Montauk Fine Sandy Loam: A well drained gneiss derived friable loamy till over a firm sandy lodgement till

Chatfield-Hollis complex: A well drained rocky till derived from gneiss and schist found on uplands and upland slopes.

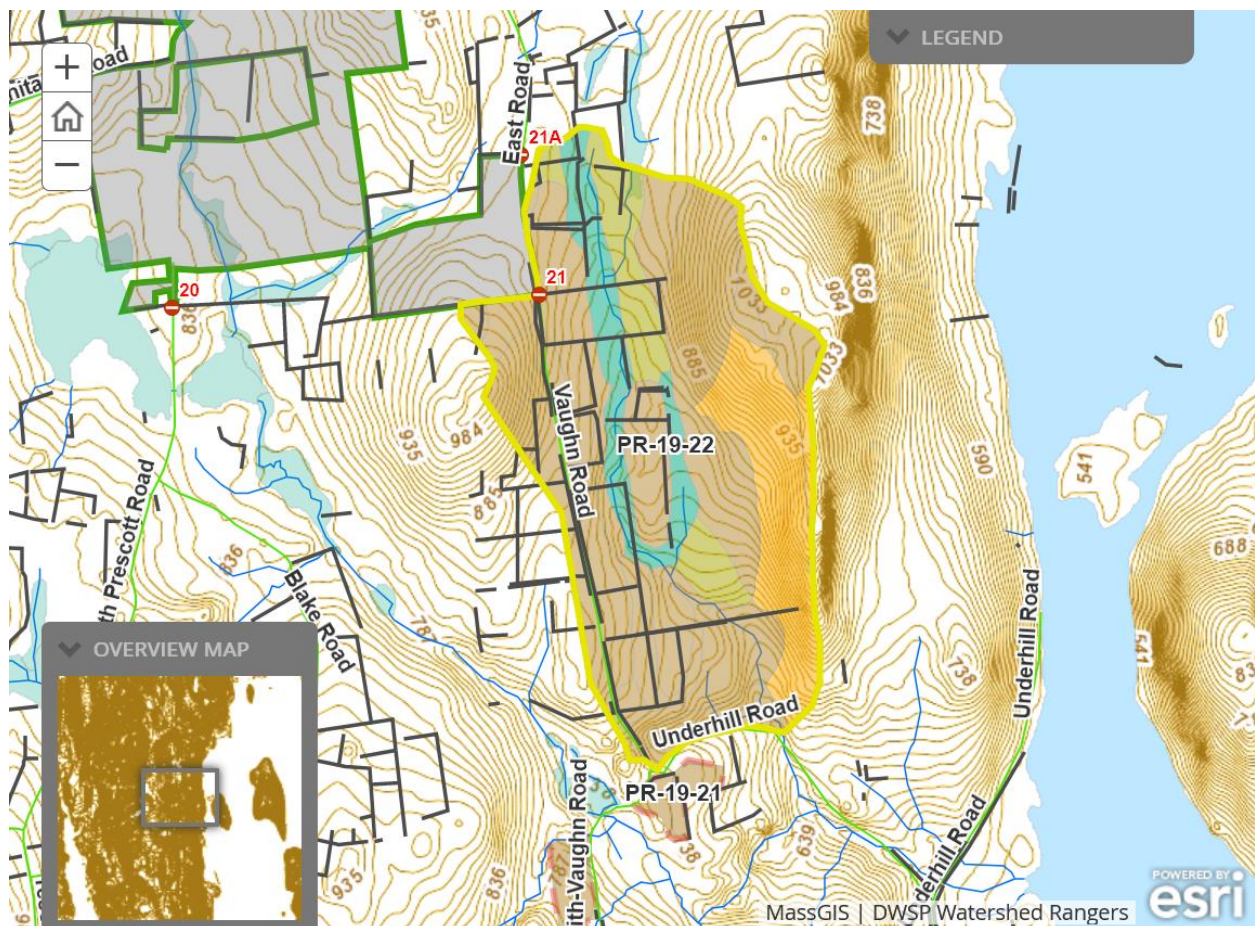
Chatfield-Canton complex: A well drained rocky till derived from gneiss and schist with a sub layer of sandy till found on uplands and upland slopes.

