

The Greensboro Bend PLACE Program & Socially Just Conservation



Photo Credit: Kyle Gray

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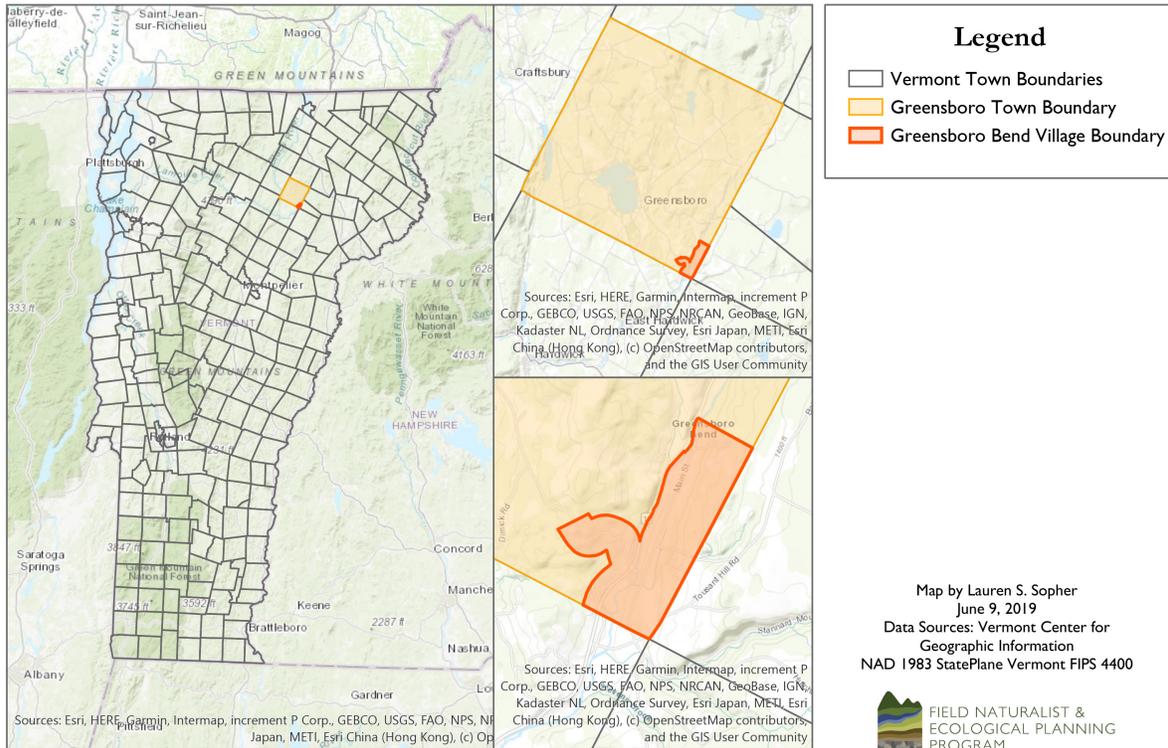


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Executive Summary

Greensboro Bend Village, VT



Map by Lauren S. Sopher
June 9, 2019

Data Sources: Vermont Center for
Geographic Information
NAD 1983 StatePlane Vermont FIPS 4400



The PLACE Program (Place-based Landscape Analysis and Community Engagement) is a forum for Vermont towns to explore their natural and cultural history. The University of Vermont worked in partnership with a community sponsor, the Greensboro Conservation Committee, on this project. Together, they helped to celebrate and deepen the Greensboro Bend community's relationship with their surroundings through concurrent social and landscape analyses. This was achieved through the following objectives:

- Assess the Greensboro Bend landscape through ecological and human history lenses.
- Understand interview participants' personal relationships with Greensboro Bend, knowledge of nature in the Bend, and thoughts about planning for its future conservation and development.

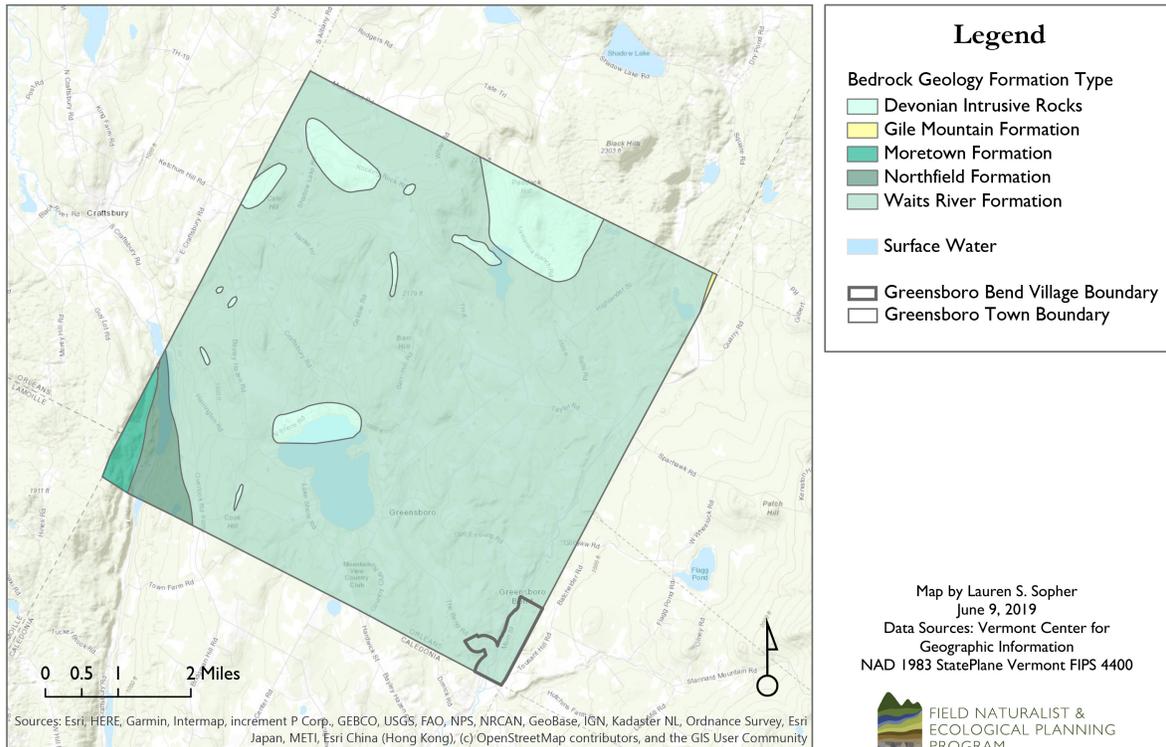
- Provide community members with the opportunity to engage with Greensboro Bend's landscape through various learning opportunities and equip community members with tools and resources that support their relationship with the landscape, beyond the timeline of this project.
- Integrate socio-economic and ecological considerations into the Conservation Recommendations for the 2019 Greensboro Town Plan.

Greensboro Bend is a 314-acre village within Greensboro Town. In the words of its community members, the Greensboro Bend landscape is, "A pretty typical small Vermont town. One of those that if you blink, you miss it. And there's a lot of those in Vermont," "its own little climate world," "a cocoon," and "almost like going into a new weather system; down into the Bend, it is a different kind of cold."

In this document, you will find a summary of my findings from a combined socio-ecological assessment of the community conducted in the spring, summer, and fall of 2018.

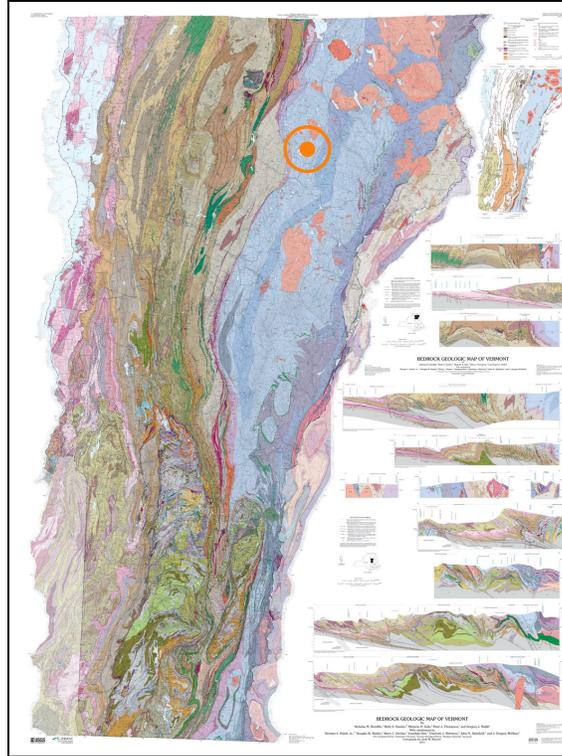
Bedrock Geology

Bedrock Geology of Greensboro, VT



Introduction

Rocks are ubiquitous and mysterious. They form the foundation of societies, crunch beneath our feet, hold valued places in our collections, and provide clues to the story of Earth's history. The Waits River Formation is the primary type of bedrock found in Greensboro. The formation runs the entirety of Vermont, from Canada in the north to Massachusetts in the south. The bedrock is mainly comprised of a metamorphosed (heat and pressure) sedimentary rock. Before being metamorphosed, this rock consisted of "calcite-rich sandstone" interlayered with shale (mud). When the rock was metamorphosed, the calcite in the sandstone recrystallized, forming a "dirty" marble, whereas the clay minerals in the shale transformed into mica. Brown weathering of the rock is likely a result of the exposure of iron and/or pyrite to the air. Below is a tour of the geologic history of Greensboro.



Bedrock Geology Map of Vermont | Source: Ratcliffe, N.M., Stanley, R.S., Gale, M.H., Thompson, P.J., and Walsh, G.J., 2011, Bedrock Geologic Map of Vermont: USGS Scientific Investigations Series Map 3184, 3 sheets, scale 1:100,000.

1.3 - 1 billion years ago | Precambrian

Orogenies, or mountain-building events, formed historic and present-day mountain ranges. The first mountain-building event whose remnants are preserved in some of Vermont's bedrock was the Grenville Orogeny. During the assembly of Rodinia, the second most recent supercontinent on Earth, the eastern margin of what is now North America converged with other fragments from the breakup of a previous supercontinent. It created mountains as high as the modern-day Himalayan range, which reach nearly 30,000 feet, about seven times the height of Mt. Mansfield. The Grenville Mountains spanned from Canada to Mexico, inland of the modern-day Appalachians.

Life at the time: photosynthesis and multicellular life have evolved—blue-green algae, bacteria, and slime molds.

600 million years ago | Precambrian

Rodinia began to break apart, forming rift valleys. During this process, sand, mud, and gravel accumulated in the opening rift valleys. The Grenville Mountains continued to slowly erode.

Streams carried sediments to these valleys, where they were deposited as lake sediments and alluvial fans—fan-shaped deposits of sediment built by streams.

Life at the time: green algae, fungi, and the first of the animals—segmented worms

550-540 million years ago | Cambrian

An ancient waterbody, the Iapetus Ocean, formed where the old continent, Rodinia, rifted apart. Shell-building marine animals living in this ocean combined calcium and carbonate from the surrounding ocean water to create the mineral calcium carbonate, the building block of their shells. Calcite, a form of calcium carbonate, is a major component of the bedrock and the overlying till and soils in Greensboro. Calcite is a rock type found in the Waits River Formation, the primary type of bedrock found in Greensboro.

Life at the time: the “Cambrian explosion,” the rapid diversification of marine life, begins—corals, jellyfish, clams, snails, trilobites, and the first vertebrates.

500-480 million years ago | Cambrian & Ordovician

The continents on either side of the Iapetus Ocean began to converge. A plate boundary developed within the Iapetus Ocean, where rocks beneath the ocean on one side of that boundary began to subduct beneath rocks on the other side of that boundary. As a result, a volcanic island arc formed between the continents, nearly parallel to the east coast of North America.

Life at the time: evolution of marine invertebrates—horseshoe crabs, sea stars, squid, and octopuses

480-450 million years ago | Ordovician

The volcanic island arc collided with eastern North America, resulting in the Taconic Orogeny. The Taconic and Green Mountains formed.

Life at the time: jawless fish and sea urchins

370-345 million years ago | Devonian & Carboniferous

Avalonia, a microcontinent, collided with North America, resulting in the Acadian Orogeny. Plumes of magma beneath the earth’s surface, known as plutons, intruded during this process. The magma slowly cooled, forming granite. These granites exist on the north shore of Caspian Lake, on the northwest shore of Long Pond, and in several other locations throughout north-northwest Greensboro.

Life at the time: club mosses, mosses, horsetails, ferns, mayflies, dragonflies, sharks, and bony fish

300-280 million years ago | Carboniferous & Permian

Vermont's geology was not directly impacted during this time. The Iapetus Ocean closed during this period and Africa joined North America, forming the supercontinent Pangea.

Life at the time: the first land invertebrates (amphibians and reptiles); beetles; gymnosperms (non-flowering plants: conifers, ginkgo, cycads); and angiosperms (flowering plants) diversify.

200-105 million years ago | Jurassic & Cretaceous

Due to the stretching of the continental crust, the Connecticut River Valley and Champlain Valley became rift basins and received sediment inputs from surrounding mountains.

Life at the time: coevolution of flowering plants and insects; birds, large marine reptiles, and dinosaurs

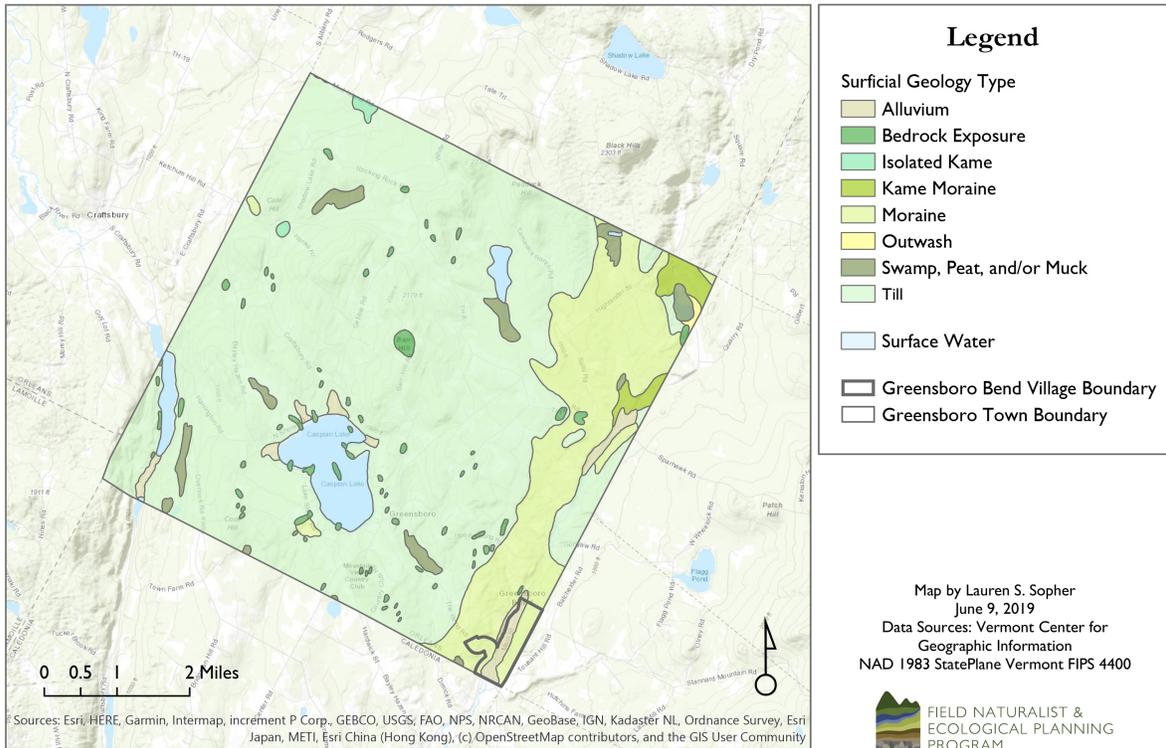
20 million years ago | Miocene

Little geologic history is preserved between 105 million years ago and the most recent glaciation.

Life at the time: flowering plants; dinosaurs are extinct, except for birds; mammals, including the earliest apes

Surficial Geology

Surficial Geology of Greensboro, VT



Introduction

The undulations of the countryside are the product of glaciers inch-worming across the landscape. In their wake, they leave glacial deposits and landforms comprised of clay, silt, sand, pebbles, cobbles, and boulders. Most of Vermont, Greensboro included, is covered in a layer of glacial till—an unsorted mix of sediment sizes. Surficial deposits provide the “parent material” for the overlying soils. Patterns in the bedrock geology, surficial geology, and soils layers influence the distribution of plant communities and agricultural lands.

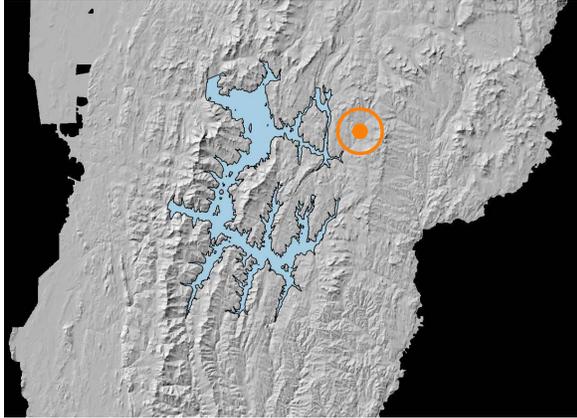
3 million years ago

Vermont’s last ice age began 3 million years ago; during this time, glaciers advanced and retreated across North America. During the last glacial advance, the Laurentide ice sheet

covered the entirety of Vermont and was over a mile thick. As the ice sheet flowed across Vermont, it eroded the underlying rocks. Much of this eroded material accumulated beneath the ice sheet and was exposed when the ice sheet retreated, leaving glacial till in its wake. The Greensboro Bend valley was likely widened and deepened when ice flowed along it.

Life at the time: saber-toothed cats, zebras, elephants, and mammoths

14,100 years ago



Glacial Lake Winooski Extent | Source: Stephen Wright

Glacial meltwater from the retreating Laurentide ice sheet likely created a high-energy environment in Greensboro Bend. Glacial Lake Winooski, the largest glacial lake in Vermont's mountains, could have been dammed in Greensboro Bend at some point; the Hardwick-Greensboro area was its northernmost reach. Delta sands, built up at the mouths of rivers, and eskers—deposits formed by streams that flow within or under glaciers—formed the surficial sediments in Greensboro Bend.

Life at the time: large mammals—woolly mammoths, mastodons, elk, dire wolves, and giant beaver

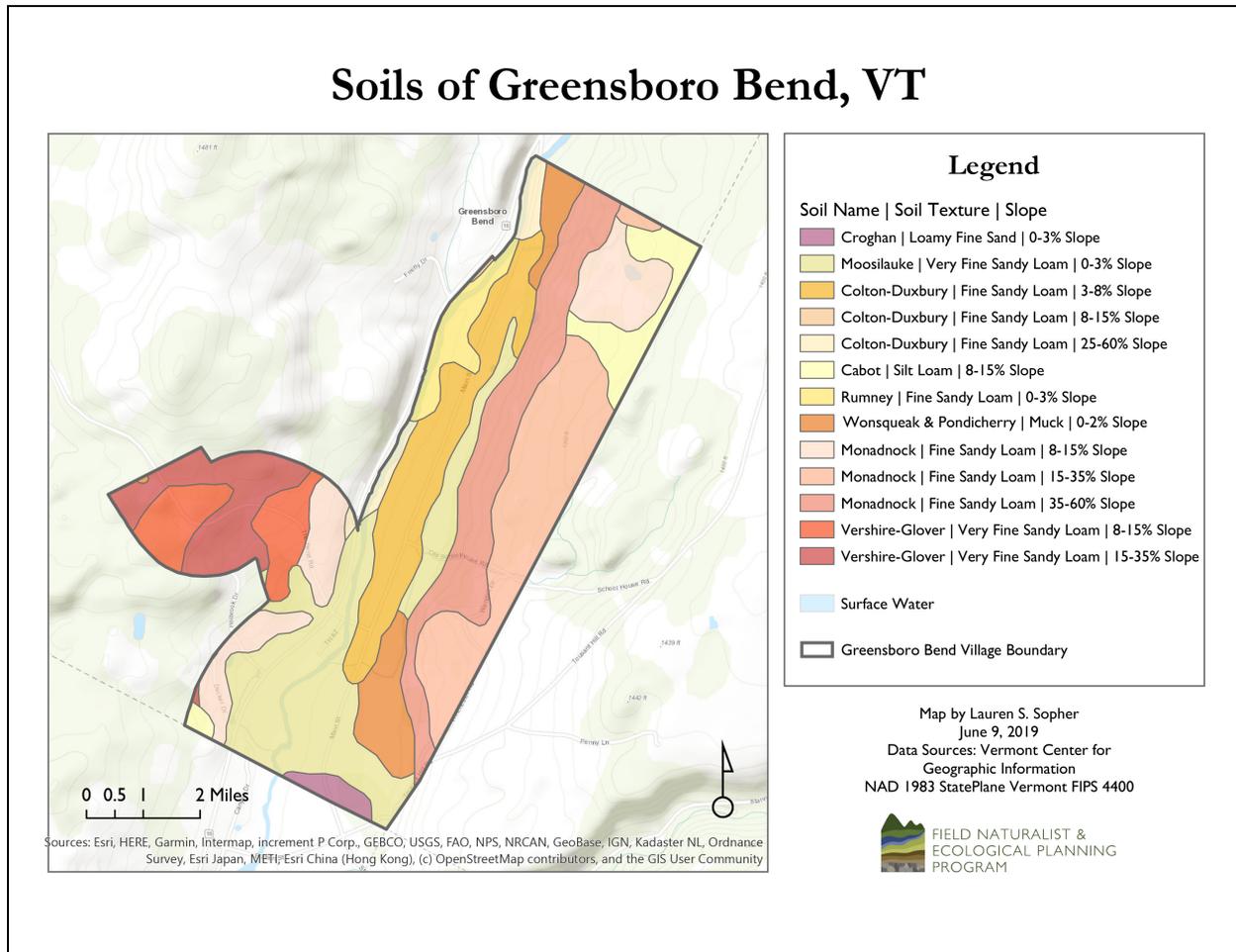
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Soils



Introduction

Soils are like Times Square in New York City: the center of activity. Soils are built on the foundation of bedrock and surficial geology and provide the foundation for plant and animal life.

Five factors influence the formation and distribution of soils across a landscape:

1. **Parent material:** bedrock and/or surficial geology provide the materials for soil to develop and determine characteristics such as soil chemistry, depth, and texture.
2. **Climate:** climatic factors, such as precipitation and temperature, impact a soil's rate of decomposition and weathering.

3. **Vegetation:** leaf nutrients, plant shade, and root systems influence soil development; for example, the needles of a spruce would acidify soils, and the leaves of a maple would enrich soils.
4. **Topography:** slope, slope aspect, and landscape position determine how water will flow through a site; for example, the slope aspect of Tousant Hill is west, which sends water toward the Lamoille River.
5. **Time:** the maturity of a soil; for example, Vermont has relatively young soils because they formed after the last glacial period, approximately 13,500 years ago.

