TOWN OF BURKE, VERMONT

NATURAL RESOURCE INVENTORY
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Report Prepared for:
Burke Planning and Conservation Commissions
Town of Burke, VT
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Commissioned and funded by the Town of Burke, Vermont

DEDICATION

This Natural Resource Inventory is dedicated to the residents of Burke, Vermont

BURKE CONSERVATION COMMISSION

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Cover Photo: Burke Mountain with Pete's Pond in foreground Burke, VT

Photo on current page: Ruffed grouse eggs found at the base of a yellow birch near a small perennial stream in Burke.

Unless otherwise stated, all photos were taken by Elise Lawson / Watershed to Wildlife during field work for this NRI.

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SUMMARY AND HOW TO USE THIS REPORT

Although not required by the State of Vermont, it is recommended for towns to complete Natural Resource Inventories. A Natural Resource Inventory (NRI) provides a clear picture of where a town's natural resources are located, which of them are significant, and why.

Examples of how an NRI can be used include:

- Guiding the conservation commission's goals and projects
- Advising the Planning Commission and other government entities involved in making land use decisions
- Informing the town's Master Plan process and recommendation of Zoning Ordinances
- Assisting in the evaluation of wetland permit applications
- Creating a foundation for a Conservation Plan
- Providing background for public forums on natural resources and environmental topics
- Integrating information into environmental education curricula in schools

The application of the NRI to land use planning is perhaps its most critical purpose. Land use planning must constantly seek to balance future growth and development with protection of natural resources. The Burke Conservation and Planning Commissions completed this report to give Burke data on these resources, so the town can make informed and balanced decisions. This NRI provides Burke with a foundation for proactive planning, rather than the all-too-common reactive approach.

Goals of the Natural Resource Inventory

In 2025, the Town of Burke hired natural resources consultant and biologist Elise Lawson, owner of Watershed to Wildlife, to prepare this NRI. The following goals guided its development, and resulted in the maps, data and narrative.

1. Promote conservation of water, forested land, wildlife habitat, wetlands and unique co-existing natural resource features throughout the town.
2. Create a document that can be incorporated into future updates of Burke's Town Plan
3. Identify areas for future conservation efforts, and areas of contiguous open space, wildlife corridors, and critical habitat.
4. Maintain inventories of natural and scenic resources, including ground water recharge areas, open water, steep slopes and hilltops.
5. Provide the Town of Burke with new accurate, standardized coverages that can be integrated into a standard GIS database.

6. Increase awareness of the values of the characteristics of Burke including forest and water resources, scenic view areas, recreation areas, riparian buffer habitat, and wetlands with associated wildlife habitat through public presentations and discussions.

Based on the results of this study, Elise Lawson of Watershed to Wildlife and the Burke Conservation Commission offer the following observations and recommendations:

1. **Surface Water Protection – 77.91 miles of streams/rivers – 26.4 acres of open water** Burke's water bodies, including rivers, streams, lakes and ponds, provide recreational opportunities such as swimming, fishing and boating. Some are also critical sources of drinking water for our residents and neighboring communities. **Maintaining good water quality is one of the highest priorities of the Burke Conservation Commission.** Burke should continue to maintain a high standard not only in the East and West Branch Passumpsic Rivers, but also in smaller rivers, streams, and headwater brooks that feed them in Burke. Recent challenges in achieving this include new knowledge of the threat and extent of PFAS contamination[1]. These chemicals are relatively new concerns in our drinking water and research is ongoing. Exposure to PFAS has been linked to health issues, including immune system effects, increased cholesterol levels, and potential developmental issues in children (US Environmental Protection Agency, 2025).

2. **Climate Change** – One of the most significant threats to the existing natural resources in Burke is climate change. The predictions of impacts as described in the 2025 Vermont Climate Action Plan should be considered by all town departments and committees in planning for Burke's future. It is recommended that land use planning incorporate actions to minimize, mitigate and adapt to climate change impacts. Create a Town Energy Committee to work with the Conservation Commission, Planning Commission and Select Board to help reduce municipal and residential activities that create greenhouse gases.

3. **Ground Water Protection – 2,316.64 acres – 10.74% important ground water recharge areas** - Future water supplies are a vital natural resource for Burke and the abutting municipalities as demonstrated by the drinking water systems already in use. Most Burke residents depend on drilled or dug wells that draw from the groundwater and aquifers below. Land use planning should include consideration of what is built and

[1] PFAS (per-and polyfluoroalkyl substances) are a large group of synthetic chemicals used in industrial and consumer products due to their resistance to heat, water, and oil. They are commonly found in items such as non-stick cookware, water-repellent clothing, stain-resistant fabrics, and firefighting foams. Their unique chemical structure makes them durable, leading to their nickname "forever chemicals" because they do not break down easily in the environment.

disposed of on the land surface of this important underground resource. Maps #3 and #4 show the location of ground water recharge areas and aquifers in Burke.

4. **Importance of Forested lands – 77% Forested in Burke**
    a. **Dense Softwood Protection- 1,141.92 acres – 1.78% of Town -** Dense softwood stands (not including white pine stands) are beneficial to wildlife for cover particularly in the winter. Maintaining existing stands for the benefit of the deer, moose and other wildlife populations is very important. This type of habitat could be negatively impacted by climate change, particularly the Lowland Spruce-Fir plant communities.

    a. **Carbon Sequestration** – Recent research indicates that forests and natural vegetation provide up to 37% of the emission reductions needed to keep global temperature from rising as quickly. Older trees and woody debris hold carbon in their structure, while the rapid growth of younger trees can sequester carbon at a faster rate. The value of forests in removing carbon dioxide from the air is critical. Furthermore, sustainable forestry practices can enhance this function. There are opportunities to generate income from carbon offset programs, and revenue from the sale of these offsets can be used to purchase additional forested land for conservation. Funds can also be used to help private landowners put forested properties into conservation easements.

5. **Continued Wetland Conservation – 861.42 acres wetlands – 4% of town -** The Burke Conservation Commission recognizes the many functions and values of wetlands including: excellent fish and wildlife habitats, higher water quality, flood storage, shoreline erosion protection, and recreation/observation/education opportunities (US EPA, 2023). This NRI report recommends that the Town continue to pursue ways to further conserve the functionality and diversity of these wetlands. An overall wetland study would help Burke to work with willing landowners to conserve some of these valuable wetland resources. Burke has floodplain and shoreline bylaws with the intent to minimize the development of structures and land uses along river floodplains and along riparian areas. More specific wording as well as including wetlands in these bylaws will help protect these resources. A link to Burke's zoning and subdivision bylaws is found here: Town of Burke: Zoning and Subdivision Bylaw, 2023

6. **Land Conservation – 2,677.57 acres (12.41%) of conserved land and 7,920.27 acres (36.7%) enrolled in Current Use -** As Burke faces increasing development pressure, this NRI recommends strengthening efforts to secure for future generations the open spaces that help define the character and quality of life that residents have repeatedly listed as

priorities for our town. This NRI highlighted four areas to be considered for further land conservation. These regions raise issues for water quality and wildlife movement, including:

a. **East Haven Mountain Area** – undeveloped larger parcels with tributaries to Flower Brook
b. **Umpire Mountain Area** – unfragmented habitat with headwater streams
c. **Burke Mountain Property** – unfragmented areas with a variety of habitat types, headwater streams and forested wetlands
d. **West Branch Passumpsic** and associated wetlands– containing the most productive and functional wetland in Burke.

7. **Hillside and Viewshed Protection** – Burke is one of the hilliest towns in the area. Its hilly topography is directly related to the town's tourism industry, scenic beauty, and diversity of natural resources - from higher elevation sensitive zones at the top of Burke Mountain to the beaver ponds, streams, and floodplain river habitat in the lower valleys. This NRI recommends researching and updating existing Zoning Regulations in Burke's Scenic and Conservation Overlay to conserve viewsheds that are basic to the rural character of the town: with a goal of tightening the rules to minimize ambiguity.
8. **Continued Cooperation** - Ecosystems, watersheds and wildlife habitats transcend municipal boundaries. The health of our natural resources is often dependent on actions taken by neighboring towns. Regional gatherings of conservation commissions and planning boards may help take watershed approaches to our natural resources. Burke has been and will continue working with government agencies, regional planning commissions, land trusts, and natural resource organizations to enhance the protection of our shared natural resources.

Painted turtle photo taken before this study by Watershed to Wildlife.

INTRODUCTION

Human relationship with natural resources in Burke stretches back more than 13,000 years of habitation by Indigenous Peoples. The area that would become the Town of Burke, Vermont, is located in the traditional homeland of the Nulhegan and Kowasuc band of Abenaki. The East and West Branches of the Passumpsic River that flow through Burke had long been important travel corridors for the Abenaki (Sanderson, JH, 2016). The Abenaki traveled along the river system between their camps and sites in Westmore, Brighton, and the Connecticut Lakes region of New Hampshire, to the settlements they had in what is now Wells River and Newbury, Vermont.

The first white people arrived in Burke sometime in the late 1790s. The first official town meeting was held on December 5, 1796 (Sanderson, JH, 2016). The Town of Burke was named after Sir Edmund Burke, a member of the British Parliament. The town was chartered in 1782 and the first settlers each received 320 acres of land. The conditions were that they had to plant and/or cultivate five acres and build a house within 3 years (Moritz, 2016).

The forested land provided potash and lumber for construction and sale. With the waterpower available, sawmills became the first industry.

> The first settlers opened the land along the central ridge. The first public building, which was built on Burke Green, housed a school, church and meeting house. The central ridge proved to be too windy, and the center was moved down the hill to Burke Hollow. The town spread out from there. South Burke was at the fork of the road between Lyndonville and Sutton, with the fork in the road going to Burke Hollow by way of Bugbee crossing. East Burke was settled early, probably because of the river valley and its easy access to Lyndonville to the south. West Burke was probably settled because of its waterpower, lumbering and farming. The railroad caused West Burke to prosper as it was in a good location with the surrounding hills in Sutton, Newark and Burke. West Burke became an incorporated village in 1901 (Burke Town Plan, 2017).

Today, the Town of Burke, Vermont is rural and mostly forested containing 33.70 square miles (21,568.21 acres) of land including 26.40 acres of ponds and open water, and 77.91 miles of rivers and perennial streams. Burke Mountain and the ridge tops are prominent, offering scenic views all over town. Burke's geography is quite diverse, ranging from flat floodplain areas along West and East Branches of the Passumpsic River to rugged hilly areas with steep slopes throughout on Mountain tops. Burke Mountain is the highest point in town at 3,240 feet elevation. The west peak of Burke Mountain is 3,140 feet. The lowest elevation is town is along the River Valleys in the southern part of Burke at 800 feet. Nearly 80% of Burke is forested.

Burke contains a wide range of ecological habitats including rivers, ponds, and headwater streams. At the time of this NRI, the Town is working hard to update their Town Plan. The last one was completed in 2017. The first vision statement states: "Burke takes pride in its past and present – its history, schools, parks, recreation and scenic beauty are all

treasured by citizens both young and old. The small-town qualities of Burke are a hallmark of its existence and the reason why people live, work and play in the Community."

The Natural Resources Chapter of the 2017 Town Plan lists two goals.

1. To protect and manage the sustainable use of Burke's finite natural resources in a manner that enhances the town's environmental well-being for the benefit of present and future generations.
2. To preserve fragile natural features that contribute to Burke's ecological health and biological diversity.

GOALS OF THE NATURAL RESOURCE INVENTORY

This project provides a Natural Resource Inventory (NRI) that, with the addition of mapping data that can be integrated with past and future studies. One of the goals of this project is to provide an inventory and future recommendations, as well as educational and planning tools, for the Town of Burke. It consists of a written report with maps, as well as an extensive mapping/GIS database that can be added as an overlay to existing maps in the town's database. It promotes conservation of water, unfragmented forested land, riparian habitat, wetlands, and unique co-existing natural resource features throughout the town.

Specific goals for this NRI include the following:

1. Promote conservation of water, unfragmented forested land, wildlife habitat, and wetlands throughout the town.
2. Create a document that can be incorporated into future updates of Burke's Town Plan.
3. Prioritize areas for future conservation efforts, and areas of contiguous open space and wildlife corridors.
4. Maintain an updated inventory of natural and scenic resources.
5. Provide the Town of Burke with new accurate, natural resource mapping features that can be integrated into the existing and future GIS database.
6. Increase awareness of Burke's natural resources – including forests, water resources, scenic views, recreation areas, riparian buffers, and associated wildlife habitat – along with the potential threats to these resources, through public presentations and discussions.

METHODOLOGY

Diane Wells, chair of the Burke Conservation Commission and Mike Harris, Burke Town Planner were the main contacts for consultant Elise Lawson of Watershed to Wildlife. Elise has worked as a natural resource consultant for over 20 years. This town-wide Natural Resource

Inventory uses a combination of existing mapping data, previous work, and current field work to produce an overall NRI for Burke, VT.

Field Work

Elise completed five days of field work for this study (June 10, June 30, July 14, August 4, and August 18). The Burke Conservation Commission and Elise reached out to landowners for permission to walk on their properties for this NRI. Elise and the BCC respect the rights of landowners and did not trespass on private property, unless granted permission. Field work was conducted to get an overall view of Burke with a focus on previously identified targeted areas. This work included inventories and assessments on several wetland complexes, riparian habitats, and upland habitats including higher elevation areas. In most cases, old roads and established trails were followed, while in other cases, compass-based orienteering and handheld GPS units were used. At points of interest, GPS locational data was taken, along with photographs and field notes. During field work sessions, any rare or endangered species found were noted and located on a map. Observed invasive plant species were also documented. Conservation Commission members, Diane Wells, Lindley van der Linde, Cathie Wheeler, and Chris Manges joined for some field work. Town residents Jake Wheeler and Georgia Gould (with Quinn and Jude!) also joined for part of a day.

Complementing this NRI work, Elise set up an iNaturalist project for Burke to gather species information throughout town. The project sets a date range from January 1, 2023, through December 31, 2025. At the time of this report 116 people recorded and reported on plant species, fungi, insects, birds, and wildlife. Data shown includes "research grade" identifications. "Observations become Research Grade when: the community agrees on species-level ID or lower, i.e. when more than 2/3 of identifiers agree on a taxon; or the community agrees on an ID between family and species and votes that the community taxon is as good as it can be" (iNaturalist, 2024).

Compiling Existing Data and Integrating into ArcGIS

Elise Lawson conducted GIS analyses, gathering digital data from the Town of Burke, GRANIT, Natural Resource Conservation Service (NRCS), and the US Fish and Wildlife Service and Vermont Fish and Wildlife Department. These data include the following:

1. Aerial photography
2. Topographic maps
3. Hydrology (rivers, streams, and ponds)
4. Roads and trails
5. Conservation lands
6. National Wetlands Inventory
7. Soil information (NRCS – Natural Resource Conservation Service)
8. Water recharge areas and subwatersheds

9. Bedrock and surface geology
10. Maps created during the Wildlife Action Plans completed by the VT Fish and Wildlife Department

Existing available maps were then integrated using ArcGIS Pro software. Using the USDA recent aerial photography, topographic maps, and soils maps, Elise digitized features, queried data, and overlaid them onto a base map. These include wetlands, farmland soils, forestry soil groups, steep slopes, permanent wildlife openings, dense softwood stands, ground water recharge areas, subwatersheds and geology. Potentially significant wildlife habitat areas were noted.

Wetlands were reviewed and analyzed using the most recent aerial photos, National Wetland Inventory (NWI), Natural Resource Conservation Service (NRCS) soils maps (displaying hydric soil map units), and field work to confirm wetland locations where visited. Vermont state laws require that three parameters be met for classification as a jurisdictional wetland: the presence of hydric soil (very poorly and poorly drained soils); sufficient hydrology; and hydrophytic[2] vegetation. When soil maps alone are used, they could potentially overestimate the number of wetlands throughout the town. This is particularly true given that up to 35% of a soil classification can be inclusions (for example, upland areas within NRCS hydric soil units or wetland areas within NRCS upland units). On the other hand, examining the NWI data alone under-represents the number of wetlands, due to the U.S. Fish and Wildlife Service's method of using aerial photography to identify wetlands. Open water, emergent, and scrub-shrub wetlands can readily be identified using aerial photography alone, but forested wetlands are often missed. Official wetland delineations require extensive fieldwork beyond the scope of this project. Despite differences and potential errors, data provided from these sources are important tools and can be built-upon in future studies.

Farmland Soils – Prime farmland and farmland of statewide importance throughout Burke were determined using the NRCS soils map data. Data were displayed in ArcMap and queried so only those soils classified as important farmland were displayed in the Town.

Permanent openings (fields - areas dominated by grasses, forbs, brambles) were digitized from recent aerial photographs. The regions digitized include only those openings managed as permanent opening habitat. They do not include clear-cuts where the intent is for timber harvesting and regeneration for future logging. **Dense softwood** (or conifer excluding white and red pine) cover areas were also digitized from the aerial photographs. These areas are considered significant wildlife habitat and could be used by deer and moose for wintering areas.

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[2] Hydrophytic vegetation are plants that grow in water or on a substrate that is at least partially deficient in oxygen as a result of excess water; plants typically found in and adapted to wet habitats.

Steep slopes were determined using the NRCS soils maps. Data was displayed in ArcGIS and queried so only those soils map units with 20% slope and greater were displayed. Similarly, **Forestry soils** were determined using the NRCS soils maps. Soils are grouped and ranked based on their capacity to grow valuable timber for harvest.

Maps are found at the end of this report with the features described above. All information gathered, compiled, and mapped for this report was delivered to the Burke Conservation Commission in digital format. It is the property of the Town of Burke, Vermont.

Public Presentation and Discussion

At the completion of this NRI, a public information presentation and discussion will be held to share the results from this study. This meeting aims to help the public understand why the Natural Resource Inventory—covering water resources, riparian habitats, forested areas, and related wildlife habitats—is important. In addition, work from this project will be displayed on Burke's town website for public access.

RESULTS

Forested Lands

Burke is nearly 80% forested. Most of Burke is within the Northeastern Highlands biophysical region[3] of the state with the southwestern part of town being part of the Northern Vermont Piedmont biophysical region. There are several different forest-types, typical for this part of northern Vermont including:

- Northern Hardwood Forests – dominated by maple, beech, birch
  - Including several areas of rich northern hardwood forest and northern hardwood talus woodland
- Montane spruce-fir forests
  - Including montane yellow birch-red spruce forest
- Lowland spruce-fir forests
- Hemlock forest
- Northern white cedar swamp
- Spruce-Fir-Tamarack Swamp
- Floodplain Forests
  - Including silver maple-ostrich fern riverine floodplain forest, red maple-black ash swamp, and calcareous red maple-tamarack swamp

The age of forests throughout Burke is diverse, ranging from young regenerating forests to mature hardwood and softwood forests.

Carbon sequestration – Forests have always provided tremendous personal and public benefits, including clean water, wildlife habitat, recreational opportunities, and forest products. Moreover, forests are an essential natural solution for climate change. Carbon sequestration is the process where atmospheric carbon dioxide is taken up by trees, saplings, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils. The sink of carbon sequestration in forests and wood products helps to offset sources of carbon dioxide put into the atmosphere through deforestation, forest fires, and fossil fuel emissions. Sustainable forestry practices can increase the ability of forests to sequester atmospheric carbon while maintaining or enhancing soil stabilization and water quality.

Fungi within these forests also play a vital role in carbon sequestration as well through their interactions with plants, their own metabolism, and contributions to soil structure (Clemmensen, et al, 2013).

1. Mycorrhizal Relationships with Plants: Many fungi, particularly mycorrhizal fungi, form symbiotic relationships with plant roots. They help plants absorb nutrients like

[3] The biophysical regions of Vermont are an organization of the landscape into smaller units that share features of climate, geology, topography, soils, natural communities, and human history (Thompson and Sorenson, 2000)

phosphorus and nitrogen, and in return, plants provide fungi with carbon-rich sugars produced through photosynthesis. This process effectively captures atmospheric CO_2 in plant biomass, and some of this carbon is transferred to the fungi and stored in soil.

2. Soil Carbon Stabilization: Fungi contribute to soil structure, helping to form aggregates that trap organic matter. The carbon in these aggregates can become stable and remain in the soil for extended periods, effectively sequestering carbon. Fungal hyphae (thread-like structures) are crucial in binding soil particles together, protecting organic matter from decomposition.

3. Decomposition and Humus Formation: Saprotrophic fungi (decomposers) break down organic material like fallen leaves, dead wood, and animal remains. While some CO_2 is released during decomposition, fungi also transform organic material into stable compounds like humus. Humus holds carbon in the soil for long periods and helps create a carbon reservoir.

4. Mycelial Biomass: Fungal networks themselves store carbon. Mycelium (the mass of fungal hyphae) is carbon-rich, and as fungi grow and die, this biomass can become a significant part of soil organic carbon.

5. Lignin Decomposition: Fungi, especially white-rot fungi, are among the few organisms capable of breaking down lignin, a tough component of wood. In decomposing lignin, they release some carbon, but they also help incorporate lignin breakdown products into the soil, where it can become stable and part of long-term soil carbon stores.

Burke contains a variety of forest types. This rich northern hardwood stand is predominantly sugar maple, with hop horn beam, white ash, yellow birch, leatherwood, blue cohosh, maiden hair fern, ostrich fern, and squirrel corn. Photo taken summer, 2019.

Forests are an essential and natural solution for climate change.

Dense Softwood (Map #1 at the end of this report)– 1,141.92 acres (5.29%) of Burke's forested land contains dense softwood stands, primarily eastern hemlock, balsam fir, red spruce, and northern white cedar. They do not include stands of white or red pine. These softwood stands range in size from just over 1 acre to over 220 acres. Some of the larger softwood stands are found on the sides of Burke Mountain, and in the northwestern part of town. Many dense softwood stands are found along rivers, streams, ponds, and wetland complexes offering proximity to good cover for wildlife and a diversity of habitat types. Some of the larger stands of dense softwood were also identified by the State of Vermont as historic deer yards. These are shown in Map #1.

