

**RTE, Natural Community  
& Critical Wildlife Habitat Inventory Report  
New England Clean Power Link Project  
October 23, 2014**



**ARROWWOOD ENVIRONMENTAL**  
950 BERT WHITE ROAD  
HUNTINGTON, VT 05462  
(802) 434-7276 FAX: (802) 329-2259



## Table of Contents

Introduction.....	1
Study Area.....	1
Inventory.....	2
1: Necessary Wildlife Habitat Surveys.....	2
1a: Deer Wintering Areas.....	2
1b: Necessary Habitat for Black Bear.....	6
2: Rare, Threatened and Endangered Plant Species Survey.....	8
3: Rare, Threatened and Endangered Animal Survey.....	12
4: Rare and Irreplaceable Natural Areas Assessment.....	14
5: Special Aquatic Sites and Special Wetlands.....	20
6: References.....	22

## Tables

Table 1: Forest Stands With Potential DWA Cover Conditions.....	5
Table 2: Summary Data Table for Recorded Animal EOs.....	13
Table 3: Summary Data for Potentially Significant Upland Natural Communities.....	16

## Attachments

- Attachment 1: RTE Rare Plant Occurrence Reporting Forms
- Attachment 2: RTE Plant Survey Summary Data
- Attachment 3: Complete List of Plant Species Recorded During the RTE Plant Survey
- Attachment 4: Survey Summary for Recorded RTE Animal EOs
- Attachment 5: Survey Summary for Recorded Natural Community EOs
- Attachment 6: Natural Community Survey Forms
- Attachment 7: GIS Data Deliverables Description



## Introduction

Arrowwood Environmental (AE) conducted the following surveys in connection with the terrestrial component of the NECPL Project: necessary wildlife habitat, special aquatic resources, rare, threatened, or endangered species habitat, and rare and irreplaceable natural areas. The surveys were conducted from May through Mid-August of 2014. This report details the methodology employed in conducting the surveys and survey results. Included with this report is a series of GIS shapefiles, as outlined in Attachment 7. AE has also conducted an Indian Bat habitat assessment and non-native invasive species inventory which shall be submitted under separate covers.

## Study Area

The route of the study area is as follows:

1. Canadian Border down Bay Road to 55 Bay Road, Alburg
2. Exit Lake at 113 Stoney Point Road, Benson
3. Lake Road to Route 22A
4. Route 22 A to Route 4
5. Route 4 to Route 7
6. Route 7 to Route 103
7. Route 103 to Route 100
8. Route 100 to Town Roads in Ludlow
9. Town Roads in Ludlow

The width of the study area corridor is as follows:

1. Alburg: 50 foot total width, including existing roadway surface (Town ROW) and private parcel owned by project developers.



2. Town Roads in Benson: 50 foot total width, including existing roadway surfaces, entirely within Town ROWs and private parcel owned by project developers.
3. VT Route 22A: Entire width of VTrans or Town of Fair Haven ROWs, ~ 66 feet.
4. US Route 4: Entire width of VTrans ROW on either side of paved roadway/shoulder (~125'), not including the median (North of westbound lands and South of eastbound lanes).
5. US Route 7: Entire width of VTrans ROW
6. VT Route 103: Entire width of VTrans ROW
7. VT Route 100: Entire width of VTrans ROW
8. Town Roads in Ludlow: 50 foot total width, including existing roadway surfaces, entirely within Town ROWs.

## Inventory

### *1: Necessary Wildlife Habitat Surveys*

AE conducted surveys of deer wintering areas and bear feeding habitat within the study area. Each of these surveys is discussed in this section.

#### **1a: Deer Wintering Areas**

The white-tailed deer (*Odocoileus virginianus*) is near its northernmost range extension in Vermont. In order for the deer to thrive in Vermont, they must utilize particular habitats during periods of extended deep snow and cold temperatures during the winter months. Coniferous evergreen tree canopies provide the forest structure that both: 1) shed snows resulting in reduced snow depths; and, 2) provide overhead tree canopies shielding deer from excessive heat loss during



winter. Mixed hardwood and evergreen forested natural communities also can provide this biological function.

Preferred species of evergreen trees utilized by white-tailed deer include Northern white cedar (*Thuja occidentalis*) and Eastern Hemlock (*Tsuga canadensis*). Balsam fir (*Abies balsamea*) and red spruce (*Picea rubens*) stands can also serve this function, but generally to a lesser degree. White pine (*Pinus strobus*), can, at times be utilized by over-wintering deer but is of considerably lesser value in fulfilling deer over-wintering habitat requirements. These evergreen forest communities retain snow in the canopy resulting in shallower winter snow depths on the ground than nearby hardwood forests. They also provide a forest canopy shielding over-wintering deer from extreme heat loss to the upper atmosphere.

The forest conditions of the study area are generally characterized as cleared along the existing roadways and varying forest edge at the limit of the ROW. These areas have been previously disturbed and for the most part do not fulfill the necessary requirements to serve as over-wintering habitats for white-tailed deer. These road edges are frequently visited by people, their pets, and often receive relatively high amounts of light both from cars and human development. Perhaps most importantly, these road sides are subject to constant noise, primarily resulting from car and truck traffic. This was especially evident regarding the well-travelled roads such as Routes 22a, 4, 7, and 103. White-tailed deer in Vermont generally develop a fidelity to the use of winter forest habitats which provide a high degree of isolation from stress causing factors such as noise, and the presence of humans and their pets. The winter of 2013-2014 was a cold and snowy winter and deer in most regions in Vermont sought shelter within so called "deeryards" or deer wintering areas (DWA).



***1a(i) DWA Methodology***

The deer wintering area survey involved both a remote review of available digital databases and aerial imagery interpretation as well as field assessment of specific habitat features within the study area. The methodology employed and the results of the survey are discussed in this section.

***1a(ii) DWA Remote Review***

AE reviewed the existing State of Vermont Fish and Wildlife Department (Vt. F&W) Deer Wintering Area data layer. AE also remotely mapped all conifer and mixed conifer/hardwood forest stands within ¼ mile of the edge of potential disturbance for the proposed project. Stand mapping was conducted through aerial photo interpretation of the 2011-2012 Vt. Orthophotography Program false color-infrared photo series from Vermont Center for Geographic Information (VCGI). Stands with a continuous or near-continuous conifer canopy were digitized as conifer forest land-cover type, and stands with approximately 50% or more conifer canopy were digitized as mixed forest land-cover type. Stand mapping was conducted at a screen scale of 1:5000 or larger, and unit size was generally proportional to the study area size with a mean stand area of 23 acres. Stands were only mapped to edge of a ¼ mile buffer from the project area, and mapping was terminated at this boundary even if the conifer or mixed forest stand continued beyond this edge. All remotely mapped conifer and mixed-conifer stands were considered potential deer winter habitats.

As a result of the remote review approximately 162 potential deer winter habitats were identified of which approximately 78 forest stands intersected with the study area and were targeted for field review.

***1a(iii) DWA Field Survey***

Coniferous and mixed conifer/hardwood forest communities which fell within the study area were visited in the field. Meandering surveys were conducted within





these target communities in the study area. Each potential DWA site was assessed for the appropriateness of the forest structure, (i.e. percent coniferous tree canopy cover) and dominant canopy species; as well as for their utilization by over-wintering white-tailed deer. The presence and abundance of deer winter scat piles as well as the extent of winter woody plant browse by deer was noted.

***1a(iv) DWA Results***

Approximately 78 forest stands were assessed for deer overwinter use within the study area. Forest stands with a combination of the appropriate tree species as well as adequate forest structure within the study area were rare with only five stands having both features. The table below provides summary information for these five stands.

**Table 1: Forest Stands With Potential DWA Cover Conditions**

Potential DWA ID	Route Segment	Potential DWA Cover Conditions
593	Route 103-Mt Holly, Ludlow	White Pine/Balsam Fir 80% cover
604	Route 103-Mt Holly, Ludlow	Red Spruce/Balsam Fir 80% cover
1058	Old North Lake Road	Hemlock 65% cover
1128	Route 103-Wallingford	Hemlock 80% cover
1139	Route 103-Mt Holly, Ludlow	Red Spruce/Balsam Fir 75% cover

There were no field observations within the evaluated forest stands revealing white-tailed deer utilization (as an over-wintering habitat). No observations of white-tailed deer winter scat piles or winter woody browse were observed within any of the evaluated forest stands.

These results are not surprising given the excessive disturbance from people and vehicular traffic within and adjacent to the study area. Evaluations did not extend beyond what was visible within the study area.



### **1b: Necessary Habitat for Black Bear**

AE conducted a remote review of available databases to identify potential necessary habitat for black bear within the project area. Databases included the Black Bear Habitat in Vermont Map (VT. F&W), the Vermont Biodiversity Project "Bear Points", and the 2006 Road Kill data.

Necessary wildlife habitat for black bears falls into one of three categories: (1) travel corridors; (2) spring feeding wetlands; and, (3) fall feeding habitat consisting of mast producing trees. Each of these habitat features is discussed in relation to the project area.

#### ***1b(i) Black Bear Travel Corridors***

Travel corridors, also called connecting lands or connecting habitats, are land areas that serve to link other patches of important wildlife habitats together. The proposed project intersects one potential black bear travel corridor located on Rte 103 near the town line separating Mt. Holly and Ludlow. There are multiple road sighting occurrences in this area (as revealed by the digital bear points database). The area has been designated "Bear Production Habitat" by the State of Vermont on the Bear Habitat Map and there are relatively wild forestlands north and south of Route 103 in this location. In general, the designation of the area as bear production habitat suggests that quality of bear habitat in this region is sufficient to support the home ranges of breeding adult female bears.

This area appears to be part of a public and private conservation effort to facilitate bear crossing of Rte 103. Bear crossing signs were observed during the field survey effort for the project.

Within the project study area, being generally characterized as heavily disturbed by road traffic and human activity, biologically critical black bear habitat is limited or non-existent. The project study area is likely limited in function to its role as



part of a travel corridor wherein bears are moving quickly between the large uninterrupted forest blocks north and south of the roadway where more appropriate biologically critical habitat exists.

***1b(ii) Black Bear Fall Feeding Habitat***

AE reviewed the State of Vermont bear points database for presence of mast stands. There are no mapped fall feeding habitats, generally mast producing trees such as American beech (*Fagus grandifolia*), within 1/2 mile of the proposed project.

During a review of potentially significant natural communities, AE identified northern red oak (*Quercus rubra*) stands within 1/2 mile of the proposed project. Red oak is a mast-producing tree also used by fall-feeding black bears. Due to the existing and frequent disturbance associated with the roadways, bear use of any red oak trees within the project area is highly unlikely.

***1b(iii) Black Bear Wetlands***

Wetlands, especially forested or sheltered wetlands, are used heavily by black bear for feeding in the spring season when very little besides newly sprouting forbs and sedges are available to eat. These "Bear Wetlands" are considered critical habitat.

AE reviewed the bear points database for presence of bear wetlands. There are no bear wetlands within the study area and there are no known bear wetlands within 1/2 mile of the proposed project. As with mast trees, the existing and frequent disturbance associated with the roadways is likely to limit any bear use of wetlands close to the project study area.



## ***2: Rare, Threatened and Endangered Plant Species Survey***

A rare, threatened and endangered (RTE) plant species survey was conducted for the study area. The survey involved both a remote assessment of available digital databases and a detailed field survey. The methodology employed and the results of the survey are discussed in this section.

### ***2(i) RTE Remote Review***

The initial step in the RTE survey was a remote assessment of known rare plant Element Occurrences (EOs) in the vicinity of the study area. This information was obtained from the Vermont Non-Game and Natural Heritage Program (NNHP) and summarized by TRC Companies, Inc (TRC). TRC in turn, provided this summarized information to AE. All known occurrence data was imported into GPS units and used as an aid during the field surveys.

### ***2(ii) RTE Plant Field Survey***

As outlined by TRC in the document: *Rare, Threatened, and Endangered Species, Necessary Wildlife Habitat, and Natural Community Survey Program* (April 2014) the field inventory methodology had three related protocol: 1) Perform targeted RTE plant surveys within the survey area in the vicinity of known EOs; 2) Conduct a visual meander survey of the study area; and 3) Perform RTE plant habitat assessments within and directly adjacent to the survey area in the vicinity of known EOs for species that cannot be identified during the survey period.

The first two protocols were conducted concurrently during the field survey. The third protocol was deemed to be unnecessary. The timing of the RTE surveys (outlined below) was such that species which bloomed earlier in the season (e.g. *Boechera spp.*) were identifiable in seed. Later blooming species (e.g. *Symphotrichum spp.*, *Desmodium spp.* and *Lespedeza spp.*) were coming into bloom during the survey period. In some cases, populations not in bloom during



the first part of the survey period were re-visited later in the survey period when blooms were present and a positive identification could be made.

The targeted surveys and the meander surveys (protocols 1 and 2) were conducted by three botanists: Michael Lew-Smith, Matt Peters and Art Gilman. The surveys commenced on July 17, 2014 and concluded on August 19, 2014. Project survey area boundaries were imported into field GPS units to identify the limits of the ROW during the field surveys. Nomenclature for the RTE plant inventory followed Flora of Vermont by Art Gilman (in press). Plant rarity ranks were based on the Vermont NNHP list dated 6-28-2014.

If a rare plant population was discovered, a location point was recorded using professional mapping-grade GPS units, with subsequent detailed mapping conducted by sub-meter grade GPS. In some cases, sub-meter GPS mapping of the population occurred at the time of discovery. In other cases, a botanist returned to the site at a later date to map the population location with sub-meter grade GPS. This was done for efficiency of field operations and in some cases, to accommodate conclusive identification of the species following collection. Sub-meter accuracy of the population boundaries was obtained using Trimble professional grade handheld GPS units. Population locations were collected as either a single point at the center of the population with notes on a radius distance from the center within which the plant is present, or as multiple points defining the boundary of a larger population. Field collected GPS points were recorded at settings recommended by the device manufacturer for sub-meter accuracy, with an average of at least 30 positions per point and were post-processed using Trimble software against Vt. Agency of Transportation CORS base station data published at: <http://www.aot.state.vt.us/geodetic/default.htm>.



Polygons were manually built from sub-meter GPS data following post-processing. Where a single point was collected at the center of a small population, a circle was constructed about the point at the radius indicated by the field botanist. When multiple points were collected for a population boundary, the appropriate points were connected to form a polygon. Each polygon was linked by reference to the original mapping grade GPS point to enable transfer of all initial species, population and other metrics collected. All polygons were reviewed for quality assurance and completeness by multiple AE personnel with geometry and associated attributes adjusted as deemed appropriate by the reviewers.

All species with an S-rank of S1, S2 and S2S3 were mapped to sub-meter accuracy. Uncommon species (S3 rank) were also documented and mapped during this inventory and are included in the summary tables. S3 populations were not mapped to sub-meter accuracy and no rare plant report forms were used. S3 populations were mapped from the original mapping-grade GPS point with a default 20' diameter circle software-generated around the point to represent the general area of occurrence.

For each rare plant population, a Rare Plant Occurrence Report Form (NNHP, Vermont Fish and Wildlife) was filled out with information about the population. Since spatial data is also being submitted, a somewhat abbreviated version of this form excluding location description was used for this project. One form was completed for each rare plant population. What comprised a population was based on distance between rare plant occurrences, plant biology, barriers to dispersal and professional judgment.