Soils of Greensboro Bend

In Greensboro Bend, the predominant soils (author-defined as greater than 10% of the village's total 314 acres), are:

- Moosilauke | Fine Sandy Loam | 0-3% Slope | 18.4% of total land area
- Colton-Duxbury | Fine Sandy Loam | 3-8% Slope | 11.3% of total land area
- Monadnock | Fine Sandy Loam | 15-35% Slope | 14% of total land area
- Monadnock | Fine Sandy Loam | 35-60% Slope | 13.2% of total land area

The Moosilauke Very Fine Sandy Loam soil is built from sand and gravel deposits left by glacial meltwater—outwash plains and stream terraces. Sandy loams have a gritty texture; if you were to rub the particles between your fingers, it would feel like a fine-grit sandpaper. The soil is poorly drained and hydric. Hydric, as defined by the USDA Natural Resources Conservation Service (NRCS), is, “a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.” . The Moosilauke Very Fine Sandy Loam soil can function as prime farmland, if it's drained.

The Colton-Duxbury Fine Sandy Loam soil is also built from sand and gravel glacial meltwater deposits and associated with outwash plains and stream terraces. In contrast to the Moosilauke soil, it is excessively drained and not hydric. The Colton-Duxbury soil in the 3-8% slope range is designated as farmland of statewide importance.

The Monadnock Fine Sandy Loams are associated with hill and mountain landforms (Tousant Hill in Greensboro Bend and Stannard). The “parent material” is loamy glacial till, derived from metamorphosed sedimentary rock (marble and mica). The Monadnock soil in the 8-15% slope range is designated as farmland of statewide importance.

The table below summarizes each soil type present in Greensboro Bend village.

Soil Name	Soil Texture	Slope	Hydric	Other
Croghan	Loamy Fine Sand	0-3%	No	
Moosilauke	Very Fine Sandy Loam	0-3%	Yes	
Colton-Duxbury	Fine Sandy Loam	3-8%	No	
Colton-Duxbury	Fine Sandy Loam	8-15%	No	
Colton-Duxbury	Fine Sandy Loam	25-60%	No	
Cabot	Silt Loam	8-15%	Yes	Very stony
Rumney	Fine Sandy Loam	0-3%	Yes	Frequently flooded
Wonsqueak & Pondicherry	Muck	0-2%	Yes	
Monadnock	Fine Sandy Loam	8-15%	No	
Monadnock	Fine Sandy Loam	15-35%	No	Very stony
Monadnock	Fine Sandy Loam	35-60%	No	Very stony
Vershire-Glover	Very Fine Sandy Loam	8-15%	No	Very rocky
Vershire-Glover	Very Fine Sandy Loam	15-35%	No	Very rocky

Source: Web Soil Survey, National Cooperative Soil Survey, USDA Natural Resources Conservation Service (NRCS)

Glossary

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Muck

Dark, finely divided, well decomposed organic soil material.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

- Very coarse sand: 2.0 to 1.0 mm
- Coarse sand: 1.0 to 0.5 mm
- Medium sand: 0.5 to 0.25 mm
- Fine sand: 0.25 to 0.10 mm
- Very fine sand: 0.1 to 0.05 mm
- Silt: 0.05 to 0.002 mm
- Clay: Less than 0.002 mm

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Source: Web Soil Survey. National Cooperative Soil Survey. USDA Natural Resources Conservation Service (NRCS)

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Hydrology

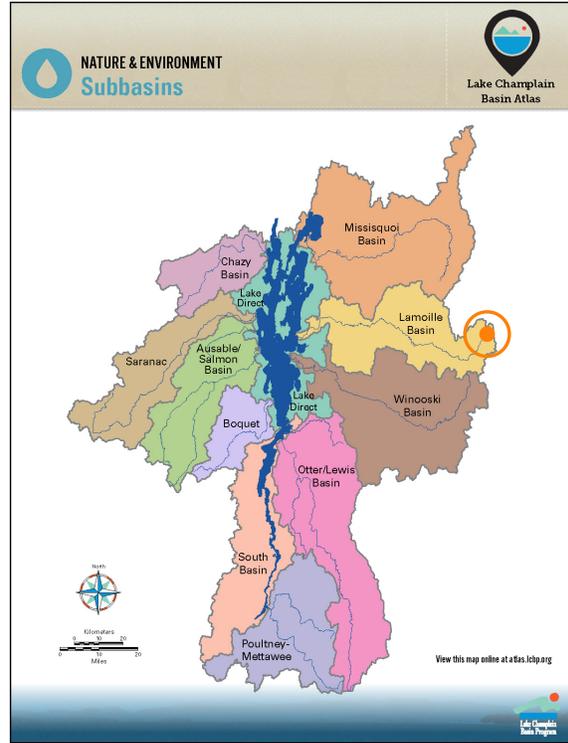
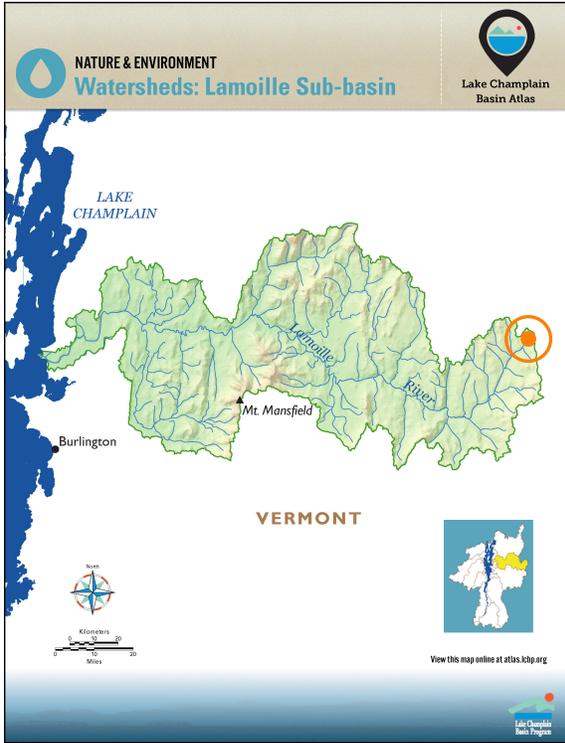
Introduction



Horse Pond. Photo Credit: Lauren Sopher

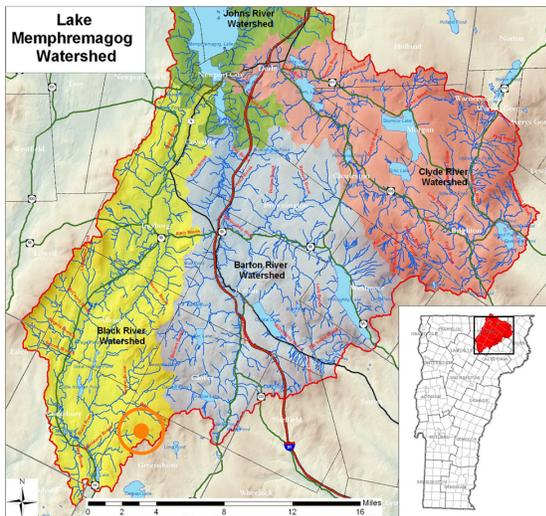
Healthy rivers support healthy people and the places they live. To live in a riparian area and a valley bottom means that human actions have an immediate effect on the local river: the Lamoille. Horse Pond, Greensboro, is the literal headwaters of the Lamoille River. The Lamoille River Watershed is divided into three sections: the Upper, Middle, and Lower Lamoille River. Greensboro Bend is within the Upper Lamoille River, or “headwaters” zone. The Lower Lamoille River drains into Lake Champlain in Milton. At 85 miles in length, the Lamoille is a major river of the Lake Champlain Basin. The plants, wildlife, and people of this 706 square-mile basin, spanning 34 towns, share a common interest in the current and future health of the Lamoille River.

Note: The terms “watershed,” “sub-basin,” and “basin” are interchangeably used in resources to describe a hierarchy in size. In this document, the Lamoille River or Black River *Watershed* describes a smaller area and the Lake Champlain or Lake Memphremagog *Basin* describes a larger area.



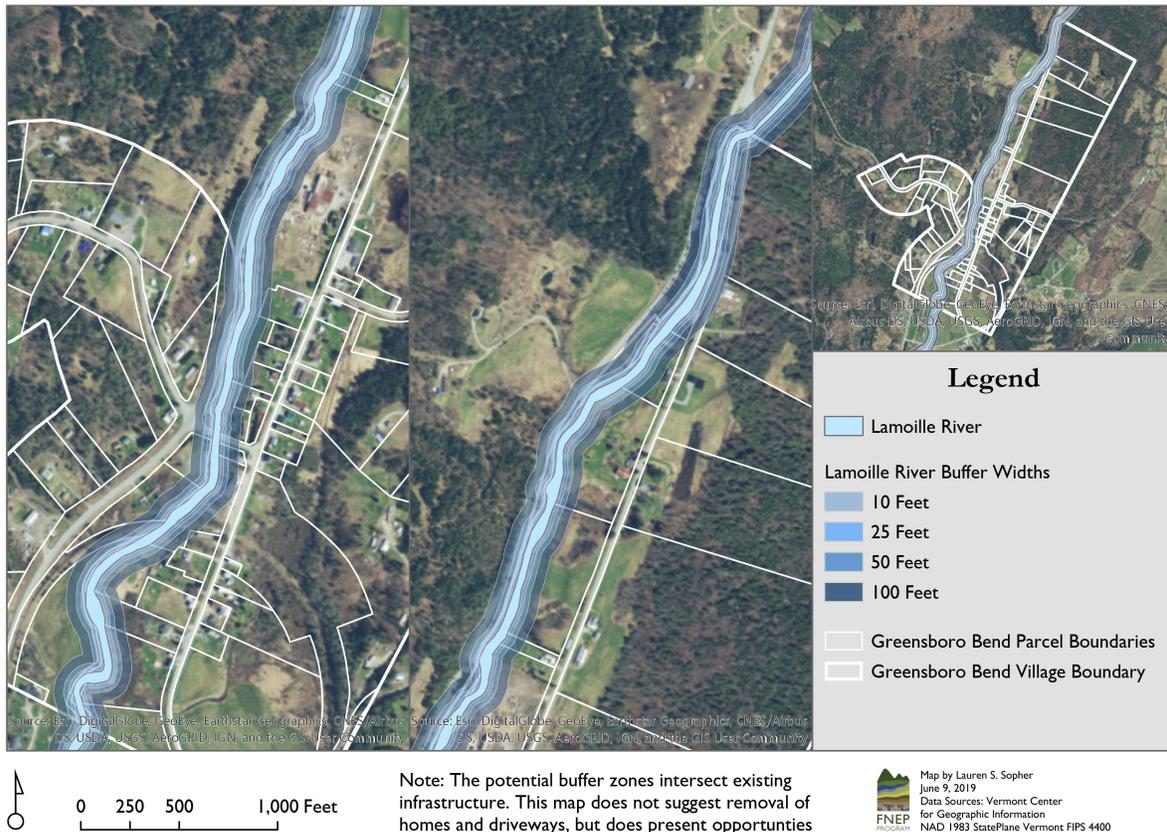
Left: Lamoille River Watershed | Right: Lake Champlain Basin | Source: Lake Champlain Basin Program

Note: The northeast portion of Greensboro is part of the Black River Watershed and drains north into the Lake Memphremagog Basin.



Source: The Lake Memphremagog Watershed Association

Potential Lamoille River Buffers in Greensboro Bend, VT



Riparian Buffers

Flood protection, fish and wildlife habitat, clean water, and river bank stability are made possible by riparian buffers—vegetated areas that border rivers, lakes, and wetlands. Intact riparian areas help prepare us for severe storms and summer droughts, which are predicted to become more frequent and severe as a result of climate change [1]. Community planting projects, whether for street beautification or riparian buffers, present an opportunity for folks to work together on common goals.

The Greensboro Bend community has the opportunity to sustain and enhance vegetated riparian buffers, ideally 100 feet wide, on either side of the Lamoille River. Please see the *Greensboro Bend PLACE Program Conservation Recommendations* in the *2019 Greensboro Town Plan* for more information on this topic.

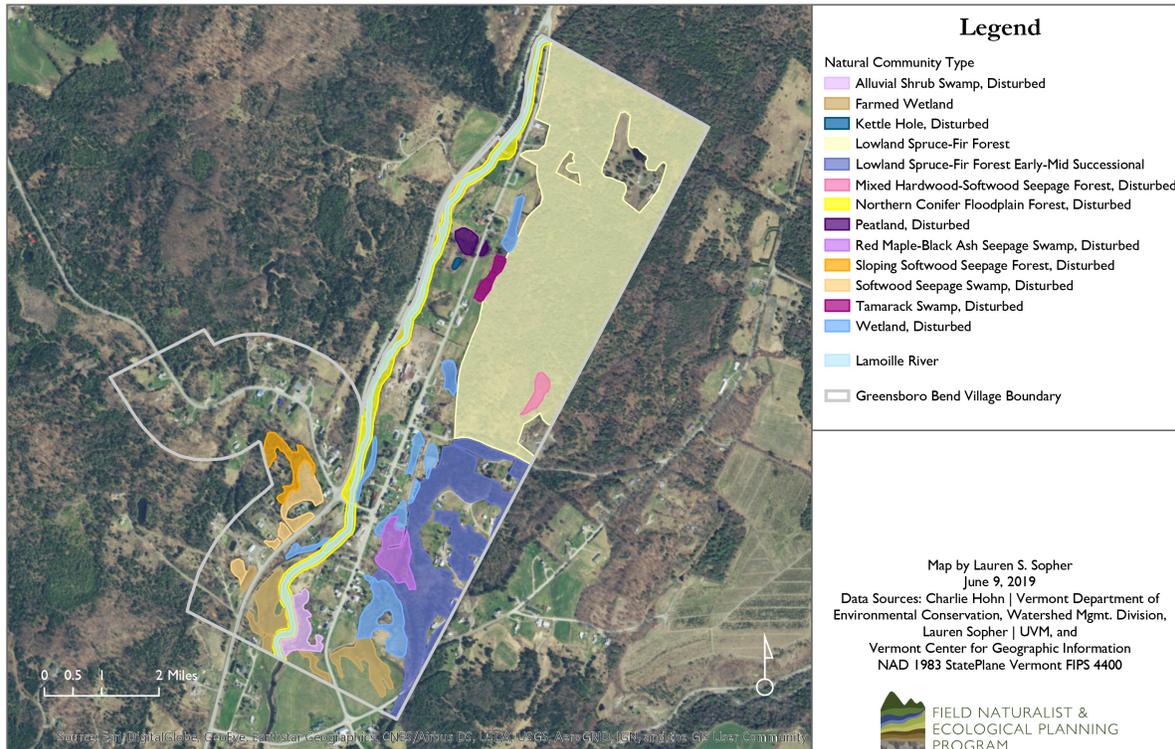
Wetlands

Greensboro Bend is home to many [Class II Wetlands](#), designated by the [Vermont Significant Wetland Inventory](#) (VSWI), which are protected by the [Vermont Wetland Rules](#). These wetlands range from Seepage Swamps and Seepage Forests to a Northern Conifer Floodplain Forest and an Alluvial Shrub Swamp (please refer to the *Natural Communities* section for a map). These wetlands provide critical habitat and food sources for fish and wildlife, filter sediments, nutrients, and pollutants, control flooding, stabilize banks, prevent erosion, protect groundwater and drinking water, and provide recreational opportunities. Many of these wetlands are disturbed, indicated by historic and current land use practices and the number of non-native or invasive species observed during fieldwork. The disturbance prohibits the wetlands from fulfilling critical ecosystem functions. The wetlands also present opportunity: if they are left alone or restored, they could improve in condition over time.

The Vermont Wetland Rules point to the importance of a 50-foot buffer zone around Class II Wetlands. Many of Greensboro Bend's wetlands fall within the floodplain of the Lamoille River. These wetlands have the ability to store large volumes of water during floods, substantial rainfall, or rapid snowmelt. They slow floodwaters and help in downstream flood peaks and bank erosion. This is of particular importance in the geographic context of Greensboro Bend, as East Hardwick, Hardwick, and Wolcott are immediately downstream and designated as Flood Hazard Areas by the Federal Emergency Management Agency (FEMA).

Natural Communities

Natural Communities of Greensboro Bend, VT



Introduction

Greensboro lies within the Northern Vermont Piedmont biophysical region. Biophysical regions share common characteristics of climate, geology, topography, soils, combinations of plants and animals, and human history. The Northern Vermont Piedmont is distinguished by hills and many rivers, a moderate climate—cooler and moister than the Champlain Valley and warmer and drier than the Northern Green Mountains—and rich soils.

A natural community is an interacting assemblage of organisms (plants and animals), their physical environment (bedrock geology, surficial geology, soils, hydrology, and topography), and the natural processes (natural disturbance, human disturbance, and succession) that impact them.

Two forest types, Lowland Spruce-Fir Forest [1] and Northern Conifer Floodplain Forest (or Boreal Floodplain Forest) [2], are highlighted in this document for the following reasons:

- These forests are distinctive upland (Lowland Spruce-Fir Forest) and wetland (Northern Conifer Floodplain Forest) communities in Greensboro Bend.
- These forests are either large in area (Lowland Spruce-Fir Forest) or readily visible to the public via the Lamoille Valley Rail Trail, Vermont Route 16, and Main Street.
- These forests have large restoration potential (Northern Conifer Floodplain Forest). This forest type has an S2 state rank—defined by the Vermont Natural Heritage Inventory as rare in the state, occurring at a small number of sites or occupying a small total area in the state [3].

The scent of a Lowland Spruce-Fir Forest puts evergreen candle fragrances to shame. Terpenes, organic compounds commonly found in conifers, are responsible for the rich olfactory experience we have when walking through this forest type. The Lowland Spruce-Fir forest type dominates the forest block in northeast Greensboro Bend

The Lowland Spruce-Fir Forest Early-Mid Successional is similar to the Lowland Spruce-Fir Forest, but is dominated by quaking aspen due to past and present logging practices. These patches of forest occur in southeast Greensboro Bend.

The Northern Conifer Floodplain Forest was historically a floodplain, though it is not actively so in some present day areas. Black ash, characterized as a “northern” species, is present in Greensboro Bend; black ash typically replaces green ash in this semi-boreal wetland community. Two other plants characteristic of this forest type, both named after their bird-like features, are the beaked hazelnut, a shrub, and the ostrich fern, an edible herb commonly referred to as “fiddlehead.”

The Alluvial Shrub Swamp is associated with the Northern Conifer Floodplain Forest; it is distinguished by the dominance of the shrub speckled alder.

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Thompson, E.H., & Sorenson, E.R. (2000). *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont*. Hanover, NH: University Press of New England.

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Lowland Spruce-Fir Forest

This forest is characterized by the following plants:

Trees	
Abundant Species	Occasional Species
<ul style="list-style-type: none"> - Balsam fir - Red spruce 	<ul style="list-style-type: none"> - Black spruce - Northern white cedar - Paper birch - Red maple - Tamarack - White pine - White spruce - Yellow birch
Herbs	
Abundant Species	Occasional Species
<ul style="list-style-type: none"> - Bluebead lily - Bunchberry - Common wood sorrel - Intermediate wood fern - Shining clubmoss - Whorled aster 	<ul style="list-style-type: none"> - Canada mayflower - Goldthread - Pink lady's slipper - Twinflower

This forest is associated with the following animals:

Animals	
Mammals	Birds
<ul style="list-style-type: none"> - Deer mouse - Fisher - Moose - Porcupine - Red fox - Red squirrel - Southern red-backed vole - White-tailed deer 	<ul style="list-style-type: none"> - Blackpoll warbler - Red-breasted nuthatch - Ruby-crowned kinglet - Swainson's thrush - Yellow-bellied flycatcher - Yellow-rumped warbler

Northern Conifer Floodplain Forest (or Boreal Floodplain Forest)

This forest is characterized by the following trees:

Trees	
Abundant Species	Occasional Species
<ul style="list-style-type: none"> - Balsam fir - Balsam poplar - Black ash - Black cherry - Northern white cedar - White spruce - Yellow birch 	<ul style="list-style-type: none"> - Red maple - Silver maple
Herbs	
Abundant Species	
<ul style="list-style-type: none"> - Ostrich fern - Sensitive fern 	

This forest is associated with the following animals:

Animals	
Mammals	Birds
<ul style="list-style-type: none"> - American beaver - Mink - Raccoon - River otter 	<ul style="list-style-type: none"> - American woodcock - Canada warbler - Common merganser - Hooded merganser - Ruffed grouse - Yellow warbler - Wood duck

Alluvial Shrub Swamp

This community is related to the Northern Conifer Floodplain Forest. It is distinguished by the dominance of shrubs.

This community is characterized by the following plants:

Trees	
Abundant Species	
<ul style="list-style-type: none"> - Black willow - Boxelder 	
Shrubs	
Abundant Species	
<ul style="list-style-type: none"> - Speckled alder 	
Herbs	
Abundant Species	
<ul style="list-style-type: none"> - Ostrich fern 	

This community is associated with the following animals:

Animals	
Mammals	Birds
<ul style="list-style-type: none"> - American beaver - Mink - Muskrat - River otter 	<ul style="list-style-type: none"> - Alder flycatcher - Common yellowthroat - Gray catbird - Veery - Yellow warbler

Source: Thompson, E.H., & Sorenson, E.R. (2000). *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont*. Hanover, NH: University Press of New England.

Wildlife



Introduction

The human-land relationship is deeply connected to wildlife. From watching backyard bird feeders and following winter tracks to fishing and hunting, daily life in Greensboro Bend involves wildlife.

With a set of focal species for Greensboro Bend, community members can maintain and improve their awareness of locally important species. Focal species were chosen based on the following factors: they are commonly found in Greensboro Bend's natural community types, have habitat needs that are shared with those of many other species, are simple to identify by sight or sound, are culturally significant, and/or are in need of protection.

Upland

Snowshoe Hare | *Lepus americanus*



Photo Credits | Top: VT State Parks, VT Fish & Wildlife Department | Bottom: Naturally Curious, Mary Holland

Background

Single Cocoa Puff-like pellets—not in clumps like those of white-tailed deer—sprinkled along packed trails throughout your backyard woodlands are a sure sign of snowshoe hare presence in the wintertime. Shrubs or trees nipped at a 45-degree angle are also a telltale sign of this bounding beauty (white-tailed deer make a shredded end). Between the hazy glows of dusk and dawn, you may be lucky enough to see a flash of white among the greens and browns of conifers—fir, pine, and spruce.

Snowshoe hares undergo a significant transformation between October and December: molting to white. Come spring, they molt back to brown. This seasonal contrast gives the snowshoe hare the nickname “varying” hare. The snowshoe hare is often mistaken for a New England cottontail (*Sylvilagus transitionalis*) or eastern cottontail (*Sylvilagus floridanus*); its enormous hind feet (hence “snowshoe”) set it apart from the cottontails. The snowshoe hare would be a shoe-in champion of the hurdles events at the Olympics, as its long hind legs allow it to launch 12 feet forward in a single bound and travel up to 31 miles per hour.