Dense softwood surrounding a small active beaver pond in Burke. Softwood stands along wetlands, beaver ponds, and streams offer excellent cover and travel corridors for many wildlife species. Photo taken 7-14-2025.

Dense softwood stands are an important habitat type to many wildlife species. They provide important cover and foraging habitat during harsh winter conditions by reducing snow accumulations and wind speeds. Therefore, animals such as red squirrels, snowshoe hare, ruffed grouse, white-tailed deer, and moose are often found utilizing them during the winter months. White-tailed deer are not well adapted for traveling in and dealing with deep snow conditions and require dense softwood stands to survive Vermont's harsher winters. When they congregate in these stands, they are referred to as deer yards or deer wintering areas. For the stand to be considered a deer yard two basic elements must be met: (1) A core area is identified by concentrations of dense softwoods, and (2) Mixed hardwood and softwoods adjacent to, or within the core area will provide accessible forage.

Dense softwood stands cover only about 3% of the land base in Vermont, so their identification and management are an important part of conserving the entire State's natural resources.

Standing in a dense softwood stand with balsam fir and red spruce and northern white cedar. This stand includes a forested wetland with a network of wildlife trails. Photo taken 6-30-2025.

Mast Trees - Mast are the fruits produced by woody stemmed plants and can be either hard (seeds and nuts) or soft (fruits and berries). Wildlife species from nuthatches, chickadees, squirrels, and eastern chipmunks to white-tailed deer, black bears, turkeys, and wood ducks rely heavily on mast as a source of feed. Burke has several species of trees that are considered important because of their mast production. These include beech, maple, hophornbeam, hemlock, red oak, black cherry, white ash, apple, and pine. Hard mast produced by red oak, beech, and some shrubs such as beaked hazelnut, is considered extremely important because it can persist for longer than soft mast and therefore is accessible to wildlife during times of the year when other food sources are limited. American beech trees face several diseases that can significantly impact their nut production, health and survival. The most common one today is Beech Bark disease which is a combination of infestation by insects and fungi. Another emerging and concerning disease is Beech Leaf Disease caused by a nematode. It leads to dark, banded discoloration on leaves and reduces photosynthesis, which in turn weakens the leaves. It is more common in southern NH and MA but spreading northward. Beech canker is a third stressor to these important mast-producing trees and is caused by fungal cankers. Although this latter is not as fatal, it does weaken the trees, making them more vulnerable to other stresses and infections (UNH Extension, 2010).

Left: Young beaked hazelnut growing at the edge of a forest in Burke. These nuts are coveted by many wildlife species. They are often hard to spot because they grow below the leaves. Photo taken 7-14-2025.

Below: Young oak tree in Burke. Red oak when they are mature, offer excellent fall food for wildlife. Photo taken 8-5-2024.

Early Successional Habitat – Early successional habitat includes an area with grasses, forbs, shrubs, and young trees (aspen, white birch, and white pine are common in Vermont). It provides excellent food and cover for wildlife but needs some sort of disturbance to be maintained. Early successional habitats have been declining throughout the Northeast for decades, as have the wildlife species associated with them. For example, American woodcock has declined by 40% over the past 30 years, and New England cottontails occur in only 20% of their historic range. In Burke, two examples of areas with early successional habitat are log landings and inactive gravel pits. In gravel pits especially, the topsoil has been removed so there is little organic matter. In these early successional habitats, the soil is sandy with very little topsoil. As a result, there were areas where birds had dusted themselves with the sand. Dust baths are part of a bird's preening and plumage maintenance. The dust is worked into the bird's feathers and absorbs excess oil to help keep the feathers from becoming greasy or matted. It also helps smother or minimize lice, feather mites and other parasites.

This type of habitat is also important for turtles. The proximity of a sandy area to open water gives turtle hatchlings a better chance of making it to water. Examples of early successional habitats in Burke include abandoned/reclaimed gravel pits, log landings from timber harvesting, transmission lines, old railway beds, and, in rare cases, in areas that experienced wildfires or prescribed burns.

Apple tree release and creation of early successional species using an excavator with a brontosaurus head. Before photo (left) taken on 6-30-2025 and after photo (right) taken by County Forester, Matt Langlais – August 2025.

Permanent Wildlife Openings[4] (Map #1 at the end of report)

Permanent wildlife openings are dominated by grasses, forbs, wildflowers, brambles and fruiting shrubs. These include hay fields, pastureland, cropland, brush-hogged fields, and mechanically maintained transmission lines. It is estimated that they provide required habitat for about 22% of New England's wildlife species and are seasonally important for nearly 70% of species. White-tailed deer, black bear, rodents, such as deer mice, meadow voles, shrews, and woodchucks, commonly feed on the vegetation present in these habitats, and carnivores from weasels and hawks to coyotes in turn feed on these species. Permanent wildlife openings are heavily used by bird species as feeding and nesting sites, including the eastern bluebird, bobolink, and eastern meadowlark, the latter two birds being species of concern in Vermont. They also create important edge habitats. Wherever an open area meets the forest, the area of transition will attract the largest diversity of species, both plant and animal. Generally, there will be species adapted to permanent wildlife openings, those adapted to forested habitat, and those that specialize in transition zone areas and will frequent these edge habitats. For

[4] Permanent wildlife openings are those that are maintained as herbaceous openings (grasses, low shrub and/or herbaceous ground cover). These openings serve as valuable sources of food for wildlife, provide nesting and resting sites, and are essential for habitat diversity in forested areas.

example, many bird species that feed in openings are known to nest within the edge habitat because there are typically more structural diversity and cover.

Currently, Burke has 2,341.18 acres maintained as permanent wildlife openings, which make up 10.85% of the town's area. The Vermont state average is 10% permanent wildlife openings. Elise digitized a total of 298 different openings from aerial photos during this project ranging in size from 0.4 acres to approximately 62.3 acres. These openings are evenly scattered throughout town, with fewer openings in the eastern part of Burke. They generally are found along roads and river floodplains - often associated with a private residence or working farms. Varying sizes of permanent openings are preferred by different species. For example, northern harriers – a predatory bird or raptor - prefer larger openings for hunting and feeding, yet snowshoe hare are more likely to feed in smaller openings where cover is more readily available. Lawns near homes and seeded woods roads were not mapped as they were so small or close to human structures. Even small openings, especially those in more isolated parts of the town, are still important habitats and help maintain Burke's plant and wildlife diversity.

As the percentage of permanent openings in Vermont has decreased significantly over the past 50+ years, the state is encouraging landowners to create or maintain permanent openings as important wildlife habitat. There is a balancing act between protecting farmland and agricultural soils and increased development pressures.

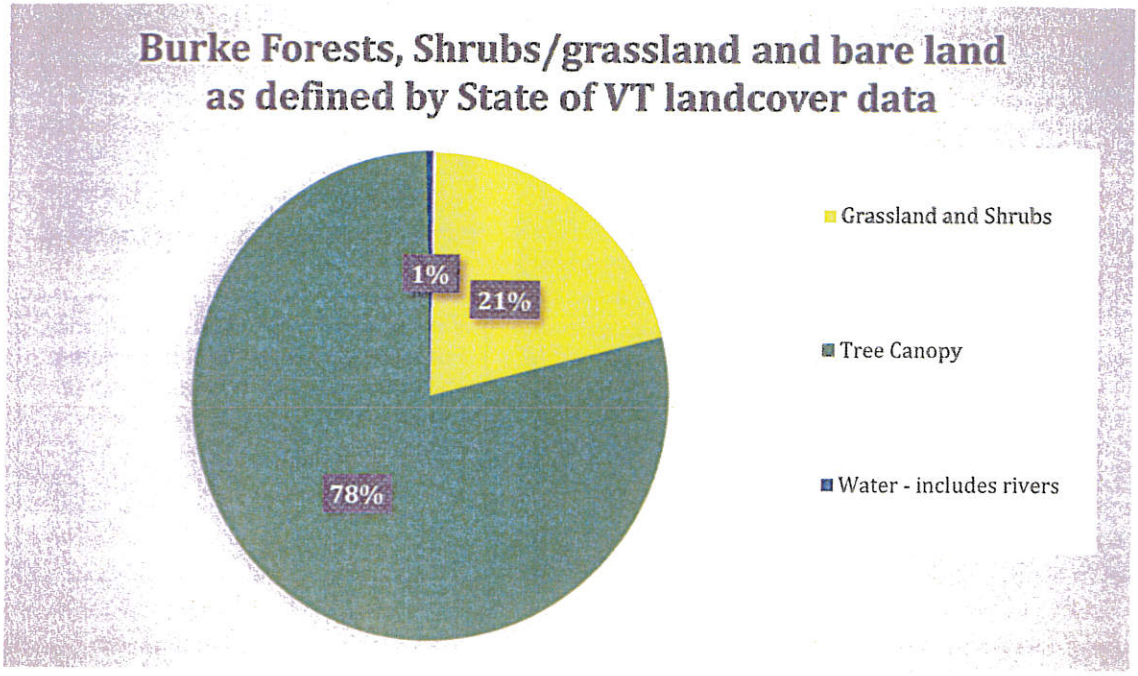
Open field near Burke Hollow Road. The combination of fields, forested areas and proximity to wetlands and the West Branch Passumpsic River, makes this area excellent/diverse wildlife habitat. A female black bear with two cubs was seen playing and grazing along the edge of this field. Photo taken on 7-14-2025.

Permanent openings are not only excellent wildlife habitat but also create scenic and expansive views. This photo was taken looking towards Burke and Kirby Mountains from Darling Hill Road. Photo taken 8-12-2024.

Permanent Wildlife Openings

Retain permanent wildlife openings to maintain a diversity of wildlife and plant community types throughout Burke.

When possible, it is a good practice to remove non-functioning fencing, such as barbed wire and woven sheep fence.



Conservation Land (Maps #2 and #9 at the end of report)

Over 2,686.32 acres equaling 12.5% of Burke is land conserved by conservation easements, State-owned land, and town-owned properties. Land conservation has been a successful goal for Burke, with the town recently acquiring two community forests (one in East Burke and one in West Burke). Conserving special areas contributes to the protection of wildlife and natural resources while also providing recreational opportunities. Some of the larger conserved or otherwise undeveloped areas are listed below.

1. 1,525.12 acres is owned by the State of Vermont including parts of Burke Mountain
2. 680 acres make up privately held Conservation Easements
3. 480.63 acres are owned by the town of Burke including two community Forests.
    a) Willey Woods Community Forest
    b) North Pasture Community Forest

View of the North Pasture Community Forest (left). A large part of this forest contains a diverse, beaver-impacted wetland. This gas pipeline is full of orchids and unique plants including sundew, nodding ladies' tresses, and purple fringed orchid (shown above). Photos taken 8-4-2025.

A newly constructed board walk crosses a headwater stream in the Willey Woods Community Forest. Outdoor classroom education and non-motorized recreation are encouraged on this newly owned town property. Photo taken 6-30-2025.

Top of Burke Mountain, partially in the clouds is owned and conserved by the State of Vermont. Photo taken 6-10-2025.

There are several ways to conserve land. Many lands are owned by federal, state, and local governments (national forests, state parks, and state/town forests, for example). A conservation easement on private land is another means to protect property. It creates a legally enforceable land preservation agreement between a landowner and a municipality or a qualified land protection organization or trust. It restricts real estate development, commercial and industrial uses, and certain other activities on a property to a mutually agreed upon level. The decision to place a conservation easement on a property is strictly a voluntary one where the easement is sold or donated. The restrictions, once set in place, are binding for all future landowners. The restrictions are spelled out in a legal document that is recorded in the local land records, and the easement becomes a part of the chain of title for the property. The landowner who gives up these development rights continues to privately own and manage the land and may receive significant state and federal tax advantages with their land for future generations. The easement holder has a responsibility to monitor future uses of the land to ensure compliance with the terms of the easement and to enforce the terms if a violation occurs.

Trail Easements – In addition to land conservation, another consideration are trail easements. They are legally binding agreements that allow public or private trails to cross privately owned land. These easements are generally permanent, securing the right for trail access over the long term. Easements on trails benefit conservation efforts, outdoor recreation, and community connectivity. Similar to land conservation easements, the landowners maintain ownership and control over their property under an easement, but they agree to allow access for trail use. They are negotiated with trail associations, land trusts, municipalities or conservation organizations. Trail easements serve as a tool for expanding and protecting recreational opportunities while balancing the rights of private landowners.

Vermont Use Value Appraisal (Current Use) – The Use Value Appraisal Program, commonly referred to as the Current Use Program, was established by the Vermont Legislature in 1978. It aims to reduce the financial pressure on landowners to develop or subdivide their land by allowing it to be taxed based on its productive capacity rather than its market value. This program helps to ensure that farms and forests remain actively managed for forestry,

agriculture and conservation. In Burke 7,920.27 acres – 36.7% - are enrolled in this program. All land enrolled in Current Use cannot be developed without incurring Land Use Change Tax.

Four areas were highlighted for priority conservation efforts in the future. They are described in the Discussion – Future Opportunities section and also shown on Maps #9 and #10 at the end of this report. The Conservation Commission has a Conservation Fund which is used to assist with conservation efforts in town.

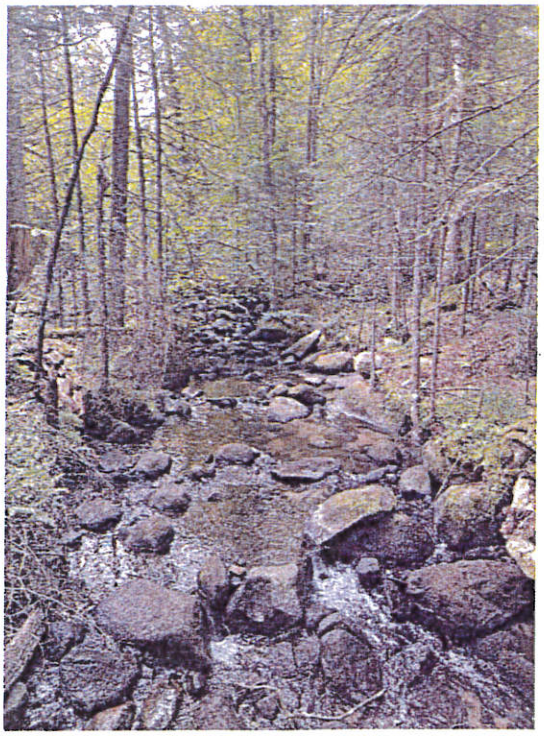
Rivers, Streams, Lakes, and Ponds (Maps #3 and #4 at end of report)

There are 77.91 miles of perennial streams and rivers that flow through Burke. Of these, 27.56 miles include 8 named rivers and streams, and 50.35 miles of unnamed streams, many of which are important headwater streams. The two largest rivers in Burke are the East Branch Passumpsic River (5.77 miles) and West Branch Passumpsic River (5.53 miles). Their watershed regions generally delineate East and West Burke. The East Branch Passumpsic River begins in Brighton. It flows through Newark and East Haven before entering Burke along Route 114. It flows through Burke north to south and merges with the West Branch Passumpsic River in Lyndon. Tributaries to the East Branch include Flower Brook, Dishmill Brook, and several unnamed tributaries, many of which are headwater streams. The West Branch Passumpsic begins on the southern side of Mt. Pisgah, east of Lake Willoughby. It flows through Westmore, Newark, Sutton, before entering Burke along Route 5. After leaving Burke, it merges with the East Branch near the southern end of Darling Hill Road and Route 114 in Lyndon. The Passumpsic River eventually enters the Connecticut River in Barnet, VT.

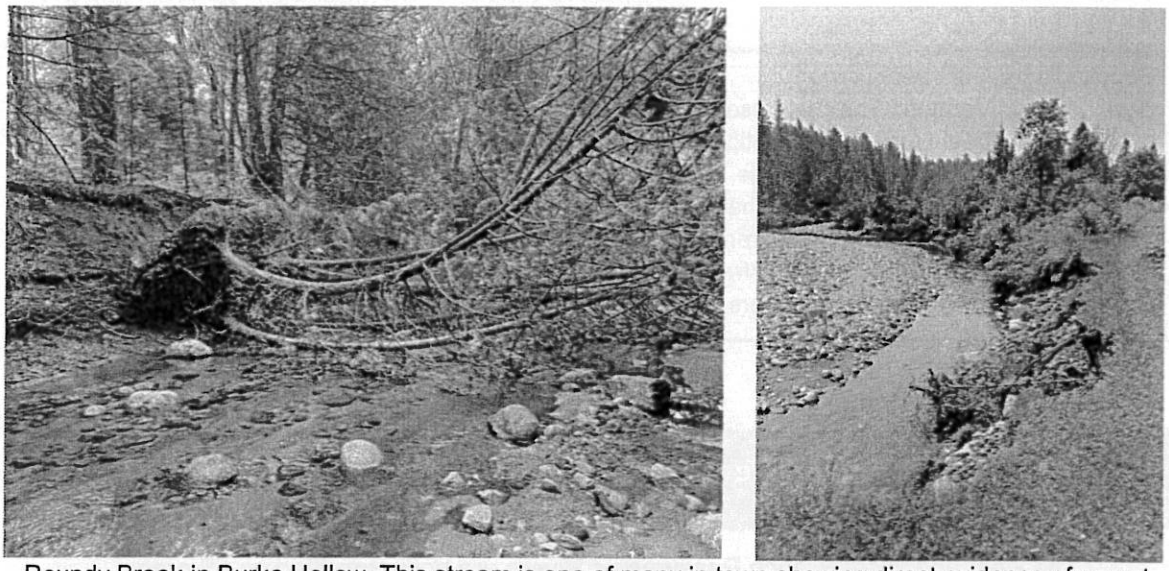
The Third largest river in Burke is Roundy Brook at 5.17 miles. It begins as a headwater stream in Newark, before entering Burke in Willey Woods Community Forest. It flows along Brook Road through Burke Hollow, entering the West Branch Passumpsic River along Route 5. Dishmill Brook is 4.97 miles long, beginning on the western slope of Umpire Mountain. It flows along the base of Burke Mountain, entering the East Branch Passumpsic River in downtown East Burke village.

Many perennial streams in Burke have a diversity of upland forest types and wetland types associated with them. Beaver activities along streams are dynamic and ongoing. Beavers enhance the diversity of wildlife habitat and make these rivers and streams some of the most diverse river-wetland complex systems throughout town. There are many unnamed streams located throughout Burke with high value habitat and excellent vegetative buffers. These areas provide excellent wildlife habitat and connectivity to forests and wetlands.

West Branch Passumpsic River facing south. Photo taken February 2025.



Maintaining water quality of headwater streams such as this one (a tributary to Flower Brook) is very important to maintaining good water quality in Burke. This unnamed perennial stream flows through the North Pasture Community Forest. The two photos of the same stream illustrate a diversity of flow and habitat type, which is valuable for wildlife and plant community diversity. Photos taken 8-4-2025.

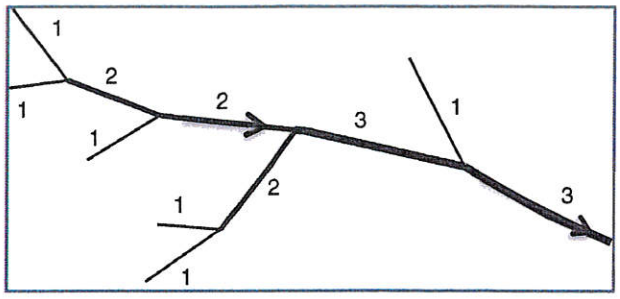


Roundy Brook in Burke Hollow. This stream is one of many in town showing direct evidence of recent flooding events. Maintaining vegetative buffers – trees and shrubs – will dramatically decrease erosion during floods. Photos taken 8-4-2025 illustrate the magnitude of erosion from the flooding events.

Table1: List of Named Rivers and Streams in Burke

River/Stream	Length in Burke (miles)	Direction of flow	Watershed Area in Burke (HUC 12)	Stream Order
Calendar Brook	1.68	Southeast	Calendar Brook	4
Dishmill Brook	4.97	West	East Branch Passumpsic	2, 3, 4
East Branch Passumpsic River	5.77	South	East Branch Passumpsic	5
Flower Brook	3.49	West	East Branch Passumpsic	2, 3
Roundy Brook	5.17	South	West Branch Passumpsic	3, 4
Sutton River	5.08	East	West Branch Passumpsic	3
Weir Mill Brook	0.58	East	Headwaters Moose River	1
West Branch Passumpsic	5.53	South	West Branch Passumpsic	3, 4, 5

Simple diagram of stream order designation in Vermont. The State uses the "Strahler Stream Order" designation. If two streams of the same order merge, the resulting stream is given a number that is one higher. If two streams with different stream orders merge, the resulting stream is given the higher of the two numbers.



East and West Branch Passumpsic Rivers

The East and West Branch Passumpsic Rivers are both classified as 5th order streams by the State of Vermont. These two are particularly vulnerable to runoff, erosion, and pollution, as they flow along major roads, and downtowns. Where possible:

- Minimize impervious surfaces adjacent to these rivers
- Maintain and enhance native vegetative buffers particularly wetlands
- Consider yearly water quality testing

Open Water / Ponds – Due to its mountainous and hilly topography, Burke has relatively fewer areas of open water compared to many other municipalities in Vermont. There are 26.40 acres of lakes, ponds and open water making up 0.12% of the town's area. Pete's Pond is the largest body of open water at 6.88 acres. It is a shallow pond with one side adjacent to Burke Hollow Road. It has excellent and diverse habitat, and wildlife including great blue heron, wood ducks, painted / snapping turtles and beaver are often seen. Duck Pond is the second largest pond at 5.36 acres. This pond also has a diversity of habitat types and is well buffered around. Both ponds are on private property.

There are several smaller unnamed ponds found in Burke, most of which are dependent on beaver activities. These ponds can be any size from very little open water to a ponded area of several acres. The size generally varies year by year.

