Natural Resource Inventory

Town of Canaan, New York

By the Climate Change Task Force

Town of Canaan, New York

Title image: Canaan's town park, Stoddard Field, and its pond and associated wetlands. Photo © Dylan Cipkowski

Contents

INTRODUCTION

Natural resources are naturally occurring physical and living things that support human life. Forests, streams, soils, fish and wildlife are examples of natural resources. Understanding what natural resources exist in a given place and their quality and extent is an important step for conservation planning. A natural resource inventory (NRI) identifies and describes natural resources of a specific geographic area. The NRI presented here is for the Town of Canaan, New York. Through a series of maps and supporting text and photographs, this NRI describes the topography, land-use, bedrock, sensitive natural areas and other natural resources within the town. It also discusses potential threats to different natural resources, strategies for their conservation, and how they relate to climate change.

There are many ways this NRI can be used. It offers context for sound decision making by agencies, organizations and individuals of the Town of Canaan. It can be used by landowners interested in protecting their property's natural resources; town officials responsible for making regulatory decisions and land-use policies; conservation organizations seeking to engage in conservation projects in the town; other municipalities seeking a more regional context regarding natural resources; and the general public seeking to learn more about the natural world in Canaan.

Figure 1. Hepatica (Hepatica sp.) is a native spring ephemeral wildflower found on some of the nutrient-rich, rocky hillsides in Canaan. Photo © Dylan Cipkowski

Additionally, this document may be helpful for climate change mitigation planning. Natural resources can affect how climate change impacts people and communities. For example, the northeastern US has seen increased precipitation intensity in recent decades, a trend that is expected to magnify in the future because of climate change (Dupigny-Giroux et al., 2018). Soil, topography and other natural resources influence how and where flooding occurs during andfollowing major rainfall events. Climate change can also have direct negative impacts on natural resources that have ecological, economic and/or cultural value. The iconic and beautiful Brook Trout (*Salvelinus fontinalis;* Figure 10) as well, as other cold water dependent animals found in some of Canaan's streams, are threatened regionally by warming temperatures and earlier snow melt driven by climate change (Groffman et al., 2014). Using this NRI to identify and conserve natural resources that may be impacted by climate change can help ensure that they are available for future generations.

This is a limited NRI that was part of the Canaan Climate Smart Community Task Force initiative. Several nearby towns, including New Lebanon and Hillsdale, have conducted large-scale and relatively comprehensive inventories of their natural resources. With no funding, this project was caried out with volunteer time alone and is therefore lacking the depth of those excellent beforementioned NRI examples. Should interest and funding be available in the future, this NRI should be enhanced and

expanded. Community involvement in particular should be a key component of a NRI, but was largely absent from this project.

Finally, two resources were key for the development of this project. The *Columbia County NRI* offered a project template and a wealth of GIS data that was used to assess, map and describe Canaan's natural resources. A second key resource for developing this NRI was *Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed* by Haeckel and Heady (2014). These documents together are critical for developing these kinds of conservation projects in Columbia County and beyond.

Figure 2. An Eastern Newt (Notophthalmus viridescens) in Canaan; this common salamander lives in water as a larvae and adult. However, as a juvenile, or "red eft" (shown here), they are terrestrial and may stay in this life stage for several years before returning to the water for reproduction. Photo © Patricia Liddle

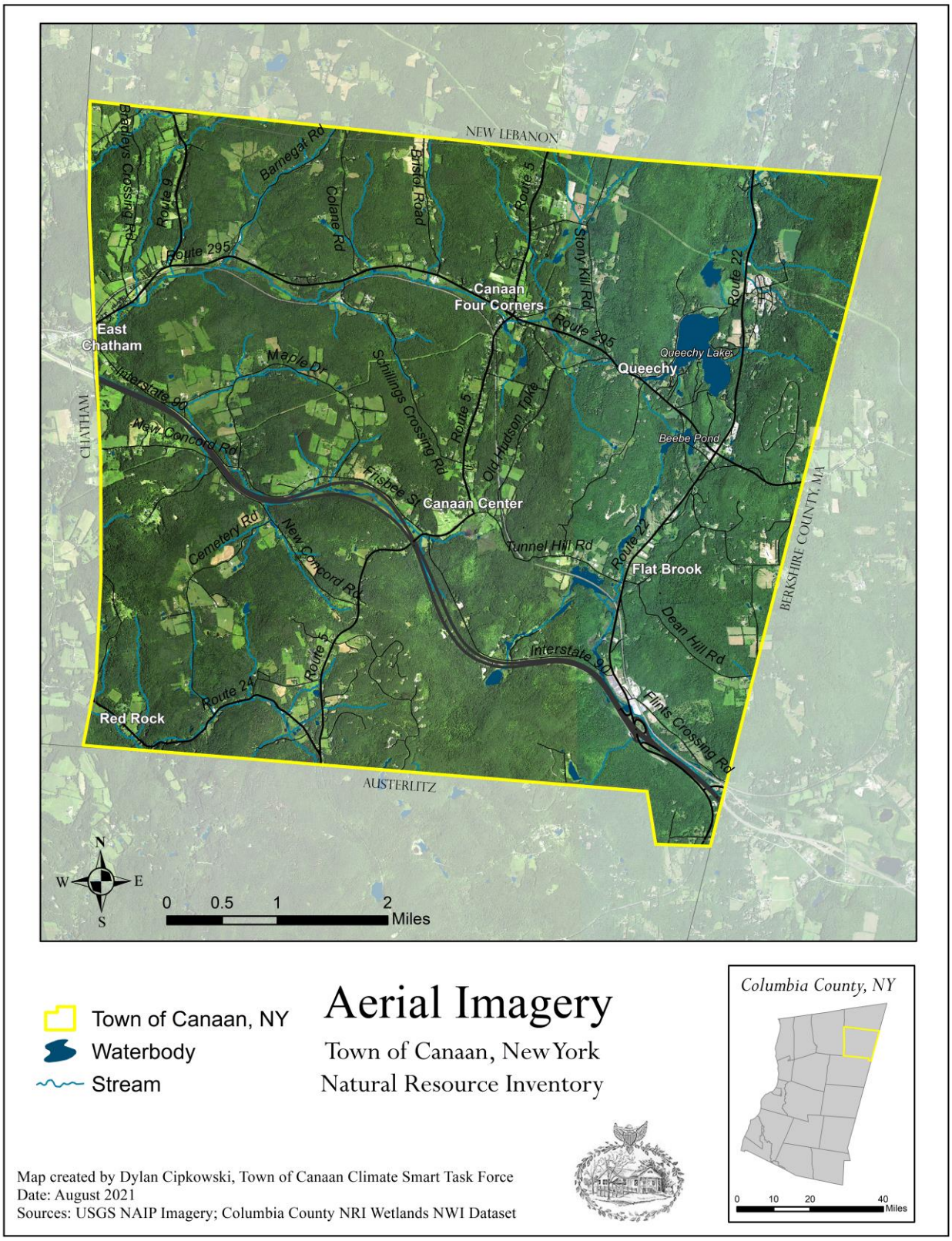
PHYSICAL SETTING

The Town of Canaan is located in northeastern Columbia County, New York (Map 1). Canaan is roughly 10 miles west of Pittsfield, MA and 15 miles northeast of Hudson, NY. There are thirty-six and a half square miles of land and about a quarter square mile of water that compose the town. Several major roads pass through Canaan, including Interstate 90 and State Routes 22 and 295. Its historical cultural centers, which are still communities today, include Canaan (or "Canaan Four Corners"), Canaan Center, East Chatham, Flat Brook, Queechy and Red Rock (Map 1). Historically, the land in Canaan was part of the Mohican tribe territory, and this area continues to be significant culturally to the Mohican people. The number of Mohican people that resided in Canaan at any point before European settlement is not well understood (Vispo, 2014).

Canaan lies in the Taconic Mountains and associated Slate Hills, both of which are part of the greater Appalachian Range. The Taconic Mountains and associated hills generally run north-south for about 200 miles, from Connecticut through eastern New York and Western Massachusetts and into Vermont. The mountains are ancient, having formed some 440 million years ago. "Taconic" or "Taghkanic" is a native American name meaning "in the trees". Today, the mountains remain largely forested and are of significant regional conservation value.

Figure 3. Rattlesnake Den, one of the few named hills in Canaan, seen from Route 5. Photo © Dylan Cipkowski

Map 1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Schillings Crossing Rd
Queechy Lake
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Interstate 90
New Concord Rd
Old Hudson Lake
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Miles
Town of Canaan, NY
Waterbody
Stream
Aerial Imagery
Town of Canaan, New York
Natural Resource Inventory
Columbia County, NY
0 10 20 40
Miles
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS NAIP Imagery; Columbia County NRI Wetlands NWI Dataset

NATURAL RESOURCES

Topography and Elevation

Topography is the arrangement of natural physical features, such as mountains and valleys, in a given area. Elevation refers to a place's height above sea level. The topography and elevation of Canaan (Map 2) have a significant impact on its ecology, natural resources and land-use.