Hares prefer conifer forests in mountainous areas. They rely on dense cover for protection from predators, such as bobcats, coyotes, fishers, foxes, and great horned owls. Snowshoe hares have a home range about the size of 16 football fields. In the summer, they feed on herbaceous plants like clover and ferns. In the winter, they feed on the twigs, bark, and buds of trees and shrubs such as balsam fir, mountain maple, raspberry, and speckled alder.

What You Can Do

The snowshoe hare is designated as a Vermont Mammal Species of Greatest Conservation Need (Medium Priority) in [Vermont’s Wildlife Action Plan](#). There are steps you can take to familiarize yourself with and support this species.

- Take a field tracking workshop with [The Green Mountain Club](#), [Keeping Track](#), or [North Branch Nature Center](#).
- Support snowshoe hare populations by providing cover, its top habitat need, through planting native species of shrubs and trees on your property. In this context, cover falls into two categories: 1) base cover and 2) travel cover. Base cover is comprised of dense conifers, where hares typically spend the day. Travel cover is also comprised of conifers, which enable hares to move from base cover to food sources.

Black-throated Green Warbler | *Dendroica virens*

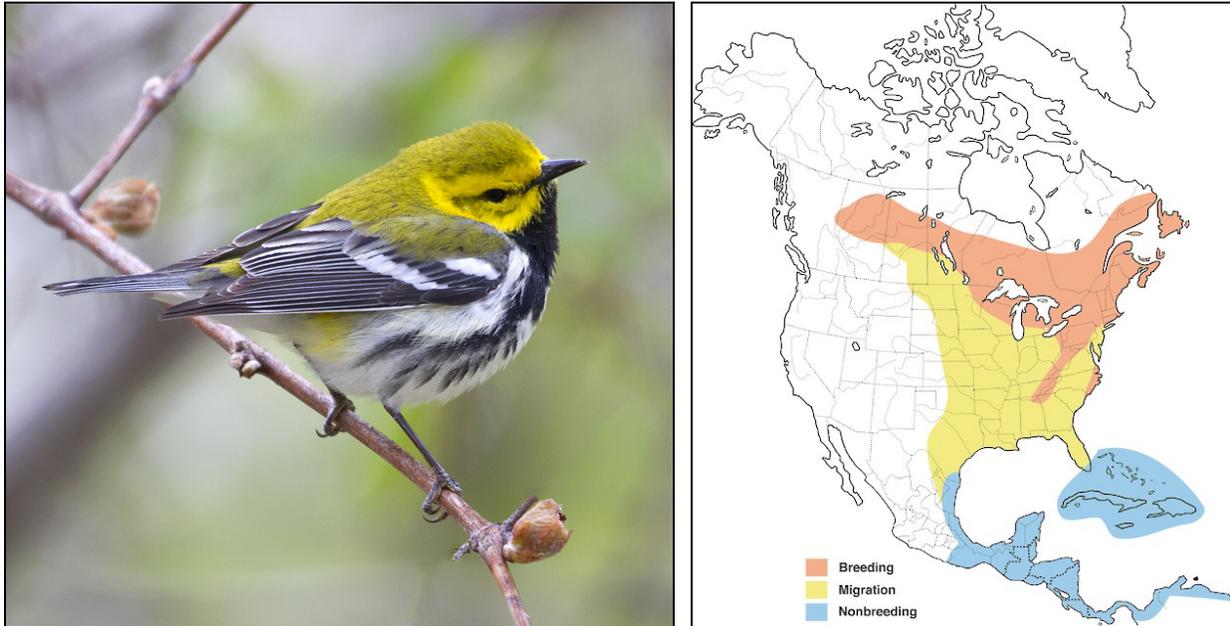


Photo Credits | Left: Bryan Pfeiffer | Right: Cornell Lab of Ornithology

Background

Birders go gaga over warblers, a type of small songbird, because of their striking colors and beautiful songs. Warblers are like winged gemstones: Blackburnian warblers, Canada warblers, and yellow warblers resemble citrine; black-throated blue warblers resemble sapphires; and black-throated green warblers resemble emeralds. In early spring, before our forests leaf out, eyes are peeled and ears are perked for these elusive sky gems.

The courting “uniform” of the male black-throated green warbler is fit for a fashion runway. He molts to breeding plumage (pictured above), a smattering of bright yellow-green contrasted against black and white—think bumble bee. He sends a five-note song, “zee-zee-zee-zoo-zee,” billowing from the tree tops to potential mates. The distinguishing characteristics of a black-throated green warbler are its black throat, yellow-green back, black and white “wing bars,” white belly, thick and straight black bill, and short tail.

Vermont is in the core of the black-throated green warbler’s breeding range (see range map above). It prefers continuous areas (~250+ acres) of closed forest canopy (>80% cover) in coniferous and mixed coniferous-deciduous forests. In boreal forests, which are present in the Greensboro area, it is strongly associated with red spruce. The black-throated green warbler typically nests in the fork of shrubs and saplings, 3-10 feet off of the ground. Its cup-shaped nest, mostly built by the female, would fit in the palm of a hand, and is made out of twigs, bark, and

spider silk lined with feathers, hair, and moss. These birds are primarily insectivorous, feeding on non-hairy caterpillars as well as aphids, beetles, gnats, and spiders.

What You Can Do

Birds are significant indicators of ecosystem health. The [Birder's Dozen](#) represents 12 of the 40 forest birds that the Audubon Vermont Forest Bird Initiative is working to protect. The black-throated green warbler is one of the Birder's Dozen species present in Greensboro Bend.

- Learn to identify this bird by sight and or sound. When you're out for a walk along Main Street or the Rail Trail in Greensboro Bend, [listen](#) for the two song types of the male black-throated green warbler. One song is used to court and communicate with females: "zee-zee-zee-zee-zoo-zee." The other song is used to establish and defend territory among other males: "zoo-zee-zoo-zoo-zee."
- Consider promoting natural conifer regeneration, especially on sites currently dominated by red maple (a result of heavy cutting of conifers in the past).

Wetland

River Otter | *Lontra canadensis*



Photo Credit: Sean Beckett

Background

The river otter is the “cool aunt” of the weasel family; they are the most social and aquatic of the bunch. The weasel family is distinguished from other carnivorous mammals by its short legs, long body, and scent glands. Other members include the American marten, American mink, ermine, fisher, and long-tailed weasel.

Fish (trout, bass, and perch) are a staple of the river otter’s diet, as are crayfish, earthworms, frogs, insects, salamanders, and snakes. If you catch a pungent fishy smell riding the breeze along a bank, scan for a pile of fish scales; it’s likely river otter scat. They create “rolls,” zones of scat mixed with urine, to waterproof and spread the scent throughout their coats. River otters have scent glands on the soles of their feet and the area of the foot in between the toes and the ankle (metatarsal).

River otters are active throughout the day and year. Their home range varies from 1-22 square miles; to put that range into perspective, the distance from the headwaters of the Lamoille River at Horse Pond to the river's intersection with East Main Street in East Hardwick is about 6.5 miles. River otters can cover a lot of ground! Their preferred habitat is the forested borders of streams, lakes, or other wetlands, where they den and play. River otters often seek out old beaver or muskrat dens as a homebase and create natural waterslides on banks.

What You Can Do

The river otter is designated as a Vermont Mammal Species of Greatest Conservation Need (Medium Priority) in [Vermont's Wildlife Action Plan](#).

- Consider land management decisions that maintain and improve the river otter's preferred habitat, a complex structure of vegetation—dense herbs, shrub thickets, and fallen and submerged trees—along streams, lakes, and other wetlands. For example, sustain and enhance buffers along rivers, ideally 100 feet wide, on either side of the Lamoille River.
- Consider partnering with a land trust to conserve lands adjacent to the Lamoille River. Riparian networks in Greensboro Bend are locally and regionally important. Riparian networks, defined as lakes, rivers, streams, and ponds and their associated corridors, allow animals to travel along corridors to find suitable habitat. They also provide habitat for wildlife that heavily rely on riparian areas for survival, including beaver, mink, and river otter.

Aquatic

Brook Trout | *Salvelinus fontinalis*



Photo Credit: VT Fish & Wildlife Department

Background

Brook trout are the kaleidoscopes of our rivers: vibrant shades of red, orange, and blue flickering in bold patterns. Their story is encapsulated in Greensboro's cultural, recreational, and ecological values. The upland streams of the Lamoille River Watershed, which flow through Greensboro, supply cold water to the river mainstem. These small streams provide essential habitat for self-sustaining native brook trout, as well as blacknose and longnose dace, creek chubs, longnose suckers, and slimy sculpins. An angler's dream!

Brook trout are Vermont's smallest native species in the salmon family. They thrive in cool temperatures (32-65°F), well-oxygenated water, and a silt-free, sandy or gravel stream bottom. They primarily feed on aquatic insect larvae—stoneflies, mayflies, and caddisflies—and terrestrial insects, worms, leeches, and molluscs.

What You Can Do

Brook trout are designated as a Vermont Fish Species of Greatest Conservation Need (Medium Priority) in [Vermont's Wildlife Action Plan](#). Wild brook trout populations are sensitive to water pollution and habitat degradation, such as channel alterations and poor riparian vegetation. An influx of recreationists in Greensboro Bend will likely follow the impending construction of the

“Morristown to Greensboro” section of the [Lamoille Valley Rail Trail](#). In south Greensboro Bend, a portion of the west bank of the Lamoille River is managed by the Vermont Fish & Wildlife Department for the purpose of public access, specifically fishing.

- There is an opportunity for private landowners, the Fish & Wildlife Department, and a partnering organization, such as the Orleans County Natural Resources Conservation District, to work together on a restoration project that supports healthy rivers, healthy brook trout populations, and a healthy human community.
- Has it been a while since you went fishing? Want to learn how? Get outside with your family and friends and fish along the Lamoille River! You can buy a fishing license [here](#). Let's keep the habitat needs of this “brookie” beauty in check and its story alive for current and future generations to enjoy.

Both Upland & Wetland

Fisher | *Martes pennanti*



Photo Credit: WA Department of Fish & Wildlife, John Jacobson

Background

The adaptable, generalist character of fishers is what makes them fascinating: they are agile in trees, on the ground, and in water bodies, and they're opportunistic carnivores. A glance at the photo above tells you fishers are gosh darn adorable.

The fisher is a member of the weasel family, along with the American marten, American mink, ermine, long-tailed weasel, and river otter. Fishers prey on a medley of animals: birds, deer, mice, moles, muskrats, porcupines, shrews, snowshoe hares, squirrels (red, gray, flying), voles, and woodchucks. They also consume apples, berries, and nuts. If you think fishers have a smörgåsbord at their "fingertips," you're right! They are targets too: bobcats, coyotes, foxes, and great-horned owls prey on fishers.

Fishers are commonly found in both Lowland Spruce-Fir Forests and Northern Conifer Floodplain Forests (or Boreal Floodplain Forests), the predominant natural communities in Greensboro Bend. They prefer coniferous and mixed hardwood forests with continuous canopy cover; in the winter, the cover of mature conifers helps to keep their foraging energy costs low. Fishers den under large boulders, in hollow trees and logs, and in old porcupine dens.

What You Can Do

Forest blocks and wildlife connectivity blocks in Greensboro Bend are locally and regionally important. Forest blocks, defined as areas of contiguous forest that are unfragmented by roads, development, or agriculture, support ecological function, such as air and water quality and predator-prey relationships. Wildlife connectivity blocks are a network of forest blocks that provide terrestrial connectivity across Vermont, adjacent states, and Canada; they support the ability of wide-ranging animals to move across their range and supply suitable habitat for plants and animals in the face of climate change.

- Consider forest blocks and wildlife connectivity in town planning decisions, especially in developing areas. Maintain and improve a network of interconnected woodlands and keep potential denning sites, such as dead trees and logs, in mind, when making land management decisions.
- The more diversity in native vegetation, the better—it provides the habitat needs for fishers and their prey.

Ruffed Grouse | *Bonasa umbellus*



Photo Credit: VT Fish & Wildlife Department

Background

Ruffed grouse are the masters of percussion and overwintering in our forests. Running into this explosive bird is like experiencing the clang of cymbals at a concert. Ruffed grouse can be flushed from their roosting sites on the ground, in trees, or in soft, deep snow. Similar to the sound of a distant shooting range, the rapid [drumming](#) of the males, most frequently heard at the time of snowmelt in spring through May, is created by compression waves from beating wings while the birds remain stationary. This love song and display, performed atop a downed log or stone wall, attracts females and fends off other males.

Ruffed grouse is one of two grouse species in the state; spruce grouse (*Falci pennis canadensis*) is the rarer of the two. The mottled brown, red, tan, and cream feathers of the ruffed grouse are the ultimate camouflage. This chicken-like game bird prefers brushy, mixed-aged woodlands and the presence of aspens and birches. Its ideal habitat is early successional—imagine a regenerating clear cut—or an abandoned apple orchard. In the winter, conifers provide cover and roosting sites. To make it through winter, the ruffed grouse employs several techniques: it plunges into fluffy snowbanks to stay warm on frigid nights, grows comb-like fringes on its toes to increase surface area and gripping ability, and gorges on shrub and tree buds. In addition to eating the buds of alder, aspen, birch, cherry, hazel, and hophornbeam, ruffed grouse feed on insects and the leafy vegetation of over 100 plant species.

What You Can Do

The ruffed grouse is designated as a Vermont Bird Species of Greatest Conservation Need (Medium Priority) in [Vermont's Wildlife Action Plan](#). The loss of habitat is the primary concern

for the decline of bird populations. Aspens, both bigtooth and quaking, are the most important trees in the management of ruffed grouse. The good news: Greensboro Bend is chock full of aspen. Other forest types that are important in managing ruffed grouse are Red Maple-Northern White Cedar Swamps, Spruce-Fir Northern Hardwood Forests, Alder Swamps, and forests containing birch.

- Maintain and improve patches of conifers ($\frac{1}{4}$ - $\frac{1}{2}$ acre) for winter cover.
- Plant aspen and apple trees if they become less common.

Spotted Salamander | *Ambystoma maculatum*



Photo Credit: Sean Beckett

Background

We yearn for pops of color among the expanse of brown in spring: the purple-pink of hepatica, the red and yellow of red-winged blackbirds, and the yellow confetti on the backs of spotted salamanders. The spotted salamander is the largest of the three mole salamanders native to Vermont (the others are the blue-spotted salamander, *Ambystoma laterale*, and the Jefferson salamander, *Ambystoma jeffersonianum*). These salamanders spend a majority of the year overwintering in shrew, mouse, or mole tunnels, hence the name “mole” salamander. A 45-degree day paired with an evening rain precipitates a mass nocturnal migration. Salamanders mosey from their upland homes down to vernal pools, beaver ponds, and old farm ponds to reproduce. One individual may trek to the same body of water up to 20 times in its lifetime.

The spotted salamander prefers moist deciduous or mixed woods in or next to floodplains, streambanks, and rocky hillsides; it seeks shelter beneath rocks, logs, stumps, and boards. For breeding, it needs permanent, semi-permanent, or ephemeral water without fish. The adult spotted salamander’s diet consists of earthworms, snails, slugs, spiders, and insects, especially larval and adult beetles.

What You Can Do

The spotted salamander is designated as a Vermont Amphibian & Reptile Species of Greatest Conservation Need (Medium Priority) in [Vermont's Wildlife Action Plan](#). Although this salamander is widely distributed across Vermont, it is a medium priority species because of the high number of deaths that occur as they cross roads to and from breeding pools.

- Why did the salamander cross the road? Get outside to find out and help out! Volunteer with the [Vermont Vernal Pool Monitoring Project](#) through the Vermont Center for Ecostudies or the [Amphibian Road Crossing Program](#) at North Branch Nature Center.
- If you have a vernal pool on your property and harvest timber, consider following the Vermont Center for Ecostudies [Suggested Guidelines for Timber Harvesting Around Vernal Pools](#).

Monarch Butterfly | *Danaus plexippus*



Photo Credit: Bryan Pfeiffer

Background

The sight of the first monarch flitting across a summer sky inspires a jump for joy. The monarchs arriving in our fields between June and August are the third or fourth generation of an annual mass migration. Imagine an epic relay, where participants are in pursuit of the prized gold medal: milkweed. The first generation migrates south to overwinter in mountainous central Mexico; the second generation begins the return flight to the northeast, but doesn't make it the whole way; the third or fourth generation completes the relay, landing in the fields of New England to lay eggs. A monarch can travel 40 to 100 miles per day. From egg, to caterpillar, to golden-speckled chrysalis, to adult, monarchs are in constant training for a great migration.

Yellow-orange and purple-pink are the royal colors of the monarch and the plants it relies on. These colors are from the palette of an accomplished artist. Monarch caterpillars specialize on common milkweed (*Asclepias syriaca*), showy milkweed (*Asclepias speciosa*), and swamp milkweed (*Asclepias incarnata*). The adults are generalists and feed on the nectar of a range of plants, such as New England American-aster (*Symphotrichum novae-angliae*), pictured above,

purple Joe-Pye weed (*Eutrochium purpureum*), and eastern purple coneflower (*Echinacea purpurea*). These butterflies prefer open meadows, weedy areas, marshes, roadsides, and disturbed habitats with milkweed. The monarch is Vermont's official state butterfly! The viceroy butterfly (*Limenitis archippus*) is a Mullerian mimic of the monarch, meaning it has similar coloration. The viceroy is smaller than the monarch and has a distinct black band across its hind wings.

What You Can Do

The monarch butterfly is designated as a Vermont Invertebrate Species of Greatest Conservation Need, Butterflies-Grassland Group (High Priority) in [Vermont's Wildlife Action Plan](#) due to habitat loss, especially of its host plant, milkweed.

- Help provide habitat for monarchs by planting milkweed in your yard, home garden, school garden, and community park, and along sidewalks and trails. Not only is milkweed beautiful, but it also creates a wonderful opportunity to learn the lifecycle of this magical creature, the monarch.

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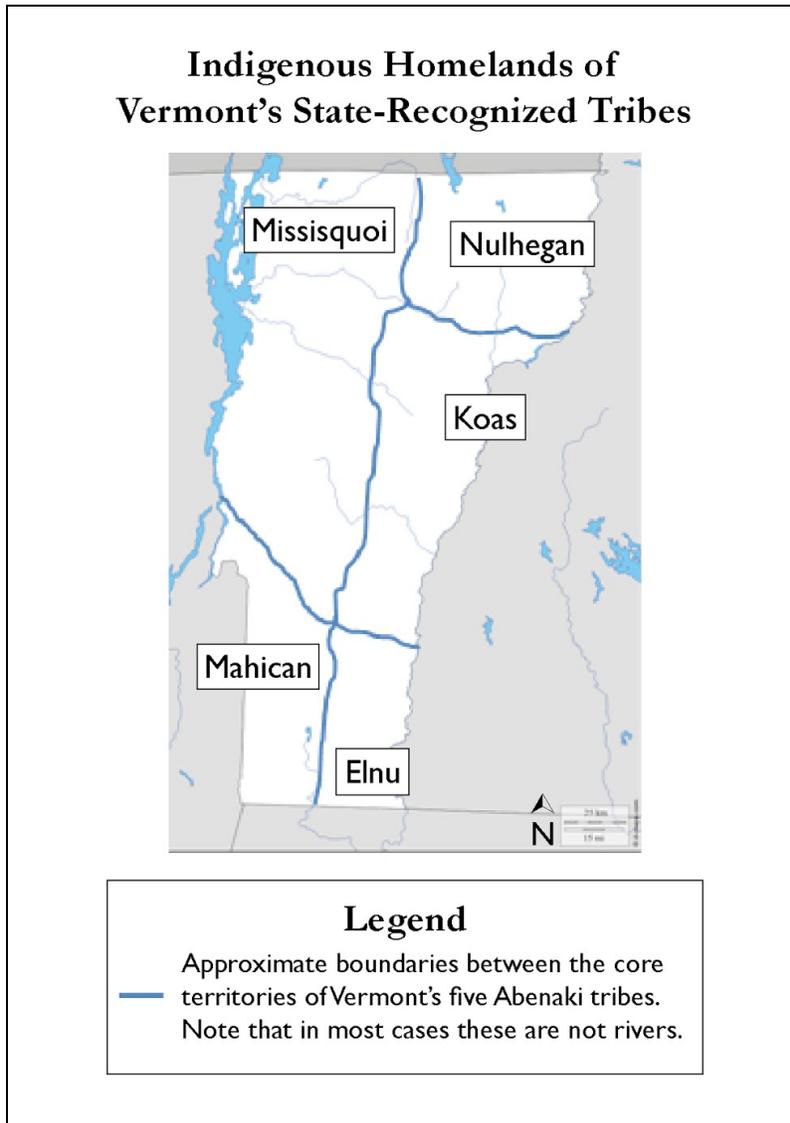
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Humans

Native Americans



Sources: The chiefs of each tribe, Frederick M. Wiseman, and Kris Stepenuck. Design edits only: Lauren Sopher

The Abenaki have been in Vermont for time immemorial and they are here now. Below is information I have been able to gather from Abenaki sources of wisdom and knowledge. The goal is to highlight unmediated Abenaki voices. My account is necessarily incomplete.

The Wabanaki Confederacy is comprised of five principal nations: Abenaki, Malecite, Micmac, Passamaquoddy, and Penobscot. There are four Vermont state-recognized Western Abenaki tribes:

1. **The Elnu Abenaki Tribe**

According to information available at <http://elnuabenakitribe.org/>, their traditional territory is southern Vermont.

2. **The Koasek Traditional Band of the Koas Abenaki Nation**

According to information available at <http://koasekofthekoas.org/>, their traditional territories are central and northwestern New Hampshire and northeastern and central Vermont.

3. **The Nulhegan Band of the Coosuk Abenaki Nation**

According to information available at <https://abenakitribe.org/>, their traditional territories are the Upper Connecticut Basins of Vermont, northern New Hampshire, and the eastern townships of Quebec.

4. **The St. Francis-Sokoki Band of the Abenaki Nation of Missisquoi**

According to the map above, agreed upon by the chiefs of each tribe and Frederick Wiseman, their traditional territory is northwestern Vermont. Their website is <https://www.abenakination.com/>.

Ancestral lands of the **Stockbridge-Munsee Band of Mohican Indians**, descendants of Mahican and Lenape peoples, include the Massachusetts town of Stockbridge. Their current territory in the eastern United States consists of 330 acres in Sullivan County, New York, and 2 acres in Madison County, New York. Their website is <https://www.mohican.com/>.

Contemporary

The Nulhegan Band of the Coosuk Abenaki Nation is nestled in *N'dakinna* (our homeland), the present-day Northeast Kingdom of Vermont. The tribal headquarters are located in Barton, Vermont.