Canton fine sandy loam: Upland rocky well drained soil derived from gneiss and schist loam over a rock till

Scituate stony fine sandy loam: A moderately well drained gneiss derive friable loamy till over firm sandy lodgement till

Ridgebury gravel fine sandy loam: A poorly drained loamy lodgement till derived from gneiss and/or schist on depressions, drumlins and uplands

Whitman very stony mucky fine sandy loam: A very poorly drained gneiss/schist derived from loamy lodgement till



Wetlands

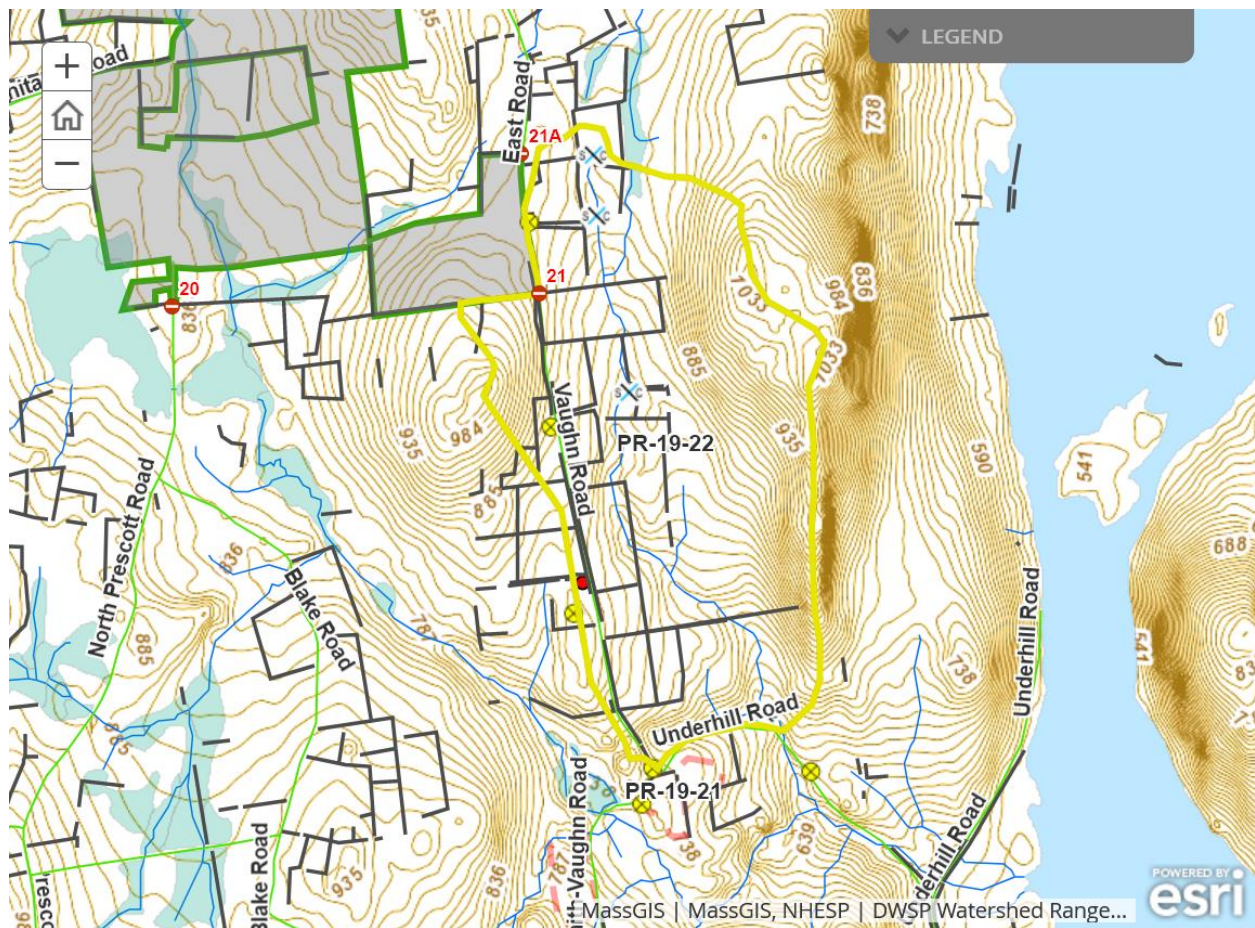
- Wetlands present? - **Yes**

- Streams present? - **Yes**
- Vernal pools present? - **Yes**
- Seeps present? - **Yes**
- Are stream crossings required? - **Yes**
- Are wetland crossings required? - **No**
- Is logging in filter strips planned? - **Yes**
- Is logging in wetlands planned? - **No**

Further comments on wetlands:

There are 4 potential crossings. Three appear to be associated with old farm lanes that commence from Vaughn Road. The actual crossings are stone culverts usually flanked by cobble embankments. The fourth (most southerly) is an old bridge abutment associated with an abandoned road that traveled east/west on the north side of Underhill Brook.

All crossings would require temporary bridging.