All rivers and water bodies offer wildlife and recreational value for Burke and the entire region. Swimming, kayaking, canoeing, birdwatching, hiking, skiing, mountain biking, fishing and hunting are all common activities in Burke. Tourism accounts for a large portion of income for Vermont and lakes and rivers are significant contributors.

Duck Pond contains a large diversity of wetland and upland habitat types. A network of wildlife trails can be found all around the pond. Photo taken 7-14-2025.

Pete's Pond can be seen from Kingdom Trails and Burke Hollow Road. Like Duck Pond, it contains a diversity of habitat types. Photo taken 6-30-2025.

Sub-Watersheds (Map #5 at end of report)

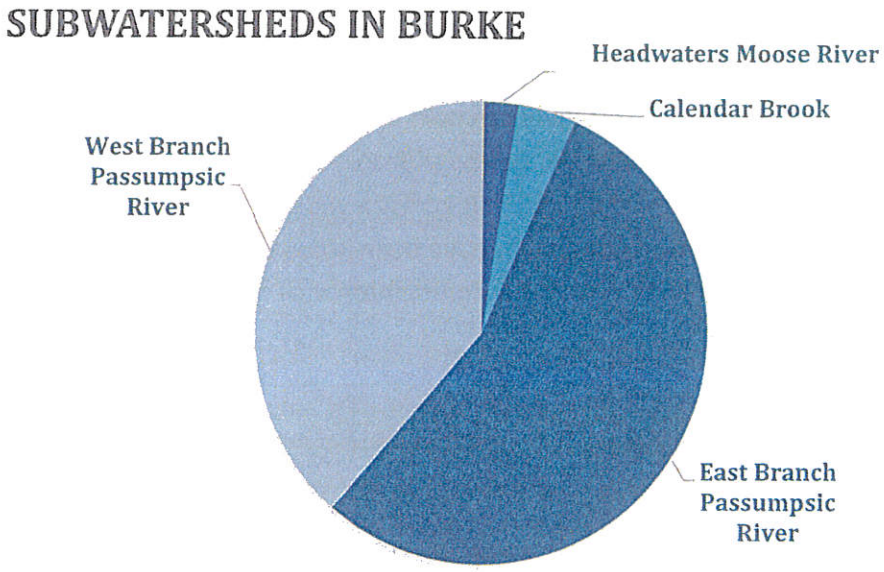
The ability to view the landscape from a watershed perspective helps to understand drainages, flows, and associated habitat throughout the town. Watersheds and subwatersheds do not stop at municipal boundaries. All things downstream are affected by land management upstream, particularly in headwater streams. The State of Vermont breaks down watersheds into different sizes, and most towns and cities contain more than one subwatershed determined by topography and ridgelines.

Burke contains portions of 4 sub-watersheds when broken down to the level 12 hydrologic unit code (HUC) listings. The largest subwatershed in Burke is East Branch Passumpsic Subwatershed which covers a large area in East Burke – roughly demarcated by Darling Hill and Burke Green Roads. It is 11,800.49 acres and includes several headwater streams which feed the East Branch Passumpsic River, including Flower and Dishmill Brooks. The West Branch Passumpsic subwatershed is the next largest in Burke covering 8,338.28 acres. It encompasses a large area in the western part of town. This subwatershed includes the West Branch Passumpsic River along with Roundy Brook and Sutton River. Calendar Brook subwatershed is in the southwestern corner of Burke, and Headwaters Moose River is along the eastern boundary of town.

All 4 of the subwatersheds in Burke are part of a larger watershed called the Connecticut River Drainage Basin Area. This area includes all of eastern Vermont and western New Hampshire. A list of the subwatersheds in Burke are shown and described in the following chart and table.

Table 3: List of Sub-watersheds in Burke, VT

HUC 12 Name - Subwatershed	Acres in Burke (HUC 12)	General Location In Burke	Larger Watershed Area
East Branch Passumpsic	11,800.49	Eastern half of Burke	Connecticut River Drainage Basin
West Branch Passumpsic	8,338.28	Western half of Burke	
Calendar Brook	898.44	Southwest corner of Burke	
Headwaters Moose River	536.89	NE and SE borders of Burke	



Because watersheds extend beyond municipal boundaries, maintaining good water quality depends on a coordinated, watershed-wide approach and strong partnerships.

Riparian Zones and Floodplains

A riparian zone or riparian area is the interface between land and a stream or river. Riparian zones are important habitats because of their role in soil conservation, their biodiversity, and the influence they have on aquatic ecosystems. Riparian habitats occur in many forms including grassland, woodland, wetland, floodplains, or a combination of features. They are important travel corridors for many wildlife species as well as valuable habitat for frogs, turtles, snakes, minks, otters, and birds. Riparian habitats moderate stream flow, stabilize riverbanks, and provide shade to stabilize soil and water temperatures. A floodplain is flat or nearly level land adjacent to a stream or river that experiences occasional, seasonal, or periodic flooding. Floodplains are a category of riparian zones and often support rich, diverse ecosystems. Burke contains a diverse amount of riparian and floodplain areas.

The Federal Emergency Management Agency (FEMA) maps with flood prone areas in the Northeast Kingdom are still in draft format, so Watershed to Wildlife digitized flood

potential areas using a combination of Digital Elevation Model (DEM) Maps, USGS Topographic Maps, and NRCS soil maps for flood frequency. Based on this, 926.44 acres making up 4.3% of Burke are areas where there is the highest likelihood of flooding by inundation. Floodplains are very fertile agricultural areas, especially along larger rivers. Some of the floodplains along the East Branch and West Branch Passumpsic Rivers contain fertile areas for farming. There are also smaller floodplain areas along Dishmill Brook, Calendar Brook, and Flower Brook in Town. Floods carry nutrient-rich sediment and distribute it across a wide area. Although some portions of Burke's riparian areas and floodplains have been impacted by development, most areas have not, and there are a few opportunities for maintenance of adjacent riparian habitat and creation of additional buffers.

The East Branch Passumpsic River with floodplain habitat on both sides of the river. There are forested floodplain areas along most of the river as it flows through town. Photo taken on 7-14-2025 facing downstream.

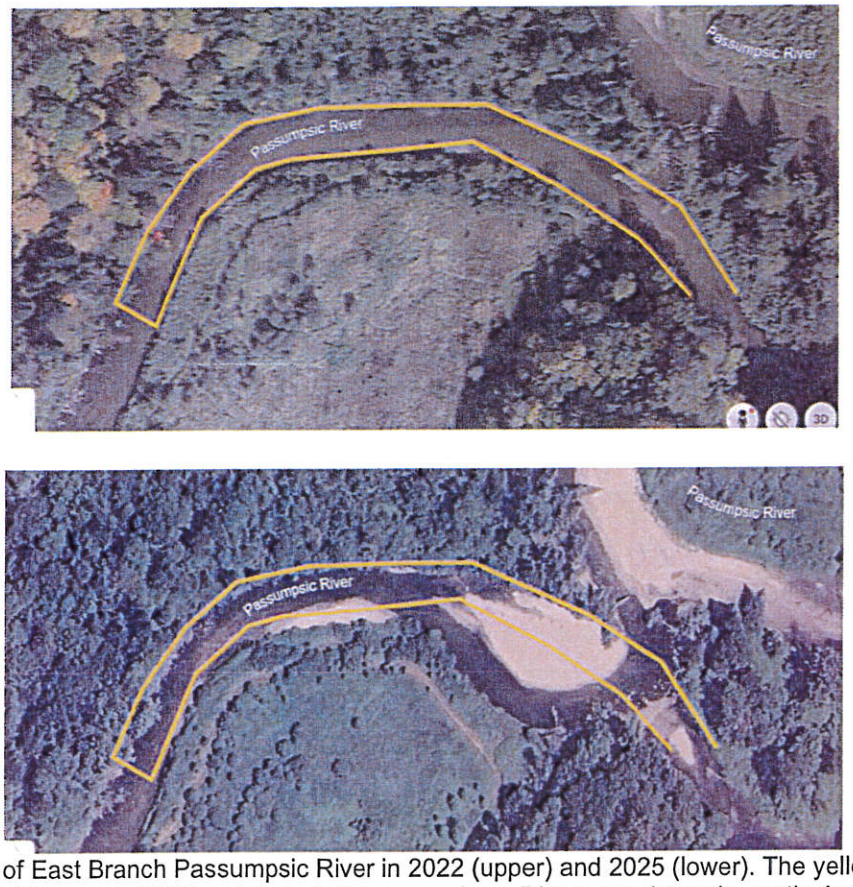
Timber Harvest in Riparian Habitat

Because of their proximity to rivers and wetlands, forested riparian areas are highly sensitive. Timber harvesting in these zones is generally not recommended and, if necessary, should be limited to winter conditions when the ground is completely frozen.

Small forested floodplain, riparian area with a mixedwood forest along an unnamed tributary to the East Branch Passumpsic River. Smaller floodplain, riparian areas shown here moderate stream flow, stabilize riverbanks, and provide shade/cover to keep water temperatures cooler. Riparian areas are especially valuable habitat for many wildlife species including frogs, turtles, snakes, minks, otters, and birds. Riparian areas also function as travel corridors for animals moving from one habitat to another. Photo taken on 7-14-2025.

Roundy Brook and adjacent forested floodplain. This floodplain is classified as a Northern White Cedar Seepage Forest. This area is in the Willey Woods Community Forest right near the start of Roundy Brook. Fortunately, this area will be protected, maintaining these excellent buffers and good water quality. Photo taken on 5-5-2025.

Floodplains and riparian areas are home to a diversity of wildlife. The rich soil creates excellent insect and amphibian breeding habitats, and these species in turn become prey for birds such as woodcock and barred owl, for mammals such as mink and raccoon, and for reptiles such as smooth green snake and wood turtle. These corridors allow wildlife to move from one habitat to another. Intact riparian areas are essential for creating and maintaining a healthy aquatic system. Overhanging vegetation such as shrubs and trees provides important shade to aquatic habitats allowing them to maintain cooler water temperatures and adequate amounts of dissolved oxygen. This is particularly important for trout and other salmonid species. The root systems of the riparian vegetation are also important for reducing the amount of erosion and subsequent sediment accumulation that the constant moving water and flooding situations can cause. Riparian habitats also slow and hold floodwater, reducing shoreline damage and can work as a filtration system removing nutrients and toxins from the water and assisting in maintenance of water quality. Additionally, riparian vegetation provides habitat structure to aquatic systems through dead or broken limbs and whole trees that fall into the water.



Main corridor of East Branch Passumpsic River in 2022 (upper) and 2025 (lower). The yellow line is the 2022 river corridor over a 2025 aerial photo for comparison. Rivers are dynamic, particularly with major flooding events which Burke has experienced for the last three years. Parts of the river moved up to 90 feet during this timeframe.

Wetlands and Hydric Soils (Map #3 at end of report)

Wetlands support a wide range of plant and animal life in Vermont and are one of the state's most important habitat types. Their character varies widely with local hydrology, soils, topography, and climate. In addition to rivers, lakes, and ponds, Vermont contains four general types of palustrine wetlands—forested, scrub-shrub, emergent (wet meadow), and open water—each of which includes several subtypes. This diversity plays out within individual wetlands, where varied plant and wildlife communities, soil textures, and water regimes co-exist. The transitions between wetlands and uplands, often called edge habitats, also support heavy wildlife use. ***An estimated 90% of the region's wildlife species use riparian areas and wetlands, and roughly half rely on them as preferred habitat***.

From Left to Right: White Bog Orchid, Purple fringed orchid, and bog cotton grass. These species were documented on both of Burke's newly acquired community forests. Photos taken 6-30-2025 and 8-4-2025.

A bog in Willey Woods Community Forest. This bog is unique and contains two documented rare plant species. Photo taken 6-30-2025.

The wetland complex behind the Burke Town School is a "gem" in Burke. It is a wide wetland and floodplain associated with the West Branch Passumpsic River. The diversity of wetland types, wildlife habitat and upland buffers make this a highly functional wetland. It is one of four areas identified as a conservation priority in town. Photo taken on 6-30-2025.

Beaver play a big role in diversity and value of wetlands. In this case, a wetland near the boundary of North Pasture Community Forest has more open water thanks to beaver activity. This wetland is part of a stream which flows into Flower Brook. Beaver are efficient at constructing dams, and in this case, they incorporated a snow machine bridge into their dam. Photo taken 8-4-2025.

This remote wetland has been impacted by beaver activities. Although relatively small, it is part of a series of beaver ponds and associated wetlands which eventually flow into the East Branch Passumpsic River. The brook and wetland offer excellent habitat for many wildlife species including wood turtles. There are a diversity of wetland and upland habitat types. Photo taken September 2025.

Round-leaved sundew (*Drosera rotundifolia*) is a carnivorous plant often found in wetlands. Hair-like tendrils on each reddish leaf are tipped with glistening droplets that attract passing insects. But this 'dew' is very sticky, trapping the insect; the sundew's tendrils detect the presence of its stuck prey and curl inwards to engulf it. Eventually, the whole leaf wraps around the insect which is digested. Sundews are often found in acidic habitats or areas where there are not as many nutrients in the soil. It's carnivorous way of life supplements its nutrition. Photo taken 8-4-2025.

Wetland Protection Recommendations

- Continue to prioritize good water quality, working to conserve and maintain all types of wetlands throughout the town. Emphasis should be placed on wetlands outside of conserved lands that are important linkages for wildlife.
- Consider additional protective buffers to all wetlands in town as well as making town-wide bylaws stronger and clearer to enforce impingements on these important areas.

Along with providing important plant, wildlife, and fish habitat, wetlands are important during droughts and floods. Because they contain hydrophytic vegetation (plants adapted to living in water and/or wet conditions) and poorly drained soils, wetlands store significant amounts of flood and/or run-off water, minimizing serious damage in times of high water. **Wetlands are important contributors to groundwater recharge. This ability to retain water allows wetlands to act as filters. As moving water is slowed and stored in wetlands, suspended sediments and particles settle into the mucky substrate, giving plant roots a chance to absorb excess nutrients, toxins, pollutants, and contaminants. *These functions make wetlands an important source for maintaining the health of aquatic systems.***

Wetlands are dynamic systems that continually change. In the absence of major disturbances, they gradually fill in overtime through a natural process known as lakefill. This succession often begins with open water, followed by the establishment of submerged plants. Floating-leaf species such as water lilies typically appear next. As conditions become shallower, emergent vegetation—including reeds, sedges, and wetland grasses—takes hold. Shrubs such as highbush cranberry, sweetgale, mountain holly, and bog rosemary eventually move in, along with heath species like leatherleaf and Labrador tea. Over time, trees such as red maple, gray birch, and larch become established, further advancing the wetland's transition toward a more forested condition.

On the other hand, there are several environmental and human-induced reasons for wetlands to increase in size. Some examples of these include:

- Human development, including damming or excavation such as the mining of gravel and sand could increase wetland sizes and often create new wetlands.
- Severe weather changes – an increase in rain will increase the wetland area, whereas a drought may diminish the area.
- The cyclic movements of beavers as hardwood saplings regenerate in early succession. In Burke there are ample signs of present and past beaver activities in most of the wetland complexes throughout the town.
- Human activities such as logging and landscape alteration can dredge out wetland areas or increase the amount of runoff into wetlands.

Burke contains 1,835.63 acres of wetlands (8.5% of town). They range in size from less than an acre to nearly 200 acres, and contain a variety of wetland habitats including forested, scrub shrub, emergent, riverine, and open water wetlands. Many wetlands mapped in Burke have been obtained from the 2025 update by the U.S. Fish and Wildlife Service's National Wetland Inventory (NWI) program. The newest update from the Fish and Wildlife Service more than doubled the number of wetlands in town from 2024 data. This is largely due to forested wetlands which have become easier to see on updated aerial photographs. Based on field work and examining recent aerial photographs, Elise digitized an additional 160 acres of wetland areas for this study. Each wetland plays an important role for wildlife and maintains good water quality.

In addition to NWI wetland data, there are over 5,038 acres of hydric soil mapped throughout Burke. This soil type is scattered throughout town the majority being in the northwestern section of town. Soils were mapped by the USDA Natural Resources Conservation Service (NRCS).

Hydric soils contain poorly and very poorly drained soils, where water is removed from the soil so slowly that free water remains at or near the surface during most of the growing season. As true with National Wetland Inventory data, there are fewer hydric soils in the hilly or mountainous parts of town (particularly around Burke Mountain). On the other hand, in flatter sections near rivers, streams, and open water, there are larger areas of very poorly drained soil. Wetlands are evenly scattered primarily along streams and rivers and associated valleys and floodplains in town. The river/stream valleys are wider, and flatter compared to the headwater's streams coming out of hills and Burke Mountain. This creates a diversity of wetlands associated and directly connected to them.

Pickerel Frog found in a wet meadow in Burke. They are common in Vermont and found in several types of wetlands, often preferring dense vegetation adjacent to aquatic environments for cover.

Photo taken June 2024.

The diverse wetland complex near the Burke Town School contains a very poorly drained soil called Wonsqueak-Pondicherry Muck. The Muck indicates a very thick black organic layer of soil which is fully saturated with water throughout the year. Photo taken 6-30-2025.

The soil type along Roundy Brook in the Willey Woods Community Forest is mapped as Cabot Silt Loam, which is a poorly drained soil. Over 60% of the community forest contains this soil type. The Northern White Cedar Seepage Swamp shown here is a unique plant community in Vermont.
Photo taken 5-5-2025.

Vernal Pools – For this project 12 vernal pools were documented in Burke. Undoubtedly there are many more throughout town. ***The BCC recommends continuing to build upon this database as new vernal pools are discovered in town***. Vernal pools are unique, often isolated and important wetland types. Vernal pools provide essential breeding habitat for certain amphibians and invertebrates such as wood frogs, yellow spotted salamanders, Jefferson and blue-spotted salamanders, fairy shrimp, fingernail clam and caddisfly. These creatures depend on vernal pools as breeding sites because they are only temporary water bodies preventing fish and other aquatic predators from taking up residency. Reptiles such as painted turtles and wood turtles also rely on vernal pools as important feeding areas in early spring. Vernal pools fill annually from precipitation, runoff, and rising groundwater in the fall and spring. By mid-summer, however, these wetlands are typically dry, making them inhabitable to many species except for specifically adapted plant and wildlife species. For this reason, many unique, rare, threatened, and endangered species are linked to this wetland type. The State of Vermont (Department of Fish and Wildlife / Environmental Conservation) recognizes their value as important habitat and gives them special attention. Refer to Map #3 –*Water Resources* - at the end of the report for locations of the two vernal pools on the Willey Woods Community Forest. All other vernal pools in town are on private property, and their location is geomasked to respect the privacy of private landowners.

Vernal pool on private property. It is part of a larger forested wetland with excellent buffers all around. It is associated with the East Branch Passumpsic River. Photo taken 7-14-2025.

Vernal pool loaded with wood frogs and spotted salamanders in Burke on private property. Photo taken May 2025.

Geology (Maps #5 and #6 at the end of this report)

Geologic events that occurred thousands and millions of years ago still influence the management of forests today. The nature of bedrock that underlies Burke has a major influence on the topography of the land, the chemistry of the soils, and the distribution of plant communities.

Burke lies within two biophysical regions – Northern Vermont Piedmont and Northeastern Highlands. The rocks of Northern Vermont Piedmont originated as marine sediments laid down up to 443 million years ago. These metamorphic rocks are generally calcareous. The older rocks of the Northeastern Highlands were formed during a similar timeframe, but from a geologic perspective, the Northeastern Highlands of Vermont are closely related to the White Mountains of New Hampshire and Maine (Thompson and Sorenson, 2000).

As shown in the surficial geology map, most of Burke is covered with a mantle of till. It is mostly composed of loose sandy material. It ranges from a few dozen feet thick in areas, such as valleys and lowlands, to ledges of bedrock projecting through it, particularly on Burke Mountain.

The East and West Branches of the Passumpsic River are flanked by kame terraces and eskers for their entire length. The eskers in particular are impressive features in Burke. Along the West Branch Passumpsic one esker extends southward from West Burke to the northern

outskirts of Lyndonville where it is joined by an esker from the East Branch Passumpsic valley which begins in East Haven. After the two rivers merge, an esker continues southward through Lyndonville, where it is largely buried by lake sediments along the Passumpsic Valley beyond St. Johnsbury, a total length of approximately 25 miles. In Burke, along both East and West Branch valleys, the esker is flanked through much of its length by kame terraces on one or both sides. As will be described in the Aquifer section, these features are excellent water recharge areas and indicate the presence of an aquifer under them.

Table: Surface Geology in Burke, Vermont

Feature Type	Lithology Name	Description	Acres in Burke
Postglacial fluvial deposit	Alluvium	Possible gravel pits	536.45
Bedrock Exposure	Bedrock Exposure	Significant Exposure of bedrock with little to no soil covering.	560.46
Glaciofluvial	Esker	Long ridge of gravel and other sediments, typically having a winding course, deposited by meltwater from a retreating glacier	504.46
Glaciofluvial deposit	Kame/Kame Terrace	A steep-sided mound of sand and gravel deposited by a melting ice sheer.	1,275.72
Pluvial deposit	Swamp, peat and/or muck	Wetland area defined by surface geology	197.17
Glacial deposit	Till	Till over bedrock, generally thicker in the valleys and thinner on the hillsides	17,000.91

Fluvial = in or near a river
Glaciofluvial = landforms or deposits created by the action of glacial meltwater
Pluvial deposit = sediments formed during periods of increased rainfall, often resulting in the formation of lakes or floodplains

Flooding in 2024 along the East Branch Passumpsic River exposed material which is alluvium and an esker. These deposits have been made both by the river itself as well as the Wisconsin Glacier which was here 11,000 years ago. Photo taken July 2025.