According to Don Stevens, chief of the Nulhegan Band of the Coosuk Abenaki Nation, “We are the Nulhegan Tribe; the Memphremagog Band; the Northern Cowasuk Indians. We have lived here, in the St. Francis, Nulhegan, Memphremagog, Passumpsic, and Upper Connecticut Basins of Vermont, northern New Hampshire, and the eastern townships of Quebec, from time beyond memory. Our memories and oral history tell about when the old ones were faced with the decision to stay or travel west to the Great Lakes. Some made the journey and some stayed here in *N'dakinna* (our homeland). Our oral history tells of the wars and the hardships of survival and acceptance in the centuries after. Our presence here has not always been wanted, warranted, or even admitted. Memories and stories of eugenics and ethnic

cleansing in the 19th and 20th centuries brought animosity and distrust that still manifests itself today.”

The Nulhegan Band of the Coosuk Abenaki Nation filed an application for [tribal recognition](#) with the Vermont Commission on Native American Affairs. On April 22, 2011, the Nulhegan Abenaki Tribe was recognized by the State of Vermont as a Native American Indian tribe. The first week of May is recognized as Abenaki Recognition and Culture Week in Vermont.

The information below is my summary of Frederick M. Wiseman’s accounts in his book, *The Voice of the Dawn: An Autohistory of the Abenaki Nation*. Dr. Wiseman is an Abenaki Tribal Council member and the Director of the Abenaki Tribal Museum and Cultural Center in Vermont.

13,000-10,000 | The Years of the *Adebaskedon* [Mammoth]

The ancestors of the Abenaki, referred to as “Our Oldest Ones,” lived in “highly dispersed groups of families tied together by language and kinship.” On a yearly cycle, they followed herds of upland game and marine life. Small and medium-sized game were hunted with a lightweight javelin, sometimes thrown with an *atlatl*—a wooden shaft with leather finger loops on one end and a hook or notch on the other end—to hold the javelin. Examples of small animals that were hunted include *mateguas* (Arctic hare), ptarmigan (a game bird in the grouse family), seabirds, and *mihkua* (squirrel). Larger game, such as *magolibo* (caribou), *ktsiwoboz* (giant elk), *adebaskedon* (mammoth), *ktsiawaasak* (mastodon), *ponkiawassos* (polar bear), and *ktsiawassos* (short-faced bear), were hunted with a heavy two-part lance. Examples of hunted marine life include fish (capelin, sculpin, smelt, and stickleback), *askigwak* (seals: bearded and hooded), *podabak* (small whales: beluga and porpoise), and walrus. Hunting was likely done from a canoe similar to the *mozolol* (hide-covered boat). *Podabak* (large whales: bowhead, finback, and humpback) were too large to hunt, but would sometimes beach themselves and be harvested.

The landscape transitioned from a tundra—grasses, lichens, sedges, and small shrubs (*sata*—blueberry, *kanosasiz*—dwarf willow, and *paksiwimen*—partridge-berry)—to a smattering of *maskwamozi* (birch), *kokokhoakw* (fir), *ossggakw* (poplar), and *mskak* (spruce) around 11,000 years ago. Over time, *wdopiak* (alders) and *kanosasak* (willows) moved in along streams and the land transitioned to an open woodland of conifers, *mahlawks* (ash), and *senomozi* (sugar maple). With the change in landscape came new animals: *tamakwa* (beaver), *awassos* (black bear), *pezo* (lynx), *apanakega* (marten), *moskwas* (muskrat), *moz* (moose), *kokw* (porcupine), and *meskagodagihla* (spruce grouse). Humans supplemented an animal diet with bark, berries, leaves, and tubers.

Koluscap [Our Great Hero] and the Frost Monsters

“Here camps my story, an old granite rock scoured by ice and covered by hoarfrost and lichen. Koluscap [our great hero] was tired of the cold. It was so cold that people had moved to Nibenakik [to the south], where it was warm enough to hunt and fish. He went to find Bezegawan, the Fog. Slowly, tendrils of mist flowed down snow-covered hills, merged and coalesced, and Bezegawan stood before Koluscap. “Why does Ice now cover the earth so much that it bends under its weight?” “Koluscap,” said the Fog, “the Frost Monsters in the north have gotten too strong. They blow their ice breath so that Winter is long and the other seasons are so short they cannot melt the ice. The Frost Monsters are powerful and dangerous; if they catch a man, they will eat him alive, consuming him into more ice.” Koluscap said, “Grandfather, these creatures do not frighten me, I will go and fight them and make them stop the Ice.” “Koluscap,” said the Fog, “the Frost Monsters live in Pabonkik, so far to the north that you will need four pairs of ogenak (snowshoes) to reach them.” So Koluscap made four wonderful pairs of snowshoes to journey to the village of the Frost Monsters. Koluscap set off across the ice. By the time his first pair of snowshoes fell apart, the icy wind was blowing so hard that his cape flew from his shoulders. By the time his second pair wore out, the wind froze his hair to his neck. By the time the third pair wore out, Koluscap could only crawl through the howling gale.

In time he came to a huge village called Wazoli [snow], palisaded with ice stalagmites and with houses made of snow lit inside by cold blue fire that took away warmth. There he saw the Frost Monsters, with their great toothed and tusked mouths from which came a huge cold gale that froze the world. They were naked. Koluscap said, “You must stop making the world cold. You have forced my people to move far to the south to be able to find game. I will wrestle you each, and if I win, warmth will come to show that I have beaten you.” The monsters were persistent and tricky in wrestling and could not be beaten without killing them, which he did, though it was hard work. After killing many, he said, “Enough, I cannot kill you all.” He also thought, “If I kill them all, winter, and the rest that it gives the earth, will not come, and Aki [earth] will tire quickly.” So he returned home, leaving some of the Frost Monsters alive. That is why we still have winter but not so strong as before, and Frost Monsters still eat the unwary hunter in the dead of winter. Koluscap laboriously slogged back to his lodge beside the lake. Bezegawan rose from the lake and said, “Koluscap, you did well to stop the breath of the Monsters, but you did even better to let some live so that my sister the earth can rest.” The Alnôbak [Abenaki] were again able to live in Wôbanakik, the Land of the Dawn.”

Source: Medawas, 1993

10,000-6,500 | The Years of the Moose [Moz]

This time period is characterized by its warmer and drier climate. The open, low woodlands transitioned into dense, tall woodlands comprised of warmer species such as *pagôn* (butternut) and *watsilmezi* (white oak). The ancestors of the Abenaki lived in smaller, seasonal camps in

order to easily hunt in the uplands and fish along rivers. The development of more sophisticated ground stone woodworking tools, the “full-channel” gouge and the adze,” allowed for the creation of dugout canoes, which replaced skin boats. The small forest animals dominated the woodlands (*tamakwa*–beaver, *mateguas*–hare, *moskuas*–muskrat, and *mihkua*–squirrel); they were hunted with a *klahigan* (deadfall trap) and lighter *atlatls*. Few large animals (*awassos*–bear, *moz*–moose, and *magolibo*–woods caribou) roamed the woods, though moose meat was a significant part of the people’s diet. Fish (*monazigan*–black bass, *maskwenoza*–muskellunge, *kwenoz*–northern pike, *namas*–salmon, *kabassa*–sturgeon, and *lapasalod*–yellow perch) and berries (*sata*–blueberry, *pessimenal*–currant, *sgueskimenal*–raspberry, and *mskikikoiminsal*–wild strawberry) also were important parts of the people’s diet. *Maskwajjoal*, bark containers filled with cooked berries and maple sweetener, were sealed with moose fat and hung from wigwam frames.

Moose [Moz] Hunting Story

“To hunt a moose by water, you approach the moose by canoe around a peninsula which hides him from you. In this canoe you must have two hunters, the one in the bow, who carries the hunting weapon, and the stern paddler who calls the moose. When you have paddled silently as close to the moose as possible without being seen, you quietly bring the canoe to a stop. The stern hunter dips the moose call, a Mason jar (or cone of birch bark in the past), into the water. The call is then lifted three feet above the lake and its water carefully poured in such a way that it sounds exactly like a female moose, in heat, urinating. The male moose, hearing this sound, will quickly and foolishly round the peninsula in search of the female. You must quickly kill the moose or, in his rage at being tricked, he may sink the canoe.”

Source: “Monkey” Drew, ca. 1955

6,500-1,000 | The Years of the Log Ships

This time period is referred to as the “Climatic Optimum,” which is defined by the warm and moist climate. The practice of woodworking (with stone, metal, and bone tools) expanded, impacting water travel and hunting; trading expanded, by sea and land. Family and village life became larger and more complex. Villages were centered around rich alluvial river valleys, such as *Nonnigonikon Winooskik* (the Winooski Site, near Burlington, Vermont). Ancestors of the Abenaki lived in clusters of wigwams: “a conical frame of flexible saplings with a birch, elm, or softwood bark covering, sewn to the frame with spruce root ties.”

The people perfected plant gathering and transitioned to a plant-dominated diet. The summer brought a bounty of berries: *satal* (blueberry), *saskibal* (elderberry), *mololdagwal* (grape), and *sgueskimenal* (raspberry). The fall brought a stockpile of nuts: *anaskamenal* (acorn), *wajomozial* (beechnut), *pakimizial* (black walnut), *pagon* (butternut), *wobimenal* (chestnut), *pagonizal* (hazelnut), and *bagimenakwamal* (hickory). This diet was supplemented by the upland hunting of

awassos (bear), *pezo* (bobcat), *nolka* (deer), *olanigw* (fisher), *bakkesso* (partridge), *kokw* (porcupine), *wokweses* (red fox), and *naama* (turkey), and the lowland marsh hunting of *tamakwa* (beaver), *doleba* (box turtle), *woptegua* (Canada goose), *moz* (moose), *moskwas* (muskrat), and *onegikw* (otter).

The people commanded travel on lake and sea. *Woleskaolakw*, canoes built with white pine or other softwoods, and huge log ships were relied upon for transportation. Marine fish (cod and swordfish), freshwater fish (*monazigan*–black bass, *maskwenoza*–muskellunge, *kwenoz*–northern pike, *meskwamakw*–salmon, *kabassa*–sturgeon, *namoakw*–trout, and *mamsalagikwsak*–walleye pike), and sea mammals (*askigw*–seals, *podabak*–whales, and walrus) were hunted too. Hunting technologies advanced, especially in the wooden *atlatl*, drag snare, *klahigan* (deadfall trap), and *astahiganal* (harpoon) departments. Drag snares, “loops of cord attached to logs that tightened and strangled the animal as it dragged the log,” were used to catch *awassos* (bear), *nolka* (deer), and *moz* (moose).

The people deepened their connection with the spiritual world: birth, death, dream, spirit, and the cycles of the sun, moon, and seasons. These worlds were interpreted by *medlawinoak* (shamans) and *wassobamit* (clear seers or clairvoyants).

Trade expanded beyond *Wôbanakik* (the Land of the Dawn) and subsistence labor declined. More time was spent crafting functional and ornamental objects. Stone bowls, cups, pipes, plates, and body ornaments were formed from soapstone of the Green Mountains. Bone, metal, polished stone, and shell were crafted into beads, gorgets (plates of stone worn around the neck), pendants, and whistles. The appearance of clay vessels, used as cooking pots, indicates the end of this period.

1,000-400 | The Years of the Corn [*Skamon*]

There were three major changes that exemplify this time period: (1) the advent of the *dobi* (bow) and the *asigwonit* (arrow); (2) the introduction of agriculture, with a focus on *skamon* (corn), *adbakwa* (beans: red and kidney), *wassawas* (squashes: acorn, butternut, pumpkin, and summer squash), Jerusalem artichokes, and *odamo* (tobacco); and (3) the loss of hunting lands to a new group of people from *Nibenakik* (south central Appalachian area). Otherwise, fish and game species, as well as their respective associated technologies, were similar to the Years of the Log Ships’ last years.

1600-1820 | The Years of the Beaver [*Tamakwa*]

This was a turbulent period for the people of *Wôbanakik* (the Land of the Dawn); they dealt with disease from the east and unfriendly visitors. Coastal villagers were the first to come in

contact with the *Blacmonak* (people from France). In exchange for information about the land and animals, those people gave glass beads, woven cloth, and black metal (iron). Iron changed how the people of *Wôbanakik* interacted with nature; using iron needles, fish hooks, points, knives, and axes were more time-efficient than using chipped- or ground-stone tools. Trade continued to expand beyond *Wôbanakik* (the Land of the Dawn) and included items like trade beads (*mozobial*—large necklace beads, bugle beads—long tubes of colored glass, and *mozobizal*—small beads for sewing to clothing), silver (*aneskamonal*—large center-holed brooches, buttons, and pins), and bells made of *wizowahlakw* (brass).

The *Agomenokiak* people introduced the beaver trade to the people of *Wôbanakik* (the Land of the Dawn), and clashes over beaver hunting territories began. In the words of Frederick Wiseman, “Our respect for conservation and game animals was challenged for the first time in scores of generations. To survive in a changing world, we could not refuse the new technology, no matter what the environmental consequences. For our neighbors, who looked upon our hunting territories with newly greedy eyes, were themselves acquiring new weapons’ technologies against which we would be helpless.”

A cycle of war amongst nations led to an alliance based on peace and hope, according to evidence from the wampum records of the Passamaquoddy and the Haudenosaunee. “...Every Indian to the farthest boundaries was informed that a great confederacy was to be made,” said Wapapi Akonutomakonol (Lewis Mitchell, 1990). The First Nations of the Great Council Fire formed, “to reduce discord among member nations and to mediate warfare and peace with native and Anglo opponents, but as time went on it also became an agent to let the European powers know that we had not lost any war and were continually knowledgeable of our rights.”

These were the last years of total sovereignty for the *Alnôbak* (Abenaki). War was common; the people had to fight throughout the year. Tools of war included the tomahawk and firearms (muskets) from the Europeans. Please refer to Wiseman’s descriptions for more details on warfare at this time (pgs. 104-113).

The *Alnôbak* (Abenaki) way of life was defined by the seasons.

Spring: “A village’s year began in *Zogalikas* (the sugar-making moon of early spring), when it became warm enough for the sap to flow in the maple and birch trees.” Bark crafts, especially of canoes and dwellings, basketry, and longhouse construction, were common in the springtime.

Summer: hunting, gathering, planting, harvesting, and playing games (*adowiz*—the ring and pin game, *gagwenigan*—the dice game, and *babaskwahamawôgan*—lacrosse) defined summer.

Fall: the processing of field corn with *dakwahogan* (corn pounding mortar), eel fishing season, and the main hunt of the year defined fall.

Winter: the hunters returned to the villages with animal harvests; a time of social renewal and games was centered within wigwams and longhouses. Winter hunting was made possible by specialized winter clothing (*plejes*–moosehide leggings and *mkezenal*–moccasins) and the perfection of *ogenak* (snowshoes) by the *Alnôba* and their neighbors.

1820-1970 | The Years of the Fox [Waukweses]

“The position of the state is that in the late 1700s the Abenaki ceased functioning as a tribe, and although they have regrouped, it still doesn’t meet the legal test.”

-Janet Ancel, Governor’s Counsel, *St. Albans Messenger*, May 15, 1995

Against the Darkness

Let the visitors believe they have conquered,

that they have the land and its bounty.

Let them believe that we are gone, Indian Joe is dead.

The forests keep our secret.

The unseen fox has kits in its den.

The drums and rattles are not stilled.

They are heard in the far places,

they are heard on the air of night.

The visitors think they have won.

Yet the scent of sweetgrass troubles their dreams.

Source: Medawas, 1994

As Anglo-Americans moved into *Wôbanakik* (the Land of the Dawn), contrary to the storyline of many academic historians, the *Alnôbak* (Abenaki) people kept their beliefs and customs. Wiseman states, “This lack of scholarly research and writing has inadvertently provided the state of Vermont with a tactical tool in its campaign of disconnecting us from our ancestors, a strategic cornerstone in its ethnic cleansing program.” He explains, “There were five options: (1) exile, (2) fade into the forests and marshes, (3) live the “Gypsy”/ “Pirate” / “River Rat” life between Native and European culture, (4) merge with the French community, (5) “pass” into English-American society.”

Alnôbak (Abenaki) families sought refuge in the Odanak and Wôlinak reserves within Canada. The St. Lawrence mission villages, run by French Canadians and the Catholic Church, were accepting of *Alnôbak* families. Overall, the *Alnôbak* people were dispersed across the landscape, in areas not desired by English Americans: the marshes, mountains, and pine woods.

Derogatory names were assigned to the various *Alnôbak* family bands: “River Rats,” “Pirates,” and “Gypsies.” River (“River Rats”) and lake (“Pirates”) folks lived in shanty towns by rivers or on houseboats on the lake. Upland (“Gypsies”) folks lived in shanty towns too, and had a semi-mobile lifestyle. Some families merged with the working “French” class in northern New England, including Frederick Wiseman’s family.

Despite significant oppression of the *Alnôbak* (Abenaki) people, traditional craft technologies continued to develop. The *alnôbaiwi* (canoe) saw significant advancements. The *mozolol* (moosehide skin-covered canoe), *woleskaolakw* (dugout canoe), *pkwahaol* (spruce bark canoe), *wigwaol* (birch-bark canoe), *odoalagwal* (cargo canoe), and *madobaolagwal* (war canoe) were used for river and lake travel. The primary materials used to build birch-bark canoes were *igua* (a single large piece of birch-bark), cedar strips for *wogino* (ribs and lining), *wadabal* (spruce-root lashings), and *pego* (spruce gum).

Craftsmanship also continued in the form of baskets, made for European collectors, and *ogenal* (snowshoes). The Victorian basket was made from *mahlawks* (ash), *wigebiak* (ash splints), and sometimes *walmogwkil* (sweetgrass). The *Alnôbak* (Abenaki) developed teardrop-shaped *ogenal* (snowshoes) that were the precursor to modern snowshoes. The snowshoes were made of *mahlawks* (ash) and rawhide.

In the mid-1920s, the Vermont Eugenics Survey was led by Henry Perkins of the University of Vermont. Wiseman describes, “Soon the lens of genocide was trained on the Gypsies, Pirates, and River Rats, as well as other ethnic groups...it was reported that over two hundred people were sterilized during this campaign.” This period of history closed with a decline in the eugenics movement, but with continued resistance to the Abenakis’ political and cultural sovereignty.

1970-1994 | The Years of the Bear [Awassos]

In the words of Frederick Wiseman, “All of the forces of creation and destruction that mold the modern Abenaki world developed in these years. The forces of creation included acceptance of the Abenaki people that they were Indian, acceptance of the Abenaki people by academia, building organizational and political structures to deal with Anglo Vermont, and rediscovery of symbolic and material heritage. The forces of destruction unleashed included a constantly shifting, overtly hostile state of Vermont and a built-in political instability caused by friction between traditional family-band politics and Anglo-imposed tribal and social organizations run by authoritarian leaders.”

Place & People Names Word Bank

Recovering and reclaiming indigenous place names is an essential component of unfolding the history of a place. The words below are full of deep history—consider using them in your personal and professional life.

Abenaki Name	Modern Name	Approximate Meaning
Alnôbak	Abenaki people	Abenaki people
Aki	Earth	Earth
Bitawbagok	Lake Champlain	Lake Between
Kwenosakek	Mouth of the Lamoille River	Pike Place
Mamhlawbagok	Lake Memphremagog	Wide Water
Wintegok	Lamoille River	Marrow River
Wabanaki	Wabanaki people	People of the First Light <i>or</i> Dawnland
Wôbanakik	Our land	The Land of the Dawn

Source: Wiseman, F.M. (2001). *The Voice of the Dawn: An Autohistory of the Abenaki Nation*. Hanover, NH: University Press of New England.

Resources

- [The Ethan Allen Homestead Museum](#): “The Vermont Abenakis: A Living Heritage” permanent exhibit
- [Nulhegan Abenaki Tribe](#)
- [Nulhegan Tribal Forest in Barton, Vermont](#)
T-Bar Films | 2016
- [“Unity Sounds Pretty Good,”](#) Wabanaki Confederacy Conference
Orca Media | 2015
- [Vermont Abenaki Artists Association](#)
- [The Vermont Abenaki: A Struggle for Recognition](#)
Center for Media & Democracy: 17 Town Meeting Television | 2013
- [Vermont Hosts the Wabanaki Confederacy Conference](#)
Here & Now: Vermont Public Radio | 2015
- [What is the Status of the Abenaki Native Americans in Vermont Today?](#)
Brave Little State: Vermont Public Radio | 2016
- Children’s Books

- Abenaki Animals Coloring Book
By Brian Chenevert, Illustrated by Francine Poitras Jones
- Azban's Great Journey
By Brian Chenevert, Illustrated by Allison Gedman

Works Consulted

Nulhegan Abenaki Tribe. (2017). Retrieved from <https://abenakitribe.org/>.

Wiseman, F.M. (2001). *The Voice of the Dawn: An Autohistory of the Abenaki Nation*. Hanover, NH: University Press of New England.

Historic Preservation



Photo Credit: Lauren Sopher

By Lauren Sopher & Samantha Ford

Introduction

“Buildings trigger memories and memories trigger stories.”

-Mary Humstone

“We shape our buildings, and afterwards, our buildings shape us.”

-Winston Churchill

What is historic preservation?

Historic preservation champions historic buildings that are well designed, expertly crafted, and reflective of the changing needs of our communities. These historic resources connect us with our past in meaningful ways and can be adaptively reused to fit modern needs. Historic preservation can meet a wide range of public goals, including small business incubation, affordable housing, sustainable development, neighborhood stabilization, job creation, promotion of the arts and culture, small-town renewal, heritage tourism, and economic development. Most historic preservation guidelines are established at the federal and state levels of government; it is up to local communities to promote and pursue historic preservation on the ground. Unfortunately, historic preservation efforts are often misunderstood as conflicting with present-day progress and civic development. Rather, it is an invaluable tool and community asset that balances old with new.

Source: Ford, S., & Jaouen, M. (2017). *Historic Preservation 101*. Jackson Hole Historical Society & Museum, 37(4).

What are character-defining features? Why are they important?

Historic preservation retains character-defining features; these features are specific elements of a building's structure that reflect its historic context or significance. Historic context is the role a particular building or structure played in the larger themes of history at its construction. Cultural values and trends influence architecture. Our buildings are a reflection of the priorities, ethics, and aesthetics of our ancestors. Historic significance is the relationship of the building to its context. Is it the first or only remaining example? Is there something about the construction or ownership that makes it stand apart from other buildings in the community? What would be lost if this building were to be removed?



Photo Credit: Lauren Sopher

Architectural Styles in Greensboro Bend

- Greek Revival: circa 1825-1860
- Gothic Revival: circa 1840-1880
- Stick Style: circa 1860-1890
- Shingle Style: circa 1880-1900
- Queen Anne: circa 1880-1910
- American Foursquare: circa 1900-1930

Background Information

This pamphlet was created by the authors as supplemental material to the field walk “Greensboro Bend’s Historic Gems,” led by Samantha Ford on August 15th, 2018. Sam is an alumna of the University of Vermont’s Historic Preservation Graduate Program. The walk was co-sponsored by the Greensboro Historical Society and the Greensboro Bend Revitalization Initiative. The event was a part of the Greensboro Bend Place-based Landscape Analysis and Community Engagement (PLACE) Program. The Greensboro Bend PLACE Program’s goal is to expand the community’s relationship with their surroundings through concurrent social and landscape analyses. Lauren Sopher included this work as part of her Master’s of Science degree in the Field Naturalist and Ecological Planning Program at the University of Vermont.

