

[Division of Water Supply Protection](#)

## DCR Division of Water Supply Protection: FY2022 Forest Harvest Proposals

### USING THIS INTERACTIVE STORY MAP

**Each tab** across the top of this page will open up an interactive map journal focused on one of the FY 2022 proposals. This year there are ten at Quabbin, five at Ware River, and six at Wachusett (the last tab on the right will open up the list of lots that cannot be fit across the top). As you scroll down in the frame on the left side, maps will update to highlight appropriate information relevant to the accompanying text section. The maps themselves can also be panned and zoomed using your mouse. *(If you are having issues with loading times or seemingly missing information, we have found that **clearing your browser cache** can help.)* A tab discussion archaeological review and protection of cultural resources during forestry activities has been included at the end.

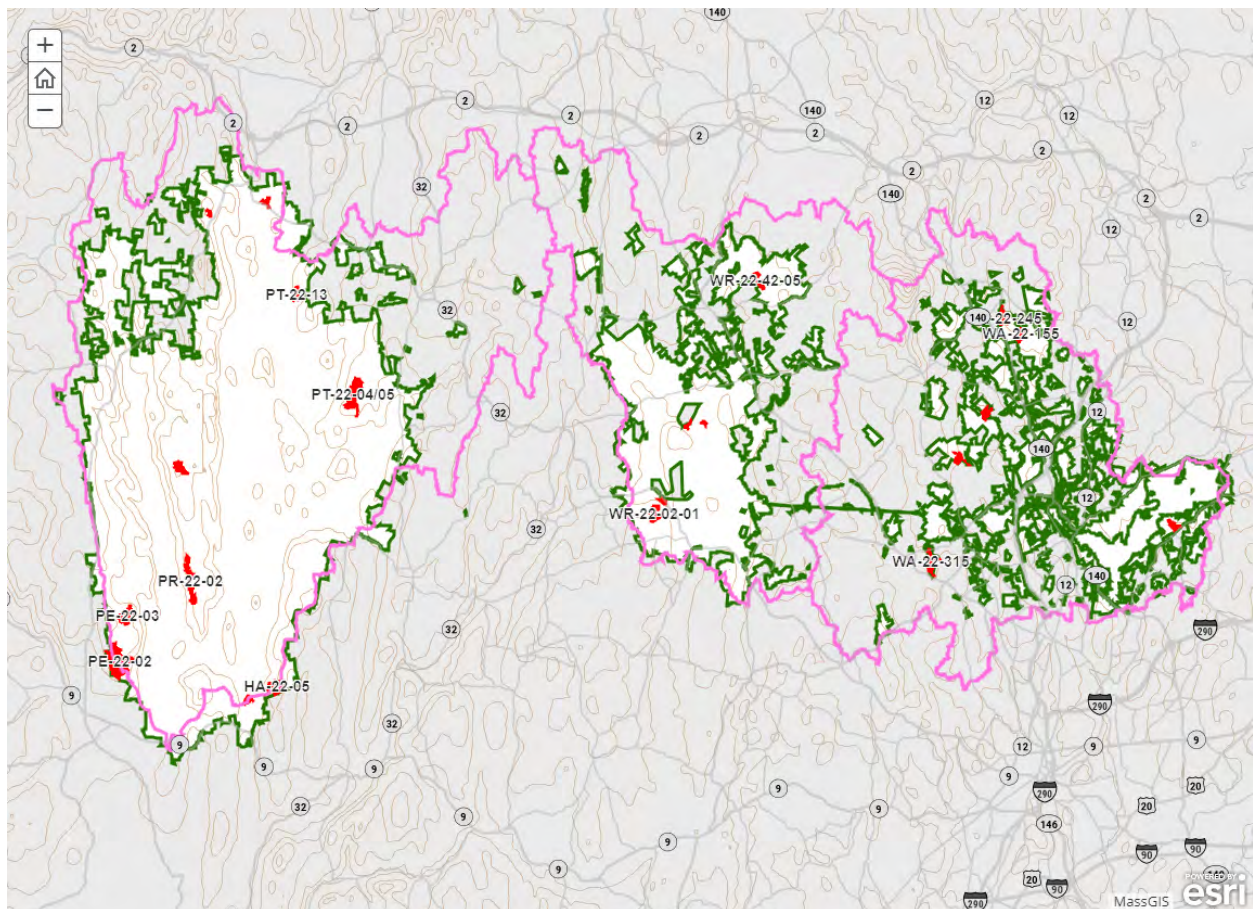
**Public comment** on these proposals is welcome and can be submitted online at this link: <https://www.mass.gov/forms/dcr-public-comments>. Comments may also be submitted by U.S. mail to

Department of Conservation and Recreation  
Office of Public Outreach  
251 Causeway Street  
Boston, MA 02114

**These proposals were presented at the Quabbin Watershed Advisory Committee meeting on June 28, 2021, and the Ware River Watershed Advisory on July 8, 2021. A link to this interactive web map application was also distributed to all advisory boards and committees, and letters were sent to individual Select Boards of affected towns.**

**Public Comments will be accepted until the close of business on Friday, August 6, 2021.**

If you have any questions, please contact Natural Resources Specialist Brian Keevan at [brian.keevan@mass.gov](mailto:brian.keevan@mass.gov) (preferred) or at (413) 213-7948.





# DWSP Forestry and Cultural Resources

## WATERSHED PROTECTION FORESTRY

[The Division of Water Supply Protection](#) (DWSP) is mandated to protect drinking water resources for over three million Massachusetts residents. DWSP owns and manages over 100,000 acres of land within the Quabbin Reservoir, Ware River, Wachusett Reservoir, and Sudbury Reservoir watersheds. Forests on these lands serve as a living, protective filter, producing high quality water in our streams and reservoirs. DWSP is committed to maintaining a watershed protection forest cover on the vast majority of its lands, and has determined that the most resilient and protective forest is one that is vigorously growing and comprised of a broad diversity of tree species and ages. The Division's long-term objective is to steadily transition today's mostly even-aged forest into a forest with more balanced proportions of young, middle-aged, and older trees of a variety of native species. These conditions have been shown to promote and enhance native plant and wildlife biodiversity. DWSP's working hypothesis is that a diverse forest structure will also promote resiliency in the event of large and small scale natural disturbances such as increasingly severe weather events, disease outbreaks, and insect pest infestations.

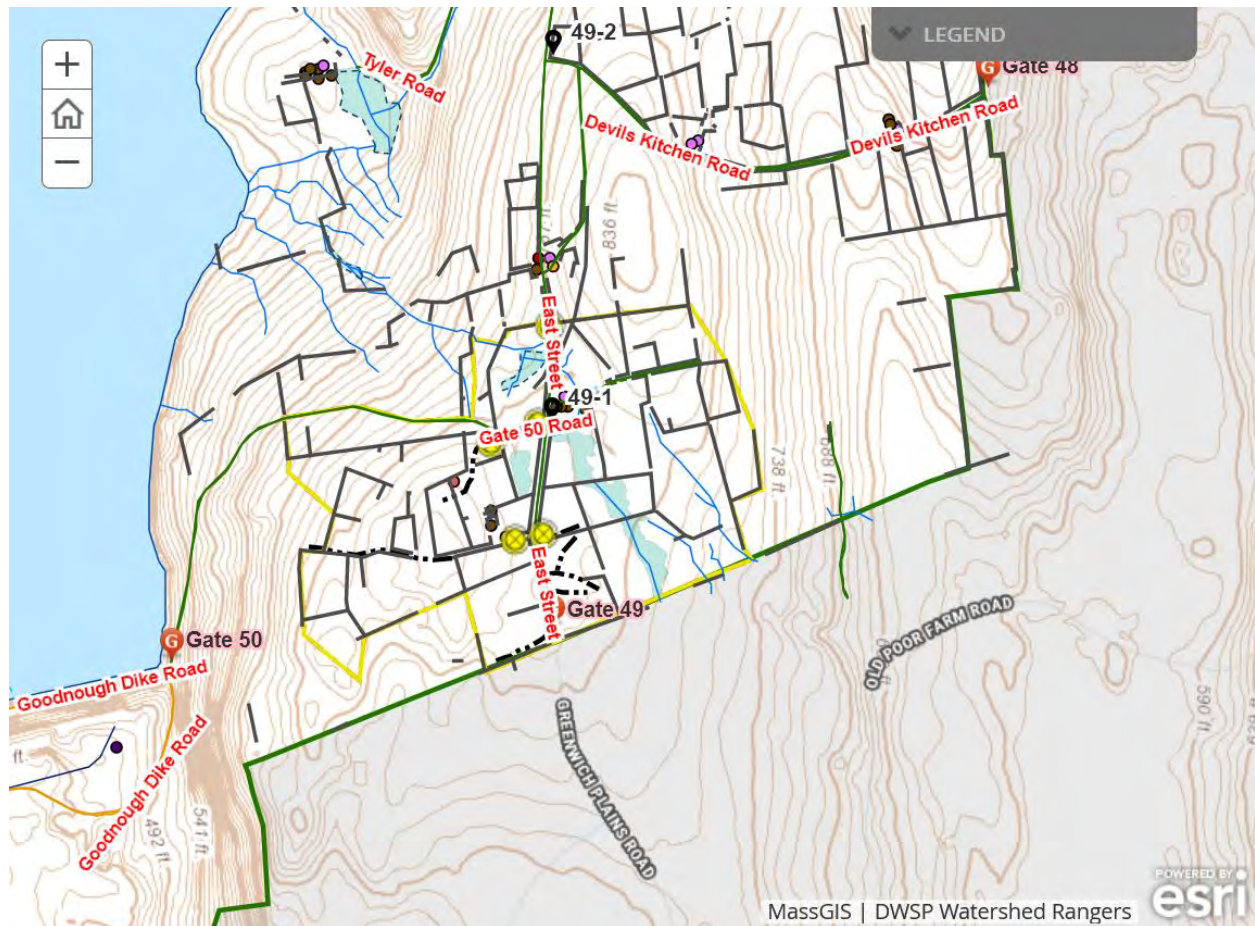
For full details on DWSP watershed land management please see the:

[2017 Land Management Plan](#) (opens a pdf)



## DWSP FORESTRY PLANNING AND REVIEW PROCESS

[DWSP Foresters](#) are responsible for the design, preparation, implementation, and oversight of forest management operations. Each year they prepare a number of timber harvest proposals which are reviewed for compliance with Land Management Plan goals and for protection of environmental resources by DWSP professionals in Natural Resources, Environmental Quality, and Watershed Management. Cultural resource review is completed by DCR's Archaeologist. Following this process, these proposals are made available for public comment as presented here.



## Cultural Resource Protection and DWSP Forestry Activities

Cultural resource review has been a standard part of the internal review of DCR forestry activities for over two decades. In addition to overseeing historical preservation activities throughout the DCR Parks system, the DCR archaeologist reviews the areas we propose to harvest for proximity to known or potentially sensitive sites, both historic and pre-Contact.

Feedback is often fairly standard. If there are known to be significant historic or archaeological resources documented within the proposed project parcel, then the lot will have restrictions to be operated when the ground is dry, frozen, or can support harvesting equipment. A standing requirement is that any cultural resource features located before or during the forestry project will be protected according to guidelines set forth in the current DWSP's Land Management Program and indicated on harvest maps accordingly. And foresters are asked to flag, protect, photograph, and map any cultural features and contact DCR staff archaeologist if there are any questions or concerns.

In most cases on DWSP properties, the cultural resource sites are easily identified as recent historical activities associated with agricultural land clearing and farming by European colonists. Stone walls, cellar holes, foundations, and wells are routinely encountered by foresters as they walk DWSP's watershed forests. Some of these structures are well-documented, especially at Quabbin, while others would require research to determine original owner/builder, last known owner, etc. Systematic surveys were conducted of all the known historical sites at Quabbin by researchers in the 1990s, using property maps created when the lands were surveyed and taken for construction of the reservoir. Much of this information is available upon request at the Quabbin Visitor Center in Belchertown.



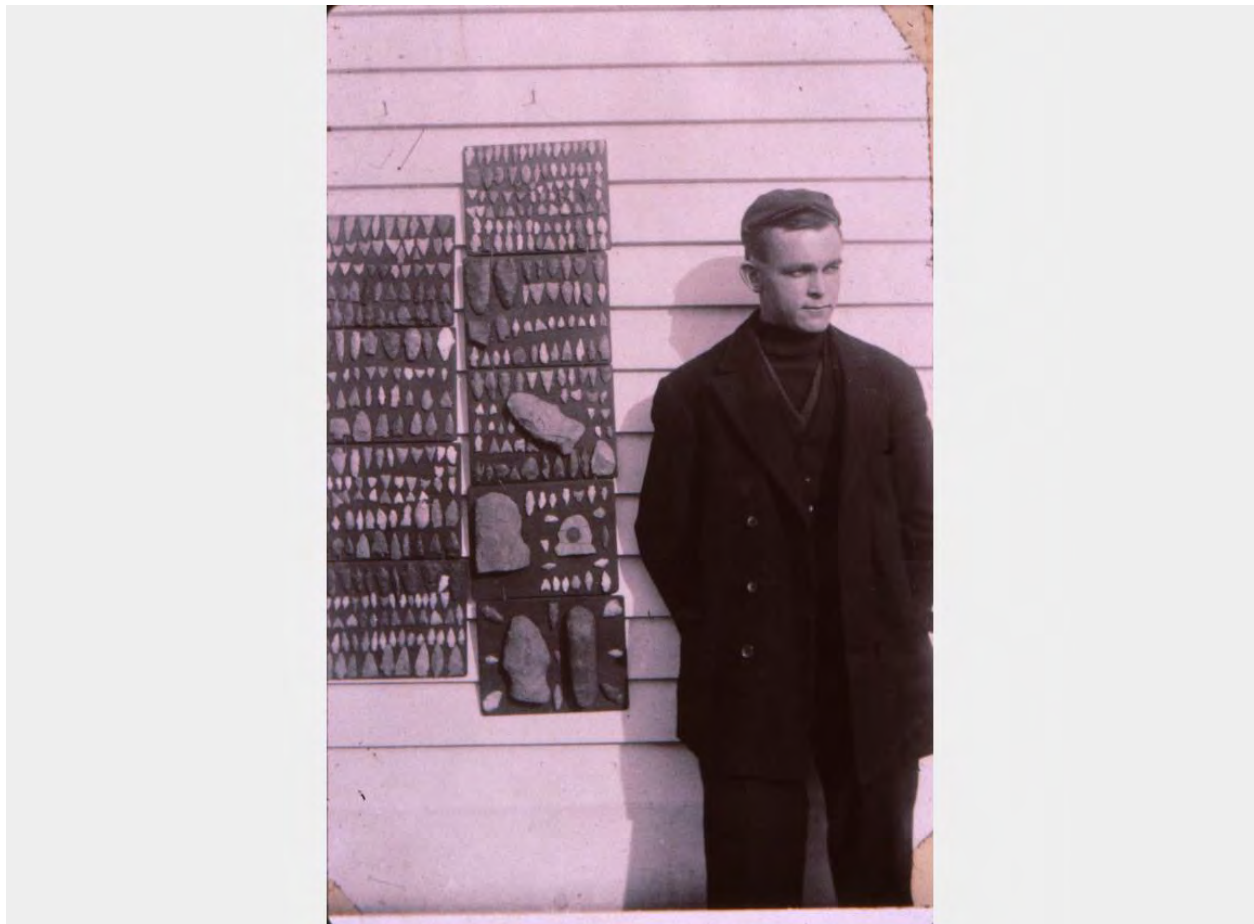


## Protection of Sensitive Sites

These lands had been occupied for thousands of years before the influx of Europeans in the 17th century and the reworking of the landscape to suit their agricultural way of life. Plowed soils often revealed artifacts from pre-Contact land use, such as the tools and weapons collected by this enthusiast from pre-Quabbin Enfield.

DCR's archaeologist routinely consults Massachusetts Historical Commission records to determine proximity of proposed activities to known protected sites such as villages and burial sites. Models are also consulted that use ground conditions such as topography and distance to water sources to estimate the potential locations of other pre-Contact sites such as seasonally occupied camps.