Silviculture

Acres in Intermediate cuts: **0**

Acres in prep/establishment cuts: **10**

Acres in Regeneration cuts: **42**

Average regen opening size: **5**

Maximum regen opening size: **10**

Description of advance regeneration in proposal area:

Excluding areas clearcut in the 1980s, regeneration density is sparse averaging 1000 stems per acre. The most abundant species is black birch, followed by white pine, red maple, white ash, hickory and the oaks. Distribution of birch and pine is lot wide. Higher concentrations of pine and oak are found on upland areas versus red maple, birch and pine on lower slope and riparian areas. There was no assessment of browse; however experience suggests it's most likely light given it has been 30 years since the last timber harvest.

General comments on silviculture proposed:

The main goal of the proposed harvest is to test the "25% rule". This hypothesis, born from a number of forested watershed studies in the eastern United States, asserts that "until approximately 25-30% of a watershed forest's stocking is removed (assuming nearly 100% forest cover), there is little to no detectable increase in water yield. And that a forested watershed harvested above the 30% stocking threshold may trigger a higher water yield, but generally reverts to its pre-harvest level within 3 to 10 years as the disturbance regenerates.

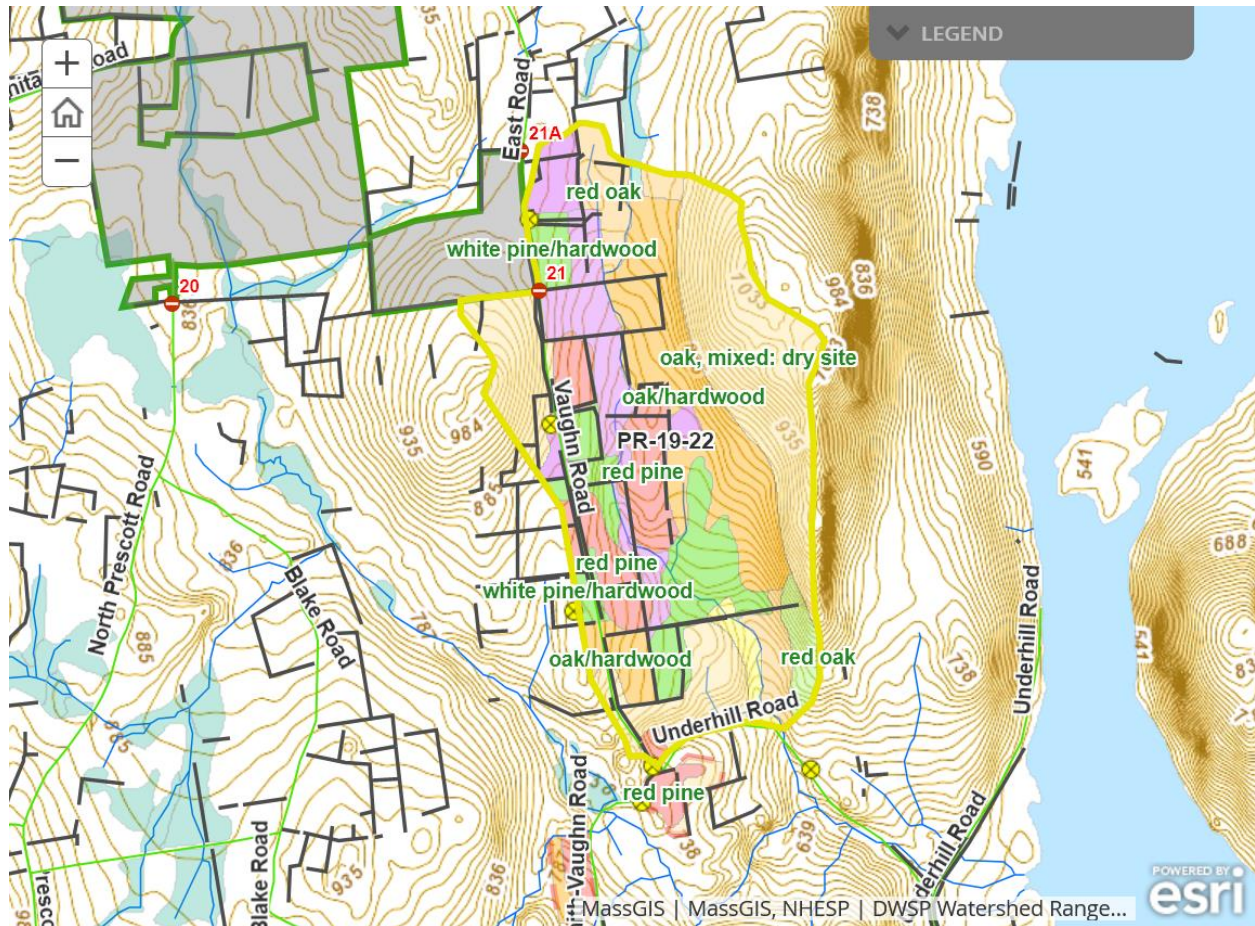
Testing the hypothesis requires determining the present forest stocking as well as the level forest harvesting over the preceding decade. Checking past harvest records indicates no harvesting has occurred on the sub watershed since 1986. Completion of a variable radius plot forest inventory suggests that the average basal area per acre, the standard measure of forest stocking, is around 112 square feet. Levels range from 0 to 240. The low corresponds with areas clearcut in the mid 80s and high with red pine plantations thinned once since inception (1940s).