Soils

Along with bedrock and surface geology, the nature of soil has a profound effect on plant growth. Whether it is rich with organic material, very poorly drained, or sandy, these characteristics will affect the type of vegetation adapted to grow in those conditions, thus affecting the type of wildlife in the area. Scientists can learn much about soil type by examining vegetation. At the same time, examining the soil will predict the types of vegetation that the area will support. Understanding soil conditions and characteristics can help identify critical areas such as wetlands, agricultural lands, forestlands, and wildlife habitats. In descriptions of soil types, the Natural Resource Conservation Service (NRCS) evaluates soil type according to its capacity for agriculture, sand and gravel production, woodland and forest productivity, community development, recreation, and wildlife habitat. Certain soils are better suited for certain land uses such as agriculture or residential development. For example, residential development should be located away from areas with unstable soil conditions such as high-water tables, and slow percolation rates, due to constraints for building foundations and septic system placement.

Farmland Soils (Map #7 at the end of report)

The first Census of Agriculture was conducted in 1840. At that time, Vermont produced 3.7 million pounds of wool from 1.7 million sheep, and $1.4 million of milk. In contrast, as of 2022, 72,813 pounds of wool is produced from 17,888 sheep, and $599 million of milk.

(Grubinger, 2024). In 2022 Vermont had 6,537 farms, very similar to the number 20 years ago. However, between 2002 and 2022 nearly 1,000 farms shifted from dairy to other products, making agriculture more diverse. In all of Vermont, the 2022 census lists:

- 744 vegetable farms
- 471 berry farms
- 507 greenhouse and nursery business
- 441 orchards
- 266 Christmas tree farms
- 1,345 hen laying farms
- 222 broiler farms
- 213 turkey farms
- 1,526 beef cows
- 1,012 horse farms
- 419 goat farms
- 300 pig farms

Vermont also leads the nations in maple production. 1,433 sugar makers produced 3.1 million gallons of syrup from 8.5 million taps statewide in 2022.

> Vermont's agricultural industry is growing. Sales of farm products now exceed one billion dollars, up by 32% since 2017. We have 12,470 farmers (41% are women), about the same as five years ago, but their average age increased from 55.9 to 57.7 years old. During that time, we lost 1.6% of our farmland (Grubinger 2024).

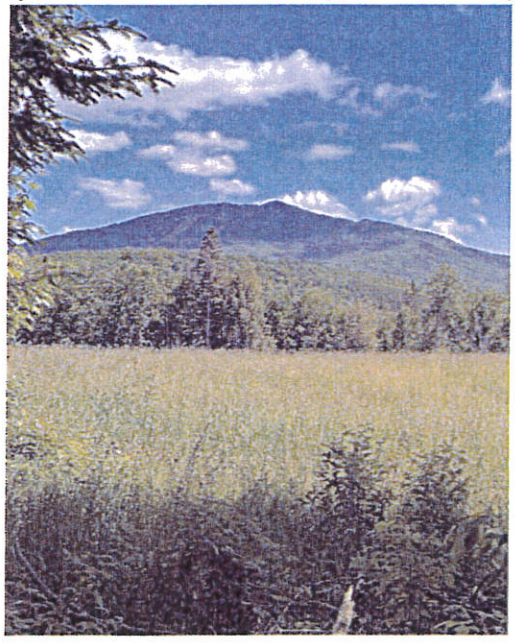
Farming in Burke reflects state-wide diversity, including vegetables, livestock, berries, Christmas trees, lumber, maple syrup, eggs, and horses. Although the size of farms in Burke has decreased, the diversity has increased, illustrating the resilience of farmers in Burke and the State of Vermont.

The soil types in Burke play a crucial role in supporting farming activities. Out of the 21,568.21 acres that make up Burke, the NRCS (Natural Resources Conservation Service) classifies 1,658.58 acres (7.69%) as USDA prime farmland, the highest quality land for food production. An additional 3,554.04 acres (16.48%) contain farmland soils of statewide importance, which are also valuable for agriculture but are considered slightly less optimal than prime farmland. Over 24% of Burke's land is regarded as highly suitable for agriculture, helping to sustain a strong local farming economy. These farmland soils are scattered throughout town particularly in valleys or along ridge tops where the topography is flatter.

Soil map units are Prime Farmland if they have the best combination of physical and chemical characteristics for producing food, feed fiber, forage, and oilseed crops and are also available for these uses. This soil type has the soil quality, growing season, and moisture supply

needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods The soil qualities, growing season, and moisture supply are those needed for a well-managed soil to produce the highest sustainable yields with minimal inputs of resources while at the same time generating the least possible damage to the environment. Farmland soils of statewide importance may not be as ideal for producing the highest possible sustainable yield as prime farmlands, but these soil types have been determined to be of agricultural importance on a more localized scale. The dominant soils in these soil map units have limitations from excessive slope and erosion hazard, excessive wetness or slow permeability, a flood hazard, shallow depth to bedrock or other layers that limit the rooting zone, and/or moderately low to very low available water capacity.

The Inn at Mountain View Farm contains prime farmland soils as well as those of statewide importance. Many of their fields are used as pastures and hayfields for their animal sanctuary. Summer 2024.



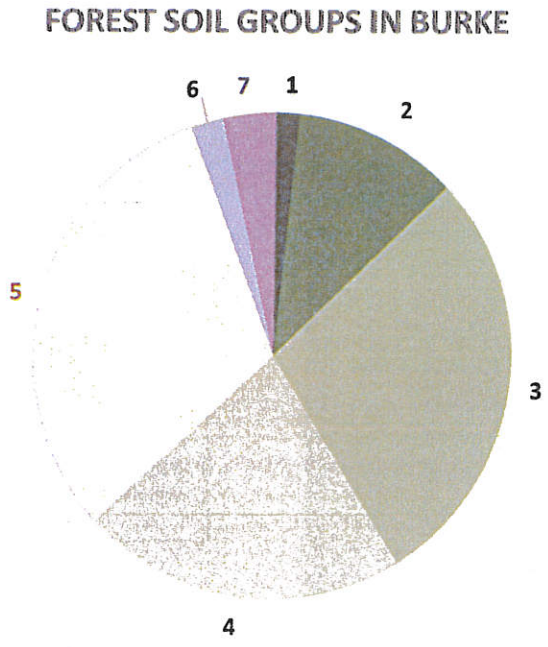
Prime farmland soil used as a productive hayfield in Burke. Photo taken June 2025.

Forestry Soil Groups (Map #8 at the end of report)

Similar to farmland and hydric soils, the NRCS has also organized the soil into Productive Forest Soil Groups. The objective is to offer a simplified tool to aid natural resource professionals and landowners. These groupings allow managers to evaluate the relative productivity of soils and to better understand patterns of plant succession and how soil and site interactions influence management decisions. All soils have been grouped into one of seven categories. Map #8 at the end of the report displays the forest soil classifications.

Forest Soil Rankings for Vermont

1. Very high in forest value – these soils have the best combination of physical and chemical characteristics for these uses, including adequate water supply, favorable temperature and growing season, and few to no surface stones or boulders.
2. High in forest value
3. Moderate in forest value
4. Moderately low in forest value
5. Low in forest value
6. Very low in forest value
7. Very little potential for commercial forestry – these soils include very steep slopes, very poorly drained mineral soils, and soils above elevations of 2,500 to 3,000 feet



Generally, those that have very high to high forest value consists of the deeper, loamy, moderately well-drained and well-drained soils. These soils are more fertile and have the most favorable soil-moisture conditions. Successional trends are toward climax stands of shade-tolerant hardwoods such as sugar maple and beech. Early successional stands frequently

contain a variety of hardwoods such as sugar maple, beech, red maple, birch (yellow, gray, and white), aspen, white ash and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and white pine. The soils in this group are well-suited for growing high-quality hardwood veneer and sawtimber, especially sugar maple, white ash, yellow birch, and northern red oak. Softwoods are usually less abundant and are best managed as a minor component of predominantly hardwood stands. Hardwood competition is severe on these soils. Successful natural regeneration of softwood and the establishment of softwood plantations require intensive management.

Moderate soil ranking consists of soils that are moderately well-drained and well-drained, sandy or loamy-over-sandy, and slightly less fertile than those above. Soil moisture is adequate for good tree growth but may not be quite as abundant. Successional trends and the trees common in early successional stands are similar to those ranked more productive; however, beech is usually more abundant and is the dominant species in climax stands. These soils are well-suited for growing less-nutrient-and-moisture-demanding hardwoods such as white birch and northern red oak.

As soil becomes less productive for timber production, there are limitations such as steep slopes, bedrock outcrops, erodibility, surface boulders, and extreme stoniness. Productivity of these soils isn't greatly affected by those limitations, but management activities such as tree planting, thinning, and harvesting are more difficult and more costly. In addition, those soils that have the lowest production are found in wetlands with very poorly drained soils, including mucky peats.

Forest productivity classification of this rich northern hardwood stand is 2, meaning it is high in forestry value. The main limitation here is the slope which would limit timber harvest activities. Photo taken 8-5-2024.

Groundwater Recharge Areas (Maps #6 at the end of report)

An aquifer is an underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt, or clay) from which groundwater can be pumped for drinking. Groundwater is a critical natural resource for the state of Vermont. Approximately 98% of public water systems rely on groundwater. There are three types of groundwater aquifers: stratified drift, till, and bedrock. Stratified drift and till aquifers are composed of unconsolidated glacial deposits (loose earth materials), while bedrock aquifers are fractured rock. In stratified drift aquifers, the materials are sorted sand and gravel. In till aquifers, the material is gravel, sand, silt, and clay mixture. In bedrock aquifers, the material is rock with fractures. Areas of more porous sand and gravel will allow infiltration, and are known as "recharge zones," signifying their importance in replenishing groundwater reservoirs.

Stratified-drift aquifers are an important source of groundwater for commercial, industrial, domestic, and public-water supplies in the state. They typically are the most productive sources of groundwater; therefore, the highest yielding public water supply wells tap these aquifers. Stratified-drift or overburden aquifers are most directly influenced by surface waters and land-use activities. They are, therefore, perhaps most susceptible to contamination. In Burke as with all of Vermont, aquifers are primarily located along river valleys, lakes, and ponds.

The wetland complex associated with the West Branch Passumpsic River is an important area for aquifer recharge. Although aquifers are not currently mapped in Burke, based on surface geology maps in town, there is likely a large aquifer under this area, which is a critical water source for Burke, particularly with its proximity to Burke Town School. Photo taken 6-30-2025.

Although there are no available aquifers maps for Burke, aquifers are present. Surface geology can help identify where they are likely located. Geology maps also help identify important aquifer recharge areas in town. Based on the surface geology maps in Burke, the best water recharge areas involve alluvium, eskers, moraines, kame terraces, and swamp peat and/or muck. Approximately 3,988.39 acres or 18.49% of Burke has surface geology indicting important water recharge area. Most of this area is along the West and East Branch Passumpsic Rivers, as well as between the two rivers along Darling Hill Ridge in southcentral Burke.

Wells used by communities and private landowners draw groundwater from aquifers. These recharge areas underlain with aquifers represent potential usable water sources for municipal purposes and should be protected to ensure their future quality and availability. Future studies will help clearly identify areas of aquifers along with their transmissivity and recharge rate.

Slope (Map #7 at the end of this report)

Slope is an important component of an area's landform and influences the plants and animals living there. Soils tend to be shallower on steeper slopes, the volume and amount of surface water runoff is higher, and the erosion potential is greater compared to flatter areas. These conditions create a unique habitat where, in some cases, plants and wildlife have special adaptations for dealing with the limitations associated with steep slopes.

Steep slopes provide opportunities for panoramic views and, for this reason, tend to be sought for residential development. However, there are significant problems associated with development on steep slopes. Slope has several limitations for building including structural problems and a greater chance of erosion. The consequences of erosion are loss of soil resulting in sedimentation of surface waters, loss of the productive capability of the land, and in severe cases, visual scars that can be seen from far away. Slope is traditionally expressed as a percentage and represents the amount of rise or fall in feet for a given horizontal distance. For example, a 15% slope means that for a 100-foot horizontal distance, the rise or fall in height is 15 feet. As slope becomes steeper, the expenses associated with building increase. In general, slopes between 15% and 25% are considered areas where development would be restrictive and slopes greater than 25% are considered too steep to provide adequate sites for structures such as roads, homes, and septic systems.

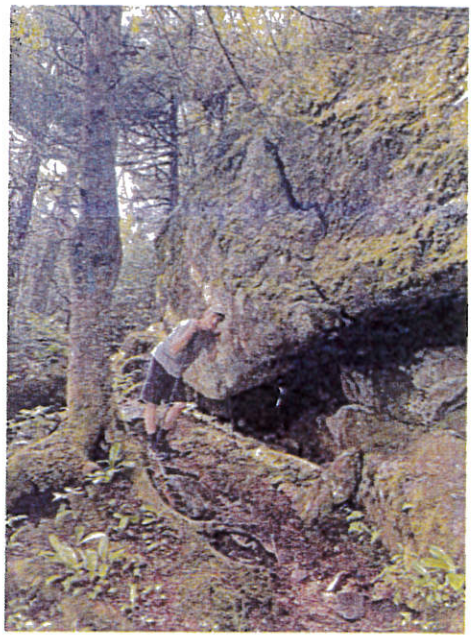
NRCS soil data was used to determine areas in Burke with slopes equal to and greater than 15%. Using NRCS data, 10,532.58 acres or 48.8% of the land in Burke contains slopes that are 15% and over. This is nearly one half of town. Steep slopes are further broken down as follows:

- 7,061.88 acres = 32.7% contain slopes between 15% and 25%
- 922.97 acres = 4.3% contain slopes between 25% and 35%

- 2,503.92 acres = 11.6% contain slopes between 35% and 60%
- 43.81 acres = 0.2% contain slopes over 60%

Some of the steepest slopes include the sides of Burke Mountain as well as areas of steep riverbanks along the West and East Branch Passumpsic River. Steep slopes are scattered throughout town though as anyone who drives, bikes, or walks along our town roads will agree.

Steep slopes on Burke Mountain often have only a thin layer of soil above the bedrock. This exposed ledge, where only mosses and ferns can take hold, shows an area where the soil is absent. Photo taken 6-10-2025.



Steep slopes often offer excellent views. The view here is from near the top of Burke Mountain looking North. Photo taken 6-10-2025.

Climate Change and the Effects on Natural Resources

The Vermont Fish and Wildlife Department as part of their 2015 Wildlife Action Plan[5] has a chapter on Climate Change and Conservation. The major impacts of climate change on wildlife and our forests include the following risks:

1. Forests – Current evidence indicates that forests will increase evapotranspiration and water use due to warmer seasonal temperatures and a longer growing season. This scenario may lower overall soil moisture, increasing the persistence of droughts, reduce forest productivity, and in turn increase the susceptibility of forests to insect and disease outbreaks. Effects of this include:
    a. Several dominant tree species will shift their ranges and forest communities adjust to new conditions.
    b. Warmer temperatures will increase invasive species (plants and insects)
2. Waterbodies – Increased intense storm events will increase the average annual stream flows resulting in more frequent and greater magnitude of flooding and erosion. Projections also suggest that warming temperatures may increase the likelihood of short-term summer droughts.
    a. Increasing frequency and amount of stormwater runoff will lead to nutrient and sediment loading in streams and rivers.
    b. Warmer water temperatures of lakes and greater nutrient loading from flooding can result in more frequent blue-green algae blooms.
3. Habitats and Species – Projections indicate that warming temperatures will expand the extent of suitable habitat for tree species such as oak, hickory and red maple, while significantly decreasing the extent of suitable habitat for more cold-tolerant species such as balsam fir. Climate change is also affecting phenology, or timing of life-history events of many plants and animal species.
    a. Moose for example, are vulnerable to climate change in Vermont. As cold-adapted species, moose are reducing food intake in response to higher summer temperatures. In Burke, the moose population has declined in moose due to shorter winter months, and less snowpack resulting in an increase in winter tick populations.
    b. Amphibians are also particularly vulnerable to interactions between altered hydrology and increasing temperature. Those that are dependent on vernal pools are especially vulnerable as they may dry up sooner, which will stress growing tadpoles and salamanders.
    c. Warmer temperatures will similarly affect cold-water fish species such as brook trout.

Animals and plants are constantly adapting to their changing ecosystems. The rapidly changing levels of greenhouse gases in the atmosphere, however, are leading to much faster and greater ecosystem pressures. The rapid rate of change observed in our climate is already

[5] Vermont Fish and Wildlife Department is in the process of updating the state's Wildlife Action Plan for 2025-2035. Planned completion date as of 10-27-2025 is March 2026.

affecting plants and wildlife in Vermont. There is increased flooding, extreme fluctuations in precipitation (including rain, snow, and ice events), shifting habitats, and species struggling to adapt. Biologists are keeping a close eye on wildlife as these changes unfold. Some of these species include American pine marten, Canada lynx, moose, brook trout, and the little brown bat. However, predicting what wildlife population numbers and assemblages will be like in the future is difficult. Wildlife species in Vermont are most at risk from a shifting habitat directly rely on these habitats to get their basic needs and cannot adapt to changes as quickly.

Forests in northern New England will be affected by a changing climate and other stressors during this century. Balsam fir, for example, has been identified as a species that will be heavily impacted by climate change. Balsam fir is a common species found in Lowland Spruce-Fir habitats as well as High Elevation Spruce-Fir. Future management of these forests should work to shift the species composition over time to other species with better long-term viability. In addition to silvicultural systems and harvest practices, enrichment plantings may be part of forest management practices to encourage those conifer and hardwood species expected to be adapted to future conditions (red spruce, white pine, hemlock, red oak, and black birch). The Vermont Fish and Wildlife Department is an excellent resource for what is happening to our forests and wildlife with climate change, as well as what is being done to monitor and adapt.

Lowland spruce-fir forests such as this one are likely to suffer the effects of climate change in Burke. Photo taken on (August 2025).

Cryptocurrency Mining as an Emerging Climate and Community Concern

Cryptocurrency mining is the process of verifying digital transactions and adding them to a blockchain ledger, typically by solving complex mathematical problems using powerful computers. While this process is needed to maintain decentralized networks like Bitcoin, it consumes a significant amount of electricity. Much of this energy comes from fossil fuels, which contribute to greenhouse gas emissions and climate change. The environmental impact extends beyond energy use. Mining operations often require large numbers of high-performance computers that generate substantial heat, leading to increased cooling demands and water use. In some areas, mining operations have stressed local water supplies and contributed to noise pollution and land use conflicts. As cryptocurrency grows, there is increasing concern about its sustainability. Artificial Intelligence or AI requires similar setups, although not as taxing on our environment.

On February 26, 2025, VT H0370 ("Cryptocurrency Public Protection Act") was introduced by Representative Greer of Bennington. This bill proposes to establish various initiatives to protect Vermonters from any potential harm associated with cryptocurrency transactions and the location of cryptocurrency mining facilities in Vermont. Part of the bill asks the Public Utility Commission to investigate the siting of cryptocurrency mining facilities in Vermont to:

1. Develop a procedure for siting such facilities following State's environmental and conservation policies and to mitigate any adverse impacts on adjacent landowners, municipalities, and the public good.
2. Establish electric and water utility rates so that other classes of ratepayers are not burdened with any increased costs associated with the construction and operation of these facilities.

This bill is in committee at the time of this report and should be monitored.

While cryptocurrency mining and AI operations are not in Burke, nationwide trends suggest this industry could pose significant future challenges. Research by the United Nations University shows that Bitcoin mining relies heavily on fossil fuels (with coal alone supplying 45% of its electricity), producing large carbon, water, and land footprints reuters.com+15earthjustice.org+15theguardian.com+15unu.edu. A study by MIT further found that emissions from major U.S. Bitcoin mines exceed the total annual emissions of Vermont arxiv.org+3ceepr.mit.edu+3greenpeace.org+3.

