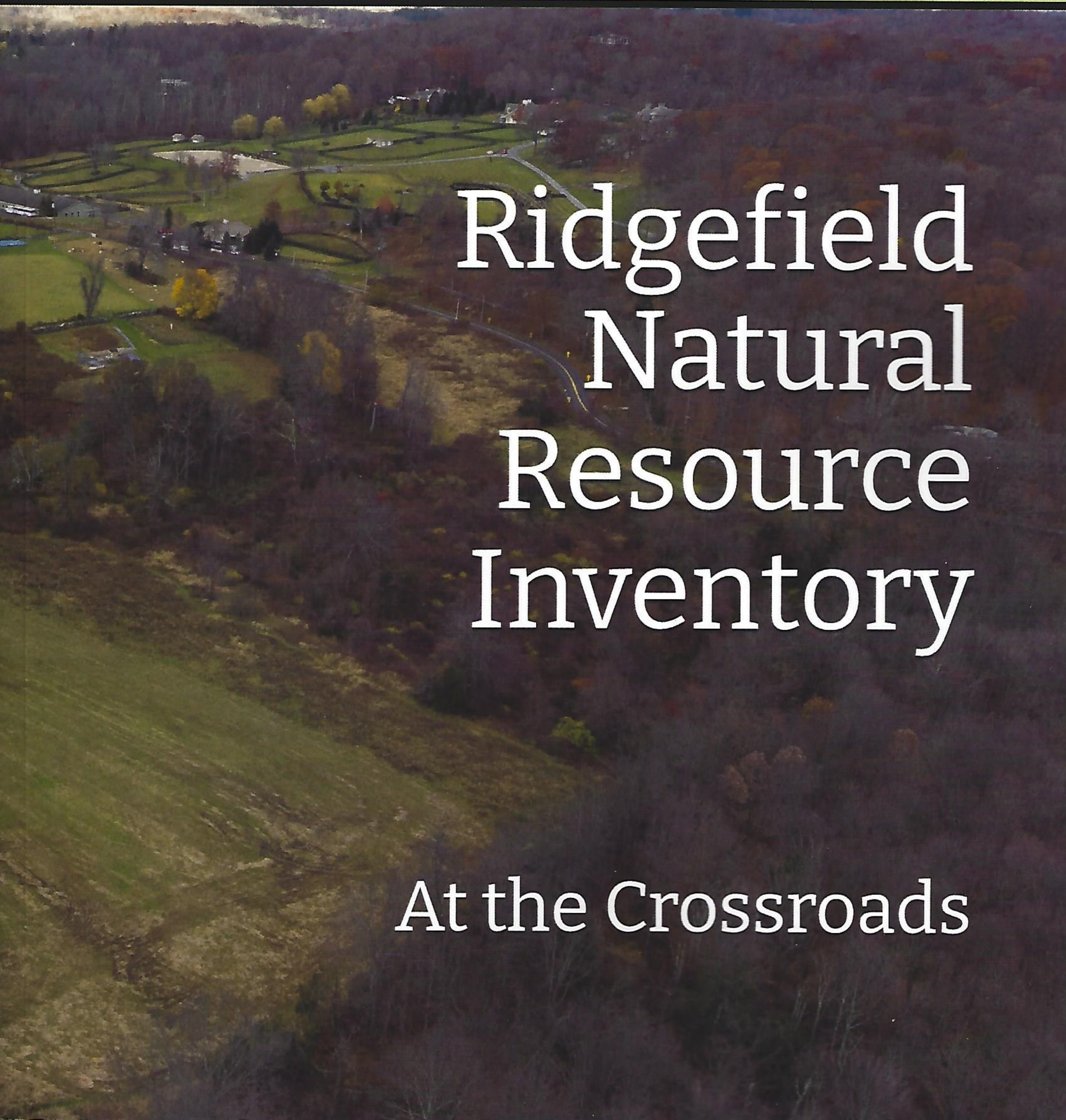
Ridgefield Conservation Commission

Ridgefield Natural Resource Inventory

At the Crossroads



RIDGEFIELD NATURAL RESOURCE INVENTORY

November 2023

James Coyle

Erik Keller

Jean Linville

Cover photo: Jonathan Thompson

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List of Acronyms and Abbreviations

APA	Aquifer Protection Agency
CAES	Connecticut Agricultural Experiment Station
CLEAR	Center for Land Use Education and Research (UConn)
DEEP	Department of Energy and Environmental Protection (Connecticut)
FoSA	Focal Species Approach
H2H	Hudson to Housatonic
IWB	Inland Wetlands Board (Ridgefield)
NABA	North American Butterfly Association
NDDB	Natural Diversity Database (DEEP)
NRCS	Natural Resource Conservation Service
NRI	Natural Resource Inventory
P&Z	Planning and Zoning
RBV	Riffle Bioassessment by Volunteers (DEEP)
RCC	Ridgefield Conservation Commission
UConn	University of Connecticut
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency

1 Introduction

The current inventory of natural resources is unlikely to remain static (or improve) unless actions are taken to protect water resources, open space land, and areas of high conservation value.

Since the publication of the last Natural Resource Inventory (NRI) in 2012, Ridgefield has experienced less degradation in its ecosystems than might be expected. Though certain species that were on the margin of survival in 2012 are no longer found in Town and there has been a slight decrease in forested and other pristine areas, many core assets are similar to those observed over a decade ago. (Certain changes, such as loss of hemlock, ash (and potentially beech) trees, are out of the Town's control, being part of larger regional trends.) The destructive expansion of invasive species and decay of habitat corridors represent the largest threats to the Town's natural resource inventory.

1.1 A Brief Overview of Ridgefield

Ridgefield was settled by English colonists from Norwalk and Milford in 1708 and incorporated under a royal charter in 1709. Ridgefield has a land-use history typical of much of southern New England that includes clearing of the virgin forest, agriculture and pasturage that slowed in the early nineteenth century with the availability of more productive lands in the Midwestern United States. This was followed by a period of reforestation, which reached an apogee in the first half of the 20th century and then declined, replaced by rapid development. Ridgefield's population grew from 6,703 in 1950 to 25,033 in 2020.

Initial industrialization in the Town was concentrated in areas where waterpower and railroad access were available, exemplified by the hamlet of Branchville, whereas other hamlets such as Ridgebury were more agrarian in nature. As land succeeded from field to forest, transitional habitats were created, including overgrown fields and shrublands. These remaining areas are presently among Ridgefield's rarest natural spaces, providing critical habitat to bird, mammal, reptile, amphibian, and insect species.

The land of Ridgefield exhibits a wide natural diversity, which is influenced by both coastal and highland ecoregions, as well as the diversity of bedrock and surficial geology. Despite its proximity to the coastline, its rocky upland terrain contains some of the highest elevations and ridges in southwestern Connecticut. The headwaters for several streams and rivers that drain into the Hudson river, as well as the Housatonic, Norwalk and Saugatuck rivers, emerge from these heights before finding their way into Upper Bay and Long Island Sound, respectively.

These formerly pristine environments, however, bear the scars of human development. The landscape is laced with stone walls, which are evidence of past attempts to tame and manage the rocky soils for cropland and pasture. Small dams can be found on many of the streams and rivers that at one time created impoundments that provided water power for industry. One such example is the dam and old millhouse at the intersection of Florida Hill Road and Route 7. These impoundments create different still water (lentic) aquatic habitats, when compared to the flowing (lotic) habitats below each dam.

The railroad spur from Branchville to Ridgefield's village center has been abandoned, now serving as a rail trail. A walk along the rail trail provides a view on how the construction of an elevated rail bed and the embankments and culverts creates distinctive wetland habitats on either side of the elevated walking path. The dry embankments serve as habitat for many creatures, including basking and nesting areas for turtles and snakes.

Like so many of its neighboring towns, Ridgefield faces the challenge to maintain the rich diversity of species and habitats that occur within its 35 square miles. While some may argue that *progress* dictates the continued loss of species, habitats, and diversity to development, there is an alternative scenario:

Through knowledge and more informed land-use decisions, Ridgefield can maintain sufficient interconnected areas of natural habitat to allow for the protection and enhancement of its remarkable biological heritage.

1.2 Natural Resource Inventory Background

A natural resource inventory (NRI) compiles information on important, naturally occurring features within a given locality (town, watershed, or region). These features are the geology, soils, streams, wetlands, forests, and wildlife that are present within a defined area. NRIs are often composed of maps, data, and a report that describes such resources. NRIs are useful aids to visualize an area's resources—where they occur and how they relate to each other and to existing development. Additionally, an NRI can provide a foundation for informed land-use planning and also serve as the basis to identify conservation priorities and strategies including open-space protection and the need to assess wildlife habitat.

The Town of Ridgefield published its first Natural Resource Inventory in 2012 through a partnership with the Ridgefield Conservation Commission (RCC) and the Metropolitan Conservation Alliance, a program of the Cary Institute of Ecosystem Studies. In 2021, the Ridgefield Conservation Commission decided to update the 2012 NRI. To achieve this goal, the RCC partnered with Woodcock Nature Center, PACE University, Western Connecticut University, Ridgefield High School, and the Weir Farm National Historic Site. A wide variety of field experts and citizen scientists of all ages contributed to the update.

It is hoped that the newest incarnation of Ridgefield's NRI will become a living document. Though it catalogs both past and present knowledge, the RCC also recognizes that these are merely snapshots of what is an ever-evolving pattern of change. All of these resources will be stored and maintained on the RCC's website, https://www.ridgefieldct.gov/conservation-commission.

This NRI, taken in tandem with the Town's Plan of Conservation and Development (POCD), provides a blueprint to chart a more sustainable future for Ridgefield that is beneficial for all (both the human and non-human) inhabitants.

1.3 Acknowledgements

This study would not have been possible without the support, encouragement, and assistance of many individuals and organizations. They include:

- **Conservation Commission** – Several other members of the RCC also contributed to this effort including Roberta Barbieri, Allan Welby, and Kitsey Snow.

- **ECOmaps LLC** - Michelle Ford combined expertise with the wishes of the RCC to produce the informative maps appearing within this document.

- **Pace University** - Professor Michael Rubbo and his graduate students collected field data facilitating the creation of the Natural Resource Inventory Story Map (a link to this can be found on the RCC web site under the NRI tab). Professor Rubbo's field expertise and his willingness to oversee the work of several graduate students and community members on the collection of data was critical to the success of this update of the NRI and the development of a digital story map.

- **Jonathan Thompson** - Thompson visited numerous open-space sites around Town to visually document many of Ridgefield's natural resources using drone photography.

- **Weir Farm National Historic Site** - Kristen Lessard and her staff along with Christopher Tait, David Herberger, Lukas Keras, Ray Simpson, Zachary Chaves, Cathy Smith, and Victor DeMasi leant invaluable support to the NRI by hosting a 24-hour BioBlitz at the National Park in 2022. Kristen and her staff were extremely gracious with their time, tents, tables, and expertise making the event a resounding success.

- **Woodcock Nature Center -** Sarah Breznen and Tommy McCarthy coordinated many walks and talks throughout the Town engaging citizen scientists that provided "boots on the ground" observations of a variety of habitats.

2 Geology and Soils

Geology is the foundation upon which wildlife habitats are built, driving the hydrology and vegetation that develops upon the landscape. Geology can be described in two parts: bedrock and surficial. Bedrock refers to the layer of solid rock located below the soil as well as glacial deposits. Ridgefield's bedrock consists of gneiss, schist, and marble. Surficial geology refers to the unconsolidated material overlying the bedrock including underlying soil. In Connecticut, this material can range from a few to several hundred feet in thickness. Most of the unconsolidated materials are deposits from continental glaciers that covered all of New England during the Pleistocene glaciations. These glacial deposits are divided into three broad categories, glacial ice-laid deposits (tills), glacial meltwater deposits (stratified drifts), and postglacial deposits (alluvial and swamp deposits).

The word *soil* refers to the first few feet of material below the ground's surface that is subject to weathering and decomposition. Soil is a complex of mineral (weathered rock) and organic material (bacteria, fungi, and microorganisms).

Soil provides five important social and biological functions:

- Medium for plant growth.
- Key mechanism to control the hydrologic cycle.
- Natural recycling system, assimilating waste and decomposing materials for reuse.
- Habitat for a wide variety of organisms.
- Engineering medium, providing the foundation for every road and dwelling (Brady and Weil, 1999).

2.1 Bedrock and Surficial Geology

2.1.1 Bedrock

Ridgefield's bedrock geology is illustrated on Figure 2-1. (For definitions of terms that appear on this figure and others in the NRI, please refer to the glossary.) Ridgefield is located within a region known as the Connecticut Western Uplands. The Western Uplands contains two major landscape regions known as the Northwest Highlands and the Southwest Hills. These regions are divided along a line that runs roughly from the Town of Canton to Ridgefield (Bell, 1985).

The northwest portion of Ridgefield, north of Route 35, is located within the Northwest Highlands region. Ridgefield is part of the Southern Marble Valley described by Bell (1985), dominated by dolomitic and schistose marble. Marble is derived from metamorphic limestone, a sedimentary rock composed mostly of carbonate mud and the shell fragments of marine fossils. These materials weather easily, resulting in a highly-erodible landform. Over time, the slightly-acidic rainwater has eroded wide, deep lowlands between ridgelines.

Ridgefield's marble valleys contain many of the Town's largest lakes and ponds, including Lake Windwing, Rainbow Lake, Fox Hill Lake, Mamanasco Lake, and Pierrepont Lake. Pumping Station Swamp and Great Swamp also occur within marble valleys.

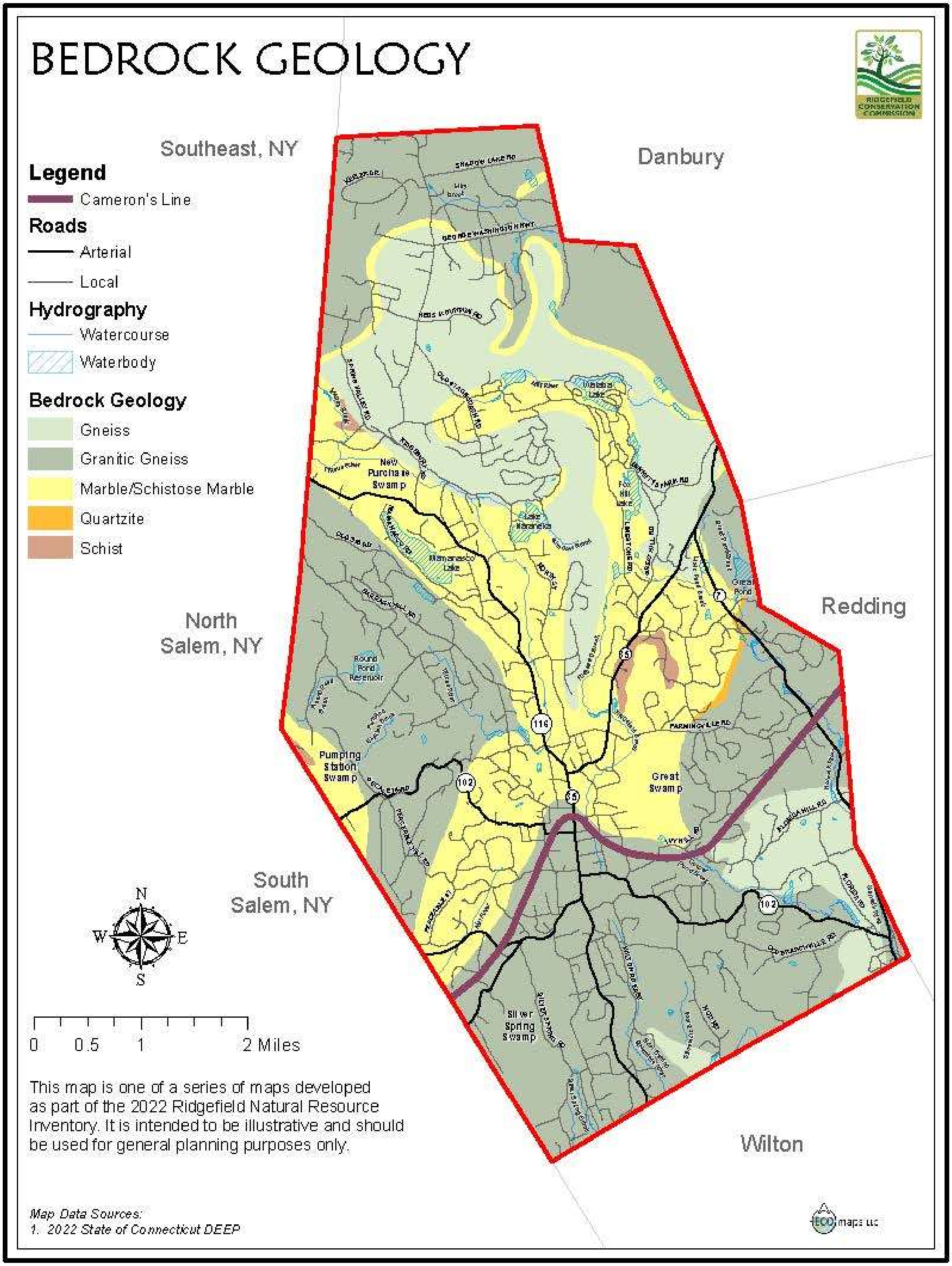

Figure 2-1: Bedrock Geology

The southern portion of Town (mostly south of Route 35) is located within the Southwest Hills region. The Southwest Hills region is characterized by metamorphic rock aligned predominately north-south.