A combination of area and volume (basal area) control will be used to reach targeted stocking reduction. The area control measure (acres harvested) is for regeneration cutting while intermediate cutting (thinning) would focus on reducing the basal area per acre by 25-30%. Another way to think about it is through a total sub watershed lens. The DWSP owned sub watershed is 170 acres; the average sub watershed stocking (basal area per acre) is 112 which equals a total basal area of roughly 19,000 square feet. Reducing the stocking by 25% or 4,760 square feet brings the total, post harvest, sub watershed stocking to 14,240 square feet. So regardless of harvest type, the basal area planned for removal (timber marked) can be precisely tracked so as not to exceed 4,760 square feet. A factor that may effect the calculation is the sub watershed's manageable acreage. Steep slopes (>20% for 200') cover roughly 40 acres. Factoring for this variable would reduce the total basal area removed.

Harvest Priority should begin with full removal of red pine plantations spurring restoration of native species to these areas.

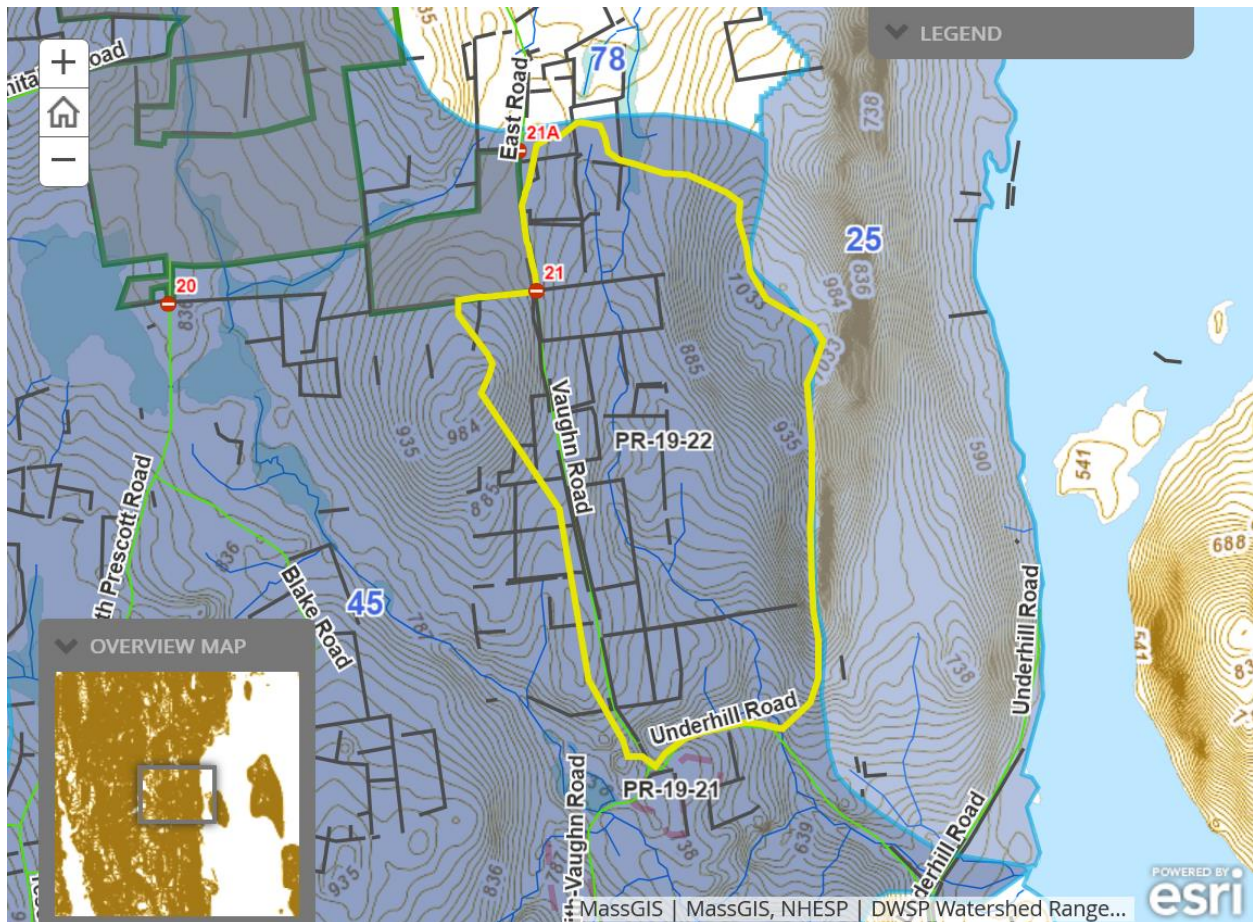
A secondary focus could be the drier site oak community inhabiting the upper west facing slope. Patch cutting would trigger structural diversity, development of seedling/sapling oak and early succession wildlife habitat for a short period (10-15 years). Another locale could be the northwest portion (west of Underhill brook) of the sub watershed which has a strong stocking of Aspen. Although here (aspen), its watershed wide representation is very low. Patch cutting in and slightly beyond the edge of the aspen will invigorate regeneration (aspen) and broaden watershed species diversity. Furthermore, groups of young aspen are ideal habitat for a variety of migratory songbirds, new england cottontail and ruffed grouse.