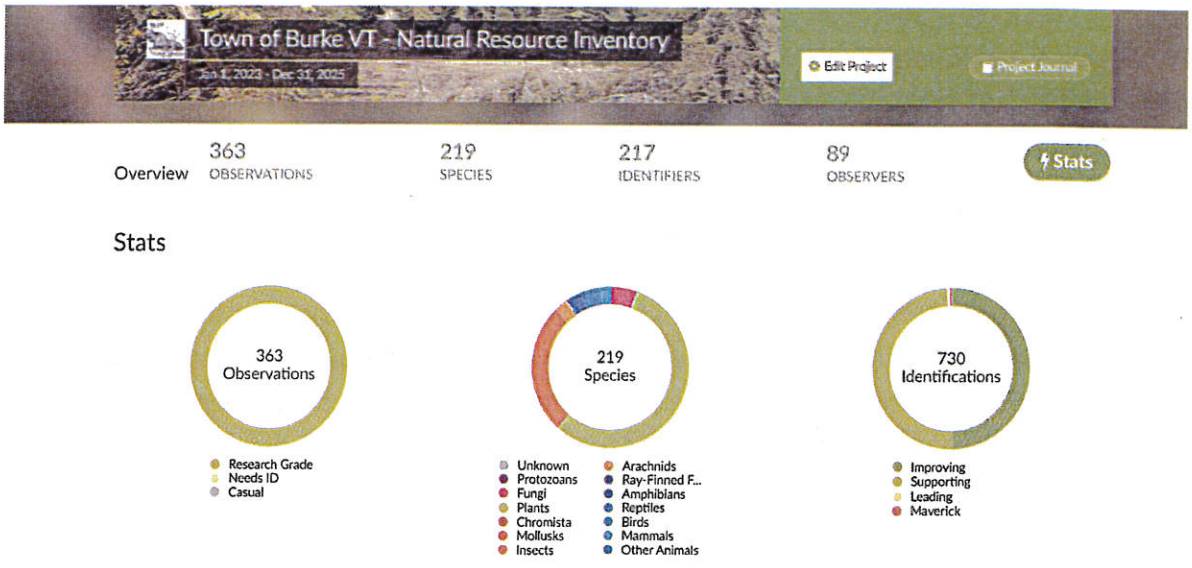
In practice, proof-of-work mining can also stress local energy grids and generate noise and air pollution. The Environmental Working Group documented cases where communities experienced degraded air quality and disruptive noise near mining sites, and residents near a mine in Granbury, Texas reported sustained noise levels over 100 dB, causing health and

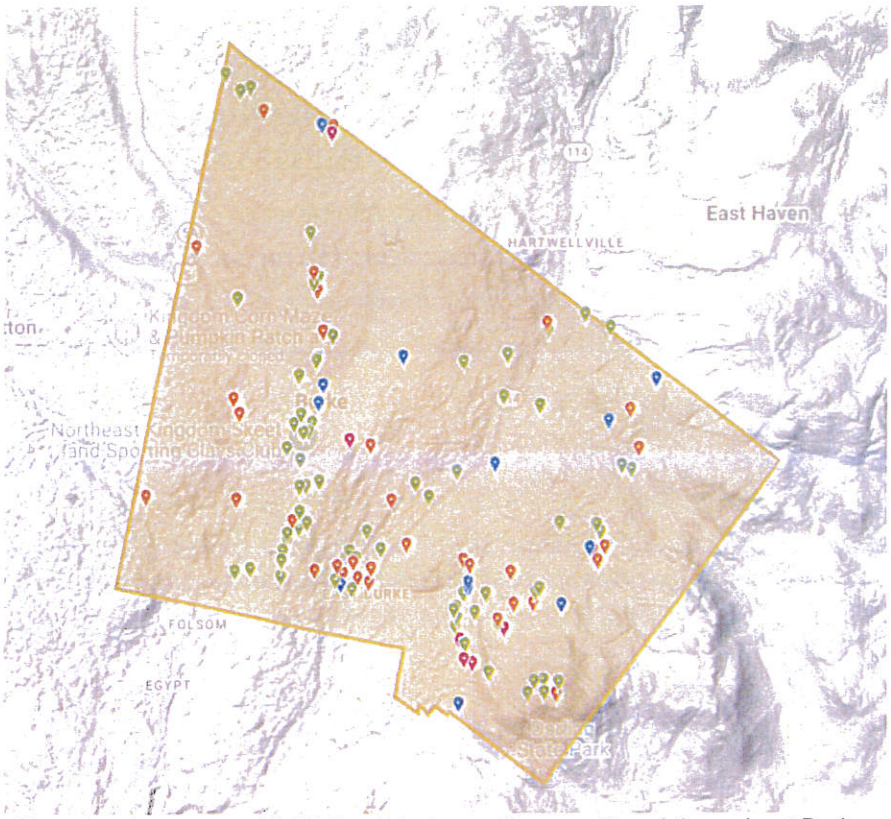
wildlife impacts time.com+1theguardian.com+1. One Pennsylvania operation even burned waste coal and old tires, emitting mercury and sulfur dioxide into neighboring air and water reuters.com. Regulatory groups like Earthjustice warn that this energy-intensive activity "threatens grids, utilities, communities, and ratepayers" earthjustice.org.

For Burke, it's important to flag cryptocurrency mining as an emerging concern to our natural resources. If such facilities were to be proposed in the region, they could conflict with Vermont's clean-energy goals, strain local power infrastructure, and potentially introduce environmental and public-health pressures—especially in our rural and forested landscape.

Concurrent iNaturalist Data

An iNaturalist project was started by the Burke Conservation Commission to gather additional data in town. At the time of this report, 89 people, including Burke residents, contributed local knowledge for this NRI via an iNaturalist project. Between January 1, 2023, and December 31, 2025, 219 species were recorded including plants, fungi, insects, birds, and wildlife found throughout town. Details of this project can be found here. This project was queried so only those observations classified as "research grade" were included. A summary is shown in the figure below. The following screen shot shows the town boundary with location of species identified scattered throughout town.





Map showing areas with iNaturalist observations scattered throughout Burke.

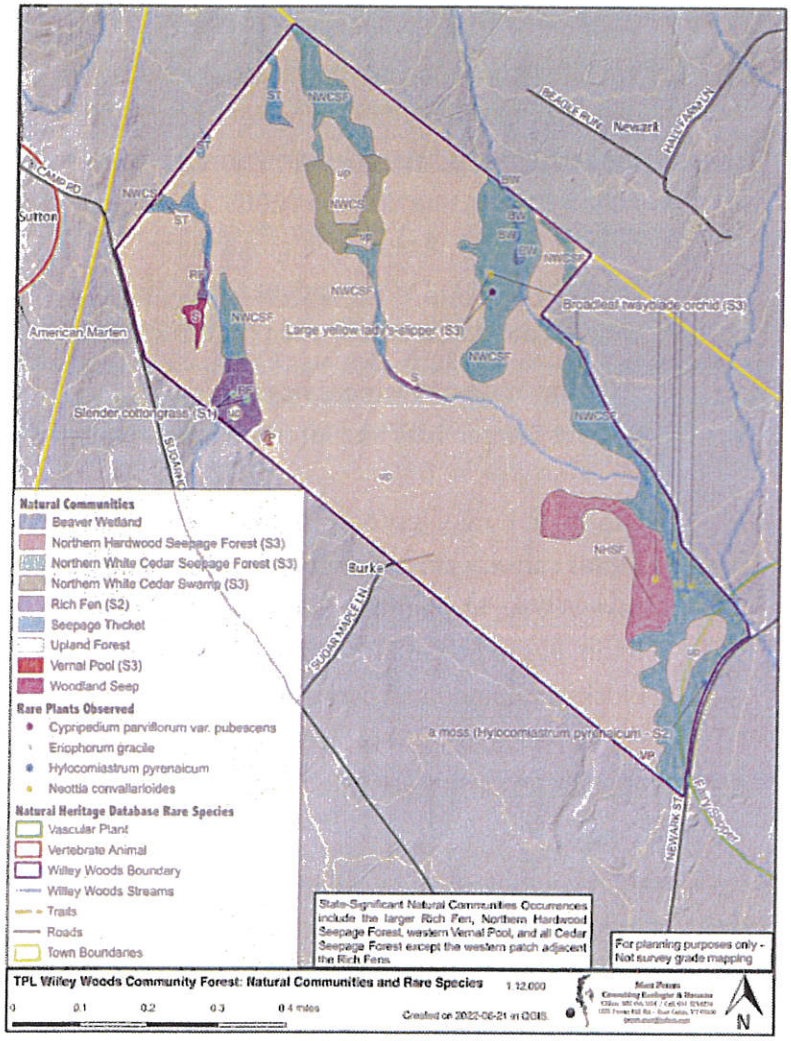
Rare Species and Exemplary Natural Communities

The Town of Burke has documented occurrences of rare species and plant communities. They are listed and monitored by the Vermont Natural Heritage Inventory part of Vermont Fish and Wildlife Department. Vermont is home to more than 500 species of vertebrate animals. Many of these animals live in Burke and the surrounding towns. The number would be considerably larger if a complete list of invertebrates (insects, crustaceans, clams and snails) were included. About 75% are nongame wildlife species – not hunted, fished, or trapped. In Vermont, 53 species are listed as endangered or threatened, which includes 37 state-endangered and 16 state-threatened species. Additionally, seven species are federally endangered and listed under the Endangered Species Act. The Vermont Fish and Game Department maintains a library of endangered, threatened and rare animals and plants in Vermont (Library: Endangered, Threatened and Rare Animals and Plants Lists | Vermont Fish & Wildlife Department). Rare plants and animal locations are buffered or geomasked in Burke. Little information is provided due to landowners' rights and privacy.

During recent studies including this NRI, Northern White Cedar Swamps were documented in Burke. These are an uncommon wetland community in the state. Because of the value of cedar wood for shingles and posts, most cedar swamps have been logged, and there are very few in undisturbed condition. Northern white cedar cannot tolerate extended flooding,

and artificial impoundments have reduced or eliminated cedar from some swamps. One of these plant community types in Burke can be found in Willey Woods Community Forest (a community forest open to the public). During a rapid ecological assessment of the Willey Woods Community Forest, Matt Peters noted the following:

> Rare species observed include the Very Rare (S1) Slender cotton-grass (*Eriophorum gracile*) in the Rich Fen, the Rare (S2) moss *Hylocomiastrum pyrenaicum*, and the Uncommon (S3) orchids Broadleaf twayblade (*Neottia convallarioides*) and Large yellow lady's-slipper (*Cypripedium parviflorum var. pubescens*) in the seepage forests. The State-Threatened and Historical (SH) Calypso or Fairy slipper orchid (*Calypso bulbosa*), previously known from an adjacent parcel, was not found, but ample potential habitat is present in the cedar wetlands. The State-Endangered, Very Rare (S1) American marten (*Martes americana*) has been documented nearby, and potential habitat is present on the property. More targeted study in needed to fully assess habitat suitability for the species, but marten may be a good focal species to guide forest and habitat management decision making in the future (Peters, 2022).



Willey Woods Community Forest map of natural plant communities and rare species. This map was created as part of a rapid ecological assessment of the property in 2022.

To learn more about threatened or endangered species or unique communities, contact the Vermont Natural Heritage Inventory office of Vermont Fish and Wildlife for plant species.

Conservation Priorities

Burke contains several areas classified as "Highest Priority" (Tier 1) as well as "Priority" (Tier 2). Those areas not currently conserved include the following:

- Umpire Mountain area identified for its headwater streams, unique habitat, and unfragmented habitat.
- Burke Mountain and surrounding area, identified for unfragmented habitat with a variety of habitat types, headwater streams, forested wetlands and seeps.
- East Haven Mountain Region identified for its headwater streams to Flower Brook, and unfragmented habitat.
- Southwestern corner of Burke, identified for unfragmented habitat.
- Northwestern part of Burke, identified due to unfragmented habitat, vernal pools, bogs, and northern forest habitat types.

Wildlife Action Plan and Conservation Priorities (Maps #9 and #10)

The Vermont Department of Fish and Wildlife worked together with many partners in the conservation community to create Vermont's Wildlife Action Plan (WAP). The plan, which is mandated and funded by the federal government through the State Wildlife Grants Program, provides a base tool for restoring and maintaining critical habitats and populations of the state's species of concern and their habitat. Vermont Fish and Wildlife states that the Wildlife Action Plan is a first step on a statewide scale to work towards helping keep species off the rare species lists. The first Vermont Wildlife Action Plan was published in 2005. It was then revised in 2015. A team of biologists are currently working on an updated 2025 WAP, which is due to be published in March 2026.

The State of Vermont has also created Priority Connectivity and Interior Forest Habitat Blocks as part of the Vermont Conservation Design. In Burke, just over 73% of them are part of this conservation priority area which connects Lake Willoughby and the Connecticut River Basin. Based on data from these Habitat Priority Blocks combined and overlayed with existing conserved lands, this project highlighted four additional areas to consider for future conservation efforts. They are listed and described in the sidebar on this page.

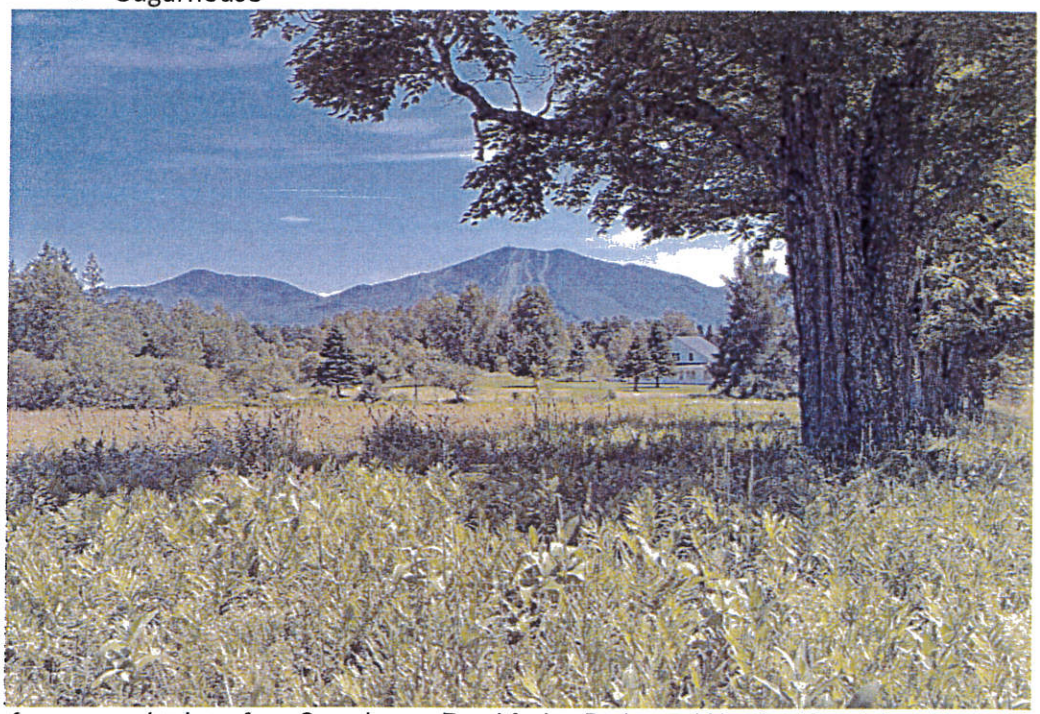
Future work, including this NRI, can be shared with Fish and wildlife and incorporated into the Wildlife Action Plan to build upon and improve data and habitat analyses. For more details on the Wildlife Action Plan visit the Vermont Fish and Wildlife Department website at: Wildlife Action Plan 2025-2035 | Vermont Fish & Wildlife Department.

Scenic Resources

With a hilly and mountainous topography, ponds, rivers, and wetlands, Burke has many scenic views and viewsheds throughout the entire town. Most areas offer scenic views overlooking rivers, streams, lakes, ponds, and hillsides across valleys. Almost every road in Burke is scenic. In 2007, the Town of Burke created a Scenic Conservation Overlay to provide regulatory protection to areas with exceptional scenic and visual quality. This overlay is currently composed of all areas of 1,500 feet in elevation and higher, and most development in this area is subject to conditional use review. Deeper setbacks may be required to protect certain natural and scenic resources. Additionally, existing, forested cover must be maintained in a manner that softens the visual impact of new development as viewed form public roads and properties. Finally, structures in this overlay must be carefully sited downslope of adjacent ridgelines and be constructed in a manner that minimizes glare and sharp contrast from the natural environment, as viewed from public roads and properties (Town of Burke, 2017).

Mapped scenic roads in Burke include:

- Darling Hill (And East Darling Hill)
- Gaskell Hill
- Burke Hill
- Sugarhouse
- White School
- Burke Hollow
- Burke Green
- Pinkham



One of many scenic views from Sugarhouse Road facing Burke and Umpire Mountains. Photo taken 6-30-2025 facing south.

Scenic view across the wetland and stream flowing through North Pasture Community Forest. Photo taken 8-4-2025.

Expansive view from Burke Mountain facing across Burke and beyond. Photo taken 6-10-2025

In addition to views from mountain tops or across ponds, lakes and rivers, excellent views can be found across fields and permanent wildlife openings. People experience scenic views in all directions while driving, biking or walking along the roads in the town, particularly where fields and permanent wildlife openings are maintained. ***Continuing to maintain permanent wildlife openings will retain these outstanding views throughout Burke.***

Development and population growth throughout the state and region have caused people to increase their appreciation of the natural scenery Vermont has to offer. As with many other towns and cities in Vermont, there are potential threats to viewsheds. Several communities are struggling with concern for future development on the ridgelines and tops of hills. In many communities, there have been extensive debates over wind towers, cell towers, and houses built on ridgelines because of their detrimental effect on viewsheds.

Dark Skies and Responsible Outdoor Light at Night

Over the past 100+ years, a steady increase in artificial outdoor lighting has led to unprecedented levels of light when there should be dark. The World Atlas of Artificial Sky Brightness, published in 2016, estimated that 80% of the world's population and 99% of North Americans, live in light polluted places. And a 2023 Study comparing data from citizen science observations around the globe found that over the past decade, the average amount of artificial light in the night sky has increased by up to 10% per year (Falchi, et. al. 2016).

In Burke, dark skies are a valuable natural resource, offering benefits that extend beyond the scenic beauty they provide. Preserving dark skies has become a priority for communities that recognize the ecological, cultural, and health implications of artificial light pollution. Below are several reasons why dark skies are vital to Burke's natural landscape and the well-being of its residents.

Ecological Health - The disruption of natural light cycles can impact wildlife, particularly nocturnal species that rely on the darkness for survival behaviors like foraging and mating. Light pollution disrupts these patterns, leading to changes in predator-prey relationships, disorientation in migrating birds, and disrupted activity cycles in mammals, reptiles, and insects. Preserving dark skies helps protect these natural rhythms, maintaining a balanced ecosystem.

Local species of conservation interest impacted by light pollution include, but are not limited to:

- Insects- Monarch Butterfly, Fireflies, Tiger beetle
- Reptiles- Eastern Box Turtle, Wood Turtle
- Amphibians- Fowler's Toad, Northern Leopard Frog, Blue Spotted Salamander
- Birds- Bicknell's Thrush, Peregrine Falcon, Cliff Swallow, Grasshopper Sparrow, Cerulean Warbler, Black-backed Woodpecker, American Three Toed Woodpecker

Human Health and Well-Being - Exposure to artificial light at night is associated with disruptions in human circadian rhythms, potentially leading to sleep disorders, mental health challenges, and other health issues. Dark skies provide a reprieve from urban lighting, allowing residents and visitors alike to experience the restorative effects of natural darkness. This is especially important for Burke, where visitors seek the natural environment for health and recreation.

Recreational and Educational Value - Dark skies are a draw for stargazers, astrophotographers, and nature enthusiasts who seek unobstructed views of the night sky. This contributes to the town's tourism, as dark-sky activities like star gazing gatherings and night hikes become more popular. Clear, dark skies are essential for astronomical research and education. Dark-sky preservation allows for better viewing of celestial objects, providing educational opportunities for local schools and astronomy groups.

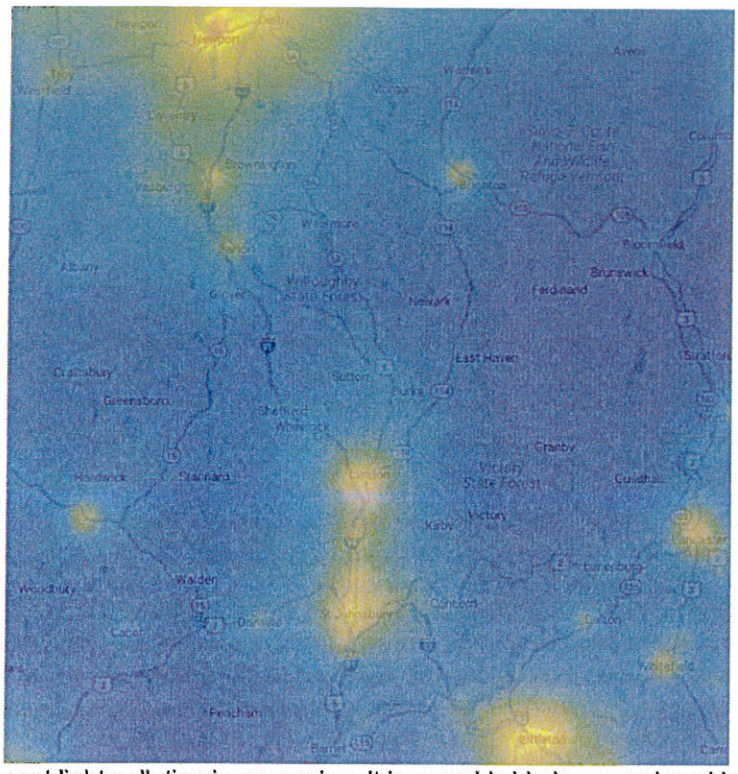
Climate and Energy Considerations - Reducing light pollution is also an environmentally friendly choice. Outdoor lighting requires energy, and excessive lighting contributes to greenhouse gas emissions. By promoting dark-sky initiatives and encouraging responsible lighting practices, Burke can decrease its energy usage, reduce its carbon footprint, and support broader sustainability goals.

In general, outdoor lighting should follow the five guidelines laid out by DarkSky International.

1. **Useful** – Use light only if it is needed. All light should have a clear purpose. Consider how the use of light will impact the area, including wildlife and their habitats.
2. **Targeted** – Direct light so it falls only where it is needed. Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.
3. **Low Level** – Light should be no brighter than necessary. Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.
4. **Controlled** – Use light only when needed. Use controls such as timers or motion detectors to ensure that light is available when it is needed. Dimmed when possible and turned off when not needed.
5. **Warm-colored** – Use warmer color lights where possible. Limit the amount of shorter wavelength (blue violet) light to the least amount needed.

Burke's Zoning and Subdivision Laws has a set of guidelines for outdoor lighting to "ensure appropriate lighting while minimizing its undesirable effects". They include:

1. All outdoor lighting should be kept to the minimum required for safety, security and intended use.
2. Permanent outdoor lighting fixtures shall not direct light upward or onto adjacent properties, road, or public waters, and shall not result in excessive lighting levels which are uncharacteristic of the rural area.
3. Outdoor lighting fixture use shall be cast downward and shall be designed to avoid glare and harsh contrasts in color and/or lighting levels.
4. Whenever possible outdoor lighting fixtures shall have timers, dimmers, and/or sensors to reduce energy consumption and eliminate unneeded lighting.
5. Outdoor lighting fixtures for non-residential use shall be illuminated only during the hours of operation (Town of Burke 2017).



Screenshot from recent light pollution in our region. It is a worldwide issue and working with neighboring towns and regions will help reduce the effects of light pollution. Screen shot taken from light pollution map information on November 4, 2025.

Cultural Resources

The Town of Burke has an exceptionally rich history of land use changes and cultural features from when Indigenous people first lived with the land, to the first settlements, to current times. Some of Burke's most historic structures are:

1. Darling Farm
2. Burklyn Hall
3. Old White School House
4. West Burke Methodists Church
5. West Burke Library
6. Union Meeting House in Burke Hollow
7. Burke Mountain Club House
8. Cemeteries
9. Barns
10. Stonewalls and Cellar holes.
11. East Burke Congregational Church

Although Burke does not have a historical society, the town website has a summary of the history of Burke and can be found here (The History of Burke, Vermont).