A unique geologic feature, known as Cameron's Line, divides the Northwest Highlands from the Southwest Hills in Ridgefield. Cameron's Line is a geologic fault that runs through Ridgefield, diagonally south to Manhattan and north to the northeastern edge of Litchfield County and into New England as shown on Figure 2-1. This fault marks the boundary of the ancient North American continent. The basement rocks (see glossary) of the Manhattan Formation located on the western side of Cameron's Line are metamorphosed sedimentary rocks and can be thought of as the remnants of the edge of the North American continent from 1 billion years ago. East of the line is generally characterized by allochthonous rocks formed elsewhere, which experienced great tectonic movement in a westward direction and on top of the underlying bedrock. The Hemlock Hills and Pine Mountain open spaces are evidence of the geologic history of folding and contorting of the bedrock that occurred along Cameron's Line.

2.1.2 Surficial Geology

Ridgefield's surficial geology is illustrated on Figure 2-2 and Table 2-1. Most widespread is the glacial deposit known as till that was laid down by glacial ice directly. Till is characterized by a non-sorted matrix of sand, silt, and clay with variable amounts of stones and large boulders. Glacial meltwater deposits are concentrated in both small and large valleys and were laid down by glacial meltwater in streams and lakes in front of the retreating ice margin during deglaciation. These deposits are characterized by layers of well- to poorly-sorted gravel, sand, silt, and clay. Postglacial sediments, primarily floodplain alluvium and swamp deposits, make up a lesser proportion of the unconsolidated materials found in Connecticut. Alluvium is glacial material reworked during stream and river flooding, and therefore has similar physical characteristics of its glacial parent material. Swamp deposits refer to muck and peat that contain minor amounts of sand, silt, and clay, accumulated in poorly drained areas. Most swamp deposits are less than 10 feet in depth and are underlain by either glacial deposits or bedrock.

2.2 Slopes

Ridgefield's name derives from the ridgelines and hills that define the rugged terrain of the Town. (Ridge tops are important travel corridors for area-sensitive carnivores such as the bobcat.) This topographic relief is visible on Figure 2-3. The ridges and their corresponding valleys determine the drainage patterns, settlement patterns, as well as the location of the major transportation routes within the Town, giving rise to various habitats associated with bedrock outcroppings and steep slopes. As the summit of many of the larger hills, such as Pine Mountain, is approached, the forest gives way to more open areas dominated by bedrock. Two other key habitat formations are those of ledge and talus slopes.

Ledge-slope habitat occurs when steep slopes intersect bedrock outcroppings. A good example of this type of formation can be found above the junction of Ridgebury and Mopus Bridge Roads, in the area of Ledges Road. These steep areas represent important habitat for snakes as well as a variety of wildflowers that are protected from deer browse by the topography of the slope. Talus slopes occur below ledges and

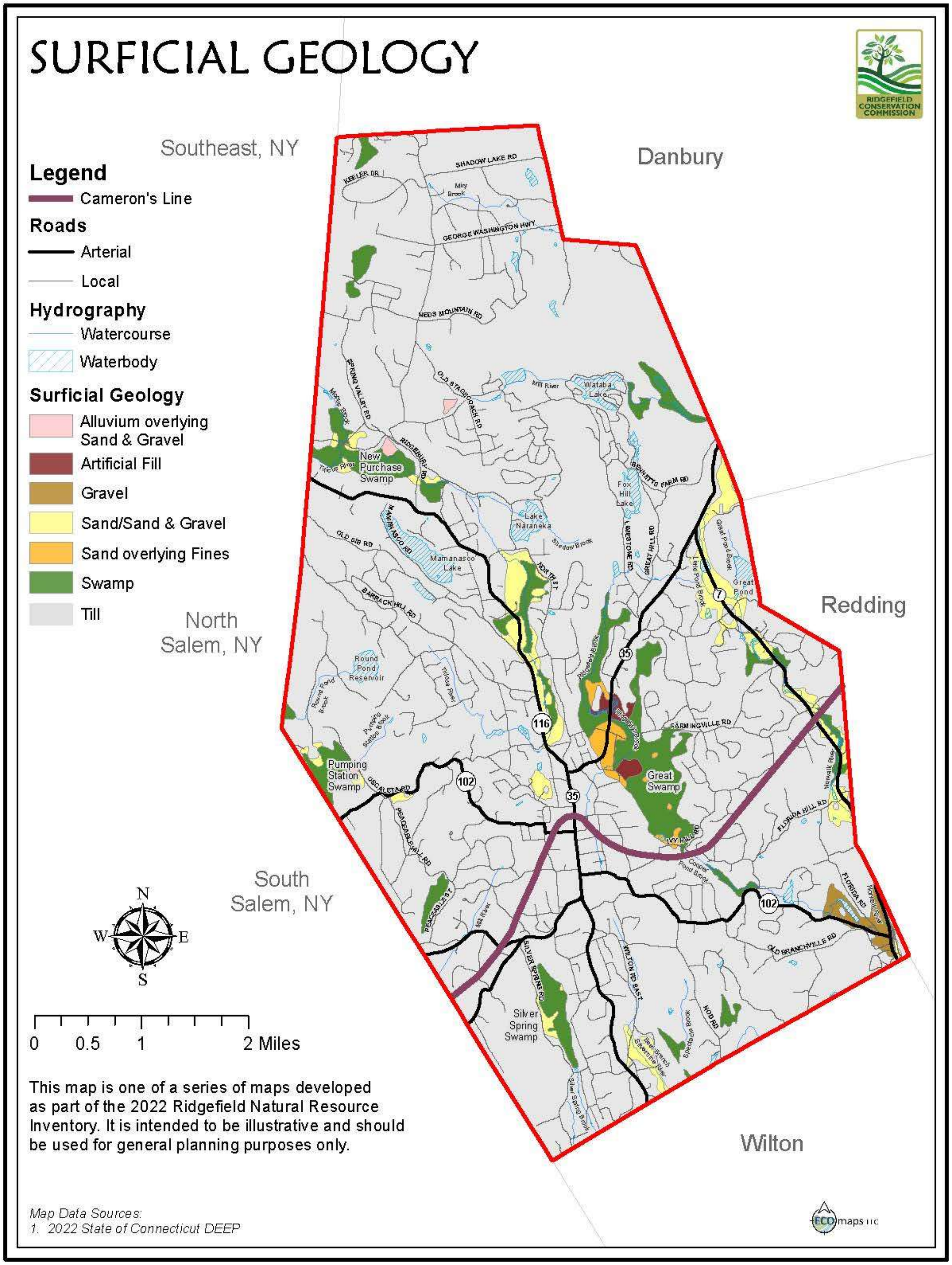

Figure 2-2: Surficial Geology

Table 2-1: Surficial Geologic Deposits of Ridgefield

Deposit	Extent	Location / Notes
Glacial Meltwater Deposits		
Alluvium overlying sand & gravel	Rare	Very limited in extent in valleys; generally under swamp deposits
Artificial fill	Rare	Developed areas; two small deposits bordering Great Swamp
Gravel	Rare	Two small deposits bordering Candees Pond, the Norwalk River, and Miller's Pond
Sand	Rare	Three deposits bordering the Titicus River, Ridgefield Brook, and East Branch Silvermine River
Sand & gravel	Uncommon	Pumping Station Swamp, Silver Spring Brook, Norwalk River, Miller's Pond, Titicus River, and Little Pond Brook
Sand overlying fines	Rare	Great Swamp
Swamp	Common	Swamps and stream valleys throughout Ridgefield
Swamp overlying fines	Rare	One deposit bordering Ridgefield Brook
Swamp overlying sand overlying fines	Rare	Underlies most of Great Swamp
Swamp overlying sand & gravel	Rare	Limited in extent along Ridgefield Brook
Glacial Ice-laid Deposits		
Thin till	Most common	Uplands
Thick till	Common	Throughout Ridgefield, predominately on ridgetops and highlands

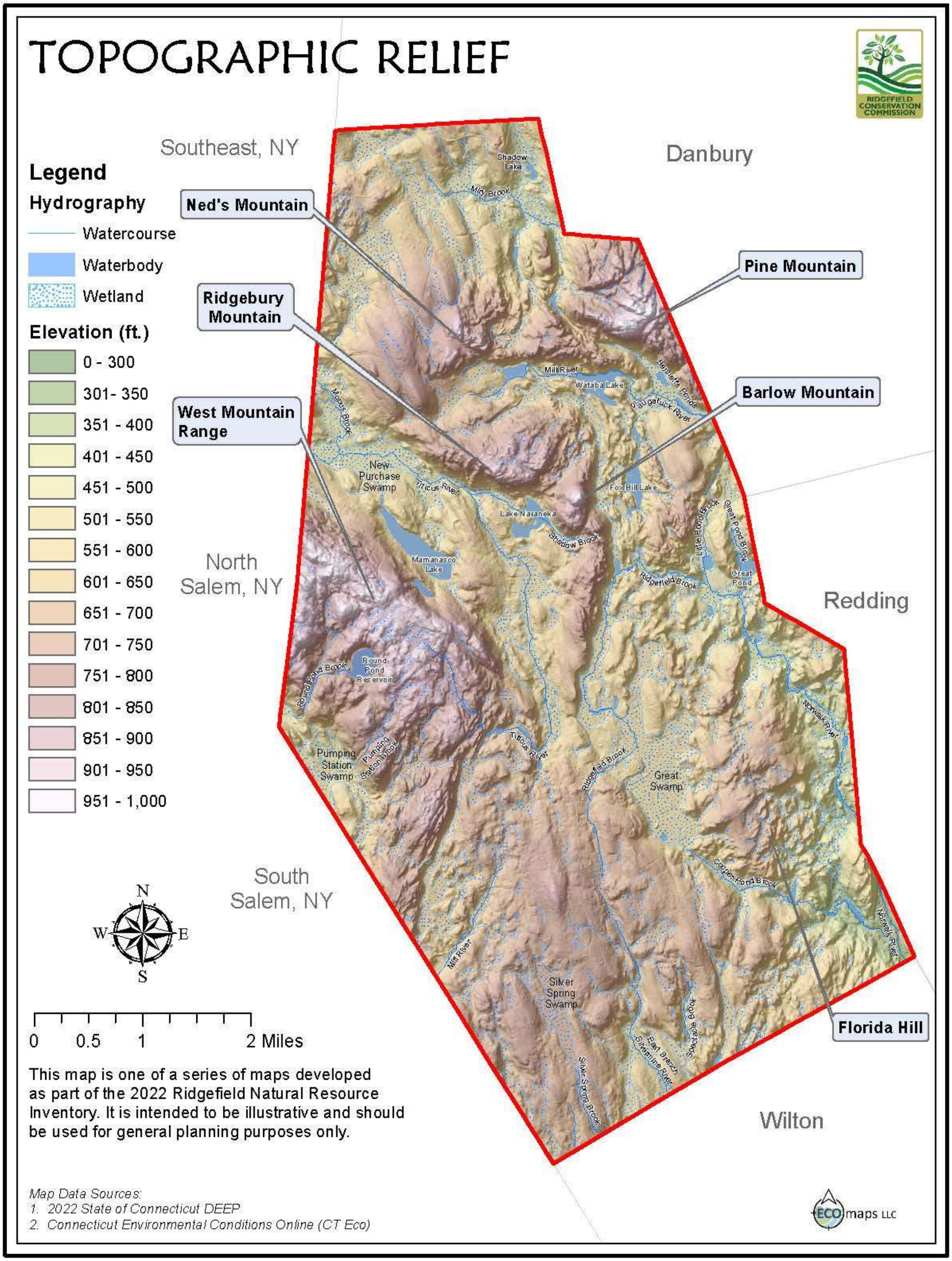

Figure 2-3: Topographic Relief

bedrock outcroppings, where the broken rock jumble is interspersed with leaf material and soil to form a rich habitat for many small mammals, amphibians, and invertebrates.

Ridgefield's surface area of 35 square miles is a two-dimensional measurement taken as if the Town were flat and does not take into account the three-dimensional qualities of its rugged topography. Thus, the area available to plants, animals, and humans is significantly larger than the Town's measured square miles. Temperature differences between the ridges and valleys are significant and can vary by several degrees Fahrenheit between areas in close proximity at any given time, in turn giving rise to differing micro-climates. While these phenomena are not unique to Ridgefield, they contribute to biodiversity because of the many ridges and corresponding valleys within the Town.

The Town's highest elevation of 1,012 feet occurs at the summit of Pine Mountain (Photos 2-1 and -2). Ridgefield's prominent hills, some of which are high enough to be referred to as mountains, are listed in Table 2-2.

A challenge for the Town, given its topography, is how to manage development on steep slopes, which are defined as lands with a grade of 15 percent or more. Development on steep slopes creates significant issues for properties below the slope as well as disrupting key habitats. The removal of vegetation increases erosion, runoff, displacement of topsoil, mudslides, and flooding. Protective measures must be undertaken during site preparation, construction, and post-construction phases to reduce the potential for damage to the property being developed and to the lower elevation properties. An example of recent steep-slope development is shown in Photo 2-3.

2.3 Soils

The soils of Ridgefield consist of those types typical of a Connecticut landscape consisting of rolling hills, ridgelines, and stream valleys. Soils of glaciofluvial[1] and alluvial[2] origins dominate the valleys, while soils originating from glacial till[3] dominate the uplands. The ridgelines of Ridgefield are characterized by soils that are shallow-to-bedrock, interspersed with pronounced bedrock outcroppings.

The specific characteristics of soils occurring in Ridgefield are listed in Appendix A. The listing is based on categories including wetland soils, organic wetland soils, limestone-derived soils, floodplain soils, and shallow-to-bedrock soils. The location of wetland, floodplain, and alluvial soils in Ridgefield are shown in Figure 2-4.

[1] Material deposited by glacial meltwater

[2] Sediment deposited by flooding of rivers and streams

[3] Non-stratified sediment carried or deposited by a glacier

Photo 2-1: View From Pine Mountain (Summer)

Photo 2-2: View From Pine Mountain (Winter)

Table 2-2: Mountains, Ridgelines, and Hills of Ridgefield

Mountain / Hill	Maximum Elevation	Dominant Aspect(s)
Pine Mountain	1,021	South
Barlow Mountain	972	East
West Mountain	958	Northeast, southwest
Ned's Mountain	956	Variable
Ridgebury Mountain	920	South
Ivy Hill	768	Southwest, northeast
Cains Hill	756	Variable
Nod Hill	650	North
Florida Hill	610	Variable
Note: Table includes named geographic features according to USGS topographic maps and locally-used nomenclature. Elevations taken from UCONN 2-foot contour LIDAR-derived data.		