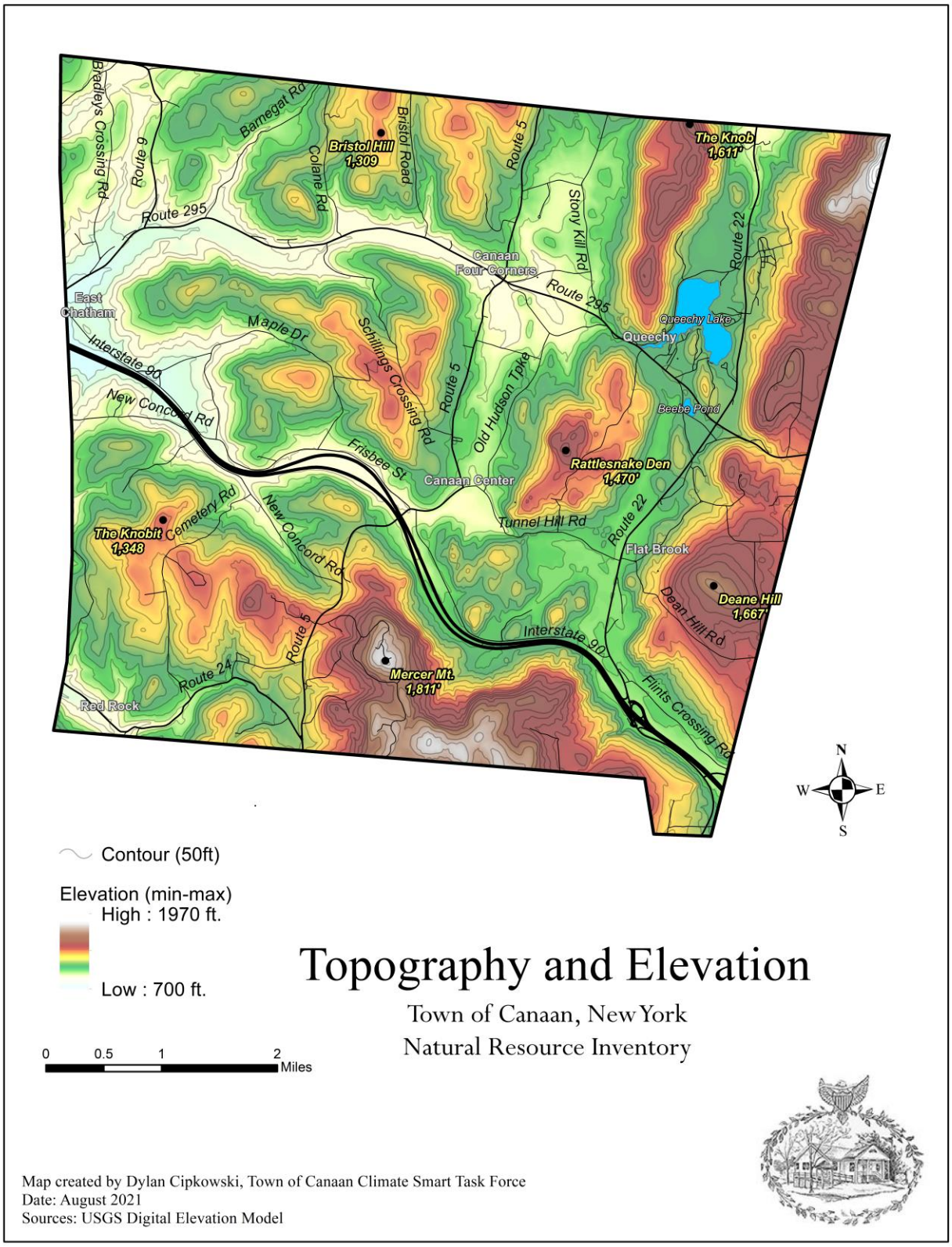
Significant topographic features in Canaan include several ridges that are part of the Taconic Range (Map 2). The highest elevation of Canaan (1,970') is on the ridge that runs along the eastern boundary of the town. The point is just 95' lower than Columbia County's highest elevation—Harvey Mountain in Austerlitz. This Canaan highpoint is not a true peak but the shoulder of Perry Peak, which is located east of Canaan in Berkshire County, MA. South of this highpoint and along the same ridge is Deane Hill (1,667'), one of only several officially named hills in Canaan, according to USGS. Another major topographic feature are the mountains located at the southern edge of the town that include Mercer Mountain (1,811') and The Knobit (1,348'). The Knob (1,611'), Rattlesnake Den (1,470'; Figure 3) and Bristol Hill (1,309') are other officially named hills in the town.

Historically, topography influenced where communities formed in Canaan and early land-use following European settlement. During the 19th century, when Canaan was at its agricultural peak, the rocky and often steep hillsides of Canaan were more suitable for raising sheep for the lucrative wool industry than cropland. In 1855, as much as much as 60% of the total landcover in Canaan was pasture, hayfield or cropland, with pasture the dominant agricultural landcover (Vispo, 2014). The stonewalls that crisscross Canaan's forests today are relics of the agriculture that once dominated the culture and land of this region. Because of a regional decline in agriculture driven by westward expansion and other social-economic forces during the 19th century, a majority of the former farmland in Canaan has since been reclaimed by forest.

Topography can also influence where sensitive natural communities or biodiversity are located. An example of this in Canaan is the beech-maple mesic forest (a kind of "natural community") that exists on a relatively high elevation ridge that includes The Knob (Map 10). The natural community is typical of more northern latitudes, such as the Adirondack region, and therefore its presence in Canaan is exceptional; it has been deemed a "significant natural community" by the New York Natural Heritage Program. As its name suggests, trees in beech-maple mesic forest are dominantly Sugar Maple and American Beech, and spring ephemeral wildflowers are often abundant on the forest floor. Major threats to the beech-maple mesic forest in Canaan include development and forest fragmentation.

The topography of Canaan has created steep slopes (Map 3), contributing to the town's hilly character and vistas. Steep slopes have an average slope equal or greater than 15% (a 15-foot rise for every 100 feet of horizontal run). They are sensitive areas that demand attention during land-use planning. Disturbance of steep slopes can have negative social and ecological impacts from resulting soil erosion, stream sedimentation and slope instability (Lake, 2016). Developing steep slopes can also affect viewsheds and can negatively impact a place's aesthetics and rural character.

Map 2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Canaan Center
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Tunnel Hill Rd
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Flat Brook
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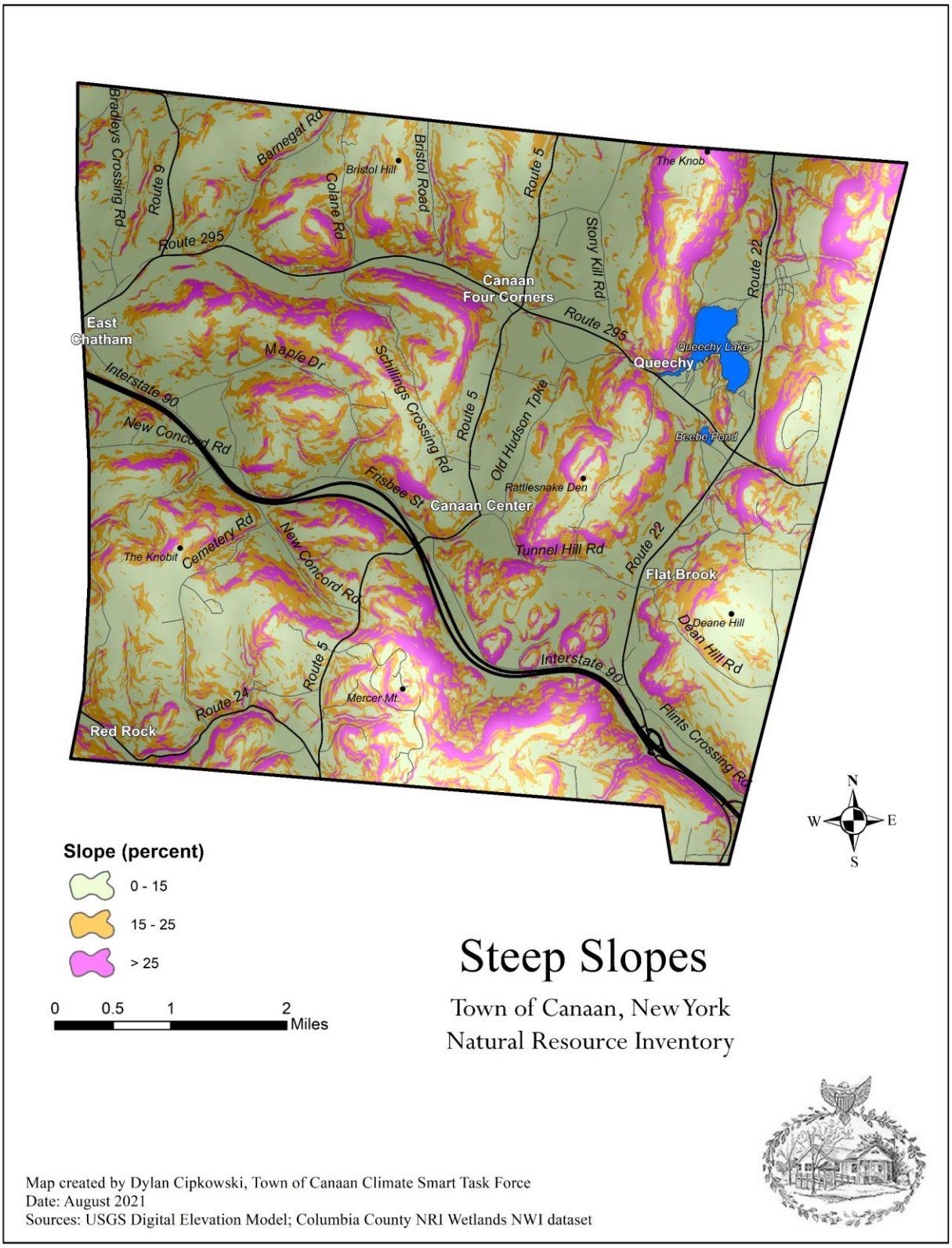
Topography and Elevation
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS Digital Elevation Model

Map 3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Flat Brook
Deane Hill
Dean Hill Rd
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Interstate 90
Mercer Mt.
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Red Rock
Flints Crossing Rd
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Slope (percent)
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15 - 25
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0
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1
2
Miles
Steep Slopes
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS Digital Elevation Model; Columbia County NRI Wetlands NWI dataset

Bedrock, Surficial Geology and Soil Drainage

Three aspects of Canaan's geology are described in this NRI: bedrock geology, surficial geology, and soil. These are key natural resources because they are the literal foundation of the town. They dictate the general physical structure of Canaan, drainage characteristics, ground and surface water availability, the establishment of rare plant populations, distribution of natural communities, the suitability of land for agriculture and development, among many other things. This section will provide a general overview of these foundational natural resources.

Bedrock geology describes the solid rock underneath soil and unconsolidated materials. Three kinds of bedrock dominate the Town of Canaan (Map 4): slate, phyllite and marble. The slate (Owl) bedrock composes more than 40 percent of the town's bedrock (Table 1) and underlies much of the western portion of the town. It is a fine-grained metamorphic rock type that formed more than 450 million years ago. Bristol Hill and The Knobit are both underlain by this slate bedrock. Because slate can be split into relatively thin slabs, it is often used for stepping stones, patios and even roofing (Fisher, 2006).

Table 1. Bedrock type, description and composition in the Town of Canaan, New York

BEDROCK TYPE	DESCRIPTION	PERCENT COMPOSITION
Owl - Slate	Fine grain, clayey metamorphic rock	42.6
Ca - Phyllite	Fine grain, metamorphic rock derived from shale	32.6
OCst - Marble	Granular, metamorphic rock formed from limestone	20.3
Cr – Graywacke	Coarse grain sandstone, hard sedimentary rock	2.4
Cgt - Greenstones	Fine grain, hard metamorphic rock, green in color, volcanic origin	1.6
Oba - Limestone	Fine Grain, sedimentary rock rich in calcium carbonate	0.2
OCs - Carbonate	Sedimentary rock composed of limestone or dolomite	0.2
Cev - Schist	Coarse grain, metamorphic rock derived from shale	0.1

More than 30 percent of Canaan's bedrock is composed of Austerlitz Phyllite, a purplish-gray to greenish-gray, fine grained metamorphic rock that is intermediate in density between schist and slate. Both it and the before mentioned slate bedrock are variable in their chemistry; however, both are relatively acidic compared to neighboring Stockbridge Marble (Fisher, 2006).