The many stone walls in Burke indicate farming occurred here. Fields were cleared of stones, and these walls were created as property boundaries as well as places to store stones removed from fields. Photo taken on the Willey Woods Community Forest. In this case, the stonewall was repaired and enhanced along a walking trail. Photo taken on 6-30-2025.

Former farmhouse site on the Willey Woods Community Forest. Photo taken 6-30-2025.

Invasive Plant Species

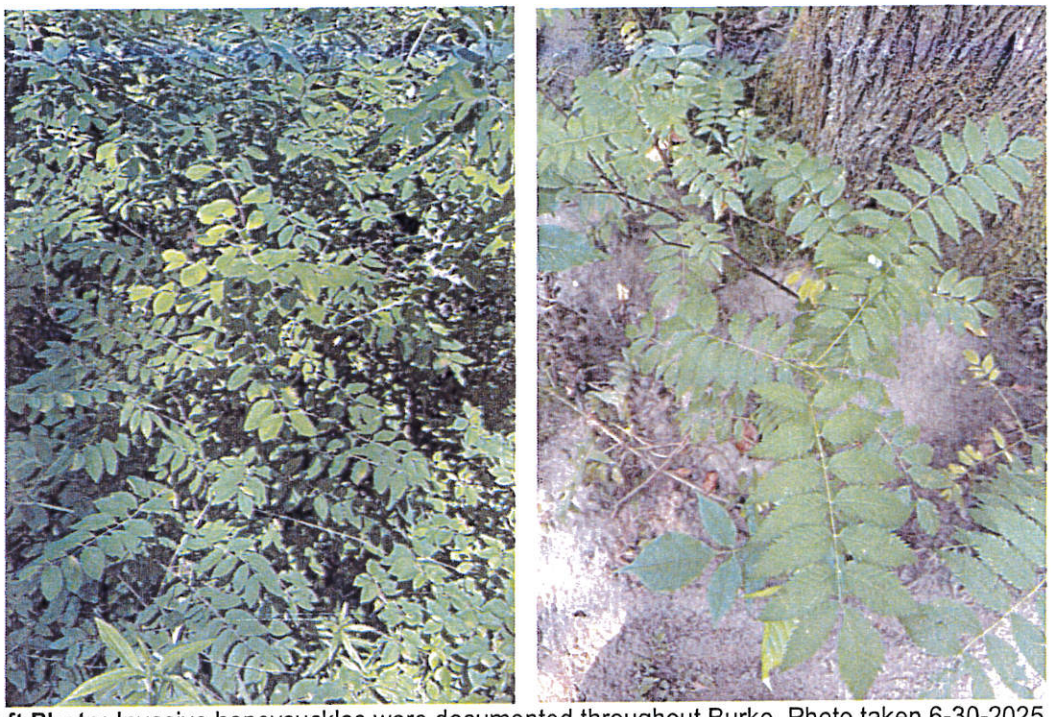
There continues to be an increase in public awareness and concern about the rapid spread of invasive species in Vermont and throughout New England. Invasive species are plant and wildlife species that are not native to an area but take up residency and can out-compete native species. These species tend to be more common in wet areas such as lakes, wetlands, riparian habitats, and areas of recent disturbance including roadsides and old gravel pits. They

can also be found at old farm sites where people have planted various fruit and ornamental plants for aesthetics and agricultural purposes.

Several invasive species were documented during field work for this NRI. Those documented and links to eradication methods are shown in the table below.

Species	Eradication Methods Sources : USDA Forest Service, 2007, Vermont Invasives
Japanese Knotweed (*Polygonum cuspidatum*) Located throughout town	• Repeated cutting several times (4-6) during growing season leaving cut plants onsite. • Or cover with durable material for 3-5 years, checking regularly. • Knotweed plants may be controlled by application of a systemic herbicide containing glyphosate or triclopyr to the actively growing plants. The injection method is recommended to reduce injury to desirable vegetation. Click here for more information
Japanese barberry (*Berberis thunbergii*) Observed in mixed forested areas throughout town (mostly isolated plants)	• Hand removal is the best option for eliminating small, isolated plants. Larger plants can be removed with a garden spade, hoe, or weed wrench. • Try to remove as much of the root system as possible because Japanese barberry can easily re-sprout from the remaining roots. • Large populations can be effectively controlled using recommended herbicides. Click here for more information
Purple Loosestrife (*Lythrum salicaria*) Documented throughout town, primarily near wetlands along roads	• Best time to manage is when it is flowering (late summer) • Small new infestations can be hand-pulled or removed with a shovel. • Before digging remove flower heads to prevent seed spreading • Plants can also be cut to the ground. This treatment only slows their spread. • Dispose of all plant parts – do not put them on a compost pile. • Can be controlled with herbicide if in an upland area. • Purple loosestrife is also being biologically controlled by two species of introduced leaf-eating beetles. Click here for more information
Japanese and Tatarian honeysuckles (*Lonicera japonica*) (*Lonicera tatarica*)	• Use mechanical means first, such as digging out or pulling the vines by their roots. This method works best for small populations. • If mechanical control isn't possible or practical, such as with large infestations, Japanese and Tatarian honeysuckle can be managed with herbicides such as glyphosate or triclopyr. If applied as a foliar spray, these herbicides are best applied in

Species	Eradication Methods Sources : USDA Forest Service, 2007, Vermont Invasives
	fall or early spring while native vegetation is still dormant. These herbicides should be applied according to product label instructions. Click here for more information
False Spirea (*Sorbaria sorbifolia*)	• There is not as much information on removal of this invasive, but many sites recommend a combination of mechanical removal (cutting and pulling) as well as herbicide application



Left Photo: Invasive honeysuckles were documented throughout Burke. Photo taken 6-30-2025.
Right Photo: False spirea is considered an invasive species, and on the Vermont watch list. A large colony of this was found along Roundy Brook in Burke. Photo taken 8-4-2025.

This NRI is not an all-inclusive search and documentation of invasive species in Burke. Undoubtedly, other species and locations where invasive species occur in Burke have been or will be documented. The Town of Burke should continue its efforts to help identify and eradicate these invasive species and may want to seek assistance from the Invasive Plant Atlas of New England (IPANE), Vermont Invasives, US Fish and Wildlife, and other organizations that have begun programs to control or eradicate invasive species. For further information on invasive species and an update of the list of these species, review the IPANE website https://www.eddmaps.org/ipane/. The Invasive Plant Atlas of New England's (IPANE) mission is to create a comprehensive web-accessible database of invasive and potentially invasive plants in New England that will be continually updated by a network of professionals and trained volunteers.

There are several other organizations with websites that help with identification and control of invasive species throughout Vermont and the northeastern US region. Here are a few with website links:

- Vermont Invasives
- Agency of Natural Resources: Invasive species resources
- Native Plant Trust: Controlling Invasives
- Penn State Cooperative Extension has several educational materials including publications, portable field guides and webinars/online materials. Click here.

Habitat Area Summary Table

The table below is a summary of different habitat areas in acres, square miles, and percentage of town land area.

Habitat Type	Acres	Square Miles	Percentage of Town Land Area
Town of Burke	21,568.21	33.70	100%
Conservation Land Total	2,686.32	4.20	12.5%
Land under Current Use	7,920.77	12.38	36.7%
Ponds and Open Water	26.40	0.04	.12%
Wetland Complexes (from National Wetland Inventory data & field work)	1,835.63	2.87	8.5%
Hydric Soils – poorly and very poorly drained*	5,038.00	7.87	23.4%
Flooding Potential (flood zones)	926.44	1.45	4.3%
Aquifer Recharge Areas	3,988.39	6.23	18.5%
Tree Canopy	16,551.72	25.86	76.8%
Grassland and Shrubs	4,407.32	6.89	20.4%
Water – including larger rivers	100.75	0.16	0.5%
Dense Softwood Cover	1,141.92	1.78	5.3%
Permanent Wildlife Openings	2,341.18	3.66	10.9%
Overall Priority Blocks*	15,793.04	24.68	73.2%
Farmland Soils – prime and statewide importance	5,212.62	8.114	24.2%
Steep slopes – 15% and greater	10,532.58	16.46	48.8%
Steep slopes – 25% and greater	3,470.70	5.42	16.1%

*Overall priority blocks are based on a number of features including, unfragmented open space, wildlife habitat diversity, wetlands, geologic features, and diversity of plant communities.

DISCUSSION – RECOMMENDATIONS FOR FUTURE ACTIONS AND OPPORTUNITIES

This project is an inventory of natural resources, including a written report, maps, and a digital database in GIS format. It is the property of the Town of Burke and was funded by the Burke Planning Commission. The data from this project is compatible with the existing Town GIS. Efforts from this project will aid in future work and inventories, as well as provide tools to guide future development and conservation decisions in Burke.

It is hoped that the results from this study will help the Town of Burke in many ways. Town-wide zones based on habitat and vegetation can be assessed and modified. Data gathered from this work will also assist the Conservation Commission, the Planning Commission and Development Review Board in foreseeing possible conflicts with future development. Perhaps the most powerful advantage of this project is that future studies and work can be easily integrated to build upon this database indefinitely.

Based on results from this study, Elise Lawson and the Burke Conservation Commission offer the following additional recommendations:

1. **Surface Water Protection** - Burke's residents obtain drinking water from drilled or dug wells as well as three water systems: Burke Mountain Water Co, serving 1,058 people; Burke Fire District 1, serving 142 people; and West Burke Housing, serving 40 people. All three water systems use groundwater, which is monitored and tested annually for contaminants. Annual testing includes screening for bacteria, nitrates, and other potential contaminants to ensure safe drinking water for residents. Maintaining good water quality is one of the highest priorities for the Burke Conservation Commission.

   Based on water quality testing in some of our rivers and streams in Burke, water quality in Burke's streams and rivers is in very good to excellent condition. Water quality should continue to be monitored not only in large rivers like the East and West Branch Passumpsic, but also in the headwater streams and brooks that feed into these larger river systems.

   a. Where possible, work to maintain or enhance riparian habitat adjacent to headwater streams and brooks. Any wetland setback should also apply to all riparian habitats along perennial streams.

   b. Consider ongoing water quality monitoring in the West and East Branch Passumpsic Rivers as well as some of the smaller feeder streams in town such as Dashney, Flower, Calendar Brooks.

c. The town should update any potential contamination source location inventory at least on an annual basis and ensure that compliance measures (secondary containment structures, and spill kits) are in place.

2. **Ground Water Protection** - Based on the locations of water recharge areas in Burke, it is important to protect the quality of groundwater, brooks, streams, and wetlands in town. Future water supplies are an invaluable natural resource for Burke and the abutting towns. Those areas with the highest water recharge potential, whether zoned residential or agricultural, should have the least impactful development. Correspondingly, where the least potential for aquifer recharge exists, the more desirable and suitable the area is for development, barring other development concerns.

    a. Implement Best Management Practices (BMPs) within ground water recharge areas, including sand and gravel deposits adjacent to rivers and streams.

    b. Monitor septic system plumes with a focus on parcels adjacent to rivers, wetlands, and recharge areas.

    c. Monitor the placement of future septic systems keeping in mind the typically high permeability of many of Burke's soils.

    d. Develop a deeper understanding of the movement of ground water and the recharge of aquifers to better understand water resources available to Burke and the larger watershed as a whole. This knowledge can also serve as an important guide to policies related to sewage treatment, solid waste disposal, landfills and risks associated with existing groundwater contamination.

        - A geologic study of aquifers in town and the region is highly recommended.

    e. Develop town-wide ordinances to help protect aquifers, including restrictions on impervious surface development and dumping of waste on top of aquifers, particularly areas with high productivity and flow.

3. **Climate Change** – One of the most significant threats to the existing natural resources in Burke is climate change. The State of Vermont collects data for the past several decades showing long-terms shifts in temperature, precipitation and the risks of certain types of severe weather. The states website on Climate Change in Vermont is a great resource and should be considered by town departments and committees in planning for Burke's future.

    a. Incorporate actions to minimize, mitigate and adapt to climate change impacts when making land use planning decisions. Examples include increasing culvert size for storm events, encouraging vegetation diversity on forested properties, and managing tree species resilient to the effects of climate change in Burke.

b. Develop a town energy use plan to reduce municipal and residential activities that create greenhouse gases.

4. **Dark Skies** - Burke's Zoning and Subdivision Regulations include guidelines for outdoor lighting that aim to provide appropriate illumination while minimizing adverse impacts. These guidelines are strong, but they remain open to interpretation and can be difficult to enforce. Ongoing public education and community involvement in lighting decisions will play a central role in protecting Burke's dark night skies.

5. **Dense Softwood Stand Protection** – Based on results from this project, there are a few areas that contain adequate acreage of dense softwood stands (excluding white pine stands) scattered throughout the town. These areas are beneficial to many wildlife species for cover as well as important wintering areas.

    a. Maintaining existing softwood stands for the benefit of the deer, moose and other wildlife populations is very important. This type of habitat could be negatively impacted by climate change.

    b. Where possible, investigate extending some existing softwood areas and/or connecting patches of softwood stands to increase overall size. Willing landowners can be encouraged to do so, particularly those whose property abuts wetlands and riparian habitat.

6. **Continued Wetland Conservation**– The Burke Conservation Commission recognizes the value of wetland protection as an important means to maintaining good water quality. It is hoped that the town will continue to pursue ways to further conserve the functionality and diversity of these wetlands. An overall wetland study could help Burke work with willing landowners to conserve some of these valuable wetland resources. This NRI recommends the following:

    a. Conduct an overall wetland study throughout Burke to identify, assess and functionally rank wetlands in town.

    b. Strengthen Burke's Zoning and Subdivision Regulations related to wetlands through coordination and discussions between the Conservation and Planning Commissions. The goal would be to maximize wetland conservation. Concurrent public outreach, education and involvement are also critical to this process.

    c. Continue to inventory vernal pools throughout Burke to enable the Conservation Commission, Planning Commission, and Development Review Board to critique and adjust future subdivision proposals if vernal pools are likely to be impacted.

    d. Continue to monitor stormwater runoff and associated drainage immediately after storm events whenever possible. Treatment devices for stormwater structures should be installed and maintained, particularly within 150 feet of rivers and wetlands.

7. Current Zoning and Subdivision Bylaws from 2023 in Burke, including conservation standards, scenic conservation overlay, lighting, flood hazard areas, can be found at the following link. Town of Burke: Zoning and Subdivision Bylaw, 2023. This study recommends creating a committee with members from different boards and commissions in town to evaluate existing bylaws, and work to make them clear and more definitive. This will assist in the decision-making process when land use changes and development proposals are submitted to the town.

6. **Land Conservation** – Over 12% of Burke is conserved and nearly 37% is under Burke Use Value Appraisal (Current Use) program. The Town has two community forests (Willey Woods and North Pasture Community Forests). This NRI highlighted four additional areas to be considered for future land conservation. These areas raise concerns about water quality and wildlife movement, including:

    a. **East Haven Mountain Area** – undeveloped larger parcels with tributaries to Flower Brook
    b. **Umpire Mountain Area** – unfragmented habitat with headwater streams.
    c. **Burke Mountain Property** – unfragmented areas with a variety of habitat types, headwater streams and forested wetlands
    d. **West Branch Passumpsic and associated wetlands** – containing the most productive and functional wetland in Burke.

    There are several land trust organizations which the Burke Conservation Commission can work with to help purchase land for conservation or work with willing landowners to put their land in a conservation easement. These include:

    a. Vermont Land Trust
    b. Passumpsic Valley Land Trust – Vermont
    c. Trust for Public Land
    d. New England Forestry Foundation
    e. Vermont Housing and Conservation Board

8. **Hillside and Viewshed Protection** - Burke's mountainous and hilly topography, wetlands, and rivers are directly related to the town's tourism industry, scenic beauty, and diversity of natural resources (wetlands, streams and rivers, wildlife, plants, soils, etc.). Currently, Burke has a Scenic and Conservation Overlay to conserve the scenic views and rural character of the town. The BCC recommends continuing to evaluate and update Zoning Regulations in Burke to conserve viewsheds as an important feature and tourist attraction to the area, while continuing to consider landowner rights.

    a. **Scenic View Conservation** - The potential for continued population increase throughout the town makes it wise to take a proactive approach in dealing with future development pressures and preserving the scenic vistas and beauty. Scenic easements are types of conservation easements that make protection of scenic resources perpetual.

b. **Steep Slope Development Criteria** – Continue to enforce town regulations to restrict future development and road construction at sites with over 25% slopes and limit development on slopes between 15% and 25%.

7. **Cooperation** – Ecosystems, watersheds and wildlife habitats often transcend municipal boundaries. The health of our natural resources is often dependent on actions taken by neighboring towns. Burke should continue working with government agencies, regional planning commissions, neighboring municipalities, and natural resource organizations to enhance the protection of our shared natural resources on a larger watershed-wide level.

    a. Work with regional planning commissions who have developed several templates for town-wide ordinances in areas from wetland and shoreline setbacks to restrictions on steep slopes, to ridgeline development.

    b. Encourage neighboring towns without Conservation Commissions to consider establishing one in town.

    c. Continue ongoing partnerships with local land trusts, high schools and colleges to encourage young people to be involved.

8. **Carbon Sequestration** – Explore the possibility of securing funds for Burke from carbon offset programs. A great resource is The Northeast Forest Carbon Program (website: https://www.northeastforestcarbon.org/). Funds from participating organizations can be used to incentivize landowners to protect their land from development for a period of time. Sustainable forestry is an important part of this process.

9. **Cryptocurrency Mining and its Effects on Natural Resources** - While this is not currently an issue in Burke or Vermont, many states are passing bills allowing this type of industry to exist. If passed, these bills would allow cryptocurrency mining and would make it virtually impossible for towns to regulate the industry. Therefore, it is worth monitoring as part of broader efforts to be ready for potential development pressures in town, protect water resources, and reduce energy-related emissions. Some newer systems are shifting to less energy-intensive methods like "proof of stake," which could help reduce their environmental footprint.

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MAPS

Map #1: Dense Softwoods and Permanent wildlife openings

Map Data Sources:

- Town Boundary, Sand and Gravel Deposits, Historic Deer Wintering Areas, Open Water, and Streams obtained from Vermont Open Geodata Portal
- Dense Softwood Stands and Permanent wildlife openings digitized by Elise Lawson 2025 using the most recent available aerial photographs

Map #2: Conservation Lands

Map Data Sources:

- Town Boundary, Current Use Properties, Open Water, Streams obtained from Vermont Open Geodata Portal
- Conservation Lands obtained from GRANIT and the Town of Burke
- Parcels obtained from the Town of Burke, VT

Map #3: Wetlands and Water Resources

Map Data Sources:

- Town Boundary, Roads, Flooding Potential, Open Water, Streams, Ground Water Protection obtained from Vermont Open Geodata Portal
- Vernal Pool locations taken using a Avenza Maps GPS during field work by Elise Lawson. All vernal pools on private property are geomasked.
- National Wetlands Inventory wetlands obtained from U.S. Fish and Wildlife Service on November 2025
- Additional Wetlands were field verified by Elise Lawson and/or digitized using recent aerial photographs in ArcGIS.
- Poorly and Very Poorly Drained Soils obtained from the Natural Resource Conservation Service

Map #4: Subwatersheds

Map Data Sources:

- Town Boundary, Roads, Open Water, Streams, obtained by Vermont Open Geodata Portal
- Subwatershed Units (HUC 12 Names) obtained from Vermont Open Geodata Portal
- Flooding Potential, digitized by Elise Lawson using a combination of NRCS soils maps, and Digital Elevation Models

Map #5: Bedrock Geology

Map Data Source:

- Town Boundary, Roads, Rivers and Streams, Ponds, and Bedrock Geology downloaded from Vermont Open Geodata Portal

Map #6: Surface Geology

Map Data Source:

- Town Boundary, Roads, Rivers and Streams, Ponds, and Surface Geology downloaded from Vermont Open Geodata Portal

Map #7: Steep Slopes and Agricultural Land

Map Data Sources:

- Town Boundary, Roads, Open Water, Rivers and Streams obtained from Vermont Open Geodata Portal

- Soil data obtained from Natural Resource Conservation Service and queried to display farmland soils and soils with steep slopes
- Burke Parcels obtained from the Town of Burke, Vermont

Map #8: Vermont Forest Soil Groups

Map Data Sources:

- Town Boundary, Roads, Open Water, River and Streams obtained from Vermont Open Geodata Portal
- Soil data obtained from Natural Resource Conservation Service and queried to display NH Forest Soil Groups

Map #9: Priority Areas for Land Conservation with VT Fish and Wildlife Priority Areas and Existing Conservation Land