Photo 2-3: Steep-Slope Construction Along Route 7 Near Little Pond

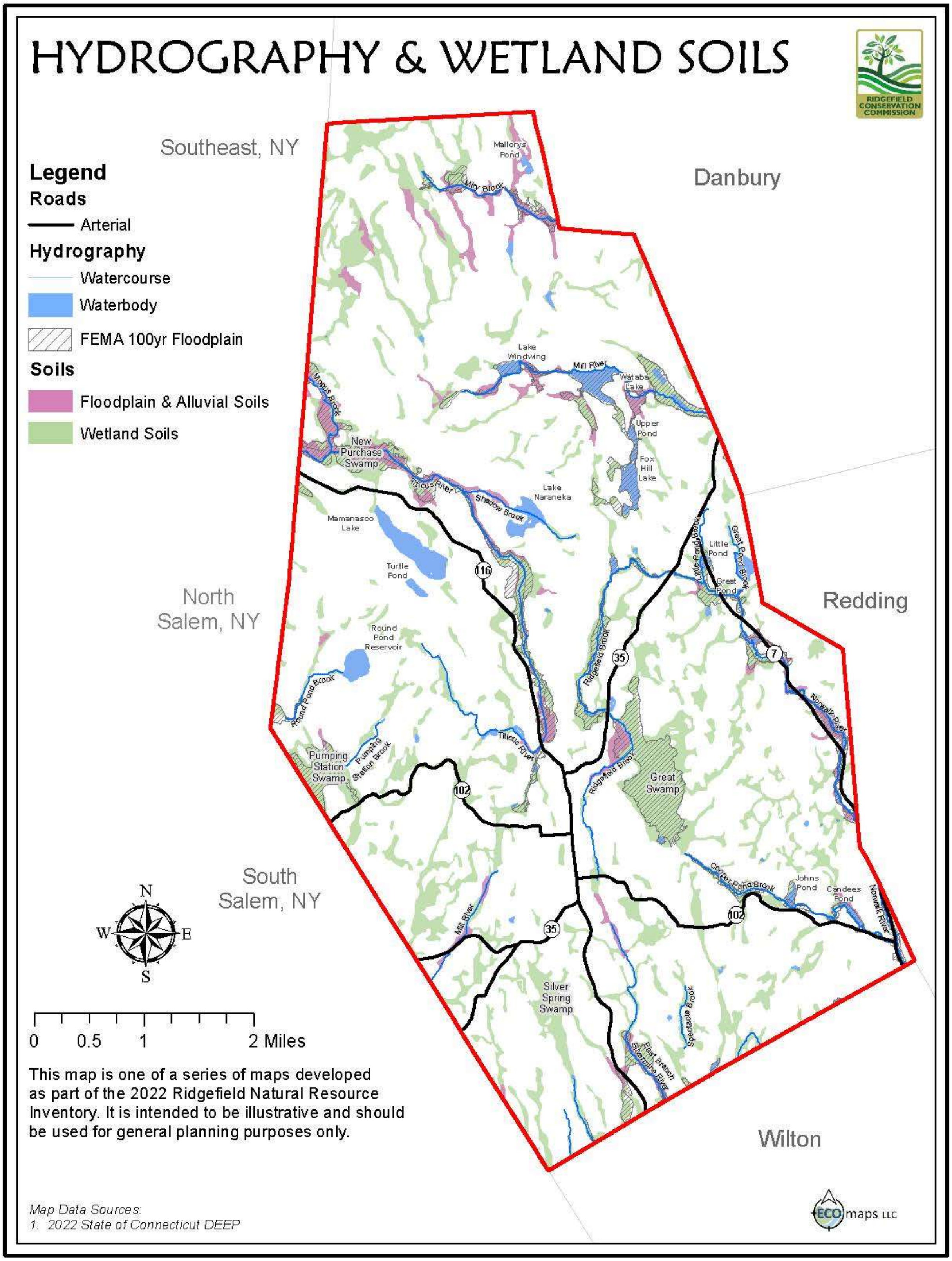

Figure 2-4: Hydrography and Wetland Soils

2.3.1 Wetland Soils

Wetland soils are those soils in which the water table is at or near the soil surface for a prolonged period during the growing season. Wetland soils fall within the *poorly drained* and *very-poorly drained* drainage class categories as defined by the United States Department of Agriculture (USDA)[4]. Seven drainage classes have been defined, from very-poorly drained (occurring in lowlands) to excessively drained (occurring in uplands) occurring along what is referred to as a *toposequence*. Changes in landscape position create different soil-drainage conditions, with poorly drained and very-poorly drained soils occurring in the low-lying areas of the drainage basin.

The most common wetland soil in Ridgefield is the Ridgebury-Leicester-Whitman soil complex. These soils types are so intermingled that they have been grouped as a single soil complex. The mapping unit consists of two poorly drained (Ridgebury and Leicester) and one very-poorly drained (Whitman) soil developed on glacial till in depressions and drainageways in uplands and valleys. The Ridgebury and Leicester series have a seasonal high-water table at or near the surface (0 to 6 inches) from Fall through Spring. The Whitman soil has a high-water table for much of the year and may be ponded frequently. The majority of smaller, sloping wetlands in Ridgefield consist of this soil complex.

The Timakwa-Natchaug and Catden-Freetown soil complexes dominate Ridgefield's most depressed lowlands and swamps. These are organic soils consisting of peat and muck material. These soils are very poorly drained and are typically ponded throughout the year. These soil types dominate Ridgefield's two largest swamp systems, Great Swamp and Pumping Station Swamp.

2.3.2 Floodplain Soils

Floodplain soils are those soils that are actively inundated by streams and rivers. They consist of fine-textured mineral material deposited by floodwaters referred to as alluvium. Drainage class ranges across the spectrum, from very poorly drained to excessively drained. These soils include the Pootatuck, Rippowam, and Saco soil series, in addition to soils classified as fluvaquents-udifluvents, which are young, undeveloped alluvial soils.

2.3.3 Shallow-to-Bedrock Soils

Shallow-to-bedrock soils are soils in which their depth to bedrock ranges from 20 to 40 inches. These soils commonly have outcroppings of bedrock or ledge. The most common shallow-to-bedrock soil is the Hollis-Chatfield-Rock Outcrop complex, which is prevalent on Ridgefield's mountains and ridgelines including Ned's Mountain, Pine Mountain, Ridgebury Mountain, and West Mountain.

Shallow-to-bedrock soils have moderate to severe development limitations often necessitating extensive site preparation for the placement of foundations and other construction associated with development.

[4] The CT Inland Wetlands and Watercourses Act (P.A. 155) defines wetlands as areas of poorly drained, very poorly drained, floodplain, and alluvial soils, as delineated by a soil scientist.

Frequently, these soils have limited capabilities for onsite septic systems without significant modifications such as raised and engineered leaching fields. Filtration capacity is diminished in these landscape soils, which results in a higher risk for groundwater pollution. This is caused by the rapidly permeable substratum that does not adequately filter effluent, or the shallowness of soils, which lack the depth to completely filter infiltrated effluent.

In addition, shallow-to-bedrock soils occur on moderate-to-steep slopes, limiting suitability for roads and driveways and increasing the likelihood of erosion when disturbed. The use of low-impact development practices (LID), such as infiltration, is also limited due to insufficient soil thickness.

2.3.4 Prime Farmland Soils

The USDA's Natural Resource Conservation Service (NRCS) has identified soil types that support *prime farmland*. Prime farmland is defined as:

> *Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban land or built-up land or water areas.*

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slopes are gentle, ranging primarily from zero to six percent (NRCS, 2008). Prime farmland soils occur predominantly on glaciofluvial and alluvial deposits on Ridgefield's valleys and gently-sloping hills and include the Pootatuck, Agawam, Haven, and Enfield soil series.

In addition to areas identified as *prime farmland* the NRCS has also identified land that is *additional farmland of statewide importance,* as:

> *Those areas that are nearly prime farmland that economically produce high yields of crops when treated and managed according to modern farming practices.*

Areas designated as prime farmland or farmland of statewide importance occur mainly in valleys and gentle topographies near major streams and rivers–sites often favored for development.

2.3.5 Limestone-Derived Soils

Limestone-derived soils refer to those soils that have developed from alkaline-rich marble parent material. These include the Fredon, Georgia, Amenia, Farmington, Halsey, and Nellis soil series. Fens, a rare wetland type in the Northeast, develop within limestone-derived soils. Rich calcareous fens (pH above 6.0) support rare plants known as calcicoles, as well as rare wildlife, such as the bog turtle (*Clemmys muhlenbergii*). The majority of fens in Ridgefield have been altered or lost due to development. Ridgefield's remaining fens are highly degraded and occur in patches within larger wetland habitat complexes.

3 Water Resources and Quality

Water resources are natural deposits of water that can be useful for humans (drinking water, irrigation water, etc.) and also support a variety of ecosystems. Examples of water resources and habitats are groundwater, aquifers, watersheds, streams, rivers, lakes, floodplains, and wetlands. Perhaps the largest improvement to protect water quality in Ridgefield since the last NRI was taken was the establishment of an independent Inland Wetlands Board (IWB) in 2019. The organization, which is composed of Town residents having extensive environmental expertise, are uniquely qualified to monitor and protect water resources in the Town. According to the Town website, *"The Inland Wetlands Board reviews development proposals and issues permits for regulated activities (disturbance of soil, filling or removal of soil) adjacent to or within designated inland wetlands areas and watercourses."*

To ensure that Town water quality meets Federal and State standards, testing is conducted by governmental and non-profit organizations, including CT DEEP, Harbor Watch (partnering with EarthPlace in Westport), Save the Sound, and volunteer citizen scientists who are trained by DEEP to collect benthic macroinvertebrate samples in several streams.

The data used to determine water quality in inland wetlands and waterbodies generally focuses on indicator bacteria (specifically *E. coli*, which is a form of fecal coliform) and Dissolved Oxygen (DO). Other substances that are often measured include nitrogen and phosphorus. Data is collected during dry and wet periods; water temperature and conductivity are also recorded. The State grades the safety of various activities in water bodies by the levels of these components–on both an average yearly mean basis and a maximum 24-hour reading. The water bodies that are regularly monitored in Ridgefield are the Norwalk River, the Saugatuck River, the Titicus River, Cooper Pond Brook, Miry Brook, Ridgefield Brook, and Mamanasco Lake.

Over the last decade, all of the above-mentioned water bodies have had elevated (above recommended) levels of *E. coli*. Typically, the contaminants are greater during heavy rains and warmer weather. Two areas that are out of compliance with the standards routinely are adjacent to the Great Swamp. The best sources for annual data on the tested sites can be found in Harbor Watch's annual Fairfield County River Report, EPA's "*How's My Waterway"* report, and DEEP's *Connecticut Integrated Water Quality Report.*

Multiple factors affect water quality. Typical culprits that produce high indicator bacteria levels include failing septic systems, aging wastewater treatment plants, and increased storm water runoff from high velocity rain storms (often due to excessively large impervious surfaces). In Ridgefield, key sources of fecal coliform are runoff from horse farms and droppings from geese and high pet waste areas. Areas with low DO are water bodies populated with high amounts of vegetation (particularly algae and other aquatic invasives) and standing warm, shallow water. High nitrogen levels are caused by fertilizer, pet waste, and decomposing vegetation (including dead leaves and grass clippings).

Fertilizer runoff, poorly maintained septic systems, agricultural waste, and leaking water mains can all be generators of high phosphorus levels. Phosphorus use is now limited by law on residential properties. The most effective ways to prevent these substances from entering rivers and lakes is to maintain septic systems on a regular basis (by pumping the effluent out every five years or less) and by keeping animal waste, fertilizers, and grass clippings from flowing into them. Planting a wide vegetative buffer of native plants (including trees, shrubs, and grasses) along the edges of properties help prevent these substances from entering the water supply.

3.1 Groundwater and Aquifers

An aquifer is a geologic formation (permeable rock or stratified drift) that yields drinking water. Ridgefield has one State-designated aquifer as well as eight locally designated aquifers.

3.1.1 State-Designated Aquifer Protection Areas (APA)

The CT DEEP manages a cooperative program partnering with municipalities and local water companies to delineate, designate, and protect water supply wells or well fields located in sand and gravel aquifers (e.g., stratified drift deposits). These are colloquially referred to as wellhead protection areas. Ridgefield adopted the DEEP's land use regulations for APAs on April 25, 2010, protecting the Town's single State-designated aquifer, the Oscaleta Well Field (Figure 3-1) centered below Mountain and Oscaleta Roads and Pumping Station Swamp. This well field lies completely within the Town's boundaries.

The DEEP APA regulations are designed to minimize the risks of contamination to well fields by restricting certain types of land uses that store, handle, or dispose of potentially hazardous materials as well as requiring pre-existing, non-conforming land uses to be registered. The Aquifer Protection Area Program responsibilities are jointly shared between the DEEP, the municipalities, and the water companies using the aquifer. The DEEP is responsible for overall program administration, establishing State land-use regulations and standards, approving aquifer protection area maps and local regulations, and developing guidance materials.

Municipalities in the program are responsible to appoint an aquifer protection agency, inventory land-uses within the aquifer protection area, design the aquifer protection area boundary, and adopt and implement local land-use regulations. Currently, this responsibility falls under the control of the Town’s Planning and Zoning Commission (P&Z). This agency regulates land-use activities within the aquifer protection area by:

- Registering existing regulated activities.
- Issuing permits for new regulated activities.
- Overseeing regulated facilities.
- Educating their citizens on ground-water protection.

Water companies are required to map, using methods specified in State mapping regulations, the critical recharge areas of the aquifer that provide water to the well fields. This preliminary mapping is refined by the water companies using extensive, site-specific data and groundwater modeling to determine the final mapping area. The final mapping defines the regulatory boundaries for the land-use regulations. In addition to mapping, the water companies:

- Assist towns with their protection programs and oversight of the aquifer protection area.
- Conduct well field monitoring to warn of contamination.
- Conduct well field monitoring to detect contamination.
- Plan for land acquisition and protection around well fields.

According to the 2021 water quality report by Aquarian Water Company, the water quality of the Oscaleta well field falls well within Federal and State standards. Polyfluoroalkyl substances (PFAS) have been detected in the wells at 4 parts per trillion (ppt). PFAS are widely used in consumer products and persist within the environment permanently. Though the Federal government has no standard on these chemicals, the State limit on these substances is 70 ppt.

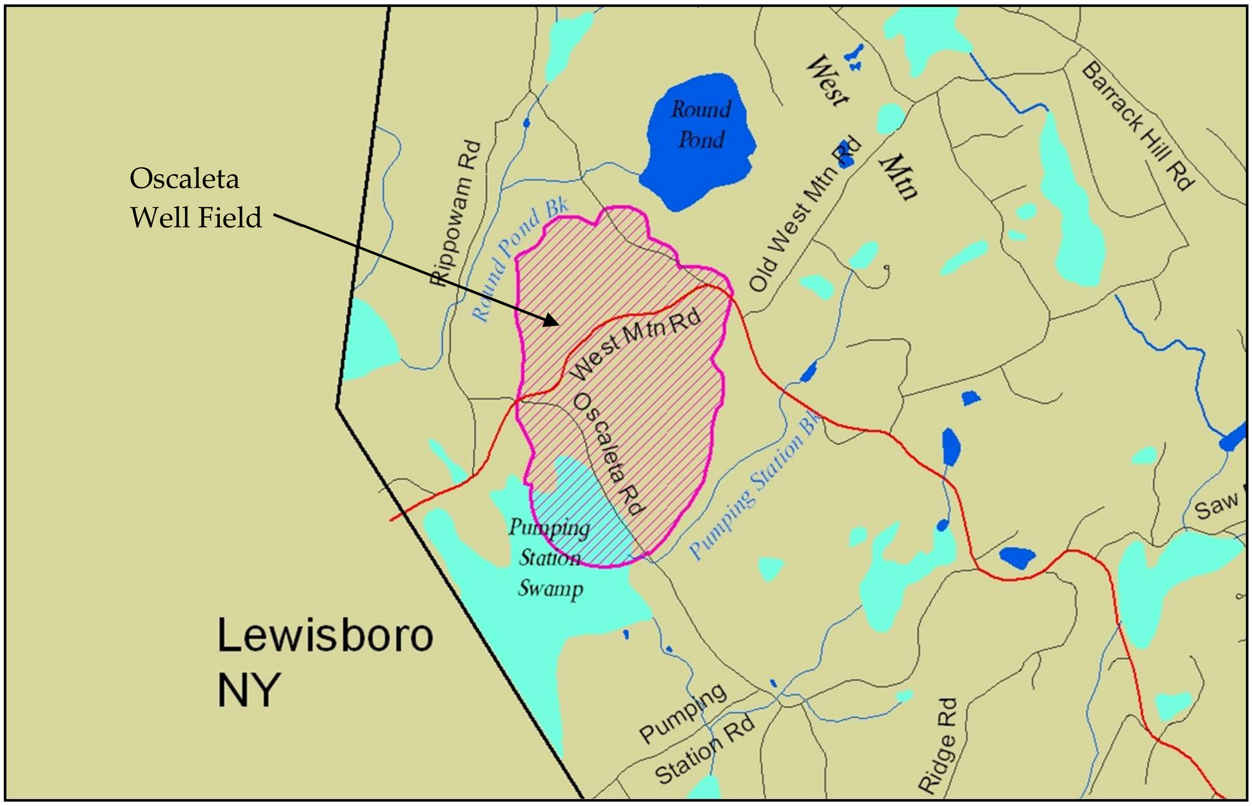

Figure 3-1: Oscaleta Well Field Aquifer Protection Area

3.1.2 Locally-Designated Aquifer Protection Zones

In 1990, Ridgefield identified eight stratified drift aquifers of local significance. These lie below certain sections of the Titicus, Norwalk, and Saugatuck river drainages, as well as below several of the Town's largest swamps (e.g., Great Swamp, Pumping Station Swamp, and New Purchase Swamp). Figure 3-2 from the Town's POCD (2020) illustrates both the Oscaleta Well Field, and the eight locally-designated aquifers.

3.2 Watersheds

A watershed, or drainage basin, is an extent of land where water from rain and snowmelt drains downhill into a body of water, such as a stream, river, or lake. The drainage basin includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into those watercourses. The drainage basin acts like a funnel, collecting all the water within the area covered by the basin and channeling it into a waterway. Each drainage basin is separated topographically from adjacent basins by a geographical barrier, such as a ridge, hill, or mountain, known as a drainage divide.

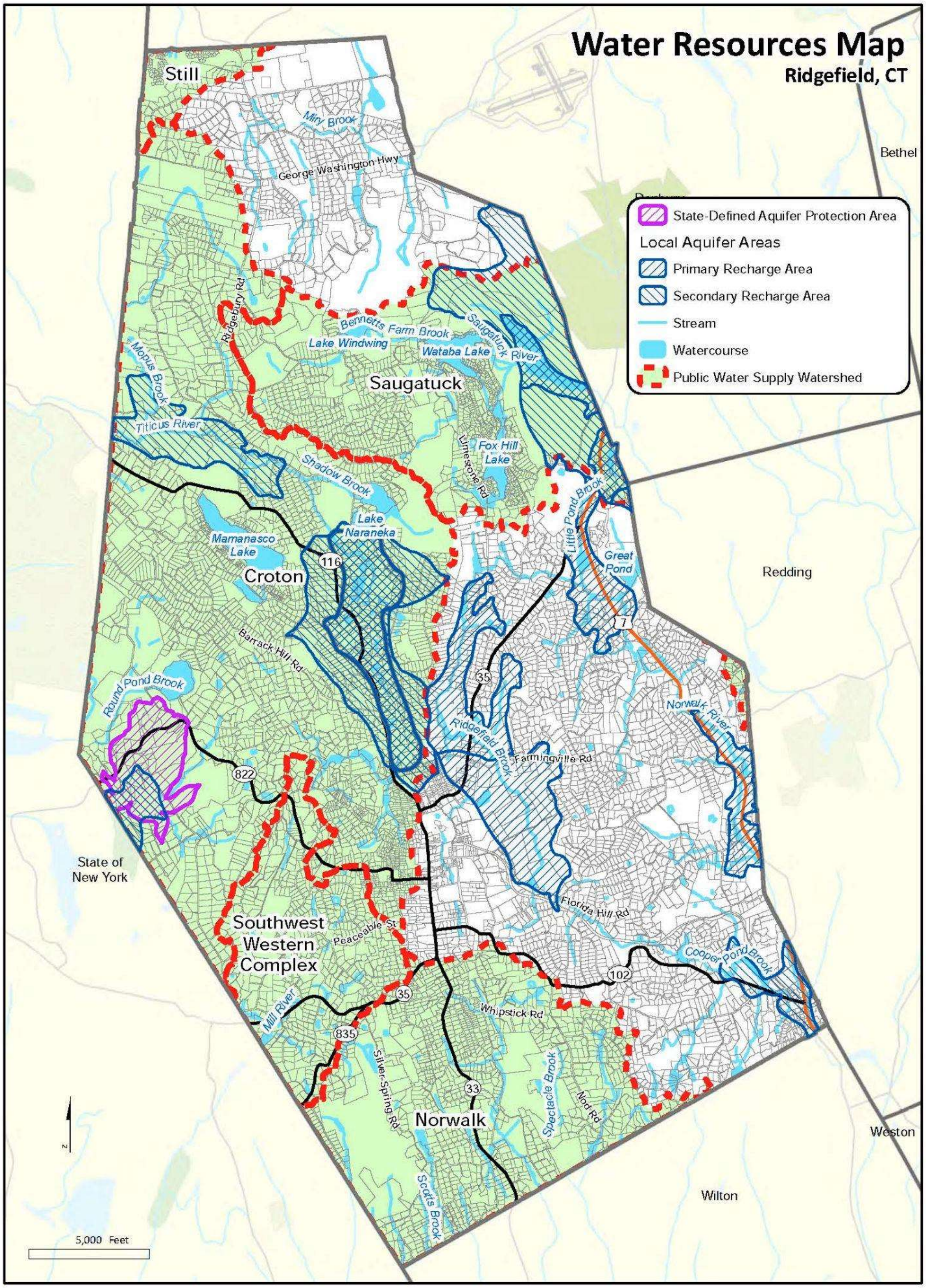

Figure 3-2: Water Resources Map Showing Locally-Designated Aquifers

Ridgefield's unique geographical position in tandem with its many ridges and valleys give rise to five separate regional drainage basins that feed two major rivers (Hudson and Housatonic) as well as the Long Island Sound estuary. Generally speaking, the northern portion of Ridgefield drains toward the Housatonic River, the western portion toward the Hudson River, and the southern and eastern portions toward the coastline via the Saugatuck and Norwalk Rivers. The ridgelines of Ned's Mountain, Pine Mountain, Ridgebury Mountain, and Barlow Mountain are major drainage divides between these regional basins.

Several sub-regional watersheds are part of the five regional drainage basins (Figure 3-3):

- Croton River basin includes the Waccabuc and Titicus subregional basins.
- Housatonic River basin includes the Still River and Miry Brook subregional basins.
- Southwest Western Complex includes the Mill River subregional basin.
- Saugatuck River basin includes the Saugatuck River subregional basin.
- Norwalk River basin includes the Norwalk River subregional basin.

3.3 Streams, Water Bodies, and Floodplains

The size of watercourses and their relative position within a watershed are described by a system known as stream order, which defines the sequence in which small streams flow into larger ones, and the hierarchy of the various tributaries of larger rivers. Figure 3-4 illustrates this watershed hierarchy within Ridgefield. In Figure 3-4, the regional drainage patterns are indicated by the colors noted. Flow path is indicated by arrows, with font size increasing with stream order. Some rivers as shown exist outside Ridgefield.

A first-order stream is so small that it does not have any tributaries that can be mapped. Typically, first-order streams are less than a mile long, with small watersheds, narrow channels, and limited flow rates. Second-order streams have only first-order streams as their tributaries. A third-order stream can have first or second-order tributaries. First-, second- and third-order streams are considered headwaters; their principal function is to collect runoff.

First-, second-, and third-order streams do not have floodplains typically, they seldom support fish larger than minnows, and are too small for most aquatic recreational activities (MacBroom 1998). Many first- and second-order streams occur in Ridgefield, originating as groundwater springs on the ridgelines of Ned's Mountain, Pine Mountain, Ridgebury Mountain, and Barlow Mountain.

3.3.1 Headwater Stream Ecology

Headwater and other low-order streams are detritus-based ecosystems. These streams are usually less than 15 feet wide and generally have a closed tree canopy (when occurring in undisturbed habitats) that limits sunlight. These streams typically have high levels of dissolved oxygen due to inputs from groundwater (e.g., springs and seeps), high-velocity flow due to steep slopes, and shading that keeps water temperatures cool. Coarse debris including leaves, twigs, and other woody debris are the primary energy source for such streams. Aquatic insects, bacteria, and fungi convert this coarse organic material to fine particulate matter that is then exported downstream (MacBroom 1998).

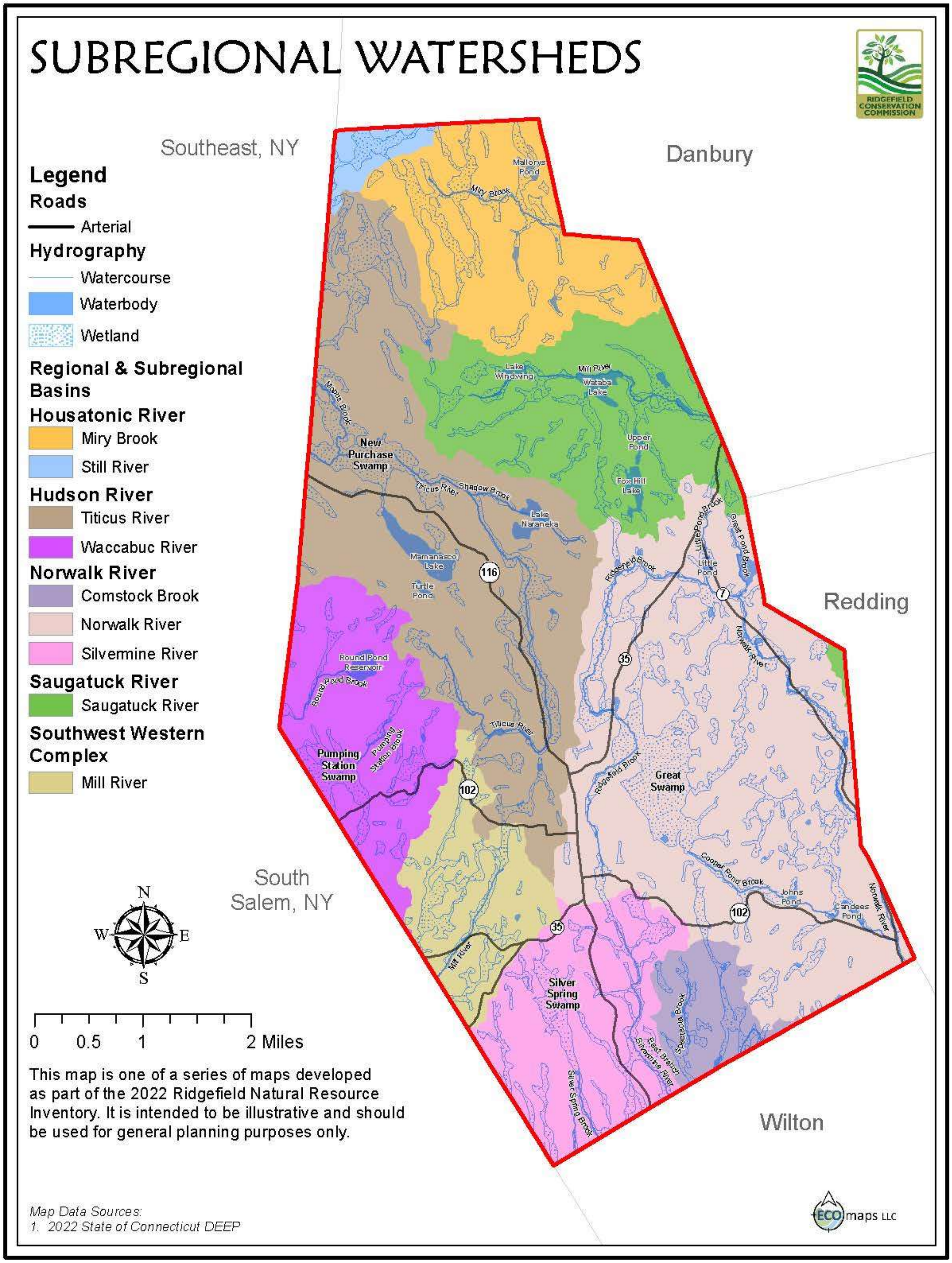

Figure 3-3: Subregional Watersheds

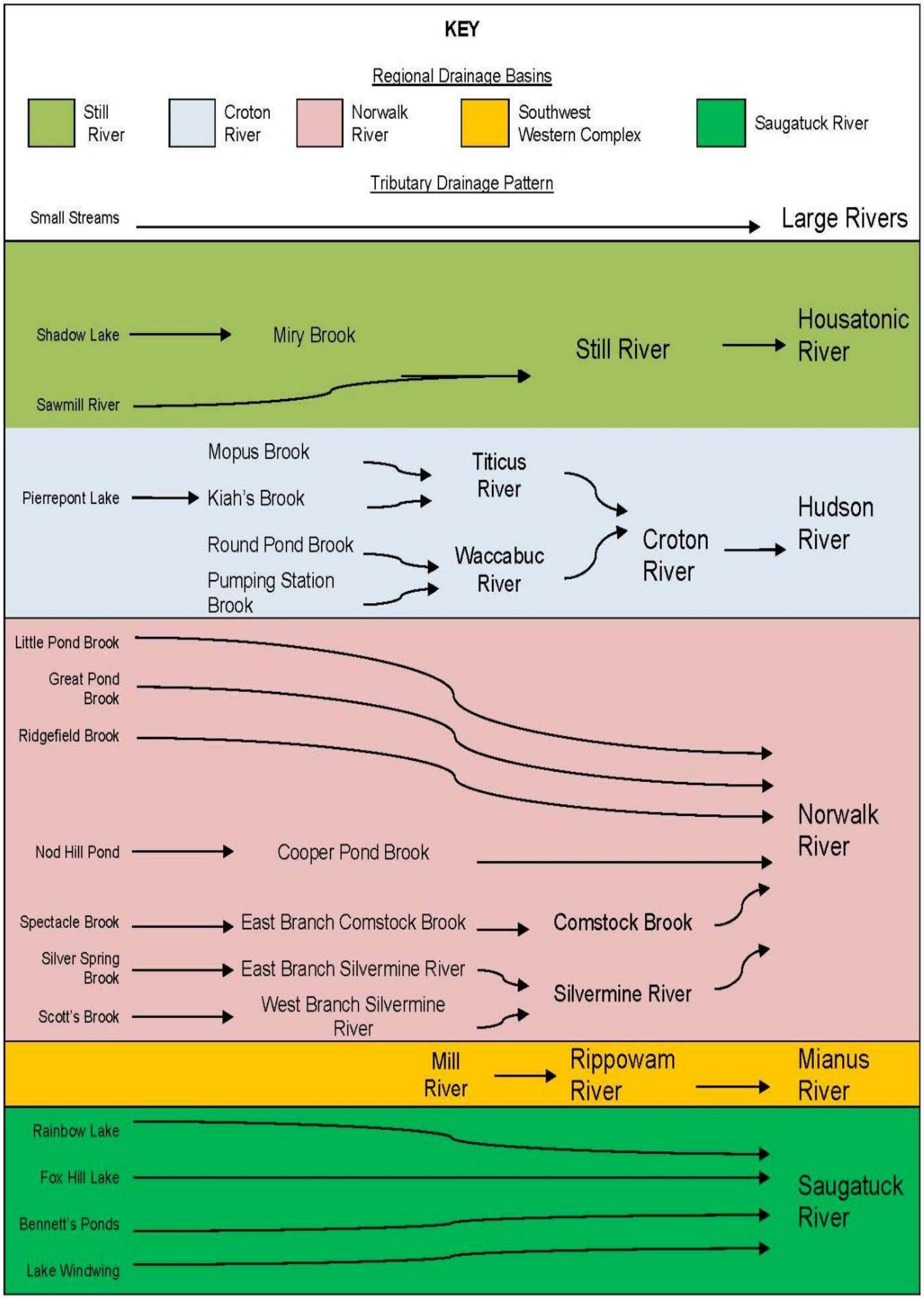

Figure 3-4: Stream and River Drainage Patterns

Fish are sometimes present in small streams and include several species of minnows, suckers, darters, trout (primarily brook trout), and sculpins. But generally speaking, fish habitat is limited in these small streams due to periods of intermittent flow creating pools of water separated by areas of dry streambed and decreased levels of dissolved oxygen.

Inputs of detritus from riparian vegetation are an important source of organic load for headwater streams and associated downstream river ecosystems. Activities, such as development or land clearing, that remove streamside vegetation or alter stream ecology (e.g., pond/dam construction) can affect the production of fine particulate matter, which in turn can disrupt downstream ecology. The creation of a separate IWB in 2019 was a major step by Ridgefield residents to further protect these important water resources.

3.3.2 Ecology of Small Rivers

As headwater streams flow into large streams, brooks, and small rivers, the ecology changes from that of a detritus-based food chain to a photosynthesis-based system. These intermediate-sized streams generally have a channel width greater than 15 feet. These wider stream channels receive greater amounts of sunlight due to decreased shading, resulting in warmer water temperatures and increased photosynthesis by algae, mosses, and vascular plants attached to stream banks (MacBroom 1998). These small rivers (sometimes referred to as mid-sized streams) receive inputs of fine particulate organic matter from headwater streams as well as direct deposits of coarse organic matter such as leaves and twigs. These streams support a wide diversity of aquatic life from benthic macro-invertebrates (bottom-dwelling aquatic insects) to numerous fish species. Aquatic turtles such as the snapping turtle (*Chelydra serpentina*) and wood turtle (*Glyptemys insculpta*) also utilize these mid-sized streams. Examples of small rivers in Ridgefield include the Norwalk, Saugatuck, and Titicus River.

The health of these systems is mixed. According to the State's 2022 Connecticut Integrated Water Quality Report, both the Titicus and the Saugatuck Rivers support aquatic life within the borders of Ridgefield. The Norwalk River supports aquatic life in certain stretches but not others while Ridgefield Brook and Copper Pond Brook do not support aquatic life at all. (There are a variety of measurements for pollutants that are used by the State to determine the suitability of water bodies to support aquatic life and recreation.)

A variety of efforts since the last NRI have improved the overall water quality of the Norwalk River. Between 2012 and 2016 the CT DEEP removed multiple sections of it from its *impaired* list because of decreases in *E. Coli* contamination. There are still, however, hot spots in Ridgefield, according to Harbor Watch where *E. Coli* concentrations are higher than permitted by CT DEEP regulations. At the same time, it appears from historical measurements by Harbor Watch that the quality of water of the Norwalk River has been improving since the last NRI consistantly. The completion and upgrade of the Town's sewage treatment system should also provide improvements once operational.

(The Town of Ridgefield was cited in a 2021 lawsuit that it was not complying with certain aspects of the Federal Government's Clean Water Act for the proper monitoring of stormwater runoff. It has since settled the suit.)

3.3.3 Floodplains

A floodplain is flat to gently sloping land adjacent to a watercourse that experiences occasional or periodic flooding from a river or stream. Floodplains contain deep, fine sediment deposited by floodwaters. Historically, floodplains have been prized as agricultural land as they contain nutrient-rich sediment and are largely free of stones. Floodplains provide numerous ecological functions and services. These include the storage and the slow releases of ponded floodwater, a process referred to as desynchronization; wildlife habitat; sediment storage; and nutrient storage and uptake as well as sequestering of pollutants within sediments, a process referred as attenuation.

Floodplains border many of Ridgefield's rivers and larger streams. Table 3-1 lists the watercourses in Ridgefield that have adjacent floodplain soils, of which there are five different types. Floodplains are common along the gently-sloping streams and rivers that flow within the Town's marble valleys, such as the Titicus River. The most expansive floodplain borders the Titicus River in the vicinity of Mopus Bridge Road.

3.3.4 Riparian Areas

Riparian areas are defined as the transition zone between fully terrestrial and fully aquatic systems. Examples are: pond and lake edges, streambanks, floodplains, wetlands, and other systems that neighbor bodies of water. Riparian soils are rich in nutrients, organic matter, and regularly experience flooding that directly affects biodiversity. Healthy riparian areas can maintain or improve water quality. As flooding or runoff occurs, riparian vegetation reduces water velocity, captures sediment and filters the nutrients and pollutants (e.g., pesticides, heavy metal, etc.) that would otherwise run into a water body.

3.4 Lakes and Ponds

Ridgefield contains 16 named lakes and ponds (Table 3-2). These include headwater impoundments as well as impoundments within streams and rivers. The majority of water bodies consist of small, privately-owned ponds less than 10 acres in size.

Ridgefield's largest water body is Mamanasco Lake (Photo 3-1). Mamanasco Lake is long, narrow and shallow, with a maximum depth of nine feet. The lake is located within a large marble valley located south of Route 116 (North Salem Road). The lake maintains a surface water connection to the Titicus River and is bordered predominately by residential development.

A study in 2017 was published by the Connecticut Agricultural Experiment Station (CAES) on the quality of the lake's ecosystem. The latest State assessment of the lake indicates that its water quality is poor as Mamanasco Lake supports neither aquatic life nor recreational uses. One of the key challenges identified is the control of invasive vegetation. Local residents are attempting to control this via chemical and mechanical treatments yearly. This contrasts to Great Pond, located on the border of Redding, which has its water quality tested weekly by Ridgefield Parks & Recreation. Other large water bodies include Pierrepont Lake, Fox Hill Lake, and Rainbow Lake.

Table 3-1: Floodplains Along Streams and Rivers

Watercourse	Floodplain Acreage	Soil Type
Pumping Station Swamp	4	Rippowam
Unnamed tributary to Round Pond Brook	4	Rippowam
Unnamed tributary to West Branch Silvermine River	4	Fluvaqents-Udifluvents complex
Cooper Pond Brook	12	Saco
Mill River	21	Rippowam, Saco
Ridgefield Brook	38	Saco
Saugatuck River and tributaries	48	Saco
Bennett's Farm Brook	52	Saco, Rippowam
East Branch Silvermine River	56	Rippowam, Saco
Mopus Brook	76	Saco, Fluvaquents-Udifluvents complex
Norwalk River and tributaries	88	Saco
Miry Brook and tributaries	180	Saco
Titicus River (includes Kiah's Brook)	187	Pootatuck, Saco, Fluvaquents-Udifluvents complex

Floodplain Soil Type	Lithology (origin)	Textural Group	USDA Drainage Class
Saco	Derived from mixed crystalline & sedimentary rock	Silty	VPD
Fluvaquents-Udifluvents Complex	Young soils, variable parent material	Variable	PD-VPD
Pootatuck	Derived from gneiss, schist, granite and quartzite	Loamy	MWD
Rippowam	Derived from gneiss, schist, granite and quartzite	Loamy	PD

Source: NRCS digital soil survey; Soil Catenas of Connecticut, 2006.

<u>Key to USDA Drainage Class</u>
VPD – very poorly drained
MWD – moderately poorly drained
PD – poorly drained

Table 3-2: Lakes and Ponds by Size

Waterbody	Acreage
Spectacle Brook Pond	0.90
Miller's Pond	2.18
Nod Hill Pond	3.28
Little Pond	5.90
Mallory's Pond	5.98
Candee's Pond	6.44
John's Pond	6.90
Turtle Pond	8.67
Bennett's Pond	9.26
Lake Windwing	13.62
Great Pond	22.46
Fox Hill Lake and Upper Pond	29.73
Round Pond	33.46
Pierrepont Lake	37.70
Rainbow Lake	40.99
Mamanasco Lake	85.89

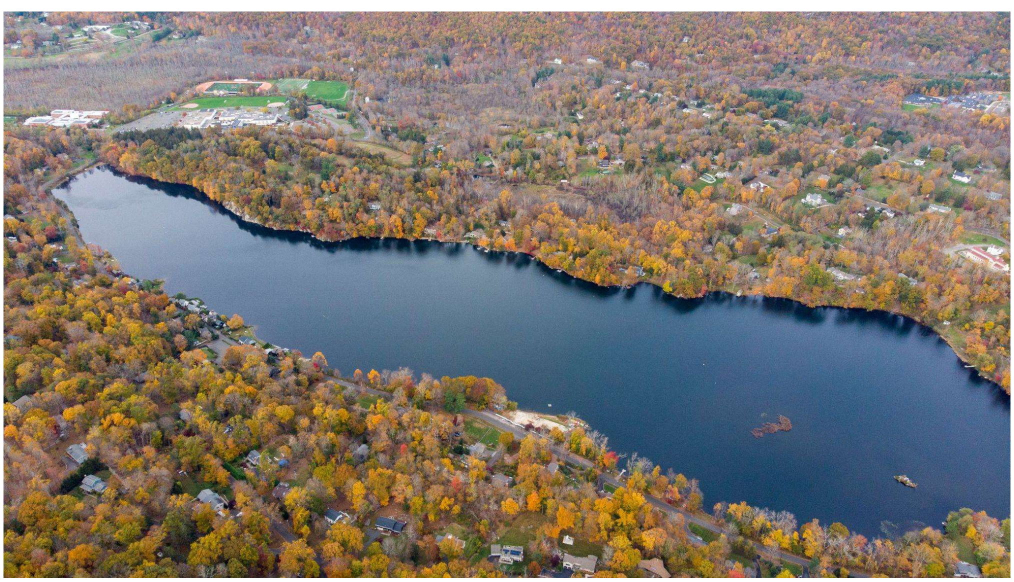

Photo 3-1: Lake Mamanasco

Some water bodies are being transformed. For example, 30 years ago Turtle Pond was a thriving pond supporting a wide variety of fish and wildlife. This has changed as it is undergoing extreme eutrophication; the northwesterly portion of the lake has become very swampy, filled with cattails *(Typha latifolia)*, invasive reed grass (*Phragmites australis)* and is starting to support bushes and small trees. Beavers (*Castor canadensis*), however, have taken up residence and are attempting to increase the water levels of the pond, which would better its overall health.

3.5 Wetlands

Wetlands are areas where the presence of water for extended periods exerts a controlling influence on the plant community, soil properties, and animals living in or using them. From a regulatory perspective, the State of Connecticut defines wetlands by soil type. Wetland soils are those soils in which the water table is at or near the soil surface for a prolonged period during the growing season. Wetland soils are those soils that fall within the poorly drained and very poorly drained drainage class categories as defined by the U.S. Department of Agriculture[1].

Wetland systems occurring in Ridgefield include riverine (i.e., watercourses), lacustrine (i.e., lakes and ponds (Photo 3-2), and palustrine (i.e., forested) systems (Cowardin et al., 1979). The most common wetland types are palustrine. Palustrine wetlands or wooded swamps (as they are more commonly referred to) are wetlands that have a vegetational community characterized by a forest canopy that is at least 20 feet tall.

Encompassing about 500 acres, the Great Swamp (Photo 3-3) is the largest wetland area in Ridgefield. It is protected State property from which it collects water from nearby ponds and empties into the Norwalk River. Swamps perform essential environmental functions acting like giant sponges (absorbing water runoff) and filters (trapping nutrient and sediment pollution). They also provide important habitat for several plant and wildlife species.

A recent survey done by Woodcock Nature Center in the Great Swamp found multiple species of beneficial aquatic insects, frogs, turtles, snakes, and birds (including ducks, raptors and owls) along with evidence of bears, bobcats, coyotes, deer, muskrats, weasels, and mink.

Native plants that are supported by these wetlands include willow (*Salix*), sedge (*Carex*), maple (*Acer*), moss (*Bryophyta*), fern (*Tracheophyta*), blueberry (*Vaccinium*), buttonbush (*Cephalanthus occidentalis*), winterberry (*Ilex verticillata*), cattails, and skunk cabbage (*Symplocarpus foetidus*). Unfortunately, many invasive plants are now also part of the vegetative make-up of the Great Swamp, including Japanese knotweed (*Fallopia japonica*), common reed grass, autumn olive (*Elaeagnus umbellata*), burning bush (*Euonymus alatus*) and Oriental bittersweet (*Celastrus orbiculatus*). The relationship between the native plants and the wildlife it supports is tenuous, at best, if these invasive plants aren't minimized.

[1] The CT Inland Wetlands and Watercourses Act (P.A. 155) defines wetlands as areas of poorly drained, very poorly drained, floodplain, and alluvial soils, as delineated by a soil scientist.

Photo 3-2: Lacustrine Wetland at Bennett's Pond

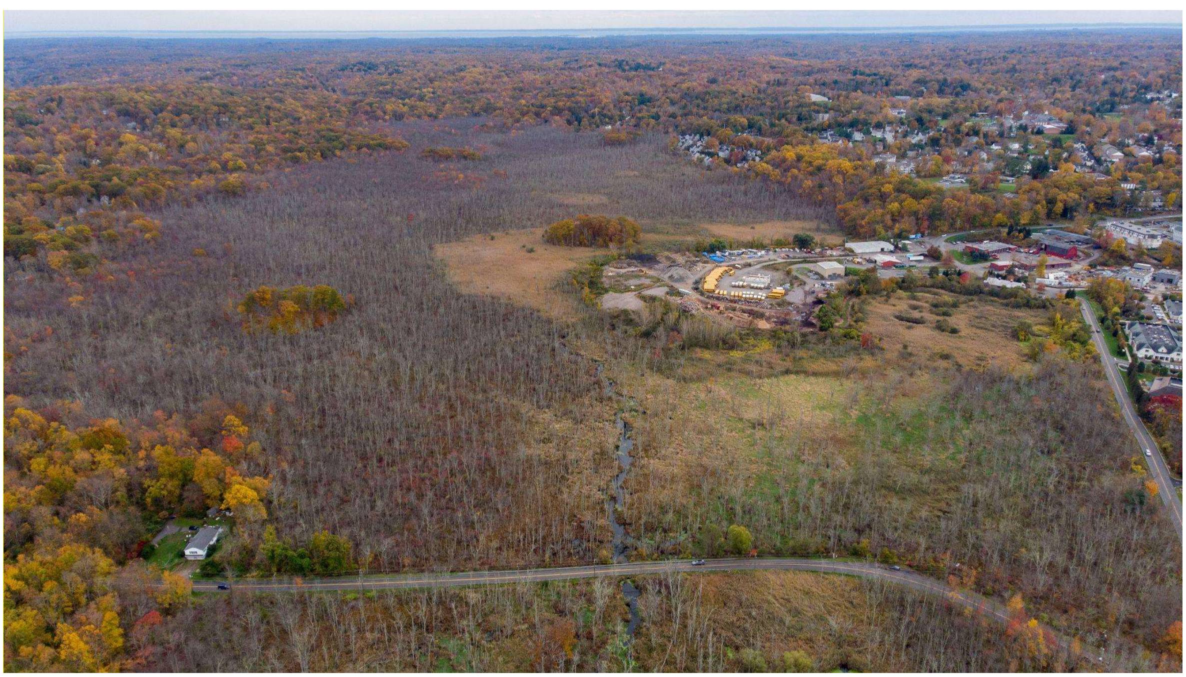

Photo 3-3: Great Swamp

4 Aquatic Habitats

An aquatic habitat is an area where water is present and provides direct support for a given species, population, or community. An aquatic habitat has three classifications:

Photo 4-1: Wood Frog Near Vernal Pool

- Non-flowing waters - such as pools, ponds, and lakes.
- Slowly flowing - such as marshes and swamps.
- Flowing - such as streams and rivers.

Aquatic habitats can be freshwater, saltwater, or brackish in nature. Ridgefield has several different freshwater habitats, including streams, rivers, lakes, and vernal pools.

A freshwater habitat is any body of water that has a very low salt content. These types of habitats make up less than one percent of the planet's total surface, but they support over 100,000 different species including fish, worms, frogs, newts, birds, and mammals. Its health, and that of species and the plants that it supports, are key and early indicators of pollution and a degrading habitat. Monitoring them and acting upon the gathered data is essential in protecting the ecosystem.

4.1 Vernal Pools

Vernal pools are seasonal water bodies that attain maximum depths in Spring and Fall, and lack permanent surface water connections with other wetlands and waterbodies. Pools fill with snowmelt and runoff in Spring, although some may be fed by groundwater primarily. The duration of surface ponding, known as hydroperiod, varies depending upon the pool and the year; vernal pool hydroperiods range along a continuum from less than 30 days to almost a year. Vernal pools are generally small in size (< 2 acres), with the extent of vegetation varying widely. They lack established fish populations, usually as a result of periodic drying, and support communities dominated by animals adapted to living in temporary, fishless pools.

Vernal pools in Ridgefield provide essential breeding habitat for one or more wildlife species including Ambystoma salamanders (*Ambystoma sp.)*, often referred to as mole salamanders because they live in subterranean shrew and rodent tunnels; wood frogs (*Rana sylvatica*) (Photo 4-1); and fairy shrimp (*Eubranchipus sp.*). Pools that hold water for more than a year, but dry out intermittently, are referred to as semi-permanent pools, and are also used by amphibians for breeding.

Vernal pools and their adjacent upland habitats are key to biodiversity within Northeastern landscapes (Photo 4-2). They support a large biomass of frogs that are the base of the food chain and provide critical ecosystem functions including flood water detention, aquifer recharge, nutrient cycling, and denitrification. Unfortunately, due to their small size and seasonality, vernal pools are often overlooked or discounted and are disproportionately impacted by development, especially suburban sprawl.

Photo 4-2: Vernal Pools at Woodcock Nature Center

A vernal-pool survey was conducted during Spring of 2022 by students from Pace University and Ridgefield High School. The 2022 survey focused on documenting species from egg masses found in the pools. Data from each site was entered onto an individual vernal-pool assessment form. Vernal pools that had species present in the 2010 NRI survey were of primary focus. The Pace University students focused on vernal pools located in the southern half of Ridgefield, while the Ridgefield High School students focused on pools in the northern half of town. Three types of data were gathered:

- **Physical**: Visual data collection and estimation.
- **Chemical:** Salinity, pH, and conductivity measurements.
- **Biological:** Visual and field guides of obligate species.

It appears that the quality and number of vernal pools in Ridgefield has remained unchanged over the last decade though no Jefferson salamanders *(Ambystoma jeffersonianum)* or their egg masses were discovered during this survey.

Vernal-pool conservation zones in Ridgefield are scattered throughout the Town (Figure 4-1). Ridgefield's protected areas, including Hemlock Hills, Wooster Mountain, and Woodcock Nature Center contain some of the most extensive vernal-pool habitats. (It is likely that there are other vernal pools in Town that have yet to be identified and protected.) Vernal pools typically occur in clusters. Often their critical upland habitat zones (750 feet from the high-water mark of the pool) overlap, indicating that these pools facilitate migration resulting in genetic exchange and higher levels of overall population viability than single isolated pools.

Vernal pools (Photos 4-3, -5, and -6) are defined, assessed, and ranked by criteria (*see* Calhoun and Klemens, 2002: 9) that include the presence of obligate species, the presence of State-listed species, the number of egg masses (Photo 4-4), and the condition of the landscape surrounding the pools. The focus of the 2022 survey was on the following indicator species: wood frog, mole salamander (Spotted, Jefferson's and marbled), and fairy shrimp.

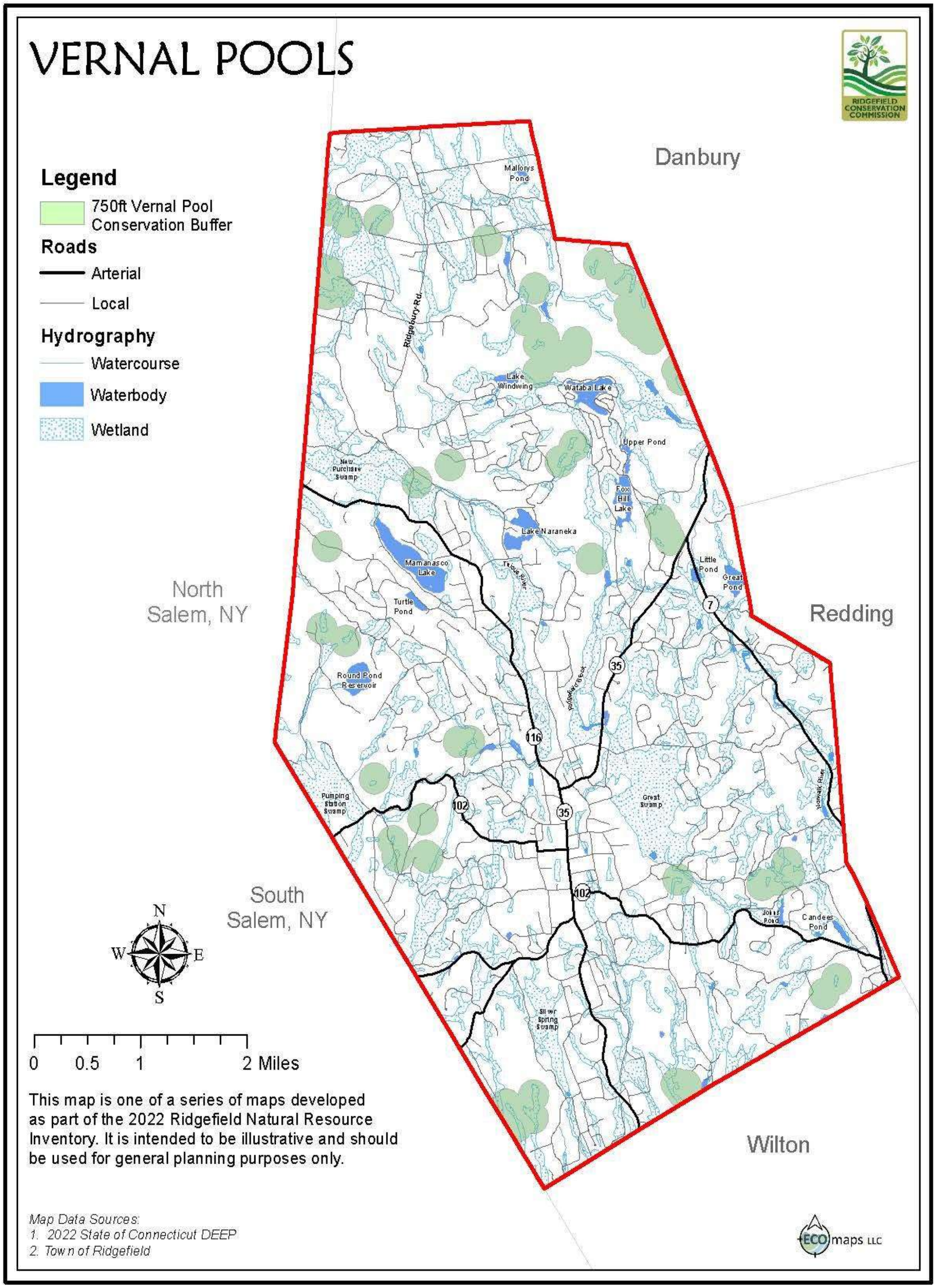

Figure 4-1: Vernal Pools

Photo 4-3: Vernal Pool at Woodcock Nature Center

Photo 4-4: Egg Masses Discovered in a Vernal Pool

Functional vernal pools require extensive areas of forested habitat surrounding them (at least 750 feet). As a result, vernal pools are under threat in the Town. For new construction or development, it is strongly recommended that vernal-pool conservation zones are identified and enforced in order to preserve vernal-pool integrity.

The following is the summary from the Pace University study conducted in 2022. The full presentation can be found on the RCC website. It determined:

- Ridgefield has many vernal pools (Photos 4-5 and -6). Overall, they appear to be in good condition.

Photo 4-5: Vernal Pool in the Sarah Bishop Open Space

Photo 4-6: Vernal Pool in the Florida Refuge

- Only slight differences in population between the 2010 and 2022 studies were found.
- The water-quality data collected did not appear to show any major impacts to the vernal pools, including roadside pools located at Peaceable and Old Sib Streets.

Species confirmed in and around vernal pools in the northern portion of Ridgefield in 2022 include: spotted salamanders (*Abystoma maculatum*), red-backed salamanders (*Pletodon cinereus*), four-toed salamanders (*Hemidactylium scutatum*), wood frogs (*Rana sylvatica*), mink frogs (*Lithobates septentrionalis)*, green frogs (*Rana clamitans melanota*), bullfrogs (*Rana catesbeiana*), spring peepers (*Pseudacris crucifer*), and a garter snake (*Thamnophis sirtalis*).

4.2 Benthic Macroinvertebrates

Benthic (meaning "bottom-dwelling") macroinvertebrates are small aquatic animals and the aquatic larval stages of insects. They include dragonfly and stonefly larvae, snails, worms, and beetles. They lack a backbone, are visible without the aid of a microscope and are found in and around water bodies during some period of their lives. Benthic macroinvertebrates are often found attached to rocks, vegetation, logs and sticks or burrowed into the bottom sand and sediments.

Sampling of benthic macroinvertebrates has been widely used in the United States to assess aquatic health for the following reasons (Barbour *et.al.* 2002):

- Macroinvertebrate assemblages are good indicators of localized conditions. Because many benthic have limited migration patterns or a sessile mode of life, they are particularly well-suited for assessing site-specific impacts (upstream-downstream studies).
- Macroinvertebrates integrate the effects of short-term environmental variations. Most species have a complex life cycle of one year or more. Sensitive life stages will respond quickly to stress; the overall community will respond more slowly.
- Degraded conditions can often be detected by an experienced biologist with only a cursory examination of the benthic macroinvertebrate assemblage. Macro-invertebrates families are relatively easy to identify.
- Benthic macroinvertebrate assemblages are made up of species that constitute a broad range of trophic levels and pollution tolerances, thus providing strong information for interpreting cumulative effects.
- Sampling is relatively easy, requires few people and inexpensive gear, and has minimal detrimental effect on the resident biota.
- Benthic macroinvertebrates serve as a primary food source for fish, including many recreationally and commercially important species.

- Benthic macroinvertebrates are abundant in most streams. Many small streams (first and second order) that naturally support a diverse macroinvertebrate fauna only support a limited fish fauna.

- Most state water quality agencies that routinely collect biosurvey data focus on macroinvertebrates. Many states already have background macroinvertebrate data. Most state water quality agencies have more expertise with invertebrates than fish.

The CT DEEP Riffle Bioassessment by Volunteers (RBV) program divides macroinvertebrates into three categories: (1) most wanted; (2) moderately wanted, and (3) least wanted. The most wanted are those species that are highly sensitive to decreases in water quality while the least wanted are those species that can tolerate a wide range of water quality, from pristine to highly disturbed. The moderately wanted are those species that fall in the middle of this pollution-tolerance spectrum.

In Fall 2010 and Fall 2021, benthic macroinvertebrate data was collected at several locations by Ridgefield volunteers as part of the RBV program (Photo 4-7). Sampling locations and results are shown in Tables 4-1, -2, and -3).

Table 4-1: Summary of 2010 RBV Survey Results

Stream/river sample locations	Most wanted	Moderately wanted	Least wanted or other
Cooper Pond Brook	2	5	4
Mopus Brook	3	5	0
Norwalk River	3	4	2
Titicus River	4	6	1

Table 4-2: Summary of 2021 RBV Survey Results

Stream/river sample locations	Most wanted	Moderately wanted	Least wanted or other
Miry Brook	2	5	6
Mopus Brook	2	4	4
Round Pond Outlet	0	3	2
Silvermine, East Branch	1	5	3
Titicus River	3	5	4
Source: CT DEEP RBV			

Table 4-3: 2021 RBV Results - List of Species Found

Most Wanted Species	Brush-legged mayfly	Common stonefly	Misc small stoneflies	Saddle casemaker caddisfly
Miry Brook	X	X		
Mopus Brook	X		X	
Round Pond Outlet				
Silvermine, East Branch				X
Titicus River	X	X	X	

Moderately Wanted Species	Common netspinner caddisfly	Fingernet caddisfly	Flathead mayfly	Water penny	Dobsonfly	Dragonfly	Damselfly
Miry Brook	X	X	X	X		X	
Mopus Brook	X		X	X			X
Round Pond Outlet	X		X		X		
Silvermine, East Branch	X	X	X		X	X	
Titicus River	X	X	X	X	X		

Least Wanted Species or Other	Non-biting midge	Black fly	Aquatic worm	Crane fly	Riffle beetle	Small minnow mayfly	Flatworn
Miry Brook		X	X	X	X	X	X
Mopus Brook	X			X	X		X
Round Pond Outlet	X				X		
Silvermine, East Branch	X		X	X			
Titicus River	X	X		X	X		

The presence of least-wanted species does not indicate an impaired stream; however, if these species make up the greatest proportion of species present, it is inferred that a degree of water-quality impairment is present. Most telling is the diversity of most-wanted species within a stream, as these species can only thrive within a narrow range of water-quality conditions. Excellent water quality that is fully supporting aquatic life is indicated when four or more most-wanted species are present.

In 2010, the Titicus River had four of these highly-sensitive species present. Mopus Brook and the Norwalk River sites also had a relatively high diversity of these high-sensitivity indicator species present (three species each). The most impaired of the four sample sites in 2010 was Cooper Pond Brook, with only two most-wanted species present and a higher proportion of moderately-wanted and least-wanted species.

In 2021, two sampling locations from the 2010 study (Norwalk River and Cooper Pond Brook) were not repeated as they fall within an area of the Norwalk River and its tributaries classified by the CT DEEP as impaired. Three new locations were added in 2021 - Miry Brook, Round Pound Outlet, and the East Branch of the Silvermine River. Mopus Brook and Titicus River were repeated as sample locations in the 2021 survey (Table 4-3). Titicus River again had the highest number of most-wanted species at a total of three, none of the five waterways sampled had four or more of most-wanted species of macroinvertebrates. Thus, none of the five achieved the designation of fully supportive of aquatic life.

Photo 4-7: Macroinvertebrate Sampling

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5 Land Use and Protection

5.1 Land Use Changes Over Time

Connecticut's landscape has undergone sequential alterations since its settlement in the early 1600s. During the 17th and 18th centuries, essentially all the virgin old growth forest was converted to farmland and the harvested timber used in a variety of ways. Bedini (1958) describes Ridgefield's tax list of 1808. Particularly instructive is the account of land-uses and conditions at that time over two centuries ago. These included 3,807.5 acres of *plough land*; 4,498.5 acres of *upland mowing and clear pastures*; as well as 405.5 acres of *boggy land-mowed*; 5,259 acres of *bushy land*; 1,257.5 acres of *other lands* in addition to numerous acres of undefined land.

During the 19th and 20th centuries, the Connecticut landscape began to reforest as people moved west in search of better farmland and the industrial era began. Statewide aerial photography in Connecticut began in 1934 at a period when second-growth reforestation of the State was largely complete. A review of these historic photos allows us to observe significant changes in land-use patterns over a nearly 80-year period, from the mid-1930s to the present day (Photos 6-5 and -6, pp. 6-12 and -13).

Striking is the abundance of farmland within several areas of Ridgefield during the 1930s, particularly within the village of Ridgebury, bordering Route 116 between Ridgebury and the Town's center and surrounding the Town's center and near the confluence of Route 35 and Route 7. Also notable is the presence of a large intact forest block surrounding Pine Mountain, a forest block still present today. Due to its rugged terrain, it has been spared from land clearing and development.

The latest data measuring the change in land use comes from the University of Connecticut's *Center for Land Use Education and Research* (CLEAR). The percentage change in Ridgefield very much mirrors that of the State. In the 30-year period between 1985 and 2015, the decreases in forest and agricultural fields matched that of increases in turf & grasses and developed lands (Table 5-1).

Table 5-1: Change in Land Use From 1985 to 2015 in Ridgefield

Use	Acres (1985)	Percentage (1985)	Acres (2015)	Percentage (2015)	Change in category (%)
Forest	13,939	62.5	13,335	59.8	-4.5
Agricultural field	558	2.5	286	1.3	-48.6
Turf & grass	2,442	10.9	2,785	12.5	14.1
Developed	4,537	20.3	5,093	22.8	12.3
Other	836	3.8	792	3.6	-5.3
Source: UConn CLEAR.					

Photo 5-1: Hayfield Bordering Ridgebury Road

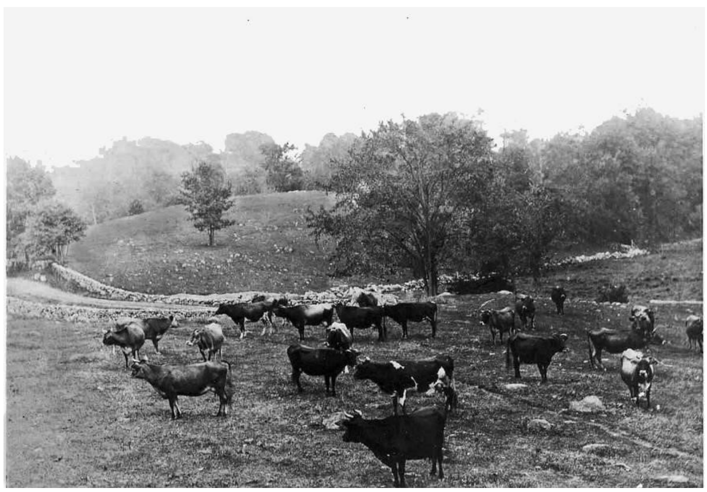

Photo 5-2: Pasture Bordering Farmingville Road

Photo 5-3: Haying Field With Horse in Ridgefield

According to Ridgefield's Planning and Zoning Department (P&Z), slightly over 50 single-family houses were constructed between 2015 and 2020 on undeveloped land. Based on zoning regulations, historical trends, and land availability, the RCC believes that less than 100 acres were used for this development. According to Connecticut's 2020 Forest Action plan, between 2010 and 2020 very little forestland was lost across the State.

This data provides some fairly predictable results of land-use changes in Ridgefield over this period. Most notable are the land cover changes for two key categories, agricultural land and developed land.

- **Agricultural Land** – Areas that are under agricultural uses such as crop production and/or active pasture. Also, likely to include some abandoned agricultural areas that have not undergone conversion to woody vegetation. Ridgefield's rich heritage of agricultural use (Photos 5-1, -2, and -3) has been nearly eliminated over the last century. Total acres of agricultural land from 1985 to 2015 decreased from 558 to 256 acres, a loss of over 270 acres or nearly half of the land used for agriculture. There are only a few remnants of this past in Town, the most notable being McKeon Farm (Photo 5-4), established in the late 1600s. (The RCC believes that the largest portion of this land consists of horse farms).

Photo 5-4: McKeon Farm

- **Developed Land** – Defined as "high-density built-up areas typically associated with commercial, industrial and residential activities and transportation routes. These areas can be expected to contain a significant amount of impervious surfaces, roofs, roads, and other concrete and asphalt surfaces." Developed land increased by over 12 percent from 4,537 to 5,093 acres. On average, over this 30-year period, Ridgefield lost approximately 19 acres of land to development annually. The two other classes of land–turf & grasses and forest–both experienced change as a byproduct of the other two. Turf & grasses (defined below) increased because of development (e.g., lawns and additional recreational grounds in Town). Decreases in forest lands (defined below) are primarily due to development.

- **Turf & Grasses** – A compound category of undifferentiated maintained grasses associated mostly with developed areas. This class contains cultivated lawns typical of residential neighborhoods, parks, cemeteries, golf courses, turf farms, and other maintained grassy areas. Also includes some agricultural fields due to similar spectral reflectance properties.

- **Forest** – Includes Southern New England mixed hardwood and softwood forests. Also includes scrub areas characterized by patches of dense woody vegetation. Includes areas depicted as wetland, but with forested cover. May include isolated low-density residential areas. A little over 600 acres has been lost between 1985 and 2015.

The largest change to Ridgefield over time is that much of its former agricultural land has been developed. What remains consists of small fragments of fields dominated by cool-season grasses. Ecologically, these fields are not unlike hayfields managed for the production of livestock feed. However, the majority of these fields appear to be maintained for aesthetic purposes rather than for the production of livestock feed; a one-acre field bordering a large estate for example. The largest contiguous area of an annually mowed field is located at the Town-owned McKeon Farm, totaling 37 acres.

There are, however, a few working farms in Ridgefield. They include the Hickories (Photo 5-5), located in the southern part of Ridgefield. It has been a working farm for over 250 years that currently has 45 acres of farmland that is organically certified. It sells a wide variety of fruits and vegetables, flowers and livestock products. Another, Veronica's Garden, has been selling produce for many years and produces its products on 3 acres in Northern Ridgefield near McKeon Farm. Henny Penny Farm maintains a herd of sheep at McKeon Farm (guarded by llamas) and sells a variety of meats and woolen products.

Photo 5-5: The Hickories Farm (Brewster Farm)

The majority of Ridgefield continues to be forested (Figure 5-1). With the exception of the center of Town, the landscape of Ridgefield is dominated by vegetation. This does not mean, however, that Ridgefield's ecosystems are entirely healthy or without threats.

5.2 Existing Dedicated Open Space

The protection and maintenance of Ridgefield's abundant natural diversity is directly dependent upon the network of dedicated open spaces that are located throughout the Town. The largest parcels serve as critical reservoirs for biodiversity. The protection and management of these areas, as well as smaller interconnected ones, are essential to the survival of these species and the diversity of Ridgefield's natural systems.

The large tracts of open space that surround Bennett's Pond, Pine Mountain, Hemlock Hills, and Lake Windwing all represent significant habitat mosaics that contain a rich abundance of habitat types, wetlands, and a diversity of plants and animals. Certain tracts of dedicated open space also contribute to regional biological connectivity, transcending Town and State boundaries.

The numerous, scattered smaller parcels of open space, while biologically less significant, are important to the overall character of the Town. These smaller, isolated patches provide welcome green space and visual buffers between residential developments and are inhabited by species that co-exist in human-dominated landscapes (e.g., raccoons, skunks, blue jays, crows, and white-tailed deer) and are classified as development-associated species. Development-associated species thrive in human-altered habitats, often at the expense of more specialized development-sensitive species.

Of the Town's total of 22,387 acres, about 5,600 acres, or 25%, are permanently protected from development as open space (Table 5-2 and Figure 5-2). This land is a mixture of Town, State, Land Conservancy, and privately-owned properties. It also includes approximately 475 acres of land that are protected through conservation easements held by the Town or the Land Conservancy of Ridgefield. The Town's *Plan of Conservation and Development* (POCD) has a goal of 30% of the Town being protected as open space. To meet that goal requires the protection of approximately an additional 1,000 additional acres in 2023.

Table 5-2
Ridgefield Open Space (2022)

Category	Total Acreage
Town Parks	211
Privately Owned	588
Land Conservancy	702
Federal and State	1,417
Town-owned Open Space	2,697
Total	5,615

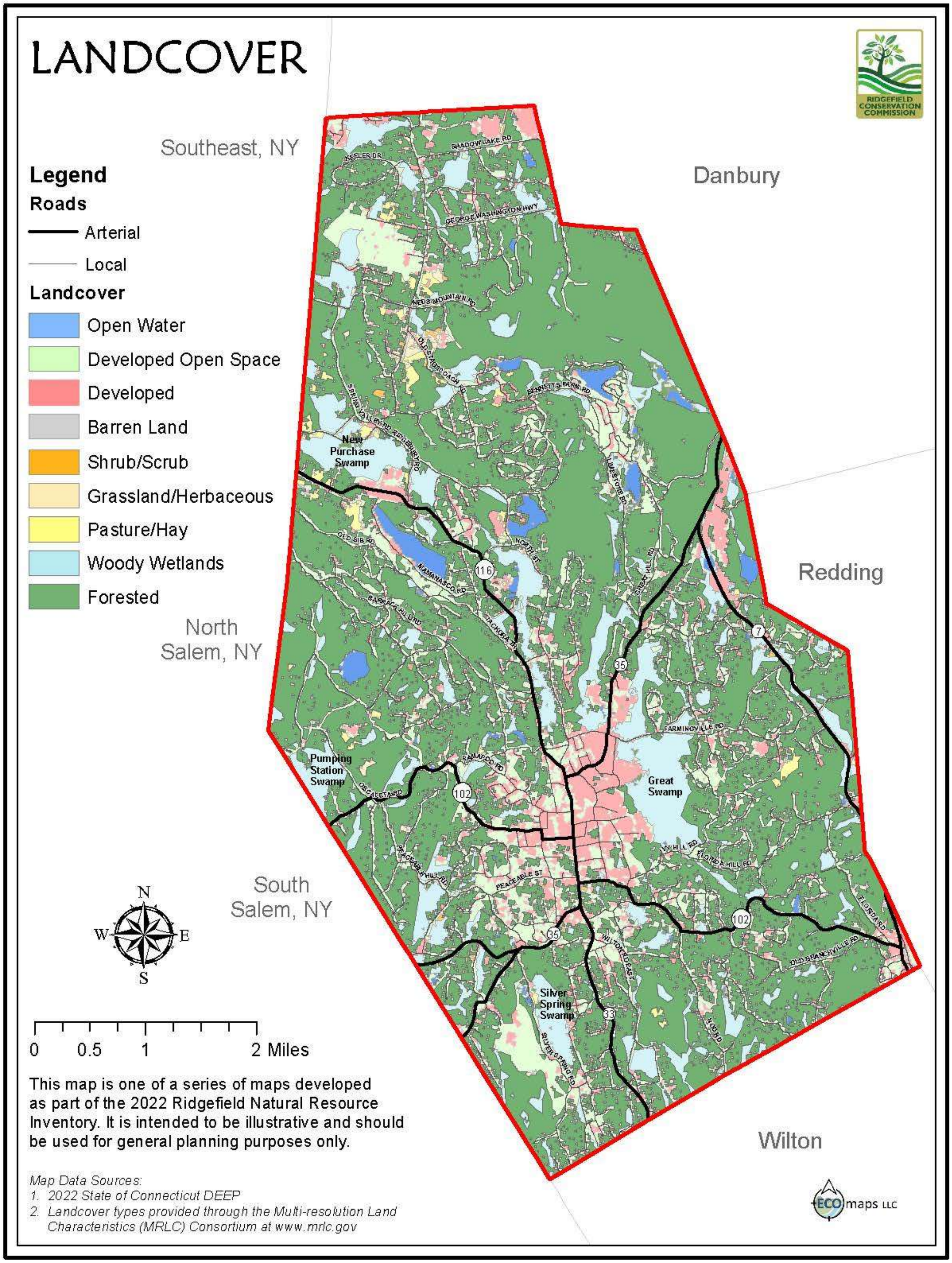

Figure 5-1: Landcover

There are a variety of opportunities to increase preserved open space in Ridgefield (Table 5-3).

Table 5-3: Opportunities to Increase Preserved Open Space

Opportunity	Approximate available acreage	Likelihood of success/difficulty
Demapping mapped streets	10	**High/Low**
Protecting portions of existing Town properties	92	**High/medium** (function of Town Board of Selectmen)
Acquiring State-owned parcels	44	**Medium/medium** (must be conveyed from the State to the Town)
Acquiring privately-owned parcels	1,050	**Low/High** (would require between $10 million and $50 million in expenditures)
Increasing properties qualifying for Public Act 490	632	**Low/High** (unknown cost factor but would require millions of dollars)

These opportunities have widely varying degrees of probable success. For example, in examining the Town map of open space and private parcels (Table 5-3) there are only four large, untouched privately owned, contiguous spaces (combinations of multiple parcels) in Town representing slightly over 550 acres. There are many smaller parcels that are adjacent to existing open spaces. Open space that has the highest value is untouched land that is contiguous with other open spaces. The goal to protect an additional 1,000 acres is possible but will require vast amounts of time, money and creativity. Two key documents related to the history and future of open space in Ridgefield can be found on the RCC website:

- *Town of Ridgefield, Open Space Preservation Plan* (August 1, 2021).
- *Town of Ridgefield, Open Space Inventory* (October 20, 2022).

Given these challenges, it is likely that the role that open space will play in providing protection for natural resources and biodiversity will remain relatively static. However, strategic acquisitions could yield ecological value and resiliency through linkages both within Ridgefield and into neighboring towns.

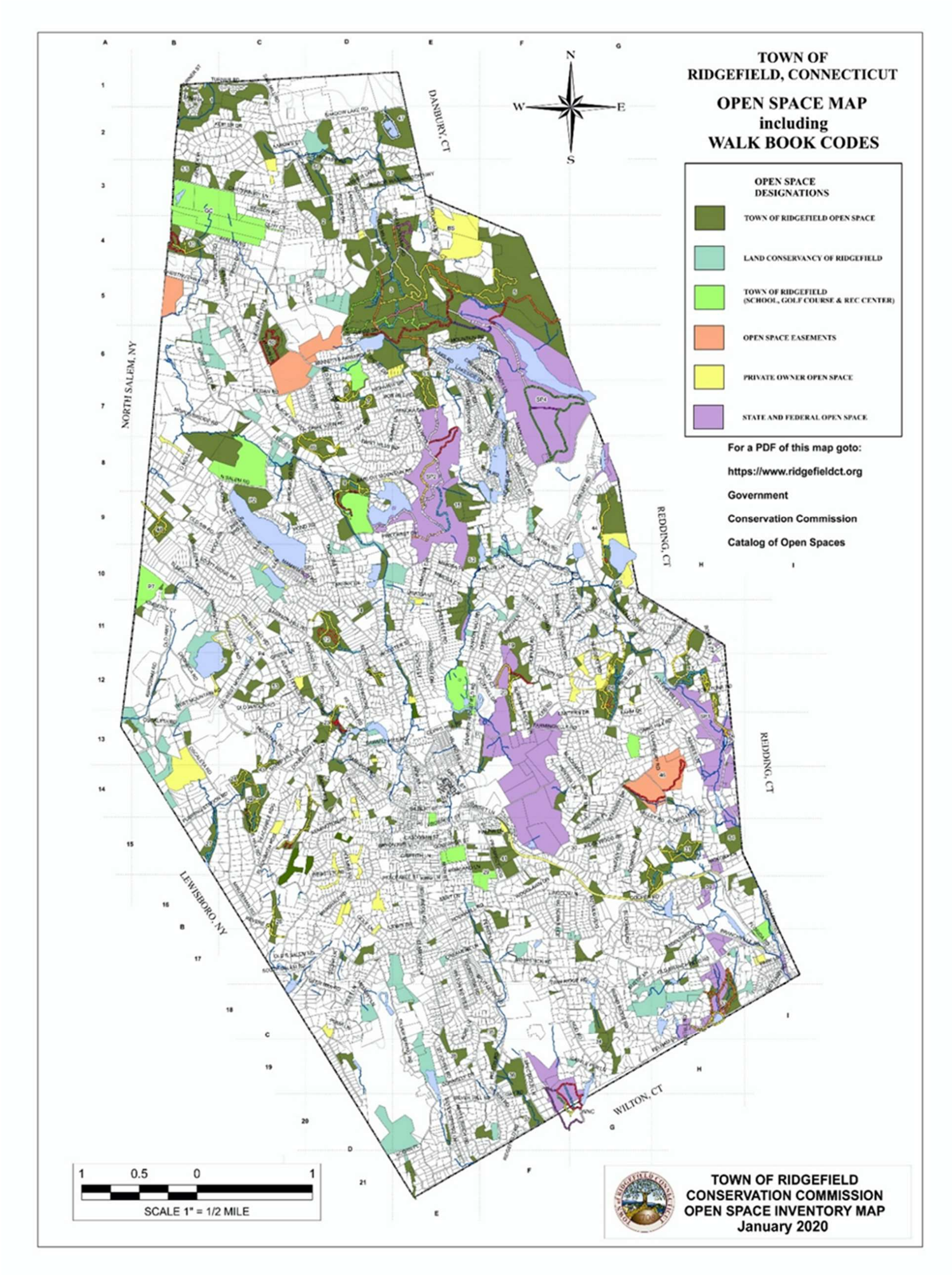

Figure 5-2: Ridgefield Open Space Inventory (2020)

5.3 Areas of Highest Conservation Value

Protected open space represents just one factor to maintain Ridgefield's natural resources. Hudson to Housatonic (H2H), is a not-for-profit partner network that "advances the pace and practice of regional land protection and stewardship from the Hudson to the Housatonic by collaborating across boundaries to enhance the connection between people and nature." Among its initiatives it has created a series of maps using a variety of data points that identifies areas of highest conservation value. According to its web site (https://h2hrcp.org):

Over a series of meetings, partners started discussions by identifying a list of criteria they care about in regard to the conservation of our region. Partners identified strong interests in things like climate resilience, habitat connectivity, the presence of drinking quality source water, wetlands, and recreational trail connections. Each of these priorities matched to datasets. During the co-occurrence modeling, the data layers are stacked on top of one another, so that in the final map, we get these hotspots that represent a high concentration of conservation values that we care about, and this becomes one tool to direct where we should prioritize land protection and stewardship as a partnership.

Figure 5-3 is the culmination of this research. What is interesting about the map is that it looks at conservation values from the perspective of factors such as topography, water sources, etc. rather than property lines and boundaries. As a result, many of these areas of high conservation value cut through private properties forming contiguous forest, habitat-corridor, wetland, etc. spaces that should not be compromised through development or removal of existing vegetation. It can be inferred from this that individual homeowners have a duty to maintain their natural spaces to protect existing wildlife. Though mechanisms such as conservation easements can also be used to protect these areas, individual actions can be less costly, more effective, and more widespread.

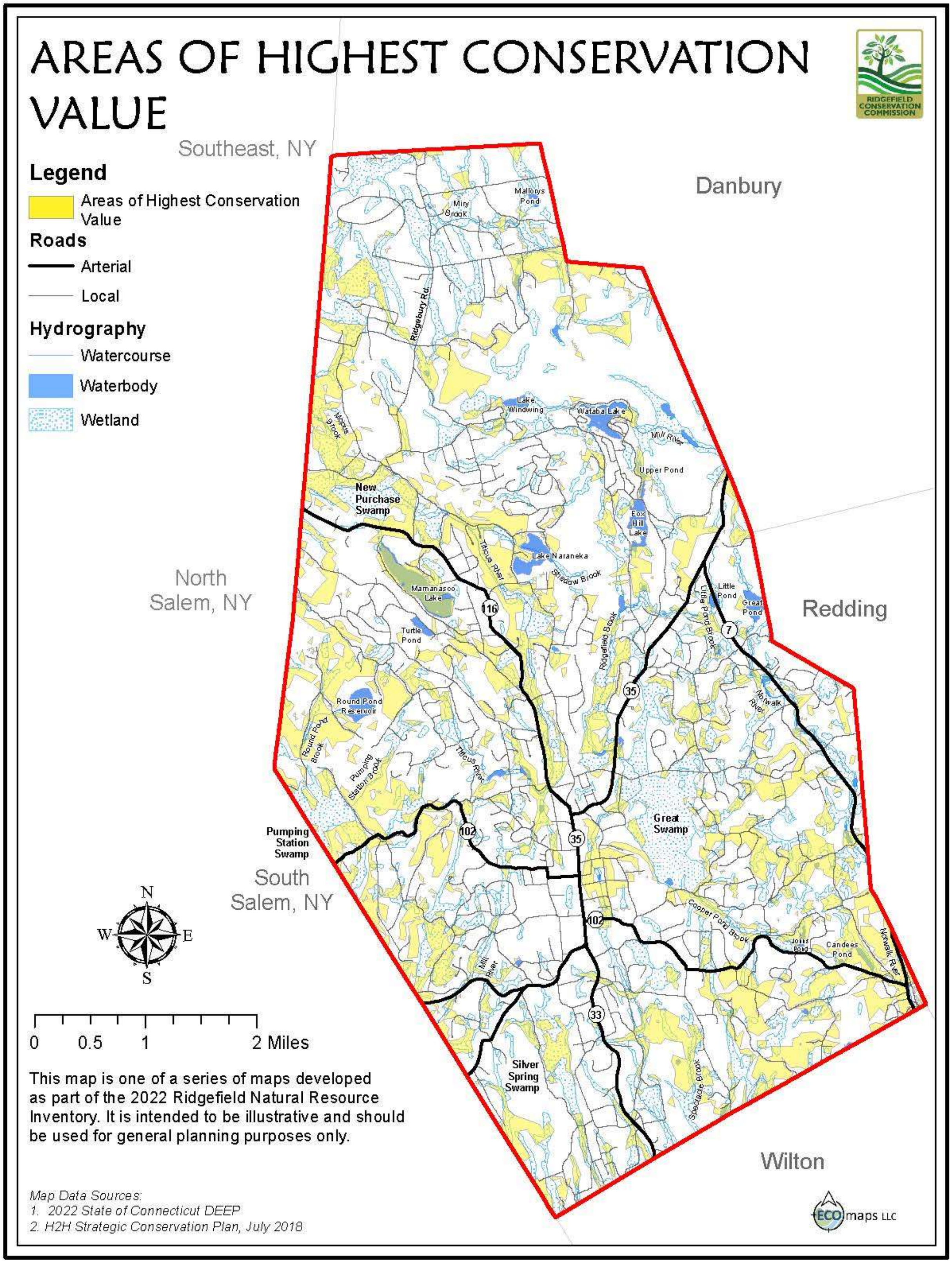

Figure 5-3: Areas of Highest Conservation Value

6 Terrestrial Habitats

A habitat is the physical and biological environment used by an individual or a population of a species. Habitat loss is the conversion of one habitat type to another such that the new habitat no longer supports a given species (Johnson and Klemens, 2005). Terrestrial habitat refers to an upland or non-wetland habitat type. Terrestrial habitats can generally be divided into two categories: forested and non-forested. Forested refers to areas (Figure 6-1) dominated by deciduous, coniferous, or a mixture of deciduous and coniferous tree species.

Non-forested habitats, often referred to as successional habitats, are habitats dominated by shrubs, small trees and herbaceous vegetation. Succession refers to the process by which non-forested habitats, such as fields, will naturally revert to forest over time. These non-forested habitats require regular disturbance to prevent succession into forest. Disturbances can include natural disturbance, such as fire or tree-throw resulting from windstorms, but it is most often due to human activity, such as mowing or tree-harvesting. Successional habitats in Ridgefield include active agricultural lands (e.g., pastureland) as well as post-agricultural lands (e.g., fields and meadows).

As stated in the prior section, Ridgefield has seen a proportionately small amount of change to non-wetlands habitats between 1985-2020. It is significant, however, as the decrease in available, buildable land leads to increased pressure and potential for damage on existing habitats.

6.1 Forest Habitat

Connecticut is a heavily forested state. Although small in land area – around 3.4 million acres – it is close to 60% covered by forests or, if just tree canopy cover is considered, 67% covered by trees. The State ranks 14th on the list of percent of total forest cover (of all states in the U.S). It also ranks eighth in terms of population density. Besides being small, heavily forested, and densely populated, Connecticut's trees are also highly heterogeneous. According to the Connecticut Tree Protective Organization web site, the approximate distribution by tree type in the State is:

- Oak-hickory hardwood type – 51%
- Northern hardwoods type – 29%
- Elm-ash-red maple – 9%
- Red and white pines – 7%
- Other – 4%

The 10 most common native trees, based on a minimum stem diameter of 1 inch at breast height, are:

- Red Maple – 27%
- Black Birch – 10%
- Eastern Hemlock – 6%
- Sugar Maple – 6%
- Northern Red Oak – 6%

- Beech – 5%
- Eastern White Pine – 4%
- Black Cherry – 3%
- Yellow Birch – 3%
- Pignut Hickory – 3%

Altogether, this covers about 73% of the native forest trees in the state. Ridgefield's forests contain all of these tree species. (There are also many non-native trees, such as the Norway maple, that are not included as part of this survey).

Comparatively, Ridgefield, is approximately 60% forested (CT DEEP, Division of Forestry). Ridgefield covers approximately 22,300 acres of land, with 13,339 acres in deciduous, coniferous, or wetland forest cover types (Figure 6-1).

In an effort to assess the ecological value of this forest cover, CLEAR conducted a second analysis of this land cover data in 2016 in order to identify interior or core forest habitat, defined as forest located greater than 300 feet from any non-forested land cover type (Figure 6-2). The existing forest concentration in Ridgefield has changed little in the last 30 years. The largest tracts of contiguous forest (in excess of 500 acres, in the northeastern portion of Town, have remained untouched while smaller tracts have been incrementally developed. According to State surveys, there are still many areas that are well-forested though increasingly fragmented. An excellent resource to see forest fragmentation illustrated from 1985 to 2015 can be found at https://clear.uconn.edu/projects/landscape/ct-forestfrag/.

Over the past few decades, numerous studies have identified *edge effects* resulting from forest fragmentation – the breaking up of large contiguous forest tracts into smaller tracts or *fragments*, as having a significant negative impact on forest-dwelling flora and fauna. This forest fragmentation data reveals that, although 59.8% of Ridgefield's land is covered in forest, only 27% of that forest, or 3,613 of 13,339 acres, are considered core forest, with only 1,443 acres considered to be "large core" forest in excess of 500 acres.

Unfragmented habitat blocks are relatively large tracts of land that are unbroken by major roads or other developments. Large blocks of undeveloped natural land are important because they typically contain a variety of habitat types that can support a greater diversity of species. Larger populations of certain species are more likely to exist in larger, undeveloped tracts and are more likely than small populations to be able to survive over time. Unfragmented blocks of land also often provide water sources for wildlife, buffer waterways from human impacts, improve water quality, and provide beautiful vistas (Photo 6-1).

The preservation of the largest intact forested tract within Ridgefield, the Bennett's Pond-Hemlock Hills-Pine Mountain complex, occurred serendipitously. The Hemlock Hills-Pine Mountain tract was slated for development in the 1960s. However, when the owner Otto Lippolt died, his widow did not pursue subdivision and in 1967, the Town bought the property. The Bennett's Pond tract, owned by IBM but never developed, was contiguous with these Town-owned lands. In the late 1990s, it was sold by IBM to a private developer. In 2005, the Town, in partnership with the State of Connecticut, acquired 450 acres of the former IBM property through eminent domain, resulting now in over 1,400 acres of un-fragmented forest.

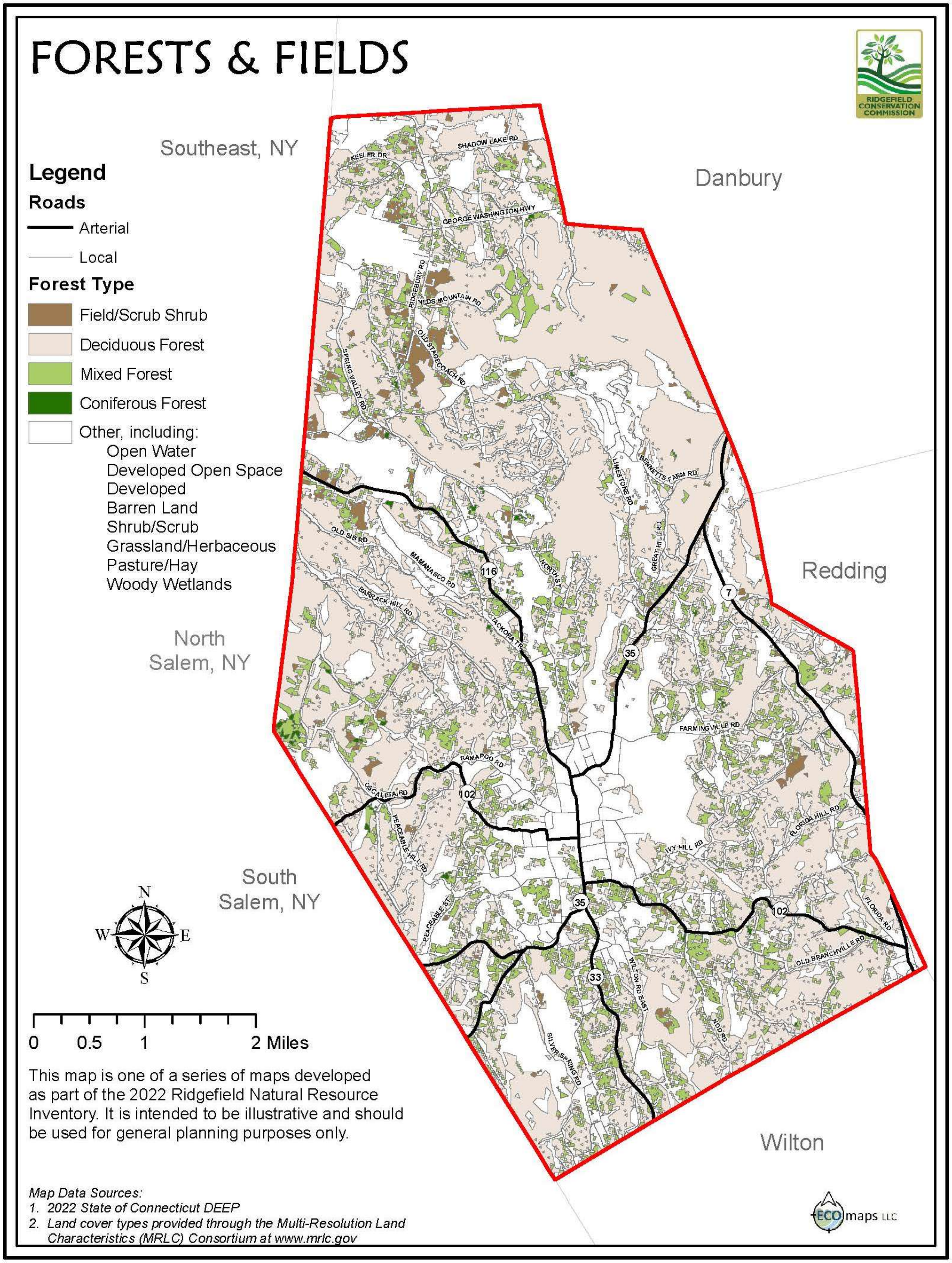

Figure 6-1: Forests and Fields