In an effort to protect this information it will not be included in the public documentation for the forestry proposals. DWSP foresters abide by all recommendations pertaining to protection of historic and pre-Contact cultural resources.





## Ongoing Field Mapping of Cultural Resources

Known and visible features and sites are mapped using GIS and are incorporated into editable digital field maps. Mapping apps for smartphones and tablets have revolutionized the ability for foresters to verify locations and add previously unmapped features right in the field. This technology aids immensely in planning harvesting operations.

At Ware River, Wachusett, and Sudbury no modern systematic surveys have been conducted, although the foresters routinely map stone walls and other features and do consult property sheets that show locations of extant homes and outbuildings at the time of land takings.

Most of what you will read in these individual lot proposals will be the foresters' assessments of visible cultural features in the area, and these are nearly always stone features related to colonial and post-colonial land use.





# Quabbin Harvest Proposal PE-22-02

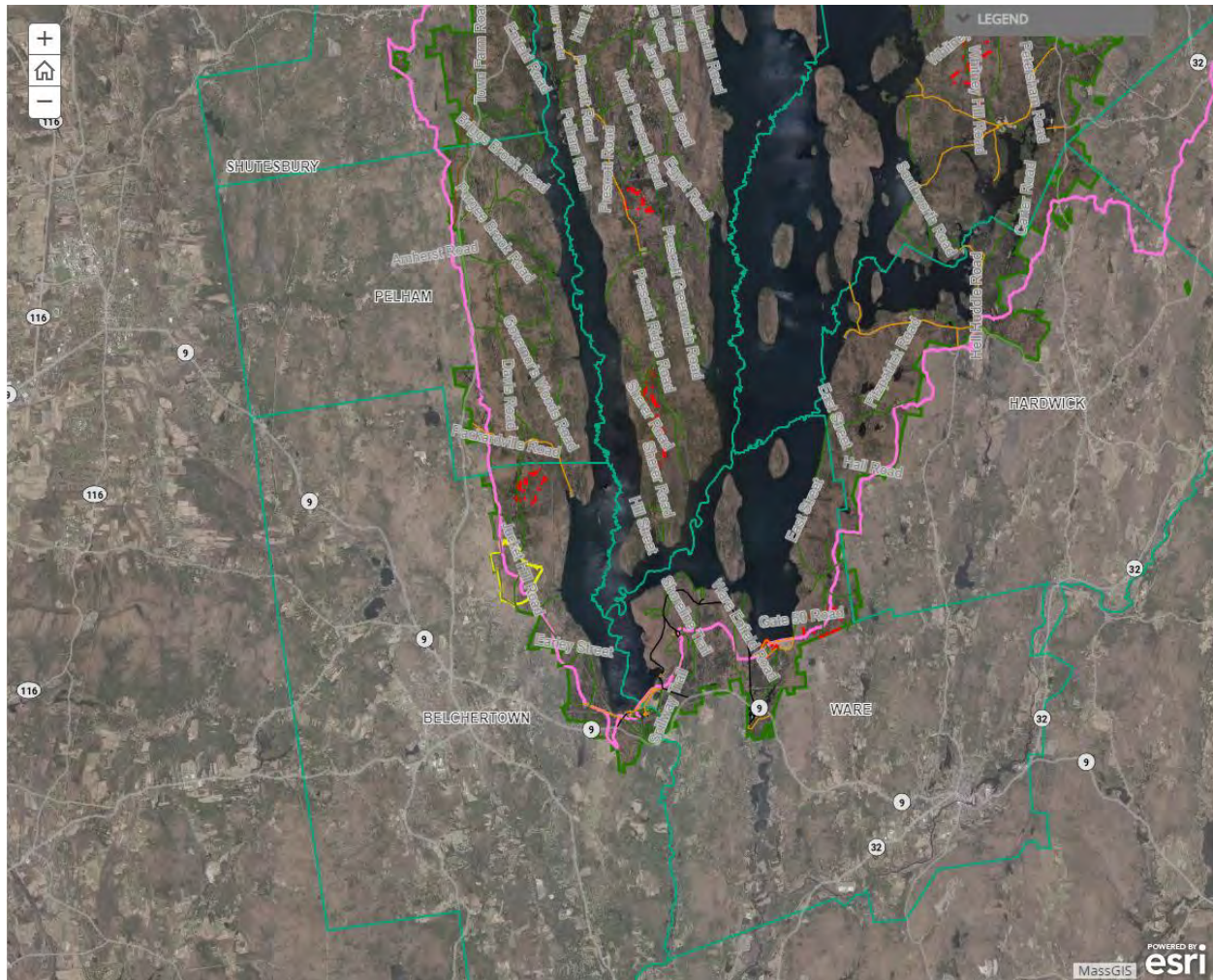
## Proposal Goals

Most of this proposal is in oak and oak - hardwood types which were severely impacted by the gypsy moth infestation of 2015-2019 and which were previously thinned in 1980's and 90's. Our standard group selection harvest will be implemented further releasing saplings and poles started from previous harvests and creating a new age class in openings ¼ acre to 4.5 acres in size..

## Proposal Location

Starting at gate 6 go north along road till hit end of PE-15-02 and end of lot 1053, follow edge of 1053 east and then northeast, continue past 1053 to Gates Brook, follow Gates brook upstream, cross Jucket Hill Road and continue following Gates Brook to the first intermittent stream on left, follow that upstream to a small wetland, head westerly across that to another wetland, cross that and head west a short distance to property boundary, follow boundary all way back to gate 6.

**Total Acres: 332**



## General Description

	Overstory Type(s)	Acres
<b>Dominant</b>	Northern red oak	195
<b>Secondary</b>	Oak - hardwoods	76
<b>Other</b>	White pine - hardwoods	46

	Understory Type(s)
<b>Dominant</b>	Tree seedlings/saplings dominate the site
<b>Secondary</b>	Dry site - blueberry/huckleberry

**Description of forest composition/condition:**

All of this area was impacted by gypsy moth (GM) from 2015-2020 with heavy mortality of oaks particularly east of Jucket Hill Road and in pockets around the central portion of the west side. Emerald ash borer (EAB) also started affecting the area around the end of 2019 and many ash were showing the characteristic "blonding" by the fall of 2020. Decline and mortality of white pine regeneration has also been noted in the area, most likely from several fungi and a canker that have been active in the region. Droughts in 2015-2016 and fall of 2020 have also had an impact as had competition from surrounding seedlings/saplings and shading from overstory. In general the understory is healthier and more vigorous where the stand was cut heavier in past or where understory is more open for other reasons. About the only good thing from the GM caused mortality is the releasing of regeneration. Most of proposal area has been thinned once or twice since 1970, with only scattered openings with vigorous regeneration still present. Most of these are in the northern 2/3rds of the eastern section of the portion west of Jucket Hill Road. Most of the proposal would currently be classed as fully stocked and even-aged.

There were 3 harvests (288, 366 and 388) on the east side of road between 1981 and 1986, with all but the steepest areas being cut. These appear to have been mostly thinnings and very well could have been salvage cuts from the last GM infestation. This side of road is mostly dry site oak with a couple of stands of white pine/hardwood. Overstory is a mix of red, black and white oak with some scarlet oak, red maple, white pine, hickory, black birch and white birch. There is a small stand of hemlock/hardwoods in the northeastern corner. Terrain is steep here and that stand might not be treated.

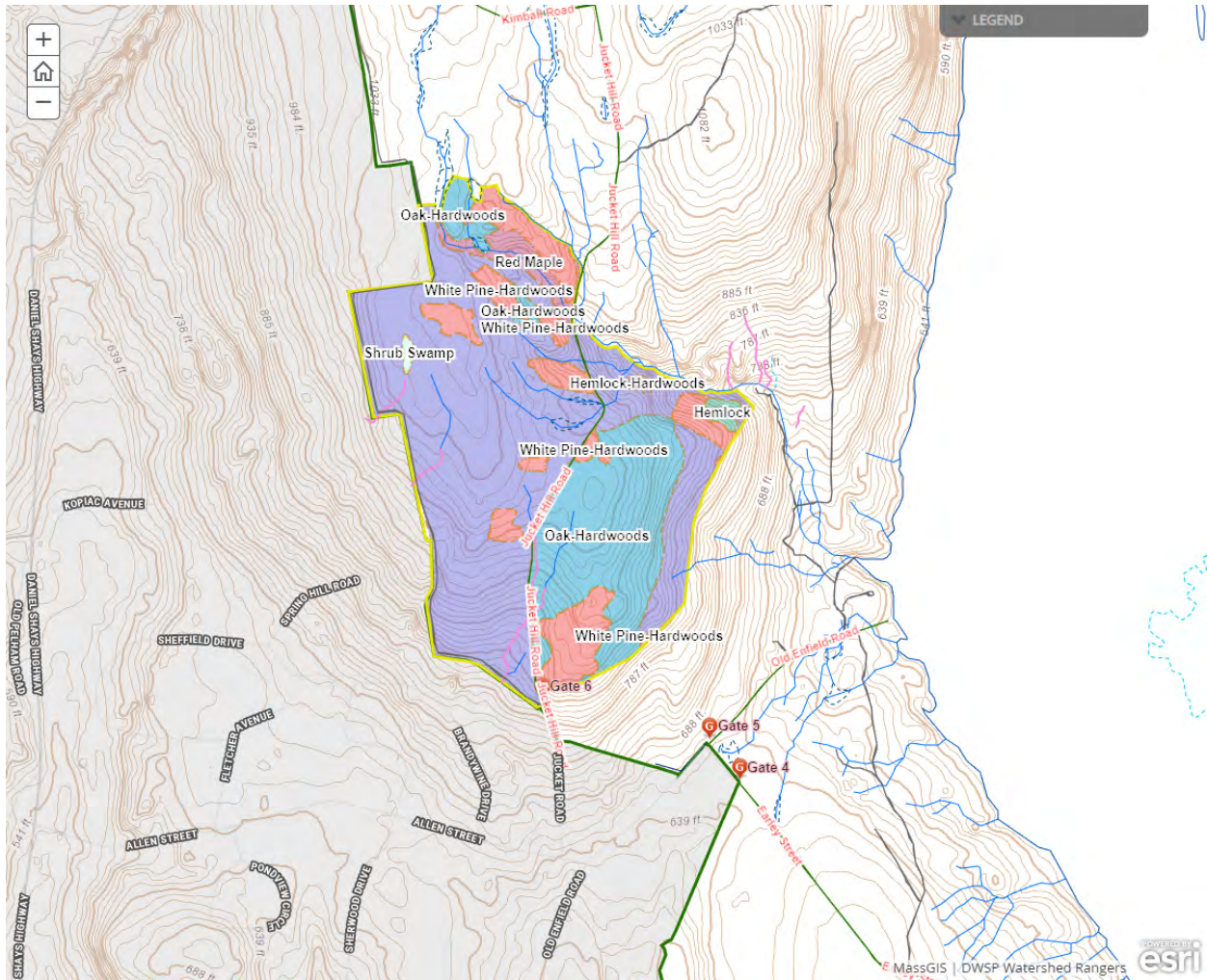
The west side of road had most of the area thinned in 1974 (95) and then there were multiple harvests between 1982-1996 (293, 342, 616, 642, 648, 760). These covered most of the western side, with several of them overlapping in some areas. Again the 2 cuts that occurred in 1982 most likely included some salvaging.

The oak on the west just after gate 6 is on the better site and is the best quality and most vigorous on the proposal. The site gradually declines and becomes drier up the hill. There is an old cart road at the junction with the main landing and truck turnaround. Along this old road some of the heavier cutting was done and the more diverse and vigorous regeneration is found. Up to the landing overstory is mostly red oak with black oak, red maple, black birch and scattered ash, hickory, sugar maple and white birch. The western area past the landing is flatter and has an intermittent stream with associated wetlands cutting through it. Species composition is about the same here but with some hemlock along the wetland and some scattered beech. North and east there are several intermittent brooks that flow easterly into Gates Brook. Types here transition in and out of white pine/hardwoods. Overstory here is generally lower quality white pine with red maple, red, black and white oak, and black and white birch.

**Assessment of Terrestrial Invasive Species:**

No invasives observed during various site walks. Probably is some Japanese barberry along some of the wetlands or intermittent streams.

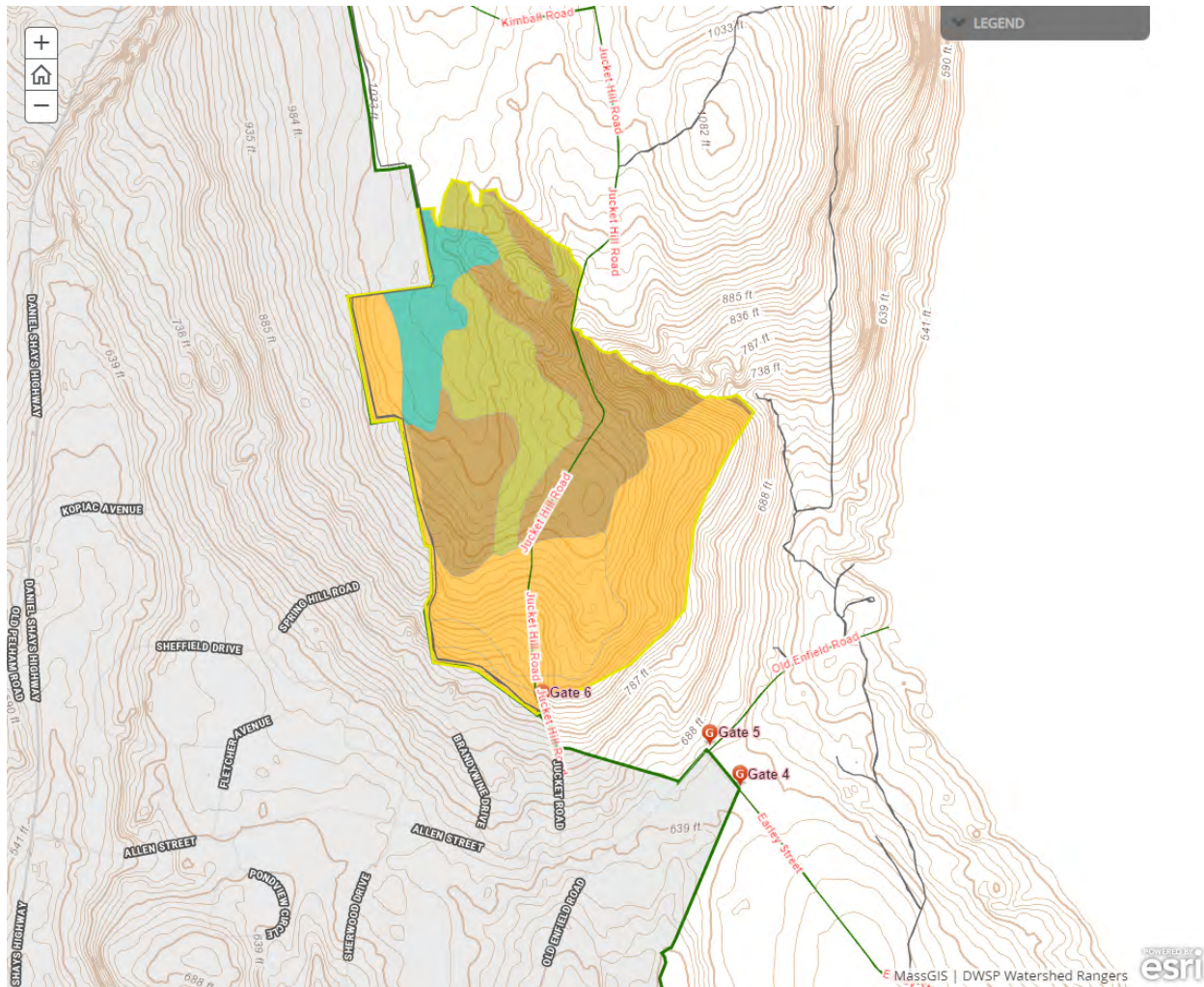




## Soils

Drainage Class	%
Excessively Drained	0
Well Drained Thin	42
Well Drained Thick	31
Moderately Well Drained	18
Poorly to Very Poorly Drained	9

Flat along existing woods road is 317C moderately drained Scituate fine sandy loam, rest of site is mainly 442B&C well drained thick Gloucester gravelly fine sandy loam. Along the western boundary soil is 103C well drained thin Charlton-Hollis-rock outcrop complex and a section of 71B poorly to very poorly drained Ridgebury fine sandy loam. The latter area contains most of the wetlands which will be avoided.