Copies of the Rare Plant Occurrence Report forms are provided as Attachment 1. The forms are linked to the digital spatial data and the data table provided as Attachment 2 by using the "Population Group" code.

*2(iv) RTE Plant Results*

Fifty-three different species of uncommon, rare, threatened or endangered plant species were identified during this survey. This includes 3 state endangered and 6 state threatened species.

Summary data for all uncommon, rare, threatened or endangered plant species is provided as Attachment 2. Each record in this table is linked to the polygon (location) data by the Polygon ID field. Records with the same "Population Group" entry are considered part of the same population. Population sizes listed for each record indicate the number of plants in each individual polygon. In some cases, there are multiple polygons for each population. In a few circumstances, the number of individuals for each polygon is not known; only the total population number is known. In these instances, "Unknown" is listed in the Population Size field, followed by total population size. The Polygon Group field is linked to the RTE forms, presented in the attachment.

A complete list of plant species recorded during the RTE plant survey is provided as Attachment 3.



### ***3: Rare, Threatened and Endangered Animal Survey***

AE conducted a Rare, Threatened and Endangered Animal species habitat survey for the project study area. The survey involved a remote review of available digital databases. RTE wildlife habitat assessments were conducted as needed and were based on existing species records within the proposed route and incidental sightings during the plant survey.

#### ***3(i) RTE Animal Remote Review***

The initial step in the RTE animal survey was a remote assessment of known rare animal Element Occurrences (EOs) in the vicinity of the study area. This information was obtained from the Vermont Non-Game and Natural Heritage Program (NNHP) and summarized by TRC. TRC in turn, provided this summarized information to AE. All known occurrence data was imported into GPS units and used as an aid during the field surveys.

#### ***3(ii) RTE Animal Field Survey***

As outlined by TRC in the document: *Rare, Threatened, and Endangered Species, Necessary Wildlife Habitat, and Natural Community Survey Program* (April 2014), the field survey methodology consisted of conducting targeted RTE animal habitat assessments in the vicinity of known EOs in the study area. No *de novo* searches for RTE animals occurred during this inventory.

With the exception of Indiana Bat habitat work (report to be presented under separate cover), the RTE animal habitat inventory occurred concurrently with the RTE plant inventory and employed the same meander survey techniques. In the vicinity of existing EOs, notes were made on the habitat present with a focus on particular habitat features (such as hibernacula for snakes).





**3(iii) RTE Animal Results**

There are eighteen known EOs of RTE animals in the study area as recorded in the NNHP database. Field work has confirmed that, in most cases, general habitat features preferred by RTE animal species is present within the study area. However, no special habitat features such as hibernacula were discovered within the study area. The results of the RTE animal habitat assessments are provided as Attachment 4. The table below provides summary information about the recorded EOs in the project area.

**Table 2: Summary Data Table for Recorded Animal EOs**

<b>Animal Species</b>	<b>S-Rank</b>	<b># of EOs</b>
Eastern Ribbonsnake	S2	2
Stinkpot (Eastern Musk Turtle)	S2	1
Eastern Ratsnake	S2	3
Upland Sandpiper	S2B	2
Fluted-Shell	S2	1
Silver Lamprey	S2	2
Timber Rattlesnake	S1	2
Cerulean Warbler	S1S2B	1
Pie-billed Grebe	S2S3B	1
Creek Heelsplitter	S2	1
Cape May Warbler	S1B	1
Indiana Bat	-	1



#### ***4: Rare and Irreplaceable Natural Areas Assessment***

Rare or irreplaceable natural areas (RINA) are not defined in state statutes. A subset of significant natural communities may be considered to be RINA as well as State Natural Areas. Significance is assessed according to the *Guidelines for the Conservation and Protection of State-Significant Natural Communities* (ANR 2004). The focus of this assessment was to identify potentially significant natural communities that may be considered to be RINA. Methodology for conducting this assessment followed Section 6.1 in the TRC document: *Rare, Threatened, and Endangered Species, Necessary Wildlife Habitat, and Natural Community Survey Program* (April 2014). A component of this evaluation is the mapping of non-native invasive species (NNIS), a report of which is submitted under separate cover. Complete evaluation of entire communities, as necessary to conclusively determine state significance, was outside the scope of this survey due to access constraints outside of the study area.

##### ***4(i) RINA Remote Review***

The initial step in the assessment was to identify known significant community Element Occurrences (EOs) in the vicinity of the study area and the presence of State Natural Areas. This information was obtained from the NNHP database. In addition, AE remotely identified any potentially significant natural communities within ¼ mile of the study area by reviewing various orthophoto imagery, topographic maps, soil surveys and VSWI wetland maps. This process was conducted for both upland and wetland natural communities. All known occurrence data, State Natural Area locations, as well as potentially significant natural communities as remotely identified was imported into GPS units and used as an aid during the field surveys.



***4(ii) RINA Field Survey***

The focus of the field work was twofold: 1) to confirm or deny that any of the known significant communities were within the study area, and 2) to assess the remotely identified potentially significant communities within the study area. The significant natural community assessments were conducted concurrent with the RTE plant survey.

For the potentially significant natural communities identified in the study area, AE gathered field information about the community type and condition. This information included canopy cover, species composition, age, disturbance and community condition. After the field work was completed, a broader analysis of the sites was conducted to include overall community size and landscape position.

The digital data submitted with this report includes a polygon shapefile of potentially significant natural communities. This submittal includes only those sites that are considered potentially significant AND occur within the study area. In addition, these natural community boundaries are clipped within ¼ mile of the study area.

***4(iii) RINA Results***

As mentioned previously, sites on the list of State Natural Areas can be considered to be RINA. There are no sites within the study area that are on the list of State Natural Areas. In addition, known significant natural community occurrences (as recorded in the NNHP database) may be considered to be RINA. Fourteen different known significant natural communities occur in the vicinity of the study area. Summary data for these sites, along with results of the field survey work, are provided as Attachment 5. Fieldwork confirmed that none of these fourteen natural communities occur within the study area.



An assessment of new significant natural community occurrences was conducted for both wetlands and uplands. There were no potentially significant wetland communities identified in the study area. Given the narrow, linear nature of the study area and the proximity of existing roads, very few undisturbed wetlands were present. In some cases, large state significant wetlands were in the vicinity of the study area, but did not enter into the study area and were therefore not assessed during the field work or included in this report.

The analysis of upland natural community occurrences resulted in the identification of eight potentially significant upland natural communities. Summary data for these sites are provided in Table 3 and briefly described below. In all cases, further field work would need to be conducted outside of the study area to determine the full nature and extent of the communities and draw any definitive conclusions regarding significance.

**Table 3: Summary Data for Potentially Significant Upland Natural Communities**

Natural Community	Mile Marker	Comments	Site Name	Rank Comments
Mesic Red Oak-Northern Hardwood Forest	122.2 to 123.0	Standard example of type	Herrick Mountain NE	Potentially Significant Natural Community
Mesic Maple-Ash-Hickory-Oak Forest	120.2 to 120.7	Nice mature forest	Mount Hanley East	Likely Significant Natural Community
Mesic Maple-Ash-Hickory-Oak Forest	119.5 to 119.9	Very nice forest, some mature areas	Mount Hanley West	Likely Significant Natural Community
Mesic Maple-Ash-Hickory-Oak Forest	121.2 to 121.8	Very nice forest, some mature areas	Twin Mountain	Likely Significant Natural Community
Mesic Maple-Ash-Hickory-Oak Forest	117.3 to 118.1	Very nice forest, drier	Blueberry Hill	Likely significant natural community



Natural Community	Mile Marker	Comments	Site Name	Rank Comments
		inclusions; larger to north		
Temperate Hemlock Forest	115.3 to 115.6	Large forest to north, somewhat disturbed along ROW	Pine Pond	Potentially Significant Natural Community
Temperate Hemlock-Hardwood Forest	114.7 to 115.2	Large mixed forest to north	Pine Pond	Potentially Significant Natural Community
Dry Oak-Hickory-Hophornbeam Forest	112.4 to 112.8	Transitional to Mesic Forest	Green Dump Hills	Potentially Significant Natural Community

**Herrick Mountain NE**

This Mesic Red Oak-Northern Hardwood Forest is dominated by northern red oak, American ash (*Fraxinus americana*), American beech, black birch (*Betula lenta*), and white pine. The understory consists of witch hazel (*Hamamelis virginiana*), maple-leaved viburnum (*Viburnum acerifolium*) and various canopy saplings. This appears to be a fairly young forest, with DBHs averaging around 10-12". Despite the age, the forest appears to be in good condition. This is a fairly common community type, and would be a significant natural community only if the rest of the forest to the south is in very good condition.

**Mount Hanley East, Mount Hanley West, Blueberry Hill and Twin Mountain**

This series of four forest communities all sit at the base of a series of dry hills in West Rutland, Ira and Castleton. They all are examples of the Mesic Maple-Ash-Hickory-Oak Forest community. They are dominated by northern red oak,



shagbark hickory (*Carya ovata*), bitternut hickory (*Carya cordiformis*), American hop hornbeam (*Ostrya virginiana*) and American ash. The understory consists of canopy species as well as maple-leaved viburnum, witch hazel, Pennsylvania sedge (*Carex pensylvanica*), wood anemone (*Anemone quinquefolia*) and blue-stemmed goldenrod (*Solidago caesia*). There are some inclusions of Dry Oak-Hickory-Hophornbeam Forest where the soils are well-drained.

While there are a few areas of more recent disturbance, most of these forests in the study area are mature and in very good condition. Given the condition, community type and size of these forests, it is likely that these communities would be considered state significant.

### **Pine Pond**

These two forests consist of a Temperate Hemlock-Hardwood Forest and a Temperate Hemlock Forest. The canopy in the mixed forest is dominated by Eastern hemlock, red maple (*Acer rubrum*), American beech, and northern red oak. The sparse understory consists of canopy species as well as rock polypody (*Polypodium virginianum*) and evergreen woodfern (*Dryopteris intermedia*). The Hemlock Forest contains less hardwood and also includes white pine. Within the ROW, some sections of these forests are somewhat disturbed and early successional. Nevertheless, they are part of very large forests outside of the ROW to the north. Further analysis of the forests outside of the study area would need to be conducted to determine if these are significant natural communities.

### **Green Dump Hills**

The forest at this location is best described as a Dry Oak-Hickory-Hophornbeam Forest community, though it may be transitional to the Mesic Maple-Ash-Hickory-Oak Forest. The canopy is dominated by northern red oak, American ash, white pine and American hop hornbeam. The understory is dominated by



Pennsylvania sedge. The forest continues to the north where it is interspersed with numerous state significant examples of the Dry Oak Forest community. Given its size, condition and community type, this forest is likely a state significant natural community.



### ***5: Special Aquatic Sites and Special Wetlands***

Special Aquatic Sites (SAS) are a U.S. Army Corps of Engineers designation which affords protection to certain types of wetlands. These wetland types are outlined in the Vermont Wetland General Permit under General Condition 27 (Department of Army Vermont General Permit, 12/11/2012). SAS include mudflats, vegetated shallows, and riffle and pool complexes. In addition, Special Wetlands are also afforded additional protection. Special Wetlands are bogs, fens, vernal pools and wetlands that provide habitat for state threatened or endangered species.

#### ***5(i) SAS Methodology***

Wetland survey data forms for the project study area were provided to AE by TRC. These data forms were used by AE to determine if any SAS or Special Wetlands were delineated based on the Cowardin Classification. Field surveys for SAS and Special Wetlands were conducted concurrently with the RTE plant surveys and survey for significant wetland natural communities. Wetlands within the study area were visited during these inventories with the intention that any SAS or Special wetland types would be identified.

#### ***5(ii) SAS Results***

The field inventory for SAS found no examples of mudflats or riffle and pool complexes within the study area. One site that is considered a vegetated shallow is wetland V-CN-W-105. This wetland sits on the margins of Lake Bomoseen, is permanently inundated and supports rooted aquatic vegetation. Therefore, wetland V-CN-W-105 is considered a Special Aquatic Site.

The field inventory of Special Wetlands found no examples of bogs, fens or vernal pools within the survey area. The field inventory did identify two wetlands which provide habitat for threatened plant species. Wetland V-CN-W-105 provides habitat for the threatened species Virginia chain fern (*Woodwardia virginica*). Wetland T-CL-W 13 NORTH provides habitat for the threatened marsh horsetail





(*Equisetum palustre*). Therefore, wetlands V-CN-W-105 and T-CL-W-13 North are considered Special Wetlands.



***6: References***

Argentine, C.C. 2008. Vermont Act 250 Handbook. Putney Press, Brattleboro, VT.

Thompson, E.H., E.S. Sorenson. 2005. Wetland, Woodland, Wildland: A guide to the natural communities of Vermont. Vermont Department of Fish and Wildlife and the Nature Conservancy. Hanover, NH.

U.S. Army Corps of Engineers, 12/11/2012. Reissuance of the Department of the Army Vermont General Permit (GP).

Vermont Agency of Natural Resources (ANR) 2004. Guidelines for the Conservation and Protection of State-Significant Natural Communities: October 21, 2004 version.

Vermont Department of Fish and Wildlife. Webpage, see <http://www.vtfishandwildlife.com>.