Silver Family Farm Barn | 189 East Main Street | circa 1860



Photo Credit: Lauren Sopher

Architectural Style: New England Barn

Character-Defining Features

- Cupolas
- Doors located on the gable end are unique to the New England barn style
- Milking shed addition, circa 1920s
- Window orientation: few on original, multiple on ground-level addition

General

The first barn type to be built in New England was the English barn. It was usually 30'x40', with few to no windows, vertical plank siding, and two doors located on the eaves sides. The doors would allow a horse and cart to pull straight through the barn, without a need to turn around. In England, these barns functioned well in their mild winters without much snow. In New England, the snow presented a new challenge for this type of structure. Every morning, farmers were forced to shovel snow away from both doorways to access the barn. A new style emerged, the New England barn, where the doors were located on the gable ends, where the snow from the roof could not block access. These were modest barns without need for surplus storage. They serviced subsistence farms, which only need to produce enough to support a family through the winter. As roads and transportation corridors improved, selling surplus at market became more common. In the 1920s, new regulations for cleanliness marked a major change in barn construction. Concrete floors, windows for ventilation and light, and a separate milking parlour were now required. The old timber-framed English and New England barn styles were either lifted up to create concrete basements or given large additions where the new materials could be implemented. This barn demonstrates the changing landscape of Vermont farming culture. The original timber frame coexists with the later concrete flooring, with cupolas added for additional ventilation.

Gile Family Home | 1128 Main Street | circa 1850-1875



Photo Credit: Lauren Sopher

Architectural Style: Greek Revival and Queen Anne

Character-Defining Features

- Front gable orientation, eaves returns
- Bay window
- Two-story porch
- Ell addition

General

This Greek Revival home incorporates a Queen Anne two-story porch and bay window. The front porch is a transitional space, where an individual can be both inside and outside. The columns are slightly decorative, meant to draw the eye to the porch without being ostentatious. These would have been a more expensive, but practical, choice for an industrious community. Preliminary research hints that this building may have housed Greensboro Bend's first library in the downstairs front room. The bay window and two-story porch would have made excellent reading locations and would have been immediately recognizable from the street.

Pope Hardware Store | 1119 Main Street | circa 1892



Photo Credit: Lauren Sopher

Architectural Style: Greek Revival

Character-Defining Features

- Large two-story front porch
- Storefront: large windows flanking door
- Projecting attic pediment with eaves returns

General

There is community value and energy in this building. It was built from local old growth wood, which can't be replicated. If the building were removed, the value and energy would be lost forever. This building closely resembles storefront architecture in Vermont (i.e., Vermont Country Store). The large two-story portico porch, large front windows, and extended attic pediment made this building stand out on the street. The porch offers respite from the elements for neighbors and visitors to exchange news or view goods within the store. This area is a natural community gathering space.

Davis' General Store | 1109 Main Street | circa 1893



Photo Credit: Lauren Sopher

Architectural Style: Greek Revival

Character-Defining Features

This building was modified to an extent where the original character-defining features are no longer defined. The large front porch was modified to enclose the upper story, the original storefront entrance and windows were removed, and a dormer was added onto the roofline. The original attic pediment remains the same, although the enclosed second-story porch makes the eaves returns difficult to see. This building now serves as a private residence and the original store-use is now hidden behind modifications necessary to change the function of the structure.

General

The store sold groceries and clothing; everyone bought woolens in the fall. In the early days, refrigeration in the store was by ice, in sawdust, which was cut from Caspian Lake. Farmers paid for their groceries with eggs; they charged 8 to 15 cents per dozen and shipped to New Hampshire and Boston. Warner Davis peddled papers for the store on the weekends; he got on the train in Greensboro Bend and also biked through Greensboro Bend, Stannard, and Walden.

From a Greensboro Historical Society interview with Warner Davis.

Devlin Family Home | 1089 Main Street | circa 1910s



Photo Credit: Lauren Sopher

Architectural Style: American Foursquare

Character-Defining Features

- Hipped roof
- Square massing
- Absence of decoration
- Eaves overhang

General

American Foursquare was a practical response to the high-styled Revival and Queen Anne houses that dominated the Victorian Era. Around 1900, the Foursquare became the most popular American architectural style. The style was known for its efficient use of space and absence of superfluous materials. It was sold in kits. Companies like Sears and Roebuck sold thousands of these house kits, with pre-cut materials and a thick instruction booklet. Options like bay windows, dormers, porch columns, and brackets could be added per the homeowner's individual taste. These extras would have cost additional money and would have been a message to neighbors that the owners had the resources to add extra elements.

Tanguay Garage | 1075 Main Street | circa 1870s



Photo Credit: Lauren Sopher

Architectural Style: Greek Revival

Character-Defining Features

- Large two-story porch
- Projecting attic portico with eaves returns
- Garage bay on first floor

General

Much like the Pope Store building, this building's use of a large, two-story portico porch and projected attic pediment demonstrates its use as a business. The large garage bay on the first floor demonstrates the building's historic use as a repair garage. The bay is located at ground level, without any steps or columns to support the second-story of the porch. Two metal poles on either end replace the original support columns; this was necessary to allow vehicle access to the front of the building. There is evidence on the north side of an original garage bay opening, but this was covered up with clapboard. The building currently serves as a residence and the garage is used for storage.

Train Station | 1066 Main Street | circa 1872



Photo Credit: Lauren Sopher

Architectural Style: Stick Style

Character-Defining Features

- Large eaves overhang
- Stick-style brackets and pseudo-framing
- Decorative stickwork frieze

General

Greensboro Bend's train station is the highest-style building on Main Street. Its original architectural features are highly intact and offer a true glimpse into what visitors in the 19th century would have seen. A train station is a building of function, this one built with a purpose to ferry passengers and goods in and out of Greensboro. The building is highly decorated, with many superfluous materials that do not serve a structural purpose. The people of Greensboro Bend wanted to make a statement about their community in this first-access-point for most visitors. This is also the only remaining intact train station on the St. Johnsbury and Lake Champlain Railroad. The interior also retains a high level of integrity—few changes have occurred to the original features.

Queen Anne Blue & White | 905 Main Street



Photo Credit: Samantha Ford

Architectural Style: Greek Revival, Gothic Revival, and Queen Anne

Character-Defining Features

- Greek Revival eaves returns and gable end orientation
- Large wrap-around front porch with shingles and doric columns
- Steep gothic gable on ell addition
- Bay window and decorative trim

General

This house displays the changing national trends in architecture. The original Greek Revival gable-front block retains the eaves returns and corner pilasters. An ell was constructed to the south, with a steeply pitched Greek Revival gable dormer. A large Queen Anne-style wrap-around front porch, with turned doric columns, was added with decorative shingles. The bay window likely dates from the Queen Anne era, with decorative upper trim. Greensboro Bend's proximity to a railroad and local sawmill allowed this small rural village the ability to regularly update their architecture; materials were easily brought in and installed. This house displays the owners' ability to update every decade or so.

The “Twins” | 855 Main Street & 862 Main Street



Photo Credit: Lauren Sopher

Architectural Style: Greek Revival, Gothic Revival, and Queen Anne

Character-Defining Features

- Steeply pitched central gable dormer
- Shingle and columned front porch
- Corner pilasters and eaves returns
- Raking cornice in gable ends

General

These two buildings present mirror images of each other and stand out on Main Street for their similarities. Their transition from Greek Revival (gable-front orientation, eaves returns, corner pilasters, and details like raked cornices in the gables), to Gothic Revival (ell with steeply pitched gable dormer), to Queen Anne (shingled front porches) demonstrates the ability of the community to access goods from the nearby railroad. For such a small rural community, Greensboro Bend was able to reflect the changing national architectural trends, on par with metropolitan areas. Although these styles were applied in a vernacular form (practical rather than ostentatious decoration), they offer a unique commentary on the priorities of the community. Bend residents demonstrated their wealth via the resources they used to decorate their homes. This was a thriving and bustling area, where attention to image was plainly visible.

Cape Cod & Classic Cottage | Throughout Greensboro Bend | circa 1800s



Photo Credit: Google Street View

Architectural Style: Cape Cod Classic Cottage

Character-Defining Features

- One to one-and-a-half story box or rectangle
- Entrance on eaves-front
- Corner pilasters
- Entablature

General

The Cape Cod house is one of the oldest building forms in New England. Originating in Cape Cod, it was an easily transferable style to any New England farm. They were easy to construct, with straightforward internal plans. They are usually one, one-and-a-half, or one-and-three-quarters story buildings. Sometimes a three-quarter second story would include knee wall windows to let in more light. These buildings are known as Classic Cottages when Greek Revival style details are present. These include: corner pilasters, full entablature, sidelights flanking front doors, and Greek Revival door and window pediments. The front entrances were located on the eaves side, rather than the gable-front like most Greek Revival buildings. Greensboro Bend has multiple modified and intact Cape Cod and Classic Cottages. They were a functional farmhouse style and were easy to maintain. Older examples include a large, dominating central chimney that would have been the structural foundation for the house.

Greensboro Bend United Methodist Church | 813 Main Street | circa 1881



Photo Credit: Preservation Trust of Vermont

Architectural Style: Gothic Revival

Character-Defining Features

- Quoins
- Gothic arch window surrounds
- Hipped roof steeple
- Shingle-clad steeple base

General

This building follows traditional church style, with the steeple projecting from the end of the building. However, the use of quoins on the corners is highly unusual. Quoins are typically used on masonry structures, or on wooden structures meant to look stone-like. In this case, their use demonstrates the community's feelings of strength and permanence in this building.

A Game Supper was held in the church every fall, starting in 1923; it was a contest between the hunters in Stannard and Greensboro Bend as to who would produce the most game for the supper.

From a Greensboro Historical Society interview with Warner Davis.

Resources

- <http://ptvermont.org>
- <http://www.placeeconomics.com>
- <https://www.nps.gov/tps/how-to-preserve/briefs.htm>
- <https://jacksonholehistory.org/wp-content/uploads/Newsletter-WINTER-2017.pdf>

Greensboro Community | Interview Themes Summary

Introduction

Lauren Sopher conducted in-person interviews with members of the Greensboro Community in 2018. Below is a summary of the themes that emerged from the interviews. For further details about this process, please refer to the other pieces within the *UVM Institutional Review Board (IRB) Process Documents* section. The content of the interviews informed the *Greensboro Bend PLACE Program Conservation Recommendations* section. Interview participants are anonymous.

Themes

Background

- “It is a pretty typical small Vermont town. One of those that if you blink, you miss it. And there’s a lot of those in Vermont.”
- “It’s really cool that it is a little valley right where we are. The river’s important—it’s right off the road. I like that it’s a little narrow passageway through. Greensboro Bend is a narrow little cocoon, if you will, with the road and the river through it, and the tracks.”
- “To me, Greensboro Bend is the birthplace of Greensboro, in a sense, because the railroad was the commerce and that’s what built our village. I think the train, the railroad, and the commerce is our heritage; it’s our history and I think we should celebrate that.”
- “I do believe that everybody needs to embrace Greensboro Bend more.”
- “We’ll be Greensboro Bend and happy and they’ll be Greensboro Village and happy, and we’ll be in the same town, happy.”

Landscape

Community members articulated their appreciation for the Silver Family Farm fields in southern Greensboro Bend, the Lamoille River, the Bend Park (Our Community Park), and the forested area of northeast Greensboro Bend as natural areas in the landscape.

- “I think we should be stewards of the land; the land is there for us to take care of, but also utilize.”
- “I hope that people are concerned about the river.”
- “The playground is, I think, one of the best things we’ve ever done.”

Historic Preservation

Residents deeply care about the preservation of historic buildings, such as the Davis' General Store, Pope Hardware Store, and Train Station.

- “The historical nature of the railroad and the importance of that community as a railroad stop: that gives people a grounding.”
- “We need to embrace the historic value of the village. And everybody embrace it, not just us that live at the bottom of the hill.”

Development

Folks would like to see development of the Lamoille Valley Lumber property, owned by David Ducharme, and the Lamoille Valley Rail Trail. Folks care about creating a balance between development and open spaces; they see a need for community gathering spaces and affordable housing.

- “Having a flow of new people come to town: new faces, new ideas, new culture—having that mix with who we are to make something better.”
- “I think development should be focused on the center of the community. I don't think we should sprawl out from the community.”
- “Doing the least harm to the environment as possible, in terms of development, although I know development is important for the future.”

Cultural

The Hunter's Breakfast, Game Supper, Chicken Pie Supper, and the Bend Block Party are important cultural events to the Greensboro community.

Socially Just Conservation Best Practices

Goal: Integrate marginalized populations into Vermont's progressive conservation agenda.

1. Begin with a mutually agreed upon project between a community and researcher or organization.
2. You, the researcher or organization, will eventually leave the community. Your role is to facilitate, not tell. To participate, not direct.
3. Do your prep work. A lot of background research is needed before you integrate into the community. For example, read the Town Plan and identify key individuals and institutions within the community.
4. Show up at any and all events you are invited to. Get to know people in the community. Build relationships. Expect to spend 6-8 weeks doing this. Actively integrate this time into your work plan. Anticipate your time spent to be 75% on people and 25% on ecology.
5. Listen (this is your gift to other people). Be patient. Be open. For example, if you are asked to buy a gallon of maple ice cream, do it.
6. Find out what sparks joy for other people. Hold onto that. Harness that.
7. Be ethical and effective throughout the project. Every organization should develop a framework for this within their mission. Have a system of checks and balances to make sure your work maintains and improves this framework. For example, create a Community Advisory Board and/or hire consulting anthropologists and geographers for projects.
8. Make decisions together. Embrace the themes and language generated by the community through interviews, surveys, focus groups, and events.
9. Create deliverables that contain action items people are capable of doing. Be realistic and avoid jargon.
10. Let go of the outcome.

Note: It took me a year to get to the point of developing this list; it is incomplete and always will be.

Source: Lauren Sopher, under the guidance of Marla R. Emery.

The Greensboro Bend PLACE Program Conservation Recommendations

Report Summary

This report presents a series of conservation recommendations arising from the work of the Greensboro Bend Place-based Landscape Analysis and Community Engagement (PLACE) Program. The Greensboro Bend PLACE Program's goal is to expand the community's relationship with their surroundings through concurrent social and landscape analyses. Lauren Sopher completed this work as part of her Master of Science degree in the Field Naturalist and Ecological Planning Program at the University of Vermont; these conservation recommendations represent her findings on opportunities to care for and use the town's natural resources.

The stories of people and the land are intertwined—one cannot be considered without the other. Through public and private conversations with community members and ecological field work, Lauren developed conservation recommendations for Greensboro Bend that fall into three major themes.

In summary:

1. **Street beautification:** use native plant species to enhance Greensboro's natural beauty.
2. **Healthy rivers:** take care of Greensboro's rivers and their adjacent lands.
3. **Forest and farms:** sustain and enhance Greensboro's working forests and farms.

Many of these recommendations apply to Greensboro at large. These practices will maintain and improve human health and safety, economic prosperity, nature and its benefits, and Greensboro's beauty for current and future generations.

Street Beautification

Use native plant species to enhance Greensboro's natural beauty.

Recommendations

1. Prioritize native species when considering new planting projects.
2. Reference the resources below to cross-check future plant purchases.

Background & Justification

Street beautification using native plants will provide aesthetic and ecological value to the community. Native herbs, vines, shrubs, and trees are critical to robust ecosystems [1, 2]. These plants thrive in the local climate and support the food and habitat needs of native wildlife, such as birds, bees, and butterflies. Non-native plant species that become invasive species have a negative impact on ecosystem health, human health, and our wallets; they disrupt forest regeneration, wildlife habitat, and recreational activities and are expensive to manage [3, 4, 5]. Planting native species is a win-win for people and the environment.

Nature, including street trees, positively impacts human health and well-being [6, 7, 8, 9, 10, 11, 12]. One researcher states, "...having natural elements or settings in the view from the window contributes substantially to residents' satisfaction with their neighborhood and with diverse aspects of their sense of well-being" [13]. For example, greenness along Main Street and within "Our Community Park" in Greensboro Bend could help promote neighborhood satisfaction, physical activity, and social cohesion [14, 15, 16].

Resources

- **Native Plants | Background Information**
 - Go Botany
Native Plant Trust
Provides users with a tool to search New England's plant species.
 - **Native Plants Species List***
Greensboro Bend Town Analysis Report
Lists native species observed in Greensboro Bend during Lauren Sopher's field work in 2018.

- New England Native Garden Plants
Native Plant Trust
Enables users to search for native plant species in our ecoregion, the Northeastern Highlands, by characteristics such as “attracts songbirds,” “salt tolerant,” and “low maintenance.”
- State of New England’s Native Plants In Brief
Native Plant Trust
Documents a comprehensive assessment of New England plant communities.
- **Native Plants | Purchase Information**
 - Native Conservation Tree and Shrub Sale
 - Contact
Orleans County Natural Resources Conservation District
Sarah Damsell, District Manager
802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net
- **Invasive Plants**
 - **Invasive Terrestrial Plants of Vermont: Guide to Identification, Prevention, and Management***
The Nature Conservancy, Vermont
Illustrates herbs, vines, shrubs, and trees that are invasive in Vermont in a durable fold-out guide.
 - Vermont Invasives
University of Vermont Extension, the Vermont Department of Forests, Parks and Recreation, the Vermont Department of Environmental Conservation, and the Nature Conservancy, Vermont
Profiles invasive terrestrial plants, forest pests, and aquatic invaders, with resources on identification, biology, management options, and Vermont distribution.

Healthy Rivers

Take care of Greensboro's rivers and their adjacent lands.

Recommendations

1. Sustain and enhance vegetated riparian buffers, ideally 100 feet wide, on either side of the Lamoille River.
2. Maintain and improve brook trout habitat in the Lamoille River and its tributaries by providing naturally stable, shaded banks and minimizing silt deposition.
3. Consider partnering with the Vermont Fish & Wildlife Department or the Vermont River Conservancy to improve public access for fishing and paddling and education about the Lamoille River.
4. Consider working with the Vermont Department of Environmental Conservation to determine if bridge upgrades along the mainstem of the Lamoille River would minimize constriction of the river and promote its natural flows.

Background & Justification

Healthy rivers support healthy people and the places they live. Flood protection, fish and wildlife habitat, clean water, and river bank stability are made possible by riparian buffers—vegetated areas that border rivers, lakes, and wetlands. Intact riparian areas help prepare us for severe storms and summer droughts, which are predicted to become more frequent and severe as a result of climate change [17]. Community planting projects, whether for street beautification or riparian buffers, present an opportunity for folks to work together on common goals.

Greensboro Bend is in the headwaters of the Upper Lamoille River. The Lamoille Tactical Basin Plan highlights three prominent stressors to the overall health of the Upper Lamoille [18], which directly impact its values to Greensboro Bend and the entire 706 square mile drainage basin of the Lake Champlain Basin. The first is flow alteration, defined as any human-induced change in the natural flow of the river, stream, lake, or reservoir levels, including Caspian and Hardwick Lakes [19]. The second is encroachment by structures, roads, railroads, improved paths, utilities, and other development into natural areas such as floodplains, river corridors, wetlands, lakes and ponds, and the buffers around these areas [20]. The third is excessive channel erosion, defined as excessive erosion that occurs in some channel locations, while excessive deposition occurs in other locations, up and down the length of a stream [21].

East Hardwick, Greensboro Bend, and Stannard have close cultural and ecological ties. The confluence of Stannard Brook and the Lamoille River is in East Hardwick, immediately downstream of the Lamoille River in Greensboro Bend. In the Lamoille River Tactical Basin Plan, Stannard Brook is highlighted as a priority sub-basin for remediation, due to encroachment, channel erosion, and land erosion. The plan proposes the following actions to address these issues: develop a stormwater management project for the town sand storage area, complete a Stream Geomorphic Assessment and river corridor plan to identify stressors and prioritize projects, and monitor. Additionally, many bridges along the Lamoille River mainstem and major tributaries are currently undersized, according to the *The Upper Lamoille River Stream Geomorphic Assessment, Phase 2 Report, Greensboro and Hardwick*, published in 2009. Addressing the remediation of Stannard Brook and the Lamoille River through a partnership between communities would bring economic and ecological benefits to the area.

An influx of recreationists in Greensboro Bend will likely follow the impending construction of the “Morristown to Greensboro” section of the Lamoille Valley Rail Trail. In south Greensboro Bend, a portion of the west bank of the Lamoille River is managed by the Vermont Fish and Wildlife Department for the purpose of public access, especially fishing.

Brook trout in particular hold cultural, recreational, and ecological value in Greensboro. The upland streams of the Lamoille River Watershed supply cold water to the mainstem. These small streams provide habitat for self-sustaining native brook trout, as well as blacknose and longnose dace, creek chubs, longnose suckers, and slimy sculpins [22]. There is an opportunity for private landowners, the Fish & Wildlife Department, and a partnering organization, such as the Orleans County Natural Resources Conservation District, to work together on a restoration project that supports healthy rivers and a healthy community.

Resources

- **Riparian Buffer Restoration Projects**

- Native Conservation Tree and Shrub Sale

Enables people to purchase plants that are native to Vermont.

- **Contact**

Orleans County Natural Resources Conservation District

Sarah Damsell, District Manager

802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net

- **Quick Guide for Waterfront Landowners***

Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources

Provides background information about the importance of riparian areas—ideal for landowners with properties adjacent to a stream, lake, or wetland.

- Riparian Buffers and Corridors Technical Papers
Vermont Agency of Natural Resources
Explains the function and value of 100-foot buffers.
- The Lake Champlain Basin Atlas
Provides resources about the Lake Champlain Basin, including interactive maps and educational fact sheets.
- The Lamoille River Tactical Basin Plan
Assesses the health of the Lamoille River Basin and outlines current and future actions and strategies to address its major stressors.
- Trees for Streams
Supports people in planting vegetated buffers along streams—ideal for landowners with riverside property.
 - **Contact**
Orleans County Natural Resources Conservation District
Sarah Damsell, District Manager
802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net
- **Bridge Upgrades**
 - The Upper Lamoille River Stream Geomorphic Assessment, Phase 2 Report, Greensboro and Hardwick
Caledonia County Natural Resources Conservation District
Outlines recommendations for the section of the Lamoille River in Greensboro Bend, including a Bridge and Culvert Assessment of the Upper Lamoille River.
 - **Contact**
Department of Environmental Conservation, Vermont Agency of Natural Resources
Danielle Owczarski, Watershed Coordinator
802-490-6176 | danielle.owczarski@vermont.gov
- **Brook Trout Habitat**
 - The Vermont Partners Program
Helps to restore wetland, riparian, in-stream, and upland habitats.
 - **Contact**
U.S. Fish and Wildlife Service
Lake Champlain Fish and Wildlife Conservation Office
Chris Smith, Fish and Wildlife Biologist
802-662-5303 | chris_e_smith@fws.gov
 - Vermont Trout in the Classroom
Supports students in raising brook trout from eggs in their classroom and releasing them into a state-approved stream.