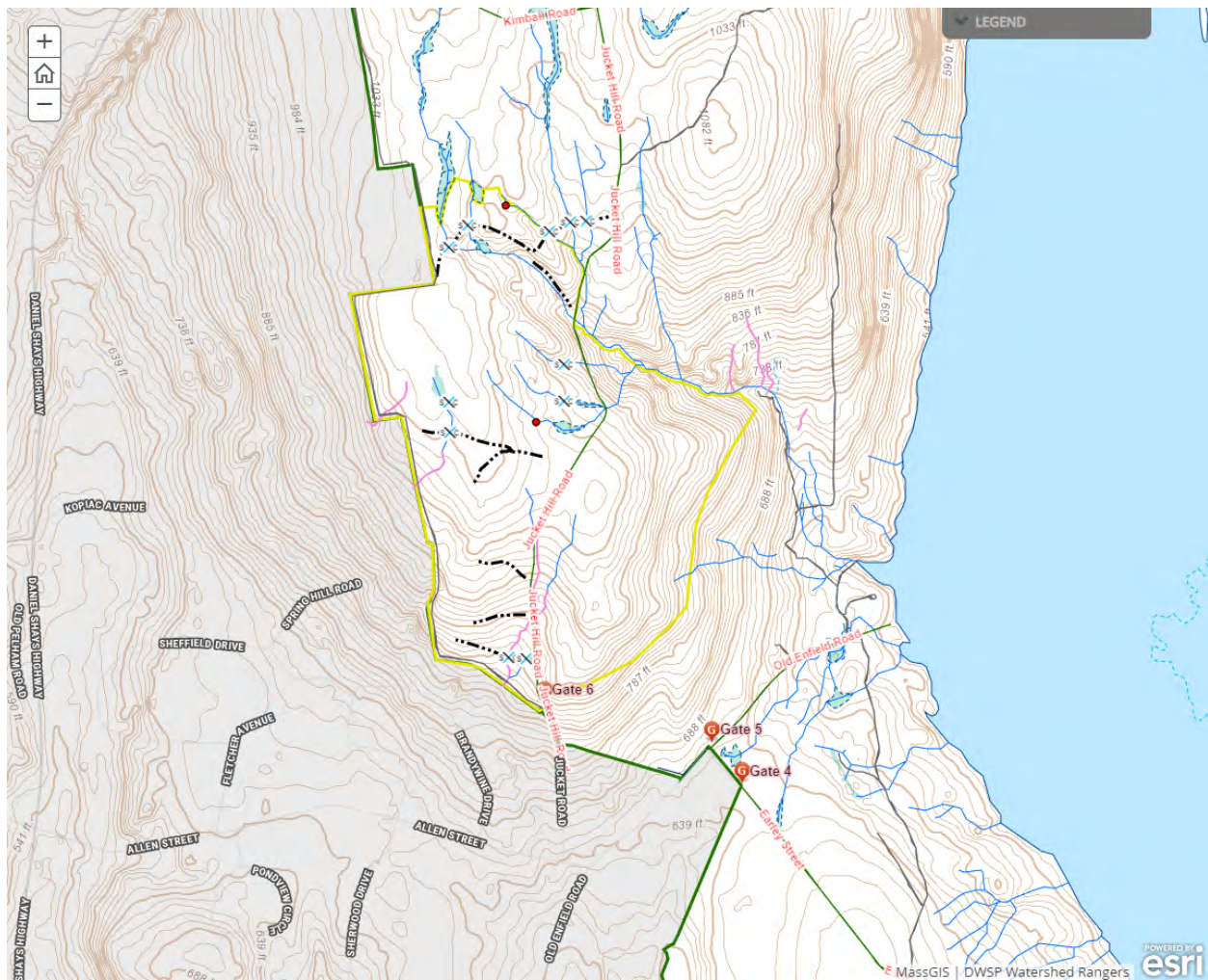


## Wetlands

- Wetlands present? - **Yes**
- Streams present? - **Yes**
- Vernal pools present? - **Yes**
- Seeps present? - **Yes**
- Are stream crossings required? - **Yes**
- Are wetland crossings required? - **Yes**
- Is logging in filter strips planned? - **Yes** ([Riparian Zone Mgt](#))
- Is logging in wetlands planned? - **No**



1 new vernal pool was identified on lot.



## Silviculture

Acres in Intermediate cuts: 17

Acres in prep/establishment cuts: **163**

Acres in Regeneration cuts: **71**

Average regen opening size: 1

Maximum regen opening size: 4.5



**Description of advance regeneration in proposal area:**

Good white pine, mixed hardwood and oak regeneration present throughout lot. The central section around the old road has some very nice oak (red, black and scarlet) regeneration to about 16'. There is also a lot of oak seedlings that are suppressed. We had a good white pine seed crop in 2020. Most areas have over 1000 seedlings/acre. Moose and deer are common here with 4 separate moose being identified on abutting harvest in 2020.

**General comments on silviculture proposed:**

Silviculture will be group selection with additional thinning between some groups, and on the better sites where there are nicely formed vigorous stems some prep or seed cuts in shelterwoods will be done. Groups created will range from .5-4.9 acres but will be concentrated in the 2-4 acre range in the oak types. The groups of good oak and mixed species regeneration will be released by harvesting around them to expand the original openings. The advanced vigorous regeneration will be protected as much as possible.

For all treatments openings will be placed as per our then current guidelines and will be located first in areas with more trees of low vigor or poor form or health. In areas partially cut these same categories will be targeted first. Additional larger higher quality trees will then be included to create the desired condition. Retained trees, other than wildlife and structural trees mentioned below, will generally be the better formed, vigorous individuals of the range of species that are desired to be regenerated on the area. Attempt will be made to retain structure and select well rooted, wind firm trees particularly in retained exposed groups in openings.

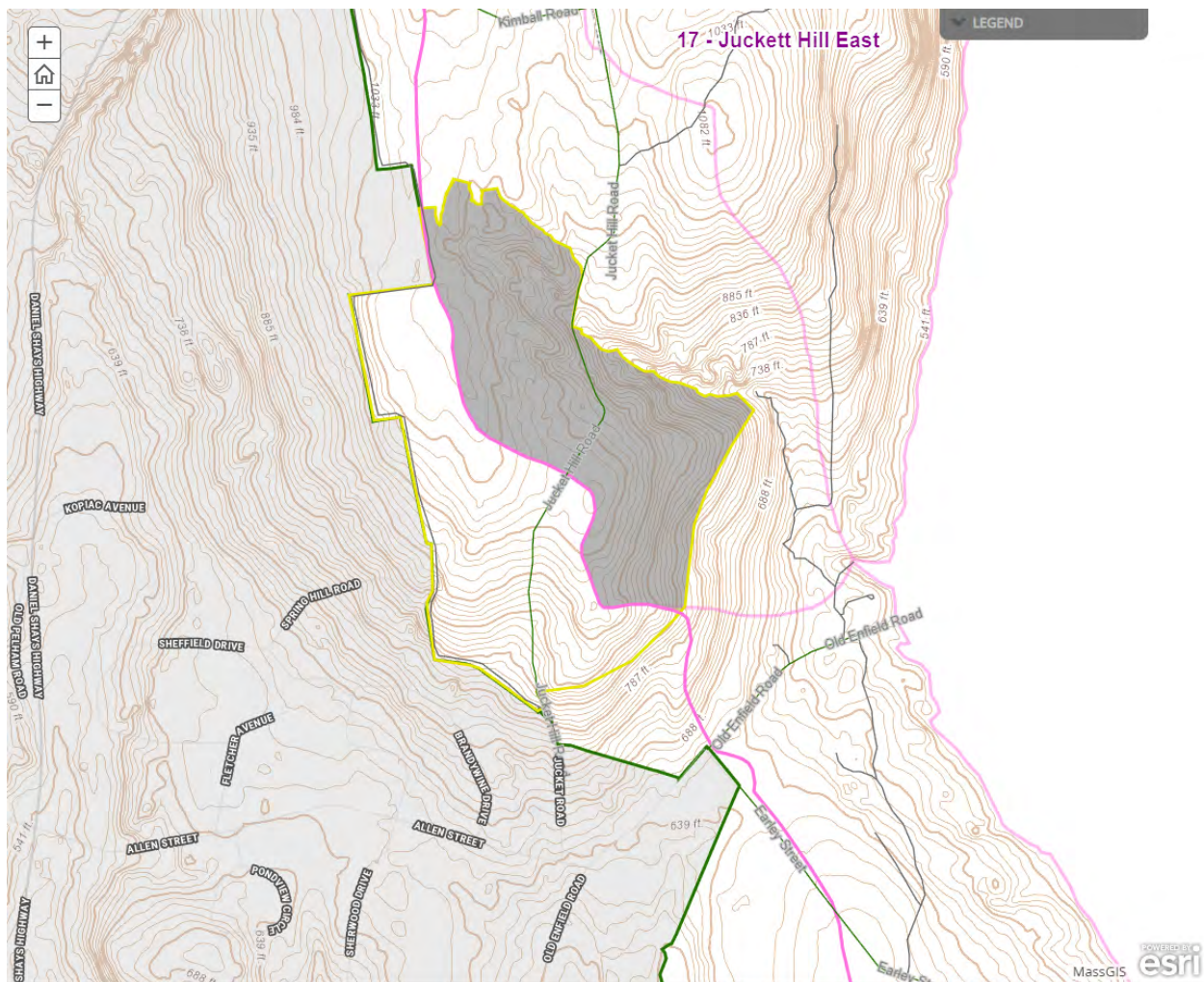
Scattered wildlife trees, standing dead, healthy individuals of all species present and individuals with superior form and vigor will be retained throughout proposal to preserve habitat, maintain or increase diversity, improve overall stand health and vigor and retain some carbon storage and increase the growth rate (carbon sequestration) of the retained trees. One of the main silvicultural goals across the proposal is to diversify species and age structure by regenerating openings with free to grow regeneration that should stay vigorous for at least 10 years. These openings should also encourage species that are better adapted to our changing climate to become established.



## 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
5 (Belchertown Shoreline)	683	37	134	<1
61 (Gates Brook)	594	3	145	174

158 acres of this proposal are off watershed. 25% threshold potentially could be exceeded on sub-shed 61 but typically only 43.6 acres would be regenerated in this sub-shed which is far below the 145.3 acre limit.