The third-most dominant bedrock in Canaan, Stockbridge Marble (OCst), is particularly important to town's ecology. Additionally, the rock type was historically an economic driver for some of the Canaan's neighbor towns in Berkshire County, MA. In the early 19th century, New York City Hall in Manhattan was built of Stockbridge Marble that was mined in Alford, MA, less than 10 miles from Canaan. Several buildings and landmarks in Lee, MA are also built of this locally mined rock that underlies a significant portion of Canaan (Hanson, 2021).

Stockbridge Marble composes about 20 percent of the Canaan's bedrock. Map 4 shows its distribution, a "U" shape around two mountain ranges in Canaan that include The Knob and Rattlesnake Den (Figure 3).

Stockbridge Marble is also metamorphic rock, but unlike the former two bedrocks described, this one is rich in calcium carbonate given its origin—sea creatures. During the Paleozoic era (~250-550 million years ago), much of the Northeastern US was covered by sea. The life and death of countless numbers of shellfish, corals and other sea life in these waters led to the sedimentation of their fossils on the sea floor, eventually forming limestone. Following the Paleozoic era, geological processes exposed this limestone to heat and pressure turning it into marble (Fisher 2006).

As Stockbridge Marble bedrock weathers, the calcareous minerals it is composed of give the surrounding soils a relatively neutral pH. In addition to creating fertile land for agriculture, this weathering process is crucial for populations of unusual plant species and natural communities that require non-acidic environments (Figure 4). Walking Fern (*Asplenium rhizophyllum*), American Basswood (*Tilia Americana*) trees and maple-basswood rich mesic forests (a forest type defined by NYNHP) can be found in this marble "belt" of Canaan, but are generally absent from other parts of the town having different bedrock types.

Another ecologically significant aspect of Stockbridge Marble bedrock is that over time the rock dissolves and can create caves. Several substantial cave systems exist in Canaan because of this process (Figure 5). These caves are critical hibernation habitat for bat species of conservation concern. In addition to bats, porcupines and other animals take shelter in these Canaan caves. Access into these caves is difficult, dangerous and prohibited without permission from the Northeast Cave Conservancy.

Figure 4. A calcium-rich forest exists on public land in Canaan, NY because of the underlying Stockbridge Marble bedrock. American Basswood (Tilia americana) and Maidenhair Fern (Adiantum pedatum), both shown here, require rich-soil to live. Photo © Dylan Cipkowski

Figure 5. Caves in Canaan, New York. Photo courtesy the Northeastern Cave Conservancy.

Aquifers under these easily weathered and relatively porous bedrock types are called “karst aquifers”. While productive and widespread in parts of the United States (e.g., in Florida), karst aquifers are particularly vulnerable to contamination.

Surficial geology describes the unconsolidated materials that lie above bedrock (Map 5). These minerals are a result of glacial deposits, weathering rock, flooding and other processes. Glaciation in particular has had a major influence on the surficial sediments of our region, including Canaan. Just 17-18

thousand years ago, a massive sheet of ice (called the “Laurentide Ice Sheet”) that covered the land and expanded across much North America began to recede in Canaan (Vispo, 2014). As it slowly melted, the glacier deposited rocks and soils that it had picked up over the course of millennia. Therefore, much of the town is dominated by a glacial deposit that are called “till” (showed in tan and marked “t” in Map 5). Glacial till is composed of an unsorted mixture of loose minerals of different sizes and textures, such as stones, gravel and sand.

Other glacial related surficial sediments include Kame deposits. As the ice sheet melted, pockets of gravel and sand built up within the glacier as meltwater pushed its way over and through the ice, carrying sediment with it. At the terminus of the glacier, these sediments that had accumulated in the ice settled to the ground forming mounds and ridges called kame deposits.

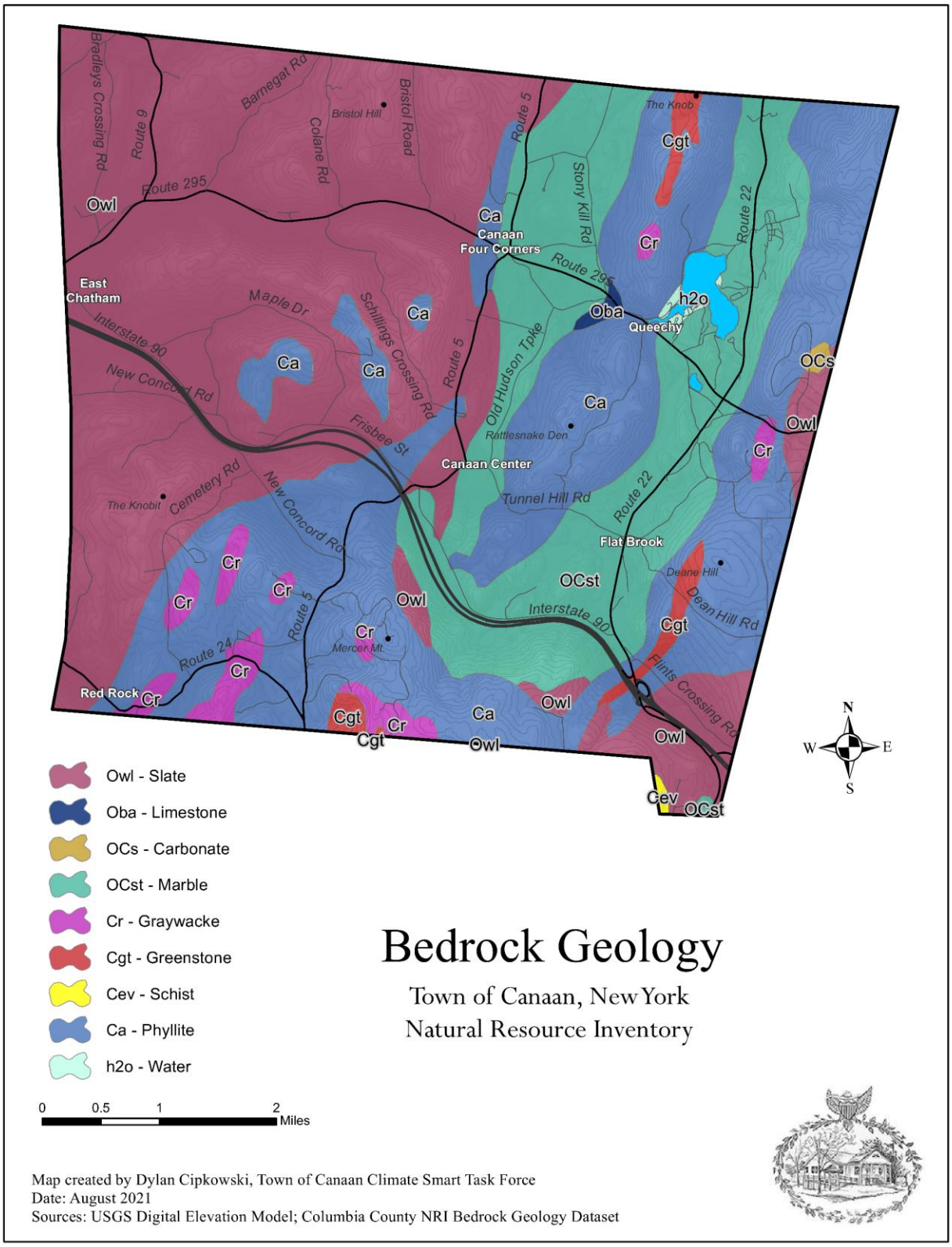
In some of the valleys of Canaan is glacial outwash (marked “og” and colored red on Map 5), a third kind of surficial sediment that is a result of glaciation. Glacial outwash was deposited by relatively large streams and rivers at the feet of the melting icesheet. It’s found in several major valleys of Canaan, including those that contain Queechy Lake, Beebe Pond, and parts of Route 295. Another surficial sediment of Canaan’s valleys is restricted to western Canaan in the valley that Interstate 90 follows, as well as portions of Rt 295 near East Chatham—Alluvial deposits, a relatively uncommon surficial sediment in Canaan. Alluvial deposits are fine to coarse minerals, from silk to boulders, that have been deposited in a sorted manner (finer sized minerals on top, larger on bottom) by streams since the end of the last glaciation to present day. Alluvial deposits yield especially fertile soils and make for prime farmland.

Soils are another foundational natural resource. Soil is the uppermost portion of the earth’s crust that is composed of decayed organic material and rock and mineral particles. Because it retains water and nutrients and is the medium for water filtration and organic material decomposition, soil is a vital component for ecological and economic systems alike. Various weathering processes create different kinds of soil. Generally, soils are classified based on their chemistry, texture, depth and moisture. There are many different soil types in Canaan and each may influence people and ecosystems in different ways.

Agriculturally, soils influence land’s suitability for different crops, water availability and drainage, erosion, irrigation needs, and the land’s fertility and requirements for soil amendments. Additionally, assessing soil characteristics in Canaan is crucial for land-use planning. Soil properties dictate land’s suitability for different kinds of development, from roads to foundations to septic systems (Haeckel & Heady, 2014).

Map 6 shows the drainage characteristic of different kinds of soils in Canaan. In this case, “drainage” refers to the moisture level of the soil and not necessarily how quickly water moves through the soil. Relatively wet soil is considered “very poorly drained”, while the driest soils are “well drained”, and there are various categories in between those two extremes. Generally, the poorest drained soils are in the lowlands where wetlands are present, while slopes and mountains tops, which tend to have shallow soils or nearly exposed bedrock, are the best drained.