- **Contact**
Trout Unlimited
Joe Mark, Lead Facilitator
802-236-3816 | joe.mark@castleton.edu

- **Public Access and Education**

- **Contact**
Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources
Will Eldridge, Aquatic Habitat Biologist
802-585-4499 | william.eldridge@vermont.gov
- **Contact**
Vermont River Conservancy
Richarda Ericson, Development and Outreach Director
802-229-0820 | vrc@vermontriverconservancy.org

Forests & Farms

Sustain and enhance Greensboro's working forests and farms.

Forests | Recommendations

1. Community initiatives work with the priorities of individual landowners.
2. Community initiatives support landowners who are interested in maintaining and improving the ecological value of their property.
3. Consider forest blocks and wildlife connectivity in town planning decisions.
4. Support residents' stated value of Greensboro Bend's undeveloped character by considering the creation of a town forest.

Farms | Recommendations

1. Community initiatives work with the priorities of individual landowners.
2. Community initiatives support efforts to integrate ecological considerations into farm management decisions, such as planting riparian buffers.

Background & Justification

Forests and farms define Vermont's landscape—this also is true for Greensboro. The forested section of northeast Greensboro Bend and the fields of south Greensboro Bend were consistently identified as areas that folks valued for their undeveloped character. There are voluntary opportunities for private landowners to manage their land in an undeveloped state, with the support of local, state, and federal resources.

Greensboro Bend is located in the biophysical region of Vermont known as the Northern Vermont Piedmont. The region is characterized by hills and rivers, a moderate climate—cooler and moister than the Champlain Valley and warmer and drier than the Northern Green Mountains—and fertile soils derived from calcium-rich bedrock. These factors influence the assemblage of plants and animals found in Greensboro Bend [23].

Forests

Two forest types, Lowland Spruce-Fir Forest [24] and Northern Conifer Floodplain Forest (or Boreal Floodplain Forest) [25], are highlighted in these recommendations for the following reasons:

- These forests are distinctive upland (Lowland Spruce-Fir Forest) and wetland (Northern Conifer Floodplain Forest) communities in Greensboro Bend.
- These forests are either large in area (Lowland Spruce-Fir Forest) or readily visible to the public via the Lamoille Valley Rail Trail, Vermont Route 16, and Main Street.
- The Northern Conifer Floodplain Forest has large restoration potential.
- The Northern Conifer Floodplain Forest has an S2 state rank—defined by the Vermont Natural Heritage Inventory as rare in the state, occurring at a small number of sites or occupying a small total area in the state [26].

Lowland Spruce-Fir Forest

This forest is characterized by the following plants:

Trees	
Abundant Species	Occasional Species
<ul style="list-style-type: none"> - Balsam fir - Red spruce 	<ul style="list-style-type: none"> - Black spruce - Northern white cedar - Paper birch - Red maple - Tamarack - White pine - White spruce - Yellow birch
Herbs	
Abundant Species	Occasional Species
<ul style="list-style-type: none"> - Bluebead lily - Bunchberry - Common wood sorrel - Intermediate wood fern - Shining clubmoss - Whorled aster 	<ul style="list-style-type: none"> - Canada mayflower - Goldthread - Pink lady's slipper - Twinflower

This forest is associated with the following animals:

Animals	
Mammals	Birds
<ul style="list-style-type: none"> - Deer mouse - Fisher - Moose - Porcupine - Red fox - Red squirrel - Southern red-backed vole - White-tailed deer 	<ul style="list-style-type: none"> - Blackpoll warbler - Red-breasted nuthatch - Ruby-crowned kinglet - Swainson's thrush - Yellow-bellied flycatcher - Yellow-rumped warbler

Northern Conifer Floodplain Forest (or Boreal Floodplain Forest)

This forest is characterized by the following trees:

Trees	
Abundant Species	Occasional Species
<ul style="list-style-type: none"> - Balsam fir - Balsam poplar - Black ash - Black cherry - Northern white cedar - White spruce - Yellow birch 	<ul style="list-style-type: none"> - Red maple - Silver maple
Herbs	
Abundant Species	
<ul style="list-style-type: none"> - Ostrich fern - Sensitive fern 	

This forest is associated with the following animals:

Animals	
Mammals	Birds
<ul style="list-style-type: none"> - American beaver - Mink - Raccoon - River otter 	<ul style="list-style-type: none"> - American woodcock - Canada warbler - Common merganser - Hooded merganser - Ruffed grouse - Yellow warbler - Wood duck

Alluvial Shrub Swamp

This community is related to the Northern Conifer Floodplain Forest. It is distinguished by the dominance of shrubs.

This community is characterized by the following plants:

Trees
Abundant Species
<ul style="list-style-type: none">– Black willow– Boxelder
Shrubs
Abundant Species
<ul style="list-style-type: none">– Speckled alder
Herbs
Abundant Species
<ul style="list-style-type: none">– Ostrich fern

This community is associated with the following animals:

Animals	
Mammals	Birds
<ul style="list-style-type: none">– American beaver– Mink– Muskrat– River otter	<ul style="list-style-type: none">– Alder flycatcher– Common yellowthroat– Gray catbird– Veery– Yellow warbler

Birds are significant indicators of ecosystem health. The Birder's Dozen represents 12 of the 40 forest birds that the Audubon Vermont Forest Bird Initiative is working to protect. Five of the Birder's Dozen were seen or heard in Greensboro Bend during Lauren Sopher's field season in 2018: black-throated green warbler, chestnut-sided warbler, veery, white-throated sparrow, and wood thrush. These birds are easy to identify by sight or sound, use a variety of forest types for feeding and breeding, and in one case—the wood thrush—show long-term declines in their global populations.

Forest blocks, wildlife connectivity blocks, and riparian networks in Greensboro Bend are locally and regionally important. Forest blocks, defined as areas of contiguous forest that are unfragmented by roads, development, or agriculture, support ecological functions, such as air and water quality and predator-prey relationships. Wildlife connectivity blocks are a network of forest blocks that provide terrestrial connectivity across Vermont, adjacent states, and Canada; they support the ability of wide-ranging animals to move across their range and supply suitable habitat for plants and animals in the face of climate change. Riparian networks, defined as lakes, rivers, streams, and ponds and their associated corridors, allow species to travel along corridors to find suitable habitat and provide habitat for wildlife that heavily rely on riparian areas for survival, including beaver, otter, and mink [27].

Farms

The undeveloped character of Greensboro's agricultural land reflects its rural traditions. Productive, affordable agricultural land can go hand-in-hand with the protection of its ecological value.

Two Important Farmland soil types, Prime Farmland (Prime) and Additional Farmland of Statewide Importance (Statewide), defined by the USDA Natural Resources Conservation Service, Vermont, predominate in Greensboro Bend [28]. These soils are the foundation for the community's fertile croplands and pastures.

The farms of Greensboro present numerous voluntary opportunities for landowners to sustain and enhance their land. Recognition of ecological functions, paired with what folks value—the undeveloped character of the land—enables landowners and the community to make informed decisions about their natural resources for current and future generations.

Forests | Resources

- **Backyard Woods Program**

Vermont Urban & Community Forestry

Helps landowners who own between 5 and 25 acres understand why their backyard woods matter in a six-week online program that incorporates activities, discussion forums, videos, webinars, and field walks.

- **Foresters for the Birds**

Audubon Vermont and the Vermont Department of Forests, Parks and Recreation

Assists voluntary landowners to integrate the practices of timber and songbird habitat management.

- **Contact**

Jared Nunery, Orleans County Forester

802-586-7711 ext.169 | jared.nunery@vermont.gov

- **Use Value Appraisal Program—“Current Use”**

Vermont Department of Forests, Parks and Recreation, Vermont Agency of Natural Resources

Enables eligible private lands where owners practice long-term forestry or agriculture to be appraised based on the property’s value of production of wood or food rather than its residential or commercial development value.

- **Contact**

Jared Nunery, Orleans County Forester

802-586-7711 ext.169 | jared.nunery@vermont.gov

- **Vermont Conservation Design**

Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources

Identifies areas of ecological priority across Vermont’s landscape at different scales.

- **BioFinder**

Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources

Displays the Vermont Conservation Design data via an online mapping tool.

- **Contact**

Jens Hawkins-Hilke, Conservation Planner

802-461-6791 | jens.hilke@vermont.gov

- **Vermont Coverts**

Nonprofit

Enables landowners to make well-informed decisions that meet their forest management goals and enhance diverse wildlife habitat and healthy ecosystems.

- **Contact**

802-877-2777 | info@vtcoverts.org

- **Vermont Woodlands Association**

Nonprofit

Advocates for the management, sustainability, perpetuation, and enjoyment of forests through the practice of excellent forestry.

Farms | Resources

- **Conservation Reserve Enhancement Program (CREP)**
Helps voluntary landowners retire cropland into protective vegetation.
 - **Contact**
Vermont Agency of Agriculture, Food & Markets
Ben Gabos, CREP Coordinator
802-461-3814 | ben.gabos@vermont.gov
- **Environmental Quality Incentives Program (EQIP)**
Supports voluntary agricultural producers in a manner that promotes agricultural production and environmental quality as compatible goals.
 - **Contact**
U.S. Department of Agriculture
Natural Resources Conservation Service (NRCS) Vermont
Newport Service Center
Sarah Damsell, District Manager
802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net
- **Farmland Access Program**
Connects farmers with affordable farmland.
 - **Contact**
Vermont Land Trust
Jon Ramsay, Director of Farmland Access Program
802-533-7705 | jramsay@vlt.org
- **The Vermont Farmland Conservation Program**
Focuses on retaining quality agricultural land in strong farming regions of the state.
 - **Contact**
Vermont Housing and Conservation Board
Nancy Everhart, Farmland Conservation Director
802-828-5066 | nancy@vhcb.org

* Hard copies available at the Greensboro Free Library

UVM Institutional Review Board (IRB) Process Documents

Information Sheet

The Greensboro Bend PLACE Program

Place-based Landscape Analysis & Community Engagement

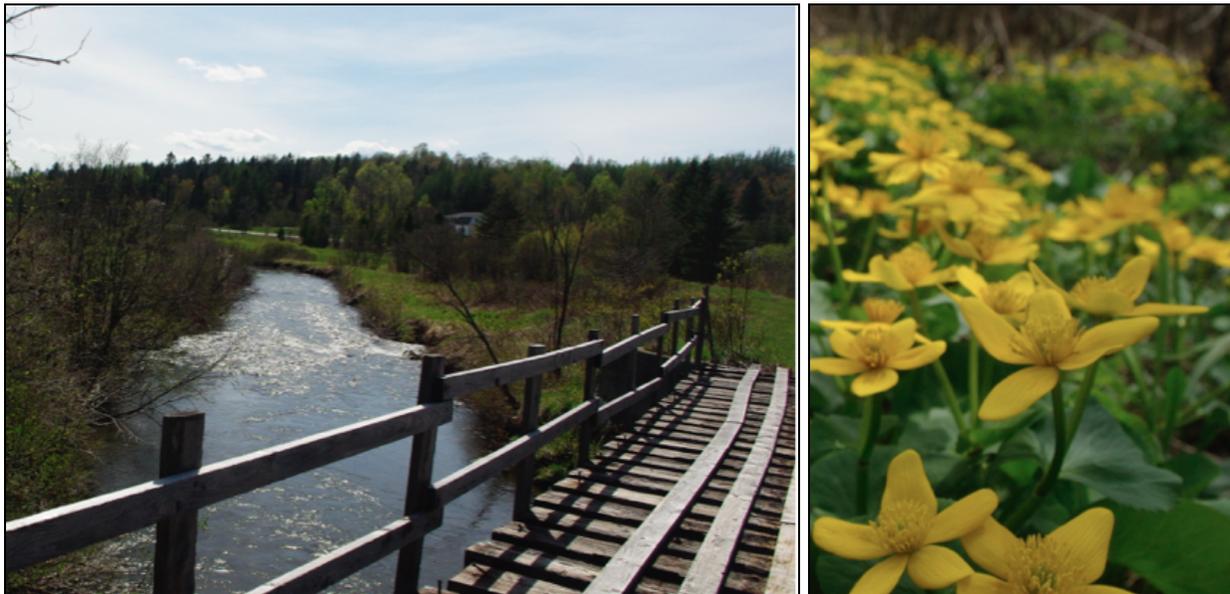


Photo Credits: Lauren Sopher

Introduction

Thank you for your interest in the PLACE Program in Greensboro Bend. The program is a forum for Vermont towns to explore their natural and cultural history. The University of Vermont partners with local residents and organizations to provide resources that celebrate and deepen a community's relationship with their landscape.

The Greensboro Bend PLACE Program combines social and landscape analyses to expand the community's ties with their surroundings. As a Greensboro resident and/or business owner, your knowledge of Greensboro Bend is invaluable to this project.

This research project is carried out in collaboration between Lauren Sopher, a master's student in the Field Naturalist & Ecological Planning Program at the University of Vermont, and her project sponsor, the Greensboro Conservation Commission. Lauren's Faculty Sponsor, Marla Emery, is a U.S. Forest Service Research Geographer.

Purpose

This project seeks to:

- Understand participants' personal relationships with Greensboro Bend, knowledge of nature in the Bend, and thoughts about planning for its future conservation and development.
- Assess the landscape through ecological and human history lenses.
- Provide community members with the opportunity to engage with Greensboro Bend's landscape through various learning opportunities and equip community members with tools and resources that support their relationship with the landscape beyond the timeline of this project.
- Integrate socio-economic and ecological considerations into conservation recommendations for Greensboro Bend.

Project Procedures

If you take part in the project, you will be asked to participate in an in-person interview in July or August of 2018. The interview will take about one hour. You will be asked questions such as, "What story would you tell someone about Greensboro Bend who has never been here before?" and, "How would you describe the Greensboro Bend landscape?"

Benefits & Risks

As a participant in this research project, there may be direct benefits to you, and information from this project may benefit other people now or in the future.

I will do my best to protect the information I collect from you during this project.

Confidentiality

All information collected about you during the course of this project will be stored with a code name or number so that I am able to match you to your answers. A master list of participants will be kept separate from identifiable information until December of 2018. Only the researcher, Lauren Sopher, will have access to participants' information.

Costs & Compensation

There will be no cost to you for participation in this research project. You will not be paid for taking part in this project.

Voluntary Participation & Withdrawal

Taking part in this research project is voluntary. If you agree to participate, you are free to not answer any questions and to withdraw at any time. Upon early withdrawal, previously collected identifiable information will be deleted from technological devices and hard copies will be disposed of.

Questions?

If you have any questions or concerns about this project, please feel free to contact Lauren Sopher at lauren.sopher@uvm.edu.

If you have questions or concerns about your rights as a research participant, please contact the University of Vermont's Director of the Research Protections Office at (802) 656-5040.

Interview Questions

Part One

Thanks for your time and willingness to chat about Greensboro Bend. You're a local, and I'm here to listen to your thoughts about this place. There are two parts to the interview, each about ten questions long. The first section relates to your personal relationship with Greensboro Bend and the second section to your knowledge of nature in the Bend and your thoughts on planning for its future conservation and development. So, let's begin with your personal relationship with the Bend.

1. *What story would you tell someone about Greensboro Bend who has never been here before?
2. *What's important to you about your relationship with this place?
3. Where do you like to spend time outside in Greensboro Bend, Greensboro, and surrounding communities?
 - a. Through what activities?
 - b. Where do kids spend time outside?
4. *Has this area changed during the time you've lived and/or worked here?
5. *What are some highlights about the history of this place?
6. What are some cultural activities or events that take place in Greensboro Bend?
7. How would you describe Greensboro Bend's community identity?
 - a. Has it changed?
8. How would you describe your and your family's well-being (economic well-being, health, political empowerment, education)?
9. Where did you grow up?
10. Where do you live now?
 - a. If Greensboro Bend, how long have you lived in the Bend?
11. When asked where you're from, what place do you usually name?

Part Two

We've reached the second half of the interview. Please let me know if you'd like to take a break (drink of water, stretch). I'm interested in your knowledge of nature in Greensboro Bend and your perspective on planning for its future conservation and development. The goal of this project is to contribute your input and that of others to the conservation planning process.

12. How would you describe the Greensboro Bend physical landscape/countryside? What are some places in it that are important to you? What are they like? Are there any stories or information about them you can share?
13. Is there any part of the Greensboro Bend landscape you are curious about or would like to learn more about? If so, what would that be?
14. What would a revitalized Greensboro Bend look like to you?
15. What areas do you think should be developed in Greensboro Bend?
 - a. What kind of development?
16. And what areas do you think should remain undeveloped?
 - a. What would undeveloped areas benefit from (plantings, beautification, public access)?
17. What are your thoughts about conservation in Greensboro Bend?
 - a. What are the best ways to involve you and your community in conservation planning that meets your needs?
18. Earlier, you described Greensboro Bend's present day identity. What parts would you like to keep? Change?
19. Earlier, you were also kind enough to tell me something about your social well-being. How could concern for your well-being and that of your family and community be taken into account in conservation planning for Greensboro Bend?
20. How do you foresee the gap being bridged between Greensboro Village and Greensboro Bend?
21. How can my analysis of Greensboro Bend's landscape best serve you and the community?
22. Do you fish, swim, or otherwise spend time at the Lamoille River? The Lamoille Valley Rail Trail? If yes, how?
23. Do you have knowledge or skills you would like to share as part of this project?
24. Is there anyone else in the community that you think I should talk to?
25. Is there anything you'd like to let me know about Greensboro Bend that I didn't touch on in my questions?

*Source:

Bussey, J., Davenport, M.A., Emery, M.R., and Carroll, C. (2016). A Lot of It Comes from the Heart: The Nature and Integration of Ecological Knowledge in Tribal and Nontribal Forest Management. *Journal of Forestry*, 114(2), 97-107. <https://doi.org/10.5849/jof.14-130>

Recruitment Scripts

Phone

Individuals I *have not* met:

Hello, [recruit's name]. My name is Lauren Sopher; I got your name from [Greensboro community member]. Do you have a few minutes to chat?

If *no*: Is there a better time that I can reach you?

If *yes*:

I am a current graduate student at the University of Vermont studying the cultural and natural history of Greensboro Bend. I'm interested in learning about your personal relationship with Greensboro Bend, your knowledge of nature in the Bend, and your thoughts on planning for its future conservation and development. The project's goal is to expand the community's relationship with their surroundings through social and landscape analyses. As a resident and/or business owner, your knowledge of Greensboro Bend would be invaluable to this project.

That being said, would you be willing to participate in an in-person interview that's about an hour long? There are two parts to the interview, each about ten questions long. The first section relates to your personal relationship with Greensboro Bend and the second section to your knowledge of nature in the Bend and your thoughts on planning for its future conservation and development.

If recruits ask for more information, I will read off of, email, or provide a hard copy of the "Information Sheet."

If *no*: Okay, thank you for your time. Take care.

If *yes*: Great, thank you so much. I am scheduling interviews over the next ___ weeks. What dates and times work best for you?

Individuals I *have* met:

Hi, [recruit's name],

This is Lauren Sopher, the graduate student studying Greensboro Bend. How are you? Do you have a few minutes to chat? As part of my study of the cultural and natural history of Greensboro Bend, I'm conducting in-person interviews with community members. As a resident and/or business owner, your knowledge of Greensboro Bend would be invaluable to this project.

Would you be willing to participate in an in-person interview that's about an hour long?

If recruits ask for more information, I will read off of, email, or provide a hard copy of the "Information Sheet."

If *no*: Okay, thank you for your time. Take care.

If *yes*: Great, thank you so much. I am scheduling interviews over the next ___ weeks.

What dates and times work best for you?

Email

Individuals I *have not* met:

Hi, [recruit's name],

My name is Lauren Sopher; I got your name from [Greensboro community member].

I am a current graduate student at the University of Vermont studying the cultural and natural history of Greensboro Bend. I'm interested in learning about your personal relationship with Greensboro Bend, your knowledge of nature in the Bend, and your thoughts on planning for its future conservation and development. The project's goal is to expand the community's relationship with their surroundings through social and landscape analyses. As a resident and/or business owner, your knowledge of Greensboro Bend would be invaluable to this project.

For more details about the project, please read the attached document.

Would you be willing to participate in an in-person interview that's about an hour long? There are two parts to the interview, each about ten questions long. The first section relates to your personal relationship with Greensboro Bend and the second section to your knowledge of nature in the Bend and your thoughts on planning for its future conservation and development.

If you would like to participate, please let me know at this email: lauren.sopher@uvm.edu, and we can schedule a time that is most convenient for you. I am scheduling interviews over the next ___ weeks.

Thank you for your consideration,
Lauren

Individuals I *have* met:

Hi, [recruit's name],

I hope this email finds you well.

As part of my study of the cultural and natural history of Greensboro Bend, I'm conducting in-person interviews with community members. As a resident and/or business owner, your knowledge of Greensboro Bend would be invaluable to this project. Would you be willing to participate in an in-person interview that's about an hour long?

For details about the project, please read the attached document.

If you would like to participate, please let me know at this email: lauren.sopher@uvm.edu, and we can schedule a time that is most convenient for you. I am scheduling interviews over the next ___ weeks.

Thank you for your consideration,
Lauren

In-person

Individuals I *have* met:

Hi, [recruit's name],

As part of my study of the cultural and natural history of Greensboro Bend, I am scheduling in-person interviews with community members. Your knowledge of Greensboro Bend would be invaluable to this project. Would you be willing to participate in an in-person interview that's about an hour long? Please feel free to take some time to think about it (hand recruit "Information Sheet").

If *no*: Okay, great to see you. Take care.

If *yes*: Great, thank you so much. I am scheduling interviews over the next ___ weeks. What dates and times work best for you? If you don't know off-hand, please email me at lauren.sopher@uvm.edu (listed on the "Information Sheet"). Thank you and take care.

Curriculum Guide for Lakeview Union School



Photo Credit: Lauren Sopher

Summary

Student Survey Results | 2017

Students want more:

1. Outside time and movement
2. Science
3. Math

Topics of Interest

- The Lamoille River
- Wildlife
- Human History
 - Native American History
 - Greensboro Bend History
 - Railroad

Resources

- Parella, D. (1995). *Project Seasons: Hands-On Activities for Discovering the Wonders of the World*. Shelburne, Vermont: Shelburne Farms.
- Schutsky, K., Kaufman, S., & Signell, S. (2006). *The ABCs of Ecology: An Educator's Guide to Learning Outside*. Saco, Maine: Ecology Education, Inc.
- University of Vermont PLACE (Place-based Landscape Analysis and Community Engagement) Program Town Analysis Report on Greensboro Bend:
<https://www.uvm.edu/place/towns/index.php>

Compiled by Lauren Sopher

Package One | Water

Field Trip Location

Lamoille River, Greensboro Bend—along the Rail Trail

Activity Suggestion

Lamoille River Watershed Relay | The ABCs of Ecology | Page 191

Goal: To introduce students to the travels of water through their watershed.