**Attachment 1.**

**RTE Rare Plant Occurrence Reporting Forms**

(Excluded from Exhibit due to confidential information)

**Attachment 2.**

**RTE Plant Survey Summary Data**

## RTE Plant Survey Summary Data

Polygon ID	NRI LINK	Species Name	S Rank	S Rank Description	Threatened/Endangered Status	Population Size	Population Group	Habitat	Notes
7	PYVE-130.198	<i>Pycnanthemum verticillatum</i> var. <i>verticillatum</i>	S2S3	Uncommon to Rare	Not Listed	4 plants	Pycver1	Roadside	Roadside opening under powerline; mowed
8	PYVE-130.198	<i>Pycnanthemum verticillatum</i> var. <i>verticillatum</i>	S2S3	Uncommon to Rare	Not Listed	13 plants	Pycver1	Roadside	Roadside opening under powerline; mowed
10	EQPA-128.518	<i>Equisetum palustre</i>	S2	Rare	Threatened	appx 100 plants	Equpal1	Marsh wetland	Good-sized population in small wetland along stream
11	EQPA-128.502	<i>Equisetum palustre</i>	S2	Rare	Threatened	4 plants	Equpal1	Marsh wetland	Only 4 plants in this polygon, most of population on other side of road
12	ASTU-132.235	<i>Asclepias tuberosa</i>	SH	Historical	Threatened	1 plant	Asctub1	Old pasture	Probably an escape from cultivation
13	WOVI-114.259	<i>Woodwardia virginica</i>	S1	Very rare	Threatened	5-10 plants	Woovir1	Wetland	Hardwood swamp, population likely extends out of ROW and is much larger
14	WOVI-114.284	<i>Woodwardia virginica</i>	S1	Very rare	Threatened	5-10 plants	Woovir1	Wetland	Hardwood swamp, population likely extends out of ROW and is much larger
15	LILO-114.241	<i>Liparis loeselii</i>	S3	Uncommon	Not Listed	Unknown	Liploe1	Wet roadside	Plants scattered over area with 15' radius
17	GAOB-113.136	<i>Galium obtusum</i>	S2S3	Uncommon to Rare	Not Listed	15-20 ramets; 5-10 genets	Galobt1	Wetland along roadside	Small backwater wetland
18	PEVI-113.135	<i>Peltandra virginica</i>	S2S3	Uncommon to Rare	Not Listed	2 plants	Pelvir1	Wetland	Marsh in bay of Lake Bomoseen; more plants north of ROW
19	RUEN-113.557	<i>Rubus ensenii</i>	SU	Status Unknown	Not Listed	Unknown	Rubens1	Roadside	One small patch occupying 5' x 5' area
20	LEHI-112.99	<i>Lespedeza hirta</i> ssp. <i>hirta</i>	S1	Very rare	Threatened	Unknown; Pop. total appx 200-300 ramets; 100-150 genets	Leshir2	Under powerline and dry outcrop above road	Large population in multiple patches north of road
21	LEHI-112.933	<i>Lespedeza hirta</i> ssp. <i>hirta</i>	S1	Very rare	Threatened	Unknown; Pop. total appx 200-300 ramets; 100-150 genets	Leshir2	Under powerline and dry outcrop above road	Large population in multiple patches north of road
22	LEHI-112.96	<i>Lespedeza hirta</i> ssp. <i>hirta</i>	S1	Very rare	Threatened	Unknown; Pop. total appx 200-300 ramets; 100-150 genets	Leshir2	Under powerline and dry outcrop above road	Large population in multiple patches north of road
23	LEHI-112.96	<i>Lespedeza hirta</i> ssp. <i>hirta</i>	S1	Very rare	Threatened	Unknown; Pop. total appx 200-300 ramets; 100-150 genets	Leshir2	Under powerline and dry outcrop above road	Large population in multiple patches north of road
24	LEHI-112.96	<i>Lespedeza hirta</i> ssp. <i>hirta</i>	S1	Very rare	Threatened	Unknown; Pop. total appx 200-300 ramets; 100-150 genets	Leshir2	Under powerline and dry outcrop above road	Large population in multiple patches north of road
25	HOLO-112.858	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 1000 plants	Houlon1	Dry summit and ledge outcrop	Series of metapopulations totalling > 1000 plants
26	HOLO-112.858	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 1000 plants	Houlon1	Dry summit and ledge outcrop	Series of metapopulations totalling > 1000 plants
27	LEHI-112.432	<i>Lespedeza hirta</i> ssp. <i>hirta</i>	S1	Very rare	Threatened	appx 160 ramets; 80 genets	Leshir1	Dry outcrop	Two patches in this sub-population totalling appx 100 plants
28	HOLO-112.47	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 1000 plants	Houlon1	Dry summit and ledge outcrop	Series of metapopulations totalling > 1000 plants
29	LEVI-112.505	<i>Lespedeza violacea</i>	S2S3	Uncommon to Rare	Not Listed	50-75 plants	Lesvio2	Dry outcrop	Small population on dry ledge above road
30	LEHI-112.506	<i>Lespedeza hirta</i> ssp. <i>hirta</i>	S1	Very rare	Threatened	appx 20 plants	Leshir1	Dry outcrop	Two patches in this sub-population totalling appx 100 plants
31	CASI-112.724	<i>Calystegia silvatica</i> ssp. <i>fraterniflora</i>	S2	Rare	Not Listed	10 ramets; 1 genet	Calsil1	Roadside	Plants stressed and mowed
32	HOLO-112.59	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 1000 plants	Houlon1	Dry summit and ledge outcrop	Series of metapopulations totalling > 1000 plants
33	CASP-112.67	<i>Calystegia spithamea</i> ssp. <i>spithamea</i>	S2	Rare	Threatened	30 ramets; 1 genet	Calspi2	Dry open outcrop	Small habitat patch
35	SYLA-110.264	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	> 100 plants	Symlae1	Roadside and dry outcrop	Large population on margin of fields and dry outcrops
37	CRDO-110.253	<i>Crataegus dodgei</i>	SH	Historical	Not Listed	Unknown; Pop. total 15-20 plants	Cradod1	Dry outcrop	15-20 plants in entire population; 80% confidence in ID; first siting in state in 25 years
38	GAPI-110.197	<i>Galium pilosum</i>	S1	Very rare	Not Listed	>1000 ramets; > 500 genets	Galpil1	Dry outcrop	One of only 2 extant populations in the state
40	SYLA-109.093	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	4 plants	Symlae1	Roadside	A few plants scattered in area
41	SYLA-109.093	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	4 plants	Symlae1	Roadside	Four plants along roadside
42	HOLO-108.992	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 200 plants	Houlon2	Dry outcrop	Series of metapopulations totalling > 200 plants
43	HOLO-108.992	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 200 plants	Houlon2	Dry outcrop	Series of metapopulations totalling > 200 plants
44	HOLO-108.992	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 200 plants	Houlon2	Dry outcrop	Series of metapopulations totalling > 200 plants
46	HOLO-108.992	<i>Houstonia longifolia</i>	S2	Rare	Not Listed	Unknown; Pop. total > 200 plants	Houlon2	Dry outcrop	Series of metapopulations totalling > 200 plants
47	SYLA-108.604	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	Unknown	Symlae1	Dry roadside embankment	Small population occupying 2% cover within polygon
48	SYLA-108.604	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	Unknown	Symlae1	Dry roadside embankment	Small population occupying 1% cover within polygon
49	SYLA-108.604	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	2 plants	Symlae1	Roadside	Small population along roadside
50	SYLA-108.604	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	2 Plants	Symlae1	Roadside	Two plants along roadside
51	SYLA-108.604	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	10 plants	Symlae1	Roadside	Small population along roadside
52	RHAR-108.652	<i>Rhus aromatica</i>	S3	Uncommon	Not Listed	Unknown	NA	Roadside	A 10' x 20' area with 90% cover of plants in open roadside
53	HEAU-alb	<i>Helenium autumnale</i>	S1	Very rare	Not Listed	appx 300 plants	Helaut1	Wetland on shore of Lake Champlain	Large population in shoreline wetland
55	SACA-101.104	<i>Sanicula canadensis</i> var. <i>canadensis</i>	S2S3	Uncommon to Rare	Not Listed	6 plants	Sancan1	Forest	2 flowering plants and 4 vegetative rosettes in dry, rich forest edge
57	SYLA-104.465	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	82 plants	Symlae2	Forest edge	Edge of dry oak forest, vigorous plants, healthy population
58	SYLA-107.748	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	50 plants	Symlae4	Roadside	Moderate sized population on dry embankment
59	SYLA-107.785	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	200 plants	Symlae4	Roadside	Moderate sized population on dry embankment
60	SYLA-107.93	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	1 plant	Symlae3	Dry outcrop	Single plant at top of roadcut
61	CASI-114.874	<i>Calystegia silvatica</i> ssp. <i>fraterniflora</i>	S2	Rare	Not Listed	20 ramets; 2 genets	Calsil2	Roadside	Scattered along base of cliff
62	MYLA-115.059	<i>Myosotis laxa</i>	S2	Rare	Not Listed	500-1000 plants	Myolax8	Wetland	Large population in natural wetland below road
63	BOST-115.324	<i>Boechera stricta</i>	S1S2	Rare to Very rare	Endangered	59 plants	Boestr1	Cliff face	Good population in crevices and ledges of natural cliff and roadcut
65	WOOB-115.347	<i>Woodsia obtusa</i> ssp. <i>obtusa</i>	S3	Uncommon	Not Listed	11 genets	NA	Cliff face	Moist, shaded cliff, some fertile fronds
66	CLOC-115.37	<i>Clematis occidentalis</i> ssp. <i>occidentalis</i>	S3	Uncommon	Not Listed	1 plant	NA	Base of cliff	Recently mowed
67	MYLA-115.514	<i>Myosotis laxa</i>	S2	Rare	Not Listed	appx 300 plants	Myolax7	Wetland	Nice population in natural wetland below road
68	AUFL-117.559	<i>Aureolaria flava</i> var. <i>flava</i>	S2	Rare	Not Listed	58 plants	Aurfla1	Open south facing slope	In flower
69	AUFL-117.675	<i>Aureolaria flava</i> var. <i>flava</i>	S2	Rare	Not Listed	223 plants	Aurfla2	Dry open outcrop	Nice, healthy population, plants in flower
70	LEVI-117.643	<i>Lespedeza violacea</i>	S2S3	Uncommon to Rare	Not Listed	27 plants	Lesvio1	Dry outcrop on edge of woods	Small population on dry ledge
71	DERO-117.688	<i>Desmodium rotundifolia</i>	S1	Very rare	Threatened	8 ramets; 3 genets	Desrot1	Dry south-facing outcrop	Plants in bloom
72	DERO-117.688	<i>Desmodium rotundifolia</i>	S1	Very rare	Threatened	8 ramets; 4 genets	Desrot1	Dry south-facing outcrop	Plants in bloom
74	SYLE-117.784	<i>Symphotrichum laeve</i> var. <i>laeve</i>	S2S3	Uncommon to Rare	Not Listed	15 plants	Symlae5	Dry open outcrop	Small population on edge of woods on open outcrop
78	BRER-117.852	<i>Brachyelytrum erectum</i>	S2S3	Uncommon to Rare	Not Listed	appx 200 plants	Braere1	Rich Forest	Small population on forest edge
79	LEVI-118.18	<i>Lespedeza violacea</i>	S2S3	Uncommon to Rare	Not Listed	> 500 plants	Lesvio3	Dry outcrop	Large population, dense cover of plants on dry ledge above road
80	CASP-119.136	<i>Calystegia spithamea</i> ssp. <i>spithamea</i>	S2	Rare	Threatened	200 plants	Calspi1	Roadside	Mostly vegetative, in un-mowed roadside