Map 4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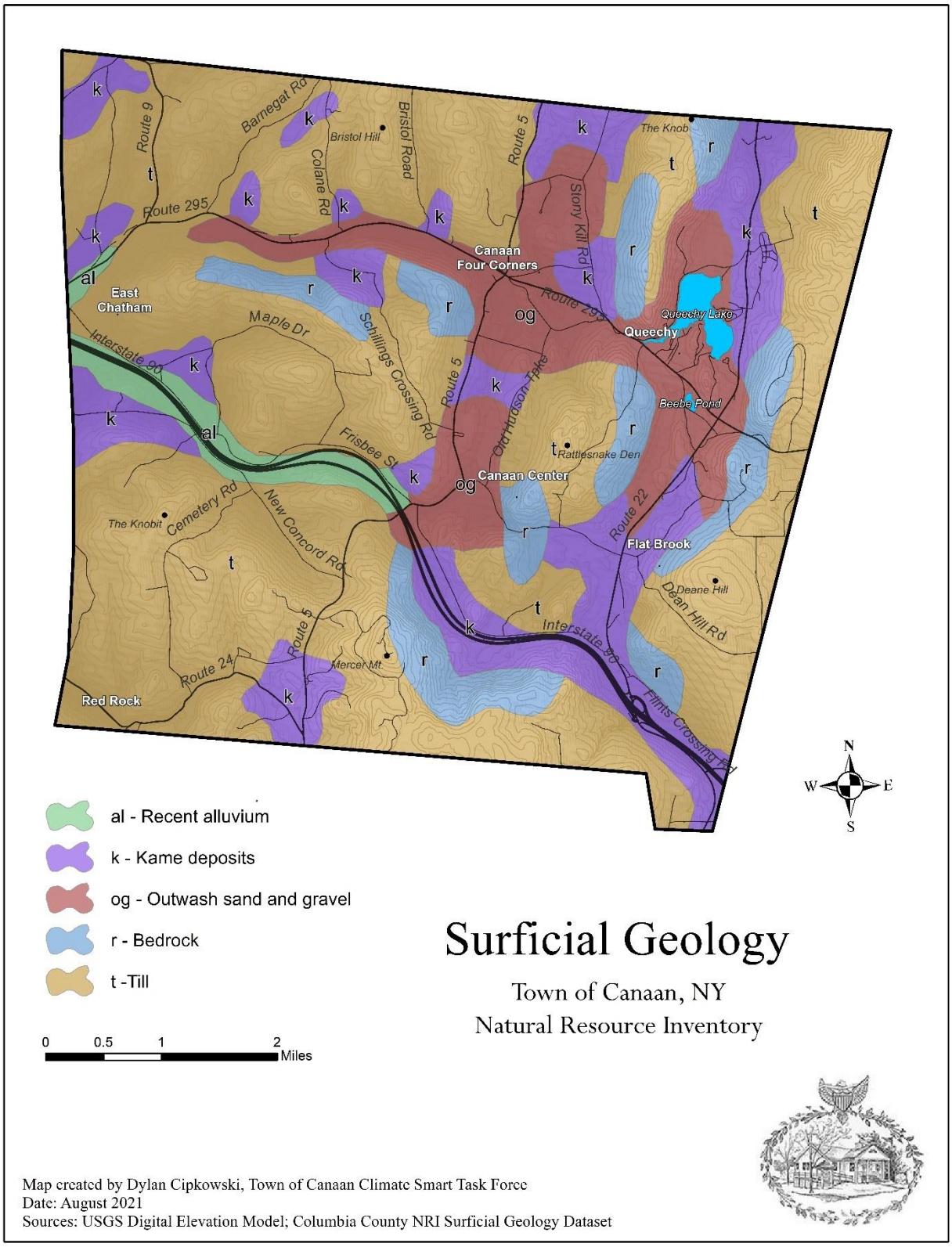
Bedrock Geology
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS Digital Elevation Model; Columbia County NRI Bedrock Geology Dataset

Map 5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Surficial Geology
Town of Canaan, NY
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
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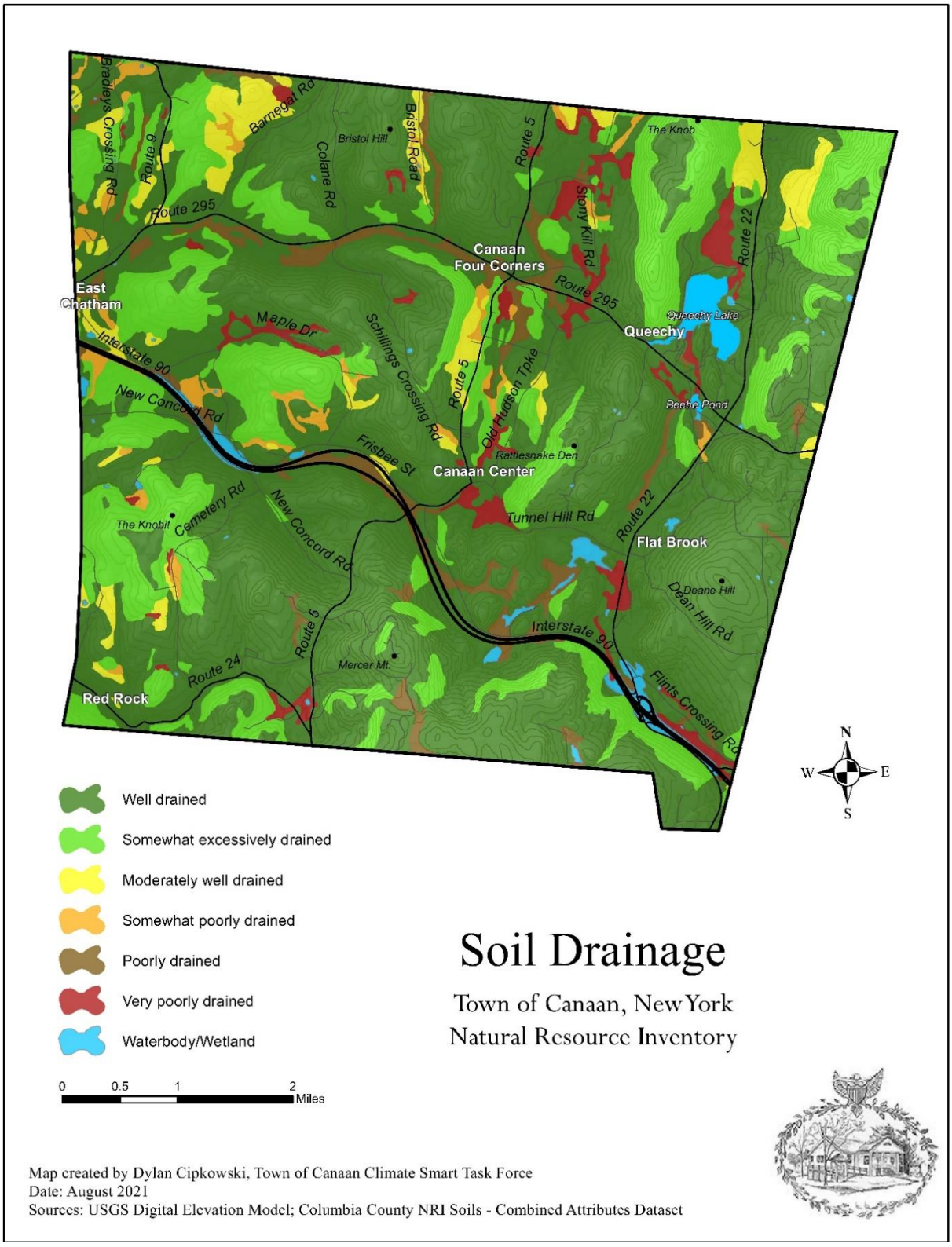
Map 6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Waterbody/Wetland
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Soil Drainage
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS Digital Elevation Model; Columbia County NRI Soils - Combined Attributes Dataset

Land-use

Land-use describes the extent of forests, agriculture, development and other land covers in a defined geographic area. The relationship between land-use and climate change is complex. Land-use affects climate change by contributing to it (certain kinds of land-use are associated with greenhouse gas emissions) or mitigating its impacts (some land-uses are linked to carbon sequestration). On the other hand, climate change can also impact land-use characteristics. For example, tree composition of forests can change in response to climate change.

Canaan is largely forested (72%) with agriculture (11%) and development (9.5%) being other prominent kinds of land cover (Map 7, Table 2). Forests in Canaan are composed of northern hardwood species, such as American Beech (*Fagus grandifolia*), Sugar Maple (*Acer saccharum*), White Ash (*Fraxinus americana*), Yellow Birch (*Betula alleghaniensis*) and Eastern Hemlock (Tsuga canadensis). In relatively warm microclimates in the town, there are tree species more suited to relatively warm climates, such as various oak and hickory species. At the town's highest and harshest elevations, populations of Red Spruce (*Picea rubens*) and perhaps other plant species more typical of the Adirondack region may exist. No Red Spruce has yet been documented in the town, but a few individuals of this species are known from the higher mountains of Austerlitz, so it's more than possible they exist in Canaan as well.

Table 2. Land-cover composition in Canaan, NY

LAND COVER TYPE	PERCENT COVER
Forest	72.1
Agriculture	11.0
Development	9.6
Wetland	3.2
Pond/Lake/Stream	3.3
Other	0.7

Forests are essential for mitigating climate change impacts because they take in carbon dioxide, one of the gases that causes climate change, and lock up the carbon in their roots and trunk. The US Forest Service reports that some 850 million tons of carbon are removed from the air and stored by trees in the US each year. The movement of carbon in forests, however, is a cycle: trees grow, taking carbon from the atmosphere, accumulating and storing it throughout their lives; and as trees die, some of this carbon is—slowly—released back into the atmosphere as they decompose. This cycle may be different species to species and depending on local conditions.

In some circumstances, actively managing forests can enhance a forest's ability to capture and store carbon. This includes managing tree density to increase carbon sequestration by trees. Moreover, keeping forests intact in coves and along streams so that they can keep water temperatures cool as temperatures rise is another way forest management can help reduce impacts of climate change. When forests are cleared to make way for other land-uses, such as development, they can obviously no longer provide their climate change resiliency services: trees cannot shade streams or sequester carbon if they are removed and replaced with agriculture or development.

Climate change will likely impact the character of Canaan's forests. While tree species composition in the Northeastern forests has been changing for millennia, with relatively recent increased temperature and precipitation in the region caused by human induced climate change, suitable habitat for various northern hardwood species is becoming scarcer in our region (Rustad et al., 2011). This will likely lead to a gradual change in tree species composition in Canaan's forests, as the northern tree species (e.g., northern hardwoods) are replaced by those that are better adapted to warmer climates (e.g., oaks and hickories). This change may take decades or even centuries to occur, and it is impossible to predict how much of the northern hardwood forests in Canaan will be lost as a result of climate change.