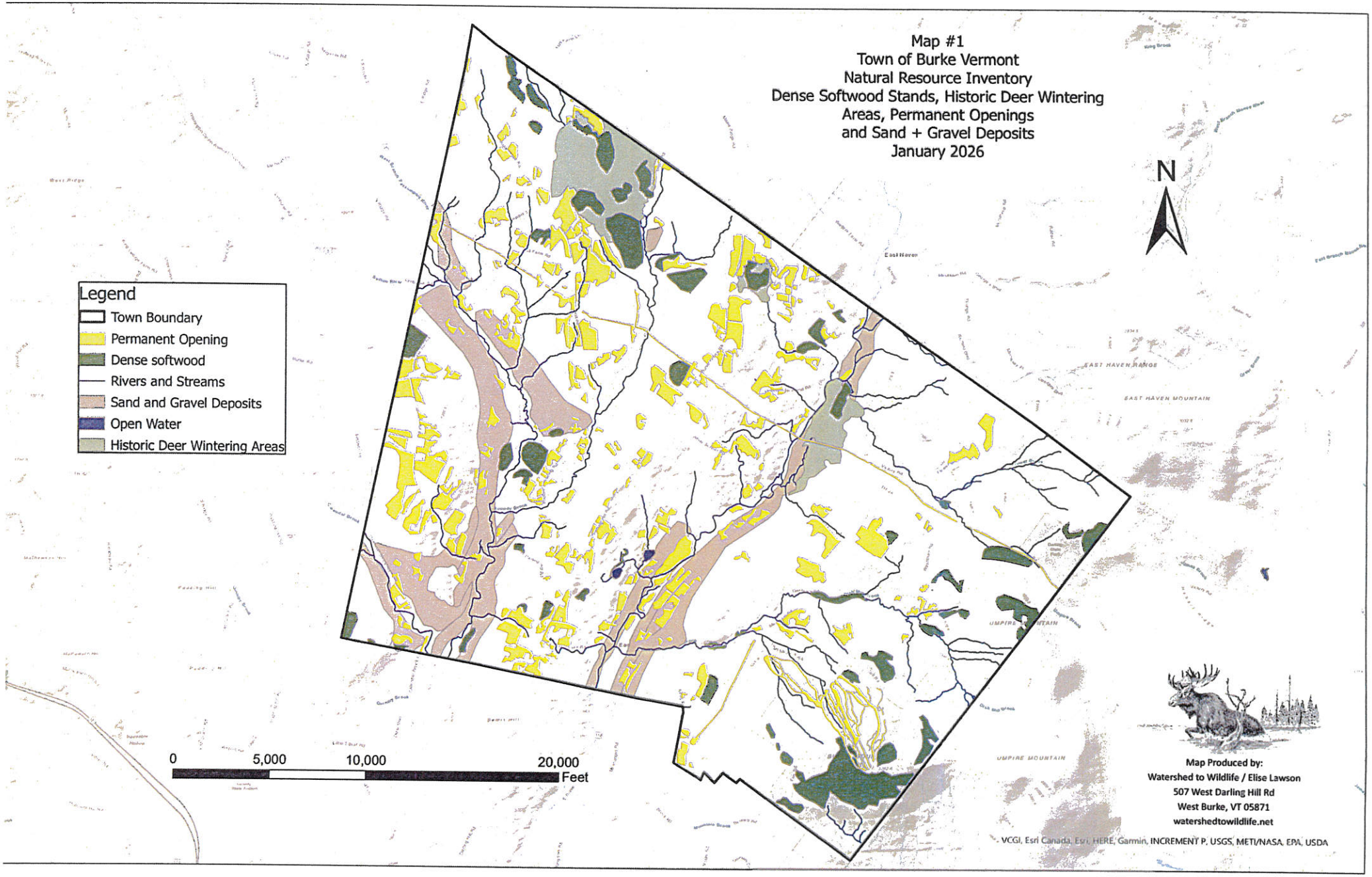
Map Data Source:

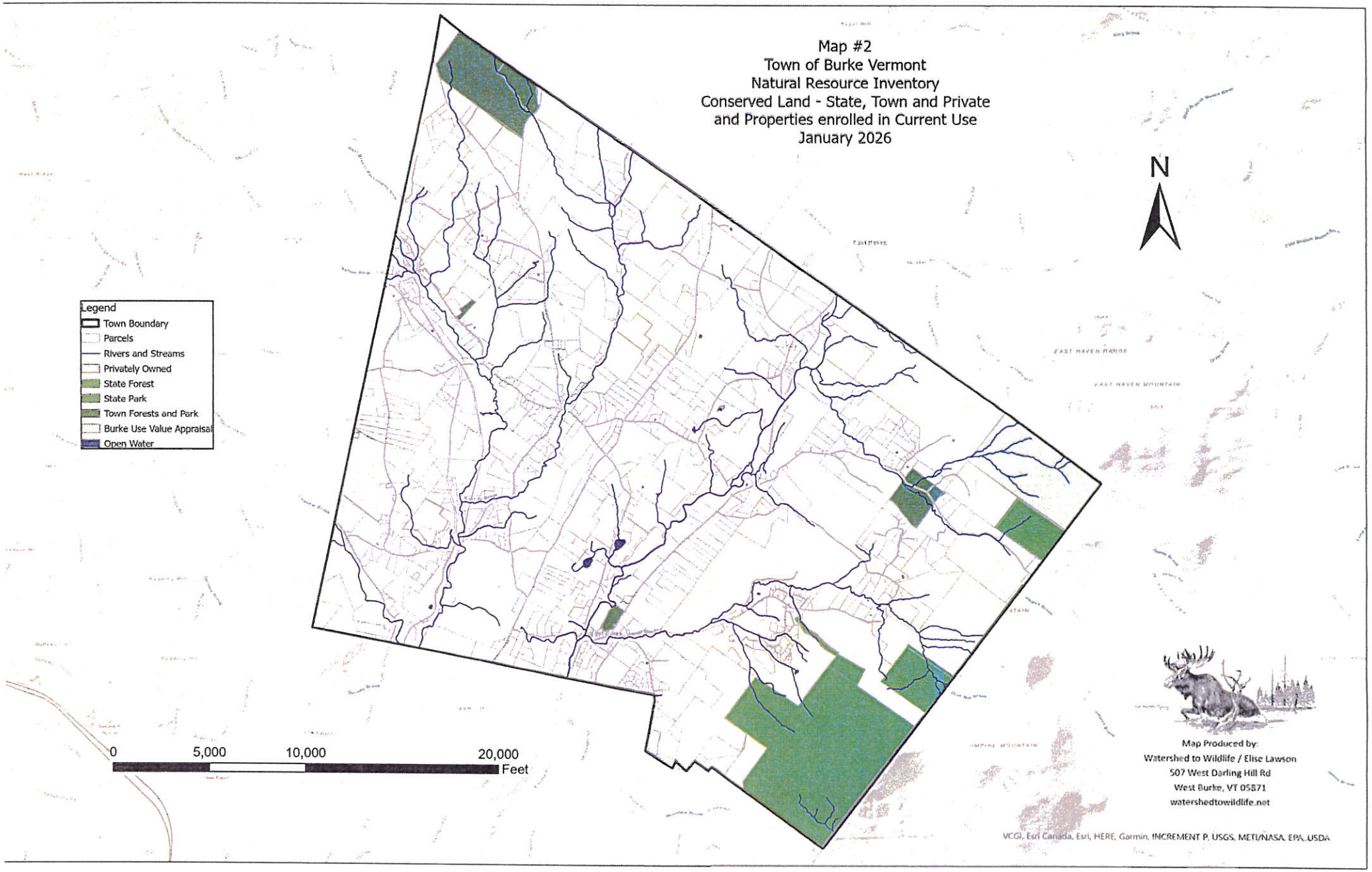
- Town Boundary, Roads, Rivers and Streams obtained from Vermont Open Geodata Portal
- National Wetlands Inventory wetlands obtained from U.S. Fish and Wildlife Service
- Additional Wetlands were field verified by Elise Lawson and/or digitized using recent aerial photographs
- Conservation Lands obtained from Vermont Open Geodata Portal and the Town of Burke
- Wildlife species priorities, Wildlife corridor priorities, and Natural Communities priorities downloaded from Vermont Open Geodata Portal

Map #10: Priority Areas for Land Conservation with VT Fish and Wildlife Priority Area Blocks and Existing Conservation Land

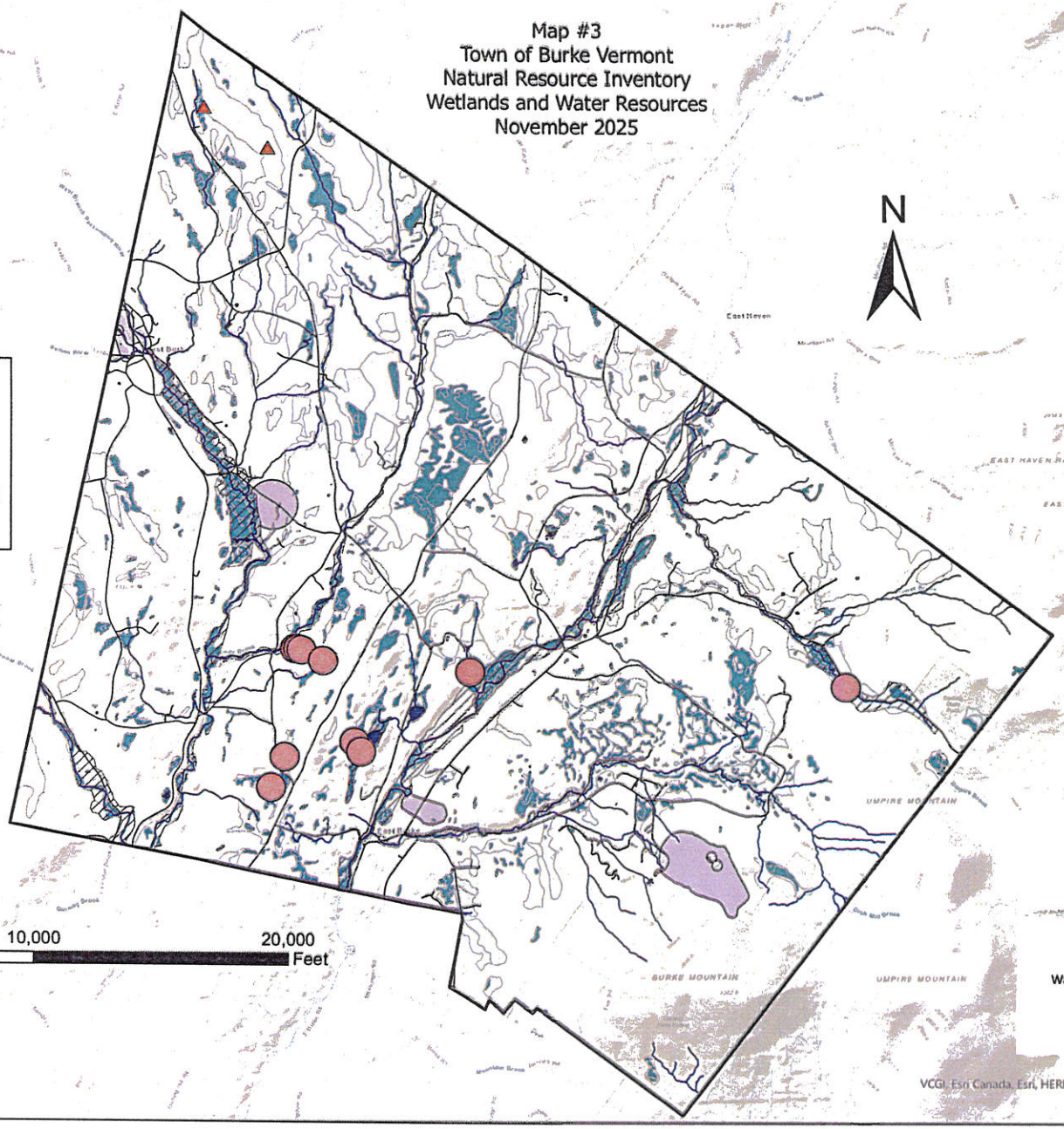
Map Data Source:

- Town Boundary, Roads, Rivers and Streams obtained from Vermont Open Geodata Portal
- Overall Priority Habitat Blocks downloaded from Vermont Open Geodata Portal


Map #1
Town of Burke Vermont
Natural Resource Inventory
Dense Softwood Stands, Historic Deer Wintering Areas, Permanent Openings and Sand + Gravel Deposits
January 2026
N
Legend
Town Boundary
Permanent Opening
Dense softwood
Rivers and Streams
Sand and Gravel Deposits
Open Water
Historic Deer Wintering Areas
0
5,000
10,000
20,000
Feet
EAST HAVEN RANGE
EAST HAVEN MOUNTAIN
UMPIRE MOUNTAIN
Map Produced by:
Watershed to Wildlife / Elise Lawson
507 West Darling Hill Rd
West Burke, VT 05871
watershedtowildlife.net
VCGI, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA


Map #2
Town of Burke Vermont
Natural Resource Inventory
Conserved Land - State, Town and Private
and Properties enrolled in Current Use
January 2026
N
Legend
Town Boundary
Parcels
Rivers and Streams
Privately Owned
State Forest
State Park
Town Forests and Park
Burke Use Value Appraisal
Open Water
0
5,000
10,000
20,000
Feet
Map Produced by:
Watershed to Wildlife / Elise Lawson
507 West Darling Hill Rd
West Burke, VT 05871
watershedtowildlife.net
VCGI, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA

Map #3
Town of Burke Vermont
Natural Resource Inventory
Wetlands and Water Resources
November 2025



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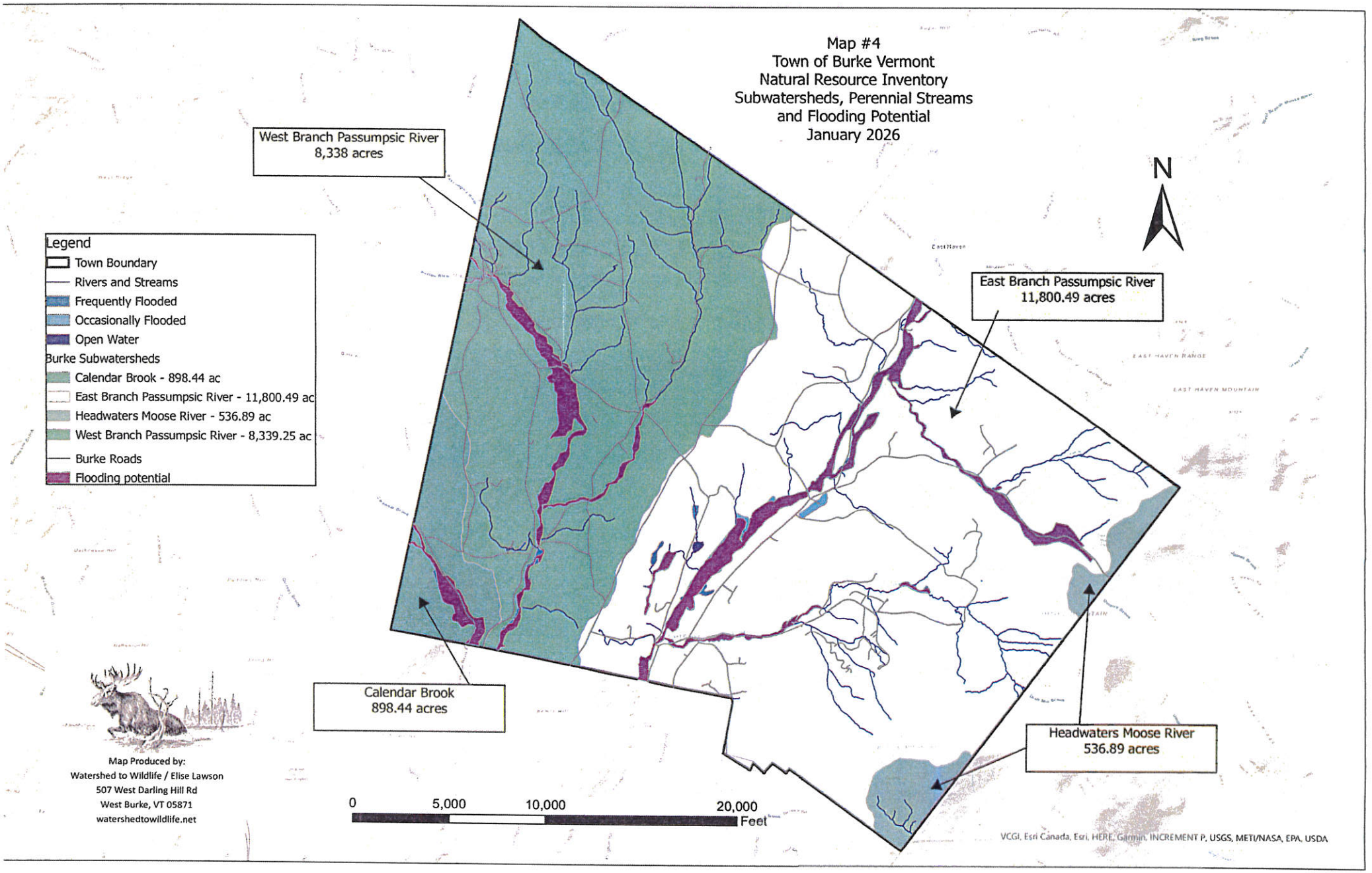
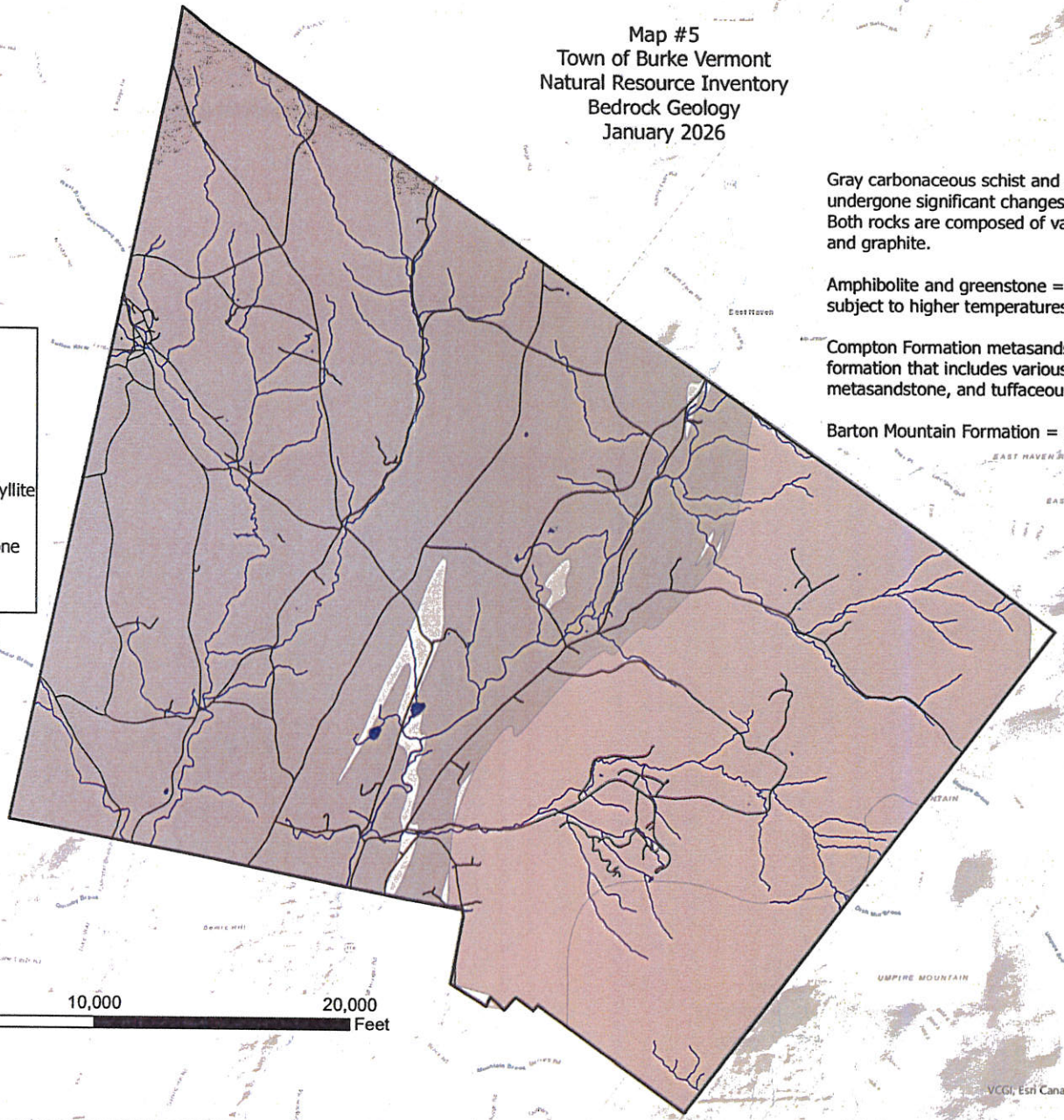

Map #4
Town of Burke Vermont
Natural Resource Inventory
Subwatersheds, Perennial Streams
and Flooding Potential
January 2026
West Branch Passumpsic River
8,338 acres
East Branch Passumpsic River
11,800.49 acres
Calendar Brook
898.44 acres
Headwaters Moose River
536.89 acres
N
Legend
Town Boundary
Rivers and Streams
Frequently Flooded
Occasionally Flooded
Open Water
Burke Subwatersheds
Calendar Brook - 898.44 ac
East Branch Passumpsic River - 11,800.49 ac
Headwaters Moose River - 536.89 ac
West Branch Passumpsic River - 8,339.25 ac
Burke Roads
Flooding potential
0
5,000
10,000
20,000
Feet
Map Produced by:
Watershed to Wildlife / Elise Lawson
507 West Darling Hill Rd
West Burke, VT 05871
watershedtowildlife.net
VCGI, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA

Map #5
Town of Burke Vermont
Natural Resource Inventory
Bedrock Geology
January 2026



Legend
- Town Boundary
- Rivers and Streams
- Ponds

Bedrock Type
- Gray carbonaceous schist and phyllite
- Amphibolite and greenstone
- Compton Formation metasandstone
- Barton Mountain Formation
- Burke Roads

N

0 5,000 10,000 20,000 Feet

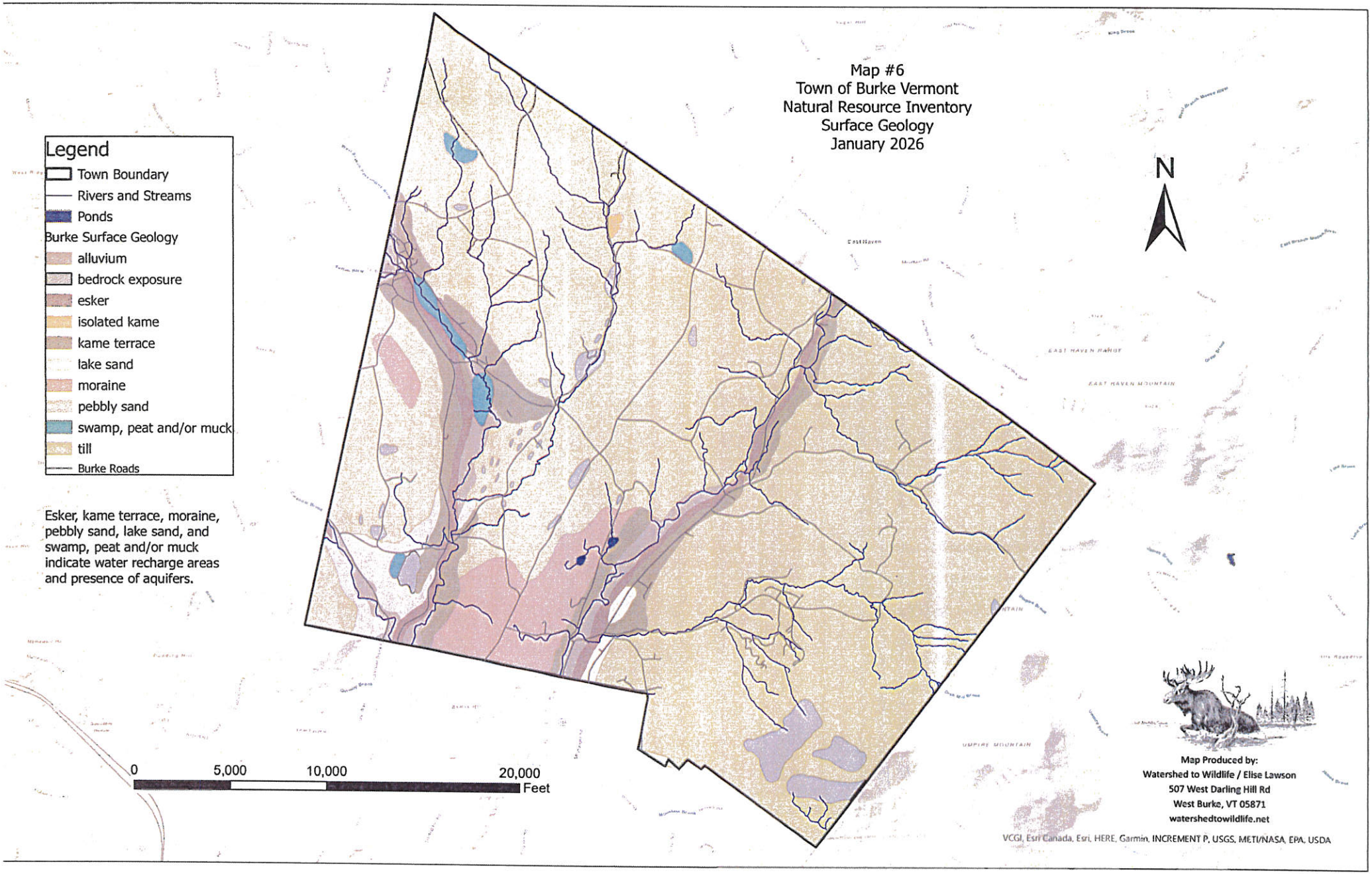
Gray carbonaceous schist and phyllite = metamorphic rocks that have undergone significant changes due to heat, pressure, and chemical activity. Both rocks are composed of various minerals, including mica, quartz, biotite, and graphite.