Polygon ID	NRI LINK	Species Name	S Rank	S Rank Description	Threatened/Endangered Status	Population Size	Population Group	Habitat	Notes
81	CAAR-119.137	Carex argyrantha	S2S3	Uncommon to Rare	Not Listed	10 ramets; 2 genets	Cararg1	Dry roadside embankment	Small population in dry, open habitat
82	CABR-119.36	Carex cf brevior	S3	Uncommon	Not Listed	15 plants	NA	Roadside	Plants in 4' diameter area
85	COAM-119.655	Corylus americana	S2S3	Uncommon to Rare	Not Listed	13 ramets; 2 genets	Corame1	Roadside	In roadside at edge of ROW
86	COAM-120.694	Corylus americana	S2S3	Uncommon to Rare	Not Listed	50 ramets; 1 genet	Corame1	Roadside	Very large shrub, to 18ft tall
87	COAM-120.736	Corylus americana	S2S3	Uncommon to Rare	Not Listed	4 ramets; 1 genet	Corame1	Roadside	Vegetative
88	CACF-120.749	Carex cf foena	S2	Rare	Endangered	11 plants	Carfoe1	Disturbed mesic forest edge	6 plants in fruit
89	COAM-120.76	Corylus americana	S2S3	Uncommon to Rare	Not Listed	6 ramets; 1 genet	Corame1	Roadside	A few fruits
90	COAM-120.773	Corylus americana	S2S3	Uncommon to Rare	Not Listed	25 ramets; 1 genet	Corame1	Shrubby berm	Fruiting heavily
91	COAM-120.789	Corylus americana	S2S3	Uncommon to Rare	Not Listed	6 ramets; 1 genet	Corame1	Roadside	Vegetative
92	COAM-121.012	Corylus americana	S2S3	Uncommon to Rare	Not Listed	10 ramets; 1 genet	Corame1	Roadside	In dense shrubs
93	COAM-121.151	Corylus americana	S2S3	Uncommon to Rare	Not Listed	2 genets	Corame1	Roadside	4' tall at mowed edge
94	COAM-121.151	Corylus americana	S2S3	Uncommon to Rare	Not Listed	2 genets	Corame1	Roadside	4' tall at mowed edge
95	COAM-121.171	Corylus americana	S2S3	Uncommon to Rare	Not Listed	1 plant	Corame1	Roadside	A few fruits
96	COAM-121.764	Corylus americana	S2S3	Uncommon to Rare	Not Listed	2 genets	Corame1	Roadside	Two plants at edge of ROW along fence
97	CASI-122.951	Calystegia silvatica ssp. fraterniflora	S2	Rare	Not Listed	> 100 plants	Calsil3	Roadside	Plants mowed, none in flower
98	TRBR-123.523	Trichostema brachiatum	S1	Very rare	Not Listed	1 plant	Tibra1	Roadside	Single plant in bloom beneath guardrail
100	TRBR-123.539	Trichostema brachiatum	S1	Very rare	Not Listed	1 plant	Tibra1	Roadside	Single plant in bloom beneath guardrail
101	TRBR-123.65	Trichostema brachiatum	S1	Very rare	Not Listed	appx 125 plants	Tibra1	Roadside	On edge of pavement in road shoulder
102	TRBR-123.787	Trichostema brachiatum	S1	Very rare	Not Listed	100s of plants	Tibra1	Roadside	On edge of pavement in road shoulder
103	TRBR-123.789	Trichostema brachiatum	S1	Very rare	Not Listed	100s of plants	Tibra1	Roadside	Hundreds of plants in road shoulder
104	TRBR-123.789	Trichostema brachiatum	S1	Very rare	Not Listed	1000s of plants	Tibra1	Roadside	Thousands of plants on road shoulder near pavement; largest population in the state
105	CAME-132.756	Carex merritt-fernaldii	S1	Very rare	Not Listed	8 plants	Carmer1	Dry sandy roadside	Small population on dry open roadside
106	STAL-136.375	Stellaria alsine	S2	Rare	Not Listed	100-200 plants	Steals1	Roadside wetland and ditch	Nice population in roadside seepage, stream and ditch
107	MYLA-140.08	Myosotis laxa	S2	Rare	Not Listed	500-1000 plants	Myolax9	Roadside ditch	Large population in roadside ditch
108	MYLA-140.547	Myosotis laxa	S2	Rare	Not Listed	30 plants	Myolax2	Roadside ditch	Small population in roadside ditch
109	MYLA-140.548	Myosotis laxa	S2	Rare	Not Listed	20 plants	Myolax1	Wetland along roadside	Small population in wetland along drainage
110	MYLA-140.582	Myosotis laxa	S2	Rare	Not Listed	4 plants	Myolax1	Wetland along roadside	Small population in wetland along drainage
111	MYLA-140.622	Myosotis laxa	S2	Rare	Not Listed	100-200 plants	Myolax2	Roadside ditch	Population in roadside ditch and wet lawn
112	CALE-140.779	Carex lenticularis	S2S3	Uncommon to Rare	Not Listed	4 plants	Carlen1	Roadside ditch	Four plants in roadside ditch
113	MYLA-141.878	Myosotis laxa	S2	Rare	Not Listed	50 plants	Myolax10	Roadside ditch	Small population in seepy roadside ditch
116	MYLA-142.806	Myosotis laxa	S2	Rare	Not Listed	150 plants	Myolax3	Wetlands along roadside	Disturbed roadside wetlands and ditch
117	MYLA-142.77	Myosotis laxa	S2	Rare	Not Listed	25 plants	Myolax3	Wetlands along roadside	Disturbed roadside wetlands and ditch
118	MYLA-142.804	Myosotis laxa	S2	Rare	Not Listed	100-200 plants	Myolax3	Wetlands along roadside	Disturbed roadside wetlands and ditch
119	CASI-145.835	Calystegia silvatica ssp. fraterniflora	S2	Rare	Not Listed	75 plants	Calsil4	Roadside	Plants mowed, 1 in flower
120	JUGR-146.233	Juncus greenei	S2	Rare	Endangered	390 ramets; 39 genets	Jungre1	Dry sandy roadside	New location in roadside, mowed
121	MYLA-146.475	Myosotis laxa	S2	Rare	Not Listed	30 plants	Myolax4	Roadside ditch	Small population in ditch at confluence with small stream
122	MYLA-146.68	Myosotis laxa	S2	Rare	Not Listed	45 plants	Myolax5	Roadside ditch	Small population in ditch and along stream
123	MYLA-147.847	Myosotis laxa	S2	Rare	Not Listed	50 plants	Myolax6	Roadside ditch	Small population in ditch by culvert
124	MYLA-147.847	Myosotis laxa	S2	Rare	Not Listed	> 100 plants	Myolax6	Wetland	Nice population in natural wetland, mostly out of ROW
125	JUGR-149.721	Juncus greenei	S2	Rare	Endangered	1230 ramets; 123 genets	Jungre2	Power line clearing	Expansion of known population, more frequent along ATV trail
126	JUGR-149.721	Juncus greenei	S2	Rare	Endangered	appx 70 ramets; 7 genets	Jungre2	Power line clearing	Expansion of known population, group of plants below main population
189	SOPA-129.858	Solidago patula	S3	Uncommon	Not Listed	5 plants	NA	Roadside ditch	2 plants flowering, 5m radius patch
190	SOPA-131.029	Solidago patula	S3	Uncommon	Not Listed	60+ plants	NA	Roadside ditch	Moderate sized population in roadside ditch
191	SOPA-131.279	Solidago patula	S3	Uncommon	Not Listed	20 plants	NA	Roadside ditch	Along small stream in 30' x 90' area
192	SOPA-131.337	Solidago patula	S3	Uncommon	Not Listed	30+ plants	NA	Roadside ditch	Three-quarters of plants with flowering stalks
193	SOPA-131.447	Solidago patula	S3	Uncommon	Not Listed	12 plants	NA	Roadside ditch	Small population in roadside ditch
194	SOPA-131.538	Solidago patula	S3	Uncommon	Not Listed	2 plants	NA	Roadside ditch	A few plants in roadside ditch
195	SOPA-131.635	Solidago patula	S3	Uncommon	Not Listed	2 plants	NA	Roadside ditch	A few plants in roadside ditch
196	SOPA-131.677	Solidago patula	S3	Uncommon	Not Listed	appx 100 plants	NA	Roadside ditch	Large population in roadside ditch
199	SOPA-131.908	Solidago patula	S3	Uncommon	Not Listed	30 plants	NA	Roadside ditch	Moderate sized population in roadside ditch
200	SOPA-132.083	Solidago patula	S3	Uncommon	Not Listed	30 plants	NA	Roadside ditch	Small population in roadside ditch
201	SERU-132.455	Selaginella rupestris	S3	Uncommon	Not Listed	38 genets	NA	Roadside	Large population on dry, exposed embankment
202	SERU-132.404	Selaginella rupestris	S3	Uncommon	Not Listed	1000s of plants	NA	Roadside	Large population on dry, exposed embankment
204	SOPA-132.081	Solidago patula	S3	Uncommon	Not Listed	100s of plants	NA	Roadside ditch	Fairly large population in roadside ditch
206	SOPA-131.422	Solidago patula	S3	Uncommon	Not Listed	10 plants	NA	Roadside ditch	Small patch 15' long in area
207	LILO-126.248	Liparis loeselii	S3	Uncommon	Not Listed	8 plants	Liploe2	Wet sloping roadside	Plants in fruit at time of visit
208	CESC-121.696	Celastrus scandens	S3	Uncommon	Not Listed	9 plants	NA	Roadside	Vegetative, short stems
209	CESC-121.538	Celastrus scandens	S3	Uncommon	Not Listed	5 plants	NA	Roadside	Vegetative, short stems
210	CESC-121.21	Celastrus scandens	S3	Uncommon	Not Listed	1 plant	NA	Roadside	2m tall, in fruit
211	CESC-121.148	Celastrus scandens	S3	Uncommon	Not Listed	9 plants	NA	Thin forest canopy	Vegetative, short stems
212	CESC-119.155	Celastrus scandens	S3	Uncommon	Not Listed	3 plants	NA	Roadside	Vegetative, short stems
213	CABR-119.141	Carex brevior	S3	Uncommon	Not Listed	2 ramets; 1 genet	NA	Roadside	Dry shrubby area
214	CESC-119.125	Celastrus scandens	S3	Uncommon	Not Listed	1 plant	NA	Roadside	Vegetative, short stems
215	CABR-118.935	Carex brevior	S3	Uncommon	Not Listed	9 plants	NA	Roadside	Most in fruit
216	CESC-117.434	Celastrus scandens	S3	Uncommon	Not Listed	5 plants	NA	Forest edge	Vegetative, short stems
217	SCLA-117.436	Scrophularia lanceolata	S3	Uncommon	Not Listed	32 ramets; 5 genets	NA	Forest edge	Plants in bloom or fruit in edge of rich forest
218	CYPA-117.429	Cypripedium parviflorum var. pubescens	S3	Uncommon	Not Listed	43 ramets; 5 genets	NA	Open edge of rich woods	1 genet mowed; 1 genet in flower
219	CABR-116.023	Carex brevior	S3	Uncommon	Not Listed	1 ramet; 1 genet	NA	Roadside	Flat, open area
220	CLOC-115.413	Clematis occidentalis ssp. occidentalis	S3	Uncommon	Not Listed	10 plants	NA	Moist cliff face	Vigorous plants in fruit covering 20'x20' vertical rock face
223	QUMU-120.454	Quercus muehlenbergii	S3	Uncommon	Not Listed	6 plants	NA	Forest	1 tree and 5 saplings in dry, rich woods
224	DEPA-120.443	Desmodium paniculatum	S3	Uncommon	Not Listed	10 plants	NA	Dry south-facing outcrop	10'x10' area, plants in bud; some browsed
225	DEPA-120.43	Desmodium paniculatum	S3	Uncommon	Not Listed	20 plants	NA	Dry south-facing outcrop	Plants within 10' x 20' area
226	DEPA-120.403	Desmodium paniculatum	S3	Uncommon	Not Listed	100's of plants	NA	Dry south-facing outcrop	Nice, large population, many plants in bud
228	DEPA-120.303	Desmodium paniculatum	S3	Uncommon	Not Listed	44 plants	NA	Dry south-facing outcrop	Nice population, plants in bud
230	DEPA-119.602	Desmodium paniculatum	S3	Uncommon	Not Listed	80 plants	NA	Dry south-facing outcrop	Nice population along appx 50' of road
231	DEPA-119.528	Desmodium paniculatum	S3	Uncommon	Not Listed	5 plants	NA	Dry south-facing outcrop	Plants within 15square foot area
232	DEPA-118.207	Desmodium paniculatum	S3	Uncommon	Not Listed	35 plants	NA	Dry south-facing outcrop	Plants in bud
233	DEPA-118.187	Desmodium paniculatum	S3	Uncommon	Not Listed	appx 50 plants	NA	Dry south-facing outcrop	8' x 6' area 100% cover
234	DEPA-118.147	Desmodium paniculatum	S3	Uncommon	Not Listed	appx 50 plants	NA	Dry south-facing outcrop	8' x5' area 100% cover
235	QUMU-117.764	Quercus muehlenbergii	S3	Uncommon	Not Listed	7 trees	NA	Forest	Large trees, co-dominant in dry, rich woods
237	DEPA-117.654	Desmodium paniculatum	S3	Uncommon	Not Listed	12 plants	NA	Dry south-facing outcrop	Plants in bud
239	DEPA-117.629	Desmodium paniculatum	S3	Uncommon	Not Listed	15 plants	NA	Dry south-facing outcrop	Plants within a 30' x 50' area

Polygon ID	NRI LINK	Species Name	S Rank	S Rank Description	Threatened/Endangered Status	Population Size	Population Group	Habitat	Notes
243	CAPS-114.326	Carex pseudocyperus	S3	Uncommon	Not Listed	5 plants	NA	Wetland along roadside	Five plants in roadside wetland
244	PEHY-111.987	Persicaria hydropiperoides	S3	Uncommon	Not Listed	Unknown	NA	Wetland	Plants occupy and area 40' x 70' at 80% cover
246	NATR-111.184	Nabalus trifoliolatus	S3	Uncommon	Not Listed	4 plants	NA	Rich woods	A few plants in woods in ROW
247	CATR-109.245	Carex trichocarpa	S3	Uncommon	Not Listed	Unavailable	NA	Slope along roadside	200'x20' area
248	ACNI-109.193	Acer nigrum	S3	Uncommon	Not Listed	2 plants	NA	Under powerline and dry outcrop above road	Two plants under powerline
249	RHAR-108.225	Rhus aromatica	S3	Uncommon	Not Listed	Unknown	NA	Roadside	200 square feet occupied by plants in open roadside
251	QUMU-122.735	Quercus muehlenbergii	S3	Uncommon	Not Listed	1 tree	NA	Forest	Single tree, 3" DBH in dry rich woods
252	WOOB-114.782	Woodsia obtusa ssp. obtusa	S3	Uncommon	Not Listed	4 genets	NA	Cliff face	Moist, shaded cliff, some fertile fronds
253	RHAR-123.567	Rhus aromatica	S3	Uncommon	Not Listed	Hundreds	NA	Roadside embankment	Planted, dense stand of shrubs
254	CESC-104.415	Celastrus scandens	S3	Uncommon	Not Listed	6 plants	NA	Roadside	1 large vine in fruit, edge of small roadcut
255	ACNI-104.471	Acer nigrum	S3	Uncommon	Not Listed	1 sapling	NA	Forest edge	One sapling on edge of rich woods
256	CALA-104.469	Carex laxiculmis	S3	Uncommon	Not Listed	1 plant	NA	Dry rich woods edge	On clay soil
257	ACNI-104.487	Acer nigrum	S3	Uncommon	Not Listed	3 saplings	NA	Forest edge	On edge of woods; saplings to 8 ft tall
258	ACNI-107.781	Acer nigrum	S3	Uncommon	Not Listed	1 sapling	NA	Forest edge	Sapling 3' tall
259	CESC-107.806	Celastrus scandens	S3	Uncommon	Not Listed	8 plants	NA	Forest edge	Vegetative, short stems
260	CESC-107.846	Celastrus scandens	S3	Uncommon	Not Listed	20 plants	NA	Roadside	1 stem in fruit
261	RHAR-107.85	Rhus aromatica	S3	Uncommon	Not Listed	25-40 ramets; 1 genet	NA	Forest edge	On edge of forest near road cut
262	RHAR-107.938	Rhus aromatica	S3	Uncommon	Not Listed	12 ramets; 1 genet	NA	Forest edge	On top of road cut on edge of woods; 4 stems in fruit
263	QUMU-107.954	Quercus muehlenbergii	S3	Uncommon	Not Listed	2 saplings	NA	Forest	Saplings in dry, rich woods
264	QUMU-107.978	Quercus muehlenbergii	S3	Uncommon	Not Listed	1 sapling	NA	Forest	Sapling in dry, rich woods
265	CESC-98.541	Celastrus scandens	S3	Uncommon	Not Listed	9 plants	NA	Roadside	Plants all vegetative
266	ACNI-98.545	Acer nigrum	S3	Uncommon	Not Listed	1 tree	NA	Roadside	Large tree, 2' DBH
267	CESC-98.562	Celastrus scandens	S3	Uncommon	Not Listed	1 plant	NA	Forest edge	In fruit along hedgerow
268	CESC-98.694	Celastrus scandens	S3	Uncommon	Not Listed	2 plants	NA	Roadside	Two small plants in roadside
269	ACNI-99.608	Acer nigrum	S3	Uncommon	Not Listed	1 tree	NA	Roadside	Single tree; 4" DBH
270	CESC-100.042	Celastrus scandens	S3	Uncommon	Not Listed	1 plant	NA	Roadside	Large vine in cottonwood tree
271	ACNI-100.089	Acer nigrum	S3	Uncommon	Not Listed	1 sapling	NA	Roadside	Single sapling, 3' tall
272	VIRA-100.568	Viburnum rafinesquianum var. rafinesquianum	S3	Uncommon	Not Listed	4 shrubs	NA	Roadside	Forested edge, some plants mowed
273	VIRA-100.74	Viburnum rafinesquianum var. rafinesquianum	S3	Uncommon	Not Listed	2 shrubs	NA	Forest	Two small shrubs in rich woods
274	VIRA-100.764	Viburnum rafinesquianum var. rafinesquianum	S3	Uncommon	Not Listed	5 shrubs	NA	Forest	In rich woods and forest edge
275	CALA-101.169	Carex laxiculmis	S3	Uncommon	Not Listed	12 plants	NA	Dry rich knoll	Plants in fruit
276	CESC-98.326	Celastrus scandens	S3	Uncommon	Not Listed	4 plants	NA	Scrubby thicket edge	Four small plants in thicket
277	RHAR-107.858	Rhus aromatica	S3	Uncommon	Not Listed	appx 150 plants	NA	Roadside and rock outcrop	Large population, likely continues out of ROW
280	RHAR-104.198	Rhus aromatica	S3	Uncommon	Not Listed	Unknown	NA	Roadside and woods edge	Dense stand in 20' x 30' area on edge of woods; partly mowed
281	VIRA-100.84	Viburnum rafinesquianum var. rafinesquianum	S3	Uncommon	Not Listed	3 shrubs	NA	Forest edge	A few plants in ROW, likely many more in forest
282	VIRA-99.421	Viburnum rafinesquianum var. rafinesquianum	S3	Uncommon	Not Listed	2 shrubs	NA	Roadside	Two short shrubs along roadside
283	JUGR-146.299	Juncus greenei	S2	Rare	Endangered	20 ramets; 2 genets	Jungre1	Dry sandy roadside	New location in roadside, mowed
284	CAPA-146.222	Carex panicea	SU	Status Unknown	Not Listed	100 ramets; 2 genets	NA	Roadside	New record for state; not native; 100's in fruit
289	TRBR-124.481	Trichostema brachiatum	S1	Very rare	Not Listed	3 plants	Tibra1	Roadside	A few stems on north shoulder with guardrail
294	TRBR-124.075	Trichostema brachiatum	S1	Very rare	Not Listed	3 plants	Tibra1	Roadside	A few plants in this location
296	ERFR-103.857	Eragrostis frankii	S3	Uncommon	Not Listed	appx 30 plants	Erafra1	Roadside	Disturbed area along road
297	ERFR-103.397	Eragrostis frankii	S3	Uncommon	Not Listed	5 plants	Erafra1	Roadside	Disturbed area along road
298	CRDO-110.253	Crataegus dodgei	SH	Historical	Not Listed	Unknown; Pop. total 15-20 plants	Cradod1	Dry outcrop	15-20 plants in entire population; 80% confidence in ID; first siting in state in 25 years
299	CRDO-110.253	Crataegus dodgei	SH	Historical	Not Listed	Unknown; Pop. total 15-20 plants	Cradod1	Dry outcrop	15-20 plants in entire population; 80% confidence in ID; first siting in state in 25 years
300	ASTU-149.03	Asclepias tuberosa	SH	Historical	Threatened	1 plant	NA	Garden	Clearly planted at end of driveway