## Harvesting Limitations

Forwarder required: **Yes**

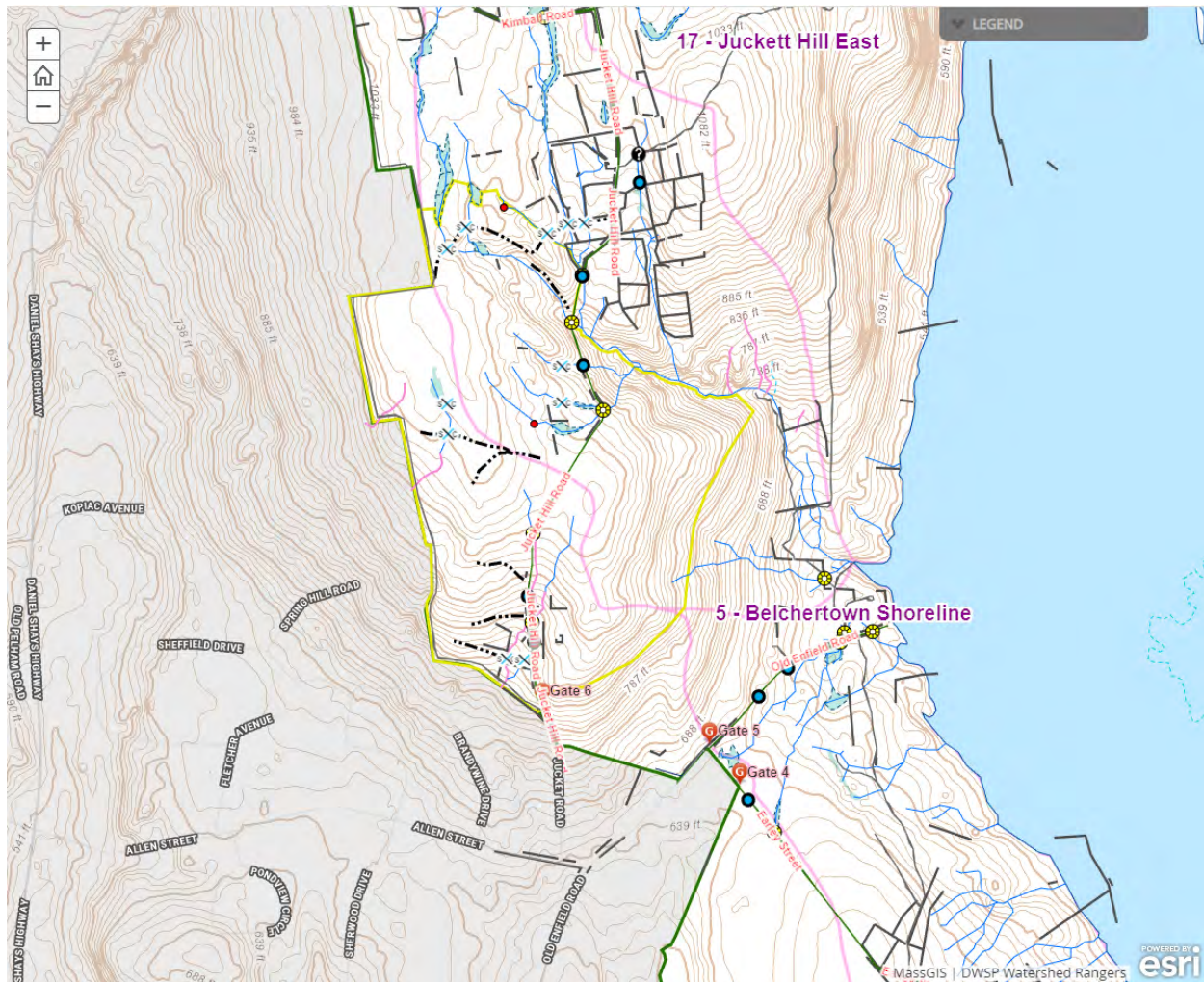
Feller/processor required: **No**

Steep slopes present: **No**

**Comments on harvesting limitations:**



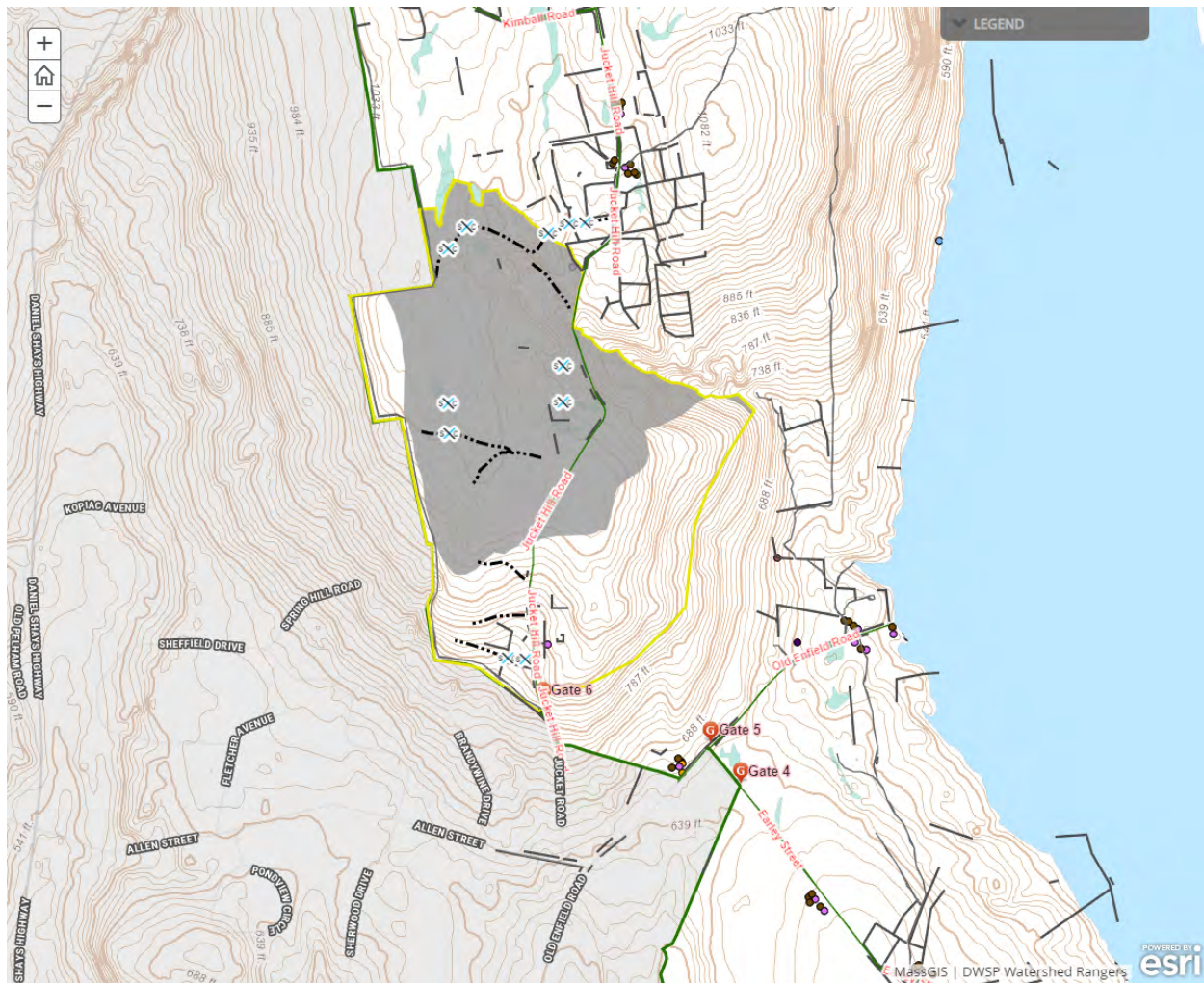
No equipment restrictions should be needed except for the southern portion of lot where landings are small and roadside and numerous walls and other cultural features are present. In these areas a 6 or 8 wheeled forwarder will be required for log transport.



## Cultural Resources

### Comments on Cultural Resources:

Most of the area surface stone is prevalent and micro topography is pronounced. No wells have been identified but there must have been some around the foundations.



## Wildlife Resources & Rare and Endangered Species

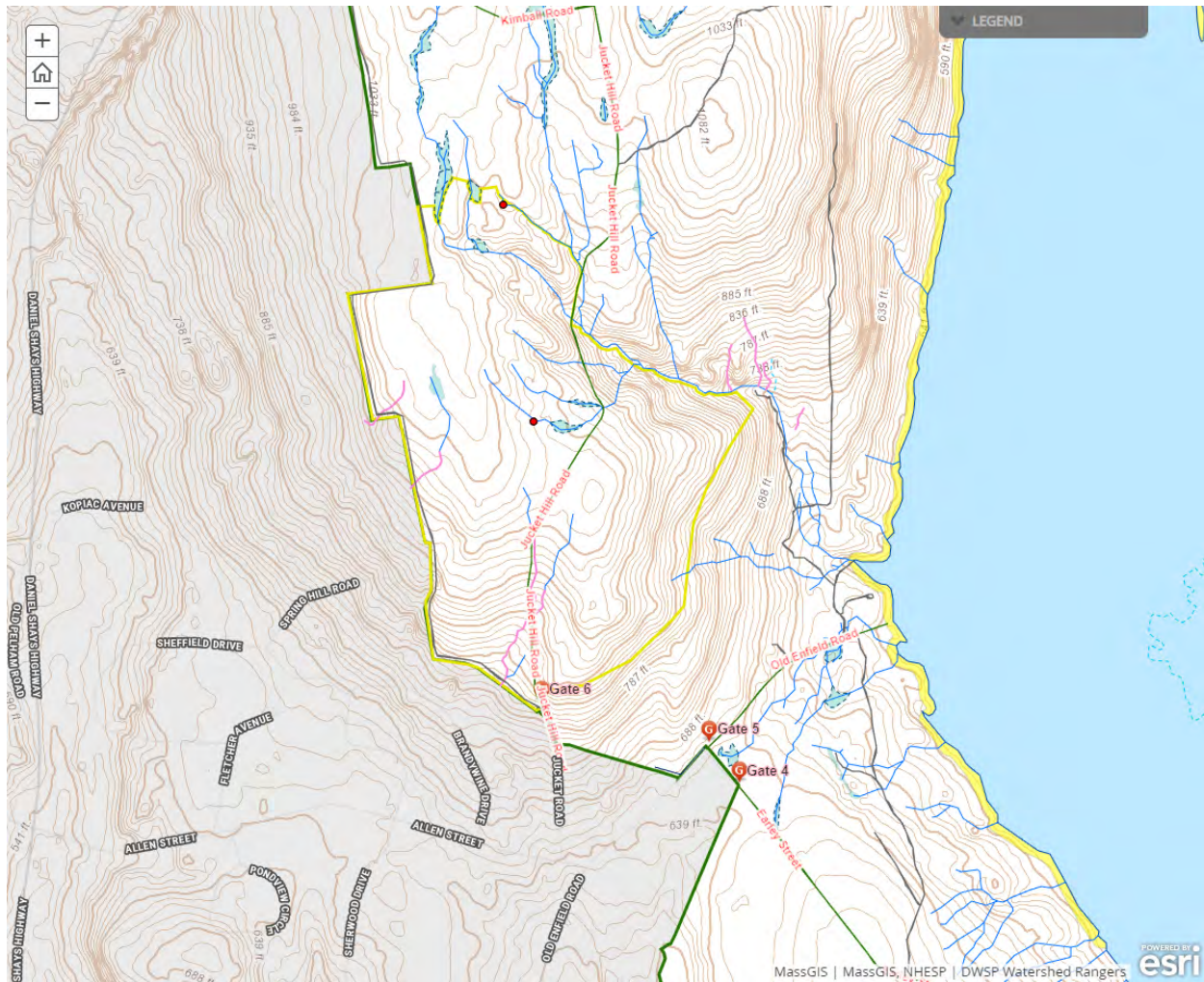
**General Wildlife Comments:**

No known unusual sites or habitats. Moose are present on lot and at least 4 were identified on harvest across the road in October of 2020. Browse is currently light to moderate but both deer and multiple moose have been spotted in area recently and moderate to heavy browse is expected. Bear, turkey, grouse and coyote also use this area.

**Comments on Rare Species/Habitats:**

No NHESP habitats in the treatment area. Two new vernal pools were identified and confirmed as active.



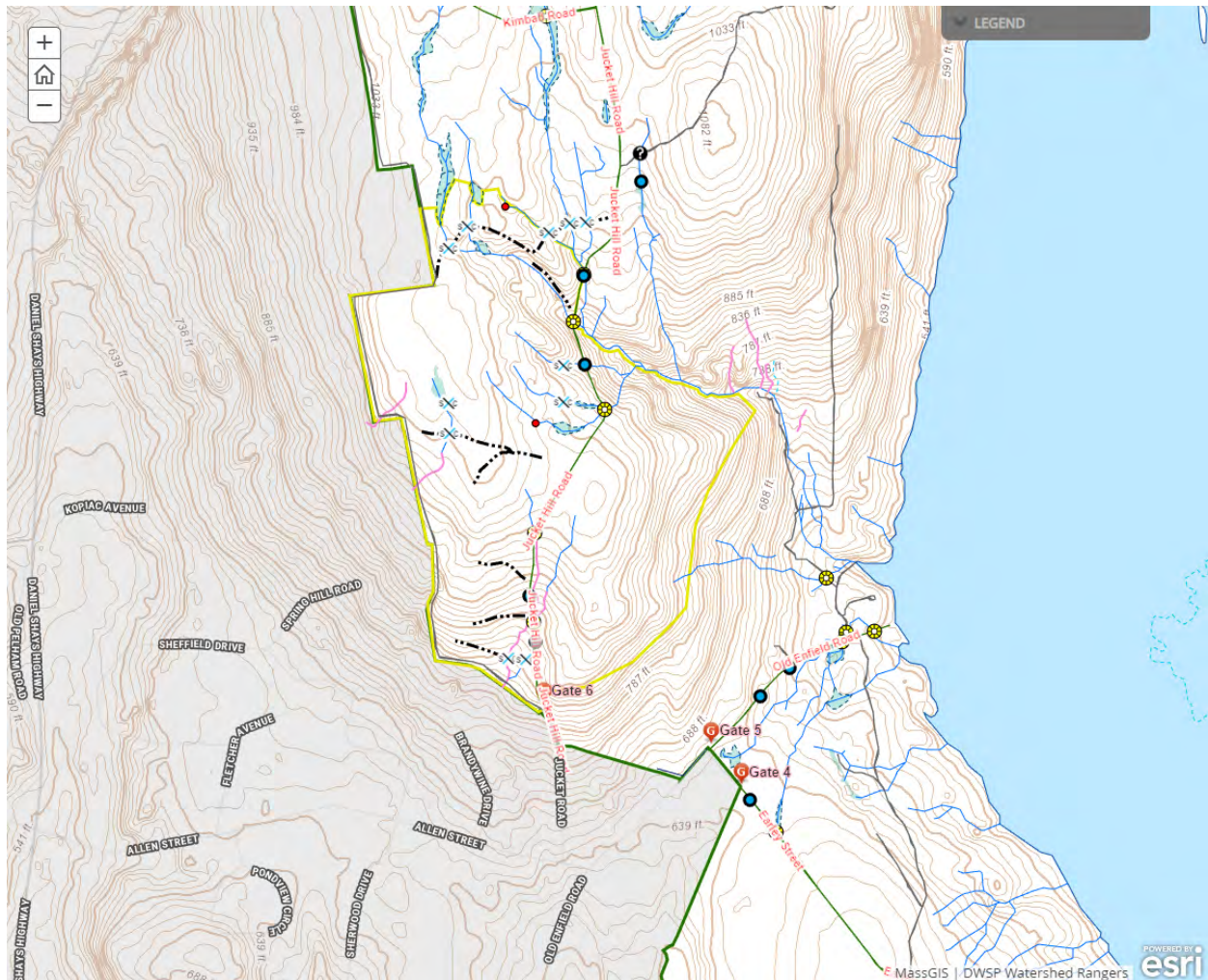


## Environmental Quality Engineering

### Comments on EQ Issues:

Only two stream crossings flow to require sampling. Other 9 crossings are all on intermittent or ephemeral crossings, as is the flow through the one wetland crossing. Most have been crossed before and several might be avoided depending on how harvests are laid out. All will be bridged if flowing or likely to flow during harvest.





