Cabot Ecological Inventory

Prepared for the Cabot Conservation Committee

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Prepared by

Matt Peters
Consulting Ecologist & Botanist
802.456.1051 – East Calais, VT
peters1.matt@gmail.com



Executive Summary

In 2019 the Cabot Conservation Committee and Town of Cabot began pursuing a town-wide ecological, or natural resources, inventory. Local ecological consultant Matt Peters was retained to conduct the study, which was carried out in two phases, initially in 2020, and again in 2024-25. The goals of the study are to enhance knowledge and understanding of the most ecologically significant places in Cabot, to provide information supporting municipal land use planning, and to help residents learn about, enjoy, and steward their place. The study focused on identifying natural communities of state and local significance, noting other significant and sensitive natural features, and providing information on forest blocks and riparian zones. Phase 1 was funded through a Town Meeting Day Grant approved at the 2020 Cabot Town Meeting. Phase 2 was funded with American Rescue Plan Act (ARPA) funds awarded to the Town. Volunteer work by Cabot Conservation Committee members was essential to both phases of this effort. I thank Committee members, participating landowners, and the Cabot community at large for making this work possible. This report encompasses both phases of the study, replacing and superseding the phase 1 report.

The study process involved gathering and analyzing existing geographic and ecological data, maps, and imagery in a process known as landscape analysis to identify and prioritize the best sites for field studies. Conservation Committee members then contacted owners of priority properties to obtain permission for field studies, which only proceeded where permission was granted. Field studies focused on identifying natural communities of state and local significance, and other significant and sensitive features. Phase 1 focused solely on this work, while phase 2 extended field studies to additional sites and added desktop analysis of forest blocks and riparian zones.

The project also emphasized public education and engagement, though these components were greatly reduced during phase 1 due to the Covid-19 pandemic. Public engagement included targeted interviews to solicit community knowledge, virtual and in-person presentations (kick-off and concluding), field walks, and site visits that often involved landowners in mutual knowledge sharing.

Cabot lies at the heart of one the region's most important wildlife linkages – the Worcester to Northeast Kingdom linkage – an area that offers the best remaining connections between some of our largest intact forested lands in the northeast. These connections support the movement and health of animals, plants, and natural communities to ensure the persistence of a vibrant, ecologically functional landscape across our northern forest region. This in turn nurtures healthy and productive human communities. Forest blocks are a valuable tool for understanding and protecting this habitat connectivity and have been mapped by the state's Vermont Conservation Design (VCD). This study built on VCD's foundational mapping, which is presented and interpreted here, with further analysis and updates, through a Cabot-focused lens. VCD maps 21 forest blocks that are defined by continuous natural land cover – that is, they encompass all areas of forest and other natural vegetation or water, unfragmented by roads, agriculture, or development. These blocks span about 73% of Cabot, with the rest being in some form of highly human-altered land use. Within Cabot, block sizes range from 2 to 3,023 acres, with about a third being >1,000 acres, a third 100-1,000 acres, and a third <100 acres. Blocks of greatest importance for large-scale habitat connectivity and wildlife movement are highlighted, along with a summary of many block attributes, such as core habitat, conserved land, wetland, and water areas, vernal pool and exemplary ecological features counts. More extensive ecological description is provided for blocks that had field study.

Landscape analysis yielded 34 'survey blocks' with potentially ecologically significant features. I prioritized 25 of these blocks for field studies based on their greater potential, including about 175 parcels of particular interest. Conservation Committee members used phone, email, in person, and postal mail outreach to seek permission for field work. Across both study phases, permission was granted to access 69 parcels, 14 denied permission, and over half did not respond. Only properties with landowner permission or public access were visited.

During the summer and fall of 2020 and 2024 I conducted rapid ecological assessment fieldwork at 22 survey blocks, including 54 properties where permission was obtained, in parts of most higher priority blocks. The higher priority blocks that were not visited lacked permissions for areas of greatest interest. Most priority properties with permission were visited. A handful of additional properties with permission remained unvisited at the conclusion of phase 2 due to time limitations.

Field studies resulted in documentation of numerous new features of state and/or local ecological significance, such as exemplary natural communities and rare species, including features at every visited block. When combined with pre-existing data, 26 of the survey blocks now have known features of state or local ecological significance. The remaining eight blocks have received little if any field study and many have potential for additional significant features.

Wetlands are abundant across the Cabot landscape, contributing disproportionately to biodiversity and habitat values, as well as to ecosystem services benefiting humans. Compilation of existing state wetland maps, new National Wetlands Inventory (NWI) mapping, and wetland natural communities mapped during this study, reveals that wetlands span around 2,292 acres or 9.3% of Cabot. Of these, 691 acres (2.8% of Cabot) are currently mapped by the Vermont Significant Wetlands Inventory (VSWI) and are protected as significant under the state Wetland Rules - though this statistic will change shortly with coming adoption of the substantial NWI updates. Importantly, unmapped wetlands are also protected if they provide similar functions and values to mapped VSWI wetlands.

Natural communities are interacting assemblages of organisms, their physical environment, and the natural processes that affect them, making them excellent tools for understanding, managing, and conserving important aspects of our natural heritage. About 37 of Vermont's 120 natural community types and variants, are found in Cabot, including 26 wetland and 11 upland types. Twenty are considered rare to uncommon at the state level, including 17 wetland and 3 upland types.

Due to this study, the number of known State-Significant natural community sites or 'occurrences' in Cabot increased from 2 to 28, including 12 different natural community types. Thirty-six additional locally-significant occurrences of 9 more natural community types were also noted, for a total of 64 state and/or locally significant occurrences of 21 natural community types. These include 16 wetland and 5 upland types that are widely dispersed throughout the town. Natural community highlights from this study include an unusual abundance of enriched communities, often associated with the calcareous Waits River Formation bedrock. These include rare Rich and Intermediate Fens and Calcareous Red Maple-Tamarack Swamps, and uncommon Northern White Cedar Swamps, Seepage Forests, and Sweet Gale Shoreline Swamps, as well as Rich Northern Hardwood Forests.

Rare and uncommon plants and animals are unique and important parts of Cabot's natural heritage. Prior to this study, Cabot was known to support 11 occurrences of 7 rare or uncommon species, including 2 state-listed Threatened or Endangered plants. As a result of this study, there are now about 152 occurrences of 70-72 rare or uncommon species known in some fashion. These include 7

state-Threatened or Endangered species. Among the sensitive species (rare, Threatened, Endangered, and uncommon) there are 46-48 vascular ('higher') plants, 18 nonvascular plants (mosses & liverworts), 3 insects, and 3 vertebrate animals. Over two-thirds (50) of these sensitive species are mainly associated with wetlands and aquatic features, underscoring the importance of these areas for biodiversity. There are currently no Federally Threatened or Endangered species known from Cabot, though one known species is under consideration for Federal Threatened status.

I saw 60 of the 70-72 rare and uncommon species during the study, while others are based on records dating back over a century. Particular highlights among the new discoveries include two new-to-New England mosses growing together on a small woodland outcrop. These minute and closely related mosses, known as Donn's Bristle Moss (*Seligeria donniana*) and Tiny Bristle Moss (*Seligeria pusilla*), have an affinity for calcareous rocks, such as Waits River Formation marble layers found in Cabot, and the nearest known sites are far off in western New York. Similarly, Four-Toothed Moss (*Tetrodontium ovatum*), now known from a Cabot hilltop, is a minuscule moss of dark rock alcoves that had not been seen in New England since 1900 until I discovered it in neighboring Marshfield in 2022. The Cabot site is just the third known extant site for it in New England. Among the 'higher' plants, discovery of Wright's Spikerush (*Eleocharis diandra*), a Globally Imperiled (G2) plant only found in the northeast, is especially important. New state-Threatened or Endangered species discovered through both field studies and records research include Bronze Sedge, Marsh Horsetail, Bog Wintergreen, Least Bur-reed, Hooker's Orchid, and the Yellow-banded Bumble Bee.

The overwhelming pattern among Cabot's many rare plant species is an association with enriched, higher pH, calcareous habitats, including rich woods, calcareous outcrops, and enriched wetland and aquatic habitats, such as cedar swamps, fens, and peaty hard-water ponds. The relative abundance of these habitats and their rare species is attributable to the abundance of calcium-rich bedrock, mainly the Waits River Formation's, that underlies much of Cabot. Similar patterns have been found in nearby towns that have been similarly studied, including Marshfield, Hardwick, and Calais.

Finally, generalized management recommendations are made to enhance stewardship of the many significant features found by this ecological inventory, and additional follow-up work is outlined.

As revealed herein, Cabot hosts many fascinating and ecologically important natural features, from vast forest blocks to the tiniest rare mosses. With improved knowledge and awareness, in part provided here, the Cabot community can steward, celebrate, and enjoy this diverse natural heritage.



Figure 1. View from Hooker Mountain across Molly's Falls Pond & Peacham Pond.

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Introduction

This report summarizes the results of a town-wide ecological, or natural resources, inventory for Cabot, VT. The goals of the study are to enhance knowledge and understanding of some of the most ecologically significant places in Cabot, to provide information supporting municipal land use planning, and to help residents learn about, enjoy, and steward their place. The study focused on identifying natural communities of state and local significance, along with other significant and sensitive natural features, as well as providing information on forest blocks and riparian zones, thus helping to fulfill natural resource inventory goals laid out in the Town Plan. This study was carried out in two phases, the first occurring in 2020, the second in 2024-2025 with field studies occurring in 2020 and 2024. The first study phase was funded through a Town Meeting Day Grant approved at the 2020 Cabot Town Meeting. The second phase was funded with American Rescue Plan Act (ARPA) funds awarded to the Town of Cabot. Substantial volunteer work by Cabot Conservation Committee members was essential to both phases of this effort. I thank Committee members, as well as participating landowners, and the Cabot community at large for making this work possible. This report encompasses both phases of the study and replaces and supersedes the phase 1 report (Peters 2020).

Landscape Context

Lying at the headwaters of the Winooski River watershed, Cabot's nearly 40-square mile[1] pastoral landscape of low to moderate elevation hill country sits at a crossroads of regional conservation significance. Cabot lies at the heart of one the region's most important wildlife linkages – the Worcester to Northeast Kingdom linkage – an area that offers the best remaining connections between some of our largest blocks of intact forested lands in the northeast (Figure 2 & Figure 3). This linkage connects the vast forest lands that span the Worcester Range and the spine of the Green Mountains with the expanse of unfragmented forest forming the core of the Northeast Kingdom, and beyond to northern New Hampshire, Maine, and Quebec. These connections support the movement and health of animals, plants, natural communities, and other life to ensure the persistence of a vibrant, ecologically functional landscape across our northern forest region, which in turn nurtures healthy and productive human communities. While conserving Cabot's natural landscape has beneficial effects that reach far beyond its borders, it also supports a myriad of special habitats, plants, animals, and other hot spots of biological diversity right here in Cabot, and it is these features that were the main focus of this study.

As we try to understand the patterns on the land, why and where natural communities, plants, animals and other creatures are, as well as why and where farms, villages and roads are, it is often helpful to know the broader landscape context and underlying features of the land. The following discussion broadly reviews and synthesizes a number of 'layers' of the landscape, including bedrock, soils, topography, hydrology, and land use history, to provide this context.

Cabot lies in the heart of the Northern Vermont Piedmont biophysical region, which spans from neighboring Woodbury east to the Connecticut River valley and from southern Orange County north to the Canadian border, excepting the Northeastern Highlands in the core of the Northeast Kingdom. Biophysical regions are large areas, nine in the state, of broadly similar climate,

[1] 24,583-acres or 38.4 sq. miles

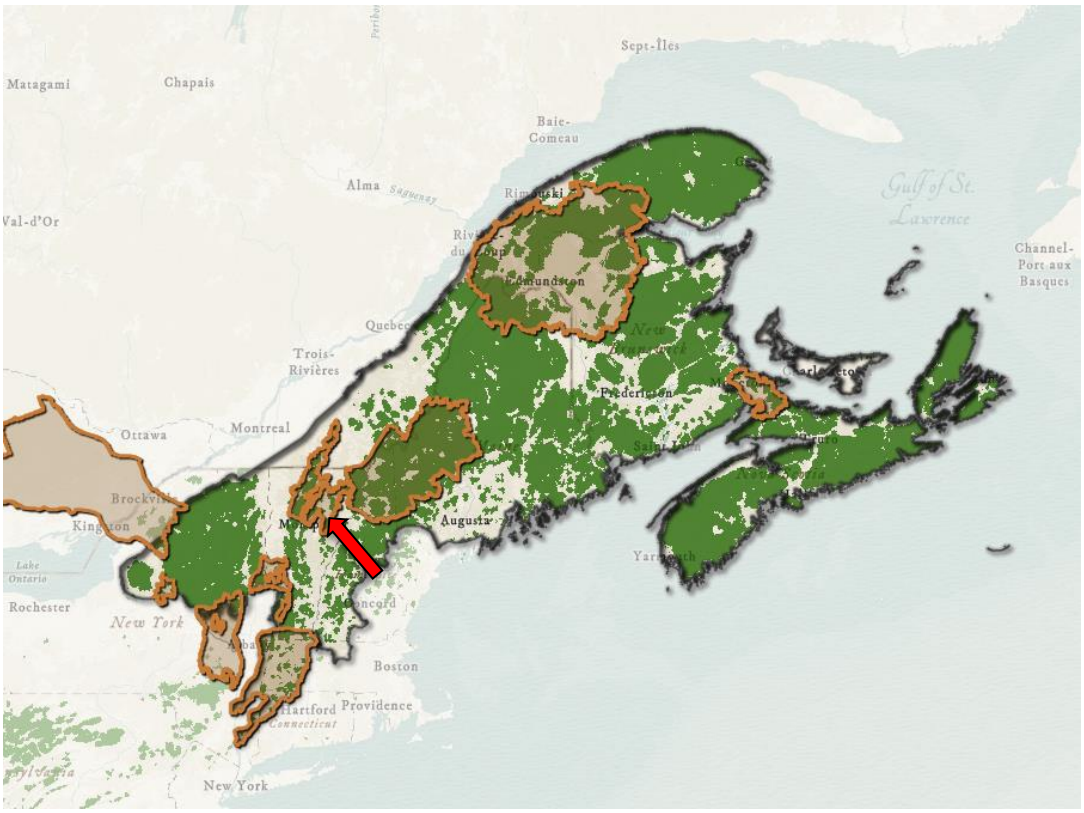


Figure 2. Priority Wildlife Linkages of the Northern Appalachian-Acadian Region. Ten priority linkages in brown. Cabot (indicated by the red arrow) is in the Worcester to Northeast Kingdom Linkage; green indicates the most extensive intact forestlands. Map courtesy of the Staying Connected Initiative.

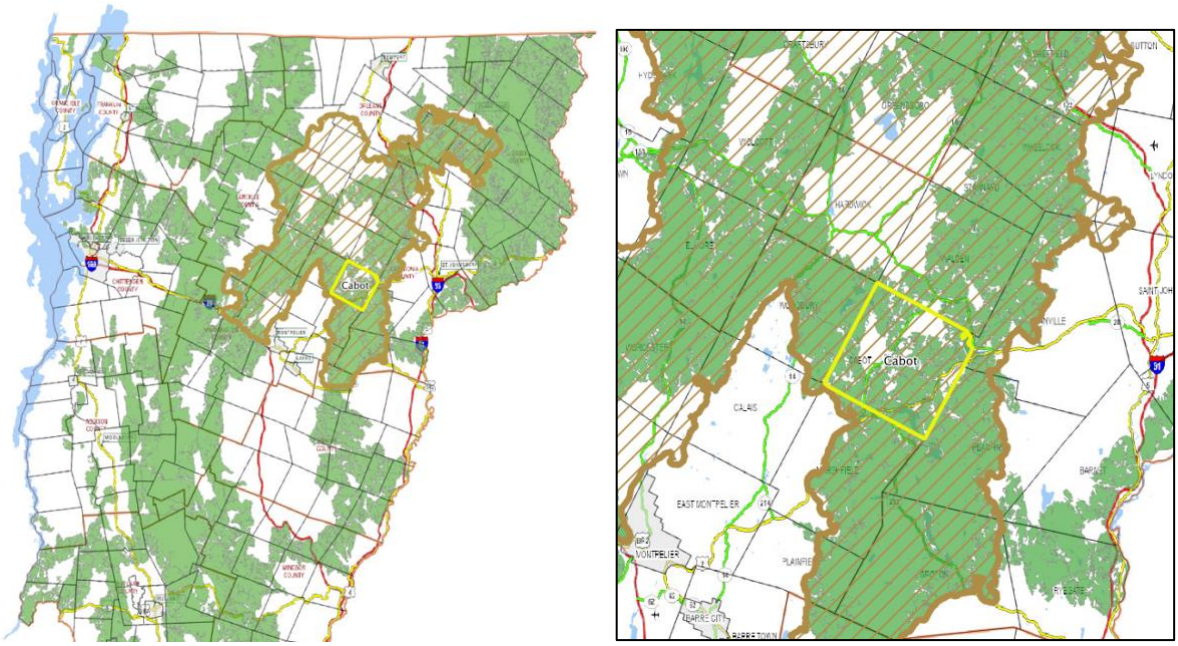


Figure 3. The network of highest priority forest blocks for habitat connectivity (in green) to maintain an ecological functional landscape, as mapped by Vermont Conservation Design. Cabot lies at a connectivity crossroads in the regionally important Worcester to Northeast Kingdom linkage (in brown).

landforms, and physical landscape attributes. Here, the climate is typically cool and moist, leading to a predominance of Northern Hardwood Forest Formation natural communities with little or no presence of oak, hickory or other associated species of warmer regions like the lower Connecticut River or Champlain valleys. All of Cabot can be characterized as low to moderate elevation hill country cut by numerous small stream valleys – the definition of 'piedmont' terrain.

Cabot is underlain by three main bedrock types shown in Figure 4. The Waits River Formation and Gile Mountain Formation provide a foundation of metamorphic rock underlying most of the town. These are about 420-million-year-old ocean bottom sediments that were compressed and folded and welded onto the North American continent by ancient continental collisions. Platy, shiny, schist and

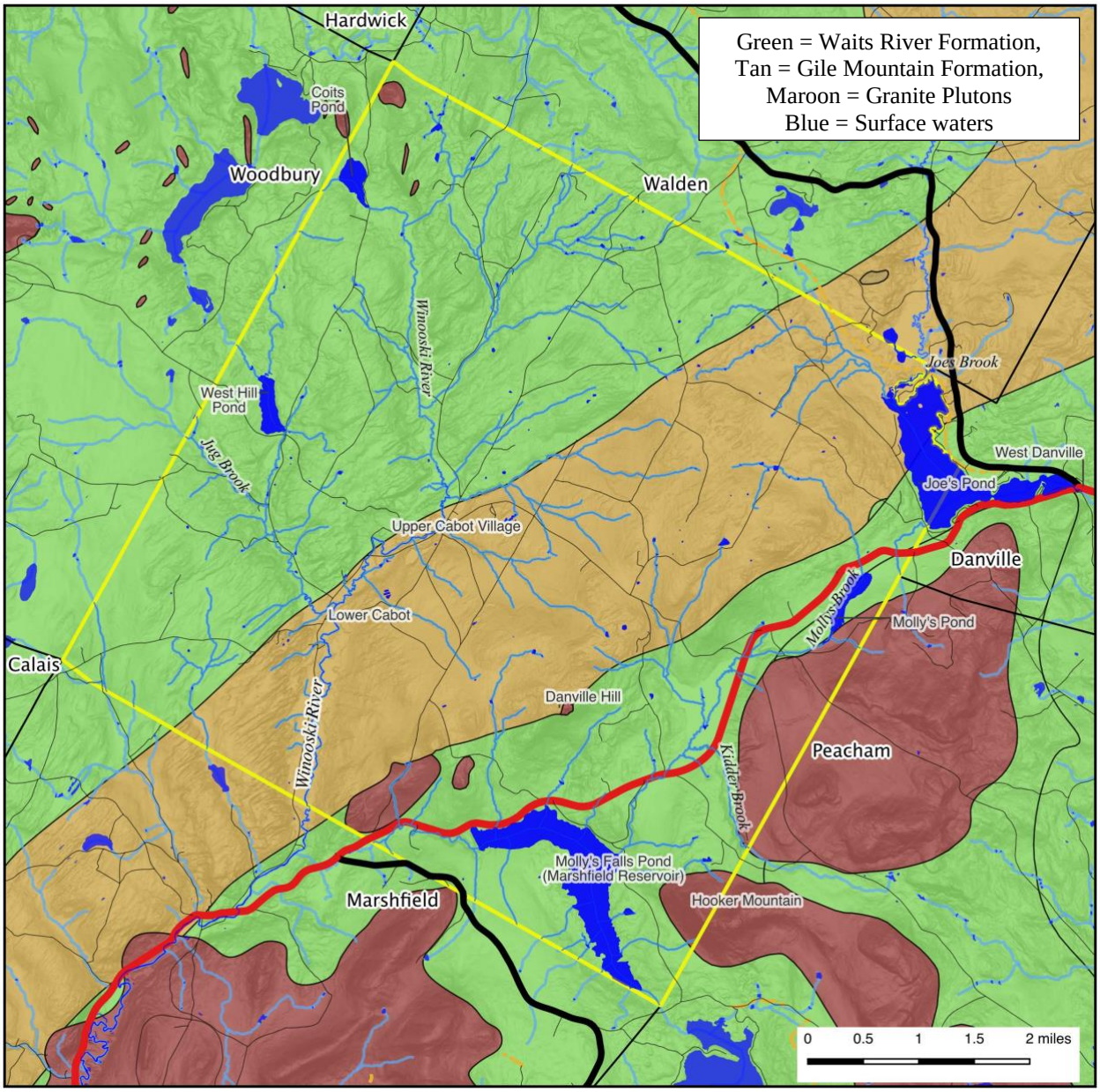


Figure 4. Bedrock Geology of Cabot, VT.

phyllite rock types are predominant, but the Waits River Formation rocks also include bands of brownish marble-like rock that is richer in important plant nutrients, especially calcium, that directly relate to both the presence of distinctly 'enriched' natural communities and more favorable soils for agriculture. In Cabot these two bedrock types are not strongly differentiated on the ground in terms of associated landforms and ecological features; however, the Waits River Formation region does appear to have a higher concentration of enriched plant communities, especially wetlands. This is expected based on the general bedrock chemistry and likely also relates to subtle topographic patterns created by the somewhat softer Waits River Formation rock. These widespread metamorphic rocks are punctuated by numerous smaller bodies of granitic rocks known as plutons, that form the cores of some of the larger hills, such as Hooker Mountain. These plutons are ancient bodies of magma that pushed up into the overlying rocks derived from ocean bottom sediments roughly 400 million years ago, cooled and hardened, and then were subsequently exposed through geologic uplift and erosion.

The soils (Figure 5) in Cabot are mainly derived from glacial till, as is typical in Vermont. There are substantial areas of dense till of the eponymous Cabot soil series and other related soils, which are often associated with an abundance of seepage forests and other wetlands. Relatively small areas of organic peat and muck soil deposits have built up in wetlands since the time of glaciation. The largest organic soil areas are at the north end of Joe's Pond and in Molly's Brook Swamp, though many smaller pockets are scattered throughout town. The lower part of the Winooski River valley in Cabot has a concentration water-sorted soil deposits. These include both recent alluvial (river deposited) soils and glacial era river and lake deposits of silts, sand, and gravel deposited where glacial meltwaters emptied into the proto-Winooski valley forming small deltas into the long vanished Glacial Lake Winooski. This massive water body once filled the Lamoille and Winooski River valleys and major tributaries to about the Elm Street bridge in Cabot village, as shown in Figure 5. These geologic and hydrologic origins result in flatter topography and water-sorted stone-free soils that are highly conducive to agriculture and other human uses, including the concentrated settlements of Upper and Lower Cabot villages. Correspondingly, this region has been the most intensively used and is the most altered from natural conditions, but continues to foster some unique and important ecological attributes not found in other parts of the town.
Notable hills line the US Route 2 corridor include Danville Hill, Joe's Hill, Thistle Hill, and Hooker Mountain, while other hills referenced by road names are often broader and less well-defined elevated regions. These include Bothfeld, Burbank, Cow, Houston, West, and Whittier Hills, along with several others that seem to lack widely known names. The highest elevation in Cabot is about 2,241 feet at the summit of the unnamed hill northeast of Danville Hill, while the Winooski River exits into Marshfield at a low elevation of about 870 feet.

Cabot includes parts of three major watersheds. Most of the town lies at the headwaters of the Winooski River watershed, draining to the Lake Champlain Basin and hence out the St. Lawrence to the sea, while the northeast corner of town drains via Joe's Brook to the Passumpsic and Connecticut Rivers and south to the Atlantic Ocean. Tiny areas along the Walden town line drain northward via tributaries of Haynesville Brook in the Lamoille River watershed. Apart from the Winooski River below Cabot village, the drainage network consists of many smaller headwater streams, including Joe's, Jug, Kidder, and Molly's Brooks, as well as numerous smaller, unnamed streams. Cabot has a handful of larger named ponds. Most visible are Joe's Pond, Molly's Falls Pond (AKA Marshfield Reservoir) and Molly's Pond along US Route 2, while West Hill Pond and Coits

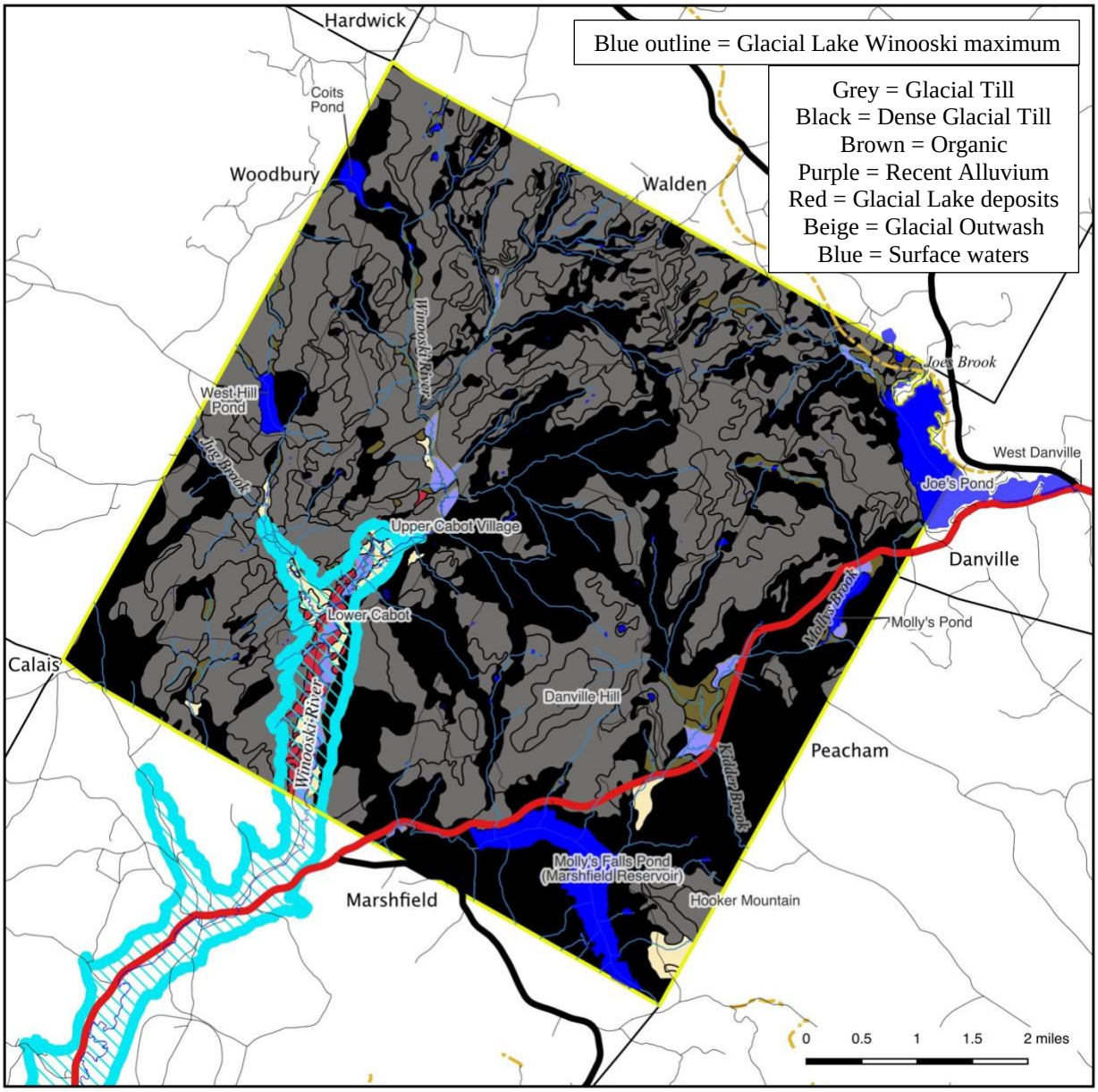


Figure 5. Soil Parent Material & Glacial Lake Winooski Maximum for Cabot, VT.

Pond are largely out of sight among the back roads. Coits Pond is often touted (though perhaps disputedly) as the source of the Winooski River. The Marshfield Reservoir is an artificial impoundment supplying a hydropower plant near the mouth of Molly's Brook in Marshfield, via a long penstock. Joe's Pond and West Hill Pond are also enlarged by dams at their outlets. Coits Pond may also be slightly raised by impounding effects of the road bed and culvert at its outlet. Molly's Pond appears to be a naturally maintained pond with only beaver dams altering its water levels, though it was not visited to confirm. There are myriad other small, unnamed waterbodies, mainly beaver ponds and artificial ponds. No major waterfalls are known in Cabot, though there are several small falls and bedrock cascades. On the Winooski River, these include a small falls/ledge drop at the old mill site just upstream of Saw Mill Road and short bedrock cascade behind the town recreation fields just below the large wet meadow along South Walden Road near the new fire station. There is also a small hidden 8-10ft falls and mill ruins along the outlet stream from West Hill

Pond. These falls and other mill sites in the village and around town once fueled Cabot's industries, with even small streams such as the drainage south of the Cabot Air Field and Ducharme Road once powering mills.

In addition to this small-scale industrial history, Cabot, like most of the region, has an extensive history of agricultural clearing followed by reversion to forest. This land use history is an important force overlying the enduring aspects of geology, soils, and topography to shape Cabot's current ecological landscape and the patterns we see on the land today. Like most of Vermont, Cabot's landscape was substantially more open even 50 years ago, and certainly 150 years ago. With its relatively gentle topography, there are few, if any, parts of the Cabot landscape that have not been subject to past agricultural clearing, sugarbush management, or at least multiple cycles of timber harvesting. Some of the more steep, rugged, and rocky hill slopes, such as those of Danville Hill above Route 2 and Hooker Mountain have likely remained continuously forested and support some of the more mature forests in town today. Similarly, larger wetlands such as Molly's Brook Swamp, and the extensive complex at the northwest end of Joe's Pond also have areas with less history of human manipulation. While reforestation and agricultural abandonment have allowed native species to return to greater portions of the landscape, the signs of past use remain hidden in the forests. Clues to past use go beyond the obvious old stone walls, mill ruins, and granite quarries, to include old field white pines, gnarly open grown sugar maples, wet pasture reverting to dense cedar seepage, and other signs for those that learn how to read them.

Methods

Landscape analysis and ecological field surveys are the core methods used in this project. Additionally, desktop analysis of forest blocks and riparian buffers was done, building on the foundation of state-produced mapping through the Vermont Conservation Design (VT ANR 2023). The landscape analysis process involves gathering and analyzing existing information from a variety of databases and information sources to remotely identify features of interest and prioritize areas for fieldwork. Information sources included public geographic base data such as bedrock, soils, hydrologic, topographic, and wetland maps; aerial imagery; and vernal pool and natural heritage databases for rare and uncommon species and natural communities. This information was compiled in a GIS (geographic information system) platform to facilitate analysis and mapping. Local knowledge can also be an important information source for studies of this nature and was gathered through targeted interviews, an in-person map session at the 2024 public kick-off presentation, and informal discussions with participating landowners. I also reviewed the growing network of online biodiversity data sources to find crowd-sourced observations and museum specimen data relevant to the study. In particular, I reviewed online database records of about 300 plant specimens collected in Cabot (CNH 2025, SERNEC 2025, SEINet 2025), as well as about 2,500 iNaturalist.org observations from the town. These were useful sources of information yielding additional rare plant and invertebrate sites and leads on natural communities of interest (albeit amid a large volume of common species observations).

The main output of the landscape analysis process, which was largely completed during phase 1 in 2020, was a map of 34 survey blocks created by manual (visual) review of the entire Cabot landscape. These survey blocks roughly approximate the forest blocks, discussed below, but were used as 'bins' to group or cluster information about finer-scale potentially ecologically significant features, which could then be prioritized for field studies. This survey block list, annotated with

descriptive information and prioritized for field studies, is presented in Appendix B. It was used to guide landowner contacts and resulting field studies during both project phases. It also provides terse description for forest blocks not discussed in more detail elsewhere in the body of this report. Landowner information for sites of interest was compiled from statewide parcel maps with associated Grand List data. This was provided to Cabot Conservation Committee members who contacted owners of priority parcels for permission to visit their land. I visited only priority areas where landowner permission was obtained.

Field studies involved documenting the ecological characteristics of sites via a walking route designed to capture the diversity of landscape features and natural communities of interest. Annotated waypoint and track information was recorded using a smartphone-based GPS receiver. Extensive field notes were recorded characterizing the sites, including species composition, vegetation structure, natural community type, soils, and any rare species encountered. Natural community identification follows the current Vermont classification system in *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (Thompson et al. 2019), and their assessment and ranking follows established protocols of the Vermont Natural Heritage Inventory (VNHI) in the Vermont Fish and Wildlife Department. Rare species documented are those considered rare or uncommon on current state lists (VNHI 2022, 2024), particularly the "Rare and Uncommon Native Vascular Plants of Vermont" list and the comparable nonvascular plant list, "Vermont Bryophyte List" (Allard 2025).

During phase 2, subsequent to the landscape analysis, survey block mapping, and field studies, I also conducted a remote assessment forest blocks and riparian zones. The forest blocks, also known as habitat blocks, presented and interpreted herein are products of the Vermont Agency of Natural Resources' *Vermont Conservation Design (VCD)* (VT ANR 2023), as updated and released in 2024, after the creation of phase 1 survey blocks. These forest blocks are defined by continuous natural land cover – that is, they encompass areas of forest and other natural vegetation or water, unfragmented by roads (class 3 or better), agricultural fields, or other development. The 2023 VCD update employs high-resolution, LiDAR-derived landcover data to improve mapping accuracy and resolution. These forest blocks are important for land use planning and are central to thinking about habitat connectivity and the movement of wildlife and species across the landscape over time. For more details on VCD's methodology for defining and mapping forest blocks and their attributes see the BioFinder documentation[2]. The Cabot-specific analysis of forest block attributes, done here, included summary of Core Habitat ('Core Forest') areas created following VCD methods (an internal 200m buffers of forest blocks); summary of wetland areas using recent National Wetlands Inventory mapping updates and project field data; summary of vernal pool, exemplary natural community, and rare and uncommon species data including field data, database records, and Vermont Vernal Pool Mapping project 'potential' and 'confirmed' pools; summary of stream and open water areas from the Vermont Hydrographic Dataset (VHD); and conserved lands from the Vermont Protected Lands Database.

Vermont Conservation Design data layers were also used to conduct a rapid desktop analysis of riparian zones, mapping and assessing riparian buffers to identify opportunities for restoration. For the analysis, I took the VCD 'SurfaceWaterRiparian' zone layer, which encompasses all surface waters, their buffers, and valley bottom landform areas, then subtracted areas that overlap with

[2] https://anr.vermont.gov/sites/anr/files/documents/VCD%20documentation%20for%202023%20update.pdf

VCD's forest blocks, which essentially include all areas of natural vegetation plus surface waters. The result is a map of those parts of the riparian zone (as defined by VCD) that lack natural vegetation.

Inventory Results

Forest Blocks

Forest blocks, also known as habitat blocks, encompass all areas of unfragmented natural habitat across the landscape, including forests, naturally open or shrubby habitats, and open waters. They are bounded by roads, development, and agriculture. Examining the shape, size, and location of these blocks provides valuable perspectives for land use planning and conservation to ensure the maintenance of an ecologically functional landscape that supports habitat connectivity and the full spectrum of biodiversity. Habitat connectivity refers to the capacity for plants, animals, and other species to move across the land, including both short- and long-range movements over differing time spans. This encompasses everything from daily travels to seasonal migrations or dispersal, to long-term movements or range shifts of plants and animals in response to climate change or other major habitat shifts.

In addition to specifically supporting wildlife, maintaining intact forest blocks is what's known as a 'coarse-filter' conservation strategy. This is an approach whereby larger, easily recognized and mapped features create an umbrella, ensuring the conservation of a vast array of habitats, plants, animals, fungi, and other life, without needing specific consideration or knowledge of all those 'finer-scale' biodiversity features, many of which we know little or nothing about. Forest block conservation supports many widely recognized ecological, social, and economic values.

For these reasons, forest blocks have been mapped statewide by the Vermont Fish and Wildlife Department and its partners in a large-scale conservation planning effort known as the Vermont Conservation Design or VCD (VTANR 2023). This recently updated, high-resolution mapping is used as the basis for this discussion and provides the foundation for municipal planning requirements around forest blocks stemming from Act 171. These blocks are shown and numbered in Figure 6 below and the blocks deemed Highest Priority for connectivity by VCD are shown in Figure 3. Vermont Conservation Design's mapping and component data layers can also be viewed interactively in the state's BioFinder mapper website[3]. Table 1 provides a forest block summary characterizing many component attributes, including core forest, conserved land, wetland, and open water areas, as well as counts of vernal pools and exemplary features (rare species and natural communities), and VCD priority ratings for all of Cabot's 21 forest blocks.

As noted previously, Cabot sits at a crossroads for habitat connectivity within the regionally important Worcester to Northeast Kingdom wildlife linkage, providing one of two primary routes for longer range wildlife movements and habitat connectivity across northeastern Vermont (Figure 3). Looking closely, we can see the main opportunities for west to east connection across the region run through Cabot from Woodbury, across the northern part of town, past Coits Pond, through blocks 3 and 7 and then turning north through Walden. An alternative connection lies across the southern part of Cabot, through blocks 6, 9, 5, & 4, before turning south through the Groton State Forest region with connections south to the Upper Connecticut River Valley. There is also a main

[3] https://anrmaps.vermont.gov/websites/BioFinder4/

north-south connectivity pathway through the eastern side of Cabot from Walden past the west end of Joe's Pond through blocks 10, 1, 2, & 4, over Danville Hill and past Molly's Falls Pond to the Groton State Forest region and beyond. The full network of blocks considered Highest Priority for habitat connectivity in a statewide perspective includes blocks 1-7, 9, 10, 13, 16, 19, and 21, collectively encompassing 63% (15,434 acres) of Cabot. To maintain large-scale connectivity, it will be particularly important to maintain the unfragmented cores of these blocks as well as the specific connections between them. These specific connecting places are the places where natural habitat, generally forest, is intact on both sides of a road or other block defining feature. Other forest blocks not part of this highest priority network also have important supporting roles, but are less likely to provide the critical pathways for movement based on current land cover.

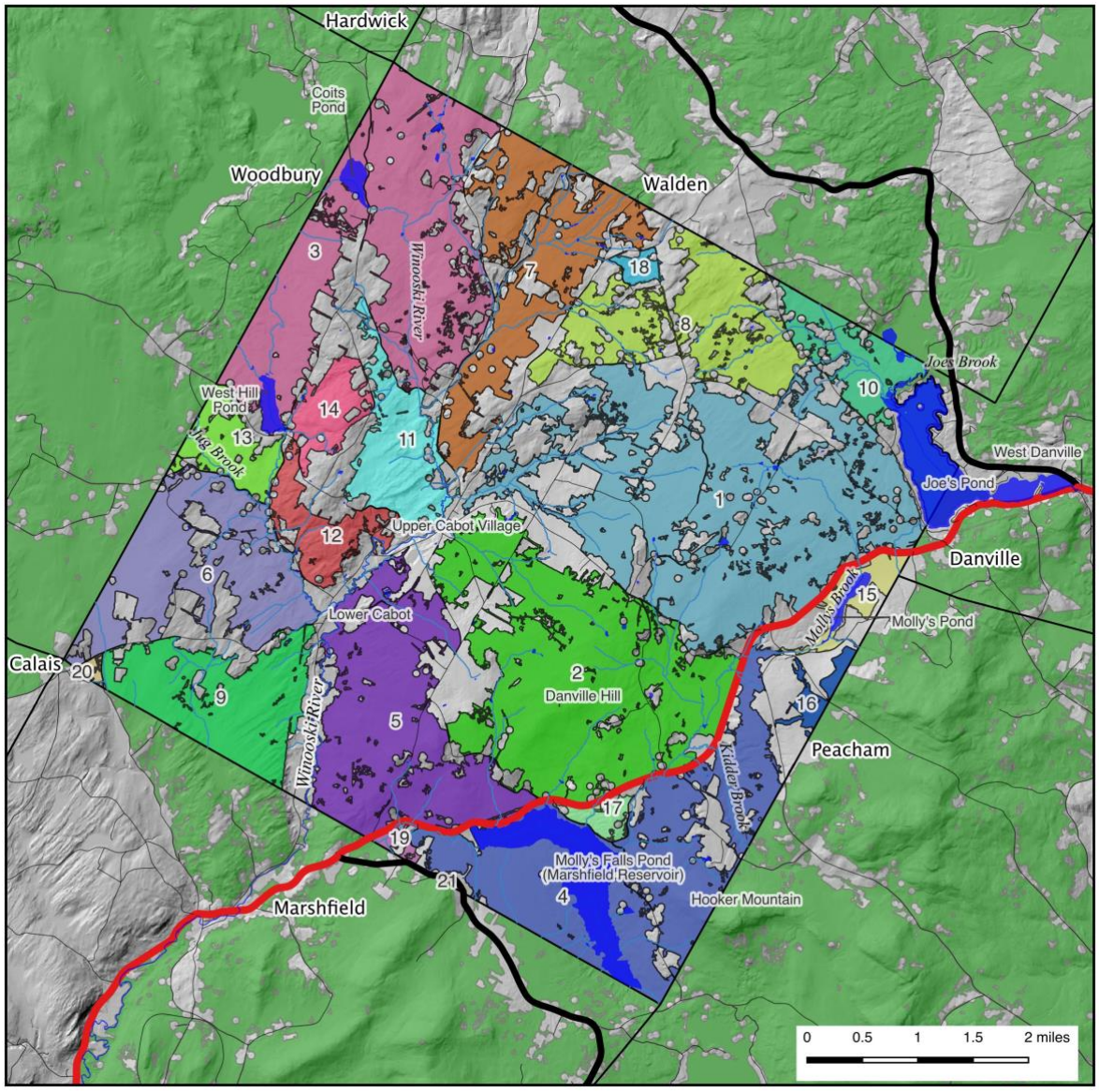


Figure 6. Forest Blocks of Cabot, VT.

Forest blocks as mapped by Vermont Conservation Design (VCD). Blocks are numbered by decreasing size within Cabot (i.e.,1 is largest, 21 smallest). Green blocks outside of Cabot show only the Highest Priority blocks for habitat connectivity.

Forest blocks also provide valuable perspectives on the local landscape scale. Cabot's 21 mapped forest blocks span about 17,839 acres or 73% of town, with the remainder of the town's nearly 25,000 acres being in some form of highly human-altered land use. Within Cabot, block sizes range from 1.9 to 3,023 acres with a third of the blocks being over 1,000 acres, about a third being less than 100 acres, and about a third in between, from 100 to 1,000 acres. These blocks are predominantly forested, with smaller areas of naturally open wetlands or water. Agricultural, open, and developed areas also have ecological and natural resource values, but they are typically lower or different from that of natural habitats and don't typically provide the same broad suite of 'coarse filter' conservation benefits supporting many native species, habitats, and ecological processes. Despite the fairly high area in natural cover, only about 2,884 acres (16%) of the forest block area is considered Core Habitat, or less than 12% of all Cabot lands. Core Habitat is interior forest, greater than 200 meters from an edge or interior block fragmenting feature, that provides conditions buffered from human disturbances. Highly irregularly shaped, long, narrow, and internally fragmented blocks support little or no core habitat conditions relative to larger, rounder blocks without internal fragmentation (openings). Thus, the modest amount of core habitat in Cabot overall is a result of a fairly high degree of internal block fragmentation and correspondingly irregular block shapes, all related to the relatively gentle landscape that supports widely distributed road and settlement patterns. About 2,275 acres (13%) of the forest blocks are presently conserved in some fashion, representing 9.3% of all Cabot lands. All conserved lands, including additional agricultural lands, span about 3,098 acres or 12.6% of Cabot[4].

The largest blocks, 1-7, greater than 1,000 acres each, include those around Molly's Falls Pond, Danville Hill and those immediately north and south, Coits Pond and the upper Winooski River, the adjacent block east of South Walden Road, and the block extending southwest from Jug Brook. It is worth noting that some blocks with small areas within Cabot are very extensive beyond; for example, the smallest block within Cabot (#21 at 1.9 acres) is actually by far the largest block at its full extent, which reaches nearly 46,000 acres and stretches south in uninterrupted forest to Route 302 in Orange and Topsham. Depending on the purpose, the within town area or full extent may be more appropriate to consider, both figures are given in Table 1. Only blocks 2, 11, 12, 17, and 18 are completely within Cabot's boundaries.

A number of blocks have particular local significance. Blocks 3 and 4 in the northwest and southeast corners of town are particularly significant for their combinations of substantial core habitat, larger size within Cabot, and greater than 10,000-acre full extent, reaching far beyond Cabot. Block 3, in the northwest surrounds Coits Pond, West Hill Pond, and over 2 miles of the uppermost section of the Winooski River, providing highly important riparian and water quality protections including flood mitigation. This block also supports the single largest collection of exemplary natural community and rare species features currently known from Cabot, with nearly a third of the total occurrences, which are largely tied to the abundance of wetland, riparian and rich forest habitats found there. Block 10, surrounding Joe's Brook and Joe's Pond supports the second largest concentration of known exemplary natural community and rare species features as well as hosting beloved and heavily used recreational assets and providing critical north-south habitat connectivity. Block 2, surrounding Danville Hill, has the second largest core habitat area in town and provides critical north-south habitat connectivity. Block 1, anchored on the unnamed hill between Danville Hill and Joe's Pond and spanning from Route 2 west to Upper Cabot village, is the single largest

[4] Based on analysis of current Vermont Protected Lands Database mapping.

block by within-Cabot acreage, and does provide critical north-south habitat connectivity. However, it is important to note the vulnerability of this block. It will be relatively easy to lose the important connectivity functions of this block due to its highly irregular shape with extensive internal fragmentation along its many included minor roads. It is important to maintain or reinforce the connections between the many outlying parts of this block in the face of increasing pressures for development. These and other High Priority Connectivity Blocks will be especially important to consider and protect through ongoing town planning. Many of the smaller blocks not specifically discussed here also have important supporting roles for connectivity; their many attributes are also presented in Table 1. Map data for Cabot's forest blocks accompanies this report in the shapefile "Cabot_ForestBlocks_clipped.shp".

Table 1. Summary of Forest Block Attributes for Cabot, VT.

Blocks are as defined and mapped by Vermont Conservation Design (VTANR 2023) and are ordered by decreasing size within Cabot. Figures represent the Cabot portions of all blocks (calculated by author), except those in ( ) represent the entire block, including portions beyond Cabot (calculated by VCD). Block Priorities: HP= High Priority, P= Priority.
*Exemplary Features include all known 'element occurrences' or EO's of rare and uncommon species and State-Significant natural communities tracked by the Vermont Natural Heritage Inventory (VNHI). Cabot figures for these EO counts and vernal pool counts are altered (mostly increased) by this study's results, which are not reflected in VCD-calculated block totals. Cabot figures for Wetland Area and % also include recent mapping updates (NWI and this study) not captured in VCD-calculated figures.

Cabot Block #	Block Size (ac)	Core Forest Area (acres)	% Core Forest	Conserved Land Area (acres)	% Conserved	Wetland Area (acres)	% Wetland	Open Water Area (acres)	% Open Water	Stream Miles	Stream Miles/ Square Mile of Block Area	# of Vernal Pools	# of Exemplary Features*	VCD Connectivity Block Priority	VCD Interior Forest Block Priority	VCD Geological Block Priority
1	3,023 (3,035)	255 (251)	8 (8)	390	13 (13)	261	9 (1)	8	0.3 (0.2)	12.0	2.5 (2.5)	0 (0)	3 (1)	HP	P	HP
2	2,411 (2,411)	512 (506)	21 (21)	213	9 (9)	319	13 (7)	6	0.2 (0.2)	11.7	3.1 (3)	0 (0)	11 (2)	HP	P	HP
3	2,172 (10,664)	460 (3,805)	21 (36)	171	8 (6)	313	14 (5)	91	4.2 (5)	9.5	2.8 (2.5)	1 (13)	48 (17)	HP	HP	HP
4	2,156 (24,826)	687 (12,010)	32 (48)	1,074	50 (52)	159	7 (6)	407	18.9 (5.9)	13.3	3.9 (1.6)	0 (15)	6 (91)	HP	HP	P
5	1,558 (1,674)	197 (198)	13 (12)	119	8 (7)	32	2 (1)	15	1 (0.1)	6.2	2.6 (1.5)	2 (1)	5 (2)	HP		HP
6	1,111 (2,215)	181 (625)	16 (28)	0	0 (9)	187	17 (5)	14	1.3 (1.4)	5.3	3 (2.2)	0 (1)	13 (13)	HP	P	HP
7	1,089 (2,280)	40 (182)	4 (8)	0	0 (5)	137	13 (1)	4	0.3 (0.2)	9.0	5.3 (5)	3 (2)	3 (0)	HP		HP
8	951 (1,077)	88 (89)	9 (8)	4	0 (0)	94	10 (6)	2	0.2 (0.4)	4.1	2.7 (2.6)	3 (3)	10 (0)	P		
9	899 (1,648)	233 (306)	26 (19)	0	0 (0)	136	15 (3)	1	0.1 (0.9)	3.7	2.7 (2.3)	3 (9)	6 (3)	HP	P	HP
10	593 (977)	67 (89)	11 (9)	93	16 (10)	123	21 (27)	224	37.8 (30.9)	4.6	5 (2.7)	0 (0)	19 (7)	HP		HP
11	530 (530)	122 (121)	23 (23)	0	0 (0)	96	18 (5)	14	2.6 (0)	3.8	4.6 (3.7)	0 (0)	7 (1)	P		HP
12	321 (321)	12 (12)	4 (4)	0	0 (0)	26	8 (0)	14	4.4 (0.1)	1.5	2.9 (2.1)	2 (2)	6 (2)			
13	289 (3,561)	2 (1,293)	1 (36)	0	0 (0)	38	13 (8)	1	0.5 (0.4)	1.5	3.4 (3.9)	1 (11)	14 (8)	HP	HP	HP
14	244 (244)	26 (25)	11 (10)	0	0 (0)	19	8 (1)	0	0.1 (0.1)	0.9	2.3 (2.2)	0 (0)	0 (0)	P		HP
15	198 (240)	2 (2)	1 (1)	86	43 (36)	51	26 (13)	46	23.3 (19.2)	1.5	4.7 (2.5)	0 (0)	4 (2)	P		HP
16	97 (5,059)	0 (1,405)	0 (28)	94	98 (25)	8	8 (1)	0	0 (0.3)	0.1	1 (1.1)	0 (0)	0 (1)	HP	HP	HP
17	83 (83)	0 (0)	0 (0)	31	38 (37)	5	7 (0)	0	0 (0)	0.3	2 (2)	0 (0)	0 (0)	P		HP
18	58 (58)	0 (0)	0 (0)	0	0 (0)	8	15 (0)	0	0 (0)	0.0	0 (0)	0 (0)	0 (0)			
19	35 (70)	0 (0)	0 (0)	0	0 (0)	4	10 (9)	0	0 (0.6)	0.4	7.3 (9.2)	0 (0)	0 (0)	HP		P
20	20 (403)	0 (8)	0 (2)	0	0 (11)	0	0 (4)	0	0 (0.1)	0.1	3.1 (5)	0 (1)	0 (1)	P		
21	2 (45,983)	0 (26,818)	0 (58)	0	0 (44)	0	0 (3)	0	0 (0.9)	0.0	0 (1.8)	0 (20)	0 (107)	HP	HP	HP
Total	**17,839 (107,359)**	**2,884 (47,743)**	**16 (44)**	**2,275**	**13**	**2,016**	**11**	**846**	**4.7**	**89.4**	**3.2**	**15 (78)**	**155 (258)**			

Riparian Buffer Analysis

Riparian zones are the areas next to waterways, lakes, ponds, and wetlands. They are particularly important parts of the landscape for many reasons, including for their vital role in protecting water quality and the health of our lakes and streams, as well as for supporting habitat connectivity for the movement of plants and animals across the landscape. They accomplish these many functions in part by filtering runoff, shading open waters, providing organic matter (leaves and wood) to feed and shape aquatic ecosystems, and by creating sheltered corridors of cover for wildlife. These processes all work best when the riparian zone has natural vegetation, usually forest or other natural wetland growth such as shrubs or marsh plants.

Unfortunately, many of our waterways have lost much of their natural riparian vegetation due to a history of clearing for agricultural use and development of flatter, valley bottom lands. Riparian restoration activities can help reverse this loss, providing benefits for both water quality and habitat connectivity, as well as other concerns such as flood resilience. For this reason, one aim of this study was to identify the riparian areas in Cabot currently lacking natural vegetation, and prioritize these based on their potential to enhance habitat connectivity if restored.

There are many approaches to mapping riparian zones and assessing riparian buffers. The approach used here draws on updated mapping from the Vermont Conservation Design, employing high-resolution, LiDAR-derived landcover data and a broadly defined riparian zone to create comprehensive, high-resolution mapping across Cabot's entire drainage network (see Methods for more details). The riparian zone defined by VCD and used here is more expansive than and essentially encompasses all of the state-mapped River Corridor area.

Based on this analysis, 73% of Cabot's 3,252 acres of riparian zone has largely natural vegetation, mainly forest cover. Conversely, 27% of this riparian zone, or 886 acres, currently lacks natural vegetation. Strategic restoration of these latter areas could support improved habitat connectivity, water quality, aquatic ecosystem function, and flood resilience among other benefits. These areas are shown in Figure 7, and are provided in the shapefile 'UnforestedRiparianZone_Cabot.shp'.

This approach provides a comprehensive town-wide coverage that allows rapid identification of the largest areas with less-than-ideal riparian vegetation, as indicated in Figure 7. These include the shorelines of Joe's Pond, West Hill Pond, and Molly's Pond, along with its outlet stream, the Winooski River valley bottom from Houston Hill Road downstream to the Marshfield town line, and the area around the confluence of Kidder and Molly's Brooks. Many other smaller, but still important, areas for improvement are also evident. The reason for lack of natural vegetation varies amongst these sites. Joe's Pond and West Hill Pond are mainly related to development, lawns and view clearing, while Molly's Pond, Kidder/Molly's Brooks confluence, and much of the Winooski River valley bottom are mainly related to agricultural use, with development as a significant secondary cause in the latter area, especially near Cabot village. Different reasons for loss of natural vegetation will likely require different approaches to restoration, perhaps with differing likelihood of success.

This unforested riparian zone map was then overlaid on VCD forest blocks to quickly assess which areas offer greatest potential for enhancing habitat connectivity. At the larger scale, the Winooski valley bottom and Kidder/Molly's Brook confluence area appear to offer the greatest opportunities for enhancing habitat connectivity through riparian restoration. Unforested zones around the three

ponds affect the ponds directly, but do not play a large roll in altering the connectivity of the surrounding landscape because of the configuration of other land uses outside the riparian zone.

Because the Winooski valley bottom and Kidder/Molly's Brook areas are most extensively occupied by active agricultural land uses, opportunities for restoration will need to balance tradeoffs with agricultural productivity. Some possible strategies might involve identifying less productive and/or hard to access areas that could be retired from use; creating multiple, narrow corridors along small tributaries that span the riparian zone while minimizing loss of agricultural land; and employing cost-share programs for retiring active agricultural lands, as well as partnering with groups already engaged in riparian restoration. Within these large focal areas, finer scale analysis is needed to identify specific properties for outreach and voluntary restoration, as well as to identify smaller focal areas that can strengthen habitat connectivity at a more local scale within Cabot.

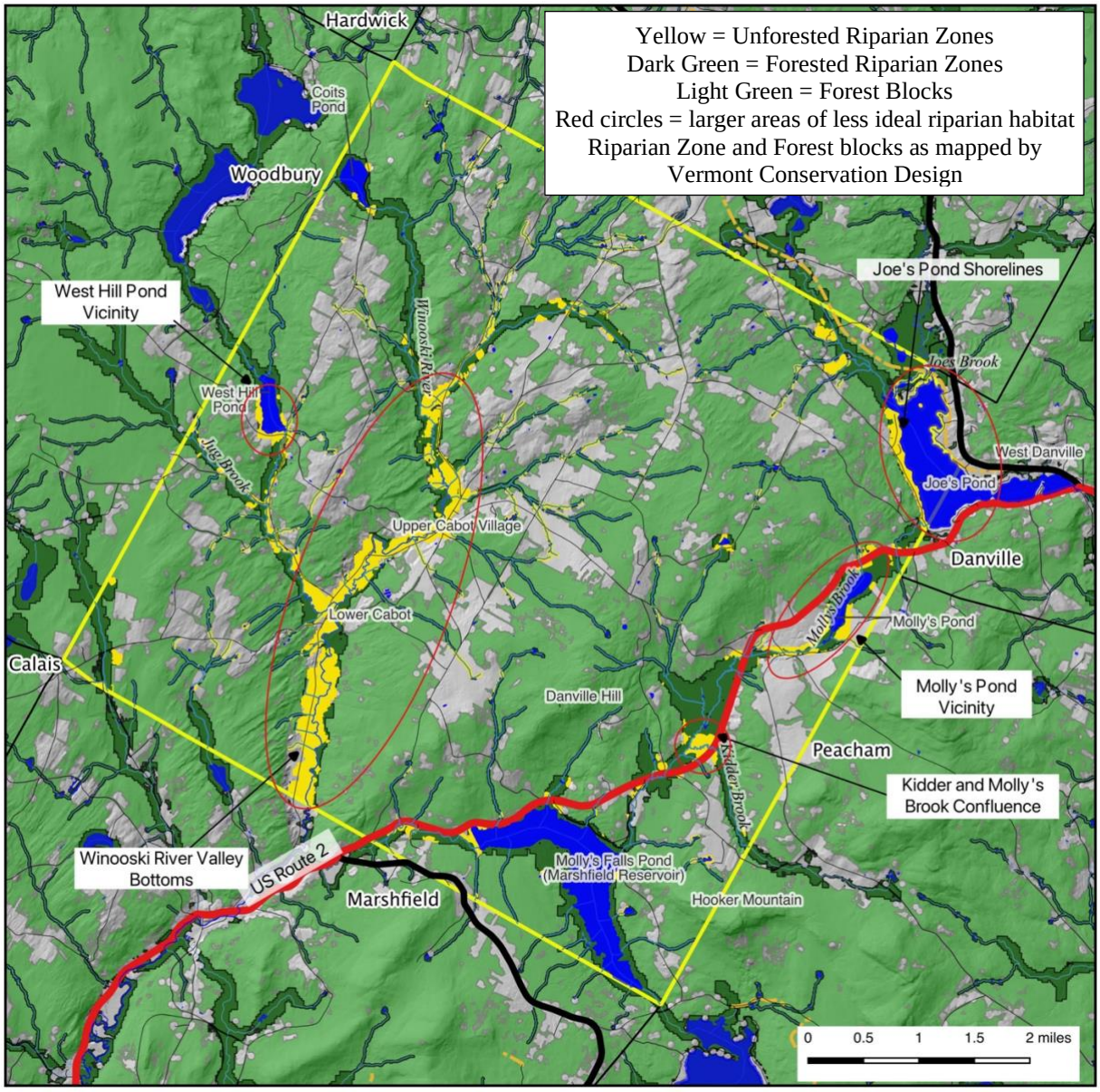


Figure 7. Forested and Unforested Riparian Zones and Forest Blocks of Cabot, VT.

Landscape Analysis and Site Prioritization

Landscape Analysis is the process of identification and prioritization of potential sites for field studies based on review of available map data and other background information. The resulting information about known or potential ecologically significant features across the entire landscape was grouped into 34 'survey blocks' (Figure 9), similar in extent to the forest blocks. These survey blocks are essentially a set of bins for organizing and prioritizing the finer scale landscape features of potential interest. The Potentially Significant Survey Blocks List in Appendix B provides a shorthand summary of the landscape analysis results organized by these blocks. This list was primarily a guide for field studies, but retains particular value for sites and features that were not visited. The list and Figure 9 map can be easily cross-referenced using the block numbers, and the list information is also provided in the attributes of the survey block shapefile.

The 34 survey blocks were prioritized for fieldwork mainly based on the likelihood of containing ecologically significant features, particularly state or locally significant natural communities. Secondarily, the prioritization sought to sample the diversity of the town's landscape in limited time. Twenty-five blocks were rated higher priority and became the main focus of landowner permissions and field inventory. The remaining thirteen blocks were rated lower priority and with a few exceptions, were not a focus of further effort, though they may still harbor significant features.

Landowner Outreach and Permissions

Among the lands encompassed by the higher priority survey blocks, there were about 175 parcels of particular interest. Note that not all parts of a priority block were of interest for field studies. During both phases of the study Conservation Committee members undertook the substantial effort of reaching out to these landowners through a combination of phone, email, in person, and postal mail outreach to obtain permission for field work. Across both study phases, permission was granted to access 69 parcels (including public lands), 14 denied permission, and over half did not respond or could not be contacted. Only the properties with landowner permission or public access were considered for field studies.

Other dimensions of this project supported goals for public education and engagement with the town's natural heritage and the ecological inventory, though these aspects were curtailed during phase 1 due to restrictions created by the Covid-19 pandemic. Phase 2 included an in-person public kick-off presentation at the town office that provided an opportunity to better incorporate local knowledge of interesting features into the



Figure 8. Landowners and community members participating in a site visit to wetlands around Joe's Brook.

landscape analysis while informing townspeople of the project goals. Site visits also frequently involved landowners either directly in field visits or in related discussions and follow-up, providing opportunities to mutually exchange knowledge about their places. Both study phases concluded with a public presentation of results. Three public field walks to sites of ecological interest are also planned for spring 2025.

Field Inventory Overview

I conducted extensive fieldwork, where permission was obtained, during both phases of this study in the summer and fall of 2020 and 2024. In total, site visits encompassed parts of 22 of the 34 survey blocks, as shown in Figure 9. Phase 1 fieldwork in 2020 included 29 properties across 10 blocks; while phase 2 fieldwork spanned another 25 properties in 17 blocks. Some blocks were visited during both phases with different areas of concentration. Site visits encompassed parts of all 10 of the highest priority blocks, 9 of 11 medium-high priority blocks, two medium, and one lower priority block. The majority of priority properties where permission was obtained were visited, and the higher priority blocks that were not visited lacked permissions for areas of greatest interest. A handful of additional properties for which permission was obtained remained unvisited at the conclusion of phase 2 due to time limitations. These provide limited opportunities for additional follow-up work.

Both phases of field studies for this project resulted in documentation of many new features of state and/or local ecological significance, including features at every visited site. Table 2 summarizes the presence of state or locally significant ecological features at each block, as identified through field studies and the landscape analysis process (i.e., prior data). Twenty-one of the survey blocks now have documented features of state-level ecological significance and five additional blocks have features of local-level significance. The remaining eight blocks have received little if any field study and many still have some potential for additional significant features based on remote analysis. The Vermont Agency of Natural Resources defines State-Significance as including all occurrences of rare, Threatened, or Endangered plant or animal species; and rare and/or exemplary natural communities. Further explanation of rarity ranking and State-Significance guidelines are provided in Appendix A. Locally significant features similarly include uncommon species, natural communities, and other landscape features that add important ecological diversity to the town, but that do not rise to State-Significance (or in a few cases are features that do not fit into the framework for State-Significance). These state and locally significant natural communities and rare or uncommon species are discussed further in the following summary sections and are described in more detail in the Survey Block Descriptions.

This study provides important advances in our knowledge of ecologically significant features in Cabot. It is important to note, however, that the information presented here is only what has been discovered to date and is not a complete inventory of the entire town. It is quite likely that additional significant natural communities and rare species populations occur but are not yet known and await discovery!

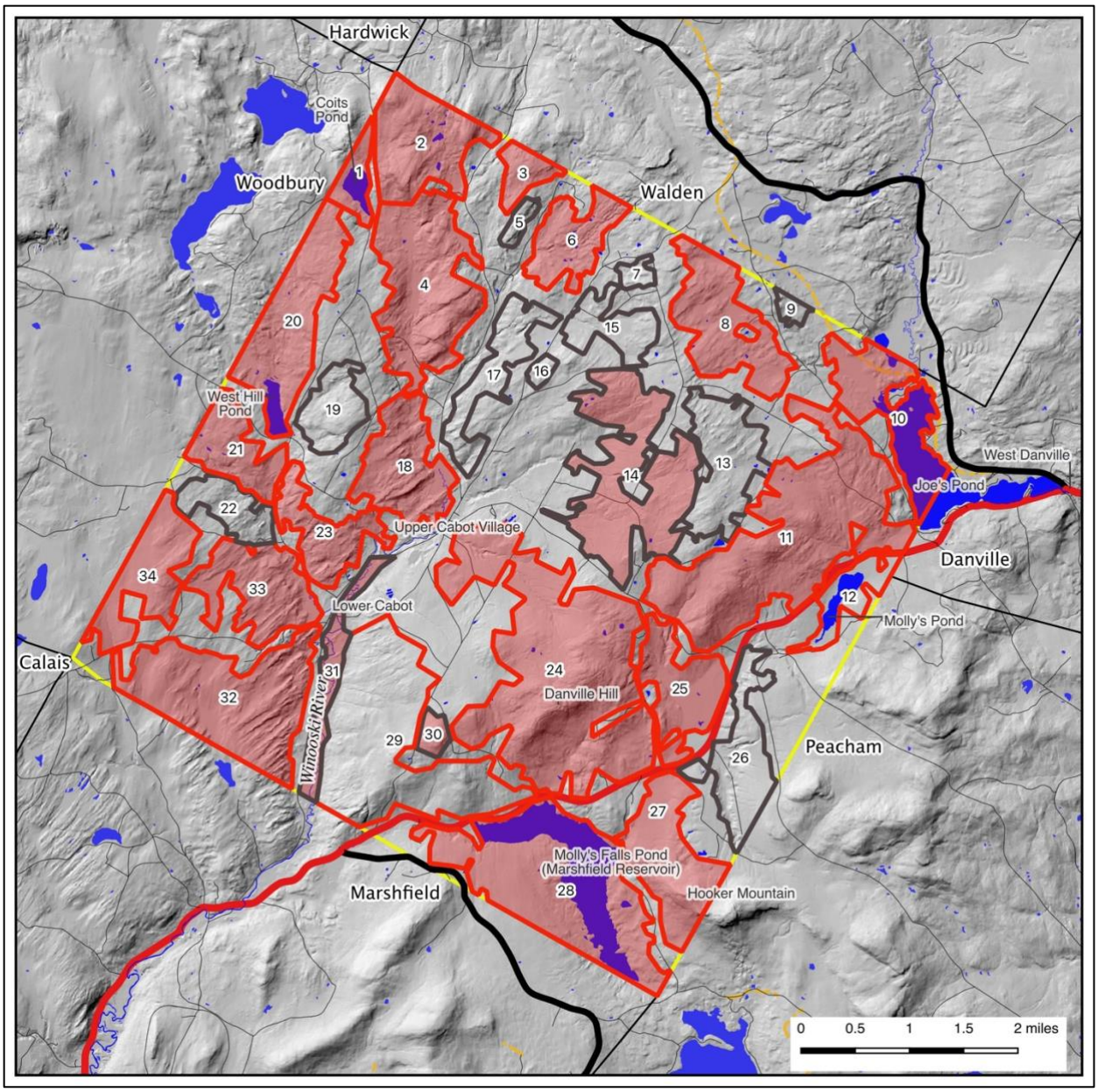


Figure 9. Visited (pink), higher (red line) and lower (black line) priority survey blocks.

See Appendix B for survey block details based on remote landscape analysis, referenced by the block number labels.

Table 2. Cabot Ecological Inventory survey blocks with known state and locally significant features*.

Highlighted blocks have at least one confirmed State-Significant natural community or rare species.

Block #	Survey Block Name	Priority	Either Year Visit	2020 Visit	2024 Visit	Nat Comm Significance	Rare Species Significance
1	Coits Pond Vicinity	H	Yes	No	Yes	State	State
2	Winooski Headwaters North	HM	Yes	No	Yes	State	State
3	Walden Line Hill	H	Yes	Yes	No	Local	State
4	Winooski Headwaters South	H	Yes	Yes	Yes	State	State
5	Walbridge Ridge	M	No	No	No	None Known	None Known
6	North Central Hills	HM	Yes	Yes	Yes	State Pot'l	Local
7	Burbank Hill West	M	No	No	No	None Known	None Known
8	Burbank Hill	H	Yes	Yes	Yes	State	State
9	Brickett's Crossing Swamps	L	No	No	No	None Known	None Known
10	Joe's Brook & Joe's Pond vicinity	H	Yes	Yes	Yes	State	State
11	Upper Molly's Brook Slopes	HM	Yes	No	Yes	Local	State
12	Molly's Pond Vicinity	HM	No	No	No	None Known	Local
13	Cabot Plains Southeast	M	No	No	No	None Known	State
14	Cabot Plains Southwest	M	Yes	No	Yes	Local	None Known
15	Burbank Hill West Slope	M	No	No	No	None Known	None Known
16	Orchard View Woods	M	No	No	No	None Known	None Known
17	Walden Road East	M	No	No	No	None Known	None Known
18	Cabot Village North	HM	Yes	No	Yes	State	State
19	West Hill	M	No	No	No	None Known	None Known
20	West Hill Pond Vicinity	HM	Yes	No	Yes	State	State
21	West Hill Pond South	HM	Yes	No	Yes	State	State

Block #	Survey Block Name	Priority	Either Year Visit	2020 Visit	2024 Visit	Nat Comm Significance	Rare Species Significance
22	Upper Jug Brook	L	No	No	No	None Known	State
23	West Hill to Winooski River	H	Yes	No	Yes	State	State
24	Danville Hill	H	Yes	No	Yes	State	State
25	Molly's Brook Swamp	H	Yes	Yes	No	State	State
26	Kidder Brook Slopes	L	No	No	No	None Known	None Known
27	Hooker Mountain	H	Yes	Yes	No	Local	State
28	Molly's Falls Pond Vicinity	HM	Yes	Yes	Yes	None Known	State
29	Thistle Hill West	HM	No	No	No	None Known	Local
30	Thistle Hill	M	Yes	No	Yes	State Pot'l	Local
31	Lower Winooski Floodplain	L	Yes	No	Yes	Local	State
32	West Winooski Ridges	H	Yes	Yes	No	State	State
33	Jug Brook Vicinity	HM	Yes	No	Yes	State	State
34	Mud Ponds East	HM	Yes	Yes	No	State	State

* Note that only currently known or highly likely (Pot'l) features are included here – additional undocumented features (often noted in Appendix B Prioritized Block List) are very likely to be present in additional blocks where none are currently known. See Appendix A for definitions of State-Significance.

Natural Communities Overview

Natural communities are interacting assemblages of plants, animals, and other organisms, their physical environment, and the natural processes that affect them. They are found in recurring patterns across the landscape that can often be predicted from the physical setting and location. This makes them excellent tools for understanding and managing land, as well as conserving important aspects of our natural heritage and biodiversity, even those such as fungi, insects, and soil microbes that we know relatively little about[5].

While comprehensive natural community mapping of Cabot was beyond the scope of this study, some generalizations and patterns are evident. Out of 120 currently recognized natural community types and variants in Vermont (Thompson et al. 2019), about 37, or about a third, are found or suspected on the Cabot landscape, including 26 wetland types and 11 upland types (Table 3). Twenty of these natural community types are considered rare to uncommon in a statewide perspective, including 17 wetland and 3 upland types. Cabot's natural communities are primarily those of the

[5] See *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (Thompson et al. 2019) for in depth discussion of the definition, classification, and use of natural communities.

Northern Hardwood Forest and Spruce-Fir-Northern Hardwood Forest Formations and associated wetland types. Communities of warmer regions, such those of the Oak-Pine-Northern Hardwood Formation, as well as those of higher elevations, are absent. Indeed, trees typical of warmer regions, such as oaks and hickories, are virtually absent, limited to only a few hilltop red oak stands and scattered, planted red oaks with their locally naturalized progeny.

Some broader natural community patterns can be discerned across the Cabot landscape. In the uplands, Northern Hardwood Forest, Hemlock-Northern Hardwood Forest, Red Spruce-Northern Hardwood Forest, and various younger, successional forests form the forested matrix. Pure hardwood stands tend to occupy better-drained hills, sometimes including pockets of more diverse Rich Northern Hardwood Forest, while conifer dominated and mixed stands occupy the less well-drained lower slopes and valleys, as well as many of the younger post-agricultural forests. Some valley bottoms and basin areas include the uncommon Lowland Spruce-Fir Forest type that becomes more common to the north. Other upland natural community types are generally limited to small areas. While there is plenty of ledge scattered around Cabot in the woods, perhaps only the small rocky areas on Hooker Mountain are extensive enough to mapped as distinct cliff or talus communities.

Wetland communities are widely distributed across Cabot, but not entirely evenly so. They are particularly abundant in the western half of town, where many have a somewhat linear northeast/southwest shape and orientation that is created by the topography and bedrock characteristics. Wetlands are also more abundant in the eastern quarter of town, but have more irregular shapes and sizes. The central strip through town, on a slight diagonal, has relatively few wetlands by comparison. This appears to be in part driven by the presence of taller hills, largely composed of somewhat harder Gile Mountain Formation bedrock. Interestingly, there are very few mapped wetlands in parts of the landscape underlain by granite bedrock, largely because the scattered masses of harder granite form the cores of various hills. Calcareous wetland natural communities are found throughout Cabot, though they are particularly abundant on the more calcareous Waits River Formation bedrock type. This is particularly true for the enriched fens and Calcareous Red Maple-Tamarack Swamps, with almost all of the known examples being on this rich bedrock type.

Riparian, or stream-side, natural communities are found most frequently along the smaller streams in town, with seasonally exposed, sparsely vegetated shoreline types such as River Sand or Gravel Shore, often flanked by Alluvial Shrub Swamps on silty or sandy river-deposited soils. A few tiny pockets of rare Boreal Floodplain Forest can be found as well. Beavers often add to the riparian diversity, by creating ever-changing mosaics of pond, marsh, sedge meadow, and shrub thickets. Floodplain forest natural communities typical of larger rivers, such as Silver Maple-Ostrich Fern Floodplain Forest and Sugar Maple Floodplain Forest may once have been present and restricted to the lower parts of the Winooski River floodplain in Cabot, though now these are essentially gone and need restoration.

Other towns in the area that have been similarly studied, especially Calais, Woodbury, Hardwick (Peters 2016, 2017, 2024), Marshfield (Peters and Engstrom 2023), and Plainfield (Engstrom 2016) share many of the "rich" natural community types found in Cabot, including cedar wetlands, fens, and Rich Northern Hardwood Forests. This is largely due to their shared, limy Waits River Formation bedrock geology. Nevertheless, each town has its own unique qualities and differences,

such as the marked abundance of cedar wetlands and fens in Cabot. Further discussion of natural community patterns is found in the following two sections.

Table 3. Natural Communities of Cabot, VT*

Natural Community Type	State Rarity Rank
WETLANDS	
Alder Swamp	S4 - Common
Alluvial Shrub Swamp	S3 - Uncommon
Beaver Wetland	Not Ranked
Boreal Floodplain Forest	S2 - Rare
Calcareous Red Maple-Tamarack Swamp	S2 - Rare
Cattail Marsh	S4 - Common
Deep Bulrush Marsh	S4 - Common
Hemlock Seepage Forest (variant of NHSF)	S3 - Uncommon
Hemlock-Balsam Fir-Black Ash Seepage Swamp	S4 - Common
Intermediate Fen	S2 - Rare
Northern Hardwood Seepage Forest	S3 - Uncommon
Northern White Cedar Seepage Forest	S3 - Uncommon
Northern White Cedar Swamp	S3 - Uncommon
Red Maple-Black Ash Seepage Swamp	S4 - Common
Red Spruce-Cinnamon Fern Swamp?	S3 - Uncommon
Rich Fen	S2 - Rare
River Cobble Shore?	S2 - Rare
River Mud Shore	S3 - Uncommon
River Sand or Gravel Shore	S3 - Uncommon
Sedge Meadow	S4 - Common
Shallow Emergent Marsh	S4 - Common
Silver Maple-Ostrich Fern Floodplain Forest?	S3 - Uncommon
Sugar Maple Floodplain Forest?	S2 - Rare
Sweet Gale Shoreline Swamp	S3 - Uncommon
Vernal Pool	S3 - Uncommon
Woodland Seep	S4 - Common
UPLANDS	
Erosional River Bluff	S2 - Rare
Hemlock Forest	S4 - Common
Hemlock-Northern Hardwood Forest	S5 - Very Common
Lowland Spruce-Fir Forest	S3 - Uncommon
Northern Hardwood Forest	S5 - Very Common

Natural Community Type	State Rarity Rank
Northern Hardwood Talus Woodland	S3 - Uncommon
Red Oak-Northern Hardwood Forest	S4 - Common
Red-Spruce-Northern Hardwood Forest	S5 - Very Common
Rich Northern Hardwood Forest	S4 - Common
Temperate Acidic Cliff	S4 - Common
White Pine-Northern Hardwood Forest (NHF variant)	S5 - Very Common

*Includes all observed and expected types - a few unconfirmed types are indicated with a '?'. Unconfirmed floodplain forest types may have been extirpated.

Wetlands

Wetlands are widely scattered across Cabot's landscape with most being modest in size. Collectively, they cover only a small part of the landscape; however, they contribute disproportionately to biodiversity and habitat values, as well as to essential ecosystem services for humans, such as water purification, water supply, and flood mitigation. This makes wetlands particularly important features to protect for their diverse public benefits. As much as 35% of Vermont's original wetland area is thought to have been lost since settlement by Europeans[6].

State wetlands maps, maintained by the Vermont Department of Environmental Conservation's (VT DEC) Wetlands Program, are currently being updated with substantial improvements in mapping accuracy and comprehensiveness. Draft updated maps are currently available through the US Fish and Wildlife Service's National Wetlands Inventory (NWI) Wetlands Mapper tool[7] or can be viewed through a state-provided mapper[8]. These updates are expected to be officially incorporated into the state's Vermont Significant Wetlands Inventory (VSWI) and Wetlands Advisory maps later in 2025 for most of Cabot (Winooski watershed). It is important to note that these mapping updates simply represent more accurate mapping, rather than a change in either the legal protected status of wetlands or the actual area of wetlands on the landscape. (Prior maps were largely based on remote assessments done in the 1980's.)

Compilation of this new draft NWI wetland mapping (minus the major water bodies), the existing state Wetlands Advisory map, and additional wetland natural communities mapped during this study's fieldwork, reveals that wetlands span around 2,292 acres or 9.3% of Cabot. This is somewhat higher than the statewide average of 4-6%[9] based on prior mapping efforts, and is substantially more than was reflected in older maps for Cabot. Of the entire wetland area, 691 acres (2.8% of Cabot) are in the current state VSWI map and are protected as significant under the state Wetland Rules - though this statistic will be changing with coming adoption of mapping updates noted above. Importantly, unmapped wetlands are also protected if they provide similar functions and values to mapped VSWI wetlands.

[6] https://www.fws.gov/media/wetland-resources-vermont
[7] https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper
[8] https://experience.arcgis.com/experience/c76d18185ede4acb8068fa352ea73c1e
[9] https://www.fws.gov/media/wetland-resources-vermont

Based on the updated mapping, there are about 826 spatially discrete wetland units now mapped in Cabot. These range from small seeps up to the largest complex, Molly's Brook Swamp, of about 197 acres. The wetland complex where Joe's Brook enters Joe's Pond is somewhat larger (over 200 acres), but only about 114 acres are within Cabot. The average (mean) wetland size is 2.8 acres and the median is just 0.8 acres. This shows the vast majority of Cabot's wetlands are quite small. Only 41 wetlands are greater than 10 acres in size.

Most of Cabot's wetlands appear to have groundwater seepage or riverine processes, often in conjunction with beaver influences, as their main hydrologic drivers. Enriched wetland types, generally of circumneutral or higher pH, are predominant, often related to the underlying calcareous Waits River Formation bedrock. Particularly abundant wetland types in Cabot include enriched beaver pond complexes with Shallow Emergent Marsh, Alder Swamp, and fringing forested wetlands, Northern White Cedar Swamps, Northern White Cedar Seepage Forests, and Alluvial Shrub Swamps along the streams. These latter three are considered Uncommon (S3) natural community types at a state level, but are locally more abundant. The abundance of cedar it is at least in part related to the calcareous bedrock, coupled with widespread low gradient slopes on soils derived from dense glacial till. Such soils, especially Cabot series soils, resist deep infiltration of water and tend to promote groundwater seepage at the surface, which, in circumneutral pH soils, is very conducive to northern white cedar growth.

Though difficult to quantify and assess, Cabot's greatest historical wetland losses or alterations have probably been through conversion of floodplain forests along the Winooski River to agricultural lands, clearance of sloping seepage forests – often resulting in wet pasture, and the loss and subsequent substantial recovery of beavers across the landscape. Another major change are the impoundments creating or raising many of the main ponds, which likely converted wetlands to open water habitats, though potentially also created additional peripheral wetlands.

Significant Natural Communities

Locating state and locally significant natural community occurrences was the primary focus of field work in this study. Mapping these areas builds our knowledge of the most ecologically important and sensitive places in Cabot to support their conservation and stewardship. Identifying State-Significant natural communities also provides landowners enrolled in the state's Use Value Appraisal property tax abatement program (often known as 'Current Use' or 'Land Use') with additional options for conserving and managing their land while receiving tax benefits. In limited development circumstances, such as Act 250 or Section 248 proceedings, these areas may receive increased regulatory review and protections.

Evaluating State-Significance for any natural community is done following standard protocols developed by the Vermont Natural Heritage Inventory and requires a mixture of field studies and remote analysis. In brief, State-Significant occurrences are particular areas of a given natural community type that display a combination of quality, landscape context, size, and rarity sufficient to be ranked as significant in a state level perspective. They are areas that are exceptional for their intact ecological processes, biodiversity, and physical makeup. In general, most examples of rare community types are State-Significant, while only larger or higher quality examples of uncommon and somewhat common types are State-Significant. Only the most exceptional examples, like old growth, of very common types, such as Northern Hardwood Forest are considered State-Significant. Additional protocol details can be found in Appendix A. Determination of local significance applies these same concepts at a more local scale.

Figure 10 and Tables 4 & 5 provide a generalized map and summary of the known significant natural community occurrences for Cabot, combining field data from this study with previously documented occurrences. Prior to this study, there were just two known State-Significant natural community occurrences, the Molly's Brook Northern White Cedar Swamp and the Sweet Gale Shoreline Swamps around Joe's Brook as it enters Joe's Pond. This study (both phases) added 26 State-Significant occurrences of 10 additional types, as well as an additional 36 locally significant occurrences and 9 additional types. Thus, in total, there are now 28 known State-Significant occurrences of 12 natural community types, and 64 locally significant occurrences of 21 types (note that locally significant occurrences include all State-Significant occurrences). These include 16 wetland and 5 upland natural community types. The mapped state and locally significant natural communities span a combined area of 653.5 acres or about 2.6% of Cabot. State-Significant occurrences alone span 504 acres or 2% of Cabot with all but about 85 acres of this being wetlands, including about 280 acres of Northern White Cedar Swamps. Mapping and occurrence ranking data for the newly documented significant natural communities are provided as polygons in the shapefile "Cabot_SigNatComsAll_04032025.shp".

All of the state and locally significant natural communities occur as small to medium-sized patches (<1 acre to ~123 acres) scattered throughout the landscape. The majority of these are wetlands, plus 7 Rich Northern Hardwood Forests, a talus woodland, a Temperate Acidic Cliff, a Red Oak-Northern Hardwood Forest, and a mature Northern Hardwood Forest. Cabot's more extensive large-patch or matrix-forming, common upland forest communities, such as Northern Hardwood Forest, Hemlock-Northern Hardwood Forest, or Red Spruce-Northern Hardwood Forest are generally not State-Significant, mainly due to a combination of fragmentation (i.e., smaller size) and management/ land use history. Most of the significant features, especially at the state level, are rare (S2) or uncommon (S3) natural community types such as Rich or Intermediate Fens, cedar swamps and seepage forests, or Vernal Pools, but some are more common types (S4), such as Rich Northern Hardwood Forest or Deep Bulrush Marsh, that have sufficient size, quality, and surrounding landscape context to be exemplary at state or local levels. Of the locally significant features, one type (2 examples), Beaver Wetlands, is not part of the state's formal natural community classification system. Further discussion of the individual State-Significant natural community occurrences is provided in the **Survey Block** descriptions below, and technical descriptions of state-significant occurrences are provided in a separate supporting document.

The overarching pattern shown by the significant natural community occurrences is the preponderance of enriched communities in Cabot, often associated with the locally abundant calcareous bedrock of the Waits River Formation. In the uplands these are the Rich Northern Hardwood Forests, and in the wetlands this particularly includes the Northern White Cedar Swamps and Seepage Forests, Rich and Intermediate Fens, Calcareous Red Maple-Tamarack Swamps, and Sweet Gale Shoreline Swamps.

While this study made great strides in documenting significant natural communities, there are undoubtedly additional important features that remain to be identified in Cabot. While most sites with access were visited during the study, many additional sites of interest lacked access, either due to denial or inability to reach the owners.

Figure 10. State and Locally Significant Natural Communities of Cabot, VT.

Only confirmed State-Significant features are called out with labels.

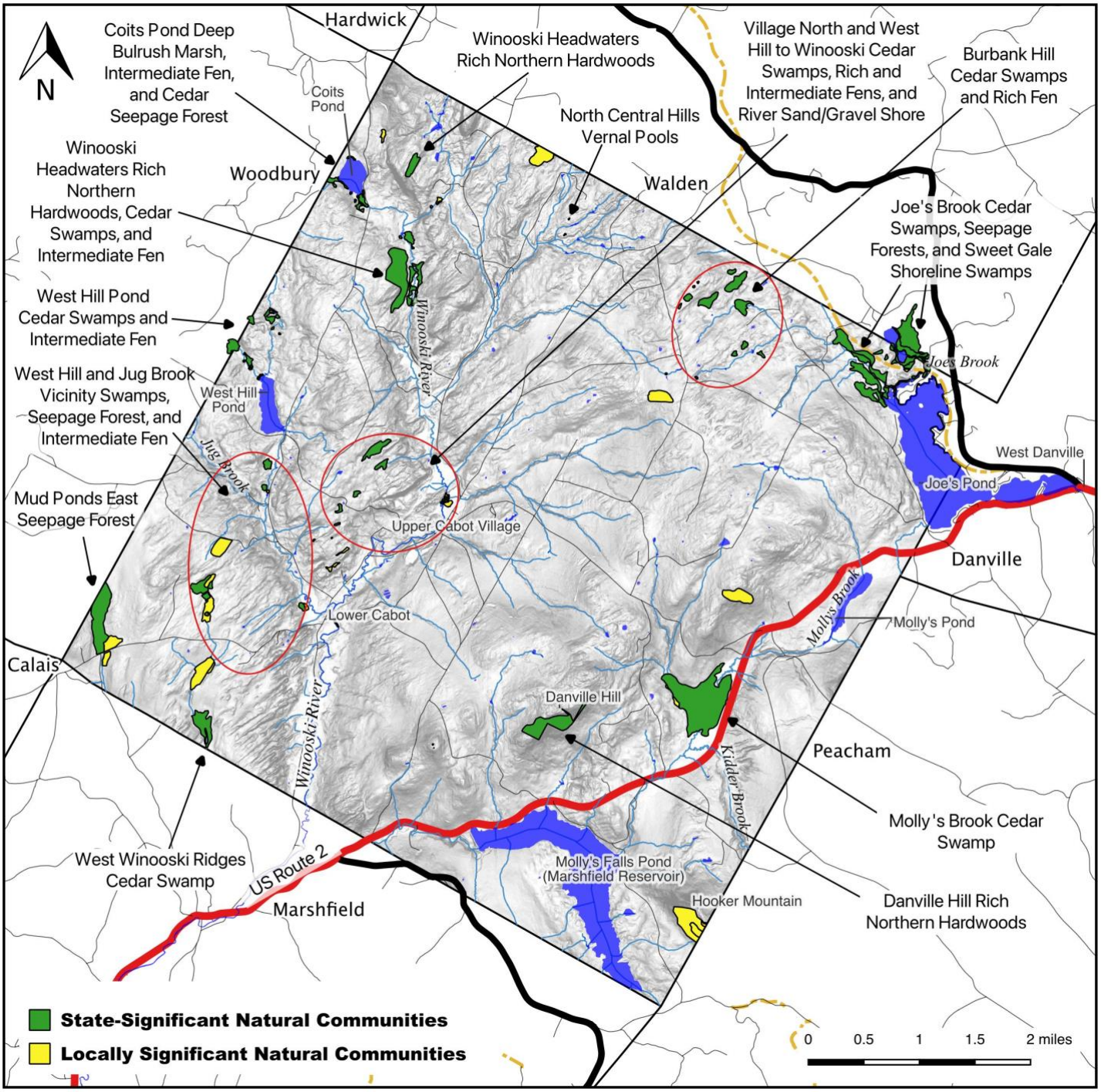


Table 4. Known State and Locally Significant Natural Communities of Cabot.

See Appendix A for State Rank (S rank) and significance determination details. S1= very rare, S2= rare, S3= uncommon, S4-S5= common to very common, NR= Not Ranked - indicates novel types not part of the VT natural community classification system.

Natural Community Type	State Rarity Rank	Total Acres	Average Size (ac)	# of State-Significant Sites	# of Locally-Significant Sites*
WETLANDS					
Alluvial Shrub Swamp	S3	4.2	1.4		3
Beaver Wetland	NR	26.3	13.2		2
Boreal Floodplain Forest	S2	0.5	0.3		2
Calcareous Red Maple-Tamarack Swamp	S2	8.1	2.7	2	3
Deep Bulrush Marsh	S4	3.5	3.5	1	1
Hemlock Seepage Forest variant	S3	12.7	12.7	1	1
Hemlock-Balsam Fir-Black Ash Seepage Swamp	S4	4.0	2.0		2
Intermediate Fen	S2	8.0	1.1	5	7
Northern Hardwood Seepage Forest	S3	44.1	44.1	1	1
Northern White Cedar Seepage Forest	S3	53.9	9.0	2	6
Northern White Cedar Swamp	S3	282.8	31.4	8	9
Rich Fen	S2	0.8	0.4	2	2
River Sand or Gravel Shore	S3	0.6	0.6	1	1
Sedge Meadow	S4	1.1	1.1		1
Sweet Gale Shoreline Swamp	S3	26.8	8.9	1	3
Vernal Pool	S3	1.3	0.1	1**	9
UPLANDS					
Northern Hardwood Forest	S5	28.2	28.2		1
Northern Hardwood Talus Woodland	S3	0.8	0.8		1
Red Oak-Northern Hardwood Forest	S4	4.7	4.7		1***
Rich Northern Hardwood Forest	S4	140.9	20.1	3	7
Temperate Acidic Cliff	S4	0.2	0.2		1
TOTALS		653.5	10.2	28	64

* Count includes all State-Significant sites since they are also locally significant.

** Only 1 pool has been fully assessed for spring amphibian use, a prerequisite for State-Significance determination; however, 7 additional confirmed pools appear likely to reach this threshold. Six additional potential Vernal Pools have been mapped by the VT Vernal Pool Mapping Project but remain to be verified and assessed with site visits.

*** Three additional oak stands likely of local significance are known from southern aspect hilltops based on community reports, but were not visited or mapped during this study to verify the community type.

Table 5. State-Significant* Natural Communities Known in Cabot, VT.

Survey Block Name	Natural Community Type	State Rarity Rank	Acres	EO Rank
Burbank Hill	Northern White Cedar Swamp	S3	33.3	B
Burbank Hill	Rich Fen	S2	0.3	C
Cabot Village North	Northern White Cedar Swamp	S3	15.2	B
Cabot Village North	River Sand or Gravel Shore	S3	0.6	B
Coits Pond Vicinity	Deep Bulrush Marsh	S4	3.5	B
Coits Pond Vicinity	Intermediate Fen	S2	1.0	C
Coits Pond Vicinity	Northern White Cedar Seepage Forest	S3	5.6	B
Danville Hill	Rich Northern Hardwood Forest	S4	33.2	A
Joe's Brook and Joe's Pond vicinity	Northern White Cedar Seepage Forest	S3	31.0	A
Joe's Brook and Joe's Pond vicinity	Northern White Cedar Swamp	S3	58.2	A
Joe's Brook and Joe's Pond vicinity	Sweet Gale Shoreline Swamp	S3	25.7	A
Jug Brook Vicinity	Calcareous Red Maple-Tamarack Swamp	S2	1.8	C
Jug Brook Vicinity	Hemlock Seepage Forest variant	S3	12.7	B
Jug Brook Vicinity	Intermediate Fen	S2	0.6	C
Molly's Brook Swamp	Northern White Cedar Swamp	S3	123.0	B
Mud Ponds East	Northern Hardwood Seepage Forest	S3	44.1	B
North Central Hills	Vernal Pool	S3	0.1	B
West Hill Pond South	Calcareous Red Maple-Tamarack Swamp	S2	4.6	C
West Hill Pond Vicinity	Intermediate Fen	S2	0.7	C
West Hill Pond Vicinity	Northern White Cedar Swamp	S3	6.8	B
West Hill Pond Vicinity	Northern White Cedar Swamp	S3	9.1	B
West Hill to Winooski River	Intermediate Fen	S2	1.6	C
West Hill to Winooski River	Rich Fen	S2	0.5	C
West Winooski Ridges	Northern White Cedar Swamp	S3	19.5	B
Winooski Headwaters North	Rich Northern Hardwood Forest	S4	8.0	B
Winooski Headwaters South	Intermediate Fen	S2	3.8	B
Winooski Headwaters South	Northern White Cedar Swamp	S3	15.7	B
Winooski Headwaters South	Rich Northern Hardwood Forest	S4	44.2	B

* Several additional Vernal Pools are pending confirmation with assessment of amphibian breeding.

Rare Species

Rare and uncommon plants and animals are unique and important components of Cabot's natural heritage that may need special consideration to persist in the landscape. These species are part of a so-called 'fine-filter' approach to biodiversity conservation, wherein the particular locations, habitat needs, and threats for less common species are considered. Such fine-filter conservation approaches are an important complement to coarse-filter conservation strategies such as protecting forest blocks, natural communities, and land conservation in general, if we are to maintain the full breadth and diversity of life on Earth.

Species can be rare for many reasons and each has a unique story and set of circumstances. Some were once more common and have become rare because of impacts from human activities, such as habitat destruction, spread of diseases or invasive species, or direct exploitation. Others have perhaps always been rare because they have very particular habitat needs that cannot be met across most parts the landscape or have life cycles that make them particularly vulnerable. Still others remain mysteries whose rarity we don't really understand. Regardless of the reason, they warrant recognition, consideration, and protection where they exist. While this study provides important advances in our knowledge of rare species in Cabot, it is important to note that the information presented here represents only what has been discovered to date and is not, by any means, a complete inventory of the entire town. It is almost certain that additional rare species and sites occur that are not yet known and await discovery!

Information on rare species populations is maintained for conservation purposes primarily by the Vermont Natural Heritage Inventory (VNHI), within the Vermont Fish and Wildlife Department (VFWD). VNHI maintains a spatial database (map with associated data) of the state's rare and uncommon species. Vermont's state rare and uncommon species lists are maintained and updated regularly by VNHI staff with input from many biologists and experts across the state and region, drawing on all available population data and a broad understanding of threats.

A species rarity can be considered at different geographic scales, usually state, regional, national, and/ or global levels. This means a species that is rare at larger levels, such as national or global, could be rare at the state level, potentially holding important genetics, habitat associations, other adaptations not present in the rest of the species. The reverse can also be true (though less commonly), where a globally or nationally rare species can be locally somewhat more frequent. This is the case for a few of Cabot's rare species such as Wood Turtles and Wright's Spikerush, both considered Globally Imperiled or Vulnerable, but found with some frequency in Vermont (in the right habitats). Such species are important 'responsibility' species for us, as Vermont may hold some of the strongest remaining populations in the world. It's also important to note that a species' rarity ranking (often expressed as 'S rank' or 'G rank'[10]) is not always well-correlated with legal Threatened or Endangered status. Most rare species are also considered Species of Greatest Conservation Need (SGCN) in Vermont's Wildlife Action Plan (VFWD 2015).

[10] see Appendix A for further rank definition details, as well as state rare species lists: https://vtfishandwildlife.com/learn-more/fish-wildlife-library/wildlife-information/library-endangered-threatened-and-rare-animals-and-plants-lists .

Cabot hosts a wealth of rare and uncommon plants and animals, an exciting, if seldom seen, part of our natural heritage! Many rare species are associated with the types of high-quality habitats and natural communities that were the main focus of this project, so it is not surprising that additional rare species were discovered. Prior to this study 7 rare or uncommon species were known to occur at 11 sites in Cabot, according to the Vermont Natural Heritage Inventory. These included 1 state-endangered plant and 1 state-threatened plant.

During both phases of this study, numerous additional rare or uncommon species were documented, drawing on a variety of information sources. The main source of these additions was my own fieldwork; however, other sources of historical and recent observations were also useful, including word of mouth, digital herbarium records, iNaturalist observations, and aquatic plant lists from the VT Department of Environmental Conservation Lakes Program.

Combining all of these sources, Cabot is now known to support 70-72 state rare and uncommon species with about 152 total occurrences (a species at a given site). These species are summarized in Table 6 below, with the rarity status and rank for each species, the number of known sites, last known year observed, and the source of the latest report. A few records need further confirmation. Of these rare species 46-48 are vascular or so-called 'higher' plants, 18 are mosses or liverworts (non-vascular plants), 3 are insects, and 3 are vertebrate animals.

There are currently no Federally Threatened or Endangered species known from Cabot, though one known species, the Wood Turtle, is under consideration for Federal Threatened status. At the state level, seven known species have legal Threatened or Endangered status, including one bumblebee and six plants: Yellow-banded Bumble Bee (*Bombus terricola),* Bronze Sedge *(Carex foenea),* Marsh Horsetail *(Equisetum palustre),* Mare's-tail *(Hippuris vulgaris),* Hooker's orchid *(Platanthera hookeri),* Bog Wintergreen *(Pyrola asarifolia),* and Least Bur-reed *(Sparganium natans).* Seven species are considered Very Rare (S1 or SH), 28 are Rare (S2 or S2S3), 36 are Uncommon (S3 or S3S4), and one is of uncertain rarity (SU). Notably, four species are considered Globally Imperiled or Vulnerable (G2-G3G4), including Wright's Spike-rush (*Eleocharis diandra*), Ginseng (*Panax quinquefolius*), Yellow-banded Bumble Bee, and Wood Turtle. Wright's Spike-rush, Ginseng, Weft Fern (*Crepidomanes intricatum*), Ovate Spike-rush (*Eleocharis ovata*), and Huron Bog-orchid (*Platanthera huronensis*) are also considered Regionally Rare or potentially so (the latter two) in *Flora Conservanda*[11] (Brumback and Gerke 2013). In addition to being ranked Globally Imperiled, Wood Turtles are considered Endangered by the International Union for



Figure 11. State-Threatened Lesser Bur-reed (*Sparganium natans*), known from a few peaty pond shores in Cabot.

[11] *Flora Conservanda* is a non-governmental assessment of vascular plant rarity across the New England region.

Conservation of Nature (IUCN) Red List (van Dijk and Harding 2011). Note that three plants previously reported as uncommon in the phase 1 report (Peters 2020) have since been downranked to more common status and are no longer tracked by VNHI – they are now omitted from phase 2 results. Detailed locality information is omitted from this report to protect the rare species, some of which could be vulnerable to illicit collection, as well as to respect landowner privacy.



Figure 12. A glimpse of the very rare Tiny Bristle Moss (*Seligeria pusilla*) one of two new to New England species discovered in Cabot during the study. The entire plant with capsule is less than 3mm tall.

A number of particularly noteworthy rare species discoveries came out of fieldwork for this study. Several of the mosses are new or very recent additions to Vermont and New England's known flora or represent rediscovery of historically known species. Remarkably, I found two new-to-New England moss's growing together on a small woodland outcrop. These minute and closely related mosses, known as Donn's Bristle Moss (*Seligeria donniana*) and Tiny Bristle Moss (*Seligeria pusilla*), have an affinity for calcareous rocks, such as Waits River Formation marble layers found in Cabot. No doubt these plants have simply been overlooked in our region by past generations of bryologists (moss scientists) due to their small size. Both have also now been found at one or more other sites in the state, and are likely more prevalent than currently known, though both are far removed from their nearest known records in central and western New York. Similarly, the Four-Toothed Moss (*Tetrodontium ovatum*) is a minuscule moss of dark alcoves in rocks that had not been seen in New England since 1900 until I recently discovered it for Vermont during a town inventory study in Marshfield. This cryptic plant also turned up in ledges on a forested hilltop in Cabot as well, making a third known site for the species in Vermont. A somewhat larger Hook Moss known as *Drepanocladus polycarpus* was historically known (1926) from one Vermont site and was found growing in several fen-like wetlands in Cabot, though the species is not always distinguished from another common moss, and may be more abundant than currently known.

Among the 'higher' plants, discovery of Wright's Spikerush (*Eleocharis diandra*), a Globally Imperiled (G2) plant only found in New England, is especially important. This annual plant grows on seasonally exposed shorelines and was known from lower in the Winooski River system, but discovery around the shores of Molly's Falls Pond may mark the highest known site in a river system globally, extending our understanding of the species potential range. Other notable discoveries from the field include finding 1 new state-endangered and 2 new state-threatened plants, as well as new populations of another threatened plant. These include the Bronze Sedge, Marsh Horsetail, Bog Wintergreen, and Least Bur-reed. Two additional threatened

and endangered species records uncovered from other sources and included Hooker's Orchid and the Yellow-banded Bumble Bee – both species experiencing recent concerning declines. The many other rare species are also noteworthy but are too numerous to expound upon here.

Fieldwork for this study was by far the largest source of new and updated rare species records with 60 species at about 116 sites. Knowledgeable community members directly contributed additional reports of 8 species at 9 sites. Searching online databases[12] of plant specimens from herbaria (museum collections of dried, pressed plants) across the country revealed a surprisingly rich history of botanical collection in Cabot with at least 291 specimens, the oldest dating back to 1891! Among these were records of an additional 13 rare or uncommon species at 18 sites, including a new state-Threatened species, Hooker's orchid. Some of these herbarium records have detailed locations while others have only a general locale, such as 'rich woods, Cabot', leaving the specific location yet to be rediscovered, as is the case for Hooker's orchid, which was last seen and collected in 1915. I also mined the iNaturalist platform[13] for all Cabot observations. This substantial pile of 2,455 observations (as of 2/28/25) yielded verified records of 3 rare or uncommon insects, including a state-threatened bumblebee. Though not used here, other online natural history observation platforms such as the Vermont Atlas of Life and eBird provide additional opportunities for 'mining' occurrence data for rare or common species, though substantial overlap exists between some platforms in this rapidly expanding and evolving space of digital observation networks. All of the 18 rare mosses and liverworts are newly documented in Cabot during this study. Most of these species were found on shorelines, especially of the Winooski River, in fen-like wetlands, or on rocky outcrops. The rarity of mosses and liverworts is less well understood and their rarity ranks are more likely to change as the state's bryoflora becomes more well known.



Figure 13. A lone plant of uncommon Hoary Willow (*Salix candida*) found in a fenny opening in a Calcareous Red Maple-Tamarack Swamp.

Over two-thirds (50) of the 72 sensitive species – rare, threatened, endangered, and uncommon – documented in Cabot are primarily associated with wetlands and aquatic features. This emphasizes the particular importance of wetlands for biodiversity, along with their many other values, especially given that wetlands cover less than 10% of Cabot's landscape. Most of the remaining species are associated with rich woods or rocky habitats, which also represent comparatively small parts of the landscape.

[12] Consortium of Northeast Herbaria (CNH), Southeast Regional Network of Expertise and Collections (SERNEC), SEINet Portal Network

[13] iNaturalist is an organization dedicated to citizen-led natural history observation through their website and phone app.

So why are there so many rare and uncommon plants in Cabot? The overwhelming pattern, looking across Cabot's many rare plant species, is an association with enriched, higher pH, calcareous habitats, including rich woods, calcareous outcrops, and enriched wetland and aquatic habitats, such as cedar swamps, Sweet Gale Shoreline Swamps, Intermediate Fens, and hard-water ponds with peaty margins. The relative abundance of such habitats and their rare species can largely be attributed to the abundance of calcium-rich bedrock, mainly the Waits River Formation's dirty marble layers, that underlies much of Cabot. Similar patterns, and some of the same species, have been found in nearby towns that have been similarly studied, including Marshfield, Hardwick, and Calais (Peters 2016, 2017, 2024, Peters and Engstrom 2023).



Figure 14. Rare Shining Rose (*Rosa nitida*) growing in the extensive swamps along Joe's Brook.

What steps should be taken to ensure Cabot's rare species persist? This is an important, but complex question that mostly requires species by species and site by site consideration that is beyond the scope of this report. But the first step has been taken, by discovering that they exist! While there is no one-size-fits-all approach to rare species management, the default recommendation is typically passive (hand's off) management with periodic monitoring, coupled with habitat protection. There certainly are cases where active management is beneficial for rare species, particularly for species/sites facing a clear threat, such as invasive species, but this requires site specific consideration from knowledgeable conservation practitioners.



Figure 15. A large mat of rare Hooked Scorpion Moss (Scorpidium scorpioides) in the foreground of an Intermediate Fen, one of several rare fen mosses found in Cabot.

Table 6. Rare and Uncommon Species of Cabot, VT.

Green shading indicates species observed during this study (either phase). Species in **bold** have legal protected status as State-Endangered (E) or State-Threatened (T), PDL=proposed for delisting. Rarity Status is a standard translation of state rank (S rank) as follows: S1= very rare, S2= rare, S3= uncommon, SH= historically known, SU= status uncertain (but presumed rare); G-ranks, when stated, indicate Globally Imperiled (G2) or Vulnerable (G3) species, see Appendix A for further details. S Ranks follow VNHI (2024, 2022) for vascular plants and animals, Allard (2025) for bryophytes, G ranks follow NatureServe 2025. Last Source Codes: 1= fieldwork for this study, 2= Vermont Natural Heritage Inventory (VNHI) database, 3= digital herbarium records (CNH, SERNEC, SEINet portals), 4= reported to the author by a community member, 5=verified iNaturalist observations, 6= VT DEC Lakes program aquatic plant list; * note that only the most recent source is listed.

English Name	Scientific Name	VT E or T	Rarity Status	Rank	# of sites	Year Last Seen	Last Source Code*
VASCULAR PLANTS (wildflowers, ferns, grasses, sedges, trees, etc.)							
Water Sedge	*Carex aquatilis*		*Uncommon*	S3	5	2024	1
Back's Sedge	*Carex backii*		*Uncommon*	S3	3	2024	1
Buxbaum's Sedge	*Carex buxbaumii*		*Rare*	S2	1	2020	1
Northeastern Sedge	*Carex cryptolepis*		*Uncommon*	S3	1	2020	1
Bronze Sedge	***Carex foenea***	**E**	***Rare***	**S2**	**1**	**2020**	**1**
Shore Sedge	*Carex lenticularis*		*Uncommon*	S3	2	2024	1
False Cyperus Sedge	*Carex pseudocyperus*		*Uncommon*	S3	4	2024	1
Thin-Flowered Sedge	*Carex tenuiflora*		*Very Rare*	S1	1	2020	1
Prickly Hornwort	*Ceratophyllum echinatum*		*Rare to Uncommon*	S2S3	1	2024	1
Long-bracted Orchid	*Coeloglossum viride*		*Uncommon*	S3	1	1915	3
Weft Fern	*Crepidomanes intricatum*		*Uncommon*	S3	1	2024	1
Steller's Rockbrake Fern	*Cryptogramma stelleri (unconfirmed)*		*Uncommon*	S3	1?	?	4
Yellow Lady's-slipper	*Cypripedium parviflorum var. pubescens*		*Uncommon*	S3	5	2020	1
Showy Lady's-slipper	*Cypripedium reginae*		*Uncommon*	S3	3	2024	1
Ground-fir	*Diphasiastrum sabinifolium*		*Rare*	S2	1	1995	2
Wright's Spikerush	*Eleocharis diandra*		*Rare*	G2, S2	1	2024	1
Matted Spikerush	*Eleocharis intermedia*		*Uncommon*	S3	7	2024	1
Ovate Spikerush	*Eleocharis ovata*		*Uncommon*	S3	2	2024	1
Marsh Horsetail	***Equisetum palustre***	**T(PDL)**	***Rare to Uncommon***	**S2S3**	**2**	**2024**	**1**
Meadow Horsetail	*Equisetum pratense*		*Uncommon*	S3	1	1986	3
Slender Cotton-grass	*Eriophorum gracile*		*Rare*	S2	1	2024	1
Northern Three-lobed Bedstraw	*Galium trifidum*		*Uncommon*	S3	5	2024	1
Mare's-tail	***Hippuris vulgaris***	**E**	***Very Rare***	**S1**	**1**	**2008**	**2**
Glade Fern	*Homalosorus pycnocarpos*		*Uncommon*	S3	2	2020	1

English Name	Scientific Name	VT E or T	Rarity Status	Rank	# of sites	Year Last Seen	Last Source Code*
Broad-headed rush	*Juncus brachycephalus*		*Uncommon*	S3	6	2024	1
Swamp Honeysuckle	*Lonicera oblongifolia*		*Rare*	S2	1	2020	1
Mountain Fly Honeysuckle	*Lonicera villosa*		*Uncommon*	S3	7	2024	1
Fall Dropseed grass	*Muhlenbergia uniflora*		*Uncommon*	S3	1	2024	1
Small Forget-me-not	*Myosotis laxa*		*Rare to Uncommon*	S2S3	1	2024	1
Slender Water-milfoil	*Myriophyllum alterniflorum*		*Rare to Uncommon*	S2S3	1	2024	1
Farwell's Water-milfoil	*Myriophyllum farwellii*		*Rare to Uncommon*	S2S3	1	1973	3
Broadleaf Twayblade Orchid	*Neottia convallarioides*		*Uncommon*	S3	2	2020	1
American Ginseng	*Panax quinquefolius*		*Uncommon*	G3G4, S3	5	2024	1
Hooker's Orchid	***Platanthera hookeri***	**T**	***Rare***	**S2**	**1**	**1915**	**3**
Huron Bog-Orchid	*Platanthera huronensis*		*Uncommon*	S3	2	2020	1
Blunt-Leaf Pondweed	*Potamogeton obtusifolius*		*Uncommon*	S3	6	2024	1
Bog Wintergreen	***Pyrola asarifolia***	**T**	***Rare***	**S2**	**1**	**2020**	**1**
Shining Rose	*Rosa nitida*		*Rare*	S2	1	2020	1
Northern Arum-leaved Arrowhead	*Sagittaria cuneata*		*Uncommon*	S3	1	1978	3
Sessile-fruited Arrowhead	*Sagittaria rigida*		*Uncommon*	S3	1	2020	1
Hoary Willow	*Salix candida*		*Uncommon*	S3	2	2024	1
Meadow Spike-moss	*Selaginella apoda*		*Uncommon*	S3	1	2023	1
Northern Mountain-ash	*Sorbus decora (unconfirmed)*		*Uncommon*	S3	1?	1986	3
Water Bur-reed	*Sparganium fluctuans*		*Uncommon*	S3	4	2024	2
Lesser Bur-reed	***Sparganium natans***	**T**	***Rare to Uncommon***	**S2S3**	**3**	**2024**	**1**
Yellow Nodding Ladies-tresses orchid	*Spiranthes ochroleuca*		*Uncommon*	S3	2	2002	3
Mixed Bladderwort	*Utricularia geminiscapa*		*Uncommon*	S3	1	1990	6
Humped Bladderwort	*Utricularia gibba*		*Uncommon*	S3	2	1990	2
NONVASCULAR PLANTS (mosses and liverworts)							
Sharpleaf Blind's Moss	*Blindia acuta*		*Rare to Uncommon*	S2S3	1	2024	1
Appalachian Rock Moss	*Bucklandiella venusta*		*Uncertain Rarity*	SU	1	2020	1
Translucent Fork Moss	*Dichodontium pellucidum*		*Rare to Uncommon*	S2S3	1	2024	1
Schreber's Forklet Moss	*Dicranella schreberiana*		*Rare*	S2	6	2024	1

English Name	Scientific Name	VT E or T	Rarity Status	Rank	# of sites	Year Last Seen	Last Source Code*
Hook Moss	*Drepanocladus polycarpos*		*Historical*	SH	3	2024	1
Polygamous Hook Moss	*Drepanocladus polygamus*		*Rare to Uncommon*	S2S3	1	2024	1
Varnished Hook Moss	*Hamatocaulis vernicosus*		*Rare*	S2	2	2024	1
Rolled-leaf Wet Ground Moss	*Hyophila involuta*		*Rare*	S2	4	2024	1
Cosson's Hook Moss	*Limprichtia cossonii*		*Rare*	S2	1	2024	1
Rusty Hook Moss	*Limprichtia revolvens*		*Very Rare to Uncommon*	S1S3	1	2024	1
Small Mousetail Mouse	*Myurella julacea*		*Rare*	S2	1	2020	1
Hidden Urn Moss	*Physcomitrium immersum*		*Very Rare*	S1	2	2024	1
Lidded Earth Moss	*Physcomitrium serratum*		*Rare to Uncommon*	S2S3	2	2024	1
Sullivant's Crystalwort Liverwort	*Riccia huebeneriana ssp. sullivantii*		*Rare*	S2	1	2024	1
Hooked Scorpion Moss	*Scorpidium scorpioides*		*Rare*	S2	1	2024	1
Donn's Bristle Moss	*Seligeria donniana*		*Very Rare*	S1 - new	3	2024	1
Tiny Bristle Moss	*Seligeria pusilla*		*Very Rare*	S1 - new	1	2024	1
Four-Toothed Moss	*Tetrodontium ovatum*		*Very Rare*	S1	1	2024	1
INSECTS							
Yellow-banded Bumble Bee	***Bombus terricola***	**T**	***Rare to Uncommon***	**G3G4, S2S3**	**2**	**2022**	**5**
Promethea Silkmoth	*Callosamia promethea*		*Uncommon*	S3	2	2021	5
Dragonhunter (a dragonfly)	*Hagenius brevistylus*		*Uncommon*	S3S4	1	2019	5
VERTEBRATE ANIMALS							
Yellow-bellied Flycatcher	*Empidonax flaviventris*		*Uncommon*	S3B	1	1999	4
Common Loon	*Gavia immer*		*Uncommon*	S3B	5	2024	2
Wood Turtle	*Glyptemys insculpta*		*Uncommon*	G2G3, S3	4	2024	1



Figure 16. A Gallery of Rare Plants, clockwise from upper left: Rare mosses *Hyophila involuta* and *Dicranella schreberiana* on limy bedrock along a stream; rare Buxbaum's Sedge (*Carex buxbaumii*) in a fenny beaver meadow; uncommon Broadleaf Twayblade orchid (*Neottia convallarioides*) in full flower in a cedar swamp; and Prickly Hornwort (*Ceratophyllum echinatum*) with its distinctive large seed, found in a peaty beaver pond.

Invasive Species

Non-native species are plants, animals, fungi, or other organisms known to have been recently introduced to our region, usually by direct or indirect human activities – which include both intentional and accidental introductions. Only a relatively small proportion of all the non-native species on our landscape are considered invasive. Invasive species are those non-native species that have a demonstrated or likely ability to harm the environment, economy or human health. Typically, they can become very abundant, very fast, often in a wide variety of landscape settings and lead to problems, such as displacing, outcompeting, or directly killing native species, substantially altering the structure of natural communities, changing important ecological processes such as nutrient and water cycles or fire regimes, causing direct health hazards, or interfering with economic activities like agriculture or forestry.

This study is not a systematic or comprehensive inventory of invasive species in Cabot, but incidental observations and reports from other sources are compiled here to promote awareness, prevent spread, and support control efforts. Table 7 provides a summary of invasive plants and animals observed during this study or reported elsewhere, though undoubtedly others are present.

Table 7. Invasive Species Known from Cabot, VT.

English Name	Scientific Name	Status	Distribution Notes
PLANTS			
Bishop's Weed (Goutweed)	*Aegopodium podagraria*	VT Class B Noxious Weed	River banks and floodplains near village, likely scattered around homesites.
Wild Chervil	*Anthriscus sylvestris*	VT Watch List	Mainly roadsides and open habitats.
Japanese Barberry	*Berberis thunbergia*	VT Class B Noxious Weed	One iNaturalist observation, likely scattered in woodlands and edges.
Common Barberry	*Berberis vulgaris*	VT Class B Noxious Weed	Sparsely but widely scattered in woodlands and edges, several iNaturalist observations.
Cypress Spurge	*Euphorbia cyparissias*	VT Watch List	One iNaturalist observation.
Knotweed	*Fallopia japonica (Polygonum cuspidatum)*	VT Class B Noxious Weed	Mainly on Winooski River banks and floodplains, esp. in village, near Durant Cemetery, lower river segments.
European Meadow-sweet	*Filipendula ulmaria*	VT Watch List	Spreading along Route 2 near Goodrich's Maple/ Molly Brook Swamps, likely scattered elsewhere.
Giant Hogweed	*Heracleum mantegazzianum*	Federal Noxious Weed	Near Elm St. - active control efforts.
Yellow Flag Iris	*Iris pseudacorus*	VT Class B Noxious Weed	Scattered in beaver wetlands in at least 1 site.
Morrow's Honeysuckle	*Lonicera morrowii*	VT Class B Noxious Weed	Most widespread invasive in town, abundant in disturbed forests, old ag lands, edges, beaver wetlands, powerlines, etc. - noted in at least 7 survey blocks.
Purple Loosestrife	*Lythrum salicaria*	VT Class B Noxious Weed	One iNaturalist observation, usually scattered in wetlands.
Wall Lettuce	*Mycelis muralis*	VT Watch List	Rapidly becoming widespread, esp. in richer woods, can invade undisturbed forests. Noted in at least 7 survey blocks.
Reed Canary grass	*Phalaris arundinacea*	VT Watch List	Problematic for riparian restoration, but sometimes used as forage, noted at 3 sites, likely widespread.

English Name	Scientific Name	Status	Distribution Notes
Common Reed	*Phragmites australis*	VT Class B Noxious Weed	Small patches in wetlands & Winooski River floodplain in at least 3 survey blocks.
Common Buckthorn	*Rhamnus cathartica*	VT Class B Noxious Weed	Sparsely scattered in woodlands and edges.
Purple Willow	*Salix purpurea*		Winooski river banks near Durant Cemetery, perhaps persistent from bank stabilization planting. Of growing concern displacing natives in riparian zone.
Periwinkle	*Vinca minor*	GMNF NNIS List	One iNaturalist observation.
ANIMALS			
Emerald Ash Borer (EAB)	*Agrilus planipennis*		2 new sites found in 2 blocks in 2024 in wetlands. First detected in Cabot in 2022. Entire town is considered within 'infested area'.[14]
Banded Mystery Snail	*Viviparus georgianus*		Abundant in Molly's Falls Pond/ Marshfield Reservoir - Known to VTDEC.



Figure 17. Distinctively striped empty shells of the invasive Banded Mystery Snail (*Viviparis georgianus*) abound along the shores of Molly's Falls Pond.

[14] VT ANR EAB Infested Area Map
https://vtanr.maps.arcgis.com/apps/PublicInformation/index.html?appid=cfda013ad1464b7b9103a3d7806f0cc5

Recommendations and Future Work

One of the intents of a natural resource inventory is to provide guidance supporting the stewardship of the documented significant features. While site-specific management recommendations are beyond the scope of this effort, I offer some generalized guidance as a starting point, with the primary objective of protecting or improving the ecological condition of the significant features. Appropriate conservation strategies and compatible uses will vary depending on the type of natural community or rare species present. Some need a hands-off approach while others are compatible with a wide range of land management and recreational uses.

Landowners interested in more specific information about significant features documented on their property can reach out to the Cabot Conservation Committee.

- Individualized, site-specific management recommendations are preferable to generalized guidelines and should be sought whenever possible. The VT Fish and Wildlife Department's Natural Heritage Inventory staff can provide valuable input in this regard.
- Small patch natural community occurrences, especially rare or uncommon types and wetlands, should ideally be treated as passive management areas and have naturally vegetated buffers (typically forest) with minimal disturbance, unless there is a compelling site-specific ecological reason to the contrary (e.g., invasive species control).
- Large-patch and matrix forming natural community types can typically be managed with routine best management practices for forestry operations, though ideally some sections would be set aside or managed with longer rotations to develop older forest conditions, and older 'legacy trees' should be maintained for their habitat and biodiversity benefits.
- Owners of ecologically significant features who are eligible for the state's Use Value Appraisal (UVA) or 'Current Use' property tax abatement program may be able to designate Ecologically Significant Treatment Areas (ESTAs) or Reserve Forestland in their UVA management plan to conserve and protect the significant features while expanding forest management options and retaining tax benefits.
- Rare species occurrences are typically best left passively managed unless species or site-specific characteristics suggest otherwise. Making management decisions for these areas should typically involve someone knowledgeable with the particular rare species as well as the site. Some exceptions to passive management might include species that benefit from increased light or soil disturbance for reproduction, or sites that need control of invasives or other ecological restoration activities.
- Controlling invasive species before they become widespread at a site is generally desirable, though not always possible. Typically, control methods creating less disturbance are preferable to avoid creating new sites for invasive colonization, though physical treatments (e.g., mechanical removal) are often preferable to chemical treatments.
- Maintaining and restoring adequate wetland and riparian (streamside) buffer vegetation, along with avoiding further encroachment into river corridors, provides important protection for these highly ecologically significant features, while safeguarding water quality, enhancing habitat connectivity, and protecting riverine processes like flood mitigation.

- While most high priority features were visited, at least in part, additional inventory is likely to reveal additional significant features, especially at sites and survey blocks that were not visited. Table 2 and Figure 9 show which blocks remain unvisited, and Appendix B, the Potentially Significant Survey Blocks List, provides leads on potentially significant features to visit in each block, based on remote landscape analysis.
- Many confirmed and potential vernal pools have been mapped in Cabot, but, since visits largely occurred from midsummer into the fall, most could not be fully assessed for state-significance. These 'locally significant' vernal pools, along with other 'unverified' potential pools from the statewide Vernal Pool Mapping Project, should be revisited in spring to document amphibian breeding use. Vernal pools can be assessed using VNHI data forms or through the Vermont Center for Ecostudies "Vermont Vernal Pool Monitoring Project" materials.



Figure 18. A scenic fall vista across Peacham Pond and the granite hills of Groton State Forest from near the summit of Hooker Mountain.

Survey Block Descriptions for Visited Sites

The following survey block descriptions succinctly summarize the main features of greatest ecological interest at each of the *visited blocks*. Only a portion of each block was visited due to time and access constraints. Importantly, the blocks NOT discussed here also have important ecological features, both known and unknown. Further study is required to find and document these fully, but preliminary information from remote landscape analysis is presented in the Potentially Significant Survey Blocks List in Appendix B. Descriptions are organized by survey block numbers, which correspond to Figure 9 (not to forest block numbers in Figure 6).

* Asterisks after natural community types indicate State-Significant occurrences.

Coits Pond Vicinity – Block 1

Significant Natural Communities: Deep Bulrush Marsh*, Northern White Cedar Seepage Forest*, Intermediate Fen*

This small block encompasses the slopes surrounding Coits Pond in the northwestern part of town and is part of a large, High Priority forest block. The hidden gem of Coits Pond is sometimes considered the source of the Winooski River (though of course every river has many sources). The largely undeveloped pond shoreline is almost entirely ringed by cedars which are also prevalent across substantial swaths of Northern White Cedar Seepage Forest on state-owned and other private lands around the pond. This alkaline pond supports numerous rare and uncommon wetland and aquatic plants, as well as nesting loons and Cabot's only example of Deep Bulrush Marsh natural community type, in the shallows of the southern arm. There are also small areas of Intermediate Fen scattered around the pond shore. Many of these beautiful and exciting features are easily seen by paddling from the public water access at the south end, though visitors should be aware of seasonal closures to protect loon nesting.



Figure 19. A 'bog log' hosts carnivorous sundew (*Drosera rotundifolia*) plants with Deep Bulrush Marsh behind in the shallows of Coits Pond.

Winooski Headwaters North – Block 2

Significant Natural Communities: Rich Northern Hardwood Forest*, Northern White Cedar Swamp

This remote-feeling area of forested hardwood hills rises just east of Coits Pond and is part of a large, High Priority forest block. Features of particular note include a rugged, diverse, and mature

Rich Northern Hardwood Forest slope adjacent to old granite quarry pits, and a small Northern White Cedar Swamp. Though not visited, the south-facing slopes also support one of Cabot's few Red Oak-Northern Hardwood Forest stands. There are numerous small beaver wetlands and swamps scattered amongst these hills, and the uppermost could be said to vie for the title of the source of the Winooski River. Several rare and uncommon plants are known from the area, including the tiny Donn's Bristle Moss *(Seligeria donniana)*, a species newly documented for Vermont.

Walden Line Hill – Block 3

Significant Natural Communities: Rich Northern Hardwood Forest

This small hill top forest patch includes a good condition Rich Northern Hardwood Forest stand with diverse flora and some areas of larger trees. If additional rich forest areas are found nearby, such as in the 'Walbridge Ridge' block, the combined occurrence might be considered state-significant. Several small perched seepage wetlands are present on the hilltop and likely provide at least marginal amphibian breeding habitat akin to Vernal Pools.

Winooski Headwaters South – Block 4

Significant Natural Communities: Rich Northern Hardwood Forest*, Intermediate Fen*, Northern White Cedar Swamp*, Northern White Cedar Seepage Forest, Boreal Floodplain Forest.

This large and highly important block surrounds over 2 miles of the uppermost headwaters of the Winooski River below its source in Coits Pond. Maintaining the unfragmented and natural condition of this extensive upper river area provides important flood mitigation benefits downstream as well as supporting health of the river system. Through parts of this reach, the river loses its channel amid numerous beaver meadows, including a large wet meadow once known as McFarland's Meadow, that was grazed and which formerly had a small mill dam structure. This rewilded area now includes a variety of enriched wetland habitats including Cabot's largest Intermediate Fen, a rare community type, and adjacent sections of older Northern White Cedar Swamp with large trees. Other small Intermediate Fen



Figure 20. Extensive fens, cedar swamps, and beaver meadows along the upper Winooski River.

patches and enriched Alder Swamps are present amongst the riparian wetlands. Slopes above the river support large swaths of very good condition Rich Northern Hardwood Forest with lush, diverse herb flora and large sugar maple and ash. This block also includes the Town Forest with its extensive trail network. Ecological highlights of the Town Forest parcel include locally significant examples of Northern White Cedar Seepage Forest and rare Boreal Floodplain Forest on the small stream, which some sources (VHD) consider to be the actual upper reach of the Winooski River (rather than the branch from Coits Pond). The Town Forest hosts another site for the tiny Donn's Bristle Moss *(Seligeria donniana)*, newly documented in Vermont. A number of other rare and uncommon species are known throughout the block. Within this larger block there are many other areas of wetlands, ledges, and rich forest that remain to be visited.

North Central Hills – Block 6
Significant Natural Communities: Vernal Pools*

Numerous small, open beaver wetlands occur along a multi-branched small stream network across the dissected topography of this block that supports critical regional habitat connectivity. Some of these wet meadows are somewhat fen-like and small areas of Northern White Cedar Seepage Forest occur adjacent to some of them, though many of these areas appear to be redeveloping natural conditions after a history of agricultural clearing. At least two vernal pools are present, one was confirmed to be highly productive of amphibians with numerous spotted salamander eggmasses and wood frog tadpoles. The other pool appears highly likely to be similarly productive, but needs spring visitation to confirm. An uncommon plant is also known from enriched wetlands.

Burbank Hill – Block 8
Significant Natural Communities: Northern White Cedar Swamp*, Rich Fen*, Vernal Pools

This broad, rolling hill drains northeast to the swamps at the north end of Joe's Pond and is peppered with many enriched wetlands. A network of at least eight patches of Northern White Cedar Swamp are scattered throughout the landscape of this block. Conditions vary, as some areas have been heavily harvested, but most of the swamps are in very good condition with many trees over 100 years old and diverse herb and moss floras typical of the community type. Several rare and uncommon plants are scattered about the enriched wetlands, that also include a tiny Rich Fen and other small patches of enriched



Figure 21. Numerous patches of uncommon Northern White Cedar Swamp are scattered across Burbank Hill collectively making a State-Significant occurrence.

seepage and beaver meadows. Two or three large Vernal Pools are present, but were dry at the time of survey preventing a full assessment of their significance and amphibian breeding productivity.

Joe's Brook & Joe's Pond Vicinity – Block 10

Significant Natural Communities: Northern White Cedar Swamp*, Northern White Cedar Seepage Forest*, and Sweet Gale Shoreline Swamp*.

An extensive, 200+ acre wetland complex spanning into neighboring Walden and Danville, lies at the northwest end of Joe's Pond, flanking Joe's Brook above its mouth into the pond, as well as along a smaller unnamed drainage to the west. This enriched peatland complex is one of the two largest wetland systems in Cabot and is one of the premier biodiversity hotspots in town. The wetland complex is a mosaic of Northern White Cedar Swamp, Northern White Cedar Seepage Forest, and Sweet Gale Shoreline Swamp, all State-Significant, as well as other marsh and aquatic bed communities. This area supports a wide array of wildlife and is an excellent recreational and wildlife viewing asset for the town. Additional important biodiversity features include numerous rare and uncommon species, mainly plants, some of which are known from only a few other locales statewide. This wetland system is vital to protecting the water quality of Joe's Pond. Part of the area is conserved by the Passumpsic Valley Land Trust and is accessible by water and via the Lamoille Valley Rail Trail.



Figure 22. Extensive Sweet Gale Shoreline Swamps, water lily aquatic beds, and Northern White Cedar Swamps (background) comprise much of the 200+ acre wetland complex around the 'Spectacle Ponds' and Joe's Brook at the northwest end of Joe's Pond.

Upper Molly's Brook Slopes – Block 11
Significant Natural Communities: Rich Northern Hardwood Forest



Figure 23. A hill top Rich Northern Hardwood Forest stand managed for sap production – a frequent use of rich woods in Cabot and elsewhere.

This larger block spans the unnamed hills and southeast aspect slopes west of Molly's Pond above Route 2 from Joe's Pond south to Molly's Brook Swamp and Danville Hill Road. Over a mile of Molly's Brook headwaters flows through interior forest with numerous associated beaver wetlands and perched swamps that are likely calcareous. These areas were not visited but are of interest. The steeper southeast-facing hillslopes support at least one, and likely several, patches of mature Rich Northern Hardwood. Spanning multiple parcels and ownerships, the stand conditions and land use history vary across the occurrence. The visited section is largely on a steep southern aspect, with a mature, relatively even-aged sugar maple canopy, with scattered white ash, few shrubs, and a characteristically diverse herb flora. It is largely managed for maple sap production. Several additional likely patches are scattered across the slopes to the southwest and northeast – if these can be confirmed the full occurrence may be State-Significant. The very rare Four-toothed moss (*Tetrodontium ovatum*), only recently rediscovered in New England and new to Vermont, was found growing on a small outcrop. This block supports high priority north-south habitat connectivity through the region.

Cabot Plains Southwest – Block 14
Significant Natural Communities: Rich Northern Hardwood Forest, Intermediate Fen



Figure 24. A snipe nest is little more than a clutch of eggs nestled amid moss and sedges in a wet field.

Only a small part of this highly irregularly shaped block was visited. Hardwood and mixed stands span the gently sloping, even terrain with many broad areas of groundwater seepage, potential seepage forests, and adjacent wet fields. One of these wet fields was found to include a tiny Intermediate Fen-like wet meadow, too small for State-Significance, but supporting many characteristic fen species. This meadow was serendipitously discovered to host ground nesting snipe, whose speckled eggs were found nestled amid the sedges after flushing the adult bird. Nearby, there is a locally significant Rich Northern Hardwood Forest stand that has long been sugared

and includes many massive, gnarly old sugar maples. One of these trees was once observed to be used by a family of hibernating bears.

Cabot Village North – Block 18

Significant Natural Communities: Northern White Cedar Swamp*, River Sand or Gravel Shore*, Alluvial Shrub Swamp

This moderate size block has several perched Northern White Cedar Swamps together spanning over 15 acres that include scattered larger cedars up to 170 or more years old. These swamps are varied in condition, some having been intensively harvested many decades ago, and all are interconnected by a complex drainage system of intervening channels and groundwater seepage. Numerous other perched wetlands are present and there are likely also some rich forest areas associated with a substantial, steep southeast aspect slope, likely with ledges, though none of these were visited. The eastern edge of this block abuts the upper village area adjacent to the Cabot Recreation Fields, where it includes a section of Winooski River valley bottom and extensive riparian wetlands. This dynamic area has experienced major recent flooding dynamics, channel shifts and sediment deposits during the major floods of 2023 & 2024. The floodplain wetlands immediately adjacent to the recreation fields includes noteworthy examples of River Sand or Gravel Shore and Alluvial Shrub Swamp natural communities as well as a number of rare and uncommon species. This river segment includes a short, but scenic bedrock cascade on the Winooski, publicly accessible across the fields. This natural bedrock grade control is at least in part responsible for impounding and creating the large, open wetland meadow just above the village along South Walden Road. This wetland, which has historical ditching, is an important flood mitigation asset for the village, as well as an important wildlife habitat, and may warrant examination for wetland restoration.



Figure 25. Large areas of River Sand or Gravel Shore communities were built or refreshed by recent flood events along the Winooski River, like this example below the Cabot Recreation Fields. Seasonally exposed shorelines like this provide a unique habitat setting for certain specialized plants and animals that are adapted to take advantage of the seasonally available, highly dynamic, full sun conditions.

West Hill Pond Vicinity – Block 20

Significant Natural Communities: Northern White Cedar Swamp*, Intermediate Fen*, Sweet Gale Shoreline Swamp, Boreal Floodplain Forest



Figure 26. Bear bite marking on cedar in a Northern White Cedar Swamp.

This large block stretches from West Hill Pond north to Coits Pond along the northwestern edge of town and is part of a much larger forest block of great importance for habitat connectivity across the region. West Hill Pond itself is created or at least enlarged by an old stone dam at the outlet and is an alkaline pond fed largely by twin drainages entering from the north and northwest. These twin drainages support extensive calcareous, beaver-influenced, peaty wetland systems with State-Significant Northern White Cedar Swamps, patches of rare Intermediate Fen meadow in some beaver meadows, calcareous Sedge Meadows, and Alder Swamps, as well as a tiny patch of rare Boreal Floodplain Forest community along one small stream segment. Many rare and uncommon plants are found scattered amongst these secluded high-pH wetlands, as well as around the pond itself, whose shoreline includes patches of Sweet Gale Shoreline Swamp and Northern White Cedar Seepage Forest. The pond offers seemingly lightly used paddling access from the south end, with good wildlife watching opportunities, especially at the north end. The block also includes at least one remotely mapped Vernal Pool that appears likely to be significant, though it still needs to be field-confirmed.



Figure 27. The beautiful and diverse mosaic of enriched Sweet Gale Shoreline Swamp, marshes, and aquatic beds at the north end of West Hill Pond is a great spot for wildlife viewing.

West Hill Pond South – Block 21

Significant Natural Communities: Calcareous Red Maple-Tamarack Swamp*, Alluvial Shrub Swamp

This small forest block extends from the unnamed outlet stream of West Hill Pond west to the town line and south to Jug Brook. Calcareous, beaver influenced wetlands flank the small outlet stream with a mixture of Sedge Meadows, Hemlock-Balsam Fir-Black Ash Seepage Swamp, Alder Swamps, and, most interestingly two patches of rare Calcareous Red Maple-Tamarack Swamp fed by enriched groundwater seepage off the flanking slopes. These forested peatlands share many species with Intermediate Fen communities, though with much more woody plant growth, and have similarly high pH, measuring as high 8 here. These wetlands and limy ledges along the brook support a number of rare and uncommon species. Though small, the outlet stream has a small, vertical falls and the ruins of an old mill site, attesting to former small-scale industry in this part of town. There are also small areas of Alluvial Shrub Swamp flanking the outlet stream. Further west, there are a few potential vernal pools, one of which was remotely mapped by the Vernal Pool Mapping Project, and various small wetlands, as well as the upper segment of Jug Brook. None of these were visited or field verified, but warrant further study.



Figure 28. A Calcareous Red Maple-Tamarack Swamp along the outlet stream from West Hill Pond. A sedge-dominated herb layer is frequently found in this rare swamp type.

West Hill to Winooski River – Block 23

Significant Natural Communities: Intermediate Fen*, Rich Fen*, Vernal Pools, Calcareous Red Maple-Tamarack Swamp, Hemlock-Balsam Fir-Black Ash Seepage Swamp

This block lies just north of Lower Cabot and west of Upper Cabot and hosts the Talbert Farm Trail network made available to the public by landowners. This makes it among the more accessible parts of Cabot and many of its outstanding ecological features can be easily seen from this trail network. The gently rolling terrain is cloaked in mature sugar maple and hemlock hardwood forests descending toward the Winooski River and Jug Brook. There are 2 or 3 classic Vernal Pools within and near the sugarbush that are likely highly productive of amphibians. Numerous small, perched mixedwood and hardwood swamps are present with deeper organic soils; these include locally significant Calcareous Red Maple-Tamarack Swamp and Hemlock-Balsam Fir-Black Ash Seepage Swamps. Unfortunately, Emerald Ash Borer (EAB) was detected in one swamp. Around the northern edge of the block and adjacent hayfields there are two significant fens representing both Intermediate Fen and Rich Fen communities. Both have influences from adjacent ag lands and historical alterations, but still offer great opportunities for experiencing these rare community types. Several rare and uncommon species were found among the fens and other areas. These include the first New England record of the Tiny Bristle Moss (*Seligeria pusilla*), hundreds of miles distant from the nearest known occurrences.



Figure 29. A Rare Intermediate Fen nestled in the swale below Talbert's sugar house.

Danville Hill – Block 24

Significant Natural Communities: Rich Northern Hardwood Forest*

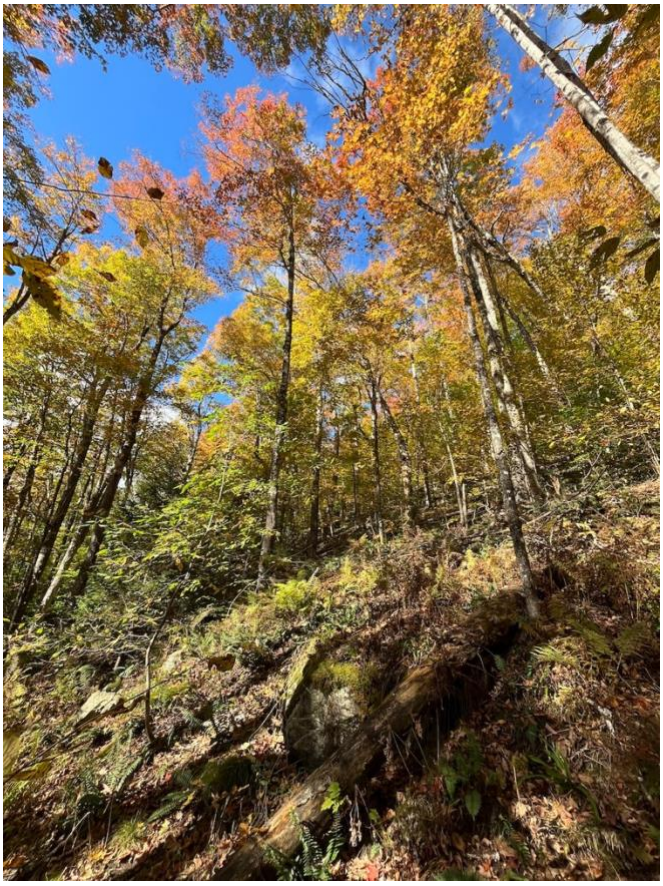


Figure 30. Steep, rugged Rich Northern Hardwood Forest in its fall glory on Joe's Hill.

Danville Hill lies at the heart of the single largest forest block that is entirely within Cabot's boundaries. This block is an essential link in both local and regional habitat connectivity from the Groton State Forest region northward. The nearly 2,200ft hardwood dominated hill hosts some of the most rugged terrain in Cabot, particularly across the steep southeast-facing slopes that provide a scenic backdrop above Route 2 from Molly's Falls Pond. The nubble-y summit topography includes lesser summits, one of which is sometimes referred to as Joe's Hill, tied to local stories of Whetstone Ledges and a possible cave used by Joe of Joe's Pond fame. The most striking ecological feature is the extensive Rich Northern Hardwood Forest found across the steep slopes and ridgetop. While not fully mapped yet, the area is State-Significant with mature, diverse, and rocky rich forest stands, that are extensively, but not entirely, tapped for maple production. There is a small core of granitic bedrock, but most of the hill is mapped as Gile Mountain and Waits River Formation bedrock types, with the rich forest appearing to align mostly with the more calcareous Waits River bedrock, as would be expected. Interestingly, the ridgetop forest hosts at least one mature red oak and scattered glade openings atop the bedrock ridge. In some sections the bedrock slabs support remarkable carpets of Sprengel's sedge (*Carex sprengelii*), a species that is not rare, but is rarely seen in such abundance. Local knowledge and artifacts suggest parts of the hilltop have been sugared since the early 1800's, and it seems likely that the more rugged parts of the hill have been continuously forested and were never cleared, which probably cannot be said about many places in Cabot. Other outlying potential features of this block include a possible Vernal Pool, small beaver wetlands, possible hemlock seepage forest slopes along drainages above Route 2 and across large areas of Cabot soils to the northwest, but these need field verification.

Molly's Brook Swamp – Block 25

Significant Natural Communities: Northern White Cedar Swamp*, Northern White Cedar Seepage Forest*.

This large (~200 acres) swamp complex lies at the foot of Danville Hill adjacent to Route 2 and it vies with the Joe's Pond complex as the largest wetland system in town. It receives drainage from Molly's Brook and another unnamed stream and absorbs large amounts of runoff from the steep adjacent slopes. Northern White Cedar Swamps dominate this complex (~125 acres or more) with

small areas of Northern White Cedar Seepage Forest at the margins, and numerous small, open beaver meadow and alder swamp patches in the interior that form a dynamic habitat mosaic. Several rare and uncommon species are known from the area and some of the cedars are quite old, with some individuals over 200 years old. Some parts of the wetland system have been cleared and/or ditched in the past for agriculture, and timber harvesting has resulted in a mosaic of stand ages within the swamp.



Figure 31. A peak into the vast Molly's Brook Northern White Cedar Swamp.

Hooker Mountain – Block 27

Significant Natural Communities: Temperate Acidic Cliff, Northern Hardwood Talus Woodland, Red Oak-Northern Hardwood Forest, Northern Hardwood Forest.

Hooker Mountain provides physical diversity to the Cabot landscape with its steep, southeast aspect, granitic slopes, which are locally rare. This rugged mountain is one of the higher points in town, though the 2,300ft summit is just over the line into Peacham. The warm, well-drained south slope makes it one of only four known sites for naturally occurring red oak in town, with a small Red Oak-Northern Hardwood Forest stand on the rocky slopes below a small Temperate Acidic Cliff and Northern Hardwood Talus Woodland patch. This jumbled, bouldery area has deep chimneys and crevasses in the rock affording excellent denning potential. The mountain is also interesting in that it is not pure granite, but has small included masses of the surrounding calcareous Waits River Formation bedrock that result in locally enriched conditions. The rugged and extremely bouldery nature of the slope has left it less frequently touched by harvesting, so it supports some of the older hardwood forest observed in town. A few rare and uncommon plants are found here. This



Figure 32. An autumnal view across Molly's Falls Pond to Camel's Hump from Hooker Mountain.

block is part of a very large and highest priority forest block essential to habitat connectivity in the region.

Molly's Falls Pond Vicinity (Marshfield Reservoir) – Block 28

Small portions of the exposed shorelines around the reservoir were visited late in the season. While this habitat is human created by dam operations, it mimics the naturally occurring, seasonally-exposed shoreline habitats found on larger lakes and along river shores and drained beaver meadows, such as Lake Sand Beach and Lake Shale or Cobble Beach communities. Not surprisingly, specialized plants typical of these communities have colonized this artificially created shoreline habitat, including several rare and uncommon species adapted to life with seasonally fluctuating water levels. The reservoir provides important water-based recreational opportunities to the region, including wildlife viewing. It also offers expansive scenic views of Danville Hill and Hooker Mountain. Unfortunately, the aquatic invasive Banded Mystery Snail (*Viviparus georgianus*) is abundantly established in the reservoir, with its distinctively striped shells being easily found along the shorelines. Visitors should take care not to spread this invasive animal despite its potentially attractive appearance. Much of this block is state land surrounding the reservoir and it is part of a very large and highest priority forest block essential to habitat connectivity in the region.



Figure 33. Hooker Mountain from Molly's Falls Pond shoreline. Note the small patch of red oak on the steep, south slope, maintaining its green leaves longer than the other hardwoods.

Thistle Hill – Block 30

Significant Natural Communities: Vernal Pools

This small hardwood hilltop block supports maturing semi-rich sugar maple forest on the 1,881ft summit surrounding a large, classic vernal pool with a smaller satellite pool nearby. These areas were dried up when visited, revealing abundant wildlife tracks, including bear, raccoon and deer. Though needing spring confirmation of amphibian breeding levels, these pools host tiny fingernail clams and show every likelihood of being highly productive – if confirmed this would make them State-Significant pools.



Figure 34. Bear tracks, mother and cub, in the late season muck of a vernal pool on Thistle Hill.

Lower Winooski Floodplain – Block 31

Significant Natural Communities: Alluvial Shrub Swamp

This block is an outlier among the survey blocks in Cabot that is in part defined by its soils. Unlike the predominantly glacial till soils of the other regions, this block has a mixture of recent riverine deposits and water-washed sediments deposited roughly 10-12,000 years ago into the glacial lake that once filled the Winooski valley. These origins result in a region of flatter topography and largely stone-free soils that are highly conducive to agriculture and other human uses. Correspondingly, this block has been the most intensively used and is largely altered from natural conditions, and is mostly excluded from the VCD forest block mapping. Despite this it is a very important area to include here due to its unique (in Cabot) larger river floodplain landforms and ecology that continues to foster unique riparian habitats and rare species, support habitat connectivity for wildlife, and provide essential riparian functions like flood flow attenuation. This block likely supported Silver Maple-Ostrich Fern Floodplain Forest or other floodplain forest types prior to clearing for agriculture, but these natural communities have essentially been extirpated from Cabot, with only the tiniest scraps and suggestive remnants remaining or recovering. Numerous smaller floodplain wetlands are mapped and protecting or restoring these is important for their contributions to flood storage and resilience, particularly for Lower Cabot and downstream communities. There are many potential opportunities for riparian habitat restoration in this block as large stretches of the river channel have little forested buffer. Some areas on the east side of the river have more intact natural vegetation with connectivity into the



Figure 35. The lower Winooski River behind Durant Cemetery. Silty shorelines, fine sediment river bottoms, and a broad, largely cleared floodplain characterize this section of the river in Cabot.

adjacent upland forests, though it could be further improved. Connectivity to the west is very limited by open lands and homes, as well as Route 215. Several rare and uncommon species make their homes here despite the historical habitat changes. Small areas of uncommon Alluvial Shrub Swamp are present in lower floodplain sections, along with seasonally exposed river shore habitats. Cabot's only waterfall on a larger river is visible just upstream of Saw Mill Road.

West Winooski Ridges – Block 32

Significant Natural Communities: Northern White Cedar Swamp*, Northern White Cedar Seepage Forest, Beaver wetlands.

This large forest block spans an area west of the Winooski River valley that includes areas of distinctive, closely spaced parallel ridges, a landform also found in parts of the Waits River Formation bedrock unit in neighboring towns. These ridges have small exposed ledges and cliffs, often with locally enriched conditions associated with weathering beds of calcareous rock that result in small areas of Rich Northern Hardwood Forest. Six potential Vernal Pools were remotely mapped in this area by the statewide Vernal Pool Mapping Project, but none of the three visited sites were actually pools; the others remain to be field checked. Beaver Brook drains much of this area and the wetlands along its path are some of the most interesting features here. At the top of the watershed lies one of the larger beaver wetlands in town, and a very scenic one at that. This site is locally known as the old mill pond for a former potato starch mill that once impounded the area. Stone remnants of the old mill structure can still be found, but beavers have reclaimed the role of being the primary impounding force here. The nearly twenty-acre wetland is a mix of open water, fenny Sedge Meadow and Alder Swamp with a small patch of Northern White Cedar Seepage Forest at the edge. Wildlife tracks and sign abound here in the exposed muddy shores, and the pond provides excellent waterfowl habitat. A quarter mile downstream lies another 20-acre wetland, this one a Northern White Cedar Swamp flanking the channel. Larger cedars are present and bear sign is abundant with some cedars showing years of bite marking as signpost trees for generations of bears. This block supports critical regional habitat connectivity through the southern portion of Cabot.



Figure 36. The 'old mill pond' wetland near the head of Beaver Brook, now reclaimed by beavers and other wildlife with a diverse mixture of wetlands.

Jug Brook Vicinity – Block 33

Significant Natural Communities: Calcareous Red Maple-Tamarack Swamp*, Sedge Meadow, Rich Northern Hardwood Forest, Hemlock Seepage Forest variant*, Hemlock-Balsam Fir-Black Ash Seepage Swamp, Intermediate Fen*, Beaver Wetland

This block supports of diversity of features with foci of interest in the riparian zone of Jug Brook, in a larger enriched wetland complex west of the Catamount Airfield at the headwaters of Beaver Brook, and in rich upland forest to the north. Areas of natural and semi-natural floodplain and wetland habitat flank Jug Brook down to its mouth at the Winooski River. These riparian wetlands include a small State-Significant Calcareous Red Maple-Tamarack Swamp, enriched Sedge Meadows, Alluvial Shrub Swamps, and various other habitats, many influenced by past of ongoing agricultural use. Away from this valley bottom, the block is largely mixedwood forest on linear, parallel ledgy terrain, similar to block 32. This terrain holds numerous, small, perched mixedwood swamps and seepages (not visited), as well as the larger calcareous, beaver influenced wetland system next to the airfield. This complex includes extensive Hemlock Seepage Forest and Hemlock-Balsam Fir-Black Ash Seepage Swamp at its head, feeding down into open enriched, peaty beaver meadows, one of which includes a small Intermediate Fen. Some of these wetlands have very high pH readings around 8. There is also a mature, rich woods sugarbush at the north edge of the block. Numerous rare and uncommon species are associated with the enriched wetlands and riparian zone.



Figure 37. An Intermediate Fen meadow amid the calcareous wetlands west of the Catamount Airfield.

Mud Ponds East – Block 34

Significant Natural Communities: Northern Hardwood Seepage Forest*, Northern White Cedar Seepage Forest.

This large forest block includes substantial gentle slopes of Cabot and related soil series that are often associated with hardpans and groundwater seepage, so it was not surprising to find large areas of two types of Seepage Forest along the lower slopes of the drainage. These uncommon communities are locally somewhat more common due to the abundance of dense till settings on gentle slopes, leading to widespread surface seepage. Further north where the terrain flattens, there are also pockets of Hemlock-Balsam Fir-Black Ash Seepage Swamp. This block also supports critical regional habitat connectivity through the southern portion of Cabot.

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Appendix A: Vermont Natural Heritage Inventory Protocols

Explanation of Legal Status and Information Ranks[15]

State Rank and Global Rank - Value that best characterizes the relative rarity (abundance) or endangerment of a native taxon within Vermont's geographic boundary or throughout its range, respectively. Ranks are as follows:

1 - 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

2 - 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

3 - Uncommon (Vulnerable): Moderate risk of extinction/extirpation due to restricted range, relatively few populations or occurrences (often 80 or fewer), recent and widespread declines, or other factors

4 - General, regular, and apparently secure: May be locally uncommon or widely scattered but not uncommon on a statewide basis

5 - Common (Secure): widespread and abundant

H - Possibly extinct/extirpated: Missing; only historical occurrences but potential for rediscovery

X - Presumed extinct/extirpated: Not located despite intensive searches and little likelihood of rediscovery

U - Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or Trends

NR - Not ranked: Not yet assessed

NA - Not applicable. Element is not a suitable target for conservation for one of the following reasons: Hybrid, Exotic Origin, Accidental/Nonregular, Not Confidently Present, No Definable Occurrences

An indicator of uncertainty about the rank, either in the form of a range rank (e.g. S1S3) or a ? qualifier, may follow a numeric rank. For global ranks only, an appended T-rank indicates an infraspecies, and a qualifier after the rank in the form of a Q indicates questionable taxonomy.

State Status - Legal protection under Vermont Endangered Species Law (10 V.S.A. Chap. 123)
E = Endangered: in immediate danger of becoming extirpated in the state
T = Threatened: with high possibility of becoming endangered in the near future
PDL = Proposed for Delisting
PE = Proposed for Endangered Status (not legally protected by 10 V.S.A. Chap. 123)
PT = Proposed for Threatened Status (not legally protected by 10 V.S.A. Chap. 123)
RE = Recommended (by the Endangered Species Committee) for Endangered Status (not legally protected)
RT = Recommended (by the Endangered Species Committee) for Threatened Status (not legally protected)
RDL = Recommended (by the Endangered Species Committee) for Delisting

Federal Status - Legal protection under the federal Endangered Species Act, U.S. Fish & Wildlife Service
LE = Listed Endangered
LT = Listed Threatened
PDL = Proposed for Delisting
C = Candidate for Listing (not legally protected under ESA)

[15] Excerpted from *Rare and Uncommon Native Vascular Plants of Vermont* (VNHI 2024)

Guidelines for State-Significance

Natural Heritage Inventory
Vermont Fish & Wildlife Department
Initially drafted November 5, 1996, latest revision July 25, 2013

The following guidelines are for determining whether a particular area will be entered into the Vermont Fish & Wildlife Department's Natural Heritage Database as a species or natural community occurrence of statewide conservation significance. They are used in conjunction with the Natural Heritage Network's Element Occurrence Data Standard and Element Occurrence Specifications. These guidelines are primarily intended for staff and others providing Natural Heritage data to the Vermont Natural Heritage Inventory (VNHI)

These guidelines represent VNHI's default position on determining state-significance for a species or natural community Element Occurrence (EO). Any deviation from the guidelines needs to be clearly justified and documented either in these guidelines (see Exceptions Section) or in the Natural Heritage Database.

The terms state-significant and exemplary have been used synonymously in the past to describe important Natural Heritage Element Occurrences. The term exemplary is currently used in the Vermont Wetland Rules (Exemplary Wetland Natural Community, section 5.5) and includes all wetland natural community occurrences that VNHI determines to be state-significant.
Meeting any of the following criteria would constitute state-significance for the purpose of entering an Element Occurrence into the Natural Heritage Database.

PLANT SPECIES

- Presence of any S1, S2, or state-listed (Threatened or Endangered) species;
- Presence of any G3/S3 species (e.g. Ginseng, Hill's Pondweed).

  Note that split-rank species default to the lower ranking, e.g. an S2S3 species is treated as S2 and mapped and tracked as an EO.

  S3 (but not S3S4) plant species are documented in the Natural Heritage Database with limited observational information but are not considered as state-significant.

ANIMAL SPECIES

- Known or suspected occupied breeding-season habitat for any S1, S2, or state-listed species;
- Known or suspected occupied breeding-season habitat for a G3/S3 species (e.g. West Virginia White);
- Known overwintering concentrations of S1, S2, or state-listed species;
- Known overwintering concentrations of G3/S3 species.

  Note that split rank species default to the lower ranking, e.g. an S2S3 species is treated as S2 and mapped and tracked as an EO.

  S3 and S3S4 animal species are documented in the Natural Heritage Database with limited observational information but are not considered as state-significant.

NATURAL COMMUNITIES

- Presence of an S1 or S2 natural community type with an EO Rank of A, B, or C;
- Presence of an S3 or S4 natural community type with an EO Rank of A or B;
- Presence of an S5 natural community type with an EO Rank of A.

  Note that D-ranked S1 and S2 natural communities, C-ranked S3 and S4 natural communities, and B-ranked S5 natural communities may be tracked in the Natural Heritage Database, and may be considered state-significant, if their EO Rank has been downgraded due to a temporary lowering of their condition for which recovery is expected. Justification must be provided. C-ranked Vernal Pools are tracked regardless

of whether their condition is downgraded and expected to recover because the primary basis for ranking vernal pools is amphibian breeding.

ASSOCIATIONS OF NATURAL COMMUNITIES

A site may be considered state-significant if it contains an association of natural communities for which ecologically intact examples are rare or declining in the state. There are typically strong ecological connections between the natural communities in these associations that relate to specific site characteristics, such as topography, soils, hydrology, or natural disturbance. In these cases, the association of natural communities is the state-significant feature, not necessarily all of the individual natural communities that are components of the association, although at least one component natural community should be state-significant. Examples include the following: Lake Champlain associations of Deep Rush Marsh, Lakeshore Grassland, Lakeside Floodplain Forests, Sand Beach, and Sand Dune, all closely tied to the ecological processes of flooding, wave action, wind, and sand deposition; and associations on calcareous hills of the Champlain Valley, including Mesic Maple-Ash-Hickory-Oak Forest, Dry Oak-Hickory-Hophornbeam Forest, and Temperate Calcareous Outcrop and Cliff, all tied to the warm, dry to mesic calcareous substrate of these hills.

EXCEPTIONS TO THE GUIDELINES

Great Blue Heron: While this species is ranked S3S4B, because of their concentrated nesting and vulnerability to human disturbance, VNHI does track Great Blue Heron rookeries.

Double-crested Cormorant: While this species meets the criteria for S2B it currently is not of conservation concern and is not tracked by VNHI. The species is considered a nuisance and its population in Vermont is being actively controlled. Under current conditions it is expected the population size would return to at least S4 levels if active control activities ceased.

American Eel: Though rare and of conservation concern, there are no definable occurrences to track due to their dispersed distribution while in their juvenile stage here. VNHI tracks observations as Independent Source Features.

Bryophytes: Most bryophyte S-ranks are provisional. VNHI will not track S3 bryophyte species, even as Independent Source Features, until further notice.

Appendix B: Potentially Significant Survey Blocks List.

Compiled from Landscape Analysis, VNHI and other sources.

Block #	Block Name	Location	Priority	Acres	Description	Source*
1	Coits Pond Vicinity	North corner of Cabot	H	128	largely undeveloped headwater pond with loon nesting, headwaters of Winooski R.; associated small wetlands with some cedar, emergent marshes; small cedar swamp/seepage forest to north; part of large, high priority habitat block; part state land; uncommon plant records from pond.	LA, VNHI, CNH
2	Winooski Headwaters North	North corner of Cabot	HM	519	larger area of several low, pure hardwood hills with and without granite bodies; one particularly steep west slope, possible rich woods east of steep slope; dense cedar-hardwood swamp on town line, old quarry with black ash, small oak stand on SW slope with uncommon plants on ledges, numerous riparian beaver wetlands, mapped muck soils along upper Winooski headwaters; part of large habitat block.	LA, PC
3	Walden Line Hill	On Walden town line east of S. Walden Rd	H	121	low hill, pure hardwood with 2-3 possible large VPs or small perched swamps on top, rich woods likely on gappy SE slopes, uncommon plant records.	LA, PC
4	Winooski Headwaters South	SE of Coits Pond	H	792	2+ mile long remote stretch of upper Winooski R. with numerous associated open beaver wetlands, some boggy/enriched fenny meadows, associated cedar swamps; a hemlock ravine, part of large habitat block, low mixedwood forested hills, ledgy rich woods patches along Houston Hill Rd and below, rare and uncommon plant records, includes Lower Cabot Town Forest.	LA, PC
5	Walbridge Ridge	east of Walbridge Rd	M	48	elongate hardwood hill with some steep east slopes, ~150ft elevation gain, with potential for rich woods and outcrops.	LA
6	North Central Hills	Between Walbridge Rd and Rte 215	HM	300	Numerous small, open beaver wetlands and associated cedar swamp/seepage forest drainages along multi-branched small stream network in dissected topography; potential large VP, other potential cedar seepage at NW and SE edge - possibly old field cedar; extensive mixedwood forests, possibly poorly drained, some dense conifer areas	LA, VPMP, PC
7	Burbank Hill West	Between Rte 215 and Bayley Hazen Rd	M	46	small forest patch with what looks like a classic VP in hardwoods and some seeps and poorly drained conifer areas.	LA
8	Burbank Hill	Burbank Hill, west of Rte 215 along NE townline	H	525	3 or more large, nice looking VPs, numerous small perched conifer swamps, several beaver meadow wetlands with associated cedar swamps/seepage along small stream, likely seepage forests on areas of Cabot soils, esp. to SE; small steep slopes with potential for rich outcrops, some recently harvested areas; scenic views from adjacent field on hilltop	LA, VPMP, PC
9	Brickett's Crossing Swamps	east of Brickett's Crossing Rd, west of Joe's Pond	L	39	Small, somewhat disturbed looking forest patch with 1.3 acre conifer swamp between 2 homes and a dug pond, could be cedar or boggier, disturbed?, plus other gappy cedar? seepage woodland areas, maybe post-ag.	LA

Block #	Block Name	Location	Priority	Acres	Description	Source*
10	Joe's Brook/Joe's Pond vicinity	North end of Joe's Pond, along Joe's Brook and adjacent areas	H	488	Unique wetland/ shallow aquatic ecosystem around lower brook, tributary, and north end of pond which is largest area of undeveloped shoreline on the pond. Sweet Gale Shrub Swamp EO, unmapped cedar swamps, several rare and uncommon plants, loon nesting and emergent marshes in NE inlet. Conserved lands.	VNHI, CNH, LA, PC
11	Upper Molly's Brook Slopes	SE facing slopes southwest of Joe's Pond and west of Rte 2	HM	1416	Larger forest block of small hills/ SE slopes above Rte 2, 1.2 miles of Molly's Brook through interior forest with numerous associated beaver wetlands, alder and perched swamps; tiny possibly boggy wetland -W side, nice mature SE slope rich cove forest; possible ledgy steeper slopes, old record of rare plant from successional pasture; rich fenny pasture near Rte 2 with rare plant potential; small beaver wetland/alder swamps/cedar swamp along unnamed trib. into Joe's Pond.	VNHI, LA, PC
12	Molly's Pond Vicinity	Molly's Pond	HM	193	undeveloped pond, though with cleared shores, uncommon plant records from pond, also rich fen-like conditions in some adjacent pastures with cottongrass, rare species pot'l, likely small seepage forest areas and shoreline marshes surrounding pond.	VNHI, CNH, LA
13	Cabot Plains Southeast	Between Urban Farm Way and Taylor Rd south of Cabot Plains Rd	M	429	largely mixedwood and conifer forest surrounding uppermost Molly's Brook reach with several small beaver wetlands and possible perched cedar/fenny areas.	LA
14	Cabot Plains Southwest	west of Dubray Rd	M	873	mixed/ hardwood stands on gently sloping even terrain, many seepage areas/pot'l seepage forests, some very disturbed, extensive hydric soils mapped, many patchy clearings, one potential rich area in sugarbush with large old trees with bear denning, a few small perched mixedwood swamps at NW end, small wooded streams, extensive early successional/young forest area, internal block fragmentation.	LA, PC
15	Burbank Hill West Slope	east of 215, west of Bayley Hazen Rd	M	222	potentially extensive hemlock seepage forest - large area of Cabot soil on uniform shallow slope between draws, though with some disturbance.	LA
16	Orchard View Woods	North of Burtt's Orchard	M	32	small woodlot, potentially rich woods, likely a sugarbush.	LA
17	Walden Road East	East of Winooski River, north of Cabot Village	M	314	moderate size upland forest block, a large VP is the primary remarkable feature, small headwater streams.	VPMP, LA
18	Cabot Village North	East of Winooski River north of Cabot village	HM	453	moderate size forest block with numerous small, perched conifer swamps up to 7 acres (cedar?), some muck soils, likely rich forest areas including a substantial steep SE slope feature, likely with outcrops; patches of intact Winooski R. riparian zone, rare animal habitat, a few cleared, ditched riparian wetlands/ wet meadows, good bird	LA, VNHI, PC

Block #	Block Name	Location	Priority	Acres	Description	Source*
					habitat, potential rare plants, small VP perched west of big riparian wet meadow.	
19	West Hill	small hill east of West Hill Pond	M	225	Small forest block with potential 30acre rich woods in hilltop sugar maple stand, small perched conifer swamps at north end.	LA
20	West Hill Pond Vicinity	West Hill Pond north toward Coits Pond along west edge of town	HM	616	West Hill Pond and part of large forest block to the north and west; 1 or more VPs, many small, perched conifer swamps, extensive beaver wetlands along two streams feeding W. Hill Pond including some cedar areas, muck soils, uncommon plant in pond.	LA, VPMP, VNHI
21	West Hill Pond South	south of West Hill Pond	HM	296	Small forest block with some conifer plantation, clearings, recent harvest; 1-3 nice looking VPs in hardwoods and another (only 1 VPMP) to SE in conifer, another very small possibly natural pond/VP with marshy seepage natural segments of Jug Brook and stream from West Hill Pond with small riparian wetlands.	LA, VPMP
22	Upper Jug Brook	south and west of Jug Brook	L	208	Natural and semi-natural areas along much of upper Jug Brook and mixedwood/hardwood slopes to the west, perhaps rare animal habitat but less likely; likely small seepages in concavities	LA
23	West Hill to Winooski River	west of Cabot village between Winooski River and Jug Brook	H	306	Gently rolling terrain descending to Winooski River and Jug Brook, 2 or 3 nice looking VPs on hilltop, numerous small perched mixedwood and hardwood swamps, a small patch of riparian forest on the Winooski River, small areas of glacial outwash, lacustrine and muck soils, big leatherwood colony/ probable rich woods with steep ledges.	LA, VPMP, PC
24	Danville Hill	Danville Hill NW of Rte 2	H	1789	Nearly 2200ft hardwood dominated hill, significant south slopes with steep sections, nubbly summit topography; possible rich slopes with outcrops or talus, likely VP SW of summit, small beaver wetlands; larger forest block; possible hemlock seepage slopes along drainages above Rte 2 and large area of Cabot soils to NW, possible cave locale: Whetstone Ledges associated with Joe of Joe's Pond.	LA, PC
25	Molly's Brook Swamp	west of Rte 2, east of Danville Hill	H	379	large (125 acre) state-significant cedar swamp complex in flats along multiple drainages converging east of Danville Hill, one of largest wetlands in town, likely additional cedar patch unmapped by heritage, rare and uncommon plant and animal records, lots of past and present land use disturbance of these wetlands; hemlock-NHF along drainages, likely seepage areas.	VNHI, LA, PC
26	Kidder Brook Slopes	between Rte 2 and Mack Mtn Rd.	L	396	fully forested segment of Kidder Brook down cut into even gentle slopes, much is post-ag forest, seepages likely near brook.	LA
27	Hooker Mountain	Hooker Mountain east of Marshfield Reservoir	H	508	One of the taller more distinctive hills (~2150ft in Cabot, summit in Peacham), part of larger forest block with some state land. granite in part, significant southeast slope with sparse oak and cedar ledges, possible rich woods, rare and uncommon plants records, rich cedar seepage area near Molly's Brook, likely other seepage forest to north,	LA, PC

Block #	Block Name	Location	Priority	Acres	Description	Source*
					extensive Cabot/Buckland soil, Some sections recently cutover.	
28	Molly's Falls Pond Vicinity	Molly's Falls Pond Area	HM	1189	Large reservoir, artificial but with nearly undeveloped, publicly owned shoreline and good upland buffers; uncommon plant records in pond, loons; associated and nearby wetlands. esp. perched conifer swamp/seepage SW of pond, possible hemlock seepage forest downstream of dam; old record of a 'tiny bog' between this and Peacham Pond, perhaps flooded out	VNHI, CNH, LA
29	Thistle Hill West	east of Winooski River to Rte 2 and Thistle Hill Rd	HM	1160	moderately large forest block sloping west down to Winooski River, mostly moderate slopes, mixedwood/hardwood forest, scattered incised drainages, likely with small seepages; small, rich woods/ Sugar Maple-Hophornbeam Forest knoll near Marshfield line with uncommon plant and nice VP - knoll recently cutover; small potential rich forest area and steep, likely ledgy west slope near summit - noted to have small oak stand, couple smaller potential VPs more maybe artificial pools.	LA, PC
30	Thistle Hill	west of Danville Hill	M	59	small hardwood hill with unconfirmed VP, maybe a large seep, near summit, specimen records of uncommon plants from old fields on Thistle Hill (1986).	CNH, VPMP
31	Lower Winooski Floodplain	Winooski river bottoms downstream of village	L	217	Floodplain of the lower parts of the Winooski R., largely active ag land in hay or pasture; potential rare animal habitat.	VNHI, LA
32	West Winooski Ridges	West of Winooski River along Marshfield town line	H	909	Unique parallel ledge terrain with extensive Hemlock-NHF, and hemlock ridges, bisected by drainage with muck soil wetlands, Large fenny sedge meadow/beaver pond complex, cedar swamp, and boggy stream margins; leatherwood/rich forest patch; 6 VPMP potential VPs with low to moderate likelihood; likely many small perched wetlands, small ledge systems with potential rich forest/outcrop slopes; extensive Cabot/Buckland soils - seepage forest potential. Rare animal sightings nearby, pot'l habitat, uncommon plant records.	LA, VPMP, PC
33	Jug Brook Vicinity	from Jug Brook west	HM	448	Areas of natural and semi-natural floodplain and wetland habitat along Jug Brook and other small tribs., potential rare animal habitat; adjacent mixedwood forests on linear ledgy terrain, numerous small perched mixedwood swamps, small muck soiled open beaver wetlands along drainage to west, possible small rich woods patches of hardwoods along west edge.	LA, VNHI
34	Mud Ponds East	East of Woodbury Mud Ponds along town line	HM	405	Substantial area of very uniform gentle slopes of Cabot/Buckland soils, mixedwood forest, possibly an extensive hemlock seepage forest with small swampier pockets, hardwood hills to east, potential rare animal habitat, potential fen/marsh opening along Blodget Rd.	LA, VNHI

* Sources: LA= Landscape Analysis, CNH= Consortium of Northeast Herbaria database, VPMP= statewide Vernal Pool Mapping NHI= VT Natural Heritage Inventory, PC= Personal communication from community member.