Lower priority areas would include the mesic lower slopes which generally are inhabited by higher quality timber. Harvesting in these areas could include small openings (half acre or less) and thinning. Ideally openings would be placed in areas with strong advanced regeneration. Harvesting in these areas may be unnecessary if stocking reduction is met by higher priority locales.



Subwatershed Analysis

Sub-watershed number	Total DCR-owned Acres	Acres Regenerated on DCR Land in the last 10 years	Acres Remaining for Regenerating Up to the 25% / 10 Year	Acres part of this proposal
45	1185	7	289	170



Harvesting Limitations

Forwarder required: **Yes**

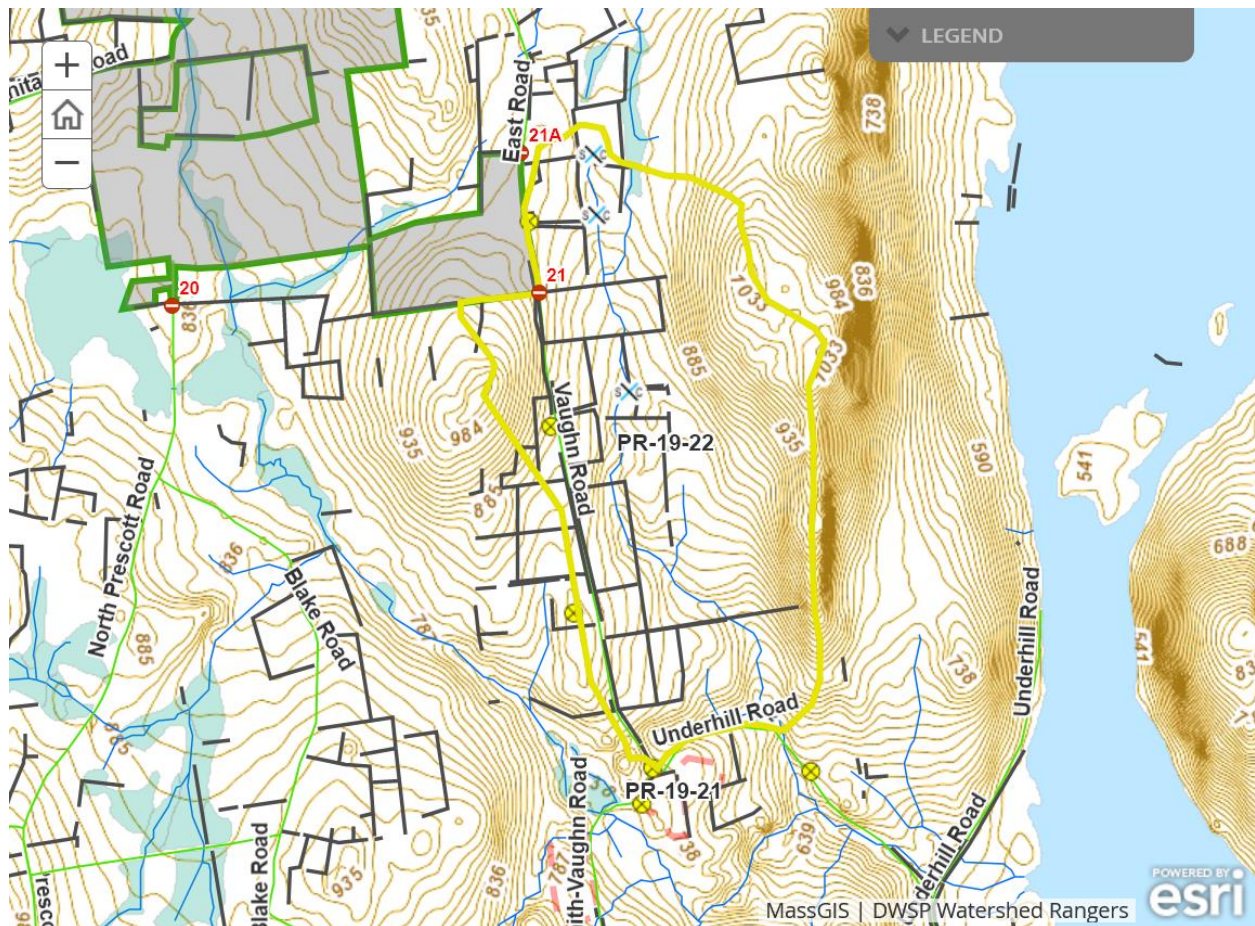
Feller/processor required: **Yes**

Steep slopes present: **Yes**

Comments on harvesting limitations:

Majority of the area is the upper slope of Bials Hill.

Cut-to-length harvest system is required to efficiently remove red pine, reduce ground pressure and minimize stream crossing disturbance.



Cultural Resources

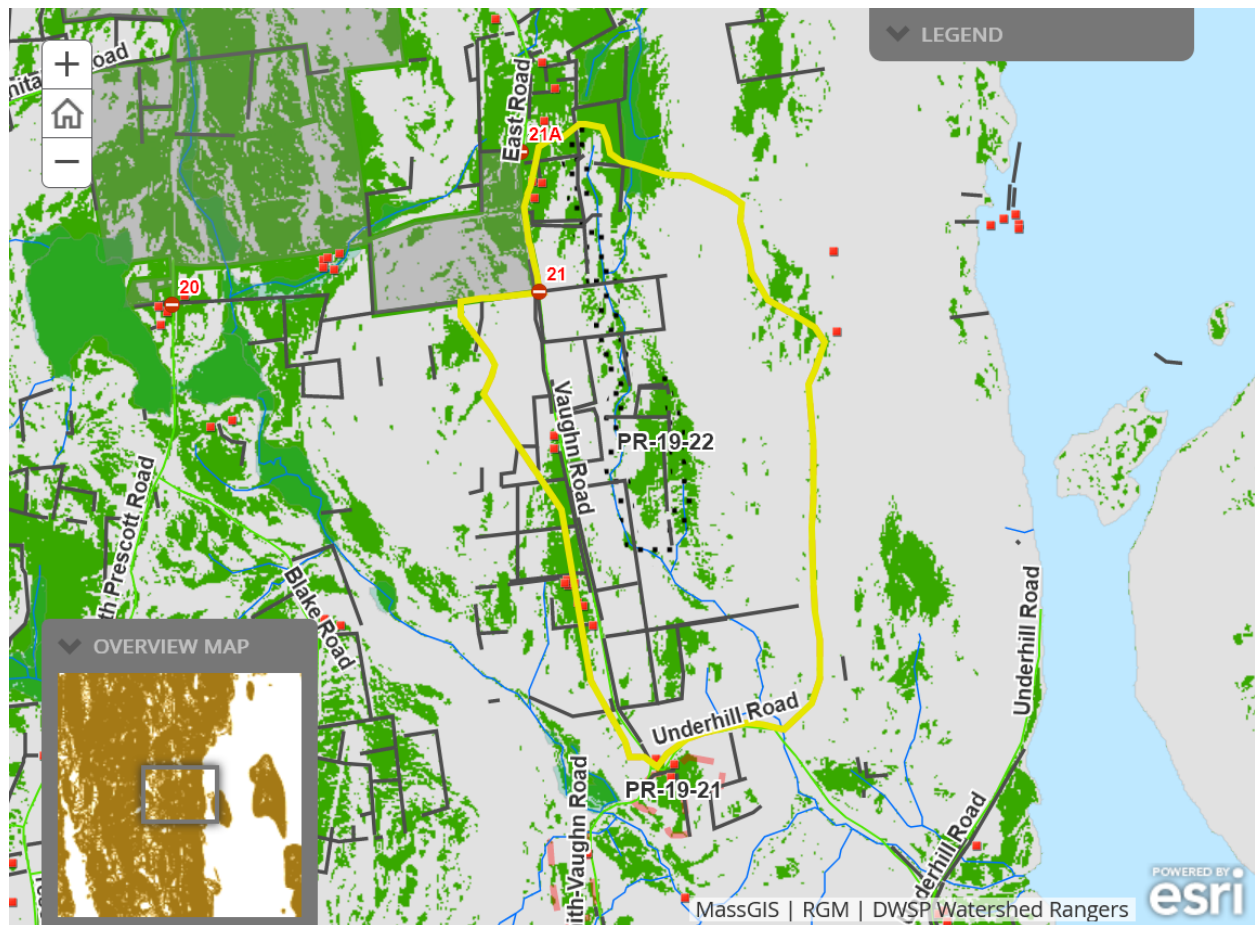
Comments on Cultural Resources:

Watershed taking maps indicate this area was farmed by (from north to south) Minnie William, Ellis Thayer, Walter and Flora Haskins and Thomas S. Mann Jr. All families have farmsteads along gate 21 road (Vaughn Road). The Williams farmstead was on the east side of the road (just south of Gate 21A). The Thayer homestead was on the west side of the road while the barn was on the east. The Haskins farmstead was all on the west side of the road. The Mann farm was located at the intersection of Vaughn Road and Underhill Road.

Outcrops and talus are scattered across the upper west facing slope of Bials Hill.

Stone walls exist throughout. Existing barways will be used where feasible and harvest layout will protect walls as much as possible. Wells and foundations will be flagged and avoided. If

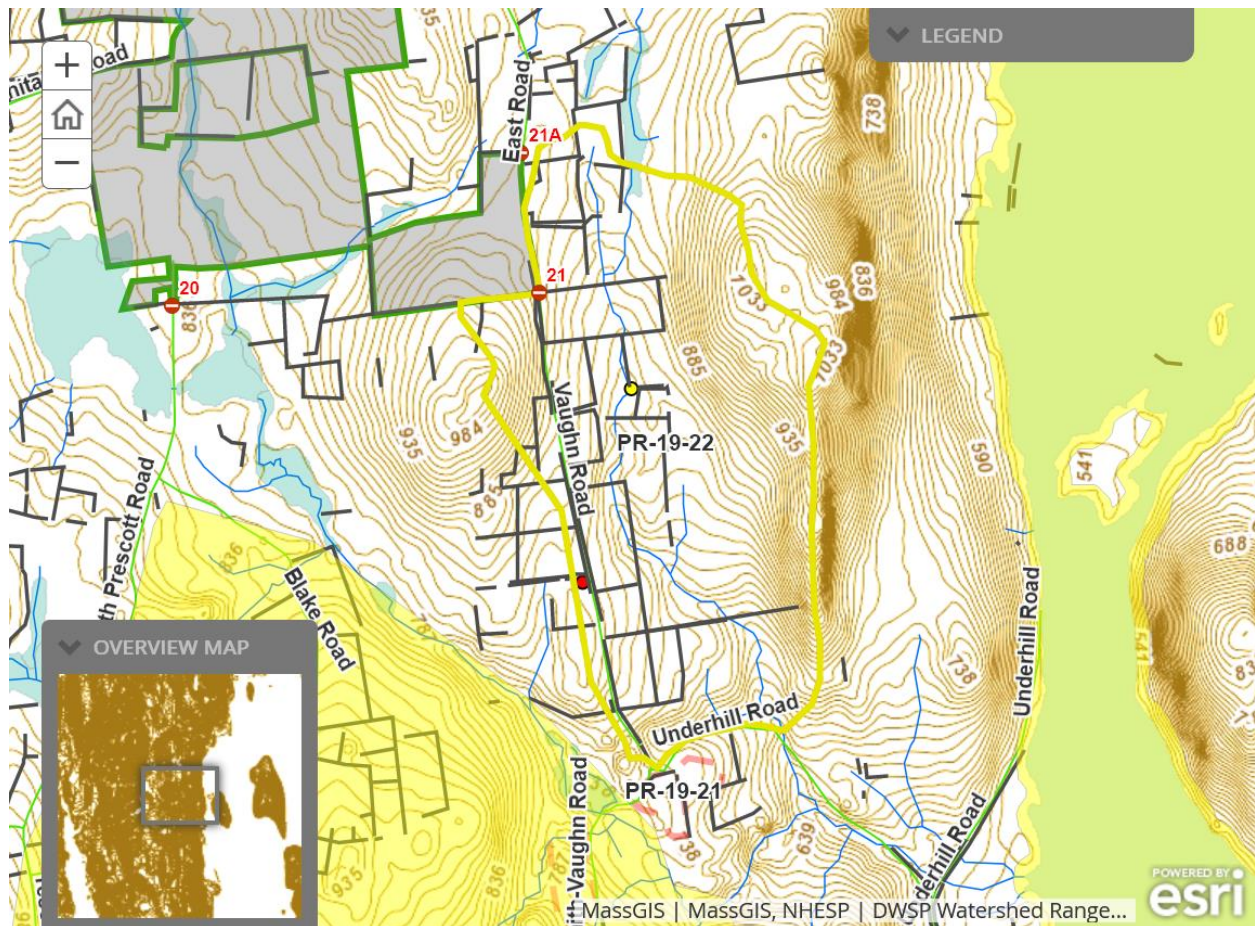
applicable DWSP will follow any additional recommendations from DCR's Archeologist regarding protection of sensitive sites.