## Forest Access Engineering

**Gravel needed:** Yes

**Landing work needed:** Yes

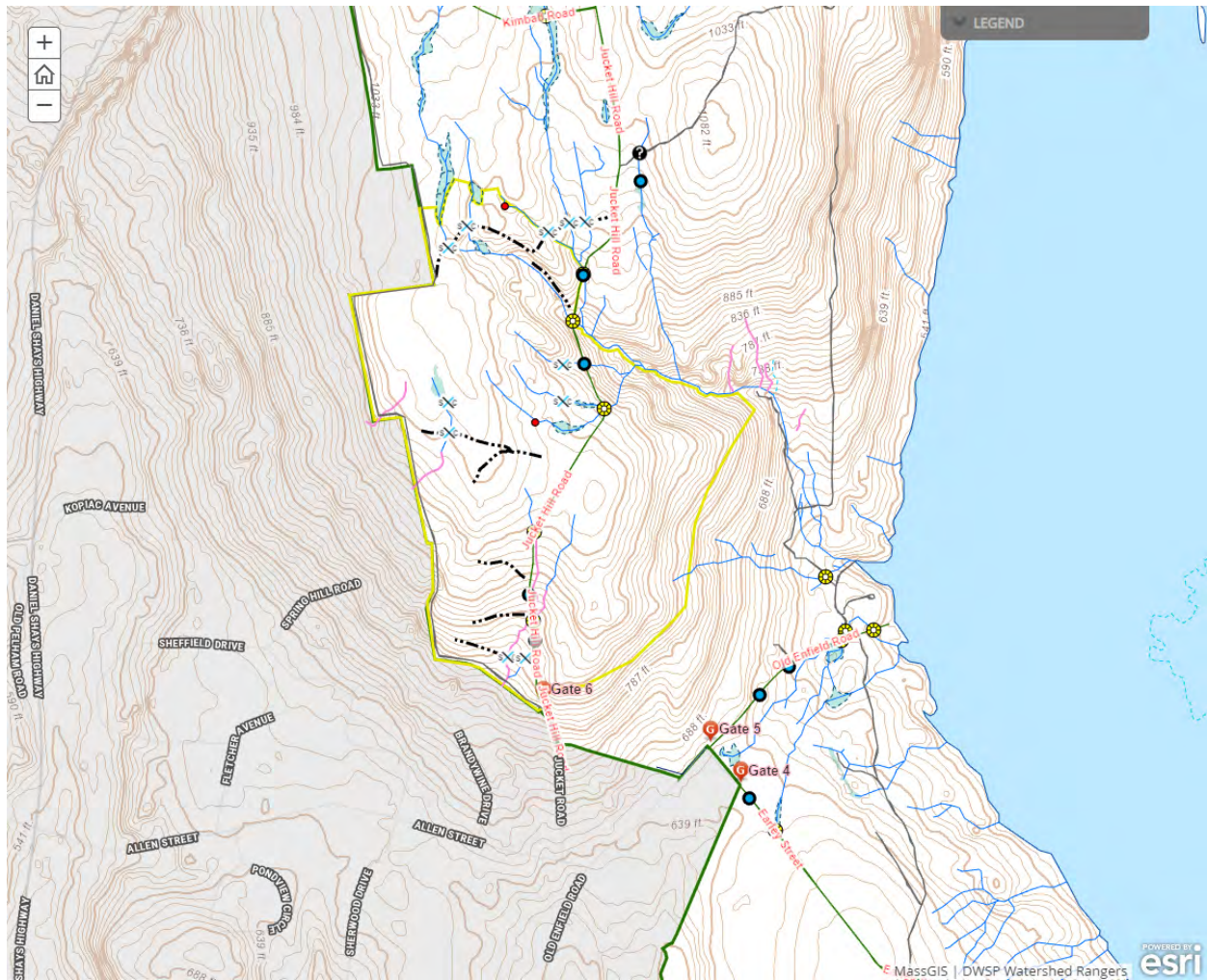
**Culverts needed:** No

**Work needed on permanent bridges:** No

**Beaver issue:** No

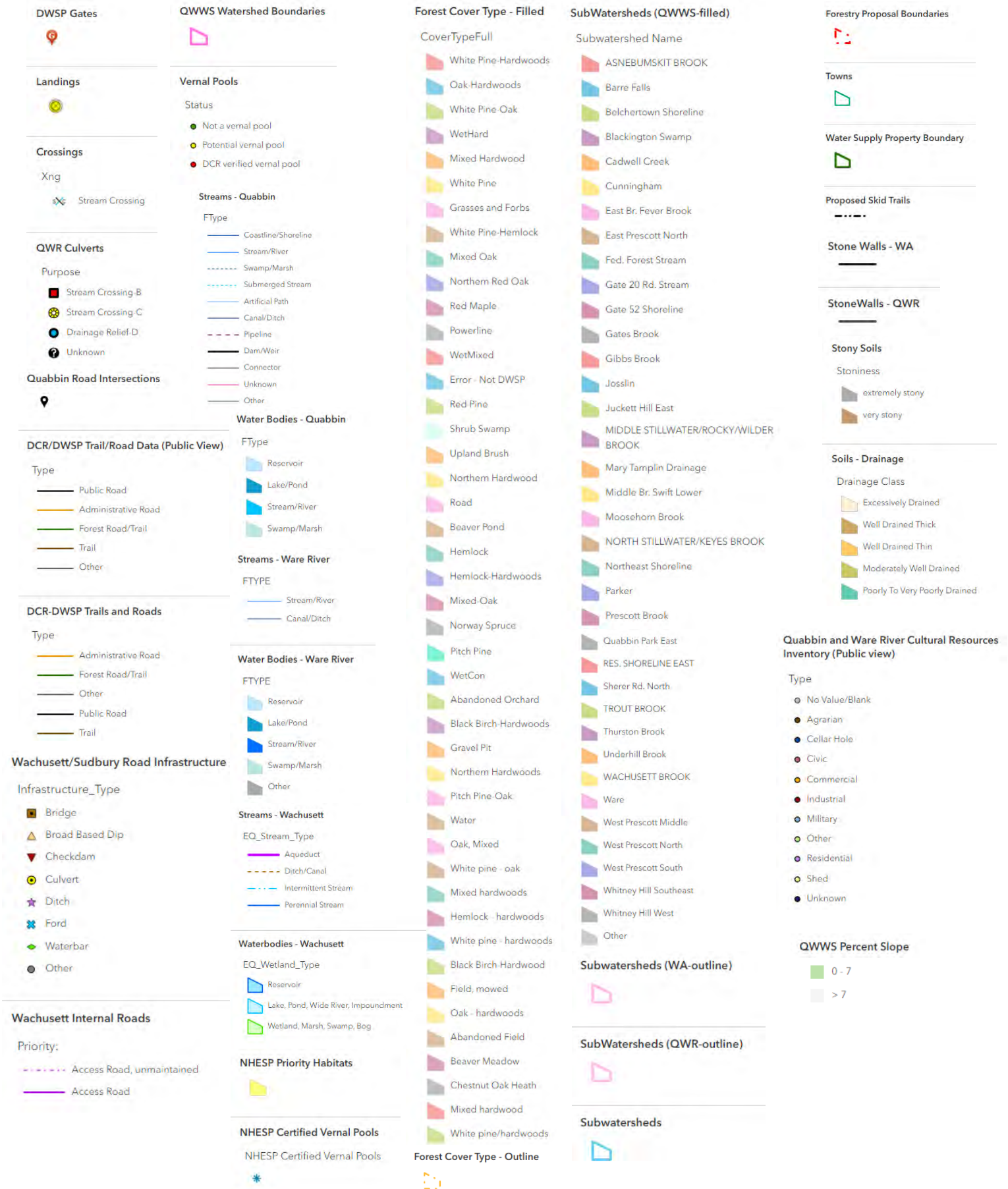
**Further comment on access needs:**

General maintenance is needed on Juckett Hill Road south of where trailer turnaround was created in 2020 and landing/turnaround will need to be improved at landing site (existing) here. Main need is ditch maintenance/improvement and some straightening and widening of road surface on corners to allow trailer access. Access will be from gate 8 unless gate 6 end is improved.





## DWSP FY 2022 Forestry Proposals – Master Legend for story maps





# Quabbin Harvest Proposal PE-22-03

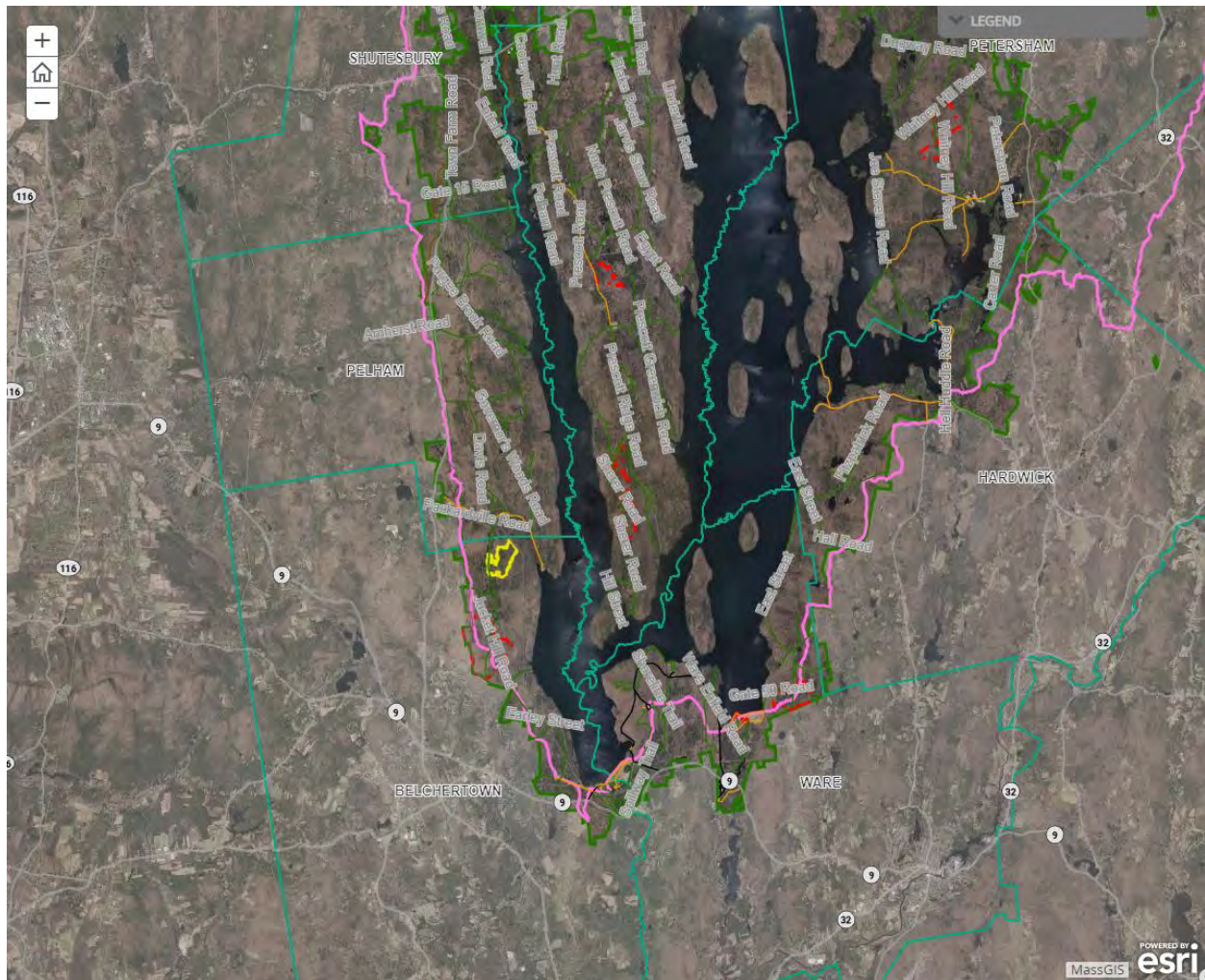
## Proposal Goals

The proposed area holds a regionally and locally uncommon Ridgetop Chestnut Oak Forest/Woodland community that is transitioning to a white pine / red maple composition, the most common forest type in Massachusetts. Ridgetop Chestnut Oak Forest/Woodlands are a fire adapted and dependent community. This proposal seeks to maintain and regenerate this uncommon community by applying prescribed fire.

## Proposal Location

To the west this proposal is bounded by Juckett Hill Road. To the north the proposal is bounded by a north aspect northern hardwoods stand and red oak stand. To the east and south the proposal is bounded by steep slopes. South and southwest of the proposal are an area of wet oak hardwoods, and an old harvest regenerating to white pine.

**Total Acres: 102**



## General Description

	Overstory Type(s)	Acres
<b>Dominant</b>	White pine - oak	57
<b>Secondary</b>	White pine	19
<b>Other</b>	Chestnut oak	16

	Understory Type(s)
<b>Dominant</b>	Dry site - blueberry/huckleberry
<b>Secondary</b>	Mountain laurel prevalent

**Description of forest composition/condition:**

Stand One is the focus stand of this proposal, a 16.3 acre chestnut oak dominated stand with a dense highbush blueberry and black huckleberry heath understory (*Vaccinium corymbosum*; *Gaylussacia baccata*). This habitat type is both regionally rare and rare within the Quabbin reservation. While the overstory basal area majority is a combination of chestnut oak (41 ft<sup>2</sup> acre-1; all basal area and trees per acre values represent the stand mean value), eastern white pine (17 ft<sup>2</sup> acre-1) and northern red oak (8 ft<sup>2</sup> acre-1), smaller size classes are slight majority red maple and white pine (51 % of trees < 10 " dbh, while only comprising 34.6% of total basal area). Chestnut oak saplings are present but are being browsed down, and red maple and eastern white pine saplings are quickly outpacing and overtopping them. At present the stand is positioned to transition to a more generalist red maple and white pine stand. The understory is predominantly high bush blueberry / black huckleberry heath, with pockets of tall dense mountain laurel (*Kalmia latifolia*). The stand also contains some ledge and surface bolder, which will require careful operation during treatment. Firewood thinning occurred in the western half of the stand in harvests in 1992 (Quabbin lot 0612).

Stand 2 is an eastern white pine/oak forest, 35 acres, at the southern end of the proposal. Growing on well drained Canton fine sandy loam. This stand is composed primarily eastern white pine (39 ft<sup>2</sup> acre-1) and northern red oak (24 ft<sup>2</sup> acre-1), with minor components of red maple, black birch, chestnut oak, black oak, white oak, and yellow birch. Stocking for the stand follows an inverse J curve, but like much of the region northern red oak is a minor component of the smaller size classes with generalist eastern white pine, and red maple making up most of the smaller size classes. The stand stretches from Juckett Hill Rd. In the west to steep south east facing slopes in the east and is bordered to the south by oak-hardwood forest and previous harvests regenerating to white pine along the road. To the north, the stand is bordered by the two white pine stands included in this proposal (Four, Six) and the chestnut oak stand (One) to the northeast. Most of the chestnut oak in Stand 2 is clustered adjacent to the chestnut oak stand (One). The understory transitions from low density woody vegetation with red maple and black birch seedlings to higher density blueberry and black huckleberry heath adjacent to the chestnut oak/heath stand (Three). Most of the stand was thinned in the 1980's (Quabbin lots 0385, 0485, 0492A) but has not had any regenerative silviculture. This stand has most of the stone walls present in this proposal.

Stand Three covers 22 acres, at the northeastern corner of the proposal. The stand is composed of eastern white pine (57 ft<sup>2</sup> acre-1), chestnut oak (17 ft<sup>2</sup> acre-1), northern red oak (10 ft<sup>2</sup> acre-1), and minor components of red maple, and black oak. It is similarly growing on well drained Canton fine sandy loam, but this stand is primarily growing on the east by southeast facing slopes of the proposal, with a third of the stand occupying the ridge top. The stand is bordered by steep slopes to the southeast, a utility right-of-way to the northeast, oak/hardwood forest to the



northwest, and the eastern white pine hardwood stand (Five) and chestnut oak stand (One) to the southwest. Chestnut oak is a stronger component throughout the easterly slopes than in Stand 2, with a reduced presence on the ridgetop. Similarly, the understory composition is a dense blueberry and huckleberry heath on the slopes, with pockets of dense mountain laurel, transitioning to a dispersed heath on the ridgetop. The sapling/seedling composition is primarily chestnut oak, white pine, and red maple on the slopes, with chestnut oak seedlings reducing but still present on the ridgetop and black birch seedlings picking up. This stand has not been harvested since the establishment of the Quabbin Reservation.

Stand Four is an 11.5 acre white pine stand, growing on well drained Canton fine sandy loam at the top of the ridge. This stand would have recently been better classified as a white pine / hemlock type, but the majority of the large diameter hemlock stems have succumbed to hemlock woolly adelgid (*Adelges tsugae*) leaving the stand dominated by larger diameter ( $> 16$  " dbh) eastern white pine (70 ft<sup>2</sup> acre-1), with minor components of northern red oak, red maple, chestnut oak, black oak, white oak, and black birch. Aside from patches of eastern white pine seedlings, often collocated with hemlock snags, much of the stand is pine/hemlock duff with little regeneration. This stand is bordered to the west by northern hardwoods (outside of proposal) to the west and north by oak / white pine (Stand Five), to the west by chestnut oak (Stand One), and to the south by white pine oak (Stand Two). This Stand was part of the previously mentioned 1992 firewood thinning.

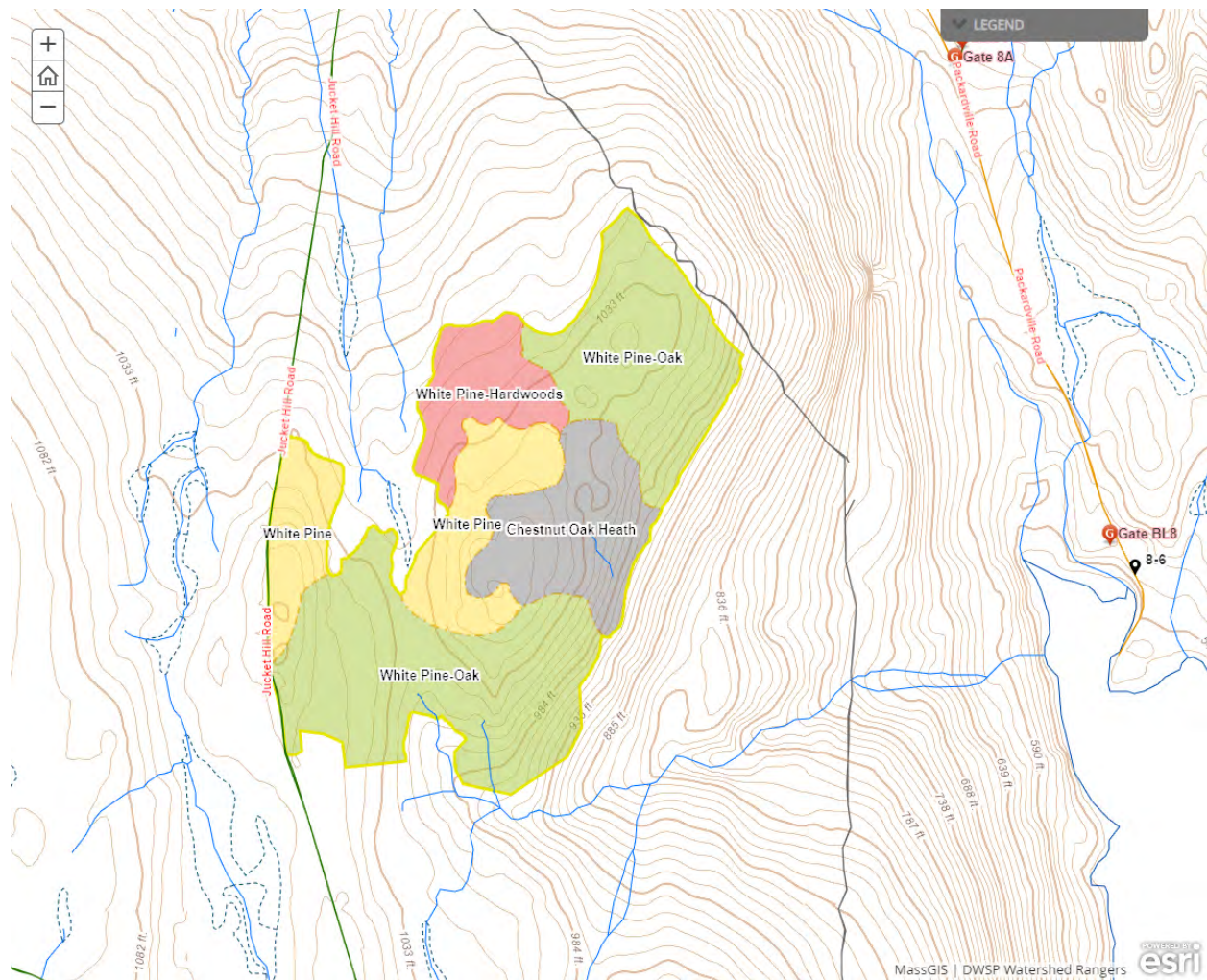
Stand Five has an oak / white pine overstory sitting at the top the ridgeline, covering 10.3 acres. It's differentiated from the rest of the proposal by it's ridgetop to north facing aspect, and a majority of the stand is growing on moderately well drained Scituate fine sandy loam, and the rest on the well drained Canton fine sandy loam. The stand is oak dominated (northern red oak, 25 ft<sup>2</sup> acre-1; black oak, 13 ft<sup>2</sup> acre-1; chestnut oak, 5 ft<sup>2</sup> acre-1), eastern white pine (15 ft<sup>2</sup> acre-1), and red maple (12 ft<sup>2</sup> acre-1), with minor components of hemlock, black, and yellow birch. The stand is species diverse across merchantable size classes. Red maple and eastern white pine are a large component of the smaller size classes, but pole sized oak are well represented. Seedlings are dominated by white pine, red maple, and black birch; there are some scattered oak seedlings but browse is a problem. Within this stand there are larger patches (0.5-0.75 acres) of dense mountain laurel preventing regeneration beneath them. This stand is bordered to the west by northern hardwoods (outside of this proposal), to the north by a red oak stand (outside of this proposal), to the east by the smaller white pine oak stand (Three), and to the south by white pine (Four). This stand was part of the previously mentioned 1992 firewood thinning.

Stand Six is 7.3 acres of white pine overstory in a narrow north south oriented block along Juckett Hill Road. This stand is dominated by eastern white pine (108 ft<sup>2</sup> acre-1), with minor components of northern red oak (15 ft<sup>2</sup> acre-1), and red maple and black oak ( $< 10$  ft<sup>2</sup> acre-1 each). Eastern white pine is distributed across all size classes and is the majority of both pole and

saw log sized stems. Eastern white pine seedlings are present in patches but much of the stand has little regeneration present. Northern red oak is only present in the canopy, and in very few scattered seedlings. Red maple in the stand is almost all in small pole sized suppressed stems. The stand is bounded by Juckett Hill Road to the west, a northern hardwood stand to the north and east (not a component of this proposal), and the larger white pine / oak stand (One) to the south. This stand is growing on the same Canton fine sandy loam as the majority of the other stands. A 1989 firewood thinning (lot 0492A) included all of this stand. There is a stone wall running along Juckett Hill Road at the western edge of this stand.

### Assessment of Terrestrial Invasive Species:

Japanese barberry is present along Juckett Hill Road near a foundation in the southwestern corner of the proposal. Other invasives were not observed during randomized sampling of the interior.

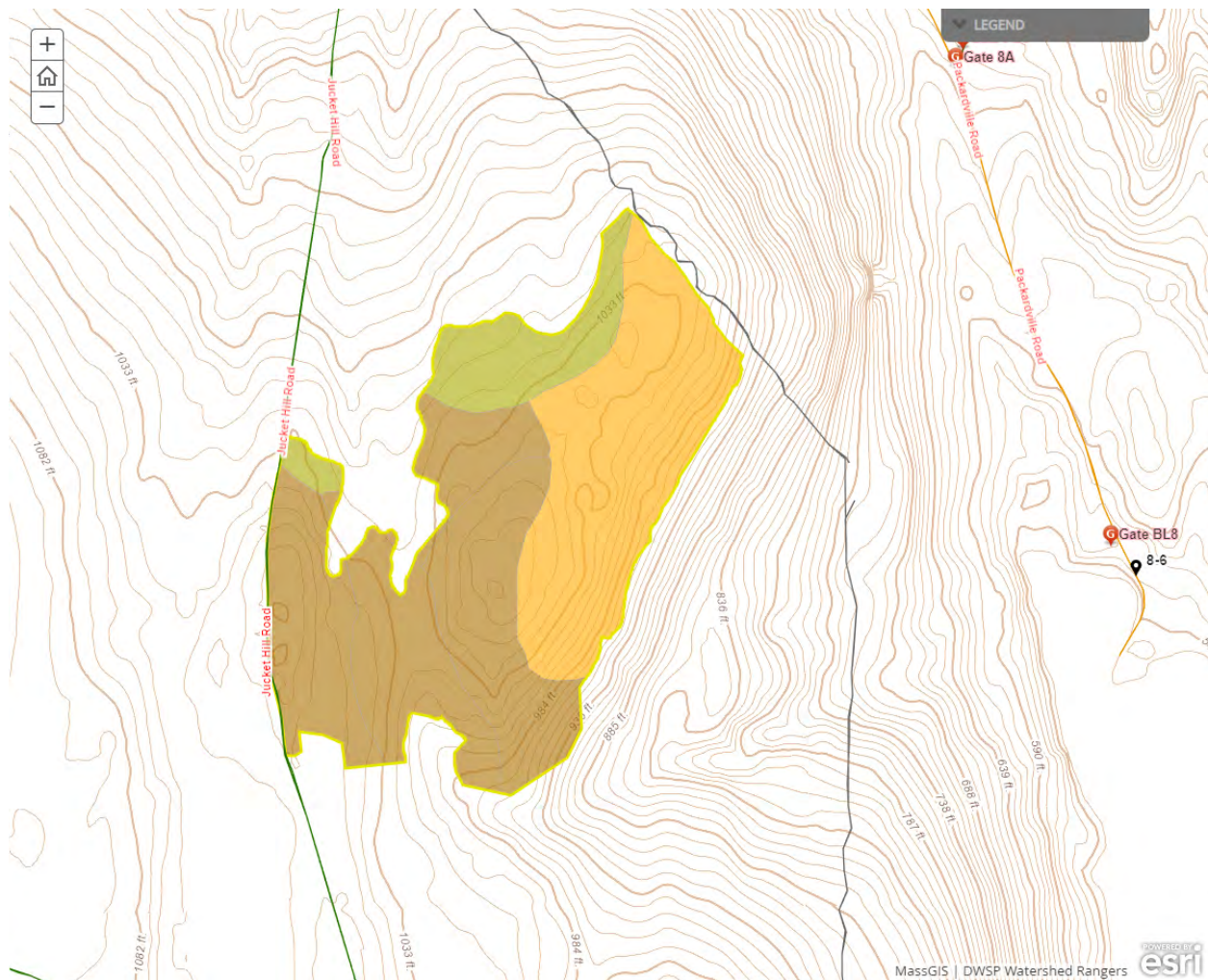


## Soils

<b>Drainage Class</b>	<b>%</b>
<b>Excessively Drained</b>	0
<b>Well Drained Thin</b>	35
<b>Well Drained Thick</b>	53
<b>Moderately Well Drained</b>	12
<b>Poorly to Very Poorly Drained</b>	0

Soils of the south eastern facing slopes are well drained thin Charlton-Hollis-Rock outcrop complex with several areas or prominently exposed rock. The majority of the remaining area is Canton fine sandy loam.

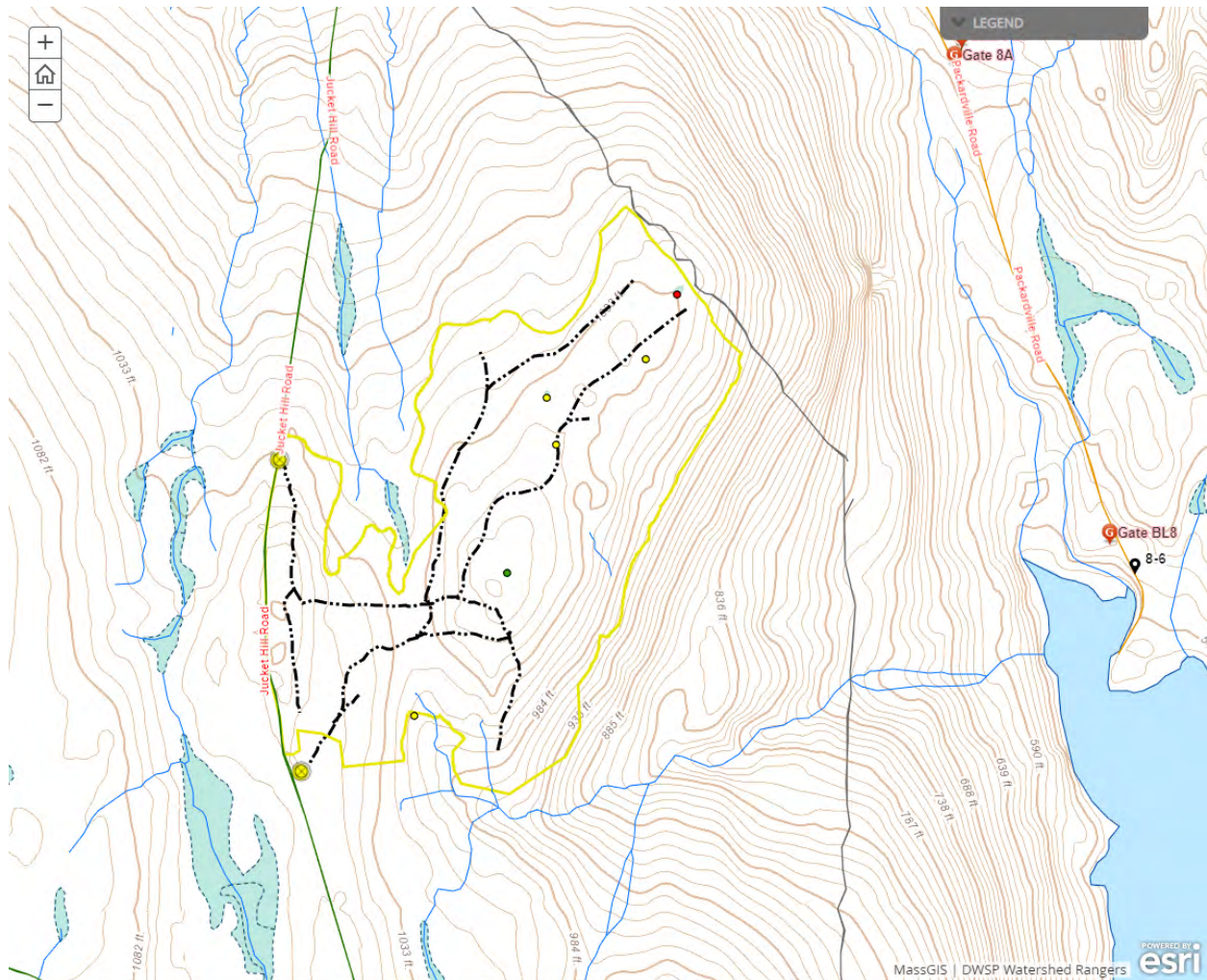




## Wetlands

- Wetlands present? - **No**
- Streams present? - **Yes**
- Vernal pools present? - **Yes**
- Seeps present? - **Yes**
- Are stream crossings required? - **No**
- Are wetland crossings required? - **No**
- Is logging in filter strips planned? - **No** ([Riparian Zone Mgt](#))
- Is logging in wetlands planned? - **No**

Wetlands are not present in this largely ridgetop and sloped area. There are several potential vernal pools in depressions on the ridgetop. The only streams present are intermittent to ephemeral meltpaths and drainages, crossings will not be necessary.



## Silviculture

Acres in Intermediate cuts: **0**

Acres in prep/establishment cuts: **51**

Acres in Regeneration cuts: **22**

Average regen opening size: **1**

Maximum regen opening size: **2**

**Description of advance regeneration in proposal area:**

Described by stand in forest composition/condition section above.

### **General comments on silviculture proposed:**

#### **Desired Conditions:**

To achieve the management goal of greater species diversity across our forested landscape we will be seeking to promote chestnut oak, a regionally rare species. Stand One is a chestnut oak forest which and can serve as a seed source/reserve for the surrounding area. With climate change chestnut oak is a species expected to do well in our area, and an area of source/ reserve will improve overall forest resilience into the future. Unfortunately, regeneration in this stand is dominated by eastern white pine and red maple, and if left unmanaged the site is likely to transition to a white pine-hardwood stand with chestnut oak as a much smaller component. Our target for this stand is to continue the current chestnut oak overstory dominance and improve relative abundance of the chestnut oak regeneration. After treatment chestnut oak should retain its relative dominance of overstory basal area, and chestnut oak saplings should represent at least a third of sapling sized stems. Blueberry/Huckleberry heath will continue to be the dominant understory cover and expanded into pockets of currently dense mountain laurel.

Stands Two & Three are even aged eastern white pine oak stands with relatively even distributions of overstory eastern white pine and oak species, including chestnut oak. To improve age diversity of the stand, as well as help increase the chestnut oak seed source/reserve of Stand One the desired future condition for the stands are a patch mosaic of age classes. Within 2 chains of the Stand One chestnut oak should become majority species in sapling stems, and majority of long-term canopy basal area. Understory blueberry/huckleberry heath will expand into areas that currently have more pine in the overstory on the slope and will expand in regeneration openings at the top of the slope.

Stands Four & Six currently have little species diversity and without some reduction in the overstory will have very little age diversity moving forward. The desired future condition of these stands is an increased diversity of age classes, distributed throughout the stand.

Stand Five has the highest species diversity present in the proposal, but similarly little age diversity, and regeneration interference problems. Harvest in this stand will help increase the distribution of age diversity and relieve some of the vegetative regeneration interference.



### Silviculture by Stand :

Stand One. The initial harvest will establish an irregular extended shelterwood system, reducing basal area to 30-40 ft<sup>2</sup> acre-1 evenly distributed. Retention will favor chestnut oak primarily and other oak species secondarily for retention. The operator will be required to mechanically treat mountain laurel patches and reduce to 10 % of current cover, as well as cut all softwood and hardwood stems between 1 and 5.6 inches dbh (any oaks falling into that category will be marked for retention). Depending upon the timing of the sale and harvest of the stand, the mountain laurel patches will be treated by brush saw the growing season after proposal approval. Treating the mountain laurel while there is still some canopy intact may help extend its recover period after canopy release. Harvest will require whole tree removal to reduce fuel loads prior to the prescribed fire. Standing snags will be retained where possible, except when within one- and one-half times their height from a delineated fire break. After at least two growing seasons of harvest, the initial prescribed fire will occur based on qualitative fuel assessments. An early growing season fire is targeted, however, implementing a fire at other times of the year when environmental conditions allow can benefit oak regeneration. If conducted outside the targeted seasonality, an additional prescribed fire may need to be implemented prior to switching to the maintenance fire interval. Maintenance prescribed fire interval will be based on regeneration and understory sampling 1 and 5 years after the first fire, as well as qualitative observations and photopoints. Harvest return is planned for 20 years post initial prescribed fire. This will be a selective harvest of at least 1/3 of shelterwood trees but retaining at least half of the surviving shelterwood stems.

Stand Two will be treated with a group selection system harvesting a third of the stand at first and return harvest. For a majority of the stand regeneration openings will vary in size from 0.75 to 1.2 acres in size with 5 – 10 40 ft<sup>2</sup> acre-1 of retention in openings greater than 1 acre, with retention focused on healthy crown codominant or dominant oaks or underrepresented hardwoods (e.g. black cherry, yellow birch, hickories). Adjacent to the focus chestnut stand (One) a 2 acre opening will be placed with retention solely focused on chestnut oak and a fire break established on the western edge to facilitate its inclusion with prescribed burning of the chestnut oak stand. Thinning from below will occur throughout the stand. At the return harvest an additional third will be harvested collocated with initial regeneration openings to maximize light exposure on established regeneration. At both harvests, where possible, snags and large diameter white pine will be retained to preserve structural diversity and carbon storage.

Stand Three will receive a similar silvicultural treatment to Stand One. A 2 acre regeneration opening will be placed adjacent to Stand One with a fire break established to the east for its

inclusion in prescribed burning of the chestnut oak stand and expansion of the heath. With more chestnut oak throughout this stand it will be a primary target for retention and release.

Stand Four will be treated with an irregular extended shelterwood system. The basal area will be reduced from 99 to 30-40 ft<sup>2</sup> acre-1 favoring surviving eastern hemlock (for wildlife values) and best formed/healthiest eastern white pine (preferring larger diameters for maintaining biological legacies). Retention will be chosen to best release existing white pine seedlings and aggregated to maximize light on pine/hemlock duff currently missing regeneration. At the return harvest, single tree selection of shelterwood individuals will be considered for release of new regeneration but retaining 50 % of shelterwood stems. All standing snags will be retained in this stand.

Stand Five. While Stand Five borders the chestnut oak heath of Stand One, similar to Stands Two and Three, its position at the top of the ridge does not make it ideal for expansion of the chestnut oak heath cover. One third of the stand will be treated with regeneration openings of 0.5 - 1 acre in size. Retention will favor well formed, healthy oak species (northern red, black, and chestnut), hemlock, and large diameter eastern white pine. Given the smaller opening size green tree retention within the openings will be limited to 5 ft<sup>2</sup> acre-1 or less. Where possible dense mountain laurel will be mechanically treated during harvest to attempt to allow some regeneration to establish before the mountain laurel rebounds. Limited thinning throughout the rest of the stand will target very poorly formed, or diseased stems. At the return harvest an additional third of the stand will be treated with similarly sized regeneration openings and retention goals. The final third of the stand will be thinned again at that time but otherwise left intact to retain the structural diversity within the stand.

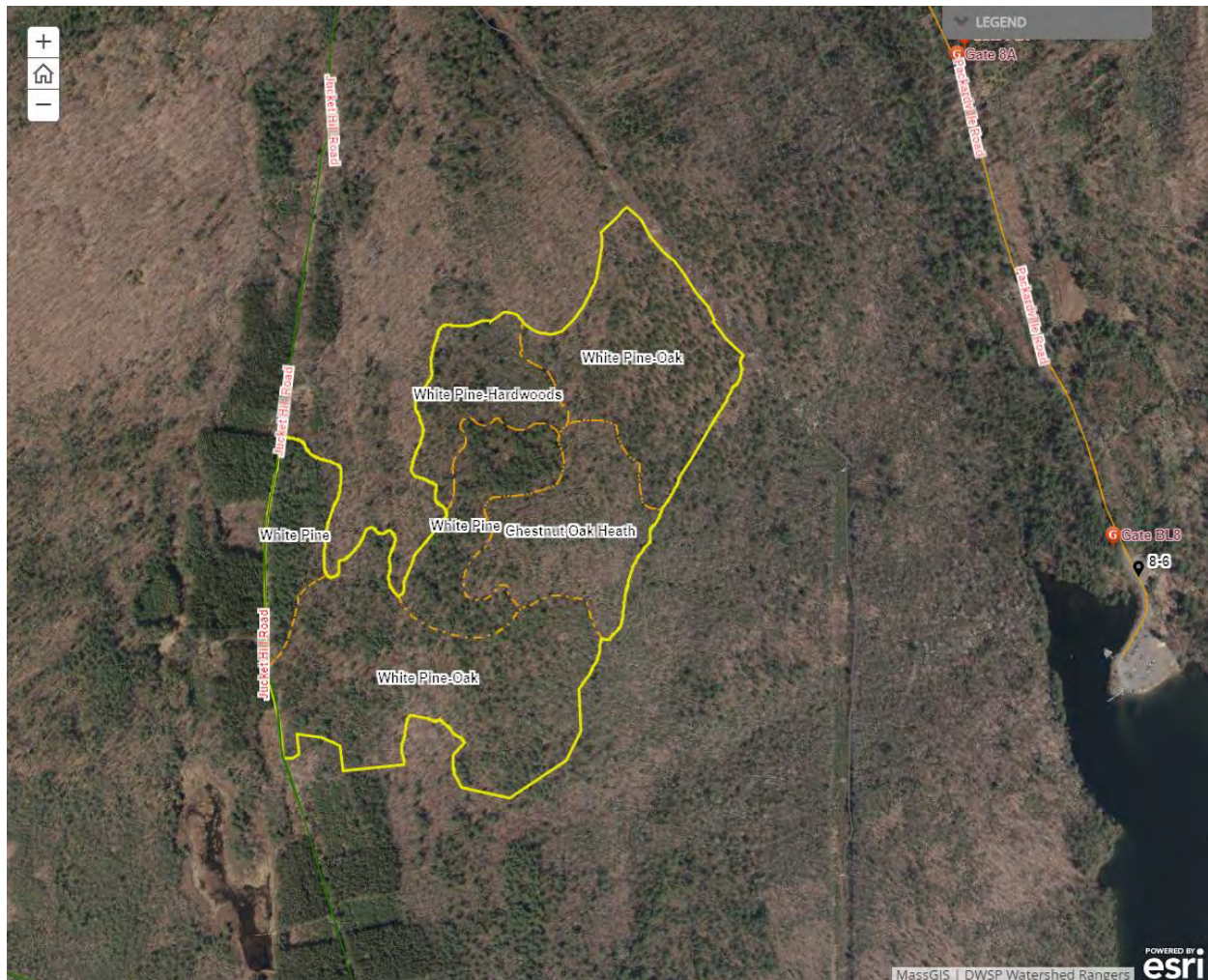
Stand Six. The very northern end of Stand Six at Juckett Hill road will host the main landing. This landing will be large enough to accommodate whole tree harvesting (necessary for the prescribed fire to be applied in Stands One-Three), and may reduce the size of the stand by 0.75 - 1 acre. The rest of the stand will be treated with a shelterwood prep cut, reducing the basal area from its current 132 ft<sup>2</sup> acre-1 down to 40 ft<sup>2</sup> acre-1. Retention will favor well-formed canopy dominant or codominant hardwoods, then well-formed dominant or codominant white pine and will be retained in clusters to reduce windthrow and maximize light availability. An average of 5 ft<sup>2</sup> acre-1 of poorly formed white pine will be girdled and left standing to increase structural diversity and promote wildlife habitat. At the return harvest an additional 25 – 30 ft<sup>2</sup> acre-1 of the shelterwood overstory will be removed to release established regeneration. At this point regeneration will target well-formed canopy dominant hardwoods and largest diameter white pine.

### Prescribed Fire & Monitoring:

Upon approval of the proposal, in consultation with prescribed fire experts within DWSP NR and DCR Fire Control an approved burn plan will be developed to apply prescribed fire to the site as specified previously. Fire breaks will be laid out in Stand One and the adjacent 2 acre openings prior to harvest for the operator to cut. Where possible skid roads will be placed to serve as fire breaks. Whole tree harvesting will be required in Stand One to reduce fuel loads. Snags will be retained as much as safety allows, with fuel removed from their base. Prescribed fire will follow the approved protocols of DCR Fire Control.

Prior to harvest 20 permanent monitoring plots will be established within the chestnut oak stand and the adjacent expansion openings. Within the existing stand 16 plots will be placed randomly, with an additional 4 placed within the expansion openings. Overstory sampling will be determined with a BAF 10 prism, and three 1/4-acre plots will be established 12 ft from plot center 0, 120, and 240 ° for sampling seedling and understory composition. At 12 ft from plot center 60, 180, and 300 °, three six ft radius plots will be established for measuring the two tallest trees  $1'' < \text{dbh} < 5.5''$ . Sampling will be repeated the growing season after prescribed fire, and five years post fire. The fire return interval will be determined by the response of vegetation but a return of after 5-8 years is likely timeframe.

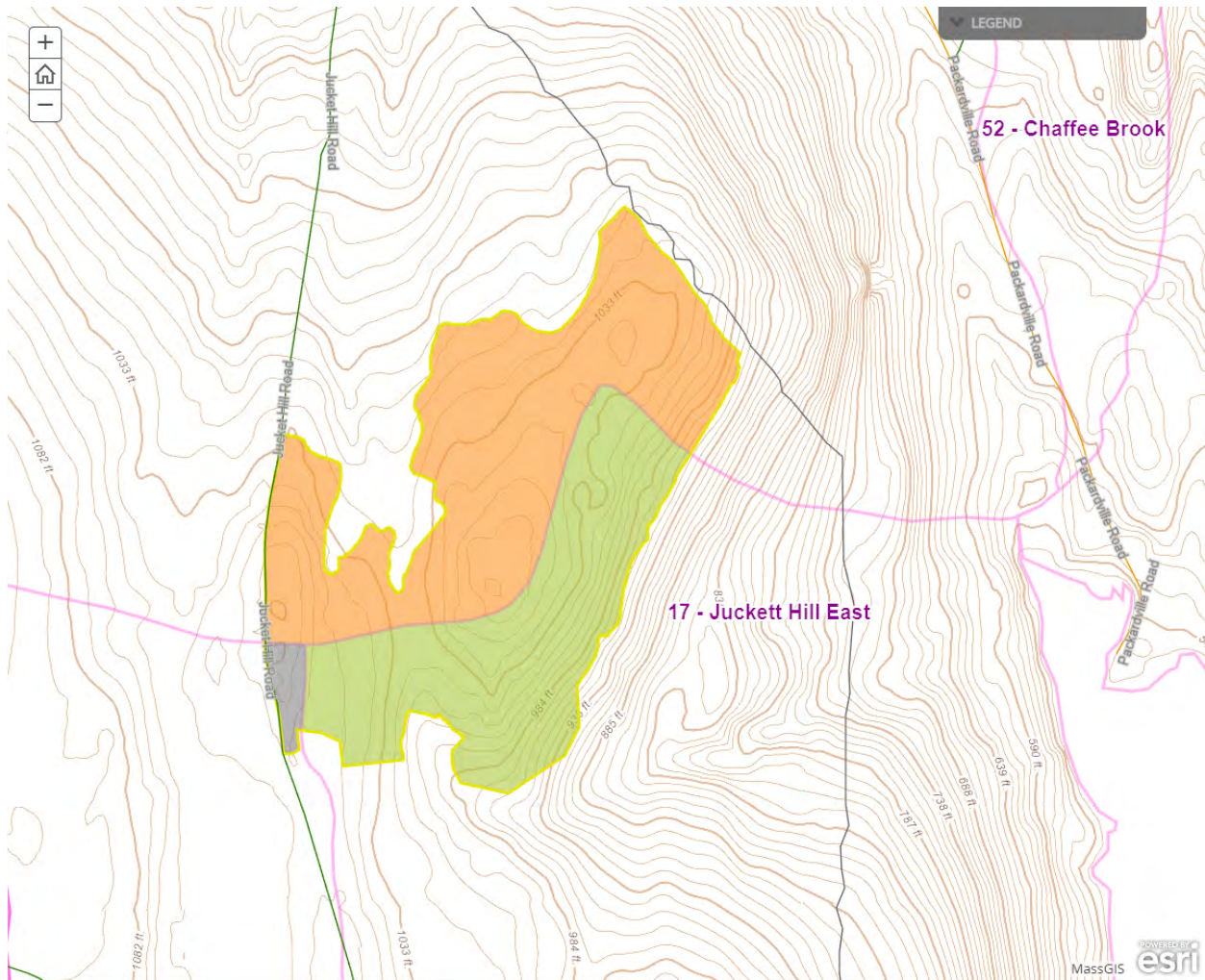




## Subwatershed Analysis

<b>Sub-watershed number</b>	<b>Total DCR-owned Acres</b>	<b>Acres Regenerated on DCR Land in the last 10 years</b>	<b>Acres Remaining for Regenerating Up to the 25% / 10 Year</b>	<b>Acres part of this proposal</b>
60 (Cadwell)	1643	41	370	58
17 (Juckett Hill East)	551	7	131	42
61 (Gates Brook)	594	23	126	2

Proposed harvesting will not exceed the 25% threshold.



## Harvesting Limitations

Forwarder required: **No**

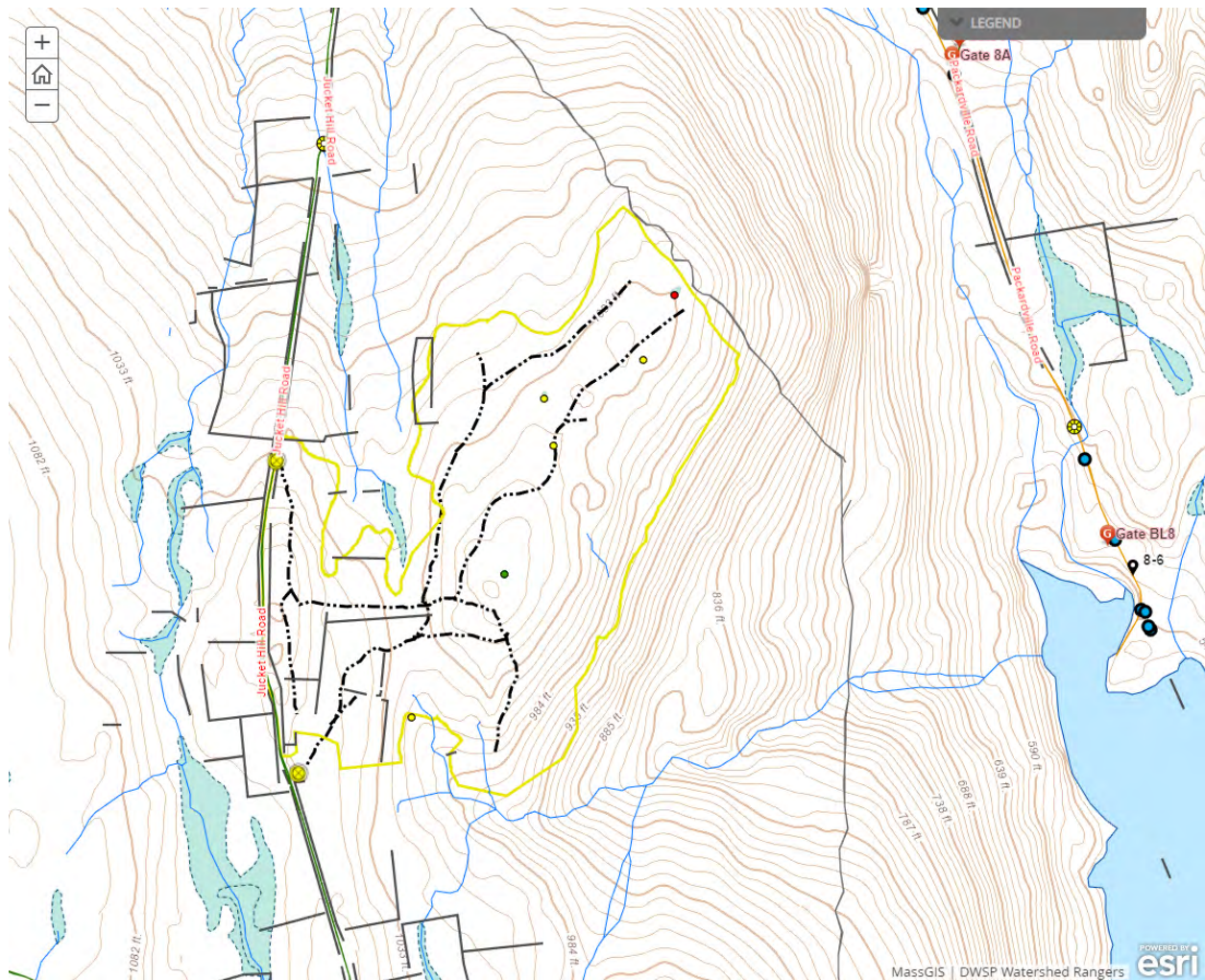
Feller/processor required: **No**

Steep slopes present: **No**

### Comments on harvesting limitations:

Whole tree harvesting will be required in the chestnut oak stand and in marked regeneration openings adjacent to the chestnut oak where prescribed fire is likely.



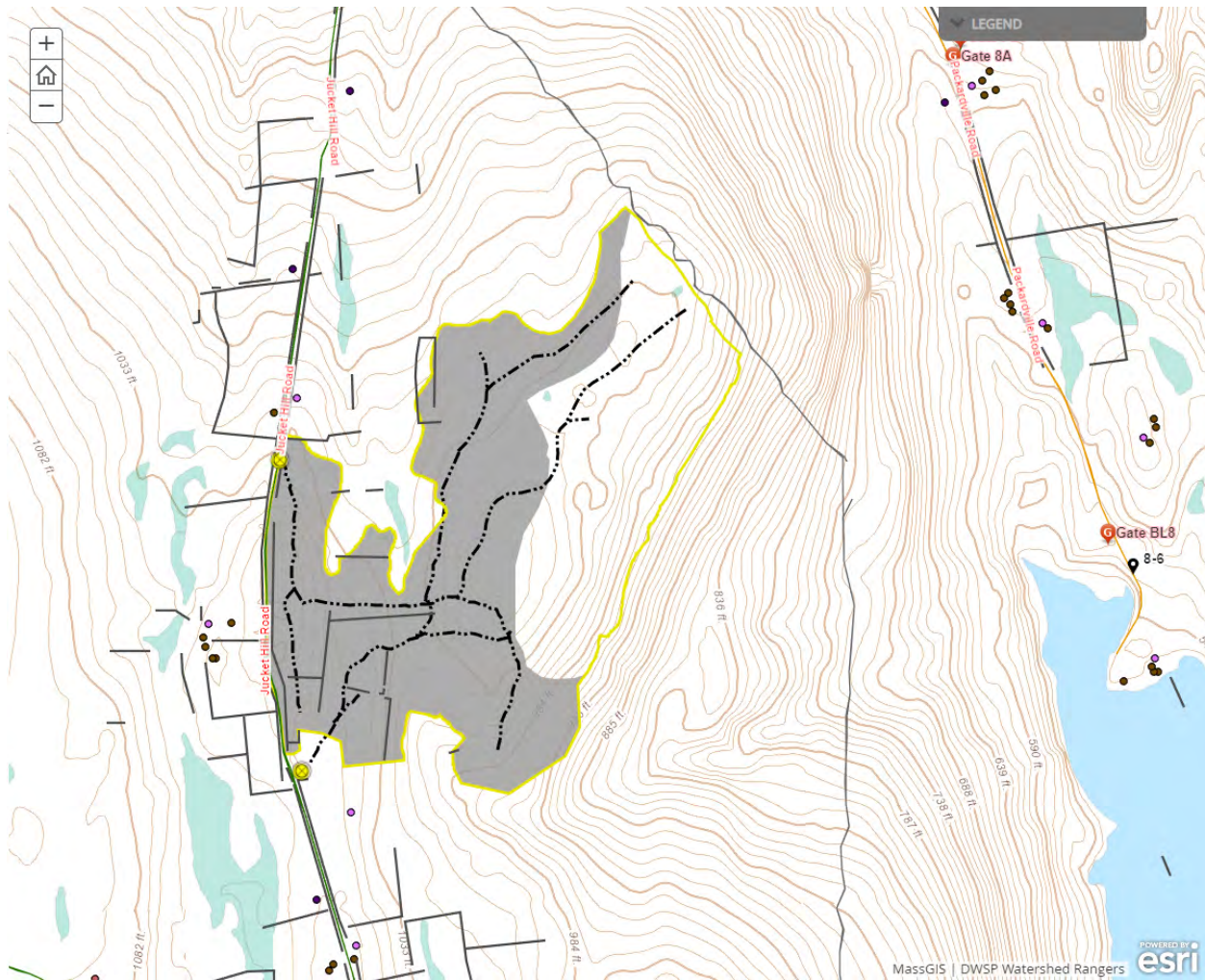


## Cultural Resources

### Comments on Cultural Resources:

Along Juckett Hill Rd the proposed area contains a foundation and there are walls throughout the roadside white pine stand, and the western portion of the white pine oak and white pine hardwood. Walls are conspicuously absent from the chestnut oak and white pine/oak stands of the southeasterly facing slopes, and the Quabbin Reservoir 'Taking Sheets' indicate that much of this area without stone walls was used as woodland. Much of the proposed area is described as 'woodland' in the Quabbin taking sheets.





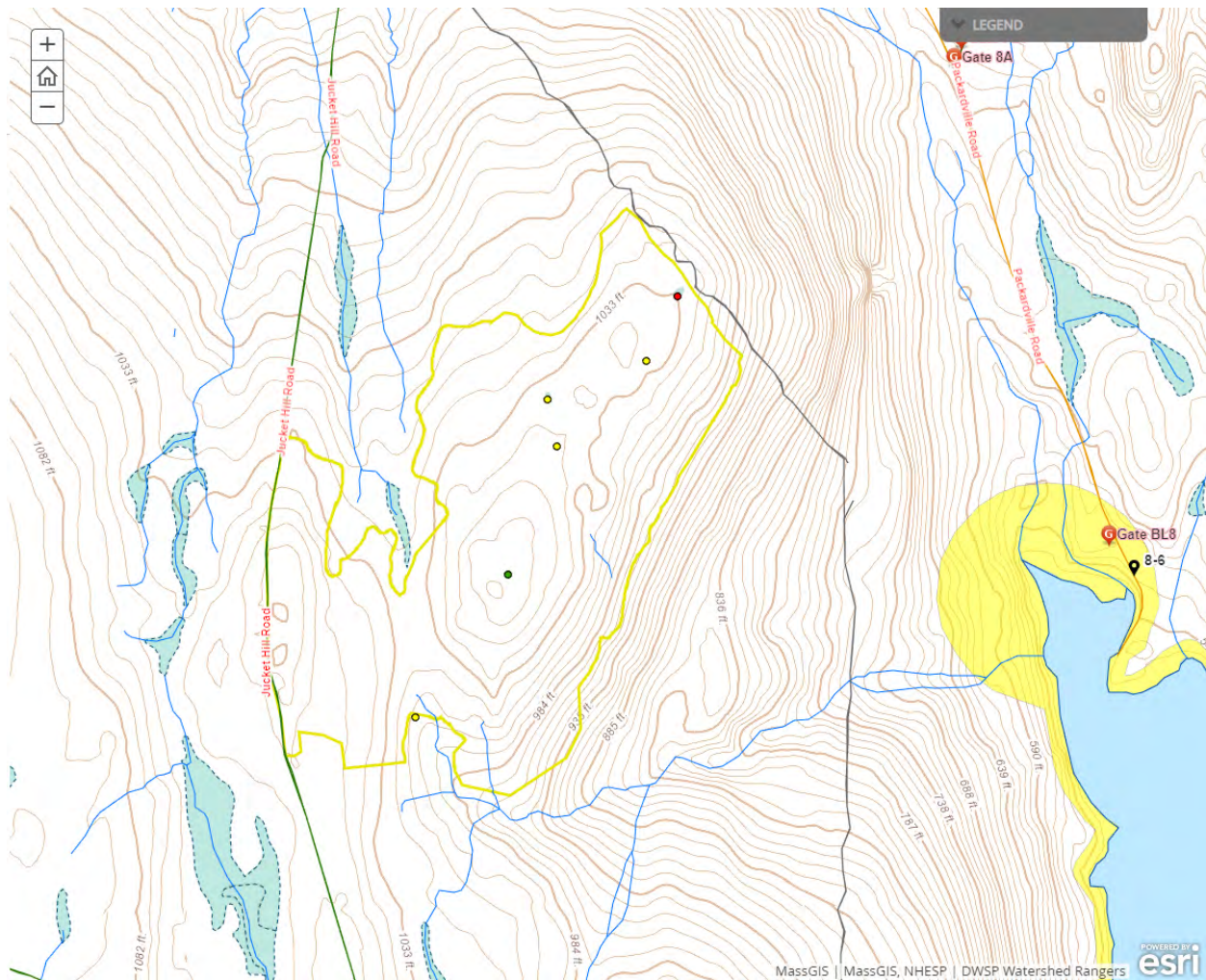
## Wildlife Resources & Rare and Endangered Species

### General Wildlife Comments:

Herbivore browse of woody plants is present, and the chestnut oak regeneration below browse height shows several years worth of browse and regrowth.

### Comments on Rare Species/Habitats:

The chestnut oak stand understory is mostly dominated by a blueberry/huckleberry heath community with pockets of dense mountain laurel. The chestnut oak/heath forest is a statewide rare habitat. Avoiding management at this site is likely to result in the loss of this habitat type as eastern white pine and red maple regeneration begin to dominate the site.

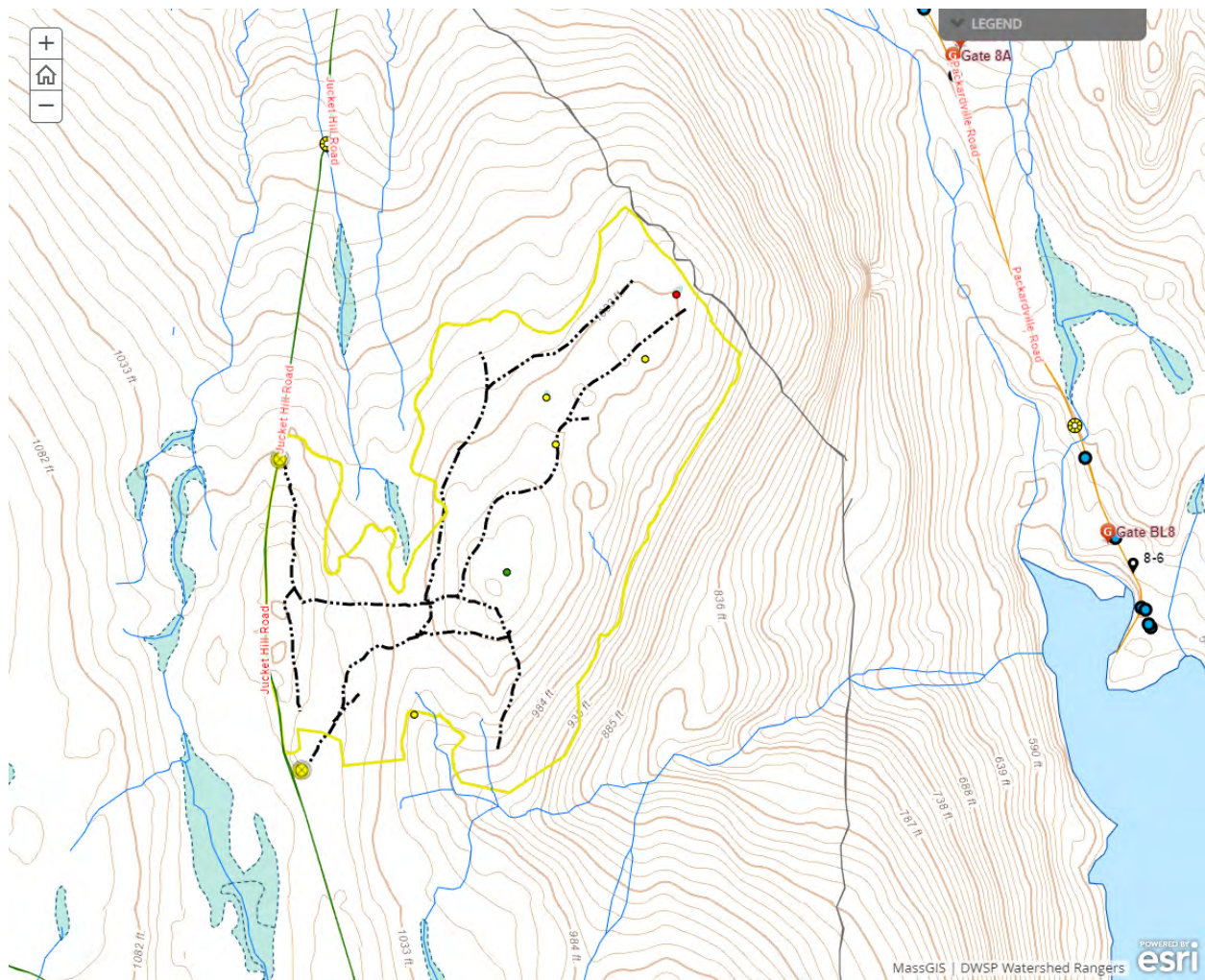


## Environmental Quality Engineering

### Comments on EQ Issues:

There are no planned stream crossings, and no perennial streams are present within the proposed area.





## Forest Access Engineering

**Gravel needed:** Yes

**Landing work needed:** Yes

**Culverts needed:** No

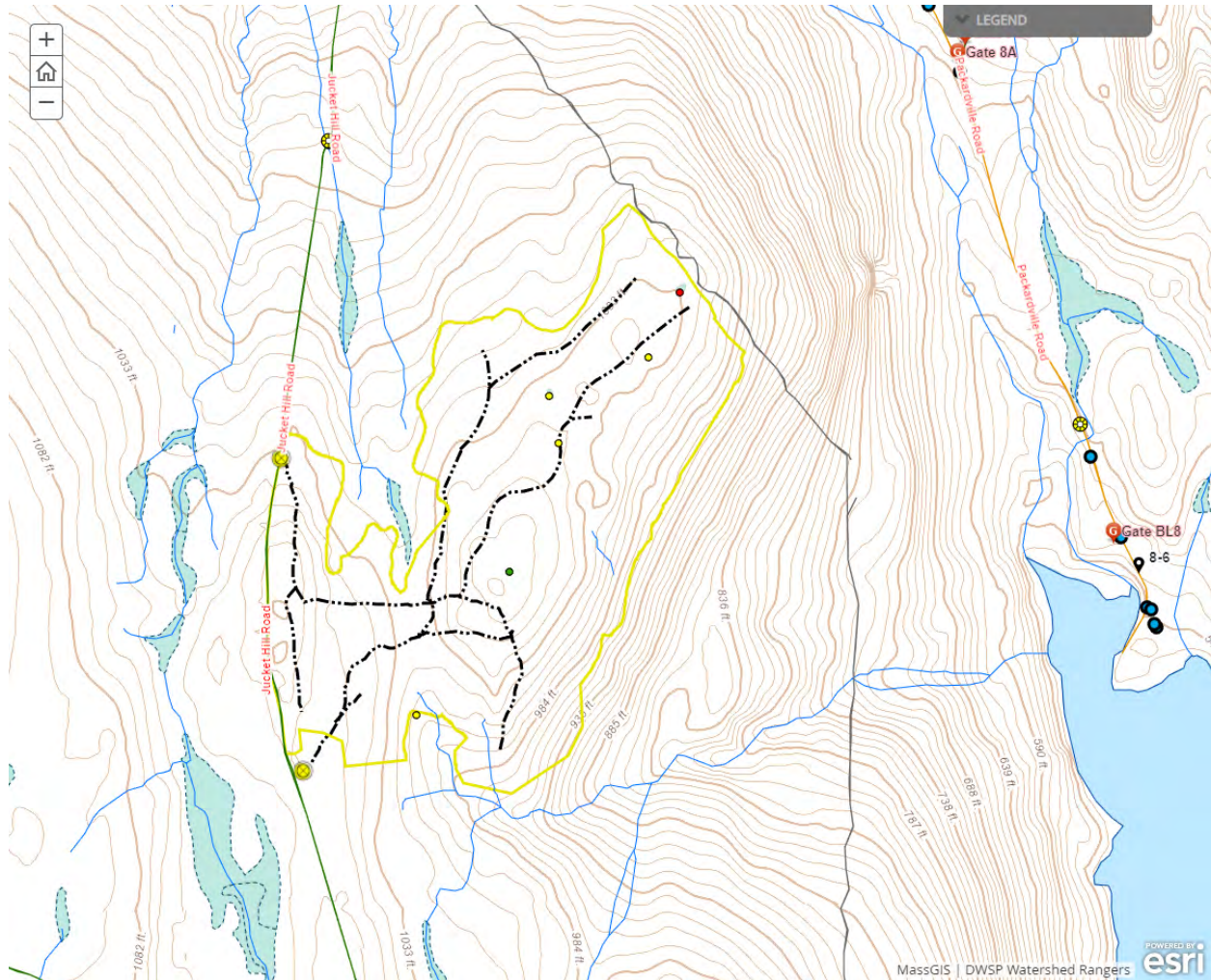
**Work needed on permanent bridges:** No

**Beaver issue:** No

**Further comment on access needs:**



Some landing work and gravel will be needed to allow enough space to accommodate whole tree harvest. Access will be needed for a tanker truck for prescribed fire crews. While the harvester will be required to maintain the existing skid road leading to the chestnut oak stand, some material may be needed in places to allow access of prescribed fire equipment.



## DWSP FY 2022 Forestry Proposals – Master Legend for story maps