Figure 6. Red Squirrel (Tamiasciurus hudsonicus) is a native forest animal that is important prey to many mammal and bird species. Photo © Patricia Liddle

Farmland is the second most common land-use in Canaan, covering about 11 percent of the town. While sparse compared to forest, farmland is an important component of this landscape; it is economically vital for many who live in Canaan today. Historically, farming was essential to Canaan's overall economy. In 1875, Canaan had 200 farms that collectively sold $84,000 (without adjusting for inflation) in products that year (Stott, 2007). Because of the history of agriculture in Canaan, farming remains an important cultural asset of the town.

Farmland in Canaan also has ecological value. In this mostly forested town, farmland offers different habitats, and supports plants and animals that otherwise would not thrive in Canaan. Some birds found in Canaan, such as Bobolink (Dolichonyx oryzivorus), a species of conservation concern across much of its range due to grassland decline, would likely not exist in the town were it not for farmland. How these open areas, fields, pastures, and croplands are managed determines their value for wildlife.

Using a Land Evaluation and Site Assessment (LESA) model, the Columbia County Agricultural and Farmland Protection Plan has outlined "priority farmland" in Canaan that should be preserved and kept in agriculture because of its soil, water, historical value and/or ecological significance. Protecting these areas from development that would hinder or prevent its use as farmland is crucial for long term viability of agriculture in Canaan. Such farmland is highlighted in Map 9.

Figure 7. Hayfields in Canaan. Photo © Dylan Cipkowski

Canaan's Forests: A Regional Perspective

When looking at the forested hills in the eastern part of Canaan (Figure 8), it might not be apparent that these woods are part of something regionally unique—a 254 thousand acre largely intact northern hardwood forest along the Taconic Mountains that spans several Northeastern states (Map 8). This impressive stretch of forest is considered a "Significant Biodiversity Area" by the New York Natural Heritage Program (NYNHP) given its distinctive geology, hydrology, and biology that distinguishes it from other parts of the landscape. Therefore, it is the regional context of Canaan's eastern woods that makes them important; this is worth considering during town planning. Such forests are important for species like Fisher (*Pekania pennanti*) and Moose (*Alces alces*), animals that were once extirpated in Canaan but have since returned. (While Moose likely do not have breeding populations in the town, there are confirmed reports of them passing through, as they disperse from more permanent parts of their range in the Berkshires.) Various bird species found in Canaan also depend on large forests.

There is at least one regionally significant forest type in Canaan, a kind of "natural community", that is nested within the above-mentioned eastern woods of Canaan. Natural communities are recurring communities of plants and animals that tend to occur in particular physical environments. For example, pitch pine-scrub oak barrens, a natural community found at Albany Pine Bush, occur in sandy-well drained soils that have occasional fires. While we do not have pine barrens in Canaan, one of the town's ridgelines is home to a beech-maple mesic forest (Map 10) considered significant by the NYNHP. It is a natural community more typical of the Adirondacks and other northern/high altitude parts of our region

than Canaan, and the example found in Canaan is exceptional. As its name suggests, trees in beech-maple mesic forest are dominantly Sugar Maple and American Beech. In spring, before leaf-out of the canopy, spring ephemeral wildflowers are abundant on the forest floor. Major threats to the beech-maple mesic forest in Canaan includes forest fragmentation from forest clearing for development, including new roads, driveways, and structures.

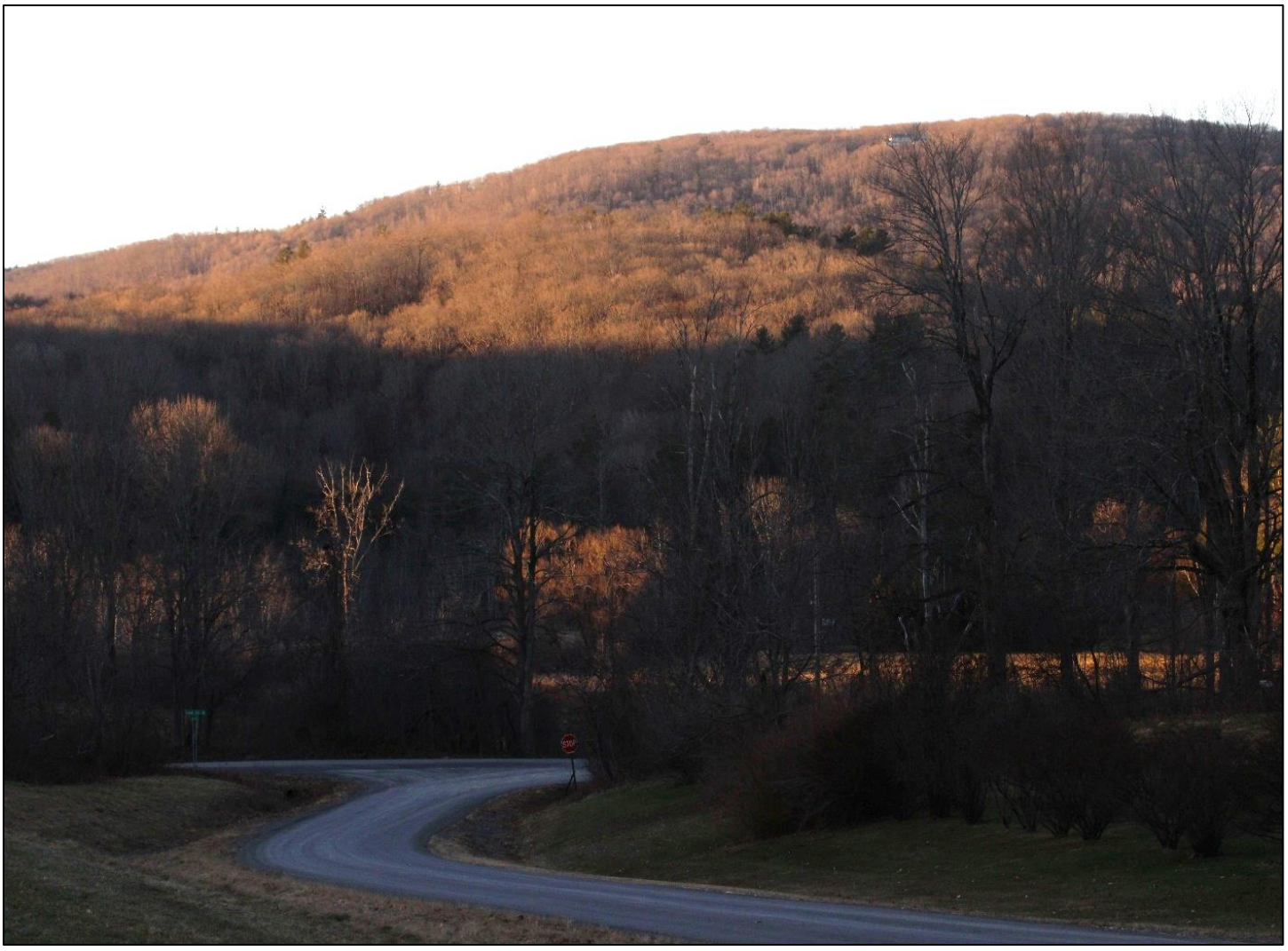
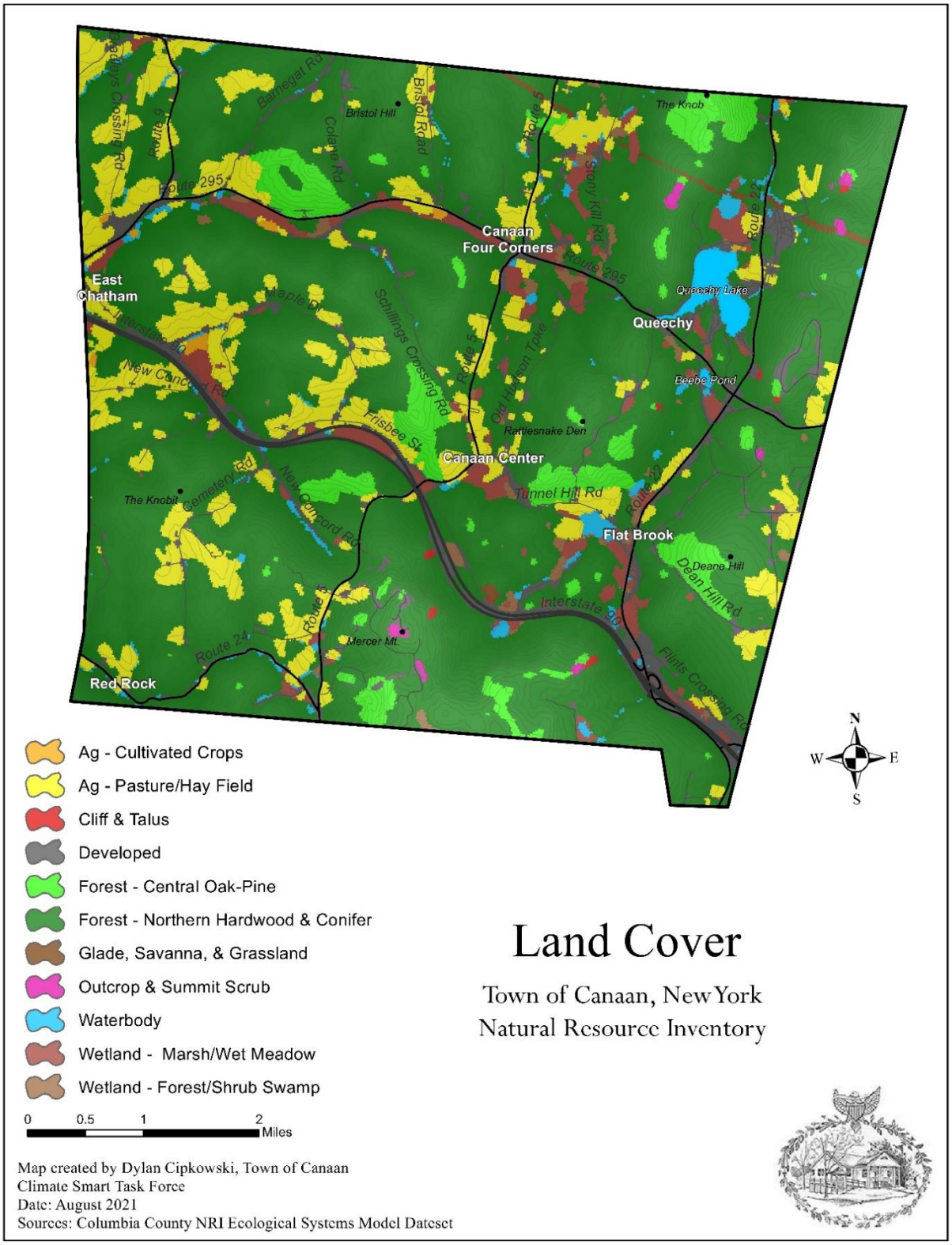


Figure 8. From Old Hudson Turnpike looking south, a view of Mercer Mountain and a glimpse of the expansive forests of eastern Canaan, NY. Photo © Dylan Cipkowski

Map 7


Canaan
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Chatham
Queechy
Queechy Lake
Beebe Pond
Canaan Center
Rattlesnake Den
Flat Brook
Deane Hill
Red Rock
Mercer Mt.
The Knob
Bristol Hill
Tunnel Hill Rd
Dean Hill Rd
Flints Crossing Rd
Schillings Crossing Rd
Stony Kill Rd
Frisbee St
Cemetery Rd
New Concord Rd
Barnegat Rd
Bristol Road
Colarusso Rd
Maple Dr
Old Hudson Turnpike
Route 295
Route 22
Route 5
Route 9
Route 24
Interstate 90
Ag - Cultivated Crops
Ag - Pasture/Hay Field
Cliff & Talus
Developed
Forest - Central Oak-Pine
Forest - Northern Hardwood & Conifer
Glade, Savanna, & Grassland
Outcrop & Summit Scrub
Waterbody
Wetland - Marsh/Wet Meadow
Wetland - Forest/Shrub Swamp
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Miles
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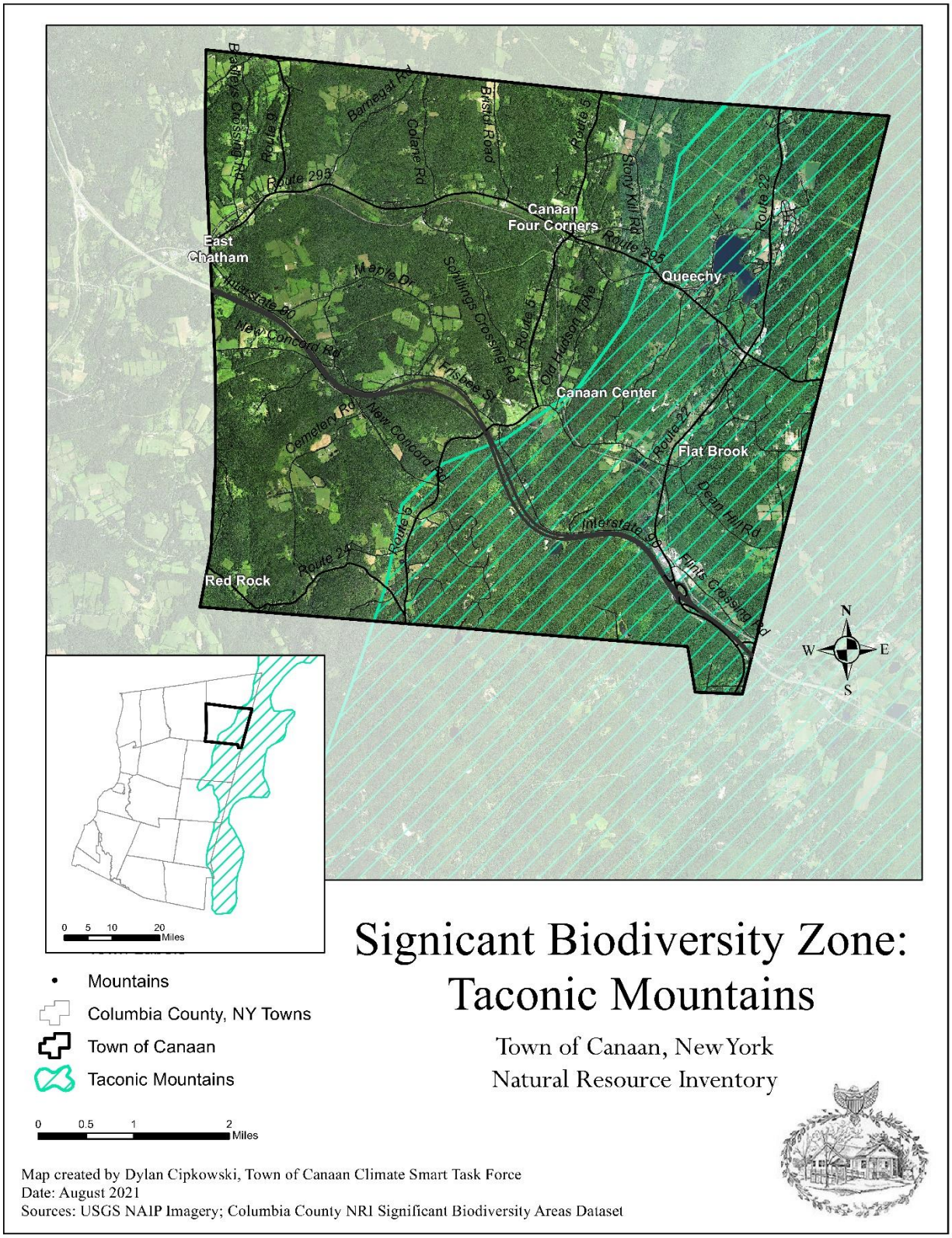
Land Cover
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan
Climate Smart Task Force
Date: August 2021
Sources: Columbia County NRI Ecological Systems Model Dataset

Map 8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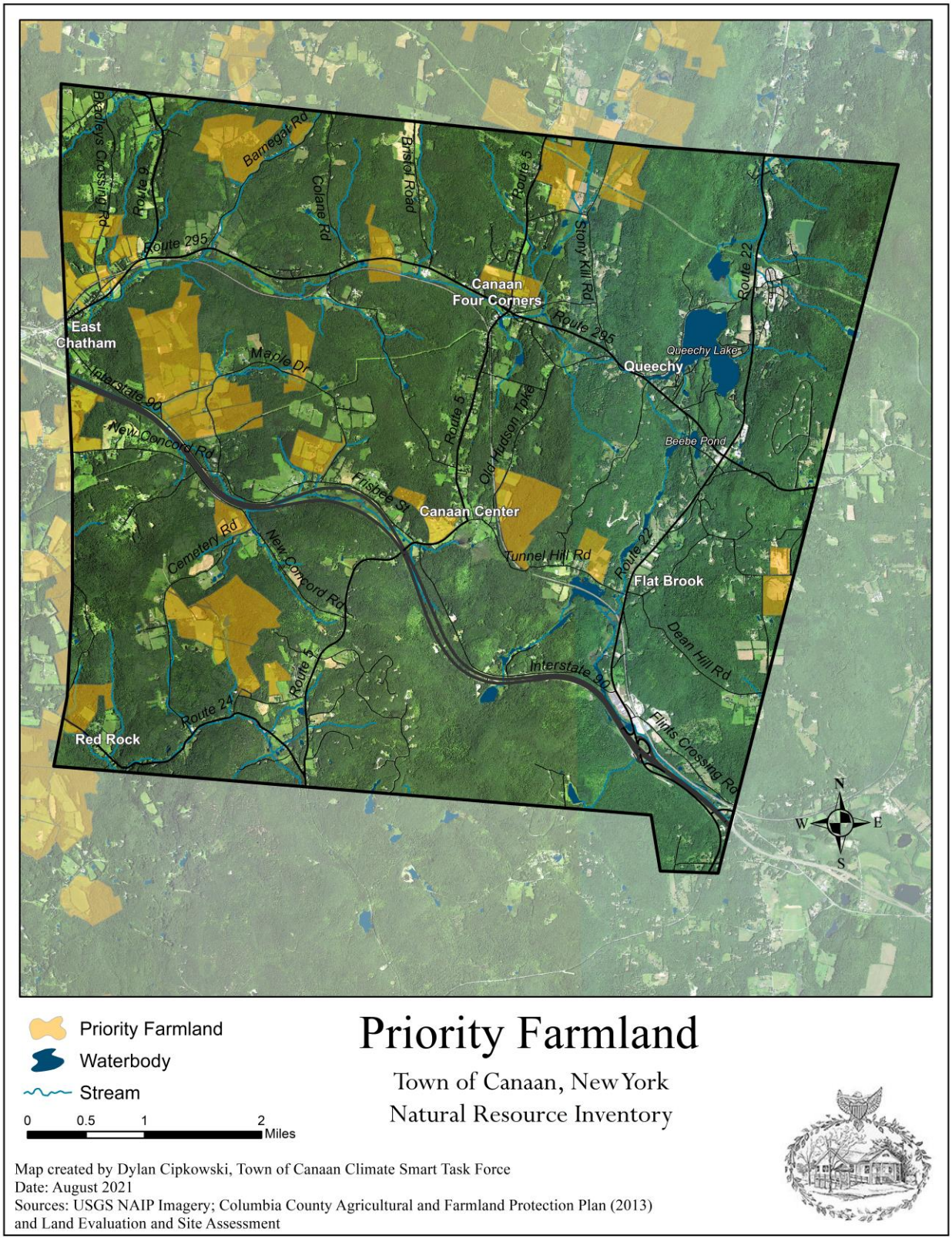
Taconic Mountains
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS NAIP Imagery; Columbia County NRI Significant Biodiversity Areas Dataset

Map 9


Priority Farmland
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Priority Farmland
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS NAIP Imagery; Columbia County Agricultural and Farmland Protection Plan (2013) and Land Evaluation and Site Assessment
Canaan Four Corners
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Queechy
Canaan Center
Flat Brook
Red Rock
Queechy Lake
Beebe Pond
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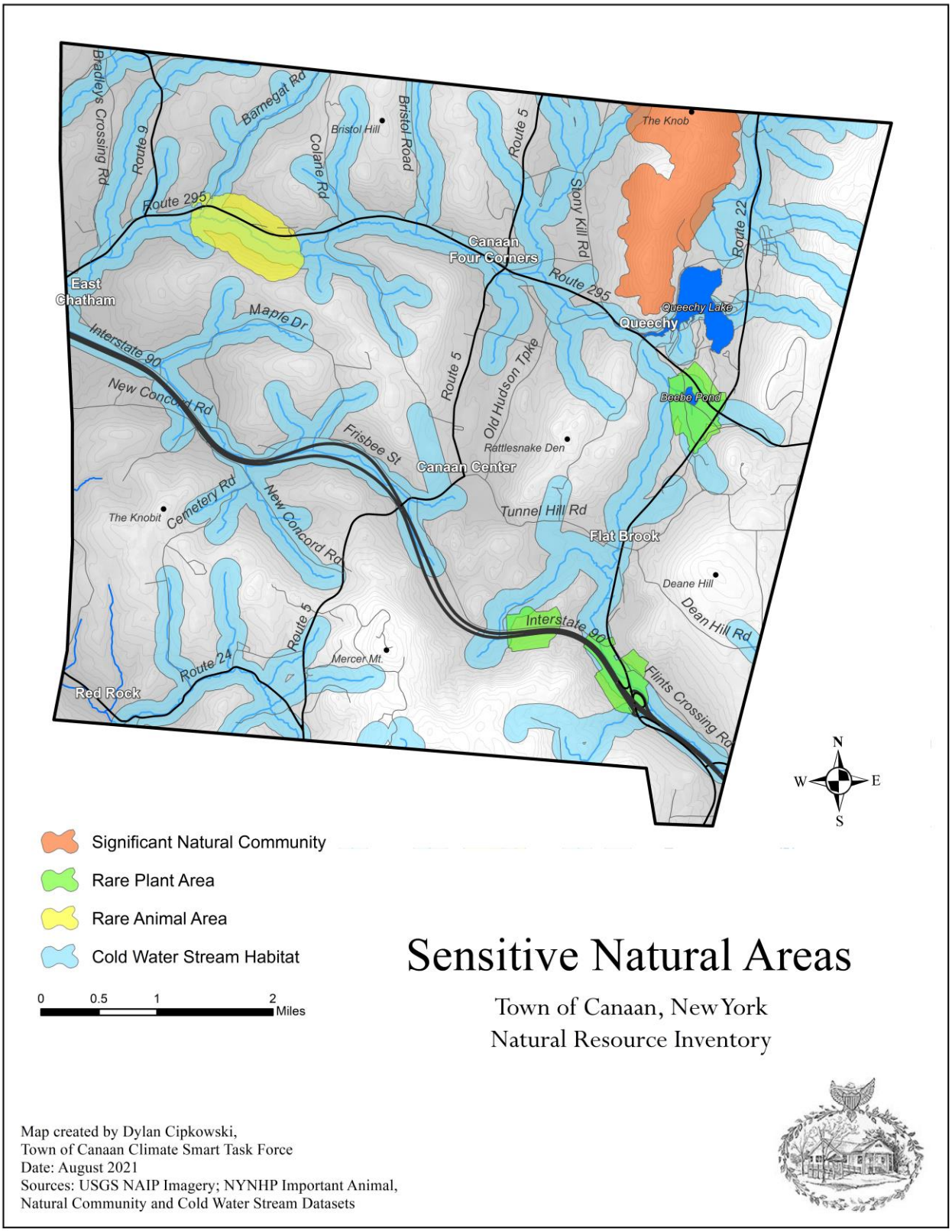
Map 10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Cemetery Rd
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Tunnel Hill Rd
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Interstate 90
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Significant Natural Community
Rare Plant Area
Rare Animal Area
Cold Water Stream Habitat
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Sensitive Natural Areas
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski,
Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS NAIP Imagery; NYNHP Important Animal,
Natural Community and Cold Water Stream Datasets

Water Resources

According to the ClimAID Synthesis Report for New York State (2011), the Hudson Valley may see annual precipitation increase by 10% by the year 2080. Given this, identifying where flooding might occur, how run-off having potentially harmful pollutants might impact communities, and how different subwatersheds are affected following significant rainfall events may contribute to the town's climate change resiliency.

Most of Canaan is part of the Hudson River Watershed (Map 12). The southeast portion of the town, however, flows into another major watershed of the Northeast—the Housatonic Watershed. Nested in these major drainages are numerous subwatersheds. The Stony Kill subwatershed is by far the largest in Canaan; it includes Queechy Lake, its outlet, and much of the central and northwestern parts of Canaan. This large subwatershed of Canaan and two others, the Kline Kill and Wyomanock Creek, eventually enter the Hudson River. The second largest subwatershed in the town, the Williams River drainage, belongs to the Housatonic, as does the Green River subwatershed, which covers a relatively small area of the town near the Canaan-Austerlitz border.

Figure 9. A Brook Trout from Essex County, NY; This species has white rimmed fins and spots lighter than its body. These characteristics set it apart from the non-native Brown and Rainbow Trout (Salmo trutta, Oncorhynchus mykiss) that also inhabit waters in Canaan. Photo © Dylan Cipkowski

Various wetlands, ponds and streams are located within Canaan (Map 11); for many people, the most well-known is Queechy Lake (Figure 13). The 140-acre lake lies in the northeastern part of the town, just west of Route 22, and has its own aptly named hamlet— "Queechy". There is a DEC Cartop Boat Launch offering public lake access. Numerous houses and "camps" are situated on the lake's shoreline. New York State Department of Conservation (DEC), reports that Queechy Lake is home various warm and cold-water fish species, including two non-native trout species that are stocked annually. According to an 1891 newspaper article in *The Columbian Republican*, the Queechy Lake used to be stocked with Lake

Trout (*Salvelinus namaycush*), a native species, maybe because it was then known as a naturally occurring fish in the lake. In any case, no native species of trout exist in the lake anymore. Recent research has assessed that Queechy Lake's water quality is relatively good compared to other lakes in the area (CSLAP, 2018). Routine water quality monitoring is performed by Queechy Lake Club, Inc., an organization more than a hundred years operating that works to preserve the beauty and character of Queechy Lake.

Notable streams in Canaan include the Stony Kill, Frisbee Creek, Indian Creek, Flat Brook and the South Branch of Wyomanock Creek (Map 11). As streams drain the town's higher elevations, they create important cold-water habitat for species like Brook Trout (Figure 9) and Southern Pygmy Clubtail (*Lanthus vernalis;* Figure 10). As shown in Map 10, many of Canaan's streams and their buffer zones have been designated "Important Area—Cold Water Stream Habitat" by the NYNHP. These streams are said to be capable of supporting naturally reproducing Brook Trout populations (persist without stocking) as well as other cold-water dependent species. Many streams, especially those that do not flow all year round, are missing from maps, and yet are key parts of healthy stream systems and watersheds.

An important habitat component for local cold-water stream dependent species is shade from trees. Trees shade streams during the warmest time of the year, keeping the water cooler, which helps create suitable habitat for populations of Brook Trout, Southern Pygmy Clubtail dragonfly and other species of cold-water streams. Vegetation along streams also help filter potentially harmful pollutants before they enter the water. Thus, protecting areas around cold-water streams (see cold-water stream habitat in Map 11) from development or other disturbances that might reduce shade and vegetation is an important conservation strategy for protecting the town's water quality, aquatic habitats and the animals that depend on them.

Canaan's valleys are dotted and lined by various wetlands (Map 11; Figure 11); some of them are expansive. Gentle elevations, streams and beavers have created long stretches of wetland around Stony Kill (along Route 295), Frisbee Creek (following Frisbee Creek and I-90), and Flat Brook (along Route 22 and I-90). Wetlands are a vital component of our ecosystems. The EPA calls wetlands "biological supermarkets" because of the high level of nutrients they produce and offer to wildlife (EPA, n.d.). Many wetlands have an abundance of fruit bearing native shrubs, like dogwood (*Cornus* spp.) and viburnum (*Viburnum* spp.), that are important food resources for various bird and mammal species. Wetlands are also

Figure 10*. A Southern Pygmy Clubtail, a NYS S1 (critically imperiled) species photographed along Queechy Brook in Canaan, NY. Photo © Dylan Cipkowski*

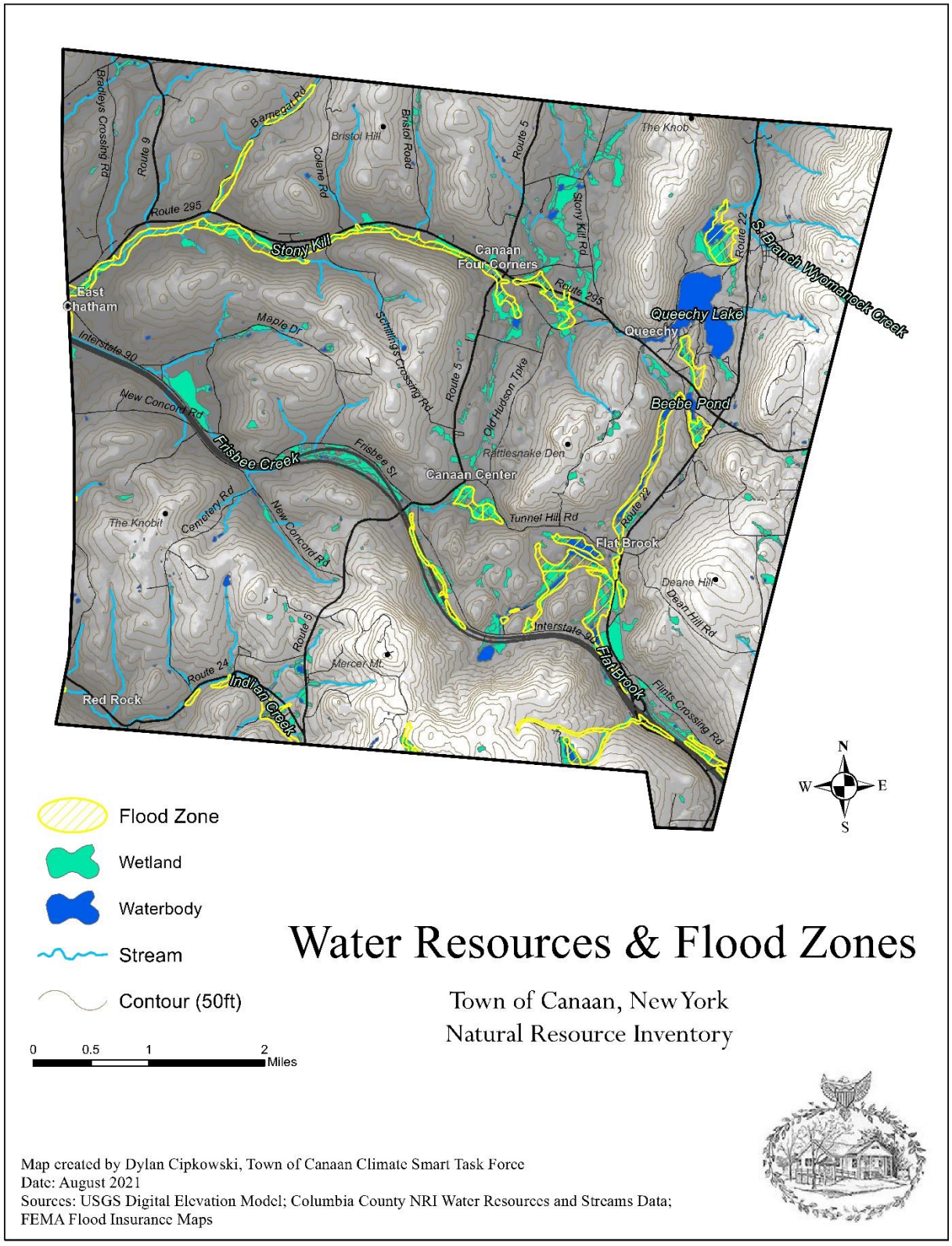
linked to the persistence of species of conservation concern: more than one third of threatened or endangered plant and animal species in the US live only in wetlands (EPA, n.d.). In Canaan, several wetlands have been deemed “Significant Areas” by the NYNHP because they are home to rare species of plants and animals (see Map 10).

Wetlands also play an important role in climate change mitigation. Wetlands help prevent flooding during extreme rainfall events because they are able to store and then slowly release large influxes of water, reducing flood heights. In this way, wetlands help reduce property damage, erosion and other negative impacts caused by flooding. Protecting wetlands, therefore, helps protect human property and well-being, and also biodiversity and ecosystem functioning.

Figure 11. A large wetland associated with Flat Brook expands along Route 22 and Tunnel Hill Rd. Photo © Dylan Cipkowski

Figure 12. A handsome buck approaches a beaver dam in a large Canaan wetland. Photo © Patricia Liddle

Map 11

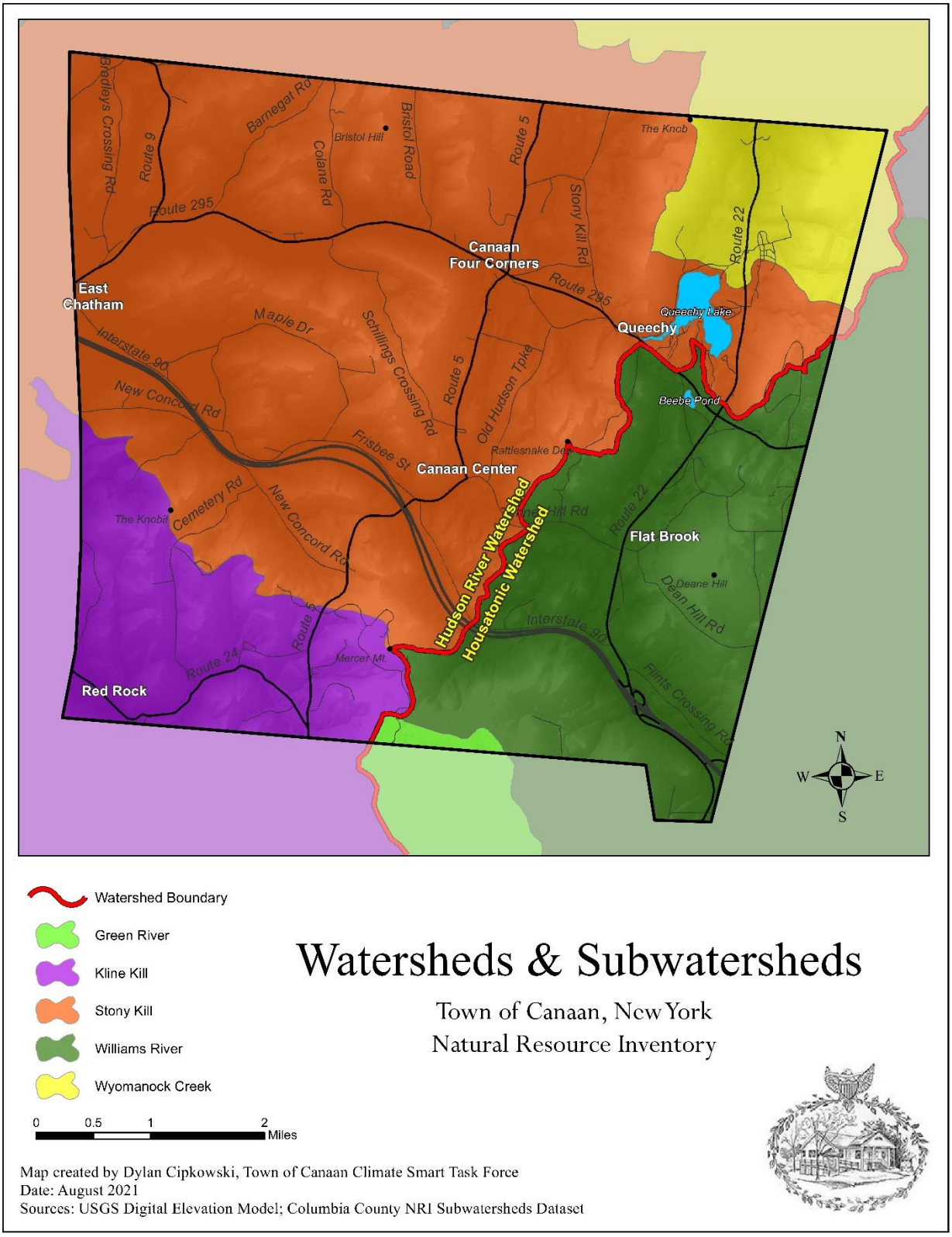


Water Resources & Flood Zones

Town of Canaan, New York
Natural Resource Inventory

Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS Digital Elevation Model; Columbia County NRI Water Resources and Streams Data; FEMA Flood Insurance Maps

Map 12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Old Hudson Tpke
Queechy Lake
Queechy
Route 295
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New Concord Rd
Beebe Pond
Rattlesnake Den
Frisbee St
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The Knobit
Cemetery Rd
New Concord Rd
Hudson River Watershed
Housatonic Watershed
Flat Brook
Route 22
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Interstate 90
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Green River
Kline Kill
Stony Kill
Williams River
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Miles
Watersheds & Subwatersheds
Town of Canaan, New York
Natural Resource Inventory
Map created by Dylan Cipkowski, Town of Canaan Climate Smart Task Force
Date: August 2021
Sources: USGS Digital Elevation Model; Columbia County NRI Subwatersheds Dataset

Figure 13. Queechy Lake from the DEC Cartop Boat Launch. Photo © Dylan Cipkowski

Community Involvement

To enhance this NRI and involve the local community, the Canaan Climate Smart Community Task Force established the Canaan Biodiversity project. This project utilizes a community science platform called "iNaturalist" to involve the Canaan community and visitors to the town in documenting biodiversity. All one has to do to participate is create an iNaturalist account (it's free) and then photograph any plant, animal or fungi observed in Canaan using the iNaturalist app; this constitutes as an "observation" and the date and place of the observation is automatically associated with the photograph. Once a photo is submitted, professional and amateur naturalists from around the world help identify the species observed. The data can then contribute to small and large-scale projects alike. All observations made in Canaan are automatically added to the Canaan Biodiversity Project.

So far, nearly 1,000 observations have been made in Canaan by more than 100 different Canaan community members and visitors. Of these observations, about 500 different species of plant, animal or fungi have so far been identified, including species of conservation concern in New York State. Species observed so far include: White Morel mushrooms (*Morchella americana*; a culinary delicacy), the Tricolored Bumblebee (*Bombus ternarius;* a vulnerable species in NYS), North American Porcupine (*Erethizon dorsatum*), the native wildflower Northern Evening Primrose (*Oenothera parviflora*) and many more. This component of the Canaan NRI to be ongoing. Data regarding species documented can be accessed through iNaturalist (link above or search "Canaan Biodiversity Project" in iNaturalist). For questions about this iNaturalist project you can contact Dylan Cipkowski (dacipkowski@gmail.com).

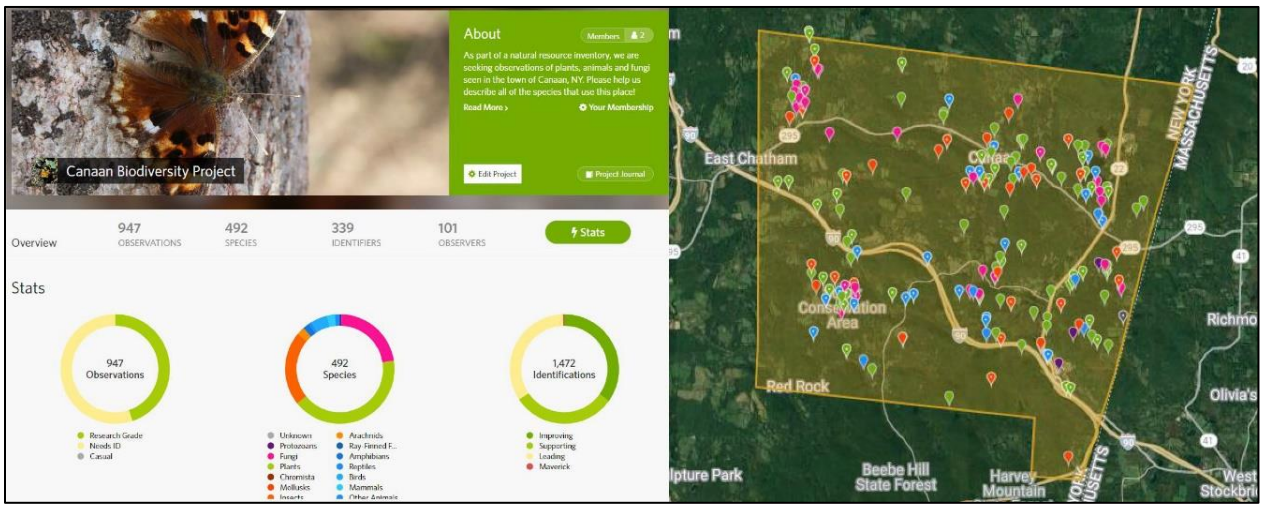

Figure 14. A screenshot of the Canaan Biodiversity Project iNaturalist page showing statistics for the project and observation locations in Canaan

Acknowledgements

Thank you to the authors and contributors of the Columbia County Natural Resource Inventory—without your work we could not have made this; to Tara Donadio and Jill Henck of the Capital District Regional Planning Commission for their continued support during various initiatives of this task force; to Brenda Adams, Town of Canaan Supervisor, for her support for this project and dedication to conservation initiatives in Canaan; the Town Board of Canaan for their interest and support for this project; to NYSERDA for their support; to Canaan resident and naturalist Patricia Liddle for contributing her inspiring photographs of Canaan wildlife for use in this report.

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