Grade Level: 2-4

Group Size: 10-12 students per group

Estimated Time: 20 minutes

Materials

- Two buckets (fill one with water)
 - Full bucket: headwaters of the Lamoille River (Horse Pond, Greensboro)
 - Empty bucket: mouth of the Lamoille River (Malletts Bay, Lake Champlain, Milton)
- Large sponge (wetlands)
- 8-ounce yogurt container with holes punched in the bottom
- Film canisters filled with “pollution” (sand, dirt, oil)

Questions

- Where did the water go?
- How might towns or ecosystems contribute pollution to a river?
- Did as much water end up at the mouth of the river as what started out at the headwaters?

Credit

Schutsky, K., Kaufman, S., & Signell, S. (2006). *The ABCs of Ecology: An Educator’s Guide to Learning Outside*. Saco, Maine: Ecology Education, Inc.

Other Activity

- *Water Use and Misuse* | The ABCs of Ecology | Page 213
 - **Goal:** For students to examine the many ways humans use water. To understand water as a potentially limited resource.

Package Two | Plants

Field Trip Locations

Lakeview Union Schoolyard, Caspian Lake, or Barr Hill Natural Area

Activity Suggestion

Meet A Tree | The ABCs of Ecology | Page 126

Goal: To get students to take a closer “look” at trees using senses other than sight.

Grade Level: K-4

Group Size: 2 students per group

Estimated Time: 7 minutes per student, 15 minutes total

Materials: Blindfolds (strips of cloth)

Questions

- What distinguishes one tree from another?
- Does the bark of your tree feel differently than the bark of your partner’s tree?
- What adjectives would you use to describe your tree?

Credit

Schutsky, K., Kaufman, S., & Signell, S. (2006). *The ABCs of Ecology: An Educator’s Guide to Learning Outside*. Saco, Maine: Ecology Education, Inc.

Other Activities

- *Build a Tree* | The ABCs of Ecology | Pages 138-140
 - Goal: For students to learn the function of a tree and its parts.
- *Schoolyard Field Guide* | The ABCs of Ecology | Pages 174-175
 - Goal: To create a field guide that illustrates the trees, shrubs, and herbaceous plants that live around your schoolyard.

Package Three | Wildlife

Field Trip Location

Greensboro Bend—along the Rail Trail

Community Connection

Mark Snyder

Activity Suggestion

Pitter Patter | Project Seasons | Pages 157-162

Goal: Students will learn to observe animals by studying their tracks and will understand how animals can be grouped according to the way they move.

Grade Level: 1-5

Group Size: Entire class

Estimated Time: 20 minutes

Materials

- Track Pattern Cards (Page 161)
- String
- Rolls of paper or window shades

Credit

Parella, D. (1995). *Project Seasons: Hands-On Activities for Discovering the Wonders of the World*. Shelburne, Vermont: Shelburne Farms.

Other Activities

- *Basement Windows* | The ABCs of Ecology | Page 151
 - Goal: To examine the “basement” of the forest—what goes on under logs and in the soil.
- *Create a Cold Weather Creature* | The ABCs of Ecology | Pages 47-49
 - Goal: For students to understand the many adaptations needed to survive a cold climate.
- *Trout in the Classroom* | Sponsored by Trout Unlimited, Vermont Chapter
 - Grade Level: 4-6
 - Websites
 - <http://vermonttroutintheclassroom.weebly.com/>
 - <http://www.troutintheclassroom.org/>
 - Point People
 - Joe Mark, Lead Facilitator for Trout in the Classroom in Vermont

- Email: joe.mark@castleton.edu | (H) 802-468-5479 | (C) 802-236-3816
 - Tom Jones, Vermont Fish & Wildlife Department
 - Email: tom.jones@vermont.gov
 - Jay Modry, Hazen Union Biology Teacher | Potential partner, but not yet involved with Trout in the Classroom
 - Email: jmodry@ossu.org
- Paperwork
 - Typically due mid-November
- Funding for Equipment
 - Year One: ~\$1,200.00
 - Thereafter: ~\$75.00-\$100.00/year
- Resources
 - Manuals: <http://vermonttroutintheclassroom.weebly.com/tic-manuals.html>
- Workshop
 - Mandatory for teachers and volunteers involved in the project
 - Typically the first week of November
 - There is no fee

Package Four | Human History

Field Trip Location

Lamoille Valley Lumber and the Train Station, Greensboro Bend

- Students have the opportunity to visit Lamoille Valley Lumber in Greensboro Bend, owned and operated by David Ducharme.
- David will describe how a tree goes from living in a forest to becoming a forest product, through the examples of lumber, mulch, and spruce cambium-wrapped cheese (Harbison, Jasper Hill Creamery).
- Sawmills have a deep history in Greensboro Bend. In 1869, there was a desire to build a sawmill in the Bend. James Simpson, Henry Tolman, and Joseph Delano asked the town to support rail through the Bend; the town agreed to an \$18,000 bond. This section was known as the St. Johnsbury and Lake Champlain Railroad. The name of Greensboro Bend originates from the seven-mile loop that detoured from the planned Walden to Hardwick track, to include the Upper Lamoille Valley.

Community Connection

David Ducharme and Mark Snyder

Activity Suggestion

The Giving Tree | Project Seasons | Pages 109-110

Goal: Students will discover how all of the parts of a tree (leaves, wood, bark, roots, flowers, fruits, seeds, and sap) are used to make a variety of products, through a class brainstorm and relay race. They will learn what forest products are developed in their “backyards” and how this industry relates to their community’s history.

Grade Level: 2-6

Group Size: Entire class

Estimated Time: 30 minutes

Materials

- Tree product cards placed in a brown bag
 - Photos glued on index cards
 - Leaves: tea, carnauba wax, henna
 - Wood: firewood, mulch, paper products (toilet paper, books, egg cartons), pencils, furniture
 - Bark: cinnamon, corkboard
 - Roots: root beer (sassafras tree)
 - Flowers: perfume

- Fruits: apple, banana, chocolate
 - Seeds: rice, sesame seeds, oats
 - Sap: maple syrup, rubber products (latex gloves, chewing gum), paint
- Eight “Tree Part Props,” representing each part of the tree
- Nine containers: one container for each of the eight tree parts, and one container for “Items Not Made From Trees”

Other Activities

- Have students conduct a tree product inventory in their homes by surveying a room for products made from trees.
- *Time Lines* | The ABCs of Ecology | Page 87
 - Goal: To create a visual aid for understanding the human history of Greensboro Bend, from Native Americans to the present day.
- *Field Guide to Humans* | The ABCs of Ecology | Pages 51-52
 - Goal: To highlight important people in Greensboro Bend’s history.

Credit

Parella, D. (1995). *Project Seasons: Hands-On Activities for Discovering the Wonders of the World*. Shelburne, Vermont: Shelburne Farms.

Community Events & Field Walks



BEND BLOCK PARTY
2ND ANNUAL

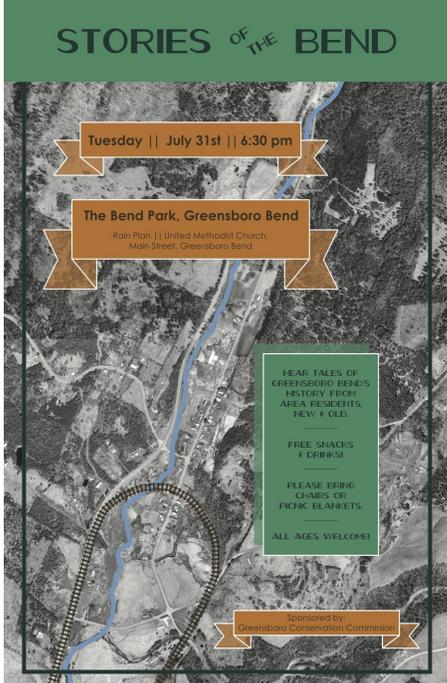
FRIDAY - JULY 27TH - 6:00 PM
The Bend Park, Greensboro Bend

COMMUNITY POTLUCK
Free burgers, hot dogs, and ice cream!

PLEASE BRING
A dish to share, and chairs or picnic blankets.

FUN
Music, games, and conversation!

Sponsored by the Greensboro Recreation Committee and the Greensboro Bend Revitalization Initiative.



STORIES OF THE BEND

Tuesday || July 31st || 6:30 pm

The Bend Park, Greensboro Bend
Rain Plan || United Methodist Church, Main Street, Greensboro Bend

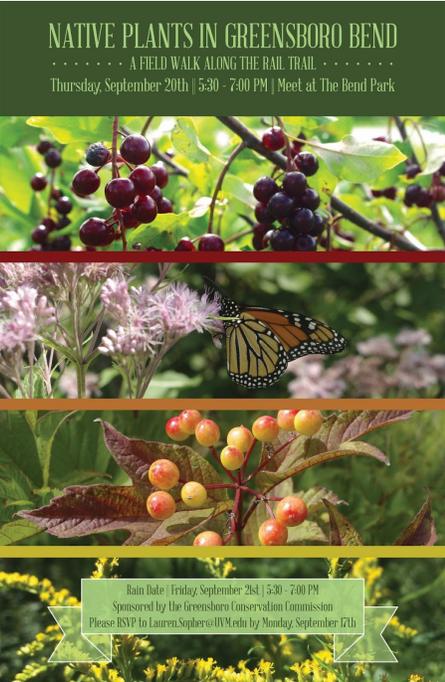
HEAR TALES OF GREENSBORO BEND'S HISTORY FROM AREA RESIDENTS, NEW & OLD.

FREE SNACKS & DRINKS!

PLEASE BRING CHAIRS OR PICNIC BLANKETS.

ALL AGES WELCOME!

Sponsored by:
Greensboro Conservation Commission



NATIVE PLANTS IN GREENSBORO BEND
..... A FIELD WALK ALONG THE RAIL TRAIL
Thursday, September 20th | 5:30 - 7:00 PM | Meet at The Bend Park

Rain Date | Friday, September 21st | 5:30 - 7:00 PM
Sponsored by the Greensboro Conservation Commission
Please RSVP to Lauren.Sopher@UVM.edu by Monday, September 17th



GREENSBORO BEND PLACE PROJECT
Community Presentation
Thursday, November 1st || 7 PM || St. Michael's Hall, Greensboro Bend

This project is sponsored by the Greensboro Conservation Commission, The Association of Vermont Conservation Commission Funds, the Greensboro Conservation Fund, and the Greensboro United Church of Christ. Residents Fund generally provided supporting funds. This presentation is funded by the Greensboro Planning Commission.

Poster Designs: Lauren Sopher

Species List

This is a list of species in Greensboro Bend based on field observations gathered by Lauren Sopher and colleagues in 2018. Context for this list can be extracted from the sections on *Bedrock Geology, Surficial Geology, Soils, Hydrology, Natural Communities, and Wildlife.*

Trees

Native Species	
Common Name	Scientific Name
American elm	<i>Ulmus americana</i>
Balsam fir	<i>Abies balsamea</i>
Balsam poplar	<i>Populus balsamifera</i>
Black ash	<i>Fraxinus nigra</i>
Black cherry	<i>Prunus serotina</i>
Black spruce	<i>Picea mariana</i>
Boxelder	<i>Acer negundo</i>
Choke cherry	<i>Prunus virginiana</i>
Eastern white pine	<i>Pinus strobus</i>
Gray birch	<i>Betula populifolia</i>
Hawthorn	<i>Crataegus sp.</i>
Mountain maple	<i>Acer spicatum</i>
Northern white cedar	<i>Thuja occidentalis</i>
Paper birch	<i>Betula papyrifera</i>
Pin cherry	<i>Prunus pensylvanica</i>
Quaking aspen	<i>Populus tremuloides</i>
Red maple	<i>Acer rubrum</i>
Red spruce	<i>Picea rubens</i>

Sugar maple	<i>Acer saccharum</i>
Tamarack	<i>Larix laricina</i>
White spruce	<i>Picea glauca</i>
Willow	<i>Salix</i> sp.
Yellow birch	<i>Betula alleghaniensis</i>
Non-Native Species	
Cultivated apple	<i>Malus pumila</i>
Invasive Species	
Amur maple	<i>Acer ginnala</i>

Shrubs

Native Species	
Common Name	Scientific Name
Alternate-leaved dogwood	<i>Swida alternifolia</i>
Beaked hazelnut	<i>Corylus cornuta</i>
Blueberry	<i>Vaccinium</i> sp.
Highbush-cranberry	<i>Viburnum opulus</i>
Red elderberry	<i>Sambucus racemosa</i>
Red-osier dogwood	<i>Swida sericea</i>
Red raspberry	<i>Rubus idaeus</i>
Rosy meadowsweet	<i>Spiraea tomentosa</i>
Serviceberry	<i>Amelanchier</i> sp.
Speckled alder	<i>Alnus incana</i>
White meadowsweet	<i>Spiraea alba</i>
Withe-rod	<i>Viburnum nudum</i>

Invasive Species	
Honeysuckle	<i>Lonicera</i> sp.

Herbs

Native Species	
Flowering	
Common Name	Scientific Name
Awl-fruited sedge	<i>Carex stipata</i>
Bloodroot	<i>Sanguinaria canadensis</i>
Blue cohosh	<i>Caulophyllum thalictroides</i>
Bulrush	<i>Scirpus</i> sp.
Bunchberry	<i>Chamaepericlymenum canadense</i>
Calico American-aster	<i>Symphotrichum lateriflorum</i>
Canada goldenrod	<i>Solidago canadensis</i>
Canada lily	<i>Lilium canadense</i>
Canada-mayflower	<i>Maianthemum canadense</i>
Common milkweed	<i>Asclepias syriaca</i>
Common selfheal	<i>Prunella vulgaris</i>
Common strawberry	<i>Fragaria virginiana</i>
Common yellow wood sorrel	<i>Oxalis stricta</i>
Common wrinkle-leaved goldenrod	<i>Solidago rugosa</i>
Common yarrow	<i>Achillea millefolium</i>
Doll's-eyes	<i>Actaea pachypoda</i>
Dwarf raspberry	<i>Rubus pubescens</i>
Eliptic-leaved shinleaf	<i>Pyrola elliptica</i>

Flat-top goldenrod	<i>Euthamia graminifolia</i>
Fowl manna grass	<i>Glyceria striata</i>
Fringed willow-herb	<i>Epilobium ciliatum</i>
Greater bladder sedge	<i>Carex intumescens</i>
Heart-leaved American-aster	<i>Symphyotrichum cordifolium</i>
Hedge false bindweed	<i>Calystegia sepium</i>
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>
Jewelweed	<i>Impatiens capensis</i>
Lady's slipper	<i>Cypripedium</i> sp.
Lake Huron bog green orchid	<i>Platanthera huronensis</i>
Large-leaved avens	<i>Geum macrophyllum</i>
Marsh bedstraw	<i>Galium palustre</i>
Marsh-marigold	<i>Caltha palustris</i>
New England American-aster	<i>Symphyotrichum novae-angliae</i>
Northern wood sorrel	<i>Oxalis montana</i>
One-flowered Indian-pipe	<i>Monotropa uniflora</i>
Painted trillium	<i>Trillium undulatum</i>
Plantain-leaved sedge	<i>Carex plantaginea</i>
Poison-ivy	<i>Toxicodendron radicans</i>
Purple-stemmed American-aster	<i>Symphyotrichum puniceum</i>
Purple virgin's-bower	<i>Clematis occidentalis</i>
Red trillium	<i>Trillium erectum</i>
Sessile-leaved bellwort	<i>Uvularia sessilifolia</i>
Smooth goldenrod	<i>Solidago gigantea</i>
Soft-leaved sedge	<i>Carex disperma</i>

Spikesedge	<i>Eleocharis</i> sp.
Spotted Joe-Pye weed	<i>Eutrochium maculatum</i>
Starflower	<i>Lysimachia borealis</i>
Swamp small-flowered-saxifrage	<i>Micranthes pennsylvanica</i>
Tall blue lettuce	<i>Lactuca biennis</i>
Tall meadow-rue	<i>Thalictrum pubescens</i>
Tall white-aster	<i>Doellingeria umbellata</i>
Thicket-creeper	<i>Parthenocissus inserta</i>
Three-leaved goldthread	<i>Coptis trifolia</i>
Tussock sedge	<i>Carex stricta</i>
Violet	<i>Viola</i> sp.
Water avens	<i>Geum rivale</i>
White turtlehead	<i>Chelone glabra</i>
Wild cucumber	<i>Echinocystis lobata</i>
Wild sarsaparilla	<i>Aralia nudicaulis</i>
Yellow blue-bead lily	<i>Clintonia borealis</i>
Yellow-green sedge	<i>Carex flava</i>
Ferns & Fern Allies	
Bracken fern	<i>Pteridium aquilinum</i>
Cinnamon fern	<i>Osmundastrum cinnamomeum</i>
Common clubmoss	<i>Lycopodium clavatum</i>
Crested wood fern	<i>Dryopteris cristata</i>
Dwarf scouring-rush	<i>Equisetum scirpoides</i>
Eastern hay-scented fern	<i>Dennstaedtia punctilobula</i>
Evergreen wood fern	<i>Dryopteris intermedia</i>

Field horsetail	<i>Equisetum arvense</i>
Flat-branched tree-clubmoss	<i>Dendrolycopodium obscurum</i>
Interrupted fern	<i>Osmunda claytoniana</i>
Marsh fern	<i>Thelypteris palustris</i>
New York fern	<i>Parathelypteris noveboracensis</i>
Northern lady fern	<i>Athyrium angustum</i>
Ostrich fern	<i>Matteuccia struthiopteris</i>
Royal fern	<i>Osmunda regalis</i>
Sensitive fern	<i>Onoclea sensibilis</i>
Shining firmoss	<i>Huperzia lucidula</i>
Non-Native Species	
Bitter dock	<i>Rumex obtusifolius</i>
Black-eyed Susan	<i>Rudbeckia hirta</i>
Bladder campion	<i>Silene vulgaris</i>
Broad-leaved helleborine	<i>Epipactis helleborine</i>
Climbing nightshade	<i>Solanum dulcamara</i>
Coltsfoot	<i>Tussilago farfara</i>
Common dandelion	<i>Taraxacum officinale</i>
Common ragwort	<i>Senecio vulgaris</i>
Cow vetch	<i>Vicia cracca</i>
Creeping buttercup	<i>Ranunculus repens</i>
Creeping yellow-loosestrife	<i>Lysimachia nummularia</i>
Meadow dropwort	<i>Filipendula ulmaria</i>
Orange hawkweed	<i>Hieracium aurantiacum</i>
Ox-eye daisy	<i>Leucanthemum vulgare</i>

Red clover	<i>Trifolium pratense</i>
Water forget-me-not	<i>Myosotis scorpioides</i>
Wild carrot	<i>Daucus carota</i>
Yellow hawkweed	<i>Hieracium caespitosum</i>
Invasive Species	
Purple loosestrife	<i>Lythrum salicaria</i>

Birds

American crow	<i>Corvus brachyrhynchos</i>
American goldfinch	<i>Spinus tristis</i>
American redstart	<i>Setophaga ruticilla</i>
American robin	<i>Turdus migratorius</i>
Barn swallow	<i>Hirundo rustica</i>
Black-capped chickadee	<i>Poecile atricapillus</i>
Black-throated green warbler	<i>Setophaga virens</i>
Blue jay	<i>Cyanocitta cristata</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Catbird	<i>Dumetella carolinensis</i>
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>
Chipping sparrow	<i>Spizella passerina</i>
Common grackle	<i>Quiscalus quiscula</i>
Common raven	<i>Corvus corax</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Great blue heron	<i>Ardea herodias</i>

Mallard	<i>Anas platyrhynchos</i>
Mourning dove	<i>Zenaida macroura</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Song sparrow	<i>Melospiza melodia</i>
Spotted sandpiper	<i>Actitis macularius</i>
Veery	<i>Catharus fuscescens</i>
White-throated sparrow	<i>Zonotrichia albicollis</i>
Wood thrush	<i>Hylocichla mustelina</i>
Yellow warbler	<i>Setophaga petechia</i>

Butterflies & Moths

Brown-hooded owlet moth	<i>Cucullia convexipennis</i>
Confused haploa moth	<i>Haploa confusa</i>
Definite tussock moth	<i>Orgyia definita</i>
Leconte's haploa moth	<i>Haploa lecontei</i>
Crescent butterfly	<i>Phyciodes sp.</i>
Monarch	<i>Danaus plexippus</i>
Northern pearly-eye	<i>Enodia anhedon</i>
Swallowtail	<i>Papilio sp.</i>
Viceroy	<i>Limenitis archippus</i>
White admiral	<i>Limenitis arthemis</i>

Note: Many thanks to Maria Dunlavey, Charlie Hohn, Christian Schorn, and Bob Zaino for their help in the identification of species in the field.

This list follows the naming convention of Go Botany [3.0.3], the Native Plant Trust (formerly the New England Wild Flower Society), as of February 13, 2019.

Dedication

This publication is dedicated to the Greensboro Bend community.

“You know how magic happens? So magic, it’s really easy—all you have to do is let go of the outcome. As soon as you put your expectation on it, you’ve changed it. It’s not magic anymore because you know what it’s gonna be. You’ve gotta go into it not knowing. That’s magic.”