**Attachment 3.**

**Complete List of Plant Species Recorded During the RTE Plant Survey**



## Appendix 3

### Complete List of Plant Species Recorded During the RTE Plant Survey

<i>Abies balsamea</i>
<i>Abies concolor</i>
<i>Acer negundo</i>
<i>Acer nigrum</i>
<i>Acer pensylvanicum</i>
<i>Acer platanoides</i>
<i>Acer rubrum</i>
<i>Acer saccharinum</i>
<i>Acer saccharum</i>
<i>Acer spicatum</i>
<i>Achillea millefolium</i>
<i>Aconitum napellus</i>
<i>Acorus calamus</i>
<i>Actaea pachypoda</i>
<i>Actaea rubra</i>
<i>Adiantum pedatum</i>
<i>Aegopodium podagraria</i>
<i>Ageratina altissima</i>
<i>Agrimonia gryposepala</i>
<i>Agrimonia striata</i>
<i>Agrostis capillaris</i>
<i>Agrostis gigantea</i>
<i>Agrostis perennans</i>
<i>Agrostis stolonifera</i>
<i>Alisma subcordatum</i>
<i>Allium tricoccum</i>
<i>Alnus incana</i>
<i>Ambrosia artemisiifolia</i>
<i>Amelanchier laevis</i>
<i>Amorpha fruticosa</i>
<i>Amphicarpaea bracteata</i>
<i>Andropogon gerardii</i>

<i>Anemone canadensis</i>
<i>Anemone quinquefolia</i>
<i>Anemone virginiana</i>
<i>Anetennaria neglecta</i>
<i>Anetennaria plantaginifolia</i>
<i>Angelica atropurpurea</i>
<i>Anthoxanthum nitens</i>
<i>Anthoxanthum odoratum</i>
<i>Anthriscus sylvestris</i>
<i>Apios americana</i>
<i>Apocynum androsaemifolium</i>
<i>Apocynum cannabinum</i>
<i>Aquilegia canadensis</i>
<i>Aralia nudicaulis</i>
<i>Aralia racemosa</i>
<i>Arctium minus</i>
<i>Argentina anserina</i>
<i>Arisaema triphyllum</i>
<i>Aronia melanocarpa</i>
<i>Artemisia vulgaris</i>
<i>Asarum canadense</i>
<i>Asclepias incarnata</i>
<i>Asclepias syriaca</i>
<i>Asclepias tuberosa</i>
<i>Asparagus officinalis</i>
<i>Asplenium platyneuron</i>
<i>Asplenium trichomanes</i>
<i>Atriplex patula</i>
<i>Aureolaria flava</i>
<i>Barbarea vulgaris</i>
<i>Berberis thunbergii</i>
<i>Berberis vulgaris</i>

<i>Berteroa incana</i>
<i>Betula alleghaniensis</i>
<i>Betula lenta</i>
<i>Betula papyrifera</i>
<i>Betula populifolia</i>
<i>Bidens connata</i>
<i>Bidens frondosa</i>
<i>Boechera stricta</i>
<i>Boehmeria cylindrica</i>
<i>Bolboschoenus fluviatilis</i>
<i>Brachyelytrum aristosum</i>
<i>Brachyelytrum erectum</i>
<i>Brassica nigra</i>
<i>Bromus inermis</i>
<i>Bromus pubescens</i>
<i>Butomus umbellatus</i>
<i>Calamagrostis canadensis</i>
<i>Caltha palustris</i>
<i>Calystegia fraterniflora</i>
<i>Calystegia sepium</i>
<i>Calystegia spithamea</i>
<i>Campanula aparinoides</i>
<i>Campanula rapunculoides</i>
<i>Campanula trachelium</i>
<i>Cannabis sativa</i>
<i>Cardamine pratensis</i>
<i>Carex albursina</i>
<i>Carex annectens</i>
<i>Carex appalachica</i>
<i>Carex arctata</i>
<i>Carex argyrantha</i>
<i>Carex aurea</i>
<i>Carex baileyi</i>

<i>Carex blanda</i>
<i>Carex brevior</i>
<i>Carex bromoides</i>
<i>Carex brunnescens</i>
<i>Carex cephalophora</i>
<i>Carex cf foenea</i>
<i>Carex cf diandra</i>
<i>Carex comosa</i>
<i>Carex conoidea</i>
<i>Carex cf cristatella</i>
<i>Carex debilis</i>
<i>Carex deflexa</i>
<i>Carex deweyana</i>
<i>Carex digitalis</i>
<i>Carex eburnea</i>
<i>Carex echinata</i>
<i>Carex flava</i>
<i>Carex gracillima</i>
<i>Carex granularis</i>
<i>Carex grisea</i>
<i>Carex gynandra</i>
<i>Carex hystericina</i>
<i>Carex interior</i>
<i>Carex intumescens</i>
<i>Carex lacustris</i>
<i>Carex laxiculmis</i>
<i>Carex laxiflora</i>
<i>Carex lenticularis</i>
<i>Carex leptalea</i>
<i>Carex lupulina</i>
<i>Carex lurida</i>
<i>Carex merritt-fernaldii</i>
<i>Carex pallescens</i>

<i>Carex panicea</i>
<i>Carex pedunculata</i>
<i>Carex pellita</i>
<i>Carex pensylvanica</i>
<i>Carex plantaginea</i>
<i>Carex platyphylla</i>
<i>Carex prasina</i>
<i>Carex projecta</i>
<i>Carex pseudocyperus</i>
<i>Carex radiata</i>
<i>Carex retrorsa</i>
<i>Carex rosea</i>
<i>Carex scoparia</i>
<i>Carex sparganioides</i>
<i>Carex spicata</i>
<i>Carex sprengei</i>
<i>Carex stipata</i>
<i>Carex stricta</i>
<i>Carex swanii</i>
<i>Carex tonsa</i>
<i>Carex torta</i>
<i>Carex tribuloides</i>
<i>Carex trichocarpa</i>
<i>Carex utriculata</i>
<i>Carex vesicaria</i>
<i>Carex virescens</i>
<i>Carex vulpinoidea</i>
<i>Carpinus caroliniana</i>
<i>Carya cordiformis</i>
<i>Carya ovata</i>
<i>Caulophyllum thalictroides</i>
<i>Ceanothus herbaceus</i>
<i>Celastrus orbiculatus</i>

<i>Celastrus scandens</i>
<i>Celtis occidentalis</i>
<i>Centaurea xmoncktonii</i>
<i>Centaurea jacea</i>
<i>Centaurea stoebe</i>
<i>Centaureum pulchellum</i>
<i>Cephalanthus occidentalis</i>
<i>Cerastium arvense</i>
<i>Cerastium fontanum</i>
<i>Chaenorhinum minus</i>
<i>Chamaenerion angustifolium</i>
<i>Chelidonium majus</i>
<i>Chelone glabra</i>
<i>Chimaphila umbellata</i>
<i>Cichorium intybus</i>
<i>Cicuta bulbifera</i>
<i>Cicuta maculata</i>
<i>Cinna latifolia</i>
<i>Circaea alpina</i>
<i>Circaea canadensis</i>
<i>Cirsium arvense</i>
<i>Cirsium pumilum</i>
<i>Cirsium vulgare</i>
<i>Clematis occidentalis</i>
<i>Clematis virginiana</i>
<i>Clinopodium vulgare</i>
<i>Comandra umbellata</i>
<i>Comptonia peregrina</i>
<i>Convallaria majalis</i>
<i>Coreopsis lanceolata</i>
<i>Cornus alternifolia</i>
<i>Cornus amomum</i>
<i>Cornus canadensis</i>

<i>Cornus racemosa</i>
<i>Cornus rugosa</i>
<i>Cornus sericea</i>
<i>Corylus americana</i>
<i>Corylus cornuta</i>
<i>Crataegus dodgei</i>
<i>Crataegus egglestonii</i>
<i>Crataegus punctata</i>
<i>Crataegus sp.</i>
<i>Crataegus submollis</i>
<i>Cynanchum louiseae</i>
<i>Cynoglossum officinale</i>
<i>Cyperus lupulinus</i>
<i>Cypripedium acaule</i>
<i>Cypripedium pubescens</i>
<i>Cystopteris bulbifera</i>
<i>Cystopteris fragilis</i>
<i>Cystopteris tenuis</i>
<i>Dactylis glomerata</i>
<i>Danthonia compressa</i>
<i>Danthonia spicata</i>
<i>Daphne mezereum</i>
<i>Dasiphora floribunda</i>
<i>Dasiphora fruticosa</i>
<i>Daucus carota</i>
<i>Dendrolycopodium dendroideum</i>
<i>Dennstaedtia punctilobula</i>
<i>Deparia acrostichoides</i>
<i>Desmodium paniculatum</i>
<i>Desmodium rotundifolium</i>
<i>Dianthus armeria</i>
<i>Dichanthelium acuminatum</i>

<i>Dichanthelium clandestinum</i>
<i>Diervilla lonicera</i>
<i>Digitaria cognata</i>
<i>Digitaria sanguinalis</i>
<i>Dipsacus fullonum</i>
<i>Dirca palustris</i>
<i>Doellingeria umbellata</i>
<i>Drosera rotundifolia</i>
<i>Dryopteris carthusiana</i>
<i>Dryopteris cristata</i>
<i>Dryopteris intermedia</i>
<i>Dryopteris marginalis</i>
<i>Echinochloa crus-galli</i>
<i>Echinochloa SP.</i>
<i>Echinocystis lobata</i>
<i>Echium vulgare</i>
<i>Elaeagnus umbellata</i>
<i>Eleocharis cf elliptica</i>
<i>Eleocharis erythropoda</i>
<i>Eleocharis obtusa</i>
<i>Eleocharis palustris</i>
<i>Eleocharis tenuis</i>
<i>Elodea canadensis</i>
<i>Elymus canadensis</i>
<i>Elymus hystrix</i>
<i>Elymus repens</i>
<i>Elymus virginicus</i>
<i>Epifagus virginiana</i>
<i>Epilobium ciliatum</i>
<i>Epilobium coloratum</i>
<i>Epilobium hirsutum</i>
<i>Epilobium leptophyllum</i>
<i>Epipactis helleborine</i>

<i>Equisetum arvense</i>
<i>Equisetum fluviatile</i>
<i>Equisetum hyemale</i>
<i>Equisetum palustre</i>
<i>Equisetum sylvaticum</i>
<i>Equisetum variegatum</i>
<i>Eragrostis frankii</i>
<i>Eragrostis pectinacea</i>
<i>Eragrostis spectabilis</i>
<i>Erechtites hieraciifolius</i>
<i>Erigeron canadensis</i>
<i>Erigeron philadelphicus</i>
<i>Erigeron strigosus</i>
<i>Euonymus alatus</i>
<i>Euonymus europaeus</i>
<i>Eupatorium perfoliatum</i>
<i>Euphorbia cyparissias</i>
<i>Eurybia divaricata</i>
<i>Eurybia macrophylla</i>
<i>Eutrochium maculatum</i>
<i>Fagus grandifolia</i>
<i>Fallopia cilinodis</i>
<i>Fallopia japonica</i>
<i>Fragaria virginiana</i>
<i>Frangula alnus</i>
<i>Fraxinus americana</i>
<i>Fraxinus nigra</i>
<i>Galeopsis tetrahit</i>
<i>Galium aparine</i>
<i>Galium asprellum</i>
<i>Galium circaezans</i>
<i>Galium mollugo</i>
<i>Galium obtusum</i>

<i>Galium palustre</i>
<i>Galium pilosum</i>
<i>Galium triflorum</i>
<i>Galium verum</i>
<i>Gaultheria procumbens</i>
<i>Gaylussacia baccata</i>
<i>Geranium maculatum</i>
<i>Geranium molle</i>
<i>Geranium robertianum</i>
<i>Geum aleppicum</i>
<i>Geum canadense</i>
<i>Geum fragarioides</i>
<i>Geum laciniatum</i>
<i>Geum rivale</i>
<i>Glechoma hederacea</i>
<i>Gleditsia triacanthos</i>
<i>Glyceria canadensis</i>
<i>Glyceria grandis</i>
<i>Glyceria melicaria</i>
<i>Glyceria striata</i>
<i>Gnaphalium uliginosum</i>
<i>Gymnocarpium dryopteris</i>
<i>Hackelia americana</i>
<i>Hackelia virginiana</i>
<i>Hamamelis virginiana</i>
<i>Hedeoma hispida</i>
<i>Hedeoma pulegioides</i>
<i>Helenium autumnale</i>
<i>Helianthus decapetalus</i>
<i>Helianthus divaricatus</i>
<i>Heracleum maximum</i>
<i>Hesperis matronalis</i>
<i>Heteranthera dubia</i>

<i>Holcus lanatus</i>
<i>Houstonia longifolia</i>
<i>Hydrocotyle americana</i>
<i>Hydrophyllum canadense</i>
<i>Hylodesmum glutinosum</i>
<i>Hypericum canadense</i>
<i>Hypericum perforatum</i>
<i>Hypericum punctatum</i>
<i>Hypopitys lanuginosa</i>
<i>Impatiens capensis</i>
<i>Impatiens pallida</i>
<i>Inula helenium</i>
<i>Iris pseudacorus</i>
<i>Iris versicolor</i>
<i>Juglans cinerea</i>
<i>Juglans nigra</i>
<i>Juncus articulatus</i>
<i>Juncus brevicaudatus</i>
<i>Juncus bufonius</i>
<i>Juncus compressus</i>
<i>Juncus dudleyi</i>
<i>Juncus effusus</i>
<i>Juncus filiformis</i>
<i>Juncus greenei</i>
<i>Juncus nodosus</i>
<i>Juncus tenuis</i>
<i>Juniperus communis</i>
<i>Juniperus virginiana</i>
<i>Lapsana communis</i>
<i>Larix laricina</i>
<i>Leersia oryzoides</i>
<i>Leersia virginica</i>
<i>Lemna minor</i>

<i>Leonurus cardiaca</i>
<i>Lepidium densiflorum</i>
<i>Lespedeza hirta</i>
<i>Lespedeza violacea</i>
<i>Linaria vulgaris</i>
<i>Liparis loeselii</i>
<i>Liriodendron tulipifera</i>
<i>Lithospermum officinale</i>
<i>Lobelia inflata</i>
<i>Lobelia spicata</i>
<i>Lolium perenne</i>
<i>Lonicera dioica</i>
<i>Lonicera maackii</i>
<i>Lonicera morrowii</i>
<i>Lonicera tatarica</i>
<i>Lotus corniculatus</i>
<i>Ludwigia palustris</i>
<i>Lupinus polyphyllus</i>
<i>Luzula acuminata</i>
<i>Lycopodium clavatum</i>
<i>Lycopus americanus</i>
<i>Lycopus uniflorus</i>
<i>Lysimachia ciliata</i>
<i>Lysimachia nummularia</i>
<i>Lysimachia quadrifolia</i>
<i>Lysimachia terrestris</i>
<i>Lysimachia thyrsoiflorus</i>
<i>Lythrum salicaria</i>
<i>Maianthemum canadense</i>
<i>Maianthemum racemosum</i>
<i>Maianthemum stellatum</i>
<i>Malus baccata</i>
<i>Malus pumila</i>

<i>Matricaria chamomilla</i>
<i>Matricaria discoidea</i>
<i>Matteuccia struthiopteris</i>
<i>Medicago lupulina</i>
<i>Medicago sativa</i>
<i>Melilotus albus</i>
<i>Melilotus officinalis</i>
<i>Menispermum canadense</i>
<i>Mentha x piperita</i>
<i>Mentha arvensis</i>
<i>Mentha spicata</i>
<i>Milium effusum</i>
<i>Mimulus ringens</i>
<i>Mitchella repens</i>
<i>Mitella nuda</i>
<i>Monarda didyma</i>
<i>Monarda fistulosa</i>
<i>Moneses uniflora</i>
<i>Monotropa uniflora</i>
<i>Morus alba</i>
<i>Muhlenbergia glomerata</i>
<i>Myosotis arvensis</i>
<i>Myosotis laxa</i>
<i>Myosotis scorpioides</i>
<i>Myrica gale</i>
<i>Nabalus altissimus</i>
<i>Nabalus trifoliolatus</i>
<i>Nepeta cataria</i>
<i>Nuphar variegata</i>
<i>Oclemena acuminata</i>
<i>Oenothera biennis</i>
<i>Oenothera perennis</i>
<i>Onoclea sensibilis</i>

<i>Origanum vulgare</i>
<i>Oryzopsis asperifolia</i>
<i>Osmunda claytoniana</i>
<i>Osmunda regalis</i>
<i>Osmundastrum cinnamomeum</i>
<i>Ostrya virginiana</i>
<i>Oxalis montana</i>
<i>Oxalis stricta</i>
<i>Packera aurea</i>
<i>Panax trifolium</i>
<i>Parathelypteris noveboracensis</i>
<i>Parthenocissus quinquefolia</i>
<i>Pastinaca officinalis</i>
<i>Pedicularis canadensis</i>
<i>Penstemon digitalis</i>
<i>Penthorum sedoides</i>
<i>Persicaria hydropiperoides</i>
<i>Persicaria sagittata</i>
<i>Persicaria virginiana</i>
<i>Phalaris arundinacea</i>
<i>Phegopteris connectilis</i>
<i>Philadelphus coronarius</i>
<i>Phleum pratense</i>
<i>Phryma leptostachya</i>
<i>Physalis heterophylla</i>
<i>Physocarpus opulifolius</i>
<i>Phytolacca americana</i>
<i>Picea glauca</i>
<i>Picea abies</i>
<i>Picea rubens</i>
<i>Pilea pumila</i>
<i>Pilosella aurantiaca</i>



<i>Pilosella caespitosa</i>
<i>Pinus resinosa</i>
<i>Pinus strobus</i>
<i>Pinus sylvestris</i>
<i>Piptatherum racemosum</i>
<i>Plantago lanceolata</i>
<i>Plantago major</i>
<i>Platanthera lacera</i>
<i>Platanthera psycodes</i>
<i>Platanus occidentalis</i>
<i>Poa annua</i>
<i>Poa compressa</i>
<i>Poa palustris</i>
<i>Poa pratensis</i>
<i>Polygaloides paucifolia</i>
<i>Polygonatum pubescens</i>
<i>Polygonum aviculare</i>
<i>Polypodium virginianum</i>
<i>Polystichum acrostichoides</i>
<i>Populus balsamifera</i>
<i>Populus deltoides</i>
<i>Populus grandidentata</i>
<i>Populus tremuloides</i>
<i>Potentilla argentea</i>
<i>Potentilla norvegica</i>
<i>Potentilla recta</i>
<i>Potentilla simplex</i>
<i>Prunella vulgaris</i>
<i>Prunus nigra</i>
<i>Prunus pennsylvanica</i>
<i>Prunus serotina</i>
<i>Prunus virginiana</i>
<i>Pteridium aquilinum</i>

<i>Pycnanthemum tenuifolium</i>
<i>Pycnanthemum verticillatum</i>
<i>Pycnanthemum virginianum</i>
<i>Pyrola americana</i>
<i>Pyrola elliptica</i>
<i>Pyrus communis</i>
<i>Quercus alba</i>
<i>Quercus coccinea</i>
<i>Quercus macrocarpa</i>
<i>Quercus muehlenbergii</i>
<i>Quercus rubra</i>
<i>Quercus velutina</i>
<i>Ranunculus abortivus</i>
<i>Ranunculus acris</i>
<i>Ranunculus alleghaniensis</i>
<i>Ranunculus caricetorum</i>
<i>Ranunculus cf sceleratus</i>
<i>Ranunculus recurvatus</i>
<i>Ranunculus repens</i>
<i>Rhamnus cathartica</i>
<i>Rheum rhabarbarum</i>
<i>Rhinanthus minor</i>
<i>Rhododendron prinophyllum</i>
<i>Rhus aromatica</i>
<i>Rhus copallina</i>
<i>Rhus typhina</i>
<i>Ribes americanum</i>
<i>Ribes cynosbati</i>
<i>Ribes hirtellum</i>
<i>Ribes lacustre</i>
<i>Ribes sativum</i>
<i>Robinia pseudo-acacia</i>
<i>Rosa multiflora</i>

<i>Rosa blanda</i>
<i>Rosa carolina</i>
<i>Rosa rugosa</i>
<i>Rubus occidentalis</i>
<i>Rubus alleghaniensis</i>
<i>Rubus dalibarda</i>
<i>Rubus enslenii</i>
<i>Rubus hispidus</i>
<i>Rubus idaeus</i>
<i>Rubus odoratus</i>
<i>Rubus pubescens</i>
<i>Rudbeckia hirta</i>
<i>Rudbeckia laciniata</i>
<i>Rumex acetosella</i>
<i>Rumex crispus</i>
<i>Rumex obtusifolius</i>
<i>Rumex verticillatus</i>
<i>Sagittaria latifolia</i>
<i>Salix lucida</i>
<i>Salix ×fragilis</i>
<i>Salix ×sepulcralis</i>
<i>Salix alba</i>
<i>Salix bebbiana</i>
<i>Salix discolor</i>
<i>Salix eriocephala</i>
<i>Salix humilis</i>
<i>Salix nigra</i>
<i>Salix petiolaris</i>
<i>Salix sericea</i>
<i>Sambucus canadensis</i>
<i>Sanguinaria canadensis</i>
<i>Sanicula canadensis</i>
<i>Saponaria officinalis</i>

<i>Saxifraga oppositifolia</i>
<i>Schedonorus arundinaceus</i>
<i>Schedonorus pratensis</i>
<i>Schizachne purpurascens</i>
<i>Schizachyrium scoparium</i>
<i>Schoenoplectus pungens</i>
<i>Schoenoplectus tabernaemontana</i>
<i>Scirpus atrocinctus</i>
<i>Scirpus atrovirens</i>
<i>Scirpus cyperinus</i>
<i>Scirpus microcarpus</i>
<i>Scirpus pendulus</i>
<i>Scrophularia lanceolata</i>
<i>Scutellaria galericulata</i>
<i>Scutellaria lateriflora</i>
<i>Securigera varia</i>
<i>Sedum acre</i>
<i>Selaginella rupestris</i>
<i>Setaria sp.</i>
<i>Setaria viridis</i>
<i>Silene antirrhina</i>
<i>Silene vulgaris</i>
<i>Silphium perfoliatum</i>
<i>Sisyrinchium montanum</i>
<i>Smilax herbacea</i>
<i>Solanum dulcamara</i>
<i>Solidago altissima</i>
<i>Solidago bicolor</i>
<i>Solidago caesia</i>
<i>Solidago canadensis</i>
<i>Solidago cf hispida</i>
<i>Solidago flexicaulis</i>

<i>Solidago gigantea</i>
<i>Solidago juncea</i>
<i>Solidago nemoralis</i>
<i>Solidago patula</i>
<i>Solidago rugosa</i>
<i>Sonchus asper</i>
<i>Sorbus americana</i>
<i>Sparganium emersum</i>
<i>Spartina pectinata</i>
<i>Spinulum annotinum</i>
<i>Spiraea alba</i>
<i>Spiraea tomentosa</i>
<i>Spiranthes sp.</i>
<i>Sporobolus cryptandrus</i>
<i>Sporobolus vaginiflorus</i>
<i>Stachys hispida</i>
<i>Stachys palustris</i>
<i>Stellaria graminea</i>
<i>Streptopus lanceolatus</i>
<i>Symphoricarpos laevigatus</i>
<i>Symphyotrichum cordifolium</i>
<i>Symphyotrichum ericoides</i>
<i>Symphyotrichum laeve</i>
<i>Symphyotrichum novae-angliae</i>
<i>Symphyotrichum puniceum</i>
<i>Symphyotrichum undulatum</i>
<i>Symplocarpus foetidus</i>
<i>Syringa vulgaris</i>
<i>Tanacetum vulgare</i>
<i>Taraxacum officinale</i>
<i>Taxus canadensis</i>
<i>Teucrium canadense</i>

<i>Thalictrum dioicum</i>
<i>Thalictrum pubescens</i>
<i>Thelypteris palustris</i>
<i>Thuja occidentalis</i>
<i>Tiarella cordata</i>
<i>Tilia americana</i>
<i>Tilia cordata</i>
<i>Toxicodendron radicans</i>
<i>Tragopogon dubius</i>
<i>Tragopogon pratensis</i>
<i>Triadenum fraseri</i>
<i>Trichostema brachiatum</i>
<i>Trichostema dichotomum</i>
<i>Trifolium arvense</i>
<i>Trifolium aureum</i>
<i>Trifolium hybridum</i>
<i>Trifolium pratense</i>
<i>Trifolium repens</i>
<i>Trillium erectum</i>
<i>Tsuga canadensis</i>
<i>Turritis glabra</i>
<i>Tussilago farfara</i>
<i>Typha angustifolia</i>
<i>Typha latifolia</i>
<i>Ulmus americana</i>
<i>Ulmus rubra</i>
<i>Urtica dioica</i>
<i>Utricularia macrorrhiza</i>
<i>Uvularia sessilifolia</i>
<i>Vaccinium angustifolium</i>
<i>Vaccinium corymbosum</i>
<i>Vaccinium myrtilloides</i>
<i>Vaccinium pallidum</i>

<i>Valeriana officinalis</i>
<i>Veratrum viride</i>
<i>Verbascum blattaria</i>
<i>Verbascum thapsus</i>
<i>Verbena hastata</i>
<i>Verbena urticifolia</i>
<i>Veronica americana</i>
<i>Veronica chamaedrys</i>
<i>Viburnum acerifolium</i>
<i>Viburnum cassinoides</i>
<i>Viburnum dentatum</i>
<i>Viburnum lentago</i>
<i>Viburnum opulus</i>
<i>Viburnum rafinesquianum</i>

<i>Vicia cracca</i>
<i>Vicia tetrasperma</i>
<i>Vinca minor</i>
<i>Viola adunca</i>
<i>Viola rotundifolia</i>
<i>Viola sagittata</i>
<i>Vitis aestivalis</i>
<i>Vitis riparia</i>
<i>Woodsia ilvensis</i>
<i>Woodsia obtusa</i>
<i>Woodwardia virginica</i>
<i>Zanthoxylum americanum</i>
<i>Zizia aurea</i>

**Attachment 4.**

**Survey Summary for Recorded RTE Animal EOs**

## Survey Summary for Recorded RTE Animal Eos

EO ID	Scientific Name	Common Name	State Rank	State Threatened or Endangered Status	Federal Threatened or Endangered Status	Habitat Characteristics	AE Habitat Survey Results
7911	<i>Thamnophis sauritus</i>	Eastern Ribbonsnake	S2	SSC	-	Wetland edges with sunny exposed basking sites in warm, low-elevation, largely undeveloped areas. The presence of nearby rocky woodlands and talus increases the likelihood of their occurrence in these areas.	EO record location is approximately 1200' from the study area. Appropriate general habitat present in the study area. No obvious hibernacula identified.
5418	<i>Sternotherus odoratus</i>	Stinkpot (Eastern Musk Turtle)	S2	SSC	-	Shallow, heavily vegetated waters of slow moving creeks, or in ponds.	EO record location is approximately 2000' south of the study area. The shoreline at the Lake in the study area is rocky substrate. No surveys conducted.
7565	<i>Pantherophis alleghaniensis</i>	Eastern Ratsnake	S2	ST	-	Old buildings, old fields, and edges of woods near rocky areas and ledges.	Appropriate general habitat present. No hibernacula present within the study area.
10349	<i>Thamnophis sauritus</i>	Eastern Ribbonsnake	S2	SSC	-	Wetland edges with sunny exposed basking sites in warm, low-elevation, largely undeveloped areas. The presence of nearby rocky woodlands and talus increases the likelihood of their occurrence in these areas.	EO record location is approximately 1200' from the study area. Appropriate habitat present in the study area. No obvious hibernacula identified.
3223	<i>Pantherophis alleghaniensis</i>	Eastern Ratsnake	S2	ST	-	Old buildings, old fields, and edges of woods near rocky areas and ledges.	Appropriate general habitat present. No hibernacula present within the study area.
3874	<i>Bartramia longicauda</i>	Upland Sandpiper	S2B	SE	-	Large areas of grasslands, fallow fields, and meadows	Extensive potentially appropriate habitat throughout the area.
9727	<i>Lasmigona costata</i>	Fluted-shell	S2	SE	-	Sand, mud, or fine gravel in medium to large rivers with slow to moderate flow.	No surveys conducted
6848	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2?	SSC	-	Large streams and lakes	No surveys conducted
4546	<i>Bartramia longicauda</i>	Upland Sandpiper	S2B	SE	-	Large areas of grasslands, fallow fields, and meadows	Historic site of Devil' Bowl Speedway has short mowed lawn, no longer good habitat. Extensive potentially appropriate habitat throughout the area.
5540	<i>Crotalus horridus</i>	Timber Rattlesnake	S1	SE	-	Forested rocky hills. Hibernating dens can be found in crevices in rocky, south-facing cliffs or piles of large boulders.	The Great Ledge and Rattlesnake Ridge are not within the study area. Appropriate general habitat within the study area. No hibernacula present within the study area.
5869	<i>Pantherophis alleghaniensis</i>	Eastern Ratsnake	S2	ST	-	Old buildings, old fields, and edges of woods near rocky areas and ledges.	The Great Ledge and Rattlesnake Ridge are not within the study area. Appropriate adjacent general habitat present. No hibernacula present within the study area.
1873	<i>Crotalus horridus</i>	Timber Rattlesnake	S1	SE	-	Forested rocky hills. Hibernating dens can be found in crevices in rocky, south-facing cliffs or piles of large boulders.	Appropriate general habitat present in the study area. No hibernacula present within study area.
6871	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2?	SSC	-	Large streams and lakes	No surveys conducted
8483	<i>Setophaga cerulea</i>	Cerulean Warbler	S1S2B	SSC	-	Mature forested areas with large and tall trees of broad-leaved, deciduous species and relatively little undergrowth.	No surveys conducted
2357	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2S3B	SSC	-	Streams, ponds, lake and freshwater marshes.	Appropriate habitat in wetlands along the Castleton River and West Rutland Marsh. No surveys conducted
6106	<i>Lasmigona compressa</i>	Creek Heelsplitter	S2	-	-	Rivers and streams of various sizes. Substrates of gravel, sand, or mud.	No surveys conducted
5882	<i>Setophaga tigrina</i>	Cape May Warbler	S1B	-	-	Coniferous woodland	No surveys conducted
-	<i>Myotis sodalis</i>	Indiana Bat	-	SE	FE	Wooded areas where they roost under loose tree bark on dead or dying trees.	Survey conducted, report under separate cover