Wildlife Resources & Rare and Endangered Species

Comments on Rare Species/Habitats:

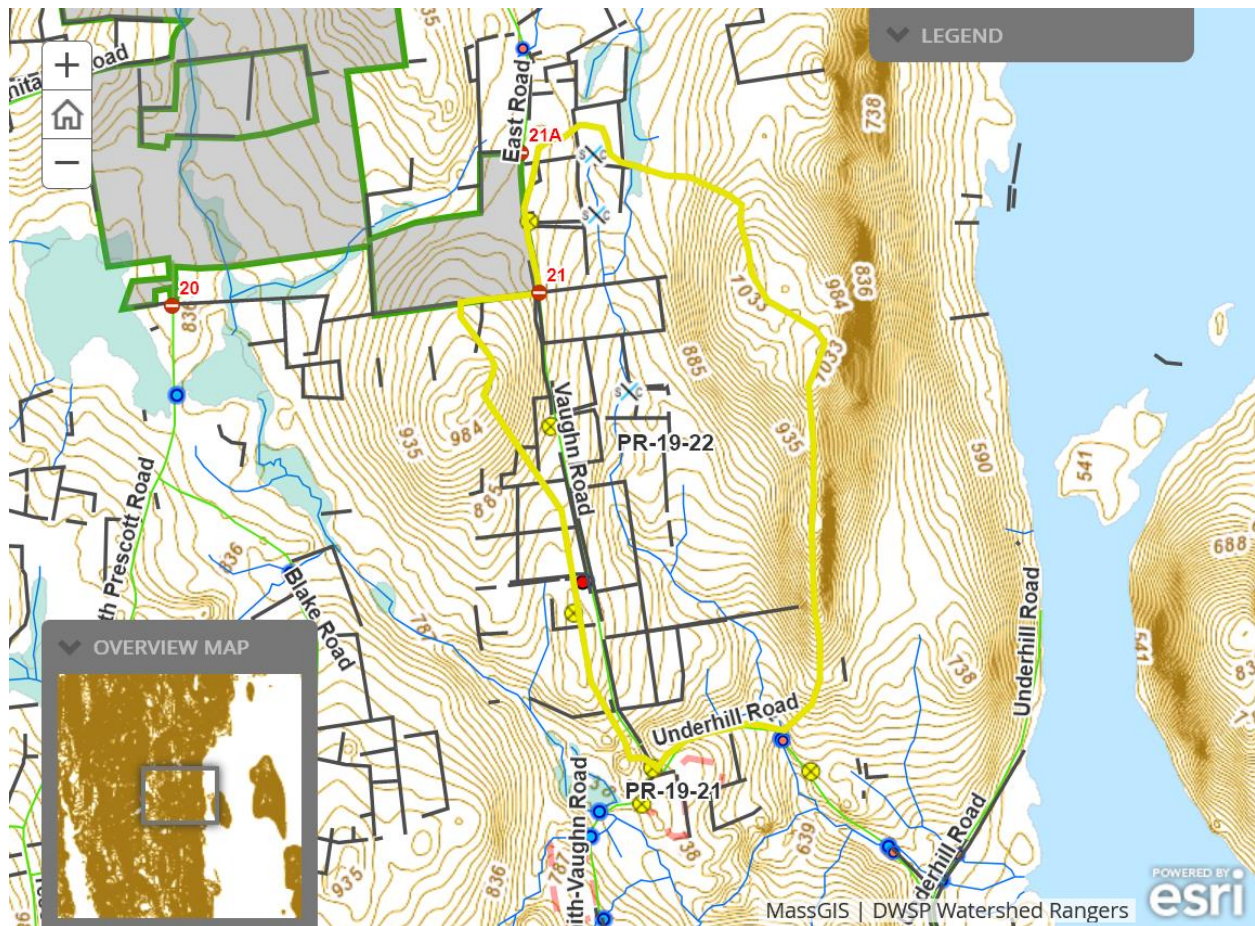
Cavity trees and potential/existing nest trees will be retained if possible. There are not any NHESP state-listed sensitive species or habitats within the lot proposal area. If any new information regarding sensitive species or habitats in the area is found DWSP will coordinate with NHESP and follow recommendations to protect these species during the proposed harvest.



Environmental Quality Engineering

Comments on EQ Issues:

There are three possible crossings from which to assess flow and potential turbidity as planned with DWSP's short term water quality monitoring associated with watershed timber harvesting projects.



Forest Access Engineering

Gravel needed: Yes

Landing work needed: Yes

Culverts needed: Yes

Work needed on permanent bridges: No

Beaver issue: No

Further comment on access needs:

Gravel may be needed to stabilize ground frequented by logging equipment and logging trucks.

DWSP FY 2019 Quabbin and Ware River Forestry Proposals – Master Legend for story maps