-Greensboro Bend Resident

Thank You

Community Sponsor

Greensboro Conservation Commission

Community Funders

- Association of Vermont Conservation Commissions Fund
- Greensboro Conservation Fund
- Greensboro United Church of Christ Pleasants Fund

Greensboro Community

- Green Mountain Monastery
- Greensboro Bend Revitalization Initiative
- Greensboro Bend United Methodist Church
- Greensboro Free Library
- Greensboro Historical Society
- Greensboro Planning Commission
- Greensboro Recreation Committee
- Greensboro Town Clerk's Office
- Smith's Store
- St. Michael's Church
- Willey's Store

Graduate Studies Committee

- Marla R. Emery | Advisor
- Walter Poleman | Committee Member
- Bob Zaino | Committee Member

University of Vermont Community

- Cohort AH: Chelsea Clarke, Maria Dunlavey, Lynn Wolfe, and Andy Wood
- Cohort AI: Carolyn Loeb, Jason Mazurowski, and Christian Schorn
- Cohort AJ: Grace Glynn, Eric Hagen, and Meredith Naughton
- Faculty & Staff: David Barrington, Tony D'Amato, Alicia Daniel, Sarah Goodrich, Bernd Heinrich, Jeffrey Hughes, Karyn McGovern, Jed Murdoch, Cathy Paris, Bryan Pfeiffer, Jennifer Pontius, Porky Reade, Michael Sundue, Elizabeth Thompson, Hub Vogelmann, Deane Wang, and Stephen Wright
- The PLACE (Place-based Landscape Analysis & Community Engagement) Program

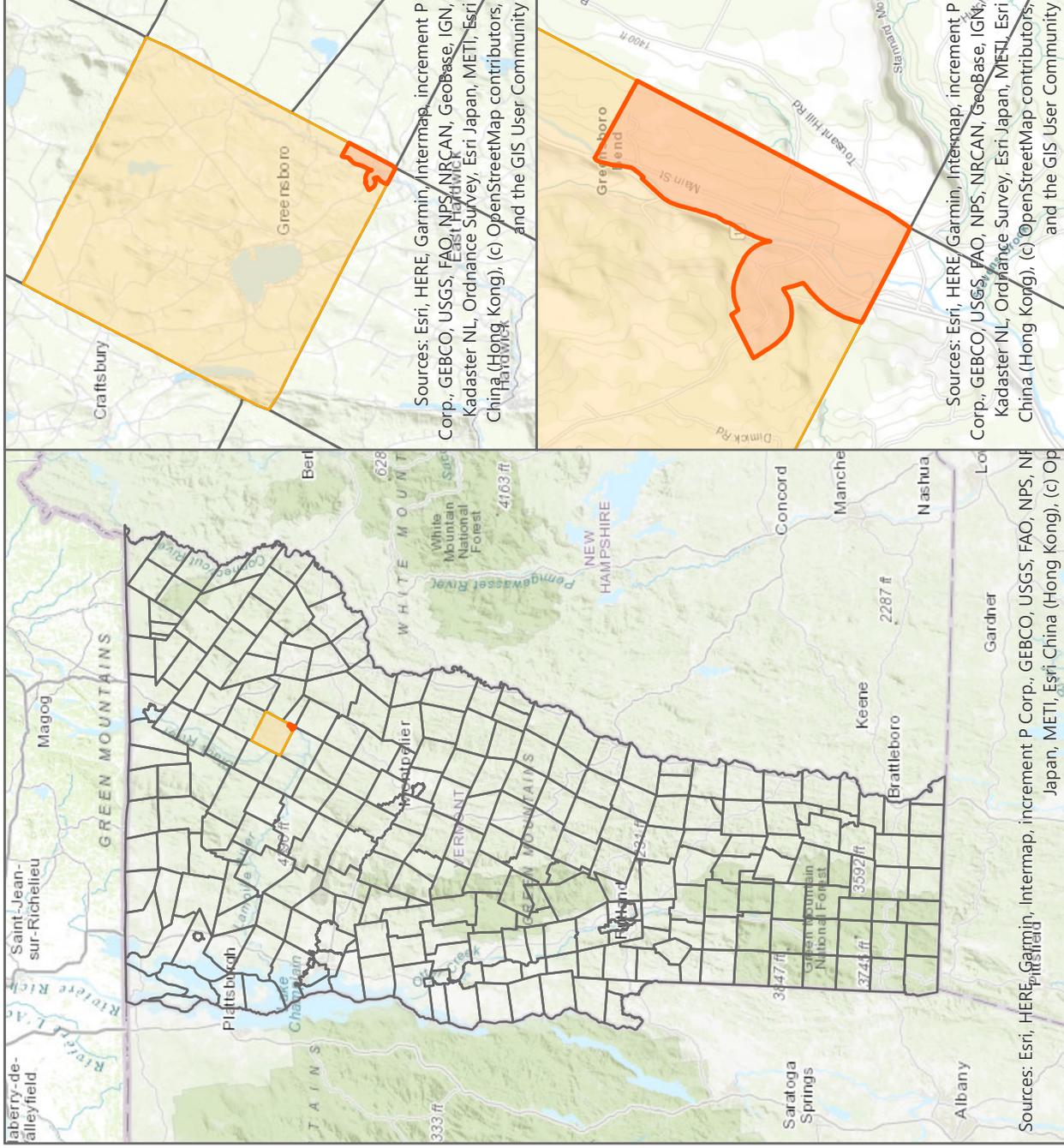
Field Naturalist Alumni & Friends

- Sean Beckett, Mike Blouin, Sonia DeYoung, Samantha Ford, Gus Goodwin, Charlie Hohn, Hannah Leigh, Ryan Morra, Hannah Phillips, Morgan Southgate, Emma Stuhl, and Laura Yayac

Copy Editor: Julia O'Connor

My Family: Lenore & Myron Sopher, Matt Sopher, and Ralph Salemme

Greensboro Bend Village, VT



Legend

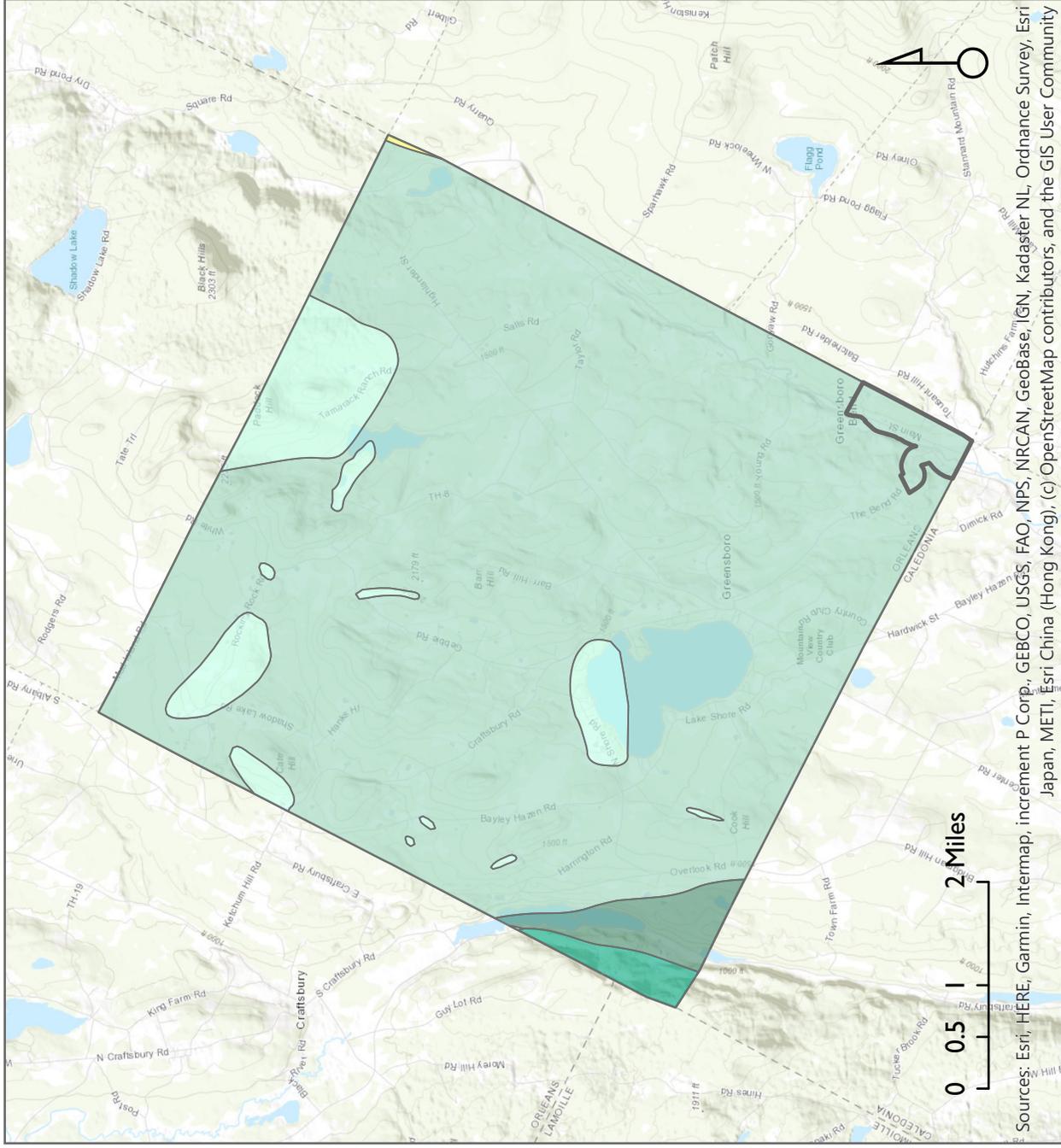
-  Vermont Town Boundaries
-  Greensboro Town Boundary
-  Greensboro Bend Village Boundary

Map by Lauren S. Sopher
June 9, 2019

Data Sources: Vermont Center for
Geographic Information
NAD 1983 StatePlane Vermont FIPS 4400



Bedrock Geology of Greensboro, VT



Legend

- Bedrock Geology Formation Type**
- Devonian Intrusive Rocks
 - Gile Mountain Formation
 - Moretown Formation
 - Northfield Formation
 - Waits River Formation
- Surface Water**
- Greensboro Bend Village Boundary**
- Greensboro Town Boundary**

Map by Lauren S. Sopher
June 9, 2019

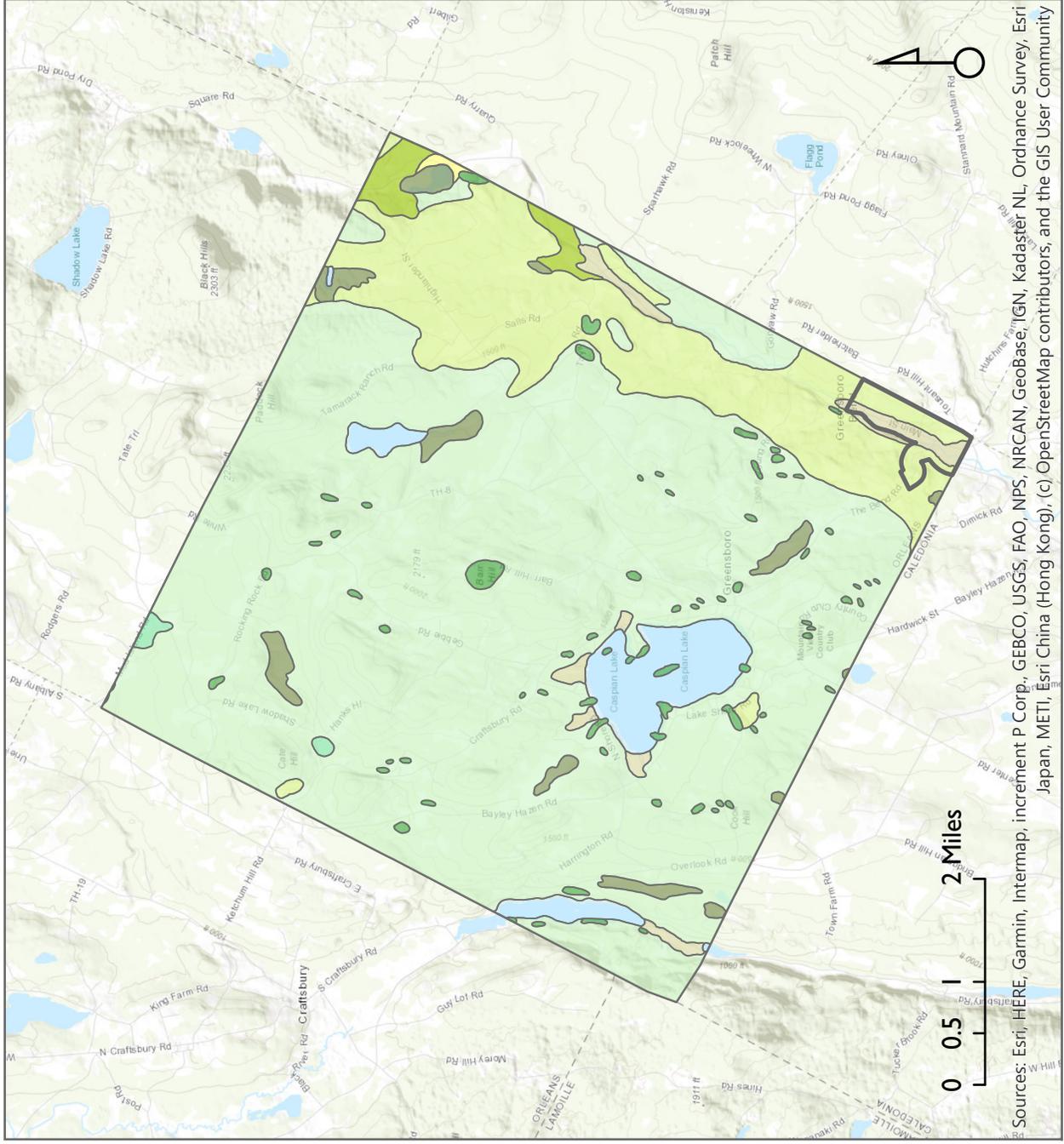
Data Sources: Vermont Center for
Geographic Information
NAD 1983 StatePlane Vermont FIPS 4400



FIELD NATURALIST &
ECOLOGICAL PLANNING
PROGRAM

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Surficial Geology of Greensboro, VT



Legend

Surficial Geology Type

- Alluvium
- Bedrock Exposure
- Isolated Kame
- Kame Moraine
- Moraine
- Outwash
- Swamp, Peat, and/or Muck
- Till

Surface Water

Greensboro Bend Village Boundary

Greensboro Town Boundary

Map by Lauren S. Sopher
June 9, 2019

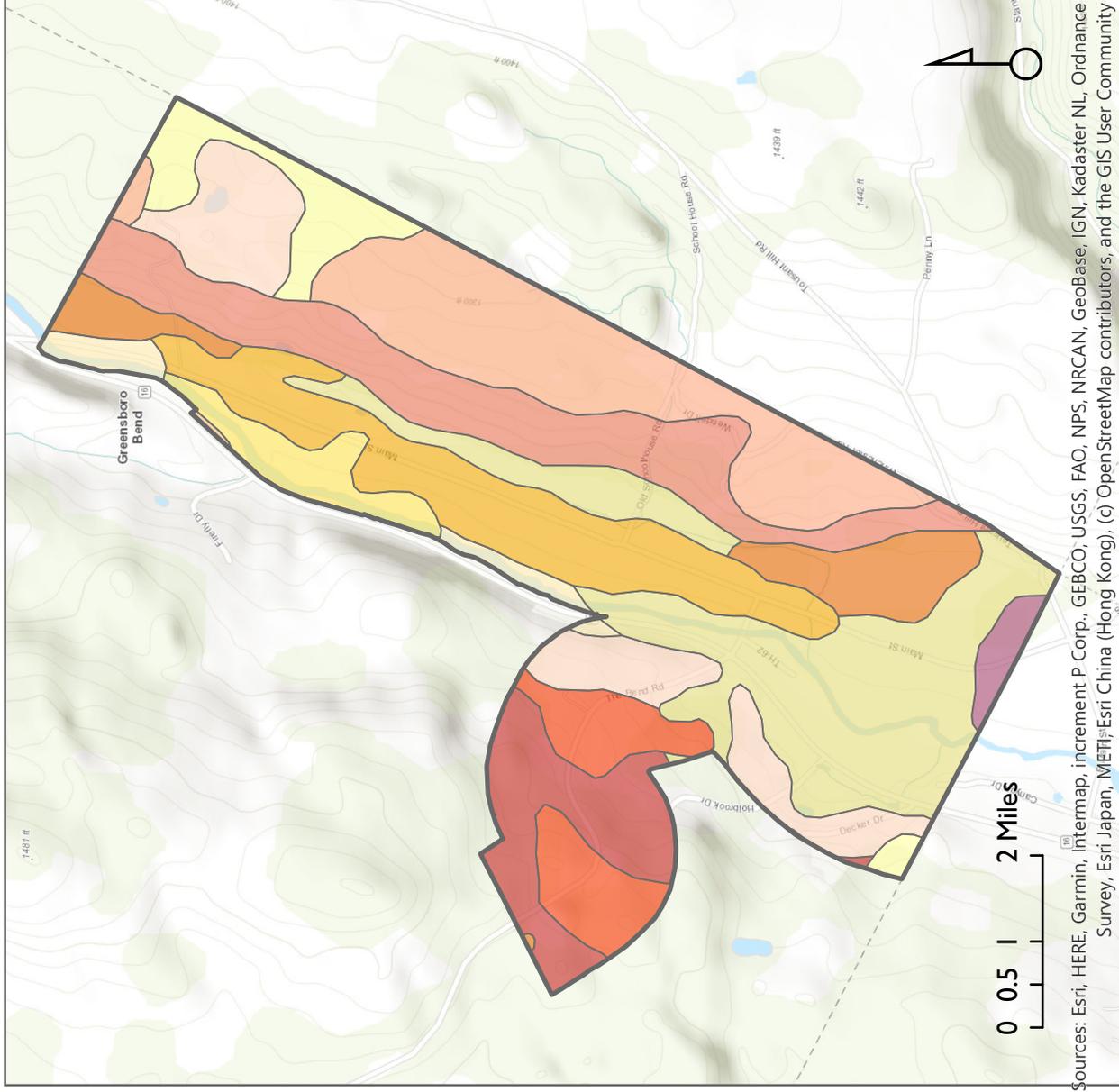
Data Sources: Vermont Center for
Geographic Information
NAD 1983 StatePlane Vermont FIPS 4400



FIELD NATURALIST &
ECOLOGICAL PLANNING
PROGRAM

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaşter NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Soils of Greensboro Bend, VT



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Legend

Soil Name	Soil Texture	Slope
	Croghan	Loamy Fine Sand 0-3% Slope
	Moosilauke	Very Fine Sandy Loam 0-3% Slope
	Colton-Duxbury	Fine Sandy Loam 3-8% Slope
	Colton-Duxbury	Fine Sandy Loam 8-15% Slope
	Colton-Duxbury	Fine Sandy Loam 25-60% Slope
	Cabot	Silt Loam 8-15% Slope
	Rumney	Fine Sandy Loam 0-3% Slope
	Wonsqueak & Pondicherry	Muck 0-2% Slope
	Monadnock	Fine Sandy Loam 8-15% Slope
	Monadnock	Fine Sandy Loam 15-35% Slope
	Monadnock	Fine Sandy Loam 35-60% Slope
	Vershire-Glover	Very Fine Sandy Loam 8-15% Slope
	Vershire-Glover	Very Fine Sandy Loam 15-35% Slope
	Surface Water	
	Greensboro Bend Village Boundary	

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Potential Lamoille River Buffers in Greensboro Bend, VT



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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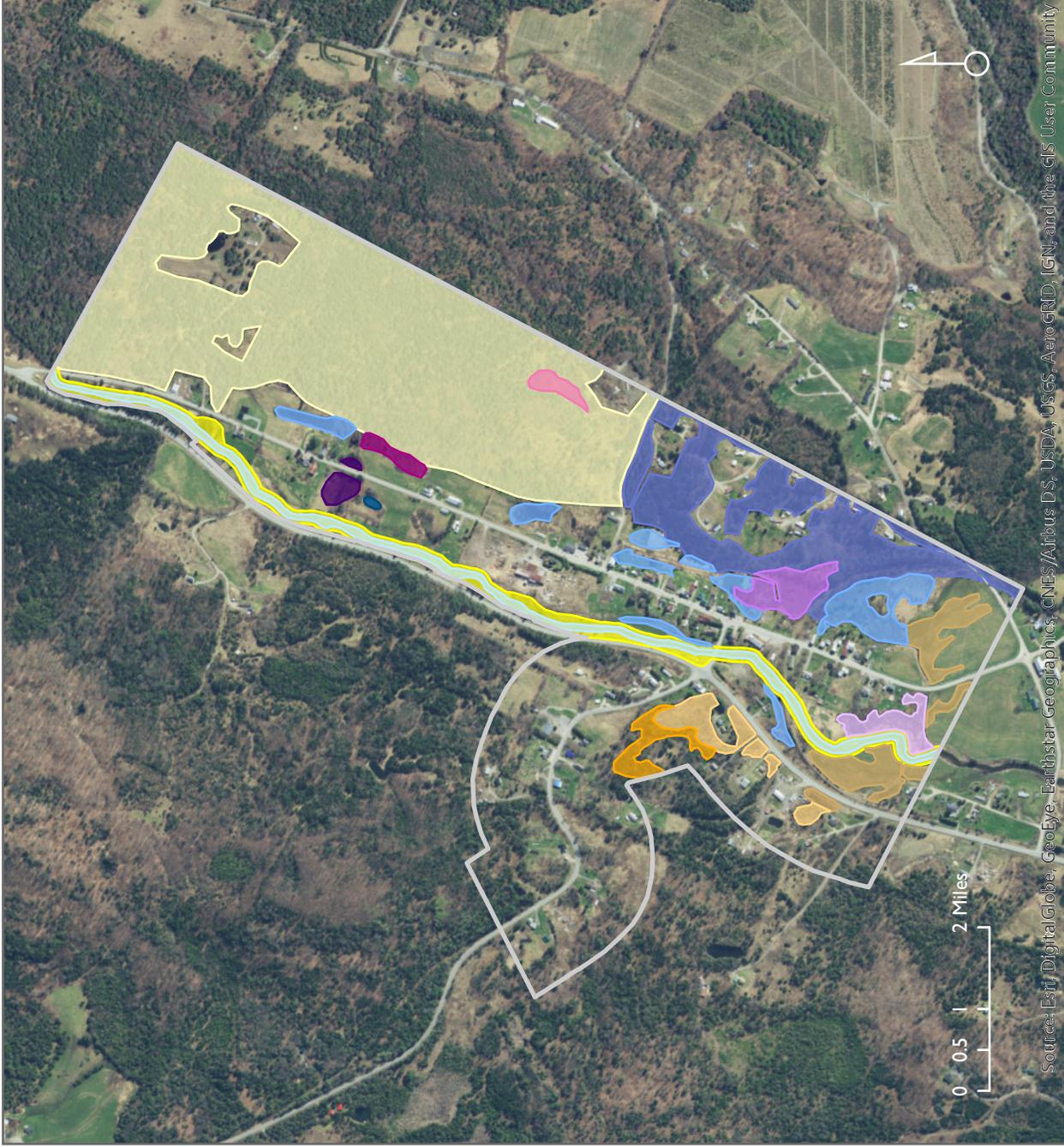
Legend

-  Lamoille River
- Lamoille River Buffer Widths**
 -  10 Feet
 -  25 Feet
 -  50 Feet
 -  100 Feet
-  Greensboro Bend Parcel Boundaries
-  Greensboro Bend Village Boundary



Note: The potential buffer zones intersect existing infrastructure. This map does not suggest removal of homes and driveways, but does present opportunities for adding vegetation.

Natural Communities of Greensboro Bend, VT



Legend

- Natural Community Type
- Alluvial Shrub Swamp, Disturbed
 - Farmed Wetland
 - Kettle Hole, Disturbed
 - Lowland Spruce-Fir Forest
 - Lowland Spruce-Fir Forest Early-Mid Successional
 - Mixed Hardwood-Softwood Seepage Forest, Disturbed
 - Northern Conifer Floodplain Forest, Disturbed
 - Peatland, Disturbed
 - Red Maple-Black Ash Seepage Swamp, Disturbed
 - Sloping Softwood Seepage Forest, Disturbed
 - Softwood Seepage Swamp, Disturbed
 - Tamarack Swamp, Disturbed
 - Wetland, Disturbed
 - Lamoille River
 - Greensboro Bend Village Boundary

Map by Lauren S. Sopher
 June 9, 2019
 Data Sources: Charlie Hohn | Vermont Department of Environmental Conservation, Watershed Mgmt. Division, Lauren Sopher | UVM, and Vermont Center for Geographic Information
 NAD 1983 StatePlane Vermont FIPS 4400



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