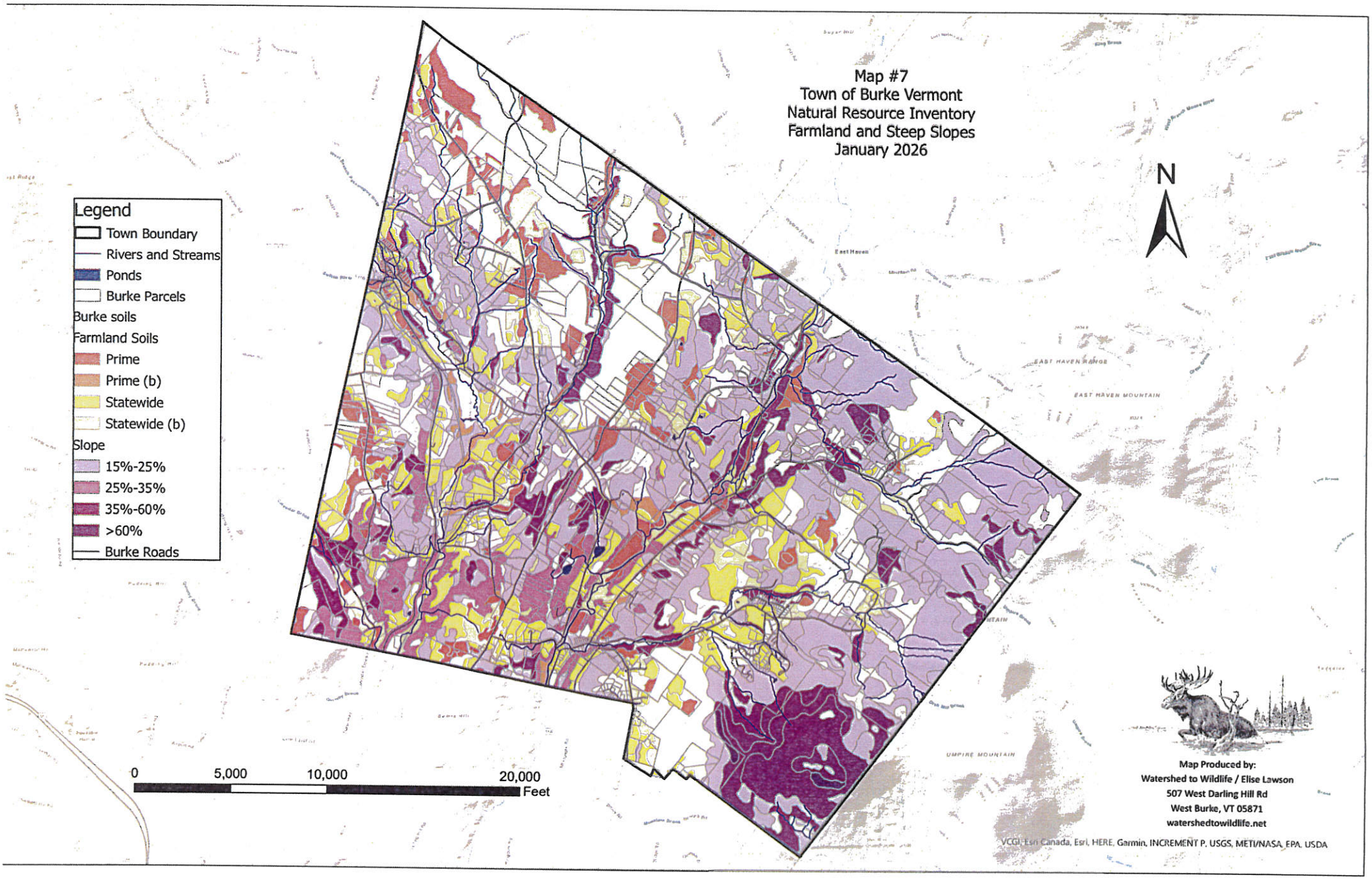
Amphibolite and greenstone = Metamorphic rock formed when basalitic rock is subject to higher temperatures and pressures. They often have a green color

Compton Formation metasandstone = The Compton Formation is a geological formation that includes various rock types, such as metaconglomerate, metasandstone, and tuffaceous phyllite.

Barton Mountain Formation = pink or gray granitic gneiss

Map Produced by:
Watershed to Wildlife / Elise Lawson
507 West Darling Hill Rd
West Burke, VT 05871
watershedtowildlife.net


Map #6
Town of Burke Vermont
Natural Resource Inventory
Surface Geology
January 2026
N
Legend
Town Boundary
Rivers and Streams
Ponds
Burke Surface Geology
alluvium
bedrock exposure
esker
isolated kame
kame terrace
lake sand
moraine
pebbly sand
swamp, peat and/or muck
till
Burke Roads
Esker, kame terrace, moraine, pebbly sand, lake sand, and swamp, peat and/or muck indicate water recharge areas and presence of aquifers.
0
5,000
10,000
20,000
Feet
Map Produced by:
Watershed to Wildlife / Elise Lawson
507 West Darling Hill Rd
West Burke, VT 05871
watershedtowildlife.net
VCGI, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA


Map #7
Town of Burke Vermont
Natural Resource Inventory
Farmland and Steep Slopes
January 2026
Legend
Town Boundary
Rivers and Streams
Ponds
Burke Parcels
Burke soils
Farmland Soils
Prime
Prime (b)
Statewide
Statewide (b)
Slope
15%-25%
25%-35%
35%-60%
>60%
Burke Roads
N
0
5,000
10,000
20,000
Feet
EAST HAVEN RANGE
EAST HAVEN MOUNTAIN
UMPIRE MOUNTAIN
Map Produced by:
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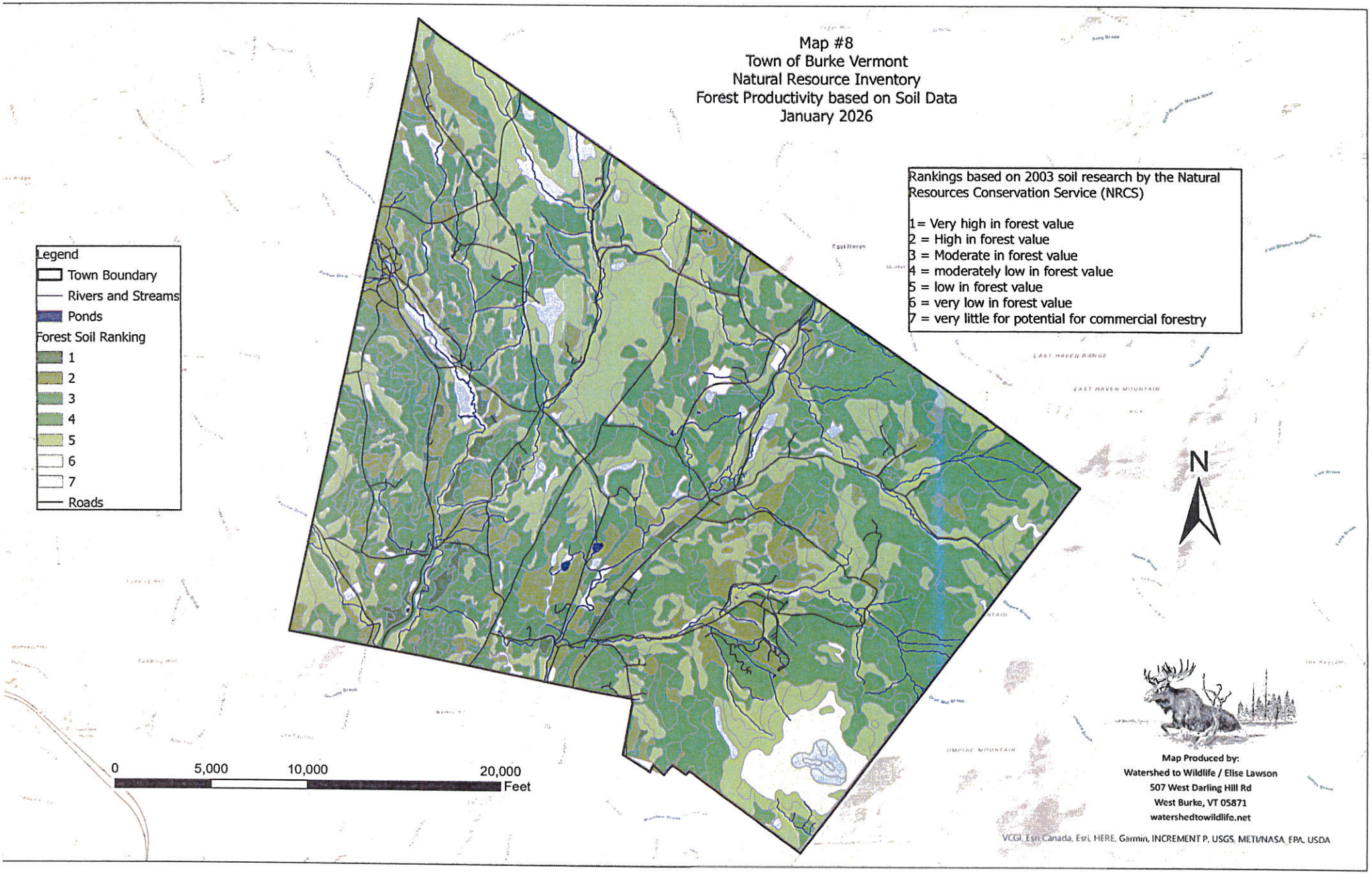
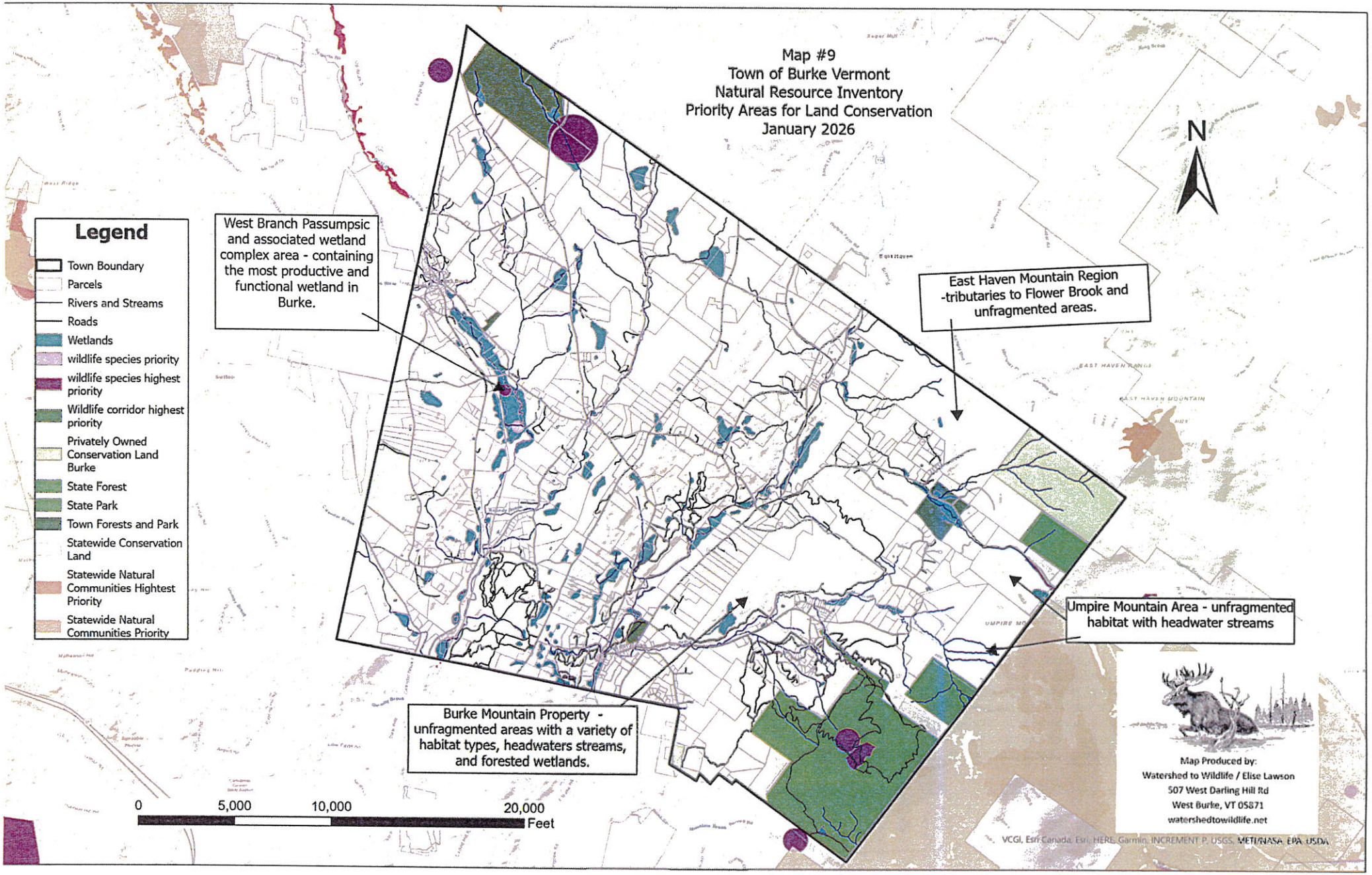

Map #8
Town of Burke Vermont
Natural Resource Inventory
Forest Productivity based on Soil Data
January 2026
Rankings based on 2003 soil research by the Natural Resources Conservation Service (NRCS)
1= Very high in forest value
2 = High in forest value
3 = Moderate in forest value
4 = moderately low in forest value
5 = low in forest value
6 = very low in forest value
7 = very little for potential for commercial forestry
Legend
Town Boundary
Rivers and Streams
Ponds
Forest Soil Ranking
1
2
3
4
5
6
7
Roads
N
0
5,000
10,000
20,000
Feet
Map Produced by:
Watershed to Wildlife / Elise Lawson
507 West Darling Hill Rd
West Burke, VT 05871
watershedtowildlife.net
VCGI, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA


Map #9
Town of Burke Vermont
Natural Resource Inventory
Priority Areas for Land Conservation
January 2026
N
Legend
Town Boundary
Parcels
Rivers and Streams
Roads
Wetlands
wildlife species priority
wildlife species highest priority
Wildlife corridor highest priority
Privately Owned Conservation Land Burke
State Forest
State Park
Town Forests and Park
Statewide Conservation Land
Statewide Natural Communities Hightest Priority
Statewide Natural Communities Priority
West Branch Passumpsic and associated wetland complex area - containing the most productive and functional wetland in Burke.
East Haven Mountain Region -tributaries to Flower Brook and unfragmented areas.
Umpire Mountain Area - unfragmented habitat with headwater streams
Burke Mountain Property - unfragmented areas with a variety of habitat types, headwaters streams, and forested wetlands.
0
5,000
10,000
20,000
Feet
Map Produced by:
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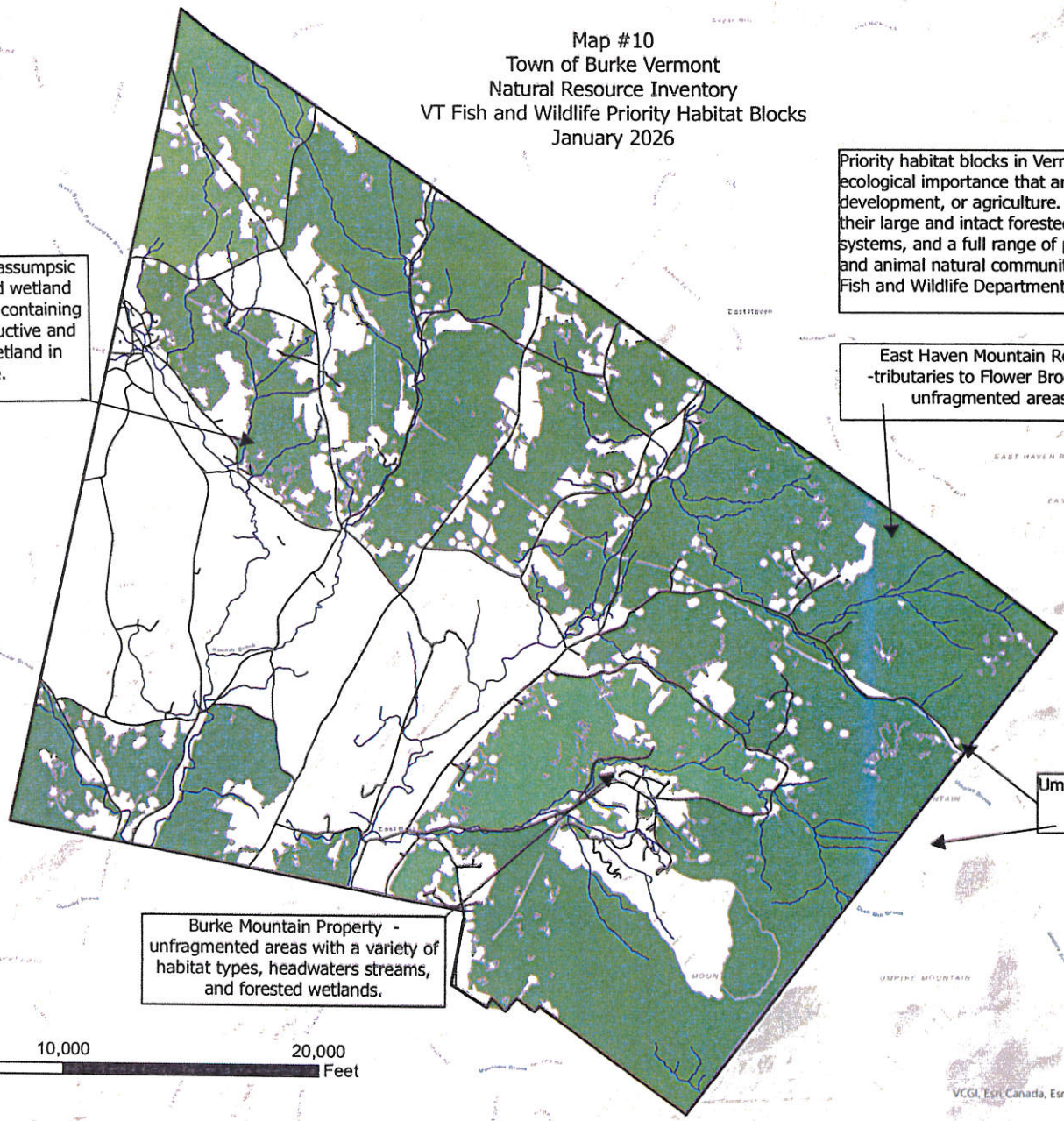
Map #10
Town of Burke Vermont
Natural Resource Inventory
VT Fish and Wildlife Priority Habitat Blocks
January 2026

Priority habitat blocks in Vermont are identified as areas of high ecological importance that are unfragmented by roads, development, or agriculture. These blocks are characterized by their large and intact forested habitat, healthy aquatic and riparian systems, and a full range of physical features essential for plant and animal natural communities. These are created by Vermont Fish and Wildlife Department.



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