

NATURAL RESOURCES IMPACT ASSESSMENT UNDER 30 V.S.A 248(B)(5) GEORGIA MOUNTAIN COMMUNITY WIND PROJECT

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Prepared for:

Georgia Mountain Community Wind, LLC



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1.0 Introduction

Arrowwood Environmental, LLC (Arrowwood) was retained by Georgia Mountain Community Wind, LLC (GMCW) to assess the potential impacts of the Georgia Mountain Community Wind Project (The Project) upon water quality and the natural environment. Specifically, this report evaluates the Project's potential impacts on Outstanding Resource Waters, Headwaters, Floodways, Streams, Shorelines, Wetlands, Rare and Irreplaceable Areas (RINA), and Necessary Wildlife Habitat and Endangered Species.

The proposed Project site, depicted on Figure 1 of this report, is a $\frac{3}{4}$ mile section of ridgeline between 1320ft and 1420ft above sea level on the top of Georgia Mountain, southeast of Arrowhead Mountain Lake, in the towns of Milton and Georgia, Vermont. The Project would involve the construction of 3-5 megawatt-sized turbines producing approximately 7.5 to 12 megawatts of power.

In addition to the wind turbines themselves, this Project would include a new 34 kV electric collection line that will carry power from the transformers at the wind turbines to a point of interconnection at the Husky Injection Molding facility entrance along Milton town highway (TH-5) North Road. The collection line will be installed underground between the turbines along the ridgeline, and a 34.5 kV overhead electric collection line on 34-38' tall, single poles, spanning approximately 250' – 300', is planned to extend from the ridgeline to North Road, then approximately 1450 ft. along North Road to connect with the existing transmission line. The corridor for the collection line will follow existing ATV trails where possible to minimize clearing area. The turbines will be accessed from the south along Ted Road which will require an upgrade (expansion) to the road intersection with Westford Road to accommodate construction equipment. From the terminus of Ted Road, the access route will continue north to the turbines generally following an existing ATV trail. The ATV trail will be upgraded as needed to accommodate construction equipment.

The applicant has defined a clearing zone, depicted on the Assessment Map in Appendix 1, within which the proposed turbines, access road, and underground transmission corridor would be contained. At this time, turbine selection has not been finalized and therefore the final project design is not complete. The proposed clearing area overestimates the actual impacts but presents the location within which the Project will be contained. The environmental impact assessment provided in this report focuses on the defined clearing area. The boundaries of the natural resources inventory area (~710 acres) are shown on the attached Assessment Map.

As a component of the Resource Assessment, Arrowwood met with the Agency of Natural Resources on three occasions (3/27/08, 5/15/08 and 11/17/08) to discuss the scope of the Project and the resources at the Project site. Two of the meetings were conducted in the field.

Arrowwood also met in the field with the Army Corps of Engineers to discuss wetland and stream resources in the Project area.

2.0 Landscape Setting

The Project site is located in the towns of Milton and Georgia in Chittenden and Franklin Counties. The Project area occurs within the Champlain Valley biophysical region of the state. The area surrounding the Project is dominated by agricultural fields and wetlands in the low valley areas. This open landscape is interspersed with forested hills and low mountains. The bedrock geology of the area is dominated by Cheshire Quartzite, which is apparent in the many outcroppings on Georgia Mountain. The surficial geology at the lower elevations of the study area consists of glacial till. The higher elevations are mapped as areas dominated by bedrock outcrop.

3.0 Methodology

The natural resource characterization of the study area employed two techniques to identify and characterize resources within the Project area: landscape analysis of publicly available data and field survey results. The methodology is based on Arrowwood's past experiences assisting wind projects with resource assessment over the last several years.

3.1 Landscape Analysis

The landscape analysis represents the first step in identifying and characterizing the natural resources of a site. As part of this Phase, Arrowwood identified potential resource areas through a comprehensive review and interpretation of available paper and digital resource inventories, maps and photographs.

Information sources that were reviewed during the landscape analysis process include: 1:40,000 Color Infra-Red aerial photographs, 1:12,000 1941 black and white aerial photographs, 1990s Orthophotography (black and white), USDA NAIP 2003, U.S. Geological Survey (USGS) topographic maps, Vermont Hydrography Dataset stream layer, Natural Resources Conservation Service soil survey maps, bedrock and surficial geology maps, Vermont Significant Wetlands Inventory maps, Non-Game & Natural Heritage Program (NNHP) database, State of Vermont Deeryard data layer, Vermont Department of Fish and Wildlife bear points database, and the Vermont Department of Fish and Wildlife 1989 Black Bear Habitat in Vermont Map.

3.2 Field Survey

Subsequent to the completion of the remote landscape analysis, Arrowwood conducted a field survey of the Project area during the 2008 field season. A preliminary Project design was provided by Vermont Environmental Research Associates (VERA) in June 2008. A study area around this preliminary alignment was developed with the Vermont Agency of Natural

Resources personnel. A study area generally encompassing a ¼ mile radius from potential Project impacts was used for this inventory.

In order to identify and map resources within this study area, approximately 36 survey transects of 200' apart were established for the study area. Arrowwood ecologists walked the transect lines to identify and map natural resource areas in the field. Field data was brought into an ArcView GIS platform.

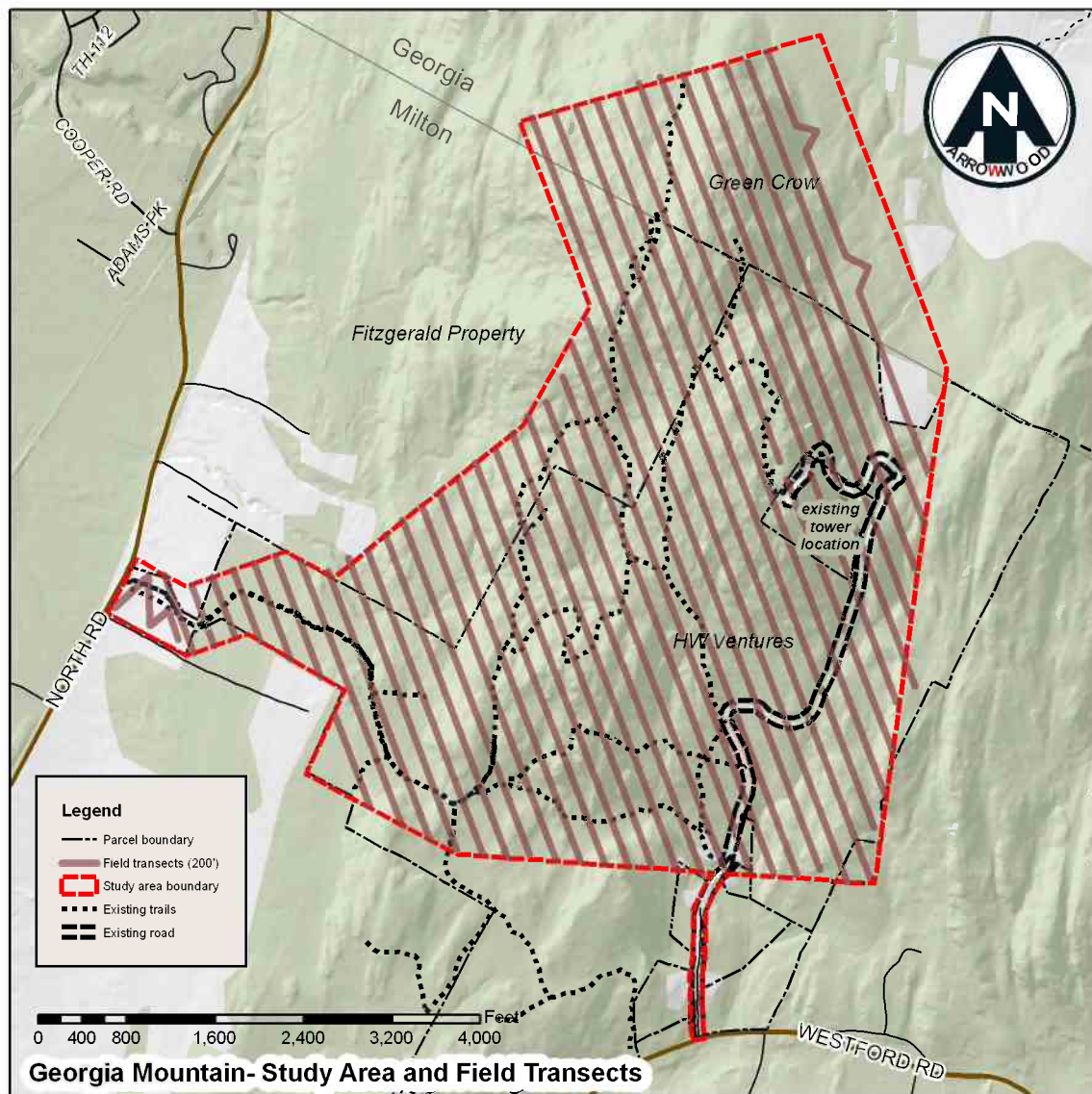


Figure 1. Georgia Mountain Study Area and Field Transects

3.2.1 Methodology for Identifying Rare and Irreplaceable Natural Areas (RINA)

The process for identifying RINA's begins with mapping natural community types. The Project field inventory for mapping natural communities focused on refining the natural community boundaries preliminary identified during the remote landscape analysis, classifying the natural communities, and assessing the current condition of those natural communities. Communities were only mapped within the study area even though in many cases their boundaries extend outside of the study area.

The assessment of each community included the identification of the dominant plant species by strata, information on soils, and an explanation of the development of the community, where appropriate. If a natural community is considered a "significant" natural community by the Vermont Nongame and Natural Heritage Program (NNHP), it may meet the criteria for a rare and irreplaceable natural area.

The NNHP has two different rankings for determining significance for a natural community: a State rank (S-rank) and an Element Occurrence rank (EO-rank). The S-rank of a community is based solely on its rarity in the state. The definition of each of these S-ranks is detailed below:

- S1: Indicates that the community is extremely rare in the state with less than five high quality occurrences known
- S2: Indicates that the community is very rare in the state occurring only at a small number of sites or occupying a small area of land in the state
- S3: Indicates that high quality examples of this community type are uncommon, but not rare in the state
- S4: Indicates that the community is widespread in the state, but the number of high quality examples is low, or the total acreage occupied by the type is relatively small
- S5: Indicates that the community is common and widespread in the state and there are many high quality examples

The Element Occurrence (EO) rank is a rank that is assigned to each individual occurrence of a mapped natural community and is independent of the S-rank. This A (excellent) – D (poor) rank is an overall rank of the quality of the site and is based on the condition, size and landscape context of the occurrence. Since EO ranks are based on site-specific factors, only those occurrences that have received a field visit can be ranked.

According to NNHP guidelines (Vermont ANR, 2004), typically only a subset of sites that are considered state significant using the criteria above will be considered "rare or irreplaceable natural areas" for projects under Act 250 (or Section 248) review. In general, the S1 and S2 communities in the list above will meet the standard for rare or irreplaceable natural areas. The more common community types (S3, S4, S5) will need to exhibit "exceptional characteristics" for the Agency to consider them rare or irreplaceable natural areas. These exceptional

characteristics include the presence of old growth or communities that are very large and unfragmented.

These methodologies for determining rankings and significance for natural communities were employed when evaluating and assessing communities as part of this environmental review. Ultimately, the final ranking of a natural community occurrence is based on a decision by NNHP personnel. To this end, a meeting with NNHP personnel was held where the natural communities were reviewed and EO ranks were assigned.

3.2.2 Methodology for Rare, Threatened and Endangered Species Survey

A field inventory for rare, threatened and endangered species was undertaken for proposed impact areas within the study area. The proposed access road, turbine locations and transmission line corridor as well as a 50' buffer around these proposed impacts was inventoried. Field visits to conduct these inventories took place throughout the 2008 field season while transects were being walked. Dedicated searches within impact areas also took place in August and September of 2008.

3.2.3 Methodology for Wetland Delineations

The Army Corps of Engineers 1987 Manual was employed for formal wetland delineations for wetlands with direct project impacts or wetlands within 50' of proposed project impacts. Projects falling outside of this range were informally delineated employing modified delineation protocols and best professional judgment. Point survey via submeter GPS was conducted of boundaries of wetlands with direct impacts or wetlands within 50' of proposed impacts. Wetlands falling outside of this range were line surveyed via GPS.

3.2.4 Methodology for Mapping Streams and Headwaters

Stream center points occurring along the survey transect were point surveyed via GPS. This data is used in conjunction with topographic data (in this case 2' contours derived from the 2004 Chittenden County Metropolitan Planning Organization LIDAR dataset, available from the Vermont Center of Geographic Information) to map stream courses in the Project area.

3.2.5 Methodology for Wildlife Habitat Survey

The survey of wildlife habitat involved identification and assessment of specific habitat types including deer and moose wintering habitat, black bear habitat, Bicknell's Thrush habitat, vernal pools, and ledge/cliff/talus habitat. In addition, observations regarding other species, their sign, and their presence were also recorded and mapped. For deer wintering habitat, conifer stands were investigated throughout the study area. A combination of winter scat, winter browse, and canopy cover were used to assess over wintering potential. Concentrated deer winter use was assessed and mapped. For black bear habitat, bear scarred trees, bear nests, bear digging (beechnuts/acorns) activity, bear tracks, bark marking signs, and bear scat were identified and mapped. Moose wintering habitat is similar to deer wintering habitat except that it occurs at higher elevations. As with deer, winter scat, browse and canopy cover

are assessed but at elevations typically over 2000 feet. Because the Project area does not exceed 1500 feet in elevation, no moose wintering habitat was expected. When sign was identified in an area, a more thorough search for additional sign was conducted. For ledge/cliff/talus, sites were point surveyed via GPS and investigated for denning and other use by various wildlife.

4.0 Summary of Conclusions

4.1 Criterion 8: Rare or Irreplaceable Natural Areas

As outlined in Section 5.1, there are five different significant natural communities identified within the Project study area. Using ANR guidelines, however, none of these communities is considered a Rare or Irreplaceable Natural Area (RINA). No Rare or Irreplaceable Natural Areas are present within the Project study area. The Project as proposed will therefore have no impact on any Rare or Irreplaceable Natural Areas.

4.2 Criterion 8(A): Wildlife Habitat and Endangered Species

As outlined in Section 5.2 the Project study area contains several habitats utilized by wildlife. However, none of the impacted habitats are protected or recognized as “necessary wildlife habitat” by the Vermont Fish and Wildlife Department, or by definitions used by the Act 250 Environmental Board. The Project as proposed will therefore not destroy or significantly imperil any necessary wildlife habitat.

As outlined in Section 5.3, rare species inventories yielded no occurrences of any rare, threatened or endangered species within the Project study area. The Project as proposed will therefore have no impact on any rare, threatened or endangered species.

4.3 Criterion 1(G): Wetlands

As outlined in Section 5.4, there are no Class I and one Class II wetland [Wetland #36] in the Project study area. The Project as proposed will not impact the Class II wetland. The Project as proposed will therefore have no impact on Class I or Class II wetlands.

4.4 Criterion 1(D): Floodways

As outlined in Section 5.5.1, there are no floodways within the Project study area. The Project as proposed will therefore have no impact on floodways.

4.5 Criterion 1 (F): Shorelines

As outlined in Section 5.5.1, there are no shorelines in the Project study area. The Project as proposed will therefore have no impact on shorelines.

4.6 Criterion 1(A): Headwaters

As outlined in Section 5.5.4, the proposed Project will not result in the reduction of water quality of ground or surface waters flowing through the Project area. The Project as proposed will have no adverse impacts on headwaters.

4.7 Criterion 1(E): Streams

As outlined in Section 5.5.2, the proposed Project involves a total of two stream crossings. The crossing at Ted Road will be accomplished via the existing roadway with no impacts to the stream. Swamp mats should be utilized to cross the ephemeral stream contained within the Class III wetland, Wetland #15, to avoid any adverse impacts to this wetland and stream from construction activities.

4.8 Outstanding Resource Waters

As outlined in Section 5.5.3, there are no outstanding resource waters in the Project area. The proposed Project will have no impacts on outstanding resource waters.

5.0 Natural Resource Assessments

5.1 Rare or Irreplaceable Natural Areas (RINA)

Criterion 8 of Act 250 provides that a permit will be granted if it can be demonstrated that there is no undue adverse impact on rare or irreplaceable natural areas (RINA). No Rare or Irreplaceable Natural Areas are present within the Project study area. The Project as proposed will therefore have no impact on any Rare or Irreplaceable Natural Areas.

Five different upland communities were mapped within the study area: Northern Hardwood forests, White Pine-Red Oak-Black Oak Forests, Mesic Red Oak-Northern Hardwood Forests, Dry Oak Hickory Hophornbeam Forests and Hemlock Forests. These forested natural communities are based on the classifications presented in Wetland, Woodland and Wildland (Thompson and Sorenson, 2000). The National Vegetation Classification (Grossman et. al. 1998) was also used to clarify distinctions between communities.

The potential impacts of the proposed Project on upland natural communities present within the study area are presented in summary form in Table 1.

Table 1. Proposed Impacts to Natural Communities within the Study Area.

Natural Community	Total Acreage in Study Area	Acreage of Proposed Impacts ¹
Northern Hardwood Forest	143 ²	7.6
Mesic Red Oak-Northern Hardwood Forest	519 ³	27.8
Hemlock Forest	37.5	Impacts Avoided
Dry Oak-Hickory-Hophornbeam Forest	38.5	0.45
White Pine-Red Oak-Black Oak Forest	8.6	Impacts Avoided
	Total Proposed Impacts	35.9 acres

¹ Impact areas include turbine locations, access road and transmission corridor.

² The Northern Hardwood Forest likely extends outside the study area to include another 1500 acres of forest. This forest outside of the study area was not assessed.

³ The Mesic Red Oak-Northern Hardwood Forest likely extends outside of the study area to include an additional forest of approximately 170 acres in size. The forest outside of the study area was not assessed.

The following section describes the upland natural communities at the Project site.

5.1.1 Northern Hardwood Forest

The presence of this community in the northern part of the Project study area corresponds with the northern facing slopes of Georgia Mountain. As is discussed below, the forests with a more dominant oak component are relegated mainly to the slopes with a southern aspect. But on these northern and eastern slopes, the Northern Hardwood Forest community predominates. This occurrence appears to be sandwiched in between the drier Mesic Red Oak-Northern Hardwood Forests to the south and the more enriched Rich Northern Hardwood Forest on the lower slopes to the north. The canopy in this forest is dominated by sugar maple (*Acer saccharum*), black cherry (*Prunus serotina*), American ash (*Fraxinus americana*), and yellow birch (*Betula alleghaniensis*). Northern red oak (*Quercus rubra*) is found occasionally in this community, but in isolated dry pockets, not typically as a canopy co-dominant. Due to recent logging in this forest, the canopy is fairly open, ranging from 50-80%. This open canopy has resulted in a lot of shrub growth. Red raspberry (*Rubus idaeus*), striped maple (*Acer pensylvanicum*) and various canopy species are common in this layer. Common herbs include wild sarsaparilla (*Aralia nudicaulis*), acuminate aster (*Aster acuminatus*), and Evergreen Woodfern (*Dryopteris intermedia*). There are localized areas of enriched conditions with herbs such as blue cohosh (*Caulophyllum thalictroides*) and herb robert (*Geranium robertianum*). These enriched areas may be more common in areas lower on the mountain slope.

This forest is fairly variable in terms of moisture and nutrient availability. Some steeper areas are drier while the bases of slopes tend to be moister and richer. Surficial rocks are common in some areas. Soils are loams and fine sandy loams with depth varying from 10-20 inches over un-weathered bedrock.



Figure 2. Northern Hardwood Forest in the Northern Part of the Study Area

Community Rank

These forests are considered to be S5 communities in Vermont, which indicates that they are common and “demonstrably secure” in the state. The occurrence of this community mapped within the study area is approximately 140 acres in size. To the north, it appears that this community grades into a Rich Northern Hardwood Forest as described by Engstrom and Lapin (1998). It appears that the Northern Hardwood Forest mapped within the study area is connected to a much larger Northern Hardwood Forest to the east. Though they have not been assessed as part of this inventory, these forests together consist of greater than 1500 acres.

The NNHP has given this forest as a whole an EO-rank of A, making it a state significant natural community. Since only a small portion of this community was assessed during the current inventory, however, only this portion can be commented upon in the present report. As mentioned above, the area inventoried is actively managed for timber production. In winter of 2007 this area underwent selective harvest and is being converted to an un-even aged stand to enhance the production and regeneration of desirable hardwood species. There were no areas of old growth or other ecologically unique features within the study area. This community does not, therefore, appear to meet the criteria for a rare or irreplaceable natural area designation.

As proposed, the Project would permanently impact approximately 7.6 acres of this 1500 acre natural community. These proposed impacts are shown on the attached map. These impacts would result from the placement of 1-2 turbines and a portion of the access road within this Northern Hardwood Forest. Though permanent, these impacts occur on the edge of this large community and affect only 0.5% of its total area.

5.1.2 Mesic Red Oak Northern Hardwood Forest

The Mesic Red Oak-Northern Hardwood forest community is generally found as large patch communities on the landscape. In some cases, it can form a matrix community. These are the dominant, “background” forests that occupy the main southern slopes of Georgia Mountain within the Project study area. As with the Northern Hardwood Forests, there is a fair amount of variability within this community. The more mesic (moist) areas have much less oak and look more like the Northern Hardwood Forests but with scattered red oak trees. Indeed, the lower elevation region of this forest is mixed with areas of Northern Hardwood Forest. These inclusions which lack oak, however, were difficult to map out of the surrounding Mesic Red Oak-Northern Hardwood Forest and so were included as part of it.

At the other extreme, drier areas within this forest occur on sites with shallow bedrock or frequent bedrock outcrops. These occur on slightly steeper southern slopes and small knolls. These areas grade into the drier natural community types like the Sugar Maple Hophornbeam and Dry Oak-Hickory Hophornbeam forests, some of which were large enough to map.

The natural history of the Georgia Mountain area has included both agricultural and forest management activities. According to aerial photographs from the early 1940’s, the southern slopes of Georgia Mountain below roughly 1100 feet were used as pasture. Some areas were also agricultural fields under cultivation. These former agricultural areas are dominated by young, pole-sized trees. Pioneer species such as red maple (*Acer rubrum*), gray birch (*Betula populifolia*), and white pine (*Pinus strobus*) are present along with the red oak, sugar maple and American beech. Above 1100 feet was a forest canopy, though the extent of grazing beneath that forest canopy at that time is unknown. It also appears from the photos that selective logging had recently occurred in the saddle between the two peaks of Georgia Mountain.

The canopy of the Mesic Red Oak-Northern Hardwood Forest is dominated by a mixture of northern red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), and American beech (*Fagus grandifolia*). More Mesic sites also have black cherry (*Prunus serotina*) and American ash (*Fraxinus americana*), whereas hop hornbeam (*Ostrya virginiana*) is more common in the drier sites. Hobblebush (*Viburnum lantanoides*) is a common short shrub in these forests, sometimes becoming very dense. The herbaceous layer is fairly variable depending on the site but throughout seems to be rather sparse. Common herbs include wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), and evergreen woodfern (*Dryopteris intermedia*). On the slightly drier sites, Pennsylvania sedge (*Carex pensylvanica*) is also common.

Soils in this community are loams and silt loams with depth varying depending on the local site conditions. These variations in soil depth often drive the variation seen in the vegetation as described above. In more mesic areas, soils can reach 20 inches deep, whereas in the drier areas, typical depth is around 8-10 inches. This forest has seen a fair amount of active management in recent years. A 24 acre clearcut from 1996 is present in the south end of the study area. Selective logging has also occurred in other areas throughout the study area. In addition, ATV traffic on various ATV trails and old logging roads is fairly common in this and the other natural communities on Georgia Mountain.



Figure 3. Mesic Red Oak-Northern Hardwood Forest

Community Rank

These communities are ranked S4, which indicates that they are fairly common and “apparently secure” in the state. The occurrence of this community within the study area is approximately 500 acres. This occurrence likely continues to the east and west along the steeper south-facing slopes. The EO-rank of this community has been determined to be a B. According to NNHP guidelines (see Section 3) this combination of ranks makes this occurrence a state significant natural community. However, in order for this to be considered a rare or irreplaceable natural area, it must have “exceptional characteristics”.

The current condition of this forest has been given a sub-rank of B. This B-rank is the result of the management history. As mentioned above, this forest has seen a fairly active management regime in recent years. Even though these impacts are temporary, they have affected the condition rank. In addition, the numerous ATV trails, snowmobile trails, logging roads and cell tower access road that criss-cross this community have also affected the condition rank.

No signs of old growth or other ecologically important areas with “exceptional characteristics” were discovered during the field work. For these reasons, it is our opinion that this community should not be considered a rare or irreplaceable natural area.

As proposed, there are approximately 28 acres of impacts in this community. The location of these proposed impacts are shown on the attached map. As mentioned above, the Mesic Red Oak-Northern Hardwood Forest is a fairly common community type in the state. Both Arrowwood Environmental and NNHP (Vermont ANR 2001) consider common community types to be less of a conservation priority than the uncommon types. Arrowwood Environmental therefore worked with the project designer to minimize impacts to the uncommon community types in the Project study area. This, however, resulted in most of the impacts to occur within this Mesic Red Oak-Northern Hardwood Forest community.

5.1.3 Hemlock Forest

The Hemlock Forest community can be found in many parts of the state on steep ravines, lower mountain slopes and on the summits of lower elevation knolls. There are two occurrences of this conifer dominated community within the study area, together comprising about 40 acres. The occurrence in the southeastern part of the study area is a narrow band of hemlock on a very steep west-facing slope. The western occurrence sits on gentler, south facing slopes. Both are dominated by a canopy of hemlock (*Tsuga canadensis*) trees. Yellow birch (*Betula alleghaniensis*) and red maple (*Acer rubrum*) are also found in the canopy but don't become dominant. White pine (*Pinus strobus*), on the other hand, becomes co-dominant in some areas, especially the southern part of the western occurrence. Canopy cover is typically dense, ranging from 70-100% and tree height is approximately 50-60 feet. The shrub and herbaceous layers are rather sparse. Occasional hobblebush (*Viburnum lantanoides*) and yellow birch shrubs are found, while the herbaceous layer is composed of scattered marginal wood fern (*Dryopteris marginalis*), common wood-sorrel (*Oxalis acetosella*) and goldthread (*Coptis trifolia*). Surficial rocks as well as bedrock outcrops are common and the loamy soils are fairly shallow. The example in the southeastern part of the study area also has small cliff and ledge faces scattered throughout this community.



Figure 4. Hemlock Forest

Community Rank

The Hemlock Forest natural community is a S4- ranked community, which indicates that they are fairly common and “apparently secure” in the state. Following NNHP guidelines the two occurrences mapped in the study area are considered separate elements because of their distance from each other (greater than 0.5 miles). NNHP has given the smaller Hemlock Forest mapped in the southeast corner of the study area an overall EO-rank of B. The larger Hemlock Forest in the western end of the study area is also a B-ranked community. As mentioned above, a B-ranked example of an S4 community indicates that the site is state significant. In order to qualify as a rare or irreplaceable natural area, however, it needs to exhibit exceptional characteristics. Like other forests on this property, this community has an active management history. Areas of selective logging are present in the southern part of this community. No old growth or other exceptional areas were discovered during the inventory. This community should not, in our opinion, be considered a rare or irreplaceable natural area.

There are no impacts proposed in this community. The closest impact to this community is a transmission line corridor which occurs near the southern end of this Hemlock Forest.

5.1.4 Dry Oak Hickory Hophornbeam Forest

This natural community occurs in the study area primarily on the summit and southern slopes of Georgia Mountain. As the name states, these are “dry” communities. The loamy soils are shallow and well to rapidly drained. Bedrock outcrops are common throughout these forests. These factors combined with their southern slopes yields a community that has affinities with more southern forests.

There are two different varieties of this community shown on the attached map: the standard Dry Oak-Hickory-Hophornbeam Forest and a slightly richer variant called a Sugar Maple-Hophornbeam Forest. The standard Dry Oak-Hickory-Hophornbeam Forest is dominated by northern red oak (*Quercus rubra*), red maple (*Acer rubrum*) and American beech (*Fagus grandifolia*). Canopy cover ranges from 50-90% and tree height from 30-60 feet. In areas that are drier and have more bedrock outcrops, both canopy cover and tree height are at the lower ends of those ranges. There is a moderate sub-canopy cover composed of muscledwood (*Carpinus caroliniana*), hop hornbeam (*Ostrya virginiana*) and the various canopy species. The shrub layers are dominated by canopy and sub-canopy species as well as maple-leaved viburnum (*Viburnum acerifolium*), lower lowbush blueberry (*Vaccinium angustifolium*), striped maple (*Acer pensylvanicum*), and shadbush (*Amelanchier sp.*). The herbaceous layer is sparse to moderate with cover values ranging from 20-60%. As with the canopy layer, the herbaceous layer tends to be sparser in areas dominated by bedrock outcrops. Common species include acuminate aster (*Aster acuminatus*), Canada mayflower (*Maianthemum canadense*), Pennsylvania sedge (*Carex pensylvanica*) and common bellwort (*Uvularia sessilifolia*).

Three small occurrences of Sugar Maple Hophornbeam Forests are mapped in the study area. These are sites surrounded by the Mesic Red Oak-Northern Hardwood Forest but occur on knolls and areas of shallow soil resulting in drier conditions. These sites resemble the Dry Oak-Hickory-Hophornbeam Forests described above but tend to be a little more mesic (moist) and slightly calcareous. This results in the oaks being replaced by species such as Sugar Maple (*Acer saccharum*) and American Beech (*Fagus grandifolia*). In some areas, these sites are richer and more diverse, resembling the Mesic Maple-Ash-Hickory-Oak Forest.



Figure 5. Dry Oak Hickory Hophornbeam Forest

Community Rank

The Dry Oak-Hickory-Hophornbeam Forest (and its variant) is ranked as an S3 natural community. This indicates that “high quality examples are uncommon in the state, but not rare.” (Thompson and Sorenson, 2000). Because all of these sites are relatively close to each other, they are all considered the same “occurrence” for ranking purposes. The NNHP has assigned these sites an EO-rank of B. This B-ranked example of an S3 community indicates that these sites are state significant natural communities. In order to qualify as a rare or irreplaceable natural area, this site needs to exhibit exceptional characteristics. Active forest management has been a part of this forest for at least a decade (see below) and no exceptional characteristics such as areas of old growth were found during the field inventory. While totaling approximately 40 acres, these sites are not considered “A-ranked” for size and therefore not likely large enough to warrant the rare or irreplaceable natural area designation.

Even though this community is not, in our opinion, a rare or irreplaceable natural area, the NNHP considers this site to be a significant natural community. With this in mind, Arrowwood Environmental has worked with the Project designers to minimize the impacts to this community, both in regards to access roads and tower clearing areas. As can be seen from Table 2, of the 38.5 acres of this community that exists within the study area, less than ½ acre will be impacted by this Project. The majority of the impacts will occur in a small 0.4 acre patch of a Sugar Maple Hophornbeam community along the summit ridgeline. While unfortunate, this impact could not be avoided due to tower placement. However, the largest example of this community within the study area is impacted only on the margins of the community (less than .03 acres). This configuration of impact retains the majority of this large, 19 acre forest and leaves this stand un-fragmented.

5.1.5 White Pine-Red Oak-Black Oak Forest

There are two occurrences of this community which have been mapped within the Project study area. The largest occurrence sits on the southern slope of the Georgia Mountain summit. There is also a small, 1 acre stand of this community in the southeastern corner of the study area. Both of these occurrences are fairly similar to the Dry Oak-Hickory-Hophornbeam Forest described above but occupy the drier areas with shallower soils and more frequent bedrock outcrops. Floristically, they can be distinguished by the presence of occasional white pine (*Pinus strobus*) and red pine (*Pinus resinosa*) in the canopy of the White Pine-Red Oak-Black Oak Forest. The presence of these species potentially suggests a historic fire regime in this forest. Lower lowbush blueberry (*Vaccinium angustifolium*) shrubs are more common in this community than in the Dry Oak-Hickory-Hophornbeam Forest. The herbaceous layer is also similar, but bracken (*Pteridium aquilinum*), common hairgrass (*Deschampsia flexuosa*) and common oatgrass (*Danthonia spicata*) are more common. In some areas (especially on the summit) where pine is less abundant these forests resemble the Dry Oak Forest community. The occurrence of hardwoods such as red maple and beech along with the white pine component, however, warrant their classification as White Pine-Red Oak-Black Oak Forest.

Like the Dry Oak-Hickory-Hophornbeam Forest, the soils in this community are shallow loams, rarely reaching depths greater than 10 inches. Bedrock outcrops are frequent, however, resulting in many areas where 3"-7" of soil is the norm. These sites are excessively to somewhat excessively drained and can be droughty during the summer months. As mentioned above, it is likely that fire historically played a role in the development of this community.



Figure 6. White Pine-Red Oak-Black Oak Forest

Community Rank

The White Pine-Red Oak-Black Oak Forest community is an S3 ranked community in Vermont. Using NNHP ranking guidelines, these two occurrences are considered a single “element” and receive the same EO rank. The NNHP has ranked these sites as B-ranked communities and as such the site is considered by NNHP as a significant natural community. However, one factor that has affected the condition rank of the largest example of this community is the presence of the cell tower and cell tower access road. This development cuts through the center of the community and fragments the stand to some degree. This community should not, in our opinion, be considered a rare or irreplaceable natural area.

Since this community is an S3 natural community and therefore considered uncommon, Arrowwood Environmental worked with Project designers to keep impacts out of this community and in the more common community types (mainly the Mesic Red Oak-Northern Hardwood Forest). Direct impacts to this community have therefore been avoided. As shown on the attached map, the proposed impacts from the turbine clearing are, at its closest, approximately 50 feet to the western boundary of this community.

5.1.6 Previously Existing Natural Community Map

In 1998, an ecological inventory of the Arrowhead Lake vicinity was conducted for Husky Injection Molding Systems (Engstrom and Lapin, 1998). This inventory was used to inform the current mapping and assessment process. Natural community boundaries were roughly delineated as part of this 1998 report and are part of the existing NNHP database. The NNHP has records for five different natural communities within or near the study area. The current natural community map detailed in this report is meant to supersede the existing NNHP data. The existing NNHP occurrences are shown in the table below along with notes on their presence based on the current inventory.

Table 2. A Comparison of the Existing NNHP Data and the Natural Community Map from the Current Inventory

Natural Community	Existing NNHP Data	Current Inventory
Dry Oak-Hickory-Hophornbeam Forest	Mapped on knoll northwest of Georgia Mountain summit.	Occurrence mapped by NNHP outside of study area. Five other occurrences mapped within study area.
Mesic Red Oak-Northern Hardwood Forest	Mapped on the western slope of Georgia Mountain and as background natural community below summit.	Mapped as the matrix forest within the study area.
Rich Northern Hardwood Forest	Mapped on the north and northeast slopes of Georgia Mountain	Mapped as Northern Hardwood Forest within the study area. Most of the Rich Northern Hardwood Forest likely occurs north of the study area.
Dry Oak Forest	Mapped on the southern slopes of the southern summit of Georgia Mountain	This community is subsumed within the White Pine-Red Oak-Black Oak Forest mapped at this location.
White Pine-Red Oak-Black Oak Forest	Extent and location unclear.	Two occurrences mapped: one on the southeastern slope of Georgia Mountain and another in the southeastern corner of the study area.
Hemlock Forest	Not mapped by NNHP	Two occurrences mapped in study area.

5.2 Necessary Wildlife Habitat

Criterion 8(A) of Act 250 also provides that a permit will not be granted if it is demonstrated that the project will “destroy or significantly imperil necessary wildlife habitat.” The Act 250 criterion for wildlife habitat defines “necessary wildlife habitat” as “concentrated habitat which is identifiable and is demonstrated as being decisive to the survival of a species of wildlife at any period in its life, including breeding and migratory periods” (10 V.S.A. Section 6001(12)). The following section discusses wildlife habitat as identified and characterized during the landscape analysis and field survey. The Project study area contains several habitats utilized by wildlife. However, none of the impacted habitats are protected or recognized as “necessary wildlife habitat” by the Vermont Fish and Wildlife Department, or by definitions used by the Act 250 Environmental Board. The Project as proposed will therefore not destroy or significantly imperil any necessary wildlife habitat.

5.2.1 General Wildlife Habitat

The Project area is dominated by hardwood forests, a variety of wetlands and some coniferous forest cover. The topography is hilly to steep and ranges in elevation from 700 feet to 1400 feet elevation. All-terrain vehicle trails are present throughout the entire site and are heavily utilized on all days of the week. Log truck and skidder tracks can also be found throughout much of the area. Several deer hunting stands are located on the properties. The forest communities range from the shrub and sapling-dominated, early successional heavily cut eastern slopes of Georgia Mountain to some older more mature oak dominated forests on south slopes.

Wildlife of the area reflects the relatively low elevations at this site. White-tailed deer are common throughout the area, while moose and moose sign was much more limited. The young forest habitat provides ample food and cover for the abundant ruffed grouse observed throughout the Project area. Sign of the eastern turkey was observed within the Project area. The forest, wetlands, ledge, and riparian forests provide habitat for raccoon, weasels, bobcat, coyote and fox. Scat or track of these species was found during the inventory. The beaver-influenced wetlands harbor waterfowl, beavers, and potentially river otter, mink, and muskrat (although no direct evidence of these species was observed). Amphibians such as frogs, toads and a variety of salamanders as well as reptiles such as snakes and turtles are also likely found at and near the site's wetlands. Small mammals such as mice, voles, shrews, and moles are likely inhabitants as well.

Songbirds typical of hardwood, conifer and mixed forests, forested riparian habitat, and forested wetlands are likely to reside and breed within the Project area. There is no high elevation spruce-fir habitat that could provide breeding habitat for Bicknell's thrush or other high elevation songbirds.

5.2.2 White-tailed Deer Habitat

White-tailed deer use is fairly common throughout the Project area on Georgia Mountain. Summer scat and plant browse is scattered throughout and occasionally concentrated in areas with low-lying available browse. The Project area contains two natural communities that offer deer over-wintering habitat.

The first potential winter deer habitat is a Hemlock Forest community located along the southeastern Project boundary (wildlife habitat #1 on attached map). This steep hemlock forest has very low evidence of deer use. Deer browse and scat levels were as light as the surrounding hardwood matrix forest. This forest community is located over 1000 feet from any proposed activities and is not important deer habitat.

The second potential deeryard (wildlife habitat #2 on attached map) is located near the western Project boundary and consists of an eastern hemlock and white pine forest. This potential deeryard is also found on the Vermont Fish and Wildlife's digital deeryard layer. Field observations confirm the presence of deer winter scat, moderate amounts of woody browse, and the presence (in pockets at least) of sufficient coniferous canopy cover to provide overhead

protection that supports white-tailed deer winter use. It should be noted that the forest in this area is currently being actively managed and areas of cover are being removed.

The outer edge of the deeryard as mapped by the State of Vermont, and refined through field investigations and remote cover assessment, show the southernmost boundary at least 400 feet to the north of the proposed collection line for the Project. Summer and fall field investigations revealed only light white-tailed deer use within these southern areas of the deeryard. White pine forest cover is more common in the southern areas. White-tailed deer use that was high to moderate (based on the presence of browse and winter scat) was limited to the far northern sections of the mapped deeryard well over 750 feet to the north of any proposed new human activity associated with the proposed Project.

In summary, growing-season white-tailed deer use occurs throughout the Project area as evidenced by the presence of spring and summer deer scat and browse. More important white-tail deer winter habitat is limited in the vicinity of the Project area, and is over 750 feet away from any proposed Project activities. Where mapped and field confirmed deer wintering habitat is present, adequate buffers, or separation distances between proposed disturbances and habitat exist. This Project as proposed will not have a negative impact upon deer habitat.

5.2.3 Black Bear Habitat

The site lacks the high quality black bear habitat elements that would support local bear or bring bear from a distance to the Project area. The State of Vermont Bear Points GIS layer does not indicate the presence of mast stands, bear crossings, or travel corridors in the area.

The potential clearing limits within the Project area that were assessed for the presence of bear scarred American beech revealed a few small beech clusters, and a low-density scattered beech tree component throughout the area's forest especially the northern hardwood forests. Two beech clusters of 20-25 beech trees/1-2 acres were located within the ¼ mile buffer area of the Project. (Wildlife habitat # 3 & 4 on attached map). Other smaller clusters of 5-10 trees were also noted. All told, less than 10 bear scarred beech trees were observed scattered on the properties, 3 such scarred trees are located on the Green Crow property among one of the larger (20-25 tree) clusters of largely unscarred American beech (Wildlife habitat #3 on attached map). None of the 3 scarred beech trees have scars from within the last 4-5 years.

The largest northern hardwood communities in the Project area occur on the east and north-facing slopes and much of this forest is under intense forest management with removal of larger trees and much residual early succession forest and very few mature mast bearing trees. The beech component of these forests is very limited.

Northern red oak is also located in various densities throughout the Project area although generally only found in higher numbers within the oak-dominated natural communities. Evidence of bear use of oak within the Project boundaries was very limited. The only specific location where bear use was strongly suspected was at Wildlife habitat #5 (see attached map). This cluster of trees contained 2-3 probable bear scarred oak trees (located east of the proposed access road). These scars were most likely left by black bears that had climbed the oaks during

feeding. These scars were light colored, shallow, and most likely were made recently, but the overall use was very light (only one climbing event was visible on each of the 2-3 trees).

The Project area contains several wetlands that have potential bear foods including sedge (*Carex gynandra* or *C. crinata*) or spotted-touch-me-not (*Impatiens spp.*). Wetland #s 1, 6, 14, 20, 21, 28, 29, 30, and 35 (see attached map) have one or both of these plants present. Field investigations during the summer of 2008 revealed no evidence of bear use and no presence of bear sign in any of these wetlands. No sign of bear use was found in any of the Project area wetlands.

There are no known or suspected black bear travel corridors in the Project area. The site lacks the high quality black bear habitat elements that would support local bear or bring bear from a distance to the Project area. The State of Vermont Bear Points GIS layer does not indicate the presence of mast stands, bear crossings, or travel corridors in the area,

5.2.4 Bear Habitat Summary

The Project area contains land that is relatively remote (particularly for the region as a whole), forested, has wetlands and mast bearing species, and is likely utilized by black bear, at least seasonally, in the region. One bear scat was found on the property, and it contained acorns and beechnuts. Recent bear harvest data suggests that bear(s) are still taken out of the nearby towns of Westford and Fairfax. However, it appears that bear are no longer taken out of Georgia and Milton (the latest published data is for 2004 and 2005). More recent harvest data may show bears being harvested in these towns. The Project area is outside of the Vermont Fish and Wildlife Department's area of prime bear habitat (where, in general, reproductive females are present). Field investigations have revealed little evidence of bear use in terms of bear scarred beech, track, scat and other sign. The Project area is marginal bear habitat and there are not many bear still found in this habitat region. The Project area is on the edge of the Lake Champlain region and forests of the region have become fragmented by roads, houses, farms, industry, and other human activities.

5.2.5 Vernal Pools

Vernal pools are seasonal wetlands that typically contain water during the wet spring months but become dry as the summer progresses. These isolated wetlands typically occur under a forest canopy, lack fish, and provide habitat to a wide variety of wildlife.

Wetland #31 is a Class III vernal pool and is located along the ridgeline, south of the proposed turbine locations. The vegetation in this wetland consists of tussocks of sedges (*Carex spp.*) and manna grass (*Glyceria canadensis*) as well as a small area colonized by sphagnum moss. Green frogs, wood frogs and spotted salamanders have been found in this pool. Because of its size and deep pools of standing water, Wetland #31 likely supports successful reproduction of these vernal pool species. There is an old ATV trail that runs through the eastern end of this pool.



Figure 7. Wetland #31: Vernal pool habitat. (10/6/08)

This wetland is important for the wildlife habitat that it provides. Wood frogs (*Rana sylvatica*) and Spotted salamanders (*Ambystoma maculatum*) are dependent on these habitats for reproduction. Though most of their lives are spent in the forest habitats surrounding these ephemeral wetlands, they migrate to these vernal pools to breed. For this reason, the condition of the forest around the vernal pool is also important for these species and ultimately the functioning of the vernal pool itself.

Recognizing the importance of these habitats, Arrowwood Environmental worked with Project designers to minimize impacts to this vernal pool and the surrounding forest. As shown in Table 4, the proposed clearing area is 77' away from the boundary of this wetland at its closest point. For this reason, it is our opinion that the development as proposed will not have an undue adverse impact on this vernal pool.



Figure 8. ATV trail along boundary of Wetland #31 (10/6/08)

Wetland # 8 is a small (0.06 acre) Class III vernal pool which occurs in the northern part of the study area, outside of parcel boundaries. Unlike Wetland # 31 discussed above, direct evidence of breeding amphibians was not recorded for this site due to the field visit taking place in the late summer. During this time, it is often difficult to document use by amphibians because many vernal pools are dry. Nonetheless, the nature of this wetland suggests that it may be a quality pool. Field inventories in the spring would be needed to accurately assess the importance of this site to amphibians. In the absence of this information, however, this site has been treated as a functioning vernal pool.

The Project as proposed involves no direct impacts to this vernal pool. Clearing for a turbine area is located approximately 270 feet from this small wetland. For this reason, it is our opinion that the development as proposed will not have an undue adverse impact on this vernal pool.

5.2.6 Ledge/Talus Habitat

A large, broken ledge and talus community (Wildlife habitat # 6 on attached map) is found uphill from a series of wetlands located west of the access road. Raccoon scat was the only sign of wildlife identified near the ledges during the field survey. The site has the potential to be denning habitat for a variety of wildlife species.

Another ledge system is located in the far north-western section of the Project study area and outside the parcel boundaries (Wildlife habitat #7 on attached plan). There is broken ledge and potential cover habitat for a wide-variety of wildlife. The cave-like openings are small (only a couple of feet deep) so limited in wildlife habitat value. No wildlife sign was observed at the site, although the area has not been fully assessed for the presence of wildlife and wildlife sign.

Both of these ledge habitat areas are 600 feet or more from proposed Project clearing zone. Any wildlife utilizing these habitats is more likely to suffer disturbance impacts from the ongoing non-Project related all-terrain vehicle and forestry activities taking place in closer proximity on an ongoing basis. The Project as proposed will not have a negative impact on use of these ledge habitats.

5.3 Threatened and Endangered Species

Criterion 8(A) of Act 250 provides that a permit will not be granted if it is demonstrated that the project will “destroy or significantly imperil necessary wildlife habitat or any endangered species.” As discussed in Section 5.2, Arrowwood conducted wildlife habitat field assessments of the Project study area and did not identify any threatened or endangered animal species.

Arrowwood conducted a survey for rare, threatened or endangered plant species. A complete species list was compiled during this inventory and is presented in the appendix of this report. No state or federally listed threatened or endangered plant species were discovered during this inventory. In addition, no species with a rank of S1 or S2 was discovered during this inventory.

The NNHP has three previous records of rare plants occurring within the study area. These species, their rarity ranks, approximate locations and general habitats are listed in Table 3. Due to data sensitivity issues, only general locations for the rare plants are given. None of these previous species records is located within the proposed Project clearing zone.

Table 3. Previous Records of Rare Plants in the Vicinity of the GMCW Study Area

Species	Rank	Location	Habitat
Bronze sedge (<i>Carex foenea</i>)	S1 Endangered	Near the western borders of the study area; approximately 750' from proposed impact.	Quartzite outcrop ledges within Dry Oak-Hickory-Hophornbeam Forest
Autumn coralroot (<i>Corallorhiza odontorhiza</i>)	S2 Threatened	Northwest of the study area; approximately ½ mile from proposed impact.	Shaded, dry ledge within a Dry Oak-Hickory-Hophornbeam Forest
Stout goldenrod (<i>Solidago squarrosa</i>)	S2S3	Southern slopes of Georgia Mountain; approximately 420' from proposed impact	White Pine-Red Oak-Black Oak Forest

5.4 Wetland Resources

Act 250 Criterion 1(G) provides that an applicant must demonstrate that a project will not violate the rules of the Vermont Water Resources Board relating to “significant” wetlands. As enumerated in the Wetland Rules, there are three classes of wetlands. “Class One” and “Class Two” wetlands are considered “significant” and are protected by the Wetland Rules. Class Three wetlands are not protected by the Vermont Wetland Rules, although they are subject to jurisdiction under Section 404 of the Clean Water Act administered by the U.S. Army Corps of Engineers (“USACE”). In addition, Class Three wetlands with significant functions can be protected under different Act 250 Criteria.

The Vermont Significant Wetland Inventory maps do not identify any Class 1 wetlands within the Project area. According to these maps, one Class 2 wetland is located within the Project area along the proposed access route adjacent to Ted Road. In addition to this Class 2 wetland, Arrowwood identified and mapped thirty-five Class 3 wetlands within the Project study area, eleven of which are in the vicinity of proposed Project clearing zone. The following table provides summary information regarding each of the wetland resources in the vicinity of the Project clearing zone.

Table 4. Summary of Wetlands at the Proposed Georgia Community Wind Project

Wetland #	Natural Community	Class	Location	Distance to Clearing Zone (ft)	Impact
21	Shallow Emergent Marsh	III	Ridgeline	0	Impact Avoided
31	Vernal Pool	III	Ridgeline	77	Impact Avoided
7	Seepage	III	Ridgeline	17	Impact Avoided
8	Vernal Pool	III	Ridgeline	262	Impact Avoided
6	Seepage	III	West of Access Road	335	Impact Avoided
3	Seepage	III	West of Access Road; Top of Ted Road	141	Impact Avoided
36	Shallow Emergent Marsh/Shrub Swamp	II	Ted Road	475	Impact Avoided
37	Seepage	III	Base of Ted Road	3	Impact Avoided
22	Seepage	III	Base of Ted Road	0	Widening of intersection (3sq.ft wetland impact)
15	Seepage/Wet Meadow/Shrub Swamp	III	Transmission Line	0	Use of existing ATV trail
34	Wet Meadow/Old Field	III	Transmission Line, east of North Road	0	Pole Placement; spanning
33	Seepage	III	North of Transmission Line	198	Impact Avoided

The Project as proposed will not directly impact any Class I or Class II wetland resources. There are two Class III wetlands within the vicinity of the Project area which have significant functions (#31 and # 8). A discussion of these wetlands is included in Section 5.2.5.

There are three Class III wetlands that will be directly impacted by the proposed Project. Each of these wetlands is discussed in Sections 5.4.1 – 5.4.3.

5.4.1 Wetland #22: Widening of Intersection at Ted Road/Westford Road

Wetland #22 is located at the base of Ted Road, on the northeast side of the intersection with Westford Road. The wetland is neither mapped nor contiguous with a mapped wetland and therefore considered Class III according to the Vermont Wetland Rules. This wetland is a small seepage wetland.

The wetland vegetation is dominated by sensitive fern (*Onoclea sensibilis*), spotted joe-pye weed (*Eupatorium maculatum*), New England Aster (*Aster novae-angliae*), spotted touch me not (*Impatiens capensis*) in the groundcover and red maple (*Acer rubrum*) in the understory. The soils are characterized by saturated organic muck from 0-9” below ground surface and underlain by rocky, sandy loam. The functions and values of this wetland are related to water storage, water protection and erosion control.

The Project requires the widening of this road intersection to accommodate construction vehicles with wide turning radii. The road widening involves permanent wetland impacts related to clearing and site grading. The square footage of wetland impact is 3 sq.ft. The area of proposed impact is directly adjacent to the existing roadway, at a culvert outfall. The proposed impact will not have an adverse impact on the long term capacity of the wetland to provide the functions of water storage, water protection and erosion control. Appropriate erosion control measures employed during construction will ensure that short term impacts do not have an adverse impact on wetland function and value as well.



Figure 9. Wetland #22: Wetland at base of Ted Road. (10/15/08)

5.4.2 Wetland #15: Overhead Transmission Line

Wetland #15 is located within the proposed overhead transmission line corridor. The wetland is neither mapped nor contiguous with a mapped wetland and therefore considered Class III according to the Vermont Wetland Rules.

This wetland is a 3.4 acre site that contains a mixture of wetland community types. In the northern and widest part of the wetland, the wetland is dominated by a mixture of herbaceous plants such as Black-green Bulrush (*Scirpus atrovirens sens. lat.*), Water Willow (*Decodon verticillatus*), and Reed Canary Grass (*Phalaris arundinacea*). Willow (*Salix spp.*) shrubs are also present. To the south, the wetland grades into a Seepage wetland type. The wetland at this location is dominated by cinnamon fern (*Osmunda cinnamomea*), spotted touch me not and American marsh penny wort (*Hydrocotyle Americana*). American Elm (*Ulmus Americana*) shrubs are also present. The wetland at this location is narrow and tree canopy from the surrounding upland forest is nearly complete. Soils in this wetland consist of loam in the A horizon (0-8" below ground surface) and sandy loam in the B horizon (8"+ below ground surface). The functions and values of this wetland likely consist of water storage, water protection, and wildlife habitat.

Arrowwood Environmental worked with Project designers to minimize the impacts to this wetland from the transmission line corridor. This transmission line crossing was selected to occur at the narrowest part of the wetland. In addition, this site was already disturbed from an

existing ATV trail crossing (see attached map). This wetland will be spanned by the overhead electric collection line poles. Impacts to this wetland from the transmission line corridor will therefore be limited to minimum clearing of trees in the upland buffer of the wetland.

It is our opinion that the transmission line crossing will not present undue or adverse impacts to this wetland. In addition we do not believe that this crossing will negatively affect the functions and values that this wetland performs.



Figure 10. Wetland #15: Existing ATV trail to be utilized for proposed transmission corridor. (10/6/08)

5.4.3 Wetland #34: North Road Wetland

Wetland #34 is located to the east of North Road. The wetland does not appear on the VSWI map nor is it contiguous to a mapped wetland. It is therefore considered a Class III wetland according to the Vermont Wetland Rules.

This wetland is characterized as an old field/wet meadow wetland. This site has an agricultural history and appears to have been used as pasture. The vegetation in this wetland is dominated by sensitive fern, giant goldenrod (*Solidago gigantea*) and common red raspberry (*Rubus idaeus*) in the groundcover with willow species present in the shrub layer. Soils are characterized by loam in the A horizon (0-8" below ground surface) and sandy loam in the B horizon (8"+ below ground surface). This wetland likely performs limited water quality protection as its only function and value.

The Project proposes to locate the overhead transmission line through this wetland. The 25 ft wide corridor will be centered along an exiting ATV trail on the north side of the wetland. The line will likely result in the installation of a single pole within the wetland.

In order to minimize impacts to this wetland, during construction swamp mats should be placed to access poles located at this site. The mats should be timber mats, fabricated from square timbers running parallel in the long direction, each mat section being approximately 16ft wide by 4ft long, placed sequentially beginning at the edge of the wetland, quantity as required to create a 16' access drive way to allow construction vehicles to achieve the required proximity to each pole location. Swamp mats should generally be in place for approximately 1 week. Any soil disturbance from the mats should be mulched with weed free straw immediately upon their removal. Large tire, all terrain style vehicles should be used during construction in order to minimize disturbance. Soils displaced by pole holes should be removed for disposal outside of wetland areas. Adherence to these construction specifications can result in avoidance of adverse impacts to this wetland resource.



Figure 11. Wetland #34: Old field wetland. Transmission line to follow existing ATV trail through meadow. (10/6/08)

5.5 Floodways, Shorelines, Streams, Outstanding Resource Waters and Headwaters

The following sections discuss floodway, shoreline, streams, outstanding resource waters and headwater resources as identified and characterized during the landscape analysis and field survey.

5.5.1 Floodways and Shorelines

Act 250 Criterion 1(D) and 1(F) provides that a permit will be granted whenever it is demonstrated by the applicant that no portion of the project is located within a 100-year flood boundary or will endanger the health, safety and welfare of the public or of the riparian owners during flooding and that development of lands on or adjacent to shorelines must of necessity be located there.

A remote review of shorelines and floodways was conducted. The Project proposal does not include any disturbance or activity within a designated floodway or shoreline. There are two FEMA flood hazard “A” zones within proximity of the Project, neither of which is closer than 0.25 miles from the proposed activity.

A tributary to Mallets Creek flows southwest on the south side of Westford Road. This stream includes a mapped flood hazard area with its closest point 0.25 miles from the Project entrance at Ted Road.

A tributary of the Lamoille River flows northerly to the east of the proposed Project site. This tributary includes a mapped flood hazard area partially encompassing an open water wetland complex on the north side of Westford Road. This floodway is approximately 0.87 miles distant from the closest Project clearing zone.

The shoreline of Arrowhead Lake is located to the northwest of the Project site, it’s closest point being approximately 0.84 miles from the nearest proposed Project clearing zone.

The Project proposal does not include any disturbance or activity within a designated floodway or shoreline. There are two FEMA flood hazard “A” zones within proximity of the Project, neither of which is closer than 0.25 miles from the proposed activity.

5.5.2 Streams

Act 250 Criterion 1(E) provides that a permit will be granted whenever it is demonstrated by the applicant that the development of lands on or adjacent to the banks of a stream will, whenever feasible, maintain natural conditions of the stream, and will not endanger the health, safety or welfare of the public or adjoining landowners.

There are numerous small intermittent streams located on the Project property. None of these streams include any flood hazard areas mapped by FEMA. Project stream crossings are limited to areas with pre-existing road crossings (Ted Road and Wetland #15 ATV trail).

Table 5. Summary Information for Streams for the Proposed GMCW Project

Stream	Location	Description	Impact
1	Ted Road; Drains wetland #36	Intermittent stream, 1-2' wide, soil/pebble/rock substrate, diffuse in places	Existing Road Crossing; no new impacts
2	Transmission line east of North Road; drains wetland #15	Ephemeral stream, 1-2' wide, muck substrate, diffuse in places	Existing ATV trail; line will span stream

As can be seen from Table 5, the proposed access road and overhead transmission line corridor involve a total of two stream crossings. The crossing at Ted Road will be accomplished via the existing roadway with no impacts to the stream. Swamp mats should be utilized to cross the ephemeral stream contained within Wetland #15 to avoid any adverse impacts to this wetland and stream from construction activities.

5.5.3 Outstanding Resource Waters

The Water Resources Panel has listed four waterways as Outstanding Resource Waters: Batten Kill River in towns of East Dorset and Arlington; Pike's Falls/Ball Mountain in the town of Jamaica; Poultney River in the towns of Poultney and Fair Haven; and Great Falls, Ompompanoosuc in the town of Thetford. There are no Outstanding Resources in the Project area.

5.5.4 Headwaters

Act 250 Criterion 1(A) provides that a permit will be granted whenever it is demonstrated by the applicant that the development will not reduce the quality of ground or surface waters.

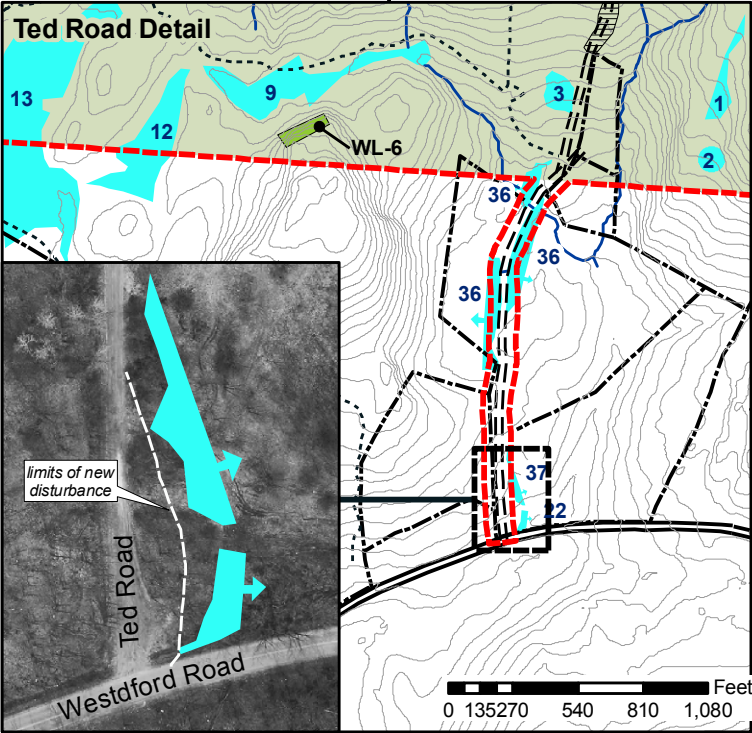
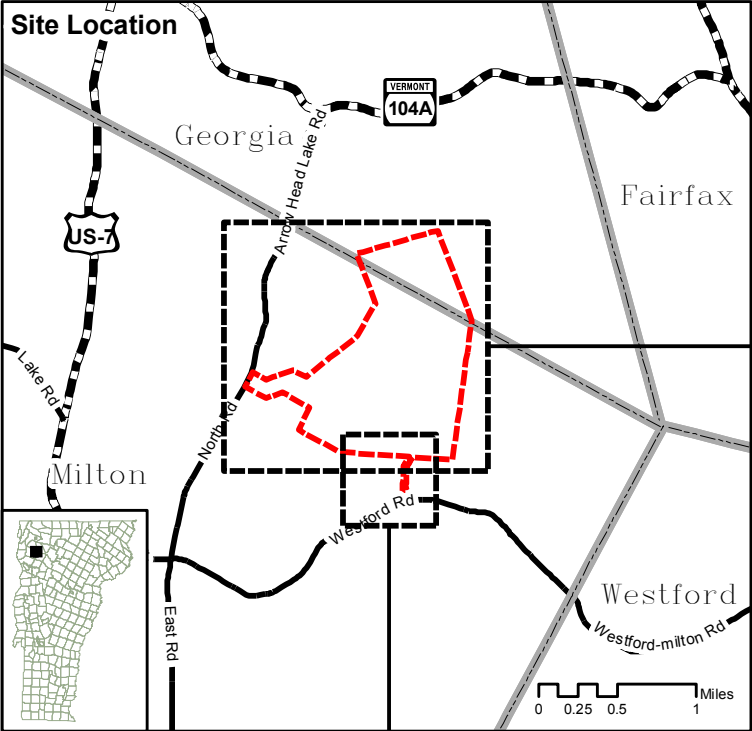
The proposed Project involves development within areas generally below 1500 feet elevation, but does contain areas of steep slopes; and drainage areas of 20 square miles or less. As discussed in Section 5.4 and in 5.5.2, the Project study area contains wetlands and intermittent streams and therefore these areas are considered headwaters.

The Project has been designed to avoid wetland and streams crossings where practicable. Impacts to stream and wetland resources are discussed in Sections 5.4 and 5.2.2, respectively. With careful project design and construction specifications, there will be no adverse impact to headwater resources.

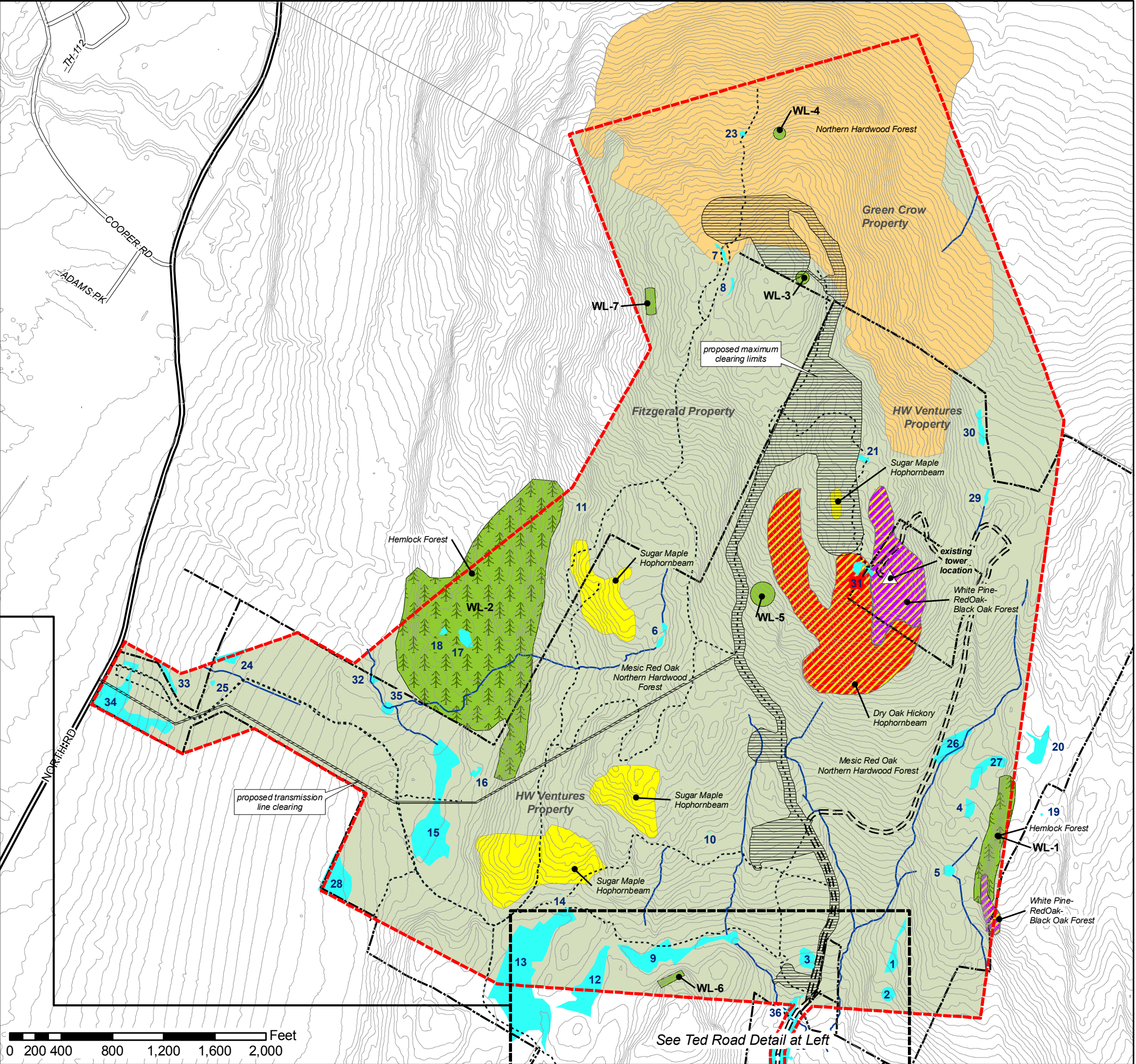
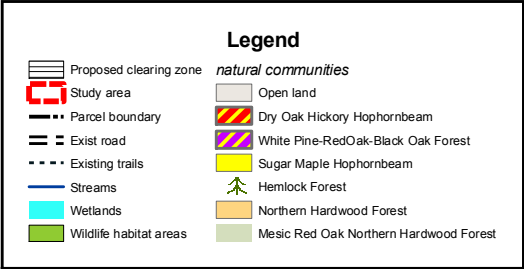
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APPENDIX 1: Natural Resource Inventory and Assessment Map



Notes: Study area, wetlands, streams, wildlife habitats and natural communities by Arrowwood Environmental, accuracy varies. Proposed maximum clearing area, property boundaries and preliminary project design standards provided by Vermont Environmental Research Associates and Cross Consulting Engineers. Contours were software generated from 2004 LIDAR derived digital elevation model from VCGI. Other data from VCGI. This map is NOT a survey.



**List of Plant Species Recorded During the Rare Plant Inventory, 2008.
Organized by Plant Family**

Scientific Name	Common Name	Plant Family
<i>Acer pensylvanicum</i>	Striped Maple	Aceraceae
<i>Acer rubrum</i>	Red Maple	Aceraceae
<i>Acer saccharum</i>	Sugar Maple	Aceraceae
<i>Rhus typhina</i>	Staghorn Sumac	Anacardiaceae
<i>Daucus carota</i>	Queen-Anne's-lace	Apiaceae
<i>Hydrocotyle americana</i>	Pennywort	Apiaceae
<i>Pastinaca sativa</i>	Wild Parsnip	Apiaceae
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	Apocynaceae
<i>Apocynum cannabinum</i>	Indian Hemp	Apocynaceae
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	Araliaceae
<i>Aralia racemosa</i>	Spikenard	Araliaceae
<i>Asarum canadense</i>	Wild Ginger	Aristolochiaceae
<i>Asclepias syriaca</i>	Common Milkweed	Asclepiadaceae
<i>Achillea millefolium</i>	Common Yarrow	Asteraceae
<i>Ambrosia artemisiifolia</i>	Common Ragweed	Asteraceae
<i>Anaphalis margaritacea</i>	Pearly Everlasting	Asteraceae
<i>Arctium minus</i>	Common Burdock	Asteraceae
<i>Artemisia vulgaris</i>	Common Mugwort	Asteraceae
<i>Aster acuminatus</i>	Acuminate Aster	Asteraceae
<i>Aster ciliolatus</i>	Ciliate Aster	Asteraceae
<i>Aster cordifolius</i>	Heart-leaved Aster	Asteraceae
<i>Aster divaricatus</i>	White Wood Aster	Asteraceae
<i>Aster lateriflorus</i>	Calico Aster	Asteraceae
<i>Aster macrophyllus</i>	Large-leaved Aster	Asteraceae
<i>Aster novae-angliae</i>	New England Aster	Asteraceae
<i>Aster puniceus</i>	Purple Stemmed Aster	Asteraceae
<i>Aster umbellatus</i>	Umbellate Aster	Asteraceae
<i>Bidens vulgata</i>	Common Beggar's-ticks	Asteraceae
<i>Cichorium intybus</i>	Chicory	Asteraceae
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	Asteraceae
<i>Eupatorium maculatum</i>	Common Joe-pye Weed	Asteraceae
<i>Eupatorium perfoliatum</i>	White Boneset	Asteraceae
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	Asteraceae
<i>Gnaphalium uliginosum</i>	Low Cudweed	Asteraceae
<i>Lactuca biennis</i>	Blue lettuce	Asteraceae
<i>Lapsana communis</i>	Nipplewort	Asteraceae
<i>Prenanthes alba</i>	Southern White Lettuce	Asteraceae
<i>Rudbeckia hirta</i>	Black-eyed Susan	Asteraceae
<i>Solidago bicolor</i>	Silver-rod	Asteraceae
<i>Solidago caesia</i>	Blue-stemmed Goldenrod	Asteraceae
<i>Solidago canadensis</i>	Canada Goldenrod	Asteraceae
<i>Solidago rugosa</i>	Rough-stemmed Goldenrod	Asteraceae
<i>Sonchus arvensis</i>	Field Sow-thistle	Asteraceae
<i>Taraxacum officinale</i>	Common Dandelion	Asteraceae
<i>Tragopogon dubius</i>	Goat's-beard	Asteraceae
<i>Tussilago farfara</i>	Coltsfoot	Asteraceae
<i>Impatiens capensis</i>	Orange Jewelweed	Balsaminaceae
<i>Impatiens pallida</i>	Yellow Jewelweed	Balsaminaceae
<i>Caulophyllum thalictroides</i>	Blue Cohoosh	Berberidaceae

<i>Alnus incana</i>	Speckled Alder	Betulaceae
<i>Betula alleghaniensis</i>	Yellow Birch	Betulaceae
<i>Betula lenta</i>	Black Birch	Betulaceae
<i>Betula populifolia</i>	Gray Birch	Betulaceae
<i>Carpinus caroliniana</i>	Musclemwood	Betulaceae
<i>Ostrya virginiana</i>	Hop Hornbeam	Betulaceae
<i>Cardamine diphylla</i>	Two-leaved Toothwort	Brassicaceae
<i>Lobelia inflata</i>	Indian-tobacco	Campanulaceae
<i>Diervilla lonicera</i>	Bush Honeysuckle	Caprifoliaceae
<i>Lonicera canadensis</i>	Canada Honeysuckle	Caprifoliaceae
<i>Lonicera morrowii</i>	European Bush Honeysuckle	Caprifoliaceae
<i>Sambucus canadensis</i>	White Elderberry	Caprifoliaceae
<i>Viburnum acerifolium</i>	Maple-leaved Viburnum	Caprifoliaceae
<i>Viburnum dentatum</i>	Arrowwood	Caprifoliaceae
<i>Viburnum lantanoides</i>	Hobblebush	Caprifoliaceae
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	Caprifoliaceae
<i>Cornus foemina</i>	Gray Dogwood	Cornaceae
<i>Carex cf bromoides</i>	Brome-like Sedge	Cyperaceae
<i>Carex arctata</i>	Arching Sedge	Cyperaceae
<i>Carex blanda</i>	Woods Sedge	Cyperaceae
<i>Carex cf echinata</i>	Little Prickly Sedge	Cyperaceae
<i>Carex communis</i>	Common Woodland Sedge	Cyperaceae
<i>Carex gracillima</i>	Graceful Sedge	Cyperaceae
<i>Carex gynandra</i>	Gynandrous Sedge	Cyperaceae
<i>Carex leptoneuria</i>	Few-nerved Sedge	Cyperaceae
<i>Carex lupulina</i>	Common Hop Sedge	Cyperaceae
<i>Carex lurida</i>	Garish Sedge	Cyperaceae
<i>Carex pennsylvanica</i>	Pennsylvania Sedge	Cyperaceae
<i>Carex plantaginea</i>	Plantain-leaved Sedge	Cyperaceae
<i>Carex radiata</i>	Spreading-fruited Sedge	Cyperaceae
<i>Carex rosea</i>	Roseate Sedge	Cyperaceae
<i>Carex swani</i>	Swan's Sedge	Cyperaceae
<i>Carex trisperma</i>	Three-seeded Sedge	Cyperaceae
<i>Carex virescens</i>	Greenish Sedge	Cyperaceae
<i>Carex vulpinoidea</i>	Foxtail Sedge (II)	Cyperaceae
<i>Eleocharis obtusa</i>	Blunt Spike-rush	Cyperaceae
<i>Scirpus acutus</i>	Hard-stem Bulrush	Cyperaceae
<i>Scirpus atrovirens sens. lat.</i>	Black-green Bulrush	Cyperaceae
<i>Scirpus cyperinus</i>	Wool-grass	Cyperaceae
<i>Dennstaedtia punctilobula</i>	Hay-scented Fern	Dennstaedtiaceae
<i>Pteridium aquilinum</i>	Bracken	Dennstaedtiaceae
<i>Athyrium filix-femina</i>	Lady Fern	Dryopteridaceae
<i>Dryopteris intermedia</i>	Evergreen Woodfern	Dryopteridaceae
<i>Dryopteris marginalis</i>	Marginal Wood Fern	Dryopteridaceae
<i>Matteuccia struthiopteris</i>	Ostrich Fern	Dryopteridaceae
<i>Onoclea sensibilis</i>	Sensitive Fern	Dryopteridaceae
<i>Polystichum acrostichoides</i>	Christmas Fern	Dryopteridaceae
<i>Equisetum arvense</i>	Common Horsetail	Equisetaceae
<i>Equisetum sylvaticum</i>	Wood Horsetail	Equisetaceae
<i>Vaccinium angustifolium</i>	Lower Lowbush Blueberry	Ericaceae
<i>Amphicarpaea bracteata</i>	Hog Peanut	Fabaceae
<i>Apios americana</i>	Groundnut	Fabaceae
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	Fabaceae
<i>Lupinus polyphyllus</i>	Garden Lupine	Fabaceae
<i>Medicago sativa</i>	Alfalfa	Fabaceae
<i>Mellilotus albus</i>	White Sweet Clover	Fabaceae
<i>Robinia pseudoacacia</i>	Black Locust	Fabaceae
<i>Trifolium hybridum</i>	Alsike Clover	Fabaceae

<i>Vicia cracca</i>	Cow-vetch	Fabaceae
<i>Fagus grandifolia</i>	American Beech	Fagaceae
<i>Quercus rubra</i>	Northern Red Oak	Fagaceae
<i>Geranium robertianum</i>	Herb Robert	Geraniaceae
<i>Ribes</i> sp.	Currant	Grossulariaceae
<i>Hamamelis virginiana</i>	Witch Hazel	Hamamelidaceae
<i>Hydrophyllum virginianum</i>	Common Waterleaf	Hydrophyllaceae
<i>Carya cordiformis</i>	Bitternut Hickory	Juglandaceae
<i>Juncus dudleyi</i>	Dudley;s Rush	Juncaceae
<i>Juncus effusus</i>	Common Rush	Juncaceae
<i>Juncus tenuis</i>	Path Rush	Juncaceae
<i>Luzula acuminata</i>	Acuminate Woodrush	Juncaceae
<i>Galeopsis tetrahit</i>	Common Hemp-nettle	Lamiaceae
<i>Lycopus americanus</i>	American Water Hore-hound	Lamiaceae
<i>Lycopus uniflorus</i>	Common Water-horehound	Lamiaceae
<i>Prunella vulgaris</i>	Self-heal	Lamiaceae
<i>Lemna minor</i>	Common Duckweed	Lemnaceae
<i>Clintonia borealis</i>	Woodlily	Liliaceae
<i>Maianthemum canadense</i>	Canada Mayflower	Liliaceae
<i>Medeola virginiana</i>	Wild Cucumber	Liliaceae
<i>Polygonatum pubescens</i>	Small Solomon's-seal	Liliaceae
<i>Smilacina racemosa</i>	Common False Solomon's-seal	Liliaceae
<i>Smilacina stellata</i>	Starry False Solomon's Seal	Liliaceae
<i>Streptopus roseus</i>	Rose Twisted-stalk	Liliaceae
<i>Trillium erectum</i>	Red Trillium	Liliaceae
<i>Trillium undulatum</i>	Painted Trillium	Liliaceae
<i>Uvularia sessilifolia</i>	Common Bellwort	Liliaceae
<i>Lycopodium digitatum</i>	Southern ground cedar	Lycopodiaceae
<i>Lycopodium lucidulum</i>	Shining Clubmoss	Lycopodiaceae
<i>Lycopodium obscurum</i>	Tree Clubmoss	Lycopodiaceae
<i>Decodon verticillatus</i>	Water Willow	Lythraceae
<i>Lythrum salicaria</i>	Purple Loosestrife	Lythraceae
<i>Monotropa uniflora</i>	Indian Pipes	Monotropaceae
<i>Fraxinus americana</i>	American Ash	Oleaceae
<i>Circaea lutetiana</i>	Large Enchanter's Nightshade	Onagraceae
<i>Epilobium ciliatum</i>	Ciliate Willowherb	Onagraceae
<i>Botrychium virginianum</i>	Rattlesnake Fern	Ophioglossaceae
<i>Epifagus virginiana</i>	Beech Drops	Orobanchaceae
<i>Osmunda cinnamomea</i>	Cinnamon Fern	Osmundaceae
<i>Osmunda regalis</i>	Royal Fern	Osmundaceae
<i>Oxalis stricta</i>	Common Yellow Wood Sorrel	Oxalidaceae
<i>Corydalis sempervirens</i>	Pale Corydalis	Papaveraceae
<i>Abies balsamea</i>	Balsam Fir	Pinaceae
<i>Picea rubens</i>	Red Spruce	Pinaceae
<i>Pinus resinosa</i>	Red Pine	Pinaceae
<i>Pinus strobus</i>	White Pine	Pinaceae
<i>Tsuga canadensis</i>	Hemlock	Pinaceae
<i>Plantago lanceolata</i>	English Plantain	Plantaginaceae
<i>Plantago major</i>	Broad-leaved Plantain	Plantaginaceae
<i>Agrostis gigantea</i>	Redtop	Poaceae
<i>Agrostis perennans</i>	Upland Bentgrass	Poaceae
<i>Agrostis scabra</i>	Bentgrass	Poaceae
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	Poaceae
<i>Brachyletrum erectum</i>	Harry Woods' Grass	Poaceae
<i>Bromus inermis</i>	Smooth Brome	Poaceae
<i>Cinna arundinacea</i>	Sout Woodreed	Poaceae
<i>Cinna latifolia</i>	Drooping woodreed	Poaceae

<i>Dactylis glomerata</i>	Orchard Grass	Poaceae
<i>Danthonia spicata</i>	Common Oatgrass	Poaceae
<i>Deschampsia flexuosa</i>	Common Hairgrass	Poaceae
<i>Dichanthelium acuminatum</i>	Hairy Panic Grass	Poaceae
<i>Digitaria ischaemum</i>	Smooth Crabgrass	Poaceae
<i>Echinochloa crusgalli</i>	Common Barnyard Grass	Poaceae
<i>Elymus cf canadensis</i>	Canada Wild-rye	Poaceae
<i>Festuca pratensis</i>	Meadow Fescue	Poaceae
<i>Festuca subverticillata</i>	Nodding Fescue	Poaceae
<i>Glyceria canadensis</i>	Canadian Mannagrass	Poaceae
<i>Glyceria grandis</i>	Great Mannagrass	Poaceae
<i>Glyceria melicaria</i>	Slender Mannagrass	Poaceae
<i>Leersia oryzoides</i>	Rice Cutgrass	Poaceae
<i>Leersia virginica</i>	Whitegrass	Poaceae
<i>Oryzopsis asperifolia</i>	Rough-leaved Ricegrass	Poaceae
<i>Panicum capillare</i>	Witch Grass	Poaceae
<i>Phalaris arundinacea</i>	Reed Canary Grass	Poaceae
<i>Phleum pratense</i>	Timothy	Poaceae
<i>Poa pratensis</i>	Common Bluegrass	Poaceae
<i>Setaria viridis</i>	Green Foxtail Grass	Poaceae
<i>Polygonum aviculare</i>	Common Knotweed	Polygonaceae
<i>Polygonum cilinode</i>	Fringed Bindweed	Polygonaceae
<i>Polygonum hydropiper</i>	Water Pepper	Polygonaceae
<i>Polygonum pensylvanicum</i>	Pennsylvania Smartweed	Polygonaceae
<i>Polygonum persicaria</i>	Lady's Thumb	Polygonaceae
<i>Polygonum sagittatum</i>	Arrow-leaved Tearthumb	Polygonaceae
<i>Polygonum scandens</i>	Climbing False Buckwheat	Polygonaceae
<i>Rumex acetosella</i>	Sheep Sorrel	Polygonaceae
<i>Rumex crispus</i>	Curly Dock	Polygonaceae
<i>Polypodium virginianum</i>	Virginia Polypody	Polypodiaceae
<i>Lysimachia ciliata</i>	Fringed Loosestrife	Primulaceae
<i>Lysimachia quadrifolia</i>	Whorled Loosestrife	Primulaceae
<i>Trientalis borealis</i>	Starflower	Primulaceae
<i>Adiantum pedatum</i>	Common Maidenhair	Pteridaceae
<i>Aquilegia canadensis</i>	Wild Columbine	Ranunculaceae
<i>Clematis virginiana</i>	Virgin's Bower	Ranunculaceae
<i>Ranunculus acris</i>	Common Buttercup	Ranunculaceae
<i>Thalictrum dasycarpum</i>	Purple meadow rue	Ranunculaceae
<i>Thalictrum sp.</i>	Meadow-rue	Ranunculaceae
<i>Rhamnus cathartica</i>	Common Buckthorn	Rhamnaceae
<i>Amelanchier sp.</i>	Shadbush	Rosaceae
<i>Crataegus sp.</i>	HawThorn	Rosaceae
<i>Fragaria sp.</i>	Strawberry	Rosaceae
<i>Geum macrophyllum</i>	Large-leaved Avens	Rosaceae
<i>Potentilla recta</i>	Rough Cinquefoil	Rosaceae
<i>Potentilla simplex</i>	Common Cinquefoil	Rosaceae
<i>Prunus pensylvanica</i>	Pin Cherry	Rosaceae
<i>Prunus virginiana</i>	Choke Cherry	Rosaceae
<i>Prunus serotina</i>	Black Cherry	Rosaceae
<i>Rubus allegheniensis</i>	Common Blackberry	Rosaceae
<i>Rubus odoratus</i>	Purple-flowering Raspberry	Rosaceae
<i>Spiraea alba</i>	Meadow-sweet	Rosaceae
<i>Galium mollugo</i>	European Bedstraw	Rubiaceae
<i>Galium triflorum</i>	Three-flowered Bedstraw	Rubiaceae
<i>Mitchella repens</i>	Partridge Berry	Rubiaceae
<i>Zanthoxylum americanum</i>	Prickly Ash	Rutaceae
<i>Populus grandidentata</i>	Big-toothed Aspen	Salicaceae
<i>Populus tremuloides</i>	Quaking Aspen	Salicaceae

<i>Salix humilis</i>	Low Willow	Salicaceae
<i>Salix petiolaris</i>	Slender Willow	Salicaceae
<i>Chrysosplenium americanum</i>	Golden Saxifrage	Saxifragaceae
<i>Saxifraga virginensis</i>	Early Saxifrage	Saxifragaceae
<i>Chelone glabra</i>	Turtlehead	Scrophulariaceae
<i>Verbascum thapsus</i>	Common Mullein	Scrophulariaceae
<i>Veronica chamaedrys</i>	Bird's-eye Speedwell	Scrophulariaceae
<i>Solanum dulcamara</i>	Common Nightshade	Solanaceae
<i>Sparganium cf. chlorocarpum</i>	Green-fruited Bur-reed	Sparganiaceae
<i>Thelypteris noveboracensis</i>	New York Fern	Thelypteridaceae
<i>Tilia americana</i>	Basswood	Tiliaceae
<i>Typha latifolia</i>	Broad-leaved Cattail	Typhaceae
<i>Ulmus americana</i>	American Elm	Ulmaceae
<i>Laportea canadensis</i>	Wood Nettle	Urticaceae
<i>Pilea pumila</i>	Clearweed	Urticaceae
<i>Verbena hastata</i>	Blue Vervain	Verbenaceae
<i>Verbena urticifolia</i>	White Vervain	Verbenaceae
<i>Viola sp.</i>	Violet	Violaceae
<i>Parthenocissus quinquefolia</i>	Common Woodbine	Vitaceae
<i>Vitis riparia</i>	River-bank Grape	Vitaceae

APPENDIX 3: Wetland Delineation Data Sheets

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Date

10/6/2008

Field ID

21z

Wetland ID

3

Surveyor

DB

Flag #s

Community Type

Seep

Wetland Classification

Class 3

Delineation

Formal

☐ Do normal circumstances exist?☐ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees	ALDER,SPECKLED		%	Shrubs	MAPLE,RED	80.0	%	
			%		ELM,AMERICAN	10.0	%	
			%				%	
			%				%	
Herbs	CATTAIL,BROAD-LEAF	10.0	%	Function/Value	Water Storage		RTE	
	FERN,SENSITIVE	25.0	%		Water Protection		Education	
	ASTER,FLAT-TOP WHITE	15.0	%		Fisheries		Recreation	
	BULRUSH,GREEN	25.0	%		Wildlife	Moderate	Open Space	
	TOUCH-ME-NOT,SPOTTED	15.0	%		Hydrophytic Veg		Erosion	
			%	VernalPool	☐			

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-12	A	10YR3/1	Silt Loam			high Organic content, wet
12-16+	B	2.5Y4/1	Silt Loam	7.5YR4/16	>20%	moist

☐ Histosol☒ Reducing Conditions☐ High Organic in Sandy Surface☐ Histic Epipedon☐ Gleyed or Low Chroma☐ Organic Streaking☐ Local Hydric Soils List☐ Aquic Moisture Regime☐ Concretions☐ Other Hydric Indicator☐ National Hydric Soils List

New England Hydric Soil Indicator: VII

Wetland Hydrology:

Depth of surface water

☐ Inundated☐ Drift lines

Secondary Indicators

☐ Oxidized root ch

Depth to water in pit

☐ Saturated upper 12"☐ Sediment deposits☐ Water stained leaves

Depth to saturated soil

☐ Water marks☒ Drainage patterns☐ Other

General Comments

no stream

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland

Upland Community Type

Old Field

Upland Community ID:

Dominant Vegetation:

Trees			%	Shrubs	ASPEN,QUAKING	80.0	%
			%		ELM,AMERICAN	10.0	%
			%				%
			%				%
Herbs	FERN,SENSITIVE	15.0	%	Herbs			%
	cucumber root	5.0	%				%
	SEDGE,WOODLAND	20.0	%				%
			%				%

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-6	A	10YR4/2	Loam			loose
6+						rock

Photos:

Photo1	DB2545	Photo Description:	wetland
Photo2			
Photo3			
Photo4			

Photo Notes:

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Date

10/15/2008

Field ID

Wetland ID

Surveyor

Flag #s

6

DB

1-19

Community Type

Seep

Wetland Classification

Class 3

Delineation

Informal

☒ Do normal circumstances exist?☐ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees

		%
		%
		%
		%

Shrubs

		%
		%
		%
		%

Herbs

TOUCH-ME-NOT,SPOTTED		%
CAREX SPP.		%
FERN,SENSITIVE		%
		%
		%
		%

Function/Value

Water Storage		RTE	
Water Protection		Education	
Fisheries		Recreation	
Wildlife	Moderate	Open Space	
Hydrophytic Veg		Erosion	
VernalPool	☒		

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-10	A	10YR4/2	Silt Loam	7.5YR4/4	10%	moist
10-12+	B	2.5Y4/1	Sand	2.5Y5/6	5%	coarse sand

☐ Histosol☐ Histic Epipedon☐ Aquic Moisture Regime☒ Reducing Conditions☐ Gleyed or Low Chroma☐ Concretions☐ High Organic in Sandy Surface☐ Organic Streaking☐ Other Hydric Indicator☐ Local Hydric Soils List☐ National Hydric Soils List

New England Hydric Soil Indicator: VI

Wetland Hydrology:

Primary Indicators

Depth of surface water

☐ Inundated

Depth to water in pit

☐ Saturated upper 12"

Depth to saturated soil

☐ Water marks☐ Drift lines☐ Sediment deposits☒ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

General Comments

stream channel, intermittant

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland

Upland Community Type

Upland Community ID:

Dominant Vegetation:

Trees	ASPEN,QUAKING		%	Shrubs	MAPLE,SUGAR		%
	BUTTERNUT		%		BEECH		%
	MAPLE,SUGAR		%		MAPLE,STRIPED		%
			%				%
Herbs	WOODFERN,EVERGREEN	30.0	%	Herbs	maple,sugar	15.0	%
	FERN,CHRISTMAS	10.0	%				%
	SNAKEROOT,WHITE	35.0	%				%
	ash,white	5.0	%				%

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle	Abun %	Soil Notes

Photos:

Photo1	2565	Photo Description:	wetland
Photo2			
Photo3			
Photo4			

Photo Notes:

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Date

10/6/2008

Field ID

11b

Wetland ID

15

Surveyor

DB

Flag #s

only flag center portion

Community Type

Seep

Wetland Classification

Class 3

Delineation

Formal

☐ Do normal circumstances exist?☒ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees		%	Shrubs	ELM,AMERICAN	%		
		%			%		
		%			%		
		%			%		
Herbs	FERN,CINNAMON	40.0 %	Function/Value	Water Storage	Moderate	RTE	
	TOUCH-ME-NOT,SPOTTED	40.0 %		Water Protection	Moderate	Education	
	PENNY-WORT,AMERICAN MARSH	20.0 %		Fisheries		Recreation	
		%		Wildlife	Moderate	Open Space	
		%		Hydrophytic Veg		Erosion	
		%		VernalPool	☐		

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-8	A	Black	Loam			muck, high Organic content
8+	B	2.5Y5/2	Sandy Loam	7.5YR4/6	>10%	

☐ Histosol☐ Histic Epipedon☐ Aquic Moisture Regime☒ Reducing Conditions☐ Gleyed or Low Chroma☐ Concretions☐ High Organic in Sandy Surface☐ Organic Streaking☐ Other Hydric Indicator☐ Local Hydric Soils List☐ National Hydric Soils List

New England Hydric Soil Indicator: VI

Wetland Hydrology:

Primary Indicators

Depth of surface water

☐ Inundated

Depth to water in pit

☐ Saturated upper 12"

Depth to saturated soil

☒ Water marks☐ Drift lines☒ Sediment deposits☒ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

General Comments

Royal Fern & Phalaris in greater wetland to north, significant ATV impacts in broader area to south. Wet meadow/shrub swamp

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland

Upland Community Type

Mesic Red Oak-Northern Hardwood

Upland Community ID:

Dominant Vegetation:

Trees	MAPLE,SUGAR	50.0	%	Shrubs	ELM,AMERICAN	15.0	%
	BIRCH,PAPER	15.0	%		MAPLE,SUGAR	40.0	%
	MAPLE,RED	25.0	%		BEECH	10.0	%
			%		MAPLE,RED	5.0	%
Herbs	SEDGE,WOODLAND	40.0	%	Herbs			%
	SARSAPARILLA,WILD	5.0	%				%
	WOODFERN,EVERGREEN	15.0	%				
	FERN,CHRISTMAS	15.0	%				

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle	Abun %	Soil Notes
0-4	A	10YR3/2	Loam				loose
4-5	E	2.5Y6/2	Sandy Loam				no streaks/mottles
5-7	B	10YR4/6	Sandy Loam				loose
7							rock

Photos:

Photo1	DB2548	atv crossing- reccomended crossing location
Photo2	DB2549	upstream
Photo3	DB2550	downstream
Photo4		

Photo Notes:

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Date

10/6/2008

Field ID

30-A

Wetland ID

21

Surveyor

DB

Flag #s

1-7

Community Type

Seep

Wetland Classification

Class 3

Delineation

Formal

☒ Do normal circumstances exist?☒ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees		%	Shrubs	MAPLE,RED	50.0	%	
		%				%	
		%				%	
		%				%	
Herbs	TOUCH-ME-NOT,SPOTTED	10.0	Function/Value	Water Storage		RTE	
	GRASS,FOWL MANNA	20.0		Water Protection		Education	
	GOLDEN-ROD,GIANT	10.0		Fisheries		Recreation	
	SEDGE,FRINGED	30.0		Wildlife	Moderate	Open Space	
	maple,red	5.0		Hydrophytic Veg		Erosion	
		%		VernalPool	☐		

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-3"	A	Black	Muck			
3-4"	B	2.5Y5/1	Silt Loam			
4"						rock/refusal

☐ Histosol☐ Histic Epipedon☐ Aquic Moisture Regime☒ Reducing Conditions☐ Gleyed or Low Chroma☐ Concretions☐ High Organic in Sandy Surface☐ Organic Streaking☐ Other Hydric Indicator☐ Local Hydric Soils List☐ National Hydric Soils List

New England Hydric Soil Indicator: VI

Wetland Hydrology:

Primary Indicators

Depth of surface water 0

☒ Inundated

Depth to water in pit 0

☒ Saturated upper 12"

Depth to saturated soil 0

☐ Water marks☐ Drift lines☐ Sediment deposits☐ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

General Comments

obvious Topo break. ATV trail along perimeter & through. No stream

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland Upland Community Type Upland Community ID:

Dominant Vegetation:

Trees	Am Beech	60.0	%	Shrubs	HOBBLE-BUSH	25.0	%
			%		MAPLE,STRIPED	15.0	%
			%		BEECH	20.0	%
			%		BLACKBERRY,ALLEGHENY		%
Herbs	Maple,red	20.0	%	Herbs	Am beech	10.0	%
	WOODFERN,EVERGREEN	25.0	%				%
	SEDGE,WOODLAND	20.0	%				
	cucumber root	10.0	%				

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-1"	O	Black	Loam			detritus/duff/loose
1-3"	B	7.5YR3/4	Silt Loam			moist
3-4"	B	7.5YR4/3	Silt Loam			moist
4"						rock

Photos:

Photo Description:

Photo1	DB2542	wetland
Photo2		
Photo3		
Photo4		

Photo Notes:

atv trail, old logging area

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Date

10/6/2008

Field ID

31/100

Wetland ID

31

Surveyor

DB

Flag #s

1-17 & 1-19

Community Type

Seep

Wetland Classification

Class 3

Delineation

Formal

☐ Do normal circumstances exist?☒ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees	MAPLE,RED	80.0	%	Shrubs			%	
			%				%	
			%				%	
			%				%	
Herbs	FERN,ROYAL	40.0	%	Function/Value	Water Storage	Moderate	RTE	
	FERN,CINNAMON	25.0	%		Water Protection		Education	
	GRASS,FOWL MANNA	5.0	%		Fisheries		Recreation	
	cucumber root	5.0	%		Wildlife	Moderate	Open Space	
	BULRUSH,GREEN	0.0	%		Hydrophytic Veg		Erosion	
	SEDGE,BLADDER	5.0	%		VernalPool	☒		

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-24"	O	peat				saturated

☒ Histosol☐ Histic Epipedon☐ Aquic Moisture Regime☐ Reducing Conditions☐ Gleyed or Low Chroma☐ Concretions☐ High Organic in Sandy Surface☐ Organic Streaking☐ Other Hydric Indicator☐ Local Hydric Soils List☐ National Hydric Soils List

New England Hydric Soil Indicator:

III

Wetland Hydrology:

Primary Indicators

Depth of surface water

☒ Inundated

Depth to water in pit

☒ Saturated upper 12"

Depth to saturated soil

☐ Water marks☐ Drift lines☐ Sediment deposits☐ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

General Comments

ATV trails, no stream, areas of standing water

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland

Upland Community Type

Upland Community ID:

Dominant Vegetation:

Trees	BEECH	80.0	%	Shrubs	BEECH	50.0	%
	oak,red	10.0	%		MAPLE,RED	30.0	%
			%		pine,white	10.0	%
			%				%
Herbs	maple,red	25.0	%	Herbs	BLACKBERRY,ALLEGHENY		%
	cucumber root	5.0	%				%
	beech	30.0	%				%
	BLACKBERRY,BRISTLY	15.0	%				%

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle	Abun %	Soil Notes
0-1"	O	black	Sandy Loam				detritus/duff
1-2"	E	10YR6/3	Sandy Loam				loose
2-8"	B	7.5YR4/6	Sandy Loam				loose, no redux
8"+							rock/refusal

Photos:

Photo1	DB2543	Photo Description:	ATV impacts
Photo2	DB2544		nice area of wetland
Photo3			
Photo4			

Photo Notes:

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Date

10/6/2008

Field ID

101

Wetland ID

34

Surveyor

DB

Flag #s

1-34

Community Type

Wet Meadow

Wetland Classification

Class 3

Delineation

Formal

☐ Do normal circumstances exist?☒ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees	ELM,AMERICAN	60.0	%	Shrubs	willow, spp	75.0	%	
			%				%	
			%				%	
			%				%	
Herbs	FERN,SENSITIVE	75.0	%	Function/Value	Water Storage		RTE	
	GOLDEN-ROD,GIANT		%		Water Protection	Low	Education	
	RASPBERRY,COMMON RED		%		Fisheries		Recreation	
			%		Wildlife		Open Space	
			%		Hydrophytic Veg		Erosion	
			%		VernalPool	☐		

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-8"	A	10YR3/1	Loam			moist
8"+	B	2.5Y5/2	Sandy Loam	2.5Y5/6	75	moist

☐ Histosol☐ Histic Epipedon☐ Aquic Moisture Regime☒ Reducing Conditions☐ Gleyed or Low Chroma☐ Concretions☐ High Organic in Sandy Surface☐ Organic Streaking☐ Other Hydric Indicator☐ Local Hydric Soils List☐ National Hydric Soils List

New England Hydric Soil Indicator: VI

Wetland Hydrology:

Primary Indicators

Depth of surface water

☐ Inundated

Depth to water in pit

☐ Saturated upper 12"

Depth to saturated soil

☐ Water marks☐ Drift lines☐ Sediment deposits☒ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

General Comments

drainage channels, no flow assume connection to a stream off property

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland

Upland Community Type

Old Field

Upland Community ID:

Dominant Vegetation:

Trees			%	Shrubs	ASH, GREEN	0.0	%
			%				%
			%				%
			%				%
Herbs	milkweed, common	15.0	%	Herbs	GOLDEN-ROD, CANADA		%
	queen-annes lace	15.0	%		GOLDEN-ROD, GIANT		%
	gallium spp	10.0	%				
	CINQUEFOIL, OLD FIELD		%				

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle	Abun %	Soil Notes
0-12"	A	10YR3/2	Loam				Dry
12-16"	B	2.5Y5/3	Sandy Loam	10YR5/6		5	

Photos:

	Photo Description:
Photo1	DB2546 wetland- SS
Photo2	DB2547 wetland- herb
Photo3	
Photo4	

Photo Notes:

mixed veg/non hydric soils

Wetland Delineation Data Form

Field/ID Notes:

Project Name		Location		
Georgia Mountain		Ted Road		
Date	Field ID	Wetland ID	Surveyor	Flag #s
10/15/2008	Ted21/Ted2/Ted3	36	DB	1-15,1-16
Community Type		Wetland Classification		Delineation
Shallow Emergent Marsh		Class 2		Formal

☒ Do normal circumstances exist?☐ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees	Willow spp	20.0	%	Shrubs	spirea spp	5.0	%	
	MAPLE,RED	5.0	%		willow spp	20.0	%	
			%				%	
			%				%	
Herbs	GRASS,REED CANARY	40.0	%	Function/Value	Water Storage		RTE	
	JOE-PYE-WEED,SPOTTED	15.0	%		Water Protection		Education	
	FERN,CINNAMON	15.0	%		Fisheries		Recreation	
	TOUCH-ME-NOT,SPOTTED	5.0	%		Wildlife		Open Space	
	carex spp	10.0	%		Hydrophytic Veg		Erosion	
	ASTER,NEW ENGLAND	10.0	%		VernalPool	☐		

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-4"	A	10Y3/2	Sandy Loam	7.5YR4/6	10%	slight decomposed O.M.
4-6"+	B	2.5YR4/2	Sand	2.5Y5/4	>2%	wet, coarse sand

☐ Histosol☐ Histic Epipedon☐ Aquic Moisture Regime☒ Reducing Conditions☐ Gleyed or Low Chroma☐ Concretions☐ High Organic in Sandy Surface☐ Organic Streaking☐ Other Hydric Indicator☐ Local Hydric Soils List☐ National Hydric Soils List

New England Hydric Soil Indicator: VII

Wetland Hydrology:

Primary Indicators

Depth of surface water

☒ Inundated

Depth to water in pit

☐ Saturated upper 12"

Depth to saturated soil

☐ Water marks☐ Drift lines☐ Sediment deposits☒ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

General Comments

open water pond w/ sedge/marsh along perim. Extends to west. Culverted under Ted Rd. Stream. TP @ Ted1-9 obv. Topo break. Existing powerline along Ted Rd. Ted2-purple loose strife present

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland Upland Community Type Upland Community ID:

Dominant Vegetation:

Trees	BIRCH,PAPER	30.0	%	Shrubs	BEECH	20.0	%
	oak,red	25.0	%		MAPLE,STRIPED	5.0	%
			%		HORNBEAM,AMERICAN	40.0	%
			%				%
Herbs	beech	15.0	%	Herbs			%
	oak,red	15.0	%				%
	maple,striped	20.0	%				%
	maple,sugar	5.0	%				%

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-9"	A	2.5Y3/2	Loamy Sand			dry/loose
9-12"	B	10YR4/4	Loamy Sand			some pebbles, dry & loose

Photos:

Photo Description:

Photo1	2559	pond/wetland north side ted road (Ted1)
Photo2	2560	south side Ted Rd (Ted2)
Photo3	2561	North side- Ted3
Photo4	2562	looking east down Ted Rd wetland other side

Photo Notes:

no hydrology

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Ted Road

Date

10/15/2008

Field ID

Ted4

Wetland ID

37

Surveyor

DB

Flag #s

1-9

Community Type

Seep

Wetland Classification

Class 3

Delineation

Formal

☒ Do normal circumstances exist?☐ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees		%	Shrubs	willow spp (1)	%		
		%			%		
		%			%		
		%			%		
Herbs	FERN,SENSITIVE	60.0 %	Function/Value	Water Storage		RTE	
	TOUCH-ME-NOT,SPOTTED	30.0 %		Water Protection	Moderate	Education	
		%		Fisheries		Recreation	
		%		Wildlife		Open Space	
		%		Hydrophytic Veg		Erosion	
		%		VernalPool	☐		

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-10"	A	10YR4/2	Silt Loam			Moist
10-13"	B	2.5Y5/2	Silt Loam	10YR3/4	>5%	
13"+						rock/refusal

☐ Histosol☐ Histic Epipedon☐ Aquic Moisture Regime☒ Reducing Conditions☐ Gleyed or Low Chroma☐ Concretions☐ High Organic in Sandy Surface☐ Organic Streaking☐ Other Hydric Indicator☐ Local Hydric Soils List☐ National Hydric Soils List

New England Hydric Soil Indicator: VI

Wetland Hydrology:

Primary Indicators

Depth of surface water

☐ Inundated

Depth to water in pit

☐ Saturated upper 12"

Depth to saturated soil

☐ Water marks☐ Drift lines☒ Sediment deposits☒ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

General Comments

stream through wetland, intermittant, some standing water

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland

Upland Community Type

Upland Community ID:

Dominant Vegetation:

Trees	haWTHORN	25.0	%	Shrubs	River Grape		%
	Apple	10.0	%		sumac, staghorn		%
	ASH, WHITE	20.0	%				%
	CHERRY, BLACK	10.0	%				%
Herbs	Queen annes lace	10.0	%	Herbs			%
	raspBERRY, flowering	15.0	%				%
	COW-PARSNIP	20.0	%				%
	GOLDEN-ROD, TALL		%				%

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle	Abun %	Soil Notes
							Gravel

Photos:

Photo1	2564	Photo Description:
Photo2		wetland @ flag 2
Photo3		
Photo4		

Photo Notes:

road shoulder, obvious topo break, no hydrology, disturbed soils

Wetland Delineation Data Form

Field/ID Notes:

Project Name

Georgia Mountain

Location

Ted Road

Date

10/15/2008

Field ID

Ted5

Wetland ID

38

Surveyor

DB

Flag #s

1-9

Community Type

Seep

Wetland Classification

Class 3

Delineation

Formal

☒ Do normal circumstances exist?☐ Is the site disturbed?☐ Is this a potential problem site?

Dominant Vegetation:

Trees	ELM,AMERICAN	20.0	%	Shrubs	MAPLE,RED	10.0	%	
	willow,spp	50.0	%				%	
			%				%	
			%				%	
Herbs	JOE-PYE-WEED,SPOTTED	20.0	%	Function/Value	Water Storage	Moderate	RTE	
	FERN,SENSITIVE	40.0	%		Water Protection	Moderate	Education	
	ASTER,NEW ENGLAND	10.0	%		Fisheries	Low	Recreation	
	TOUCH-ME-NOT,SPOTTED	10.0	%		Wildlife	Low	Open Space	Moderate
	HORSETAIL,FIELD	5.0	%		Hydrophytic Veg		Erosion	Moderate
			%	VernalPool	☐			

Wetland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle Abun %	Soil Notes
0-9"	O	10YR3/1	Muck			muck/saturated
9"+	B	2.5Y5/2	Sandy Loam	2.5Y5/6		rocky bright mottles

☐ Histosol☒ Reducing Conditions☐ High Organic in Sandy Surface☒ Histic Epipedon☐ Gleyed or Low Chroma☐ Organic Streaking☐ Local Hydric Soils List☐ Aquic Moisture Regime☐ Concretions☐ Other Hydric Indicator☐ National Hydric Soils List

New England Hydric Soil Indicator: IV

Wetland Hydrology:

Primary Indicators

Depth of surface water

☐ Inundated☒ Saturated upper 12"☐ Water marks☐ Drift lines☐ Sediment deposits☒ Drainage patterns

Secondary Indicators

☐ Oxidized root ch☐ Water stained leaves☐ Other

Depth to water in pit

8

Depth to saturated soil

General Comments

adjacent to road, data pt at flag#8

☒ Hydrophytic vegetation present?☒ Wetland hydrology present?☒ Hydric soils present?☒ Is this a wetland?

Surrounding Upland

Upland Community Type

Upland Community ID:

Dominant Vegetation:

Trees	MAPLE,SUGAR	15.0	%	Shrubs	CHERRY,BLACK	20.0	%
	CHERRY,BLACK	20.0	%		BUCKTHORN,COMMON	20.0	%
	ASH,WHITE	40.0	%		ELM,AMERICAN	10.0	%
	MAPLE,RED	20.0	%				%
Herbs	WOODFERN,EVERGREEN	10.0	%	Herbs	Cornus spp	5.0	%
		0.0	%		buckthorn, common	5.0	%
	BLACKBERRY,ALLEGHENY	10.0	%				
	STRAWBERRY,VIRGINIA	5.0	%				

Upland Soils:

Depth range	Hor	Matrix Colo	Texture	Mottle Color	Mottle	Abun %	Soil Notes
0-8"	A	10YR4/3	Sandy Loam				loose dry
8"	C						rock/refusal

Photos:

Photo1	2563	Photo Description:
Photo2		wetland
Photo3		
Photo4		

Photo Notes: