Appendix 1: Methodology

Appendix 1

Methodology

The Mount Holly Natural Heritage Element Inventory and Assessment project includes the identification, inventory and assessment of wetlands, wildlife habitat and connecting lands, vernal pools, and rare elements in the town of Mount Holly, Vermont. Existing digital and paper databases as well as information gathered from public meetings and interviews were used in determining areas of potential significance and identifying sites for field assessments. These natural areas were evaluated by specific ecological and landscape criteria to determine the significance and value that these areas have to the natural heritage of the towns. The methodology and findings of the inventory are documented in this report.

The methodology section is organized into five sections, each of the first four addressing one of the resource topics of A. Wetlands, B. Vernal Pools C. Rare Species, and D. Wildlife Habitat. The fifth section addresses ranking for biodiversity conservation.

A. Wetland Mapping and Assessment

For the purposes of this inventory, a wetland is defined as an area that is inundated by surface or ground water with a frequency sufficient to support organisms that depend on saturated or seasonally saturated soil conditions for growth and reproduction. For any particular site to be considered a wetland there needs to be the following three criteria present: 1) hydrophytic (wetland) vegetation, 2) hydric soils, and 3) wetland hydrology. The boundaries of wetlands cannot be determined and/or delineated remotely. The boundaries present on the attached inventory map are for planning purposes only; detailed fieldwork is required to determine the actual presence and extent of wetlands. The field work conducted during this study did not attempt to formally delineate the boundaries of any wetlands.

1. Remote Wetlands Landscape Analysis

The landscape analysis represents the first step in conducting an inventory of a Town's wetlands. As part of this Phase, Arrowwood Environmental (AE) identified and mapped the wetlands in the town of Mount Holly through a comprehensive review and interpretation of available paper and digital resource inventories, maps and photographs.

Information sources that were reviewed during the landscape analysis process include: 1:40,000 Color Infra-Red aerial photographs, Natural Resources Conservation Service soil survey maps, 1990s Orthophotography (black and white), Vermont Significant Wetlands Inventory maps and U.S. Geological Survey (USGS) topographic maps.

In general, the process for identifying and mapping wetlands starts with the Color Infra-Red aerial photographs (CIR photos). Wetlands identified from the CIR photos were transferred directly to a digital wetlands database created in an ArcView platform using the digital Orthophotographs as a base map. Polygon lines (approximate wetland boundaries) were drawn in this digital wetlands map using common landscape features present in both the CIR photos and the digital Orthophotographs. The digital Natural Resource Conservation Service (NRCS) hydric soils maps, Vermont Significant Wetlands Inventory (VSWI) maps, and U.S. Geological Survey (USGS) topographic maps were also consulted during this inventory. As each wetland was mapped, it was given a preliminary natural community name based on Wetland, Woodland, Wildland. A Guide to the Natural Communities of Vermont (Thompson and Sorenson 2000). Each of the data sources that were used during this inventory is described in detail below.

1:40,000 NAPP Color Infra-Red Aerial Photographs (CIR photos)

The CIR photos were the main data source used to identify wetlands for this inventory. The data sources described below were used to verify or confirm wetlands discovered using the CIR photos. This set of aerial photographs was flown in the spring (April-May) of 1992-1993 at a scale of 1:40,000. These are “false color” photos which combine infrared reflectance with the green and red visible bands. These photos were examined at 3X magnification under a stereoscope. The use of the stereoscope allows the photos to be viewed in three dimensions, thus enabling the interpreter to see elevation. These photos have proven to be the most useful tool for remotely identifying wetlands in Vermont. When evaluating aerial photographs, the most important characteristic is the “photosignature”. The photosignature is the way that a feature, in this case a wetland, presents itself on the photograph. Water on the CIR photos presents a very clear, dark photosignature that is distinct from most other features in the photos.

Many wetlands, however, do not have standing water and the wetland photosignature may be unclear. In some cases, it was possible to confirm the presence of a wetland at these sites by using one of the other wetland data sources. At other sites, it was not possible to confirm or deny the presence of a wetland. In these cases, the site was included in the wetlands map but with a lower confidence or certainty score level. Because there is some uncertainty associated with remotely mapping wetlands (particularly small wetlands), the "Certainty" score is meant to track that potential error. This score ranks the "Certainty" that a particular site actually contains a wetland and is useful in prioritizing the field work.

Vermont Significant Wetlands Inventory Map (VSWI)

The VSWI map is based on the National Wetlands Inventory Map (NWI) and is used as the standard regulatory wetlands map for Vermont by the State Wetlands Office. For the purposes of this inventory, VSWI and NWI are used interchangeably. All wetlands that occur on the VSWI map appear on the attached Mount Holly Wetlands Inventory Map. In many cases, the location of the

wetland from the VSWI map is inaccurate and does not reflect the actual location of the wetland. Using the CIR photos and other map sources, these locations were corrected on the Wetlands Inventory Map. In most instances, the wetlands on the VSWI map are indeed wetlands. There are a few instances where information from other map sources suggests that the site is not actually a wetland. In these situations, the wetland remained on the Wetlands Inventory Map because it is a state regulated wetland and should be checked in the field. In the Comments field of the database, however, it is noted that the site does not appear to be wet from other map sources.

All wetlands that appear on the VSWI are considered Class II wetlands, as defined in the State of Vermont Wetland Rules. These wetlands are offered a certain amount of regulatory protection. Wetlands that are not on the VSWI map and are not hydrologically connected to a Class II wetland are considered Class III wetlands and are not regulated by the State of Vermont Wetland Rules. Because remote sources cannot determine if one wetland is hydrologically connected to another wetland, the classification of the wetlands identified was not included in this inventory. However, all wetlands that are indicated to be VSWI wetlands in the wetland map can be considered Class II wetlands.

USGS Topographic Maps

The USGS topographic maps were used as a secondary map source to better understand a wetlands position on the landscape. The topographic position can give insight to the nature of a wetland and the potential for wetlands to occupy certain areas.

1:5,000 Digital Orthophotographs

Orthophotographs are 1:5000 aerial photographs that are geo-rectified and, in the case of this inventory, used in a digital format. Unlike the CIR photos, the photosignature of wetlands in orthophotographs is often unclear. Orthophotographs are important, however, because they are digitized and geo-rectified. This allows the photo interpreter to accurately (and digitally) map a wetland that was identified from the CIR aerial photos. These orthophotographs were therefore used as a base map and all mapping of wetlands was done based on common landscape features present in these photographs and the CIR photos.

Natural Resource Conservation Service (NRCS) Soil Survey

A digital copy of the Washington County Soil Survey was used during this inventory. A map of all hydric soils in the town was used to identify areas that may contain wetlands. The hydric soils in the town consisted of the following soil types: Cabot, Peachum, Peru,

Rumney, Scantic, Sunny and Grange soils. Each soil type forms under different environmental conditions and can give clues to the nature of the wetland or potential wetland site.

As mentioned above, the presence of a wetland is dependent on hydric soils, wetland hydrology and wetland vegetation. Some areas of hydric soil, therefore, are not wetlands. Wherever hydric soils were present, other remote data sources were used to determine if the site likely contained a wetland. In many circumstances, other data sources led to the conclusion that wetlands occurred only in part of the hydric soil area. In these cases, polygon lines were redrawn to reflect probable wetland boundaries. The NRCS hydric soils boundary and the approximate wetland boundary are therefore not identical. In most cases, the wetland areas are smaller than the hydric soil areas.

2. Remote Wetland Functions and Values Assessments

Wetlands were assessed remotely utilizing information available from existing digital and paper databases. Eight functional criteria were used in remotely assessing the wetland resources in the study area. Hydrophytic Vegetation and Rare, Threatened and Endangered Species functions can only be accurately assessed from a field visit and were therefore not included in the remote assessment. Each of the identified wetland areas was evaluated for the presence of factors that would indicate that the wetland was serving a significant function as a productive ecosystem and/or a public resource. The wetland assessment methodology integrates information about a wetland's soils, vegetation, shape and size, habitat diversity and position in the landscape to produce a composite picture about a wetland's role in the larger ecosystem. The following eight functional criteria were selected for use in remote evaluation of wetlands in the town of Mount Holly:

- Flood Control
- Water Quality (Nutrients and sediments)
- Wildlife Habitat
- Fisheries Habitat
- Erosion Control
- Open Space
- Recreation
- Education

An in-depth description of each of the functional assessment criteria is provided in the field assessment discussion below.

3. Field Assessments

Field assessments of selected wetlands were conducted during the 2008 field season. The purpose of the field inventory was to assess the accuracy of the remote wetlands identification procedure and to obtain more in depth data about a wetland's natural community type and functions and values. Wetlands selected for a site visit were chosen with the intent of visiting a cross-section of wetlands in terms of natural communities, functions and values, and remote mapping confidence. Landowner permission for conducting field visits was obtained by the town of Mount Holly.

Natural Community Assessments

Each wetland that was visited received a natural community assessment. This assessment involves collecting data on wetland soils, vegetation structure and composition, topographic position and other relevant ecological information. Special attention was paid to noting factors that may degrade the quality of the wetland community such as invasion of exotic plants, disruption of local hydrology, surrounding landuse or direct development in the wetland. Together, this information was used to assign each community visited a final natural community name and to give information about the current condition of the community.

Field-Based Functions and Values Assessment

Each wetland that obtained a field visit also received an in depth functions and values assessment. The assessment involves evaluating a wetland based on its vegetation, hydrology, habitat diversity, topographic position, shape, size and position in the watershed for select functions and values. The Vermont Wetland Evaluation Form, US Army Corps of Engineers Highway Methodology Handbook and Golet Model Wetland Evaluation Form were used as guides for establishing the functions and values criteria. As a result of the assessment, each wetland is given a functional score based on a scale of low/medium/high. Each visited wetland was assessed for the following functions and values:

1. Flood Water Retention and Attenuation;
2. Water Quality (Nutrients and sediments);
3. Wildlife Habitat;
4. Fisheries Habitat;
5. Hydrophytic Vegetation;
6. Rare, Threatened and Endangered Species;

7. Sediment Stabilization (Erosion Control);
8. Open Space;
9. Recreation; and
10. Education

The following is a description of how wetlands perform the specified function and/or value listed above. The functional assessment is based upon whether the wetland has the capacity for the function or value and whether there is an opportunity for the wetland to perform the specific function or value.

Floodwater Retention

Wetlands that retain and slowly release floodwaters are usually associated with streams or rivers. In order for a wetland to perform this function, there must be an expandable basin present in the wetland that allows room for the floodwater to disperse. This expandable basin and the presence of persistent vegetation have the effect of slowing the water down and diffusing the energy of the floodwater.

The most significant wetlands for this function are located upstream of significant natural resources or human resources such as developed areas, culverts, and roads. In these circumstances, the upstream wetlands may be protecting these resources from floodwaters, such that any activity that impairs the wetland's ability to perform this function will often have serious impacts to downstream resources.

Water Quality (Nutrients and Sediments)

Many wetlands filter sediments and nutrients, such as phosphorus and nitrogen, from surface waters resulting in improved water quality. Wetlands that retain nutrients generally have diffuse or sinuous drainage pathways which slow down the flow of water. Slower water velocity provides more opportunity for sediments and nutrients to settle out and to be absorbed by vegetation. The velocity of the water moving through a wetland is determined by slope, landscape position and the outlet conditions in the wetland. Wetlands with constricted outlets generally have much slower water velocities and greater potential for sediment and nutrient removal. The presence of persistent vegetation is also important for slowing down water velocities.

The water quality function takes on particular importance in impaired watersheds where water and its uses are diminished. The opportunity for a particular wetland to perform this function is determined by the presence of agricultural lands, urban impervious

surfaces, steep slopes, and areas of impaired water quality. Wetlands that recharge a wellhead protection area or contribute to the flows of Class A surface water may also be of particular importance.

Wildlife Habitat

Wildlife use of wetlands is widely variable and dependent upon the size, diversity and structure of the wetland. In general, the wetlands that are the most valuable for wildlife are those that have multiple community types, greater vegetative diversity, some open water and multiple layers of vegetation. The interspersion of the open water and different vegetation cover can also be important for determining wildlife use. In general, a greater diversity of wildlife is often found in wetlands that have open water that is extensively interspersed with vegetation. The interspersion of different vegetation or cover types is also important.

Large wetlands, with ample space and a variety of food and cover resources often harbor a greater diversity of wildlife. Smaller wetlands are also important for wildlife when viewed not as individual wetlands but as groups or clusters of wetlands on the landscape. These smaller wetlands often work in concert to provide habitat for species that utilize several different wetlands throughout their weekly or yearly movements on the landscape.

Fisheries

The fisheries function is determined primarily upon a wetland's connection to permanent surface water that could provide fish habitat. Wetlands that are associated with these permanent surface waters can increase the fisheries habitat by: 1) providing pools and refugia during periods of low water; 2) providing shade to the surface waters thereby lowering the temperature of the water (which is crucial to some species of fish); 3) providing stream bank stability thereby decreasing the amount of river clogging sediments in the water system; 4) providing undercut banks which offer spawning, nursery, feeding and cover habitat for fish and; 5) providing an input of cool, clean spring water into the surface water system.

Hydrophytic Vegetation

The hydrophytic vegetation function is meant to evaluate whether or not wetlands may harbor significant natural communities or vegetation. In general, wetlands of rare or unusual types, such as bogs, fens, alpine peatlands or black gum swamps are considered significant for this function. Also, any wetland which contains the best example of a particular natural community in the county or

region is considered significant for this function. For the purposes of this study, any site that was considered locally (Mount Holly and the immediate area) significant was also considered significant for this function.

In addition to natural communities, the Hydrophytic Vegetation function is meant to assess if the wetland contains rare or uncommon plants. Any wetland that harbors a rare plant or a plant at its range limit may be considered significant for this function.

Rare, Threatened and Endangered (RTE) Species

The presence of the RTE function is determined based upon the presence of a Federal or State listed Threatened and Endangered species of plant or animal. This includes the historic (within the last 10 years) presence of a rare element in the wetland. The opportunity for this function is based on the presence of appropriate habitat for RTE species. In some cases, wetlands in this study were given a low score for this function if the habitat was appropriate for RTE species. This was done because no RTE surveys were conducted during the field visits.

Erosion Control (Sediment Stabilization)

Many wetlands located in areas where erosive forces are present are important for this function. This includes wetlands along rivers and streams and wetlands along lakes and ponds where there is enough fetch to produce erosion along the shore. In Mount Holly, wetlands found along streams with at least seasonally heavy, erosive flow are most important for this function. This tends to occur at low to middle watershed positions. The most important element in a wetland significant for this function is the presence of persistent vegetation, especially woody vegetation such as trees and shrubs. The roots of this vegetation act to bind the soil and prevent it from eroding. Wetlands that perform this function upstream of biologically significant areas such as spawning habitat, significant natural communities, or RTE element sites are very valuable.

Open Space

The Open Space function is determined primarily by a wetland's position in the landscape in relation to ease of public viewing. Wetlands that can be readily viewed by the public such as those on public lands or along the road network are often significant for this function. These wetlands are important because they enhance the likelihood of observing wildlife and colorful wildflowers. Open space becomes a particularly important function in more developed areas.

Recreation

The recreation function is determined based on the presence or likelihood of recreational activities occurring within the wetland or wetlands that provide economic benefits. This includes wetlands that provide habitat for species that can be fished, hunted or trapped and/or the presence of wild foods that are harvested.

Education/Research

Wetlands that are significant for Education and Research are generally those that have a history of use for these purposes or have the real potential to be used for these purposes. Publicly owned wetlands, wetlands with unique features and wetlands with RTE species are characteristics that may make a wetland significant for this function.

4. Windshield Assessments

As part of the inventory process, information on wetland boundaries and community types was gathered from points of public access such as public roads. Observations from the windshield survey were used to help refine the wetland map. A few sites for which permission could not be obtained received a more formal windshield assessment. This assessment is an abbreviated version of the natural community and functions and values evaluations described above.

5. Wetlands Map Creation

Once fieldwork was concluded, field data was compiled and integrated into the Wetlands Inventory Map. This involved adding wetlands that were discovered during the field inventory, changing wetland boundaries on the map and removing sites that were determined not to be wetlands. Data from the field visits were also incorporated into the attribute table which is linked to the map. The information included in the attribute table is listed in Appendix 3.

B. Vernal Pools Mapping and Assessment

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

1. Remote Vernal Pool Mapping

Remote identification of potential pool locations is a good way to initiate the mapping process on a town scale and also serves to target field work. This is done using existing aerial photography.

The methodology presented here follows that outlined in the Vernal Pool Report (Arrowwood Environmental, 2004). This study (conducted for the Vermont Non-Game and Natural Heritage Program) outlined a methodology for mapping vernal pools on a town-wide scale in Vermont. The Color Infra-red (CIR) 1:40,000 scale photos are examined under magnification and using a stereoscope yielding a set of potential vernal pool locations. These locations are transferred to black and white, 1:5,000 digital orthophotos. By digitizing the location of these potential sites, Global Positioning System (GPS) locations can be obtained for each site. These locations are used during the field component of the inventory (discussed below).

During the remote mapping process, attribute information was gathered for each potential vernal pool location. This data included:

1. An Identification Number
2. A “Certainty” score
3. A “Location Certainty” score
4. Comments

Because there is some uncertainty associated with remotely mapping very small wetlands, the "Certainty" score is meant to track that potential error. This score ranks the "Certainty" that a particular site actually contains a vernal pool and is useful in prioritizing the field work. The "Location Certainty" score is used primarily when the digitized location of a particular pool may be in doubt. This information is useful during the field component of the inventory.

Because of the difficulties associated with remote mapping of vernal pools, the remote inventory is meant as only one part of a multifaceted approach. The advantage of this process is that it results in a series of potential sites which can focus a field inventory.

2. Field Assessments

The second part of the vernal pool mapping process consisted of verifying the potential vernal pool locations identified in the remote mapping process. The field work is important because it is the best way to be certain that a vernal pool exists in a particular location.

GPS technology was used to locate the potential pool locations identified during the remote assessment. Once a site is found, data on the size, depth, hydrology, wildlife use and ecology were taken. Data on the current condition and landscape quality of these sites was also included. Finally, data on the disturbance of each visited pool is taken and based on the method used in the Vermont Wetlands Bioassessment Program (2003). This data collection is important in gaining an understanding of the functionality of these pools as wildlife habitat and leads to a more complete understanding of the pools in the project area.

3. Vernal Pool Map Creation

Once fieldwork was concluded, field data was compiled and integrated into the final Wetlands Inventory Map. This involved removing pool locations that are not present and adding new pool locations that were found during the field inventory. Data from the field visits were also incorporated into the attribute table which is linked to the map. The attribute table information for the vernal pool data is explained in Appendix 3.

C. Rare, Threatened and Endangered Species Mapping and Assessment

Historical locations of rare plants and animals in the town of Mount Holly were obtained from the Vermont Non-Game and Natural Heritage Program (NNHP).

In addition data from other sources was used to prioritize field work. As mentioned in the main body of the report, information from the Vermont Loon Recovery Program was used to get updated information on loon activity on Lake Ninevah. Information from the Breeding Bird Atlas (administered by Vermont Center for Ecostudies) was also used to get information on known bird species from the area and to update NNHP records. Finally, information from the Lakes and Ponds Division of the Vermont Department of Environmental Conservation was obtained for Star Lake and Lake Ninevah.

D. Wildlife Habitat Mapping and Assessment

Landcover Delineation

Arrowwood Environmental built several of the GIS layers utilized in this project from a foundation of basic landcover analysis. This analysis was conducted by AE personnel, and is intended to replace the use of the statewide LCLU (landcover/landuse) dataset available from the Vermont Center for Geographic Information (VCGI). Although the VCGI LCLU data is available covering the entire state of Vermont, Arrowwood has found the level of detail too coarse to effectively assist on a town-scale analysis of natural heritage elements. For this inventory, Arrowwood conducted a combined automated and manual digitization of broad classifications of land cover types.

Roads- Road areas were delineated using a collection of publicly available statewide data sources obtained from VCGI. Features in these source datasets were buffered to approximate an average development disturbance as detailed in the table below.

Selected Data	Data Source	Source Data Type	VCGI Layer Name	Source Data Date	Buffer Generated
Major Roads (State & US Routes)	E-911 Road Centerlines	Polyline shapefile	EmergencyE911_RDS	2005	50 feet both sides of line
Moderate-use Roads (Class 1,2 Roads) & Railroads	E-911 Road Centerlines	Polyline shapefile	EmergencyE911_RDS	2005	25 feet both sides of line
Minor Roads- (Class 3 Roads)	E-911 Road Centerlines	Polyline shapefile	EmergencyE911_RDS	2005	15 feet both sides of line

Further modifications were made to the road openings during the hand delineation process described below.

Open Land- open, non forested land was delineated by hand from both 2008 NAIP (USDA) 1 meter resolution color and color-infrared orthophotography and 1990's series Vermont Mapping Program 0.5 meter resolution black and white orthophotography. The orthophotography was visually analyzed at a scale of 1:5000 on a computer monitor within a geographic information system (GIS) software platform. Non-forested agricultural, recreational, residential, commercial and industrial areas were digitized by hand in the GIS software. Large areas of open wetland were not mapped as "Open", as the wetland classification was utilized from the wetland inventory portion of this project in the habitat identification process.

Early Succession- Small areas of young forest cover including major powerlines that did not fall into either the roadway or open land process descriptions above were visually inspected and when appropriate were given the "ES" designation.

Boundaries and classifications were adjusted as appropriate through the remainder of the inventory and assessment project.

While an effort was made to be relatively accurate at the working scale, the scope of this project did not include either the budget or time necessary to complete a highly accurate manual digitization of landcover classes. The intention of this exercise was to provide a more accurate depiction of broad landcover types (most specifically forested vs. non-forested land) within the town than is currently available from remotely sensed sources in a rapid fashion. Other than visual review, no quality assurance was conducted, no tests of consistency were completed and no measure of expected accuracy was assessed.

Figure 1. Landcover Delineation

Wildlife habitat elements were identified within the study area utilizing Geographic Information Systems (GIS). All GIS data presented in this project should be considered approximate. The locations depicted are for planning purposes, and further field biological assessments should be considered a requirement for additional understanding of the function of the wildlife unit area on the landscape and its importance to any or all species that may utilize it. This section describes the derivation process for the individual habitat unit polygons, the attributes and assessment are discussed in the study report.

The following habitat elements were identified and mapped:

- Core forest units
- Deer winter habitat
- Mast stands
- Early succession areas
- Forested riparian corridors
- Wetlands
- Ledges, cliffs & talus

Core Forest

Core forest areas for the State of Vermont were originally developed by the UVM Spatial Analysis Lab (SAL) for inclusion in a region wide GAP analysis. AE utilized similar parameters as the original SAL project, but updated the inputs using the landcover delineation described above.

Open land (non-forested) features were buffered by 100 meters and the remaining areas within the study area were considered Core Forest. For the purposes of this project, any Core Forest Units with an area of 100 acres or less were eliminated.

The Core Forest analysis included a one-half mile area outside of the project town in order to take into account the value of core forest that extends beyond town boundaries.

Deer Winter Habitat

Delineation of deer winter habitat began with review of the existing State of Vermont Deeryard data layer. Deer winter habitat was assessed remotely based on review of orthophotography for identification of forested areas with significant conifer cover. Polygons were further modified to reflect conditions noted in the field, including current signs of use and habitat potential based on professional experience. Average aspect was derived for each deeryard using software tools, and subsequently separated into groups representing the 8 major cardinal directions. Potential deer winter habitats with a southern or western average aspect were considered of higher potential value to wintering deer due to the increased solar exposure resulting in warmer winter temperatures and lower snow pack.

Mast Stands

Hard mast of importance to black bear within the study area is assumed to be American Beech and Red Oak tree species. Mast stands as identified for the purposes of this study originated from the following sources:

- Vermont Dept. of Fish and Wildlife bear points database (vector- point)
- Vermont Dept. of Forest Parks & Recreation, aerial forest health monitoring data- The VT Dept. FPR conducts annual aerial surveys throughout the State of Vermont in order to map forest health threats, insect attacks and tree disease. One disease identified and mapped by the aerial forestry team is Beech Bark Disease, a disease specific to American beech trees, and unfortunately quite prevalent in our region. AE utilized the FPR Beech Bark Disease data as provided in draft form by the VT Dept. FPR to identify areas where concentrations of American beech trees are likely to occur.

- Vermont Dept. of Forest Parks & Recreation Okemo State Forest Management Plan, 1990. This document discussed a major mast stand exhibiting bear use within the Okemo State Forest.
- Field visits by AE personnel

Mast stands from all the above sources were not specifically visited in the field and no attempt was made to provide an accurate depiction of the extent or boundary of any American beech stand or concentration. Mast stands appearing in the data and maps accompanying this report are very general locations. This should NOT be construed as a complete accounting of all mast stand areas present within the project area. It is highly likely unmapped mast stands exist throughout the town, and their identification should continue to be a conservation priority. Boundaries presented for this project are to be considered approximate, habitat quality and bear use were not methodically evaluated within the scope of this project.

Early Succession Habitat

Areas of early succession forest were delineated from 1990s and 2008 orthophotography. Due to the limitation and resolution of the imagery, the areas defined as early succession were typically logging patch cuts, clear cuts or old fields. Small early succession patches in forested settings were not able to be seen, and therefore do not appear in the dataset. Wetlands identified as beaver complexes and alder swamp wetlands were added to the early succession habitat data, as these wetlands typically provide the vegetative structure and composition required by early succession obligate and facultative species. Any additional early succession areas discovered in the field were subsequently added to the dataset.

Forested Riparian Corridors

Identification of forested riparian corridors was completed through a remote GIS model with the following inputs:

- Vermont Hydrography Dataset stream layer (line)
- Vermont Hydrography Dataset waterbodies layer (polygon)
- AE Mt. Holly Landcover analysis, described above

Streams were buffered at 50 meters, giving a 100 meter wide corridor. Areas within the corridor that were described in the AE landcover analysis as open, developed or miscellaneous, or were classified as agriculturally impacted wetlands in the natural community assessment were eliminated. Remaining forested areas within 50 meters of a stream, but separated from the stream by a road were also eliminated using an automatic selection process.

All resulting corridor areas were merged to provide an approximation of intact riparian corridor areas.

Bear Wetlands

Wetlands more likely to be utilized by black bear for spring feeding activity were derived from the complete wetland inventory data described in the study report for this project. The following wetland communities were included in this dataset:

- Forested wetlands (such as "Spruce-Fir Tamarack Swamp")
- Seep or Seepage Forest communities
- Beaver wetlands

Wetland areas meeting one of the above community descriptions were evaluated against 2008 orthophotography for proximity to development, agriculture areas or other disturbances, and those that appeared likely to suffer such impacts were removed from the dataset.

Ledges, Cliffs & Talus

Ledges, cliffs and talus areas were derived from the following sources:

- USGS Topographic map review by AE ecologists
- Field identified ledges, cliffs or talus by AE ecologists

Contiguous Habitat Units

Contiguous habitat units (CHUs) were derived from the above mentioned habitat elements. The contiguous units are patches of habitat that should be expected to provide a range of critical habitat function for a range of wildlife species including mammals, birds and reptiles & amphibians. CHUs were derived through combining the following previously described polygon layers:

- Core forest units
- Deer winter habitat
- Early succession areas
- Forested riparian corridors
- Wetlands
- Ledges, cliffs & talus

In many cases, there are forest zones adjacent to CHUs that likely function as secondary or maybe even primary habitat for some species but fall out of the definition used for development of the CHU layer.

Each CHU was then described by a variety of statistics as presented in summary table format in Appendix 2 and listed below.

- Size of Contiguous Habitat (core habitat and overall)
- Horizontal Diversity of Core Habitat
- Length of Streams
- Size of Deer Winter Habitat
- Area of Wetlands
- Presence of Vernal Pools
- Area of Early Succession Habitat
- Area of Riparian Corridor
- Presence of Mast Stands
- Presence of Ledge
- Elevation metrics
- Area of Conserved Land

Horizontal Diversity

Horizontal diversity was delineated within each Contiguous Habitat Unit area from 1995, 2003, and 2008 orthophotography. Two separate axes were drawn (1) a north-south axis at the widest point of a core area, and (2) an east-west axis at the widest point of a core area. Along each of the four axes a point was given for each change in vegetative physiognomic type that was at least 100 meters wide. Different physiognomic types included: various wetland types, shrub or other early succession habitat, evergreen forest, deciduous forest, and mixed evergreen/deciduous forest. The number of changes divided by the total linear length of the axis yields a measure of the amount of vegetative change per unit length.

The more the vegetation changes along each axis-the greater the gross vegetative structural change within that CHU. By itself, and on a statewide basis, the amount of change per unit is essentially meaningless (because we do not have this data over the range of the state). However, the high, medium, and low rankings provided in this study are a comparison of the relative diversity of the vegetative structure of CHUs within Mount Holly.

Wildlife Travel Corridors

Travel corridors, also called connecting lands or connecting habitats are land areas that serve to link patches of important wildlife habitats together. Some species of wildlife rely on a variety of habitat features that are often separated from each other by roads, houses or other impediments to easy movement. Species in this category include many amphibians, bobcat, fisher, and river otter. Others species such as moose, deer and black bear require large tracts of similar landscape that are quite rare in the developed northeastern United States. In order to survive in this region, these wide ranging species must move between several habitat patches of similar makeup.

AE assessed wildlife travel corridors in Mount Holly in the following ways:

- GENERAL WIDE RANGING MAMMAL CORRIDORS
- AMPHIBIAN ROAD CROSSING ZONES

General wide ranging mammal corridors:

The process of identifying general wildlife travel corridors seeks to predict areas within a town or area that are most likely to provide safe and preferable passage to a wide range of non-specific wildlife from one large habitat patch to another. AE utilized four components in attempting to identify these locations. The components and their parameters all consider the landscape in somewhat general terms, at varying levels of resolution, with the intent of rapidly capturing a sense of potential habitat blocks and movement potential between them.

Component 1: Wildlife Crossing Value

In 2006 the Vermont Department of Fish and Wildlife released the results of a project undertaken in conjunction with the Vt Agency of Transportation. The project included the development of a GIS model to scientifically and consistently predict segments of the State Highway system where wildlife crossings could be expected, and by extension those areas likely to see higher road kill mortality and be most in need of road design elements supportive of wildlife travel.

The first result of the project involved a statewide assessment of wildlife habitat potential. Three elements, contiguous (core) forest, land-cover type, and development density were included in the model that ranked all areas of the state based on their potential to

support wildlife habitat (defined in very general terms). The output was a statewide GIS layer called "Wildlife Habitat Analysis" (see GIS raster layer- "VT_WLHA") describing the relative suitability of any given area to provide general wildlife habitat characteristics.

The second result, the "Wildlife Crossing Value" (WLCV) was an assessment of all State Roads based on their proximity to varying wildlife habitat suitability as determined in the first model.

Finally, data from historical records of road kill mortality was compiled and evaluated to assess the accuracy of the WCV model. More information about this project is available at: http://www.vcgi.org/dataware/default.cfm?layer=EcologicHabitat_WLH**.** Figure 2 shows output data from the Wildlife Habitat Analysis with higher quality habitat signified in shades of green and lesser quality habitat in shades of brown.

AE utilized the VT F&W project as a starting point for evaluating potential travel corridors in Mount Holly. The statewide WHS was derived from fairly recent, standardized and general parameters so this dataset was utilized without revision. At the second step, the WCV model was rebuilt to incorporate <u>all</u> mapped roads in the town of Mount Holly, rather than just those in the State Highway system. This provides a scaled ranking describing the relative potential for any given section of roadway in the town to provide "linkage habitat", or areas of likely crossings. See Figure 3 below for illustration of two steps.

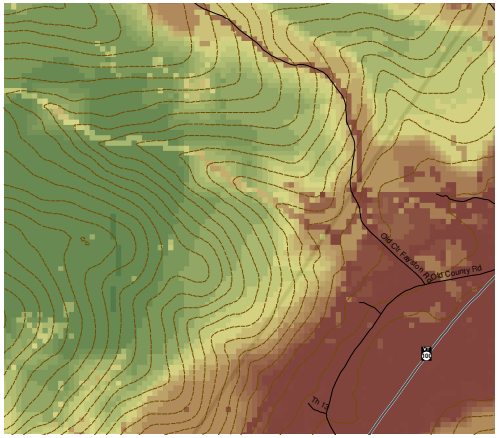
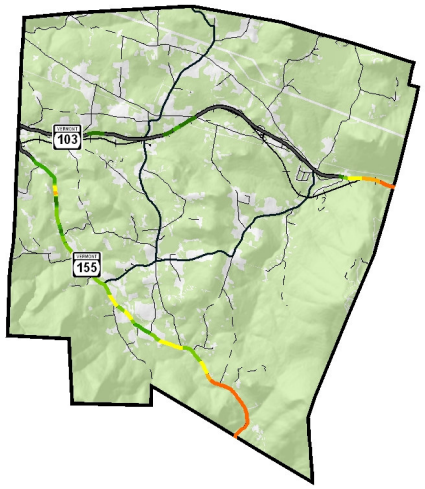
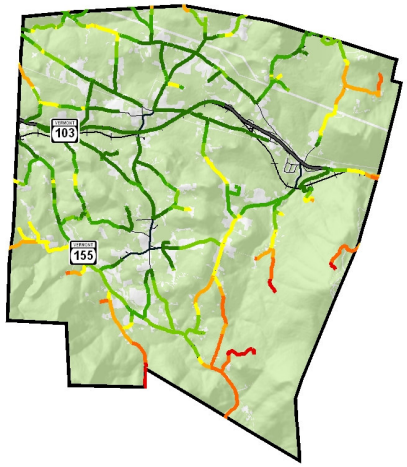


Figure 1. WLHA example



Vt Fish and Wildlife Crossing Value Map



AE Crossing Value Map- all roads included

Figure 3

The WLCV model, as refined by AE to suit this project, resulted in a wide range of crossing values throughout the town. The model ranks a road's ability to provide potential crossing value on a scale of 5.0 to 9.5. Any road segments receiving a score less than 5.0 are considered unlikely to provide significant crossing value. Roads of all classes were included in the revised version of the model. The roads that received the highest rating tended to be those of limited use- i.e. Class 4 or private roads. Despite their limited use, they were retained to inform planning decisions in these areas and serve as good comparison data to more developed areas of the study area. Town planners may want to consider the value of Class 4 and private roads in relation to wildlife movement when projecting development densities in areas currently un-served by more heavily traveled roadways.

Figure 4

Component 2: Contiguous Habitat Unit proximity

Contiguous Habitat Units (CHU), and the process of defining them for this project, are discussed extensively in the main study report. In defining corridors, areas where a contiguous unit comes within close proximity of another are considered likely travel corridors. These "proximity zones" suggest the safest, least impacted area for wildlife species in general to move from one CHU to another. See Figure 4 for illustration of Component 2.

Component 3: Corridor Enhancing Features

The following features generally known to provide necessary cover or travel suitability for wildlife movement were identified:

- Forested Riparian Zones
- Wetlands
- Softwood (conifer) cover areas

Component 4: Known Crossing and Roadkill Sites

The Vt. Department of Transportation (Vtrans) maintains a database of roadkill locations, specifically for large mammals such as bear and moose. In 2006, the Vt. Dept. of Fish and Wildlife worked with Vtrans to compile roadkill, as well as known wildlife crossing locations, into a single dataset. This information was consulted and used to suggest or refine potential crossing locations.

Combining Components: When the four project corridor components are viewed together it begins to suggest a reinforced picture of areas general wildlife are likely to prefer when moving from one source or focused habitat area to another. The components provide a diverse base upon which to base corridor assumptions. Corridors presented in this project are intended to be general, approximate and suggestive and would, of course, benefit from additional focused field evaluation during a variety of field conditions and seasons. Potential corridors were scored based on the number of above listed components informing or within proximity to a given corridor area. It is assumed that potential corridors with greater numbers of identifying components are more likely to provide higher quality wildlife movement opportunities.

Amphibian Road Crossings

The location of potential crossing sites was determined from remote sources. The location of vernal pools and vernal pool-wetlands was examined in relation to the upland forest habitat and road locations. Using this information along with the known migration

distances for the different amphibians that breed in vernal pools, the potential crossing sites were mapped. The migration distances used to determine likely road crossing sites were taken from the published literature. There is a fair amount of variability in the records of migration distances within amphibian species. The three species considered during this analysis were Wood frog (*Rana sylvatica*), Spotted salamander (*Ambystoma maculatum*) and Jefferson salamander (*Ambystoma jeffersonianum*). Spotted salamanders have been known to migrate up to 2700 ft, but on average around 380 ft. Jefferson salamanders are known to migrate up to 2000 ft but on average around 500 ft. Wood frogs are probably the most well traveled as a species, with annual migration towards breeding pools around 1500 ft (Colburn, 2004). When determining road crossing sites, a rough figure of around 800 ft was used. If a vernal pool habitat element was found greater than 800 ft from a road, it was generally not included in the crossing site map. The reason for using this lower number (instead of the 1500 ft for wood frogs) was that it is unlikely that all of the vernal pool habitat sites are known in the town. The farther away a known pool is from upland forested habitat, the greater the likelihood that other suitable habitat is closer. Also, the migration distances for these species in Vermont may be different than those reported elsewhere in the literature. Most of the longer distances were reported from the Midwest where topographic obstacles may not be a factor as they likely are in Vermont.

E. Ranking for Biodiversity Conservation

Determining the local or state significance of natural features occurs after all of the field work is completed and the final maps are compiled. The local or state significance methodology is based on the system used by the Vermont NonGame and Natural Heritage Program. For natural communities this methodology takes into account the rarity, size and condition of the community as well as the quality of the landscape that the community exists in.

The state has a system of rarity rankings based on a numeric system of 1-5 (from rarest to most common). This rank is usually preceded by an "S" to indicate that the rank is on the state-wide scale. This ranking is assigned to each community type as a whole and does not refer to specific examples of the community. This rarity ranking is included in the database in the “State_Rank” field and is based on the following system:

S1 Very Rare (1-5 occurrences)
S2 Rare (6-20 occurrences)
S3 Uncommon (> 20 occurrences)
S4 Apparently Secure
S5 Demonstrably Secure

Particular occurrences of communities are ranked based on the conditions present on the site. As mentioned above, the factors that determine the rank of a particular community include its condition, size and condition of the landscape. This alphabetic ranking (A-D) is included in the database in the "EO_Rank" (Element Occurrence) field. In most cases, sites that did not receive a field visit were not ranked. In some cases, assumptions were made about particular communities based on field work in nearby sites and remote sources.

For many natural communities, the ranking methodology allows for multiple communities to be grouped together and ranked as a single unit. Multiple communities of the same type which are separated by short distances on the landscape may be considered as one "element" when ranking. The grouping of some of these communities is shown in the "ElementGrp" field.

Once particular communities are ranked, the Element Occurrence ("EO_Rank" field) is compared to the State rarity rank ("State_Rank" field). A community would be considered state significant if the following criteria are met: S1 or S2 communities with an EO rank of A, B or C; S3 or S4 communities with an EO rank of A or B; S5 communities with an EO rank of A. These guidelines are considered in conjunction with professional judgment and knowledge about the site.

Local significance is determined in two different ways. The first method follows the methodology of determining state significance but puts the community in a local perspective. Local geology, biophysical region, size and condition of the community all play a role in determining local significance. All communities that were considered to be state significant, are also considered locally significant. In addition, any community that doesn't meet the criteria for state significance but is considered to be significant on the town scale, is also labeled as locally significant.

The second method for determining local significance is applicable only to wetlands and is assessed in terms of functions and values. Communities that are performing a wide variety of functions or values on the landscape are also considered to be significant. During the functions and values analysis, these sites must rate 'High" for multiple criteria to be considered locally significant. The reason for assigning local significance (because of natural community or functions and values) is listed in the "Justificat" (Justification) field of the attribute table.

F. References

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Appendix 2: Summary Data Tables

Table 1: Wetland Natural Community Summary Data
Natural Heritage Element Inventory and Assessment for Mount Holly

						Wetland Functions and Values									Local	State
ID #	Size (acres)	Natural Community Type	Natural Community Type #2	VSWI	Vernal Pool Habitat	Floodwater	Water Quality	Fisheries	Wildlife	Recreation	Openspace	Erosion	Education	Vegetation	Significance	Significance
1	2.51	Intermediate Fen		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
2	0.68	Poor Fen		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
3	0.52	Poor Fen		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
4	2.71	Poor Fen		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
5	6.38	Poor Fen		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
6	1.49	Poor Fen		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
7	1.08	Sweet Gale Shoreline Swamp		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
8	0.80	Sweet Gale Shoreline Swamp		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
9	21.22	Intermediate Fen		Y	N	N	M	M	M	N	M	N	N	H	Y	Y
10	4.80	Shallow Emergent Marsh		N	N	N	L	N	H	N	N	N	N	N	Not Assessed	Not Assess
11	5.86	Old Field		N	N	N	M	L	L	N	L	L	N	N	N	N
12	2.61	Seep	Seepage Forest	N	N	N	L	N	M	N	N	N	N	N	Not Assessed	Not Assess
13	3.61	Spruce-Fir-Tamarack Swamp	Lowland Spruce-Fir Forest	N	N	M	M	N	H	N	M	N	N	N	Not Assessed	Not Assess
14	2.01	Old Field	Alder Swamp	N	N	L	M	N	L	N	L	N	N	N	N	N
15	10.87	Old Field	Alder Swamp	N	N	L	M	N	M	N	L	N	N	N	N	N
16	12.29	Alder Swamp		Y	Y	N	H	N	H	N	N	N	N	N	Not Assessed	Not Assess
17	4.72	Conifer-Hardwood Swamp	Spruce-Fir-Tamarack Swamp	Y	Y	N	N	N	H	N	N	N	N	N	Not Assessed	Not Assess
18	8.42	Spruce-Fir-Tamarack Swamp	Lowland Spruce-Fir Forest	N	N	N	L	H	H	N	N	H	N	N	Not Assessed	Not Assess
19	0.25	Spruce-Fir-Tamarack Swamp	Lowland Spruce-Fir Forest	N	N	N	L	H	H	N	N	H	N	N	Not Assessed	Not Assess
20	3.48	Old Field	Alder Swamp	N	N	N	N	N	M	N	N	N	N	N	N	N
21	4.27	Old Field	Alder Swamp	N	N	N	L	N	L	N	N	N	N	N	N	N
22	21.21	Spruce-Fir-Tamarack Swamp		Y	Y	M	H	N	H	N	N	N	N	N	Potential	Potential
23	2.18	Alder Swamp	Shallow Emergent Marsh	Y	Y	M	M	M	M	N	N	M	N	N	N	N
24	0.10	Pond		N	Y	N	N	N	M	N	N	N	N	N	N	N
25	0.43	Seepage Forest	Seep	N	N	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
26	7.77	Spruce-Fir-Tamarack Swamp	Conifer-Hardwood Swamp	Y	Y	L	L	N	H	N	N	N	N	N	Not Assessed	Not Assess
27	2.02	Shallow Emergent Marsh		Y	Y	N	L	M	H	N	N	M	N	N	Not Assessed	Not Assess
28	2.42	Shallow Emergent Marsh	Alder Swamp	N	N	L	L	L	M	N	L	L	N	N	N	N
29	0.30	Alder Swamp		N	N	L	N	N	N	N	N	N	N	N	Not Assessed	Not Assess
30	5.63	Spruce-Fir-Tamarack Swamp	Seepage Forest	N	N	N	L	H	H	N	N	H	N	N	Not Assessed	Not Assess
31	0.45	Shallow Emergent Marsh	Old Field	Y	N	L	L	L	L	N	N	L	N	N	Not Assessed	Not Assess
32	0.70	Alder Swamp	Shallow Emergent Marsh	Y	Y	L	L	L	M	N	N	M	N	N	Not Assessed	Not Assess
33	9.78	Spruce-Fir-Tamarack Swamp		Y	Y	M	M	L	M	N	L	H	N	N	Not Assessed	Not Assess
34	0.41	Pond		Y	Y	N	N	N	H	N	N	N	N	N	N	N
35	0.10	Pond		N	Y	N	N	N	L	N	N	N	N	N	N	N
36	0.06	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
37	1.24	Pond		Y	Y	N	N	N	M	N	N	N	N	N	N	N
38	0.11	Pond		Y	Y	N	N	N	L	N	N	N	N	N	N	N
39	0.24	Pond		N	N	N	L	N	L	N	N	N	N	N	N	N
40	0.17	Pond	Vernal Pool	N	Y	N	N	L	H	N	N	N	N	N	N	N
41	0.11	Pond	Shallow Emergent Marsh	Y	N	N	L	M	L	L	N	N	N	N	N	N
42	1.35	Pond		Y	N	L	M	M	L	N	L	N	N	N	N	N
43	0.10	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
44	0.02	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
45	0.61	Pond		Y	Y	N	L	N	L	N	N	N	N	N	N	N
46	0.06	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
47	1.06	Pond		Y	Y	N	L	N	H	N	N	N	N	N	N	N
48	0.24	Pond		N	N	N	L	L	M	L	N	N	N	N	N	N
49	0.16	Pond		Y	N	N	L	N	M	N	N	N	N	N	N	N
50	0.27	Pond		Y	N	N	L	M	L	N	N	N	N	N	N	N
51	0.10	Pond		N	N	N	N	M	L	L	N	N	N	N	N	N
52	0.16	Pond		N	N	N	L	M	N	N	N	N	N	N	N	N

						Wetland Functions and Values									Local	State
ID #	Size (acres)	Natural Community Type	Natural Community Type #2	VSWI	Vernal Pool Habitat	Floodwater	Water Quality	Fisheries	Wildlife	Recreation	Openspace	Erosion	Education	Vegetation	Significance	Significance
53	0.13	Pond		Y	Y	N	L	N	M	N	N	N	N	N	N	N
54	0.16	Pond		Y	Y	N	N	N	L	N	N	N	N	N	N	N
55	0.14	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
56	0.50	Pond		N	Y	N	N	N	M	N	N	N	N	N	N	N
57	0.18	Pond		Y	N	N	L	N	L	N	N	N	N	N	N	N
58	0.29	Pond		Y	N	N	N	N	N	N	N	N	N	N	N	N
59	0.36	Pond		Y	N	N	N	N	N	N	N	N	N	N	N	N
60	0.06	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
61	0.11	Pond		Y	Y	N	L	N	M	N	L	N	N	N	N	N
62	0.11	Pond		Y	N	N	L	L	L	L	N	N	N	N	N	N
63	0.08	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
64	0.09	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
65	0.06	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
66	0.45	Pond		N	N	N	L	M	M	L	L	N	N	N	N	N
67	0.21	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
68	0.11	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
69	1.68	Pond	Shallow Emergent Marsh	Y	Y	M	H	N	M	N	H	N	N	N	N	N
70	0.37	Pond	Shallow Emergent Marsh	Y	Y	L	L	L	M	N	N	M	N	N	N	N
71	0.07	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
72	0.07	Pond	Shallow Emergent Marsh	Y	Y	L	L	L	M	N	N	N	N	N	N	N
73	0.09	Pond	Shallow Emergent Marsh	Y	Y	N	L	N	M	N	N	N	N	N	N	N
74	0.64	Pond		N	N	N	L	N	L	N	N	N	N	N	N	N
75	0.11	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
76	0.12	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
77	0.10	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
78	0.20	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
79	0.29	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
80	0.26	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
81	0.20	Pond		N	N	N	L	N	N	N	N	N	N	N	N	N
82	0.25	Pond		N	N	N	L	N	L	N	N	N	N	N	N	N
83	0.46	Pond		Y	Y	L	L	N	L	N	N	N	N	N	N	N
84	0.91	Pond		Y	Y	M	L	N	M	L	L	N	N	N	N	N
85	0.65	Pond		Y	N	N	L	L	L	N	N	N	N	N	N	N
86	0.25	Pond		N	Y	N	N	N	H	N	N	N	N	N	N	N
87	0.19	Pond		Y	N	N	L	N	L	N	N	N	N	N	N	N
88	0.35	Pond		N	N	N	L	L	L	N	N	N	N	N	N	N
89	0.25	Pond		Y	N	N	L	N	L	N	N	N	N	N	N	N
90	0.07	Pond		N	N	N	N	N	L	N	L	N	N	N	N	N
91	0.05	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
92	0.63	Pond		Y	Y	L	L	N	L	N	N	N	N	N	N	N
93	0.17	Pond		N	N	N	N	L	L	N	N	N	N	N	N	N
94	0.29	Pond		Y	N	N	L	N	N	N	N	N	N	N	N	N
95	0.25	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
96	0.23	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
97	0.12	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
98	0.21	Pond		N	N	N	L	N	N	N	N	N	N	N	N	N
99	0.16	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
100	0.29	Pond		N	N	N	L	N	N	N	N	N	N	N	N	N
101	0.29	Pond		Y	N	N	N	N	N	N	N	N	N	N	N	N
102	0.16	Pond		N	N	N	L	N	L	N	N	N	N	N	N	N
103	0.23	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
104	0.38	Pond	Shallow Emergent Marsh	N	N	N	L	L	L	N	N	N	N	N	N	N
105	0.09	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
106	0.09	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
107	0.08	Pond		Y	N	N	N	N	N	N	N	N	N	N	N	N
108	0.36	Pond		Y	N	N	N	N	N	N	N	N	N	N	N	N

						Wetland Functions and Values									Local	State
ID #	Size (acres)	Natural Community Type	Natural Community Type #2	VSWI	Vernal Pool Habitat	Floodwater	Water Quality	Fisheries	Wildlife	Recreation	Openspace	Erosion	Education	Vegetation	Significance	Significance
109	1.92	Beaver Wetland	Shallow Emergent Marsh	Y	Y	N	L	L	H	N	N	L	N	N	N	N
110	0.12	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
111	0.22	Pond		Y	N	N	L	N	L	N	N	N	N	N	N	N
112	1.50	Beaver Wetland	Shallow Emergent Marsh	Y	Y	M	M	M	H	L	L	M	N	N	Not Assessed	Not Assess
113	0.35	Beaver Wetland	Shallow Emergent Marsh	Y	Y	N	L	L	M	N	N	L	N	N	Not Assessed	Not Assess
114	2.60	Pond		Y	Y	L	L	N	M	N	N	N	N	N	N	N
115	0.25	Pond		Y	Y	N	N	N	M	N	N	N	N	N	N	N
116	0.15	Pond		Y	Y	L	L	L	M	N	N	N	N	N	N	N
117	0.70	Pond		N	N	N	N	L	L	L	N	N	N	N	N	N
118	0.08	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
119	0.09	Pond		N	N	N	N	L	L	L	N	N	N	N	N	N
120	0.08	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
121	0.20	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
122	5.07	Beaver Wetland	Shallow Emergent Marsh	Y	Y	L	M	M	H	N	L	L	N	N	N	N
123	2.27	Beaver Wetland	Pond	Y	Y	L	M	M	M	N	N	L	N	N	N	N
124	3.03	Old Field	Alder Swamp	N	N	N	L	N	N	N	L	N	N	N	N	N
125	3.44	Alder Swamp	Old Field	N	N	N	L	N	L	N	N	N	N	N	N	N
126	9.41	Shallow Emergent Marsh	Alder Swamp	Y	N	H	H	M	H	N	M	M	N	N	N	N
127	22.37	Agricultural Field	Old Field	Y	N	N	L	N	L	N	N	N	N	N	N	N
128	3.35	Spruce-Fir-Tamarack Swamp		Y	Y	N	N	H	H	N	N	H	N	N	Not Assessed	Not Assess
129	19.13	Shallow Emergent Marsh	Old Field	Y	N	H	H	L	H	N	L	H	N	N	N	N
130	7.32	Alder Swamp	Old Field	N	N	N	L	N	L	N	N	N	N	N	N	N
131	2.90	Alder Swamp		Y	Y	M	M	M	M	N	L	H	N	N	Y	N
132	5.29	Alder Swamp	Red Maple-Black Ash Swamp	Y	N	L	M	L	H	N	L	M	N	N	N	N
133	3.76	Old Field	Alder Swamp	Y	Y	N	M	N	L	N	N	N	N	N	N	N
134	2.46	Old Field	Alder Swamp	Y	N	M	M	L	M	N	L	L	N	N	N	N
135	2.13	Shallow Emergent Marsh	Pond	Y	Y	M	L	H	H	N	N	H	N	N	Not Assessed	Not Assess
136	21.11	Spruce-Fir-Tamarack Swamp	Conifer-Hardwood Swamp	Y	Y	H	M	M	H	L	M	H	N	N	Potential	Potential
137	18.36	Spruce-Fir-Tamarack Swamp		Y	Y	M	M	M	H	L	L	M	N	N	Potential	Potential
138	4.58	Shallow Emergent Marsh	Alder Swamp	Y	N	L	M	L	M	N	L	M	N	N	N	N
139	3.42	Shallow Emergent Marsh	Old Field	Y	N	M	M	M	H	N	N	M	N	N	Not Assessed	Not Assess
140	1.15	Alder Swamp	Shallow Emergent Marsh	Y	N	N	L	M	M	N	L	M	N	N	Not Assessed	Not Assess
141	7.56	Alder Swamp	Shallow Emergent Marsh	Y	N	M	H	H	H	N	N	H	N	N	Not Assessed	Not Assess
142	5.24	Agricultural Field	Old Field	N	N	L	N	N	N	N	N	N	N	N	N	N
143	7.20	Agricultural Field	Old Field	N	N	L	N	N	N	N	N	N	N	N	N	N
144	2.41	Spruce-Fir-Tamarack Swamp	Seepage Forest	N	Y	N	L	H	H	N	N	H	N	N	Not Assessed	Not Assess
145	5.33	Conifer-Hardwood Swamp		N	N	L	M	L	M	N	N	M	N	N	N	N
146	4.81	Conifer-Hardwood Swamp	Seepage Forest	N	N	N	N	N	H	N	N	H	N	N	Not Assessed	Not Assess
147	5.04	Conifer-Hardwood Swamp	Seepage Forest	N	N	N	M	H	H	N	N	H	N	N	Not Assessed	Not Assess
148	1.24	Old Field	Alder Swamp	N	N	N	L	N	L	N	L	N	N	N	N	N
149	0.08	Pond		Y	Y	N	N	N	L	N	N	N	N	N	N	N
150	0.06	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
151	3.69	Seepage Forest	Conifer-Hardwood Swamp	N	Y	N	M	N	M	N	N	N	N	N	Not Assessed	Not Assess
152	8.06	Alder Swamp		Y	N	N	M	N	H	N	N	N	N	N	Not Assessed	Not Assess
153	7.04	Spruce-Fir-Tamarack Swamp		Y	Y	N	N	N	H	N	N	N	N	N	Not Assessed	Not Assess
154	8.35	Alder Swamp		N	N	L	M	N	M	N	L	N	N	N	N	N
155	2.96	Old Field	Red Maple-Black Ash Swamp	N	N	N	L	N	L	N	L	N	N	N	N	N
156	0.38	Seepage Forest	Seep	N	N	N	L	L	L	N	N	N	N	N	Not Assessed	Not Assess
157	0.63	Agricultural Field	Old Field	N	N	N	N	N	N	N	N	N	N	N	N	N
158	11.91	Spruce-Fir-Tamarack Swamp		Y	Y	M	H	H	H	N	N	H	N	N	Potential	Potential
159	2.20	Shallow Emergent Marsh		Y	Y	M	H	H	H	L	N	H	N	N	Not Assessed	Not Assess
160	7.69	Shallow Emergent Marsh	Alder Swamp	Y	Y	H	H	M	H	L	M	M	N	N	Potential	Potential
161	0.63	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
162	3.57	Shallow Emergent Marsh		N	Y	M	M	M	H	N	N	M	N	N	Not Assessed	Not Assess
163	1.31	Agricultural Field		N	N	N	N	N	N	N	N	N	N	N	N	N
164	11.59	Old Field	Red Maple-Black Ash Swamp	N	N	N	L	N	L	N	L	N	N	N	N	N

						Wetland Functions and Values									Local	State
ID #	Size (acres)	Natural Community Type	Natural Community Type #2	VSWI	Vernal Pool Habitat	Floodwater	Water Quality	Fisheries	Wildlife	Recreation	Openspace	Erosion	Education	Vegetation	Significance	Significance
165	1.72	Alder Swamp	Shallow Emergent Marsh	Y	Y	L	L	L	M	N	L	M	N	N	Not Assessed	Not Assess
166	2.00	Spruce-Fir-Tamarack Swamp	Alder Swamp	N	N	L	M	H	H	N	N	H	N	N	Not Assessed	Not Assess
167	1.18	Spruce-Fir-Tamarack Swamp	Alder Swamp	Y	N	N	M	N	L	N	N	N	N	N	Not Assessed	Not Assess
168	1.86	Spruce-Fir-Tamarack Swamp	Alder Swamp	Y	N	N	L	N	L	N	N	N	N	N	Not Assessed	Not Assess
169	2.16	Spruce-Fir-Tamarack Swamp	Lowland Spruce-Fir Forest	N	N	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
170	0.73	Agricultural Field		N	N	N	N	N	N	N	N	N	N	N	N	N
171	1.25	Old Field		N	N	N	N	N	N	N	N	N	N	N	N	N
172	0.44	Agricultural Field	Old Field	N	N	N	N	N	N	N	N	N	N	N	N	N
173	0.08	Shallow Emergent Marsh	Pond	N	N	N	N	N	N	N	N	N	N	N	N	N
174	1.19	Red Maple-Black Ash Swamp		N	N	N	L	N	L	N	N	N	N	N	N	N
175	2.58	Spruce-Fir-Tamarack Swamp		N	N	N	N	N	H	N	N	N	N	N	Not Assessed	Not Assess
176	7.37	Old Field		N	N	N	M	N	M	N	N	N	N	N	N	N
177	0.33	Agricultural Field	Pond	N	N	N	L	N	N	N	N	N	N	N	N	N
178	0.04	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
179	1.25	Agricultural Field	Old Field	N	N	N	L	N	L	N	N	N	N	N	N	N
180	3.18	Old Field	Spruce-Fir-Tamarack Swamp	N	N	N	M	N	L	N	N	N	N	N	N	N
181	3.25	Alder Swamp		N	N	N	M	N	L	N	N	N	N	N	N	N
182	5.98	Shallow Emergent Marsh	Old Field	N	Y	H	H	M	M	N	H	M	N	N	N	N
183	5.96	Spruce-Fir-Tamarack Swamp		N	Y	L	H	H	H	N	L	H	N	N	Not Assessed	Not Assess
184	8.92	Old Field	Alder Swamp	N	N	N	L	N	L	N	N	L	N	N	N	N
185	6.80	Spruce-Fir-Tamarack Swamp	Alder Swamp	Y	Y	N	M	N	M	N	N	N	N	N	Not Assessed	Not Assess
186	0.99	Shallow Emergent Marsh		Y	Y	L	M	N	H	N	N	M	N	N	Not Assessed	Not Assess
187	29.81	Spruce-Fir-Tamarack Swamp	Alder Swamp	Y	Y	H	H	M	H	N	N	H	N	N	Not Assessed	Not Assess
188	15.22	Old Field	Alder Swamp	Y	N	L	M	L	M	N	L	H	N	N	N	N
189	5.74	Agricultural Field		Y	N	L	N	N	N	N	N	N	N	N	N	N
190	4.72	Old Field		N	N	N	L	N	M	N	N	N	N	N	N	N
191	19.19	Old Field		N	N	N	M	L	L	N	L	L	N	N	N	N
192	8.88	Alder Swamp	Old Field	N	N	L	L	L	M	N	N	L	N	N	N	N
193	9.40	Seepage Forest		N	N	N	M	N	M	N	N	N	N	N	Not Assessed	Not Assess
194	6.11	Alder Swamp	Old Field	N	N	N	M	N	M	N	N	N	N	N	Not Assessed	Not Assess
195	2.99	Alder Swamp	Shallow Emergent Marsh	N	N	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
196	21.52	Spruce-Fir-Tamarack Swamp		Y	Y	H	H	H	H	M	H	H	N	N	Not Assessed	Not Assess
197	0.28	Agricultural Field		N	N	N	N	N	N	N	N	N	N	N	N	N
198	5.21	Conifer-Hardwood Swamp	Spruce-Fir-Tamarack Swamp	Y	Y	L	L	N	H	N	N	N	N	N	Not Assessed	Not Assess
199	0.42	Shallow Emergent Marsh		Y	Y	N	L	N	L	N	N	N	N	N	Not Assessed	Not Assess
200	7.76	Conifer-Hardwood Swamp	Seepage Forest	N	N	N	M	H	H	N	N	H	N	N	Not Assessed	Not Assess
201	10.16	Old Field		N	N	N	L	N	L	N	N	N	N	N	N	N
202	0.55	Pond		Y	N	N	L	N	M	N	N	N	N	N	N	N
203	5.59	Alder Swamp	Old Field	N	N	N	N	M	M	N	N	M	N	N	Not Assessed	Not Assess
204	2.68	Old Field	Alder Swamp	Y	N	N	L	N	L	N	N	N	N	N	N	N
205	3.46	Old Field		N	N	N	N	N	L	N	N	N	N	N	N	N
206	0.20	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
207	0.56	Agricultural Field	Old Field	N	N	N	N	N	N	N	N	N	N	N	N	N
208	0.13	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
209	0.11	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
210	0.06	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
211	3.14	Red Maple-Black Ash Swamp	Alder Swamp	Y	Y	L	L	M	M	N	N	H	N	N	N	N
212	6.56	Red Maple-Black Ash Swamp		Y	Y	N	H	M	H	H	M	L	N	N	Potential	Potential
213	3.88	Red Maple-Black Ash Swamp		Y	Y	N	M	N	M	N	M	N	N	N	Potential	Potential
214	1.07	Red Maple-Black Ash Swamp	Alder Swamp	N	Y	N	M	N	M	N	N	N	N	N	Not Assessed	Not Assess
215	0.09	Pond		N	Y	N	N	N	M	N	N	N	N	N	N	N
216	2.06	Seepage Forest		N	N	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
217	0.22	Pond		Y	N	N	L	N	L	N	N	N	N	N	N	N
218	4.43	Spruce-Fir-Tamarack Swamp	Conifer-Hardwood Swamp	N	Y	N	M	N	H	N	N	N	N	N	Not Assessed	Not Assess
219	1.80	Seepage Forest	Spruce-Fir-Tamarack Swamp	N	N	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
220	3.32	Seepage Forest	Conifer-Hardwood Swamp	N	N	N	L	N	M	N	N	N	N	N	Not Assessed	Not Assess

						Wetland Functions and Values									Local	State
ID #	Size (acres)	Natural Community Type	Natural Community Type #2	VSWI	Vernal Pool Habitat	Floodwater	Water Quality	Fisheries	Wildlife	Recreation	Openspace	Erosion	Education	Vegetation	Significance	Significance
221	0.57	Spruce-Fir-Tamarack Swamp		N	Y	L	L	L	M	N	M	L	N	N	Not Assessed	Not Assess
222	0.77	Pond		Y	N	N	N	N	L	N	N	N	N	N	N	N
223	6.94	Alder Swamp		Y	Y	L	L	N	M	N	N	N	N	M	Y	N
224	0.09	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
225	1.36	Shallow Emergent Marsh		N	Y	N	L	L	M	N	N	M	N	N	Not Assessed	Not Assess
226	5.76	Alder Swamp	Red Maple-Black Ash Swamp	Y	Y	N	M	M	H	N	N	H	N	N	Not Assessed	Not Assess
227	2.09	Pond	Shallow Emergent Marsh	Y	Y	L	L	L	M	N	L	N	N	N	N	N
228	8.48	Old Field	Alder Swamp	Y	N	N	L	N	L	N	N	L	N	N	N	N
229	2.49	Red Maple-Black Ash Swamp		Y	Y	L	L	M	M	N	N	M	N	N	Not Assessed	Not Assess
230	0.09	Pond		N	Y	N	N	N	M	N	N	N	N	N	N	N
231	0.18	Pond		Y	N	N	N	L	L	L	N	N	N	N	N	N
232	0.17	Pond		N	Y	N	N	N	L	N	N	N	N	N	N	N
233	1.62	Seepage Forest		N	N	N	N	M	M	N	N	M	N	N	Not Assessed	Not Assess
234	8.52	Conifer-Hardwood Swamp		Y	Y	N	L	H	H	N	N	H	N	N	Not Assessed	Not Assess
235	2.29	Old Field		N	N	N	L	N	L	N	N	N	N	N	N	N
236	0.16	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
237	1.70	Seepage Forest	Red Maple-Black Ash Swamp	N	Y	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
238	1.73	Seepage Forest		N	N	N	L	M	M	N	N	M	N	N	Not Assessed	Not Assess
239	2.35	Shallow Emergent Marsh	Alder Swamp	N	N	L	M	L	L	N	N	M	N	N	N	N
240	0.15	Pond		Y	N	N	N	N	N	N	N	N	N	N	N	N
241	2.62	Seep	Shallow Emergent Marsh	N	N	N	L	N	L	N	N	N	N	N	N	N
242	1.66	Spruce-Fir-Tamarack Swamp	Seepage Forest	N	Y	N	L	N	H	N	N	N	N	N	Not Assessed	Not Assess
243	3.54	Seepage Forest	Conifer-Hardwood Swamp	N	Y	N	N	N	H	N	N	N	N	N	Not Assessed	Not Assess
244	1.76	Shallow Emergent Marsh	Old Field	Y	N	L	M	N	M	L	H	N	N	N	Not Assessed	Not Assess
245	0.15	Pond		N	N	N	N	N	L	N	N	N	N	N	N	N
246	2.34	Old Field		N	N	N	L	N	L	N	N	N	N	N	N	N
247	12.50	Old Field		N	N	N	L	N	L	N	N	N	N	N	N	N
248	6.51	Floodplain Forest		N	N	H	H	M	H	M	H	M	N	N	Not Assessed	Not Assess
249	8.20	Floodplain Forest		N	N	H	H	M	H	H	H	M	N	N	Not Assessed	Not Assess
250	1.18	Alder Swamp		Y	Y	N	L	M	H	N	N	M	N	N	Not Assessed	Not Assess
251	3.66	Seepage Forest		N	N	N	L	H	H	N	N	H	N	N	N	N
252	38.92	Floodplain Forest	Old Field	Y	N	H	H	H	H	H	H	H	N	N	N	
253	1.48	Agricultural Field		Y	N	N	N	N	N	N	N	N	N	N	N	N
254	1.11	Alder Swamp		Y	Y	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
255	1.62	Old Field	Alder Swamp	N	N	N	N	N	L	N	N	N	N	N	N	N
256	1.64	Old Field	Alder Swamp	N	N	N	N	N	L	N	N	N	N	N	N	N
257	5.84	Old Field	Seepage Forest	N	N	N	N	N	L	N	N	N	N	N	N	N
258	5.60	Seepage Forest		N	Y	L	M	L	L	N	L	M	N	N	N	N
259	2.29	Old Field	Alder Swamp	N	N	N	L	N	L	N	N	N	N	N	N	N
260	2.08	Old Field		Y	N	L	L	L	M	N	N	M	N	N	N	N
261	2.12	Seepage Forest	Old Field	N	Y	N	N	N	M	N	N	N	N	N	Not Assessed	Not Assess
262	10.49	Alder Swamp	Spruce-Fir-Tamarack Swamp	Y	Y	M	M	N	M	N	M	N	N	N	N	N
263	1.13	Alder Swamp		N	N	N	L	H	H	N	N	H	N	N	Not Assessed	Not Assess
264	2.03	Shallow Emergent Marsh	Alder Swamp	Y	Y	L	L	N	M	N	M	N	N	N	N	N
265	1.03	Shallow Emergent Marsh	Old Field	N	N	N	L	N	L	N	N	N	N	N	N	N
266	7.21	Old Field		N	N	L	N	N	N	N	N	N	N	N	N	N
267	11.19	Spruce-Fir-Tamarack Swamp		N	Y	L	H	H	H	N	N	H	N	N	Not Assessed	Not Assess
268	0.10	Pond		N	N	N	N	N	N	N	N	N	N	N	N	N
269	18.71	Alder Swamp	Alluvial Shrub Swamp	Y	Y	H	H	H	H	N	H	H	N	N	Y	N
270	4.99	Alder Swamp	Spruce-Fir-Tamarack Swamp	Y	N	L	M	N	H	N	L	N	N	N	N	N
271	0.40	Shallow Emergent Marsh		N	Y	M	H	H	H	N	N	H	N	N	Not Assessed	Not Assess
272	1.14	Seepage Forest	Conifer-Hardwood Swamp	N	Y	N	M	H	H	N	N	H	N	N	Not Assessed	Not Assess
273	6.42	Agricultural Field		N	N	N	N	N	L	N	N	N	N	N	N	N

Table 2: Vernal Pool Summary Data
Natural Heritage Element Inventory and Assessment for Mount Holly

ID	Field Visit	Size	Amphibians Present	Vegetation	Hydroperiod	Local Significance	State Significance
1	N	Unknown	Unknown	Unknown	Unknown	NA	NA
2	N	Unknown	Unknown	Unknown	Unknown	NA	NA
3	N	Unknown	Unknown	Unknown	Unknown	NA	NA
4	N	Unknown	Unknown	Unknown	Unknown	NA	NA
5	N	Unknown	Unknown	Unknown	Unknown	NA	NA
6	N	Unknown	Unknown	Unknown	Unknown	NA	NA
7	N	Unknown	Unknown	Unknown	Unknown	NA	NA
8	Y	30m X 40m	Spotted Salamander egg (28), Wood Frog tadpoles	Moss only	Likely sufficient	Y	Y
9	Y	35m X 15m	Spotted Salamander egg (40+), Wood Frog tadpoles	Sedges, winterberry holly	Likely sufficient	Y	Y
10	Y	28m X 15m	Spotted Salamander egg (15), Wood Frog tadpoles	Sedges, sensitive fern, yellow birch	Likely sufficient	Y	Y
11	Y	8m X 30m	Spotted Salamander egg (22), Wood Frog tadpoles	Sedges	Likely sufficient	Y	Y
12	N	Unknown	Unknown	Unknown	Unknown	NA	NA
13	N	Unknown	Unknown	Unknown	Unknown	NA	NA
14	N	Unknown	Unknown	Unknown	Unknown	NA	NA
15	N	Unknown	Unknown	Unknown	Unknown	NA	NA
16	Y	10m X 50m	Wood frog tadpoles	Sedges, Royal fern	Likely insufficient	Y	Y
17	N	Unknown	Unknown	Unknown	Unknown	NA	NA
18	N	Unknown	Unknown	Unknown	Unknown	NA	NA
19	Y	12m X 20m	Wood frog tadpoles, Green frogs, Newts	Sedges	Likely sufficient	Y	N
20	N	Unknown	Unknown	Unknown	Unknown	NA	NA
21	N	Unknown	Unknown	Unknown	Unknown	NA	NA
22	Y	20m X 20m	Spotted salamander egg (3), adult spotted sal	None	Likely insufficient	N	N
23	Y	20m X 30m	Spotted Salamander egg (12+), Wood frog tadpoles	None	Obviously sufficient	Y	Y
24	Y	8m X 30m	Spotted salamander egg (8), Wood frog tadpoles	Sensitive fern, Impatiens moss	Likely sufficient	Y	Y
25	N	Unknown	Unknown	Unknown	Unknown	NA	NA
26	N	Unknown	Unknown	Unknown	Unknown	NA	NA
27	N	Unknown	Unknown	Unknown	Unknown	NA	NA
28	Y	22m X 35m	Spotted Salamander, Wood Frog	Meaowsweet, Wood fern	Likely sufficient	Y	Y
29	Y	10m X 18m	Spotted salamanders, wood frogs	None	Obviously sufficient	Y	Y
30	Y	10m X 18m	None at time of visit (September)	None	Likely sufficient	NA	NA
31	Y	10m X 20m	None at time of visit (September)	None	Likely sufficient	NA	NA
32	D	10m X 15m	Unknown	Unknown	Unknown	NA	NA

Table 3: Wildlife Habitat Summary Data for Contiguous Habitat Units
Natural Heritage Element Inventory and Assessment for Mount Holly

CHU #	Size (acres)	Name	Core Area (acres)	Deeryard Area (acres)	Stream Length (miles)	Wetland Area (acres)	Early Succession (acres)	Riparian Corridor (acres)	Mast Present	Ledge Present	Bear Wetland Present	Vernal Pools Present (# of)	Max Elevation (feet)	Min Elevation (feet)	Elevation Mean (feet)	Elevation Range (feet)	Core Horizontal Diversity Rank	Conserved Area (acres)	Conserved Area %
1	6876.80	Ludlow Mountain	6467	0	31.3	121.0	238	1099	Yes	Yes	Yes	6	3318	1324	2260	1994	Low	3672	53
2	5282.58	Willard Mountain	4893	547	27.7	101.6	175	946	Yes	Yes	Yes	3	2805	1249	2044	1556	Low	4281	81
3	1277.01	Mount Holly	902	332	8.0	108.9	43	199	Yes		Yes	3	2049	1255	1623	794	Low	58	5
4	1973.84	Steward Rd.	1526	403	9.4	276.6	92	287		Yes	Yes	3	2252	1399	1684	853	High	104	5
5	107.52	Bowlsville	0	52	4.9	11.8	48	17			Yes	0	1599	1360	1462	239	Moderate	0	0
6	564.14	Roger Hill	398	162	1.1	28.4	42	32	Yes		Yes	0	1646	1134	1441	512	High	0	0
7	348.13	Hortonville	115	173	7.7	149.2	3	43			Yes	0	1635	1472	1538	163	High	0	0
8	3083.52	Ninevah/Sawyer Rocks	2854	151	11.7	169.1	150	407	Yes	Yes	Yes	11	2348	1189	1800	1159	Moderate	1618	52
9	1914.76	Russel Brook	1398	464	13.2	276.2	228	316			Yes	4	1764	1087	1484	677	Moderate	0	0
10	1293.23	Proctor Hill	1086	132	13.1	88.5	84	224			Yes	0	2241	1553	1810	688	High	167	13

Appendix 3: Attribute Tables

Table 1: Wetland Natural Community Attributes

Field Name	Meaning	Responses	Description
AE_ID	Unique Identification	Integer	Unique identification number
NatCom	Natural Community	General Text	Lists the primary natural community present on the site
NatCom2	Natural Community 2	General Text	Lists an alternate or co-dominant natural community on site
Comments	Comments	General Text	Comments on the ecology, vegetation or mapping of the community
Confidence	Confidence	H/M/L/C H=high, M=moderate, L=low, C=confirmed	Indicates the confidence that a wetland exists at the site based on the remote inventory. Sites that were field verified receive a "C"
Field_Visit	Field Visit	Y/N/D: Yes/ No/ Drive-by	Indicates whether the site received a field visit. Drive-by denotes sites that were viewed from a public access site such as trails or roads.
Acres	Acres	Integer	The size of the community in acres
VSWI	Vermont Significant Wetlands Inventory	Y/N Yes/No	Indicates if the site is on the VSWI map and is a Class II wetland.
Hydric	Hydric Soil	Y/N Yes/No	Indicates if the site contains hydric soils
Hydric_Type	Hydric Soil Type	General Text	For sites that contain hydric soils, indicates the type of hydric soil present
State_Rank	State Rank	S1/S2/S3/S4/S5/NR S1 is rare, S5 is common. NR indicates sites that are not ranked	The state rarity rank of the natural community.
Priority	Priority	H/M/L: H=high, M=moderate, L=low	Indicates the priority for conducting a field visit
VP_Habitat	Vernal Pool Habitat	Y/N Yes/No	Indicates if the wetland has likely habitat for vernal pool-dependent species
Floodwater	Floodwater	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for floodwater retention
WQ	Water Quality	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for water quality
Fisheries	Fisheries	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for fisheries
Wildlife	Wildlife	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for wildlife habitat
Recreation	Recreation	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for recreation
Open_Space	Open Space	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for open space
Erosion	Erosion	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for erosion control
Education	Education	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for education
Vegetation	Vegetation	L/M/H/N: Low/Moderate/High/No	Indicates if the site functions for significant vegetation

Table 1 (continued): Wetland Natural Community Attributes

Field Name	Meaning	Responses	Description
FV_Score	Function and Values Score	Integer	A sum of the function and values rankings. Sum was calculated using High=3, Moderate=2, Low=1.
ElementGrp	Element Group	General Text	A grouping method used in determining local and state significance.
EO_Rank	Element Occurrence Rank	A/B/C/D A=Excellent, D=Poor	Rank of the particular natural community
Size_Rank	Size Rank	A/B/C/D A=Excellent, D=Poor	A rank assigned by NNHP based on the size of the community type. Only sites that were potentially significant natural communities were ranked.
CC_Rank	Community Condition Rank	A/B/C/D A=Excellent, D=Poor	A rank assigned by NNHP based on the condition of the community. Only sites that were potentially significant natural communities were ranked.
LC_Rank	Landscape Rank	A/B/C/D A=Excellent, D=Poor	A rank assigned by NNHP based on the quality of the landscape surrounding the community. Only sites that were potentially significant natural communities were ranked.
Local_Sig	Local significance	Y/N/Not Assessed Yes/No/Not Assessed	Indicates if the site is a locally significant site
State_Sig	State Significance	Y/N/Not Assessed Yes/No/Not Assessed	Indicates if the site is a state significant site
SIG_Justificat	Significance Justification	General Text	Indicates the reason for assigning local or state significance
Site_Name	Site Value	General Text	Sites determined to be potentially, locally or state significant sites were given a site name.
FieldID	Field Identification	Integer	Identification number that links to the field forms

Table: 2: Vernal Pool Attributes

Field Name	Meaning	Responses	Description
AE_ID	Identification	Integers	Unique identification number
Comments	Comments	General Text	Comments on the ecology of the pool
Loc_Accura	Location Accuracy	L/ML/M/MH/H/C: L=low, ML=medium low, M=medium, MH=medium high, H=high, C=confirmed	Scores the location accuracy of the mapped pool, based on the remote inventory. A confirmed score indicates that the location was confirmed by a field visit.
Confidence	Confidence	L/ML/M/MH/H/C: L=low, ML=medium low, M=medium, MH=medium high, H=high, C=confirmed	Scores the confidence that a pool exists at a particular location, based on the remote inventory. A confirmed score indicates the site was confirmed by a field visit.
FieldVisit	Field Visit	Y/N: Yes/No	Indicates if a field visit of the pool was conducted
Size	Size	Width X Depth in feet	An estimate of the size of the pool based on field observations
Depth	Depth	Depth in feet or inches	As estimate of the depth of the pool based on field observations
Amphibians	Amphibians	General Text	A list of the amphibians present in the pool based on field observations
Vegetation	Vegetation	General Text	A list of the dominant vegetation present in the pool based on field observations
Landscape_Q	Landscape Quality	A/B/C/D A=Excellent, D=Poor	A rank assigned by NNHP based on the quality of the landscape surrounding the community. Only sites that were potentially significant natural communities were ranked.
Size_Rank	Size Rank	A/B/C/D A=Excellent, D=Poor	A rank assigned by NNHP based on the size of the vernal pool.
Amph_Rank	Amphibian Rank	A/B/C/D A=Excellent, D=Poor	A rank assigned by NNHP based on the use by amphibians.
Comm_Cond	Community Condition	A/B/C/D A=Excellent, D=Poor	A rank assigned by NNHP based on the condition of the community. Only sites that were field visited were ranked.
Hydroperio	Hydroperiod	Obviously insufficient/ Likely insufficient/ Likely sufficient/ Obviously sufficient/ Semi-permanent water body/ Permanent water body	Describes the length of time that the pool holds water based on field observations. Ranked in regards to pool staying wet long enough to support successful reproduction of animals present during year with normal rainfall
Local_Sig	Locally Significant	Y/N/NA: Yes/No/Not Assessed	Describes if the vernal pool is considered locally significant. Only pools that were visited at the appropriate time of year were assessed.
State_Sig	State Significant	Y/N/NA: Yes/No/Not Assessed	Describes if the vernal pool is considered locally significant. Only pools that were visited at the appropriate time of year were assessed.
EO_Rank	Element Occurrence Rank	A/B/C/D A=Excellent, D=Poor	Rank of the particular natural community

Table 3: Wildlife Contiguous Habitat Unit (CHU) Attributes

Field Name	Meaning	Responses	Description
ID	Identification	Integer	Unit identification number assigned by Arrowwood Environmental
ACRES	Acres	Integer	The size of the CHU
Name	Identifying Name	Text	The name assigned to describe the CHU
Comment	Comment	Text	Comments regarding CHU
Core_acres	Core acres	Integer	The acres of core habitat within the CHU
Dryd_acres	Deeryard acres	Integer	The acres of deeryard within the CHU
Strm_mile	Stream miles	Integer	The length in miles of stream within the CHU
Wet_acres	Wetland acres	Integer	The area of wetlands within the CHU
ES_acres	Early Successional acres	Integer	The acres of early successional habitat within the CHU
FRC_acres	Forested riparian corridor acres	Integer	The acres of forested riparian corridor within the CHU
Mast_pres	Mast present	Yes/blank	Indicates if mast is present within the CHU
Ledge_pres	Ledge present	Yes/blank	Indicates if ledge is present within the CHU
BW_pres	Bear wetland present	Yes/blank	Indicates if bear wetland is present within the CHU
VP_count	Vernal Pool count	Integer	Indicates the number of vernal pools identified within the CHU
Sig_natcom	Significant natural community	State/local	Indicates the presence of locally or state significant natural communities within the CHU
Elev_min	Elevation minimum	Integer/Feet	Indicates the minimum elevation (in feet) within the CHU
Elev_max	Elevation maximum	Integer/Feet	Indicates the maximum elevation (in feet) within the CHU
Elev_range	Elevation range	Integer/Feet	Indicates the range of elevation (in feet) within the CHU
Elev_mean	Elevation mean	Integer/Feet	Indicates the mean elevation (in feet) within the CHU
C_hd_rank	Core horizontal diversity rank	Low/moderate/high	Indicates the core horizontal diversity rank assigned by Arrowwood Environmental
Cons_acres	Conservation acres	Integer	Area of conserved land within the CHU
Cons_Prcnt	Conserved Percentage	Integer/percentage	% of CHU currently in conservation

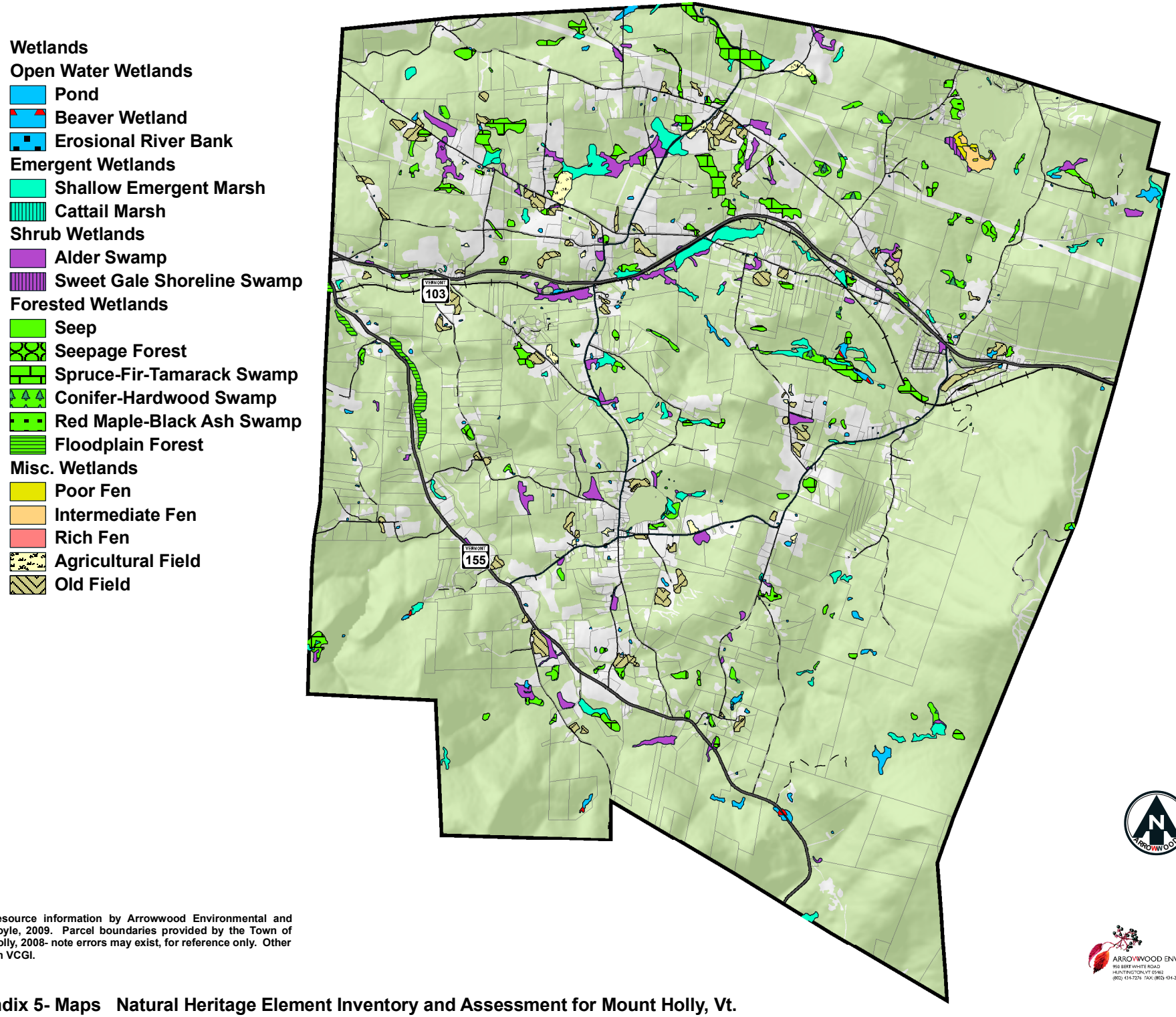
Appendix 4: Bird Species List

Table 4 : Bird Species List

Bird species identified during the 2003-2007 Breeding Bird Atlas in and around Mount Holly, Vt.
from: http://www.pwrc.usgs.gov/bba- data retrived from Mount Holly Quad- blocks 1-6

Alder Flycatcher	Chestnut-sided Warbler	Indigo Bunting	Swainson's Thrush
American Bittern	Chimney Swift	Killdeer	Swamp Sparrow
American Black Duck	Chipping Sparrow	Least Flycatcher	Tree Swallow
American Crow	Cliff Swallow	Magnolia Warbler	Tufted Titmouse
American Goldfinch	Common Grackle	Mallard	Turkey Vulture
American Kestrel	Common Loon	Mourning Dove	Veery
American Redstart	Common Raven	Mourning Warbler	Warbling Vireo
American Robin	Common Yellowthroat	Nashville Warbler	
American Woodcock	Dark-eyed Junco	Northern Flicker	
Baltimore Oriole	Downy Woodpecker	Northern Goshawk	
Bank Swallow	Eastern Bluebird	Northern Parula	
Barn Swallow	Eastern Kingbird	Northern Waterthrush	
Barred Owl	Eastern Meadowlark	Ovenbird	
Belted Kingfisher	Eastern Phoebe	Pileated Woodpecker	
Bicknell's Thrush	Eastern Towhee	Purple Finch	
Black-and-white Warbler	Eastern Wood-Pewee	Red-breasted Merganser	
Black-billed Cuckoo	European Starling	Red-breasted Nuthatch	
Blackburnian Warbler	Evening Grosbeak	Red-eyed Vireo	
Black-capped Chickadee	Field Sparrow	Red-shouldered Hawk	
Black-throated Blue Warbler	Golden-crowned Kinglet	Red-tailed Hawk	
Black-throated Green Warbler	Gray Catbird	Red-winged Blackbird	
Blue Jay	Great Blue Heron	Rock Pigeon	
Blue-headed Vireo	Great Crested Flycatcher	Rose-breasted Grosbeak	
Bobolink	Great Horned Owl	Ruby-throated Hummingbird	
Broad-winged Hawk	Green Heron	Ruffed Grouse	
Brown Creeper	Hairy Woodpecker	Rusty Blackbird	
Brown Thrasher	Hermit Thrush	Savannah Sparrow	
Brown-headed Cowbird	Hooded Merganser	Scarlet Tanager	
Canada Goose	House Finch	Sharp-shinned Hawk	
Canada Warbler	House Sparrow	Song Sparrow	
Cedar Waxwing	House Wren	Spotted Sandpiper	

Appendix 5: Report Maps



Note: Resource information by Arrowwood Environmental and Kathy Doyle, 2009. Parcel boundaries provided by the Town of Mount Holly, 2008- note errors may exist, for reference only. Other data from VCGI.

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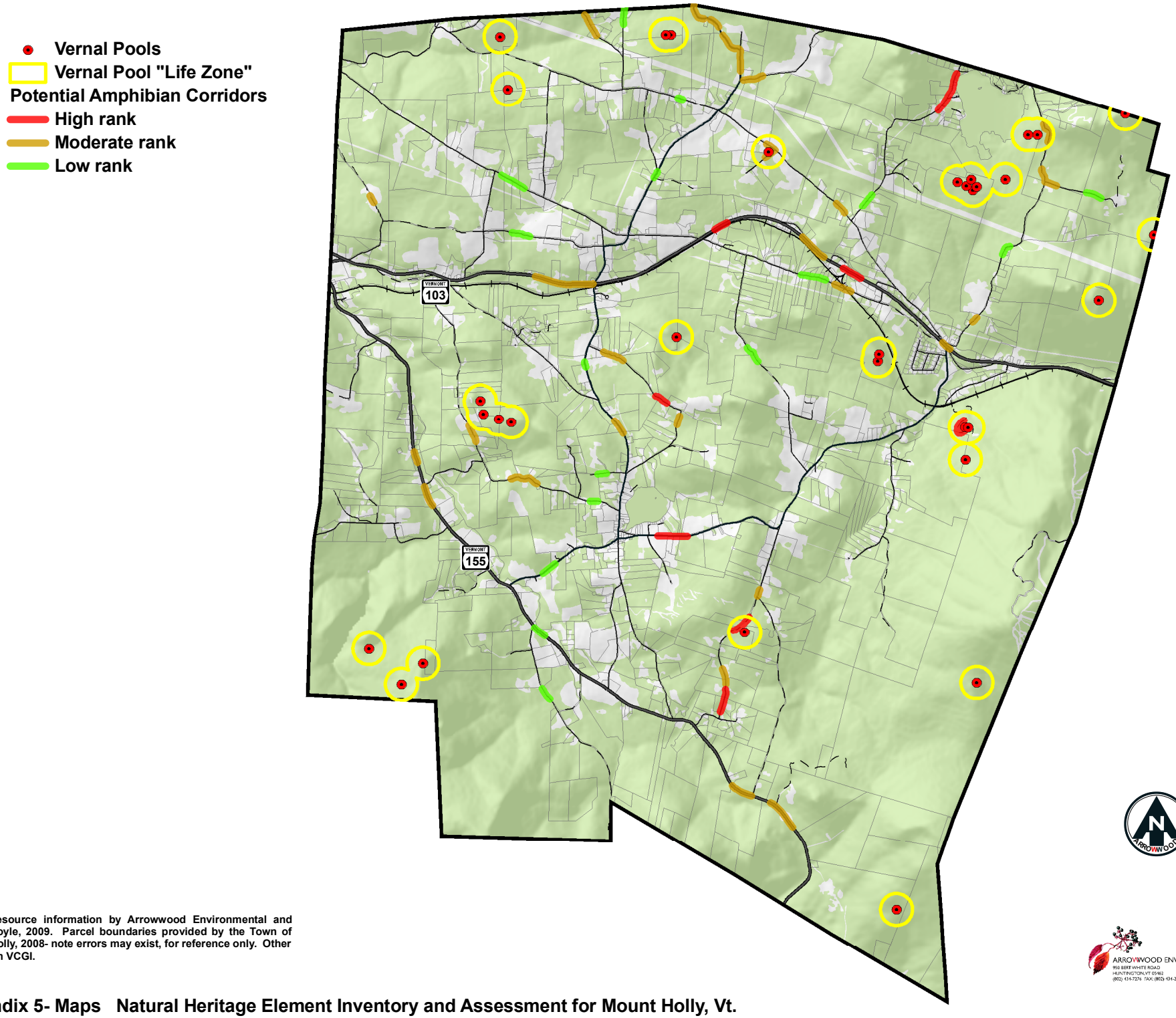

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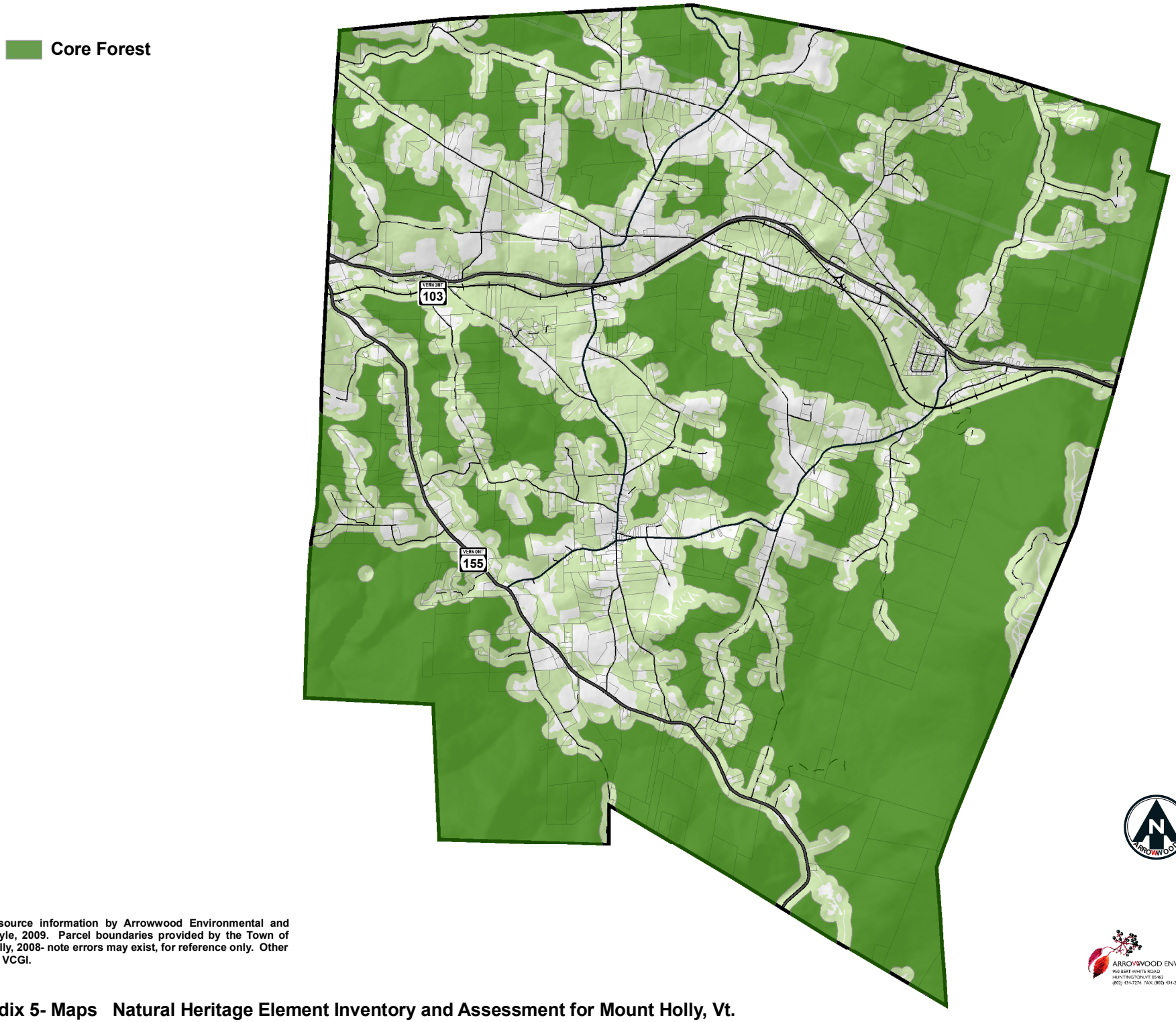

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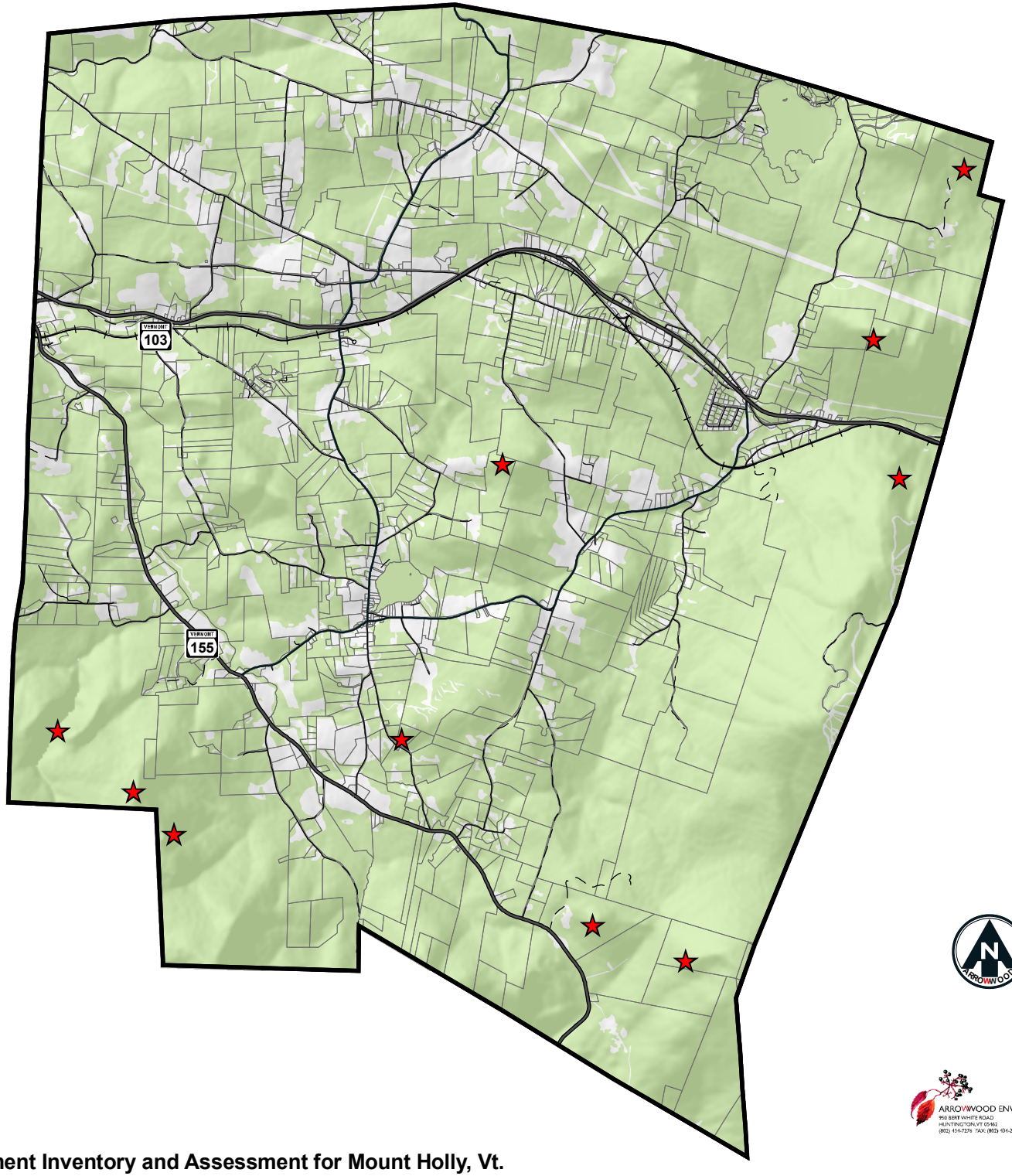
Appendix 5- Maps Natural Heritage Element Inventory and Assessment for Mount Holly, Vt.

★ **Ledge Habitats**



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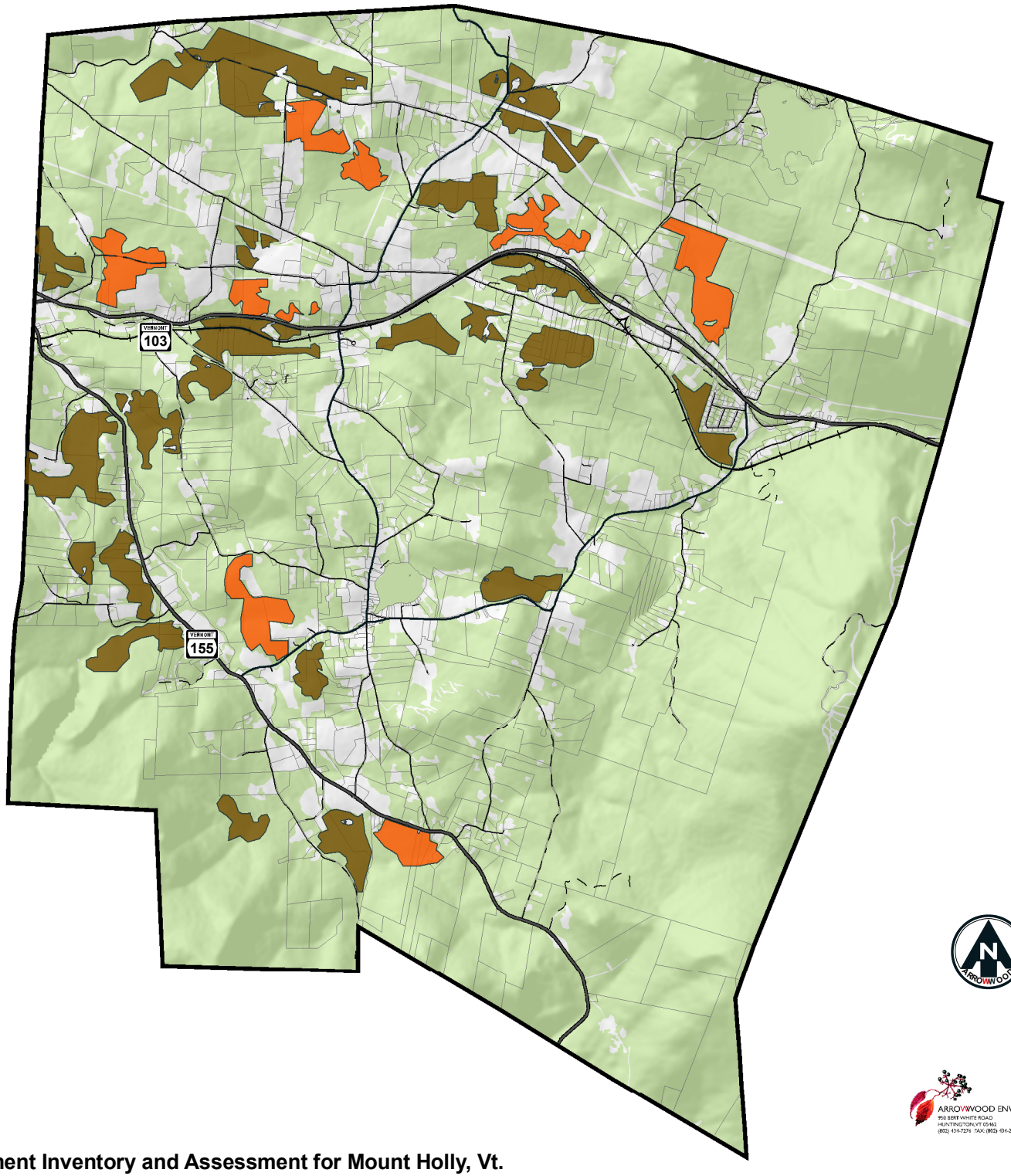
Deer Winter Habitat

Softwood cover

High value habitat
(south or southwest aspect)



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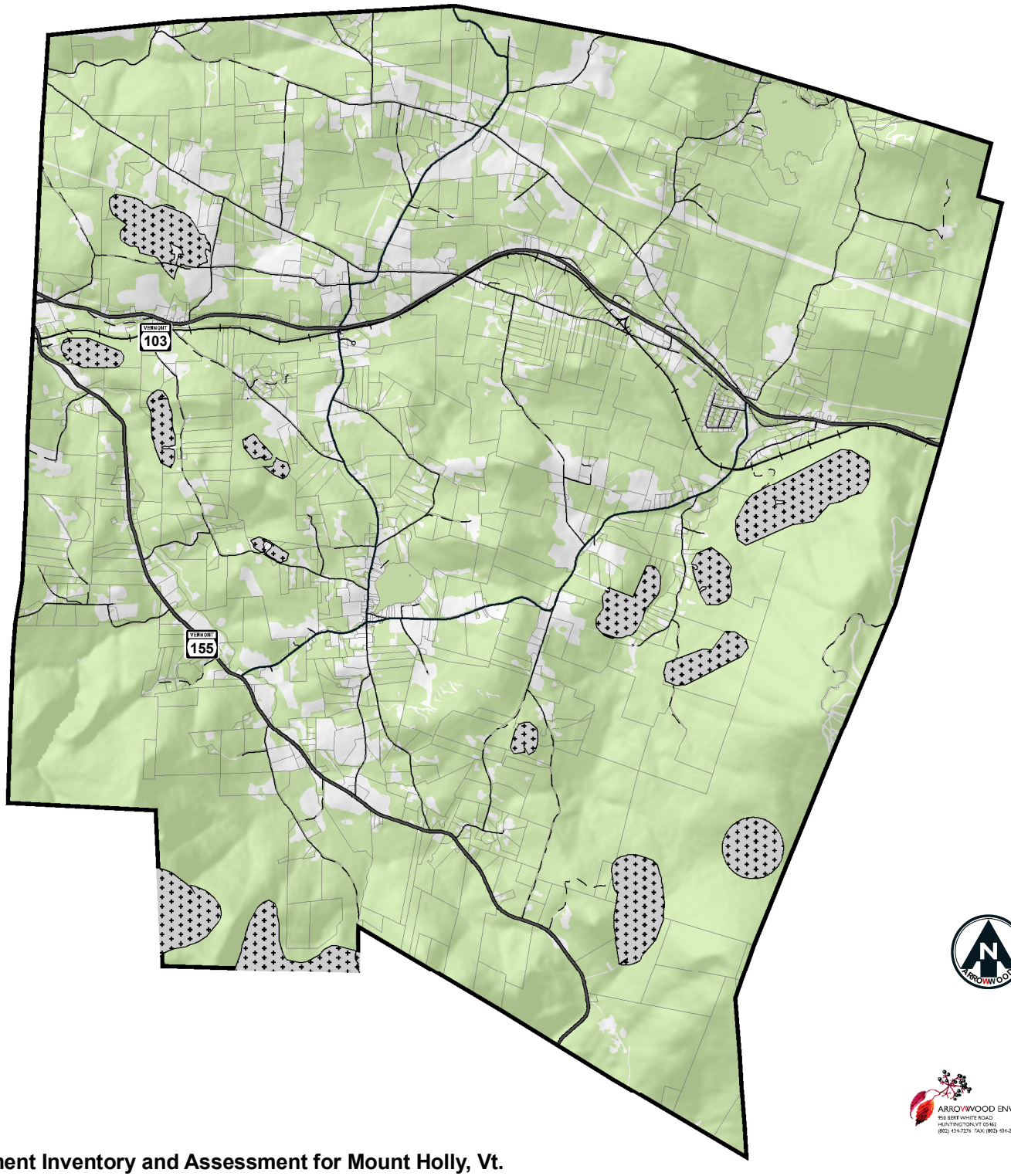
Mast Stands

(from Vt. Forest Parks & Rec & Vt. Fish & Wildlife)



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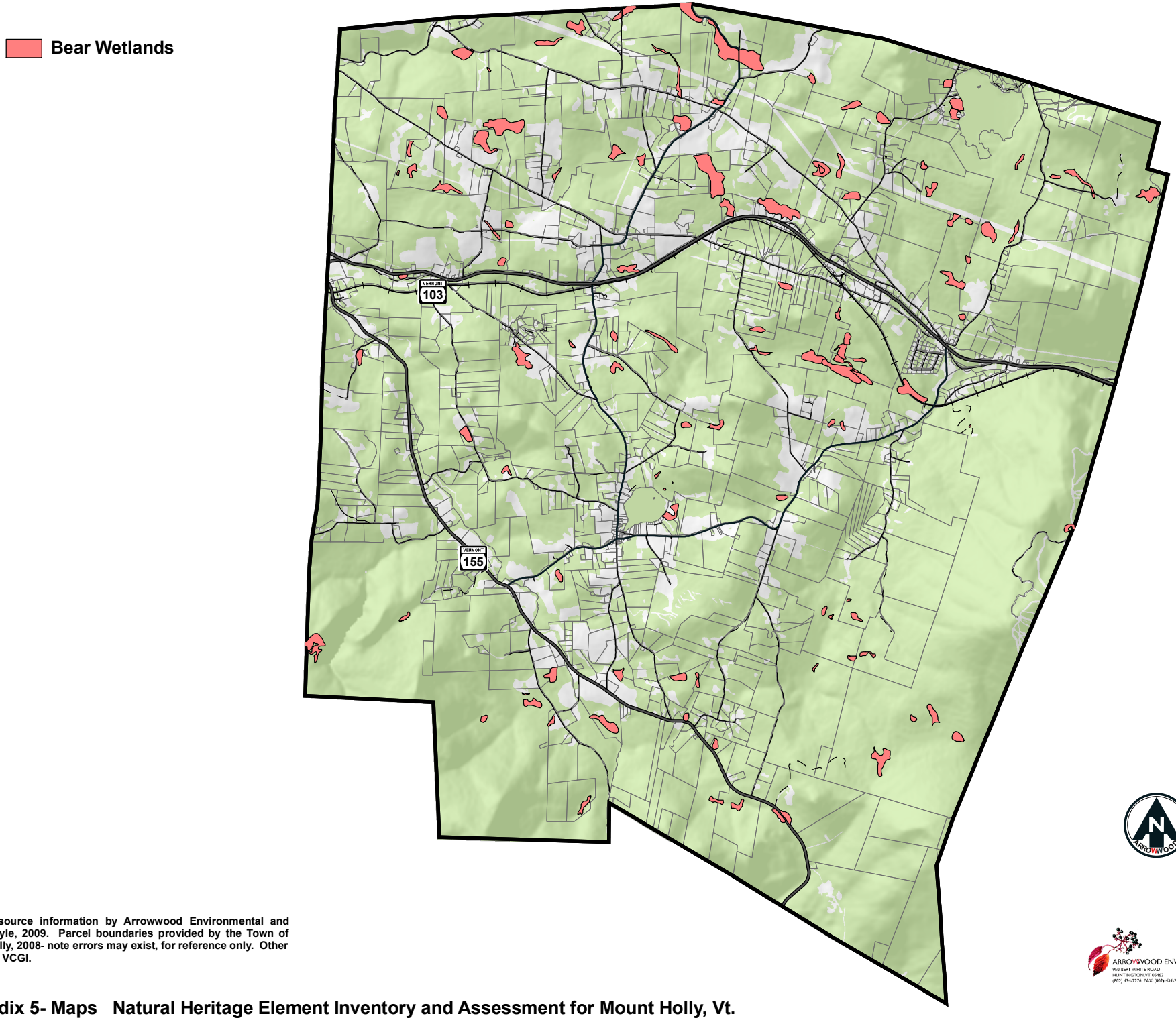

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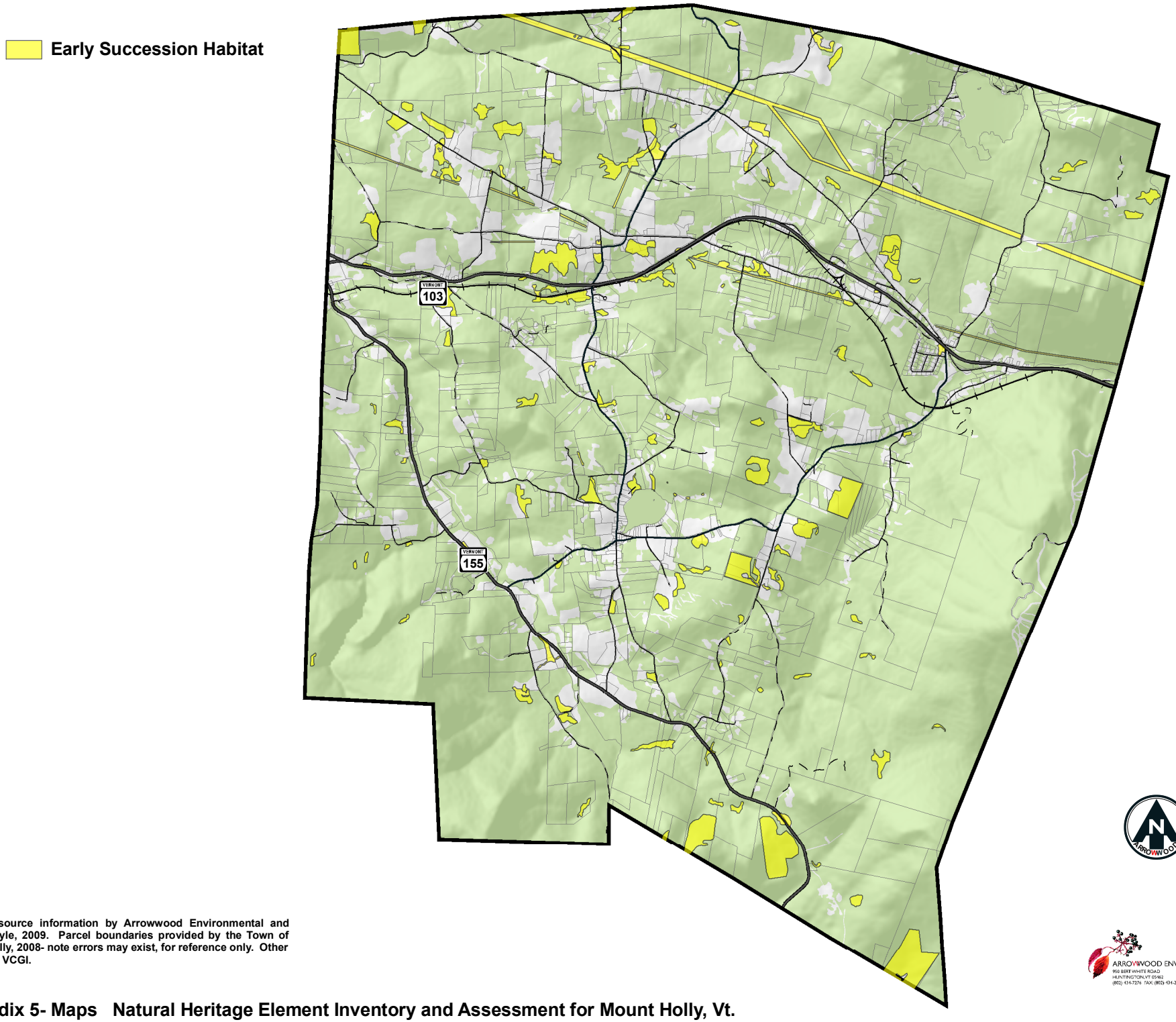
Appendix 5- Maps Natural Heritage Element Inventory and Assessment for Mount Holly, Vt.



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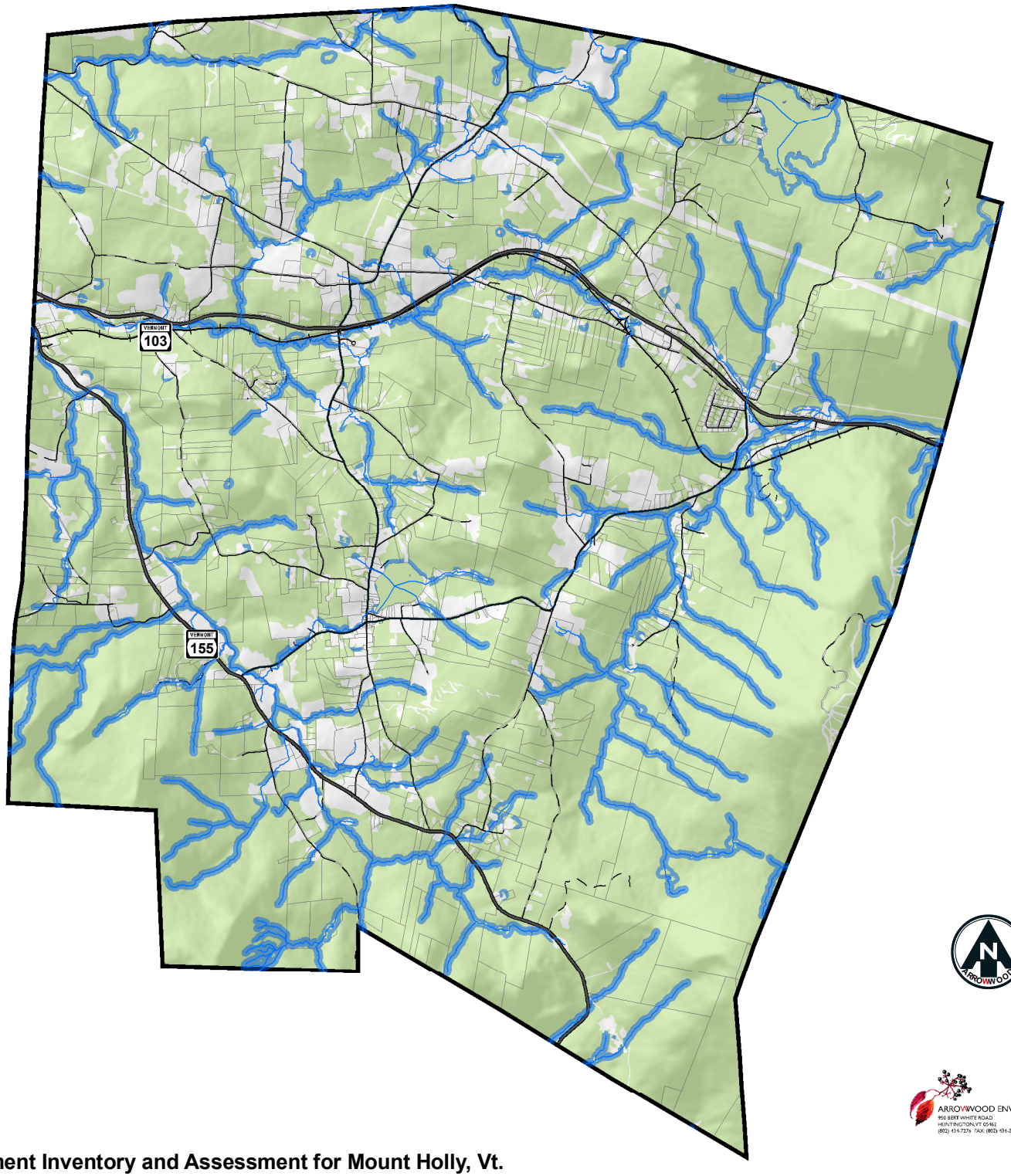
Appendix 5- Maps Natural Heritage Element Inventory and Assessment for Mount Holly, Vt.

Forested Riparian Buffer



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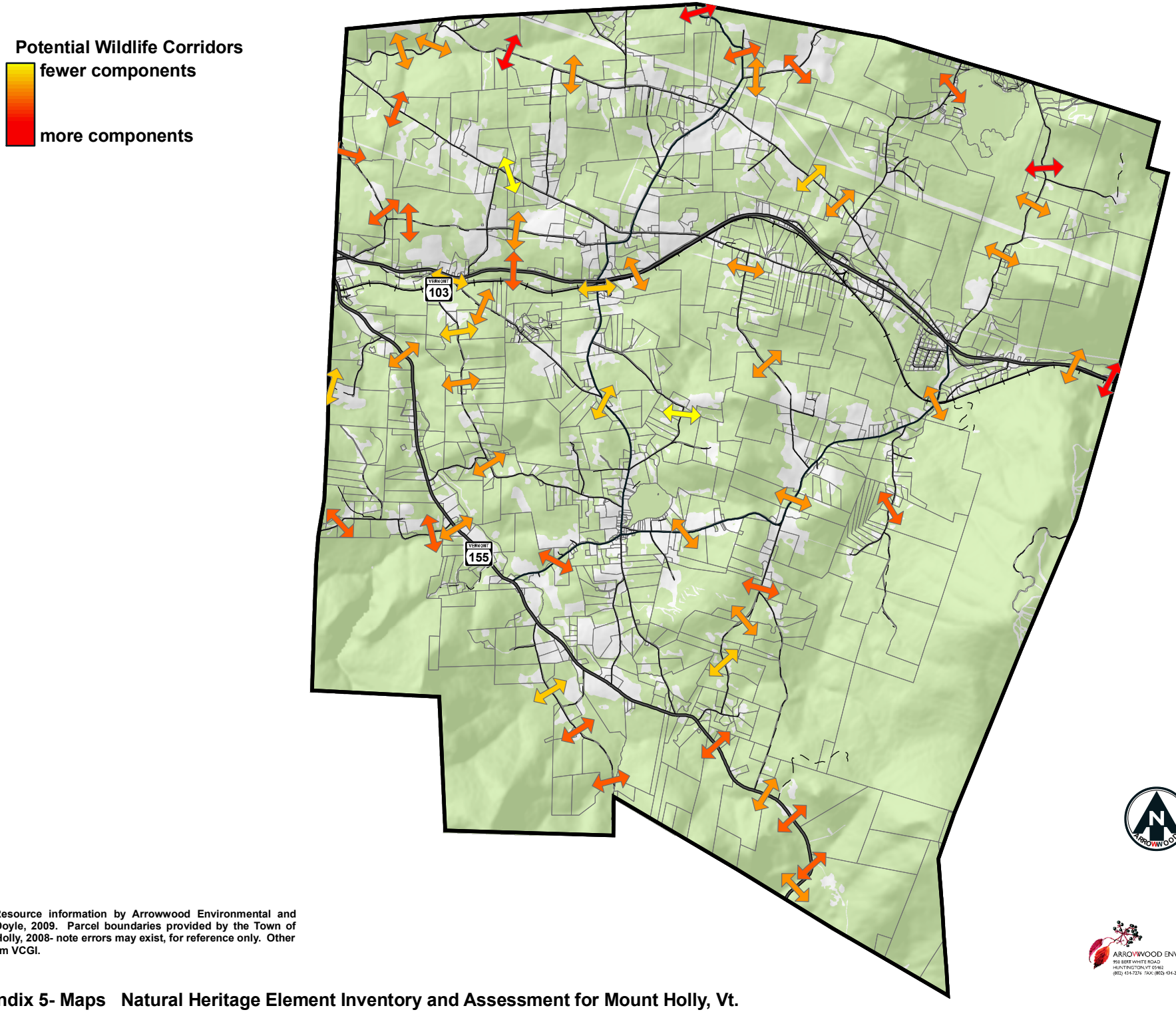

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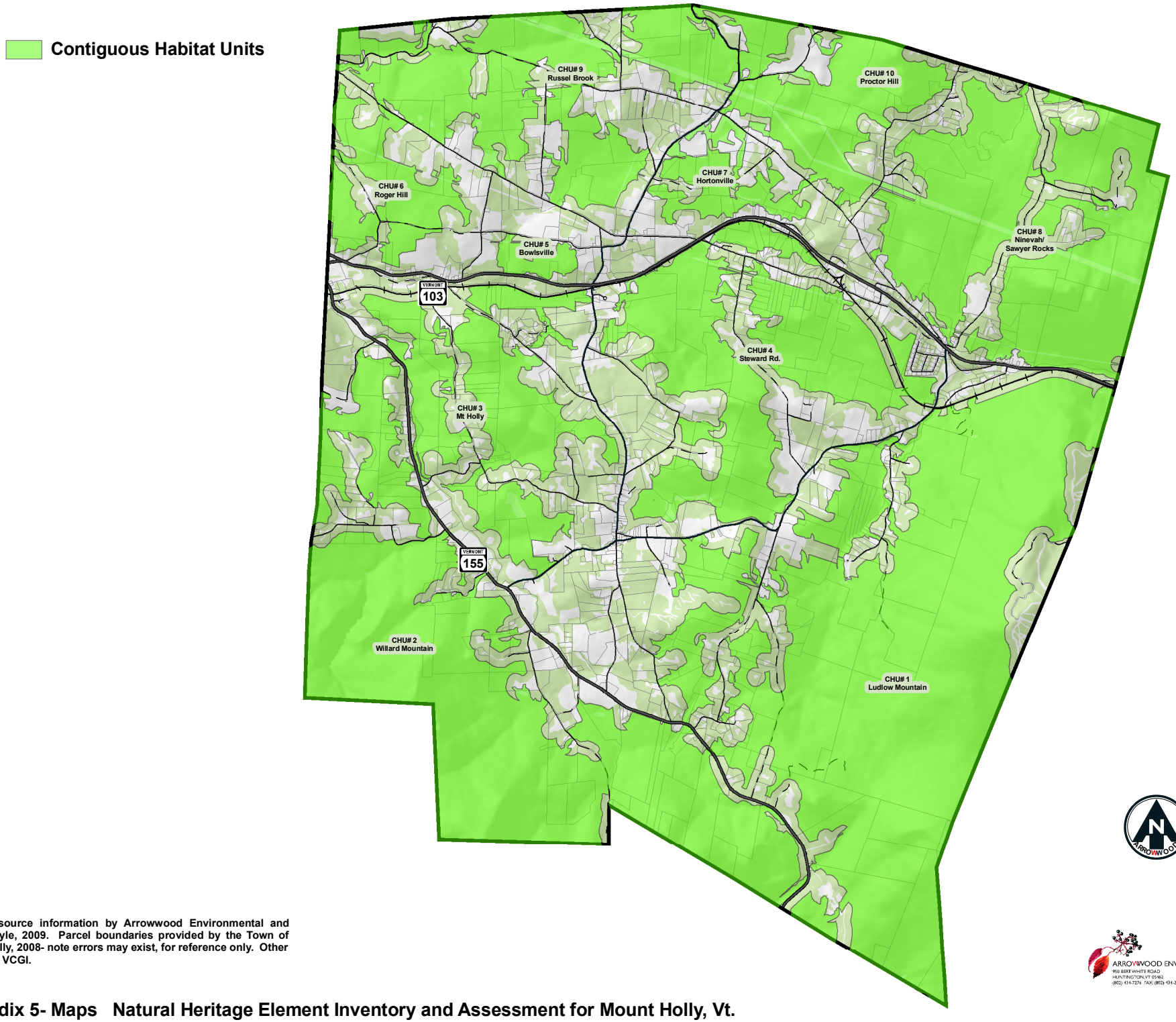

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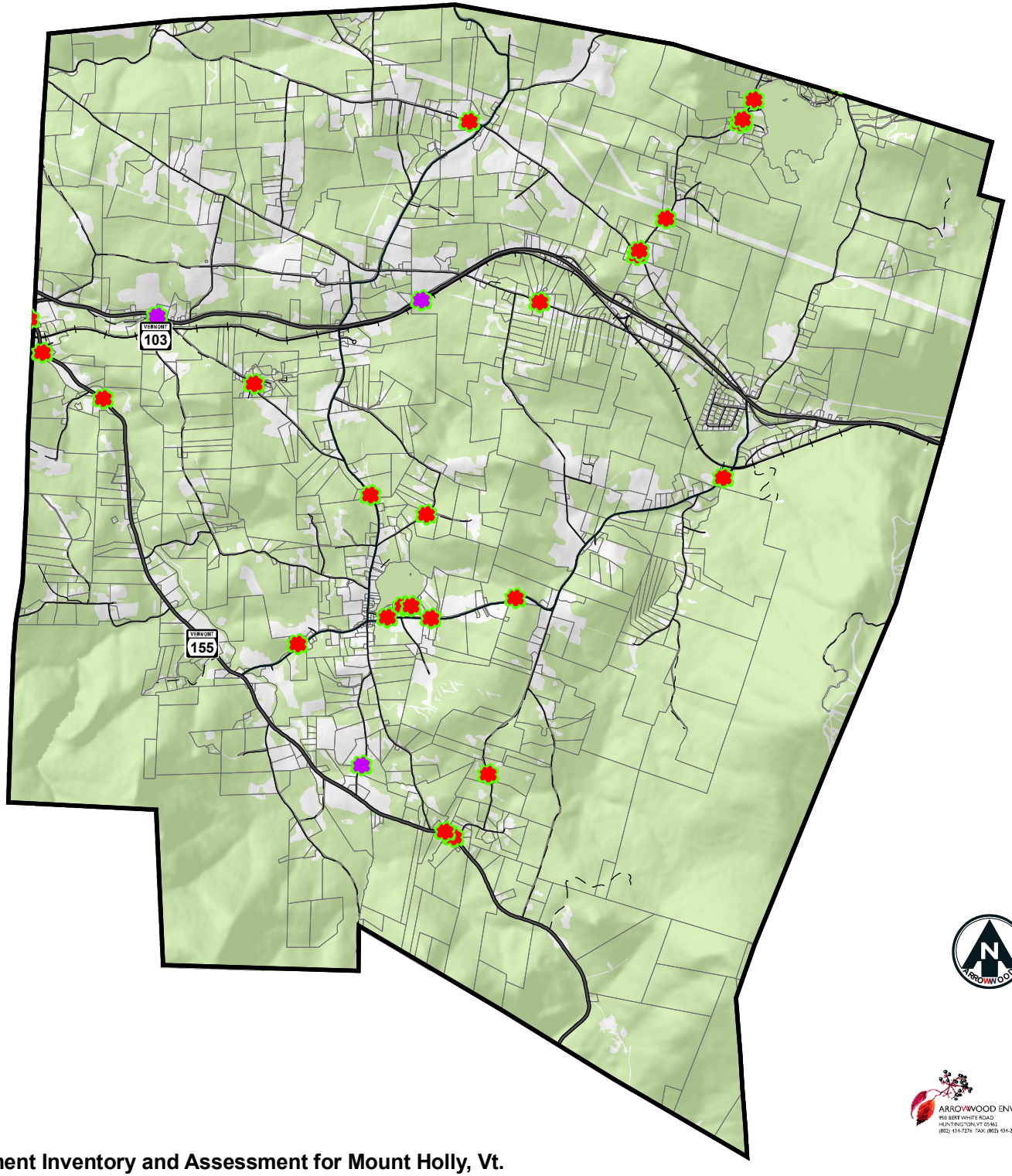
Invasive Species Location

- Japaneese Knotweed
- Common Reed (phragmites)



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