<p><b>1 - State Rank</b>  S1 - Very rare (Critically imperiled): At very high risk of extinction or extirpation due to extreme rarity (often 5 or fewer populations or occurrences), very steep declines, or other factors  S2 - Rare (Imperiled): At high risk of extinction or extirpation due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors  S3 - Uncommon (Vulnerable): At moderate risk of extinction or extirpation due to restricted range, relatively few populations or occurrences (often 80 or fewer), recent and widespread declines, or other factors  S4 - Common to uncommon (Apparently secure): locally common or widely scattered to uncommon, but not rare; some cause for long-term concern due to declines or other factors; or stable over many decades and not threatened but of restricted distribution or other factors  S5 - Common (Secure): widespread and abundant  B - Breeding  N - Nonbreeding  H - Possibly extinct/extirpated: Missing; known from only historical occurrences but still some hope of rediscovery</p>					
<p><b>2 - State and Federal Threatened and Endangered Status</b></p>					
<p>ST - Listed as Threatened in the State of Vermont  SE - Listed as Endangered in the State of Vermont  SSC - Listed as Special Concern in the State of Vermont  FT - Federally-listed as Threatened  FE - Federally-listed as Endangered</p>					

**Attachment 5.**

**Survey Summary for Recorded Natural Community EOs**



## Attachment 5

### Survey Summary for Recorded Natural Community EOs

EO ID	Name	State Rank	AE Survey Results
4347	Vernal Pool	S3	Confirmed outside of study area
661	Dry Oak-Hickory-Hophornbeam Forest	S3	Confirmed outside of study area. Forest at this location is disturbed White Pine-Northern Hardwood Forest
3473	Transition Hardwood Talus Woodland	S3	Confirmed outside of study area. Forest at this location is small example of Mesic Maple-Ash-Hickory-Oak forest with planted red and white pine. Not a significant community.
4952	Wet Clayplain Forest	S2	Wet Clayplain Forest does not occur anywhere within the study area
2774	Temperate Calcareous Outcrop	S3	Confirmed outside of study area
3080	Transition Hardwood Talus Woodland	S3	Confirmed outside of study area
7984	Mesic Clayplain Forest	S2	Confirmed outside of study area
9691	Dry Oak Forest	S3	Confirmed outside of study area
6802	Red Maple-Black Ash Seepage Swamp	S4	Confirmed outside of study area
8321	Dry Oak Forest	S3	Confirmed outside of study area
8334	Northern Hardwood Forest	S5	Confirmed outside of study area. South of Railroad tracks.
8364	Hemlock Forest	S4	Confirmed outside of study area
8365	Hemlock-Northern Hardwood Forest	S4	Confirmed outside of study area
8366	Red Maple-Sphagnum Acidic Basin Swamp	S3	Confirmed outside of study area

**Attachment 6.**

**Natural Community Survey Forms**

**VERMONT NATURAL COMMUNITY SURVEY FORM**  
**Nongame and Natural Heritage Program**  
**Vermont Fish & Wildlife Department**

rev. Apr. 2009

**Survey Site:** Green Dump Hills Is this an update?  EO# (if known): \_\_\_\_\_

**Community Type:** Dry Oak-Hickory-Hophornbeam Forest

(For vernal pools, please use the Vernal Pool Survey Form on our website)

Community Variant Name (if applicable): \_\_\_\_\_

Association Name (NVC type) (office): \_\_\_\_\_

**Surveyor(s):** Michael Lew-Smith Contact Info: mlewsmith@arrowwoodvt.com

**Survey Date(s):** 8-3-2014 Town: Castleton County: Rutland

Unusual data sensitivity issues?  If so, explain: \_\_\_\_\_

**LANDOWNER(S) / CONTACT(S)** (Name, Telephone, Address, Email—if not in a Site Summary Form) Permission?  
Unknown

**GENERAL DESCRIPTION of SITE**

Describe *Site* and its range and variability (give a word picture of natural and man-made features, including: general topography, elevation, exposure, community types, geologic substrata, evidence of disturbance, exotics, etc.):  
Variable topography. Southern end of larger forests to north. Shallow sandy loam soils.

**NATURAL COMMUNITY INFORMATION**

Describe *Natural Community* occurrence (include canopy cover, dominant species by stratum, soils, physical environment, & evidence of disturbance):  
The forest at this location is best described as a Dry Oak-Hickory-Hophornbeam Forest community, though it may be transitional to the Mesic Maple-Ash-Hickory-Oak Forest. The canopy is dominated by northern red oak (*Quercus rubra*), American ash (*Fraxinus americana*), white pine (*Pinus strobus*) and hop hornbeam (*Ostrya virginiana*). The understory is dominated by Pennsylvania sedge (*Carex pensylvanica*). The forest continues to the north where it is interspersed with numerous state significant examples of the Dry Oak Forest community. Given its size, condition and community type, this forest is likely a state significant community as well.

Aspect: mostly south Slope (degrees): variable Elevation (with units): minimum 500+ maximum ?

Bedrock geologic type (Doll et al. 1961 or more recent):  
Bull Formation

Soil type or description (NRCS):  
Taconic-Hubbarton Complex

**COMMUNITY OCCURRENCE RANKING:** a range of ranks may be used (e.g. AB)

Using **VT NNHP ranking specifications** (if available)\*:  OR Using **Generic ranking specifications** (provided below):

	Rank:	Comments:
Current Condition:		Further work on rest of forest needs to be conducted.
Landscape Context:		
Size:		Community size (acres) and how determined:
Overall Rank:		

\* Available for some natural communities at [www.vtfishandwildlife.com/wildlife\\_nongame.cfm](http://www.vtfishandwildlife.com/wildlife_nongame.cfm). Use to fill in the grid above.

**Generic ranking specifications:**

Use the following guidelines to fill in the grid above if VT NNHP Natural Community ranking specifications are unavailable

**Current Condition:**

- A:** mature example of the community type (forests with trees generally >150 years old); natural processes intact; no exotics
- B:** some minor alteration of vegetation structure and composition, such as by selective logging; minor alterations in ecological processes; exotics species present in low abundance
- C:** significant alteration of vegetation structure and composition, such as by heavy logging; alteration of ecological processes are significant, but community recovery/restoration is likely; exotic species are abundant and control will take significant effort
- D:** ecological processes significantly altered to the point where vegetation composition and structure are very different from A-ranked condition and restoration/recovery is unlikely; exotic species are abundant or control will be difficult

**Landscape Context:**

- A:** highly connected; area around EO (>1,000acres) is largely intact natural vegetation, with species interactions and natural processes occurring across communities; surrounding matrix forest meets at least B specifications for Condition.
- B:** moderately connected; area around EO (>1,000acres) is moderately intact natural vegetation, with species interactions and some natural processes occurring across many communities, although temporary disturbances such as logging have reduced condition of the landscape; surrounding matrix forest meets at least C specifications for Condition
- C:** moderately fragmented; area around EO is largely a combination of cultural and natural vegetation with barriers to species interactions and natural processes across communities; surrounding land is a mix of fragmented forest, agriculture, and rural development
- D:** highly fragmented; area around EO is entirely, or almost entirely, surrounded by agriculture or urban development

**Size:**

No Generic ranking applicable. Please provide size of community in grid above.

**Overall Rank** (based on best judgment):

- A:** excellent estimated viability
- B:** good estimated viability
- C:** fair estimated viability
- D:** poor estimated viability

**MANAGEMENT/PROTECTION RECOMMENDATIONS for NATURAL COMMUNITY**

**ADDITIONAL INFORMATION**

- Plot form(s) attached. Plot Code: \_\_\_\_\_
- Animal list attached
- Plant list attached (in addition to plot forms)
- Map of route taken and observation points—or include with Natural Community map.
- Photographs

Comments that do not fit in another field:

Further work needs to be conducted on larger forest to make final significance determination. Forest only assessed in the Route 4 right-of-way.

**MAPPING**

Attach a digital or paper map of the natural community boundary mapped as polygons (required):

Shapefile attached (encouraged):  File must be NAD83 State Plane:  File name: \_\_\_\_\_

Estimated % of mapped polygon occupied by this community: >95% ; 80-95% ; 20-80% ; 0-20% ; Unknown

Explain if <95%: \_\_\_\_\_

Base Map Used to delineate occurrence:	Confident that full extent is known: <input type="checkbox"/>
1:24,000 USGS Quad: <input type="checkbox"/>	Uncertain if full extent is known: <input type="checkbox"/>
1:25,000 USGS Quad: <input type="checkbox"/>	Confident that full extent is <i>not</i> known: <input type="checkbox"/>
1:5000 Ortho Photo: <input type="checkbox"/>	Additional inventory needed? <input type="checkbox"/> If so, explain:
GPS: <input type="checkbox"/> Accuracy: _____	
Other: <input type="checkbox"/> Specify: _____	

Please send completed forms to Eric Sorenson: Eric.Sorenson [at] state.vt.us / Nongame & Natural Heritage Program, Vermont Fish & Wildlife Dept., 103 South Main Street, Building 10 South, Waterbury, VT 05671-0501 / (802)-241-3714

**VERMONT NATURAL COMMUNITY SURVEY FORM**  
**Nongame and Natural Heritage Program**  
**Vermont Fish & Wildlife Department**

rev. Apr. 2009

**Survey Site:** Herrick Mountain NE Is this an update?  EO# (if known): \_\_\_\_\_

**Community Type:** Mesic Red Oak-Northern Hardwood Forest

(For vernal pools, please use the Vernal Pool Survey Form on our website)

Community Variant Name (if applicable): \_\_\_\_\_

Association Name (NVC type) (office): \_\_\_\_\_

**Surveyor(s):** Michael Lew-Smith Contact Info: mlewsmith@arrowwoodvt.com

**Survey Date(s):** 8-4-14 Town: West Rutland County: Rutland

Unusual data sensitivity issues?  If so, explain: \_\_\_\_\_

**LANDOWNER(S) / CONTACT(S)** (Name, Telephone, Address, Email—if not in a Site Summary Form) Permission?  
Unknown

**GENERAL DESCRIPTION of SITE**

Describe *Site* and its range and variability (give a word picture of natural and man-made features, including: general topography, elevation, exposure, community types, geologic substrata, evidence of disturbance, exotics, etc.):  
Variable topography. Northeasten corner of large RONH forest. Loam and sandy loam soils. Some surficial rock.

**NATURAL COMMUNITY INFORMATION**

Describe *Natural Community* occurrence (include canopy cover, dominant species by stratum, soils, physical environment, & evidence of disturbance):  
This Mesic Red Oak-Northern Hardwood Forest is dominated by northern red oak (*Quercus rubra*), American ash (*Fraxinus americana*), American beech (*Fagus grandifolia*), black birch (*Betula lenta*), and white pine (*Pinus strobus*). The understory consists of witch hazel (*Hamamelis virginiana*), maple-leaved viburnum (*Viburnum acerifolium*) and various canopy saplings. This appears to be a fairly young forest, with DBHs averaging around 10-12". Despite the age, the forest appears to be in good condition. This is a fairly common community type, and would be a significant natural community only if the rest of the forest to the south is in very good condition.

Aspect: variable Slope (degrees): variable Elevation (with units): minimum 500+ maximum ?

Bedrock geologic type (Doll et al. 1961 or more recent):  
Bull Formation

Soil type or description (NRCS):  
Macomber-Taconic Complex

**COMMUNITY OCCURRENCE RANKING:** a range of ranks may be used (e.g. AB)

Using **VT NNHP ranking specifications** (if available)\*:  OR Using **Generic ranking specifications** (provided below):

	Rank:	Comments:
Current Condition:		Further work on rest of forest needs to be conducted.
Landscape Context:		
Size:		Community size (acres) and how determined:
Overall Rank:		

\* Available for some natural communities at [www.vtfishandwildlife.com/wildlife\\_nongame.cfm](http://www.vtfishandwildlife.com/wildlife_nongame.cfm). Use to fill in the grid above.

**Generic ranking specifications:**

Use the following guidelines to fill in the grid above if VT NNHP Natural Community ranking specifications are unavailable

**Current Condition:**

- A:** mature example of the community type (forests with trees generally >150 years old); natural processes intact; no exotics
- B:** some minor alteration of vegetation structure and composition, such as by selective logging; minor alterations in ecological processes; exotics species present in low abundance
- C:** significant alteration of vegetation structure and composition, such as by heavy logging; alteration of ecological processes are significant, but community recovery/restoration is likely; exotic species are abundant and control will take significant effort
- D:** ecological processes significantly altered to the point where vegetation composition and structure are very different from A-ranked condition and restoration/recovery is unlikely; exotic species are abundant or control will be difficult

**Landscape Context:**

- A:** highly connected; area around EO (>1,000acres) is largely intact natural vegetation, with species interactions and natural processes occurring across communities; surrounding matrix forest meets at least B specifications for Condition.
- B:** moderately connected; area around EO (>1,000acres) is moderately intact natural vegetation, with species interactions and some natural processes occurring across many communities, although temporary disturbances such as logging have reduced condition of the landscape; surrounding matrix forest meets at least C specifications for Condition
- C:** moderately fragmented; area around EO is largely a combination of cultural and natural vegetation with barriers to species interactions and natural processes across communities; surrounding land is a mix of fragmented forest, agriculture, and rural development
- D:** highly fragmented; area around EO is entirely, or almost entirely, surrounded by agriculture or urban development

**Size:**

No Generic ranking applicable. Please provide size of community in grid above.

**Overall Rank** (based on best judgment):

- A:** excellent estimated viability
- B:** good estimated viability
- C:** fair estimated viability
- D:** poor estimated viability

**MANAGEMENT/PROTECTION RECOMMENDATIONS for NATURAL COMMUNITY**

**ADDITIONAL INFORMATION**

- Plot form(s) attached. Plot Code: \_\_\_\_\_
- Animal list attached
- Plant list attached (in addition to plot forms)
- Map of route taken and observation points—or include with Natural Community map.
- Photographs

Comments that do not fit in another field:

Further work needs to be conducted on larger forest to make final significance determination. Forest only assessed in the Route 4 right-of-way.

**MAPPING**

Attach a digital or paper map of the natural community boundary mapped as polygons (required):

Shapefile attached (encouraged):  File must be NAD83 State Plane:  File name: \_\_\_\_\_

Estimated % of mapped polygon occupied by this community: >95% ; 80-95% ; 20-80% ; 0-20% ; Unknown

Explain if <95%: \_\_\_\_\_

Base Map Used to delineate occurrence: 1:24,000 USGS Quad: <input type="checkbox"/> 1:25,000 USGS Quad: <input type="checkbox"/> 1:5000 Ortho Photo: <input type="checkbox"/> GPS: <input type="checkbox"/> Accuracy: _____ Other: <input type="checkbox"/> Specify: _____	Confident that full extent is known: <input type="checkbox"/> Uncertain if full extent is known: <input type="checkbox"/> Confident that full extent is <i>not</i> known: <input type="checkbox"/> Additional inventory needed? <input type="checkbox"/> If so, explain: _____
---	---

Please send completed forms to Eric Sorenson: Eric.Sorenson [at] state.vt.us / Nongame & Natural Heritage Program, Vermont Fish & Wildlife Dept., 103 South Main Street, Building 10 South, Waterbury, VT 05671-0501 / (802)-241-3714



**VERMONT NATURAL COMMUNITY SURVEY FORM**  
**Nongame and Natural Heritage Program**  
**Vermont Fish & Wildlife Department**

rev. Apr. 2009

**Survey Site:** Pine Pond Is this an update?  EO# (if known): \_\_\_\_\_

**Community Type:** Temperate Hemlock Forest and Temperage Hemlock-Hardwood Forest

(For vernal pools, please use the Vernal Pool Survey Form on our website)

Community Variant Name (if applicable): \_\_\_\_\_

Association Name (NVC type) (office): \_\_\_\_\_

**Surveyor(s):** Michael Lew-Smith Contact Info: lewsmith@arrowwoodvt.com

**Survey Date(s):** 7-26-14 Town: Castleton County: Rutland

Unusual data sensitivity issues?  If so, explain: \_\_\_\_\_

**LANDOWNER(S) / CONTACT(S)** (Name, Telephone, Address, Email—if not in a Site Summary Form) Permission?  
Unknown

**GENERAL DESCRIPTION of SITE**

Describe *Site* and its range and variability (give a word picture of natural and man-made features, including: general topography, elevation, exposure, community types, geologic substrata, evidence of disturbance, exotics, etc.):  
Variable topography. Southern end of larger forests to north. Silt loam soils, bedrock outcrops common.

**NATURAL COMMUNITY INFORMATION**

Describe *Natural Community* occurrence (include canopy cover, dominant species by stratum, soils, physical environment, & evidence of disturbance):  
These two forests consist of a Temperate Hemlock-Hardwood Forest and a Temperate Hemlock Forest. The canopy in the mixed forest is dominated by hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), and northern red oak (*Quercus rubra*). The sparse understory consists of canopy species as well as rock polypody (*Polypodium virginianum*) and evergreen woodfern (*Dryopteris intermedia*). The Hemlock forest contains less hardwood and also includes white pine (*Pinus strobus*). Within the ROW, some sections of these forests are somewhat disturbed and early successional. Nevertheless, they are part of very large forests outside of the ROW to the north. Further analysis of the forests outside of the study area needs to be conducted to determine if these are significant natural communities.

Aspect: variable Slope (degrees): variable Elevation (with units): minimum 500+ maximum ?

Bedrock geologic type (Doll et al. 1961 or more recent):  
West Castleton Formation

Soil type or description (NRCS):  
Taconic-Hubbarton Complex

**COMMUNITY OCCURRENCE RANKING:** a range of ranks may be used (e.g. AB)

Using **VT NNHP ranking specifications** (if available)\*:  OR Using **Generic ranking specifications** (provided below):

	Rank:	Comments:
Current Condition:		Further work on rest of forest needs to be conducted.
Landscape Context:		
Size:		Community size (acres) and how determined:
Overall Rank:		

\* Available for some natural communities at [www.vtfishandwildlife.com/wildlife\\_nongame.cfm](http://www.vtfishandwildlife.com/wildlife_nongame.cfm). Use to fill in the grid above.

**Generic ranking specifications:**

Use the following guidelines to fill in the grid above if VT NNHP Natural Community ranking specifications are unavailable

**Current Condition:**

- A:** mature example of the community type (forests with trees generally >150 years old); natural processes intact; no exotics
- B:** some minor alteration of vegetation structure and composition, such as by selective logging; minor alterations in ecological processes; exotics species present in low abundance
- C:** significant alteration of vegetation structure and composition, such as by heavy logging; alteration of ecological processes are significant, but community recovery/restoration is likely; exotic species are abundant and control will take significant effort
- D:** ecological processes significantly altered to the point where vegetation composition and structure are very different from A-ranked condition and restoration/recovery is unlikely; exotic species are abundant or control will be difficult

**Landscape Context:**

- A:** highly connected; area around EO (>1,000acres) is largely intact natural vegetation, with species interactions and natural processes occurring across communities; surrounding matrix forest meets at least B specifications for Condition.
- B:** moderately connected; area around EO (>1,000acres) is moderately intact natural vegetation, with species interactions and some natural processes occurring across many communities, although temporary disturbances such as logging have reduced condition of the landscape; surrounding matrix forest meets at least C specifications for Condition
- C:** moderately fragmented; area around EO is largely a combination of cultural and natural vegetation with barriers to species interactions and natural processes across communities; surrounding land is a mix of fragmented forest, agriculture, and rural development
- D:** highly fragmented; area around EO is entirely, or almost entirely, surrounded by agriculture or urban development

**Size:**

No Generic ranking applicable. Please provide size of community in grid above.

**Overall Rank** (based on best judgment):

- A:** excellent estimated viability
- B:** good estimated viability
- C:** fair estimated viability
- D:** poor estimated viability

**MANAGEMENT/PROTECTION RECOMMENDATIONS for NATURAL COMMUNITY**

**ADDITIONAL INFORMATION**

- Plot form(s) attached. Plot Code: \_\_\_\_\_
- Animal list attached
- Plant list attached (in addition to plot forms)
- Map of route taken and observation points—or include with Natural Community map.
- Photographs

Comments that do not fit in another field:

Further work needs to be conducted on larger forest to make final significance determination. Forest only assessed in the Route 4 right-of-way.

**MAPPING**

Attach a digital or paper map of the natural community boundary mapped as polygons (required):

Shapefile attached (encouraged):  File must be NAD83 State Plane:  File name: \_\_\_\_\_

Estimated % of mapped polygon occupied by this community: >95% ; 80-95% ; 20-80% ; 0-20% ; Unknown

Explain if <95%: \_\_\_\_\_

Base Map Used to delineate occurrence: 1:24,000 USGS Quad: <input type="checkbox"/> 1:25,000 USGS Quad: <input type="checkbox"/> 1:5000 Ortho Photo: <input type="checkbox"/> GPS: <input type="checkbox"/> Accuracy: _____ Other: <input type="checkbox"/> Specify: _____	Confident that full extent is known: <input type="checkbox"/> Uncertain if full extent is known: <input type="checkbox"/> Confident that full extent is <i>not</i> known: <input type="checkbox"/> Additional inventory needed? <input type="checkbox"/> If so, explain: _____
---	---

Please send completed forms to Eric Sorenson: Eric.Sorenson [at] state.vt.us / Nongame & Natural Heritage Program, Vermont Fish & Wildlife Dept., 103 South Main Street, Building 10 South, Waterbury, VT 05671-0501 / (802)-241-3714

**VERMONT NATURAL COMMUNITY SURVEY FORM**  
**Nongame and Natural Heritage Program**  
**Vermont Fish & Wildlife Department**

rev. Apr. 2009

**Survey Site:** Mount Hanley East, Mount Hanley West, Blueberry Hill and Twin Mountain      Is this an update?       EO# (if known): \_\_\_\_\_

**Community Type:** Mesic Maple-Ash-Hickory-Oak Forest  
(For vernal pools, please use the Vernal Pool Survey Form on our website)

Community Variant Name (if applicable): \_\_\_\_\_

Association Name (NVC type) (office): \_\_\_\_\_

**Surveyor(s):** Michael Lew-Smith      Contact Info: mlewsmith@arrowwoodvt.com

**Survey Date(s):** 7-24-14      Town: West Rutland, Ira, Castleton      County: Rutland

Unusual data sensitivity issues?       If so, explain: \_\_\_\_\_

**LANDOWNER(S) / CONTACT(S)** (Name, Telephone, Address, Email—if not in a Site Summary Form)      Permission?  
Unknown        
\_\_\_\_\_     

**GENERAL DESCRIPTION of SITE**

Describe *Site* and its range and variability (give a word picture of natural and man-made features, including: general topography, elevation, exposure, community types, geologic substrata, evidence of disturbance, exotics, etc.):  
Variable topography, mostly south facing, Southern end of large MAHO forests to north. Loam and sandy loam soils. Some surficial rock. Some bedrock outcrops

**NATURAL COMMUNITY INFORMATION**

Describe *Natural Community* occurrence (include canopy cover, dominant species by stratum, soils, physical environment, & evidence of disturbance):  
This series of four forest communities all sit at the base of a series of dry hills in West Rutland, Ira and Castleton. They all are examples of Mesic Maple-Ash-Hickory-Oak Forest community. They are dominated by northern red oak (*Quercus rubra*), shagbark hickory (*Carya ovata*), bitternut hickory (*Carya cordiformis*), hop hornbeam (*Ostrya virginiana*) and american ash (*Fraxinus americana*). The understory consists of canopy species as well as maple-leaved viburnum (*Viburnum acerifolium*), witch hazel (*Hamamelis virginiana*), Pennsylvania sedge (*Carex pensylvanica*), wood anemone (*Anemone quinquefolia*) and blue-stemmed goldenrod (*Solidago caesia*). There are some inclusions of Dry Oak-Hickory-Hophornbeam Forest where the soils are well-drained.  
  
While there are a few areas of more recent disturbance, most of these forests in the study area are mature and in very good condition. Given the condition, community type and size of these forests, it is likely that these communities would be considered state significant.

Aspect: mostly southern      Slope (degrees): variable      Elevation (with units): minimum 500+      maximum ?

Bedrock geologic type (Doll et al. 1961 or more recent):  
Mostly the Bull Formation

Soil type or description (NRCS): Mostly Macomber-Taconic Complex
---

**COMMUNITY OCCURRENCE RANKING:** a range of ranks may be used (e.g. AB)

Using **VT NNHP ranking specifications** (if available)\*:  OR Using **Generic ranking specifications** (provided below):

	Rank:	Comments:
Current Condition:		Further work on rest of forest needs to be conducted.
Landscape Context:		
Size:		Community size (acres) and how determined:
Overall Rank:		

\* Available for some natural communities at [www.vtfishandwildlife.com/wildlife\\_nongame.cfm](http://www.vtfishandwildlife.com/wildlife_nongame.cfm). Use to fill in the grid above.

**Generic ranking specifications:**

Use the following guidelines to fill in the grid above if VT NNHP Natural Community ranking specifications are unavailable

**Current Condition:**

- A:** mature example of the community type (forests with trees generally >150 years old); natural processes intact; no exotics
- B:** some minor alteration of vegetation structure and composition, such as by selective logging; minor alterations in ecological processes; exotics species present in low abundance
- C:** significant alteration of vegetation structure and composition, such as by heavy logging; alteration of ecological processes are significant, but community recovery/restoration is likely; exotic species are abundant and control will take significant effort
- D:** ecological processes significantly altered to the point where vegetation composition and structure are very different from A-ranked condition and restoration/recovery is unlikely; exotic species are abundant or control will be difficult

**Landscape Context:**

- A:** highly connected; area around EO (>1,000acres) is largely intact natural vegetation, with species interactions and natural processes occurring across communities; surrounding matrix forest meets at least B specifications for Condition.
- B:** moderately connected; area around EO (>1,000acres) is moderately intact natural vegetation, with species interactions and some natural processes occurring across many communities, although temporary disturbances such as logging have reduced condition of the landscape; surrounding matrix forest meets at least C specifications for Condition
- C:** moderately fragmented; area around EO is largely a combination of cultural and natural vegetation with barriers to species interactions and natural processes across communities; surrounding land is a mix of fragmented forest, agriculture, and rural development
- D:** highly fragmented; area around EO is entirely, or almost entirely, surrounded by agriculture or urban development

**Size:**

No Generic ranking applicable. Please provide size of community in grid above.

**Overall Rank** (based on best judgment):

- A:** excellent estimated viability
- B:** good estimated viability
- C:** fair estimated viability
- D:** poor estimated viability

**MANAGEMENT/PROTECTION RECOMMENDATIONS for NATURAL COMMUNITY**

--

**ADDITIONAL INFORMATION**

- Plot form(s) attached. Plot Code: \_\_\_\_\_
- Animal list attached
- Plant list attached (in addition to plot forms)
- Map of route taken and observation points—or include with Natural Community map.
- Photographs

Comments that do not fit in another field:  
 Further work needs to be conducted on larger forest to make final significance determination. Forest only assessed in the Route 4 right-of-way.

**MAPPING**

Attach a digital or paper map of the natural community boundary mapped as polygons (required):

Shapefile attached (encouraged):  File must be NAD83 State Plane:  File name: \_\_\_\_\_

Estimated % of mapped polygon occupied by this community: >95% ; 80-95% ; 20-80% ; 0-20% ; Unknown

Explain if <95%: \_\_\_\_\_

Base Map Used to delineate occurrence: 1:24,000 USGS Quad: <input type="checkbox"/> 1:25,000 USGS Quad: <input type="checkbox"/> 1:5000 Ortho Photo: <input type="checkbox"/> GPS: <input type="checkbox"/> Accuracy: _____ Other: <input type="checkbox"/> Specify: _____	Confident that full extent is known: <input type="checkbox"/> Uncertain if full extent is known: <input type="checkbox"/> Confident that full extent is <i>not</i> known: <input type="checkbox"/> Additional inventory needed? <input type="checkbox"/> If so, explain: _____
---	---

**Please send completed forms to Eric Sorenson: Eric.Sorenson [at] state.vt.us / Nongame & Natural Heritage Program, Vermont Fish & Wildlife Dept., 103 South Main Street, Building 10 South, Waterbury, VT 05671-0501 / (802)-241-3714**

**Attachment 7.**

**GIS Data Deliverables Description**

## GIS Data Deliverables Descriptions

File Name	Geometry Type	Description	Source	Accuracy	Notes
Invasive_LocalPts.shp	Point	Local (small or isolated) populations of invasive species	Field collected GPS Data	assumed +/- 30'	Locations as collected by field ecologists
Invasive_LinearPts.shp	Point	Start and End points of linear (extensive) populations of invasive species	Field collected GPS Data	assumed +/- 30'	Locations as collected by field ecologists
Invasive_LinearLines.shp	Line	Linear representation of extensive invasive species populations	Auto and manually processed from Invasive_LinearPts.shp	None- this data is representative of population length and general area only.	This data is provided to facilitate visualization and approximate quantification of the field data provided in Invasive_LinearPts.shp. This dataset does not purport to accurately represent exact locations of populations or plant locations within the study area, but only to indicate the general linear position and extent ALONG and parallel to the study area. The data may be used to determine approximate lengths of invasive infestations. The lines are offset a predetermined amount from the road centerline. In addition, to facilitate visualization, each species is offset slightly to avoid overlaps and enable cartographic visualization.
NatComm_Significant.shp	Polygon	Approximate boundaries of potentially significant natural communities within 1/4 mile of the proposed project	screen digitized	None- derived from remote analysis and aerial photo interpretation. Boundaries are not field verified.	This data is a subset of remotely mapped potentially significant natural communities mapped within ~1/4 mile of the project study area. These polygons represent communities within which landscape characteristics supported confirmation of natural community type and condition as evaluated from within the project study area.
DWA_Potential.shp	Polygon	Approximate boundaries of potential deer winter habitats within 1/4 mile of the proposed project	screen digitized	None- derived from remote analysis and aerial photo interpretation. Boundaries are not field verified.	This data is a subset of remotely mapped conifer and mixed conifer/hardwood forest stands mapped within ~1/4 mile of the project study area. These polygons represent stands within which forest conditions were found favorable for deer winter use when evaluated only within the project study area.
RTE.shp	Polygon	Boundaries of RTE plant populations and Approximate locations of Uncommon (S3) plant populations	Field collected GPS Data	Sub-meter grade GPS (S1-S2) and assumed +/- 30' (S3)	Locations as collected by field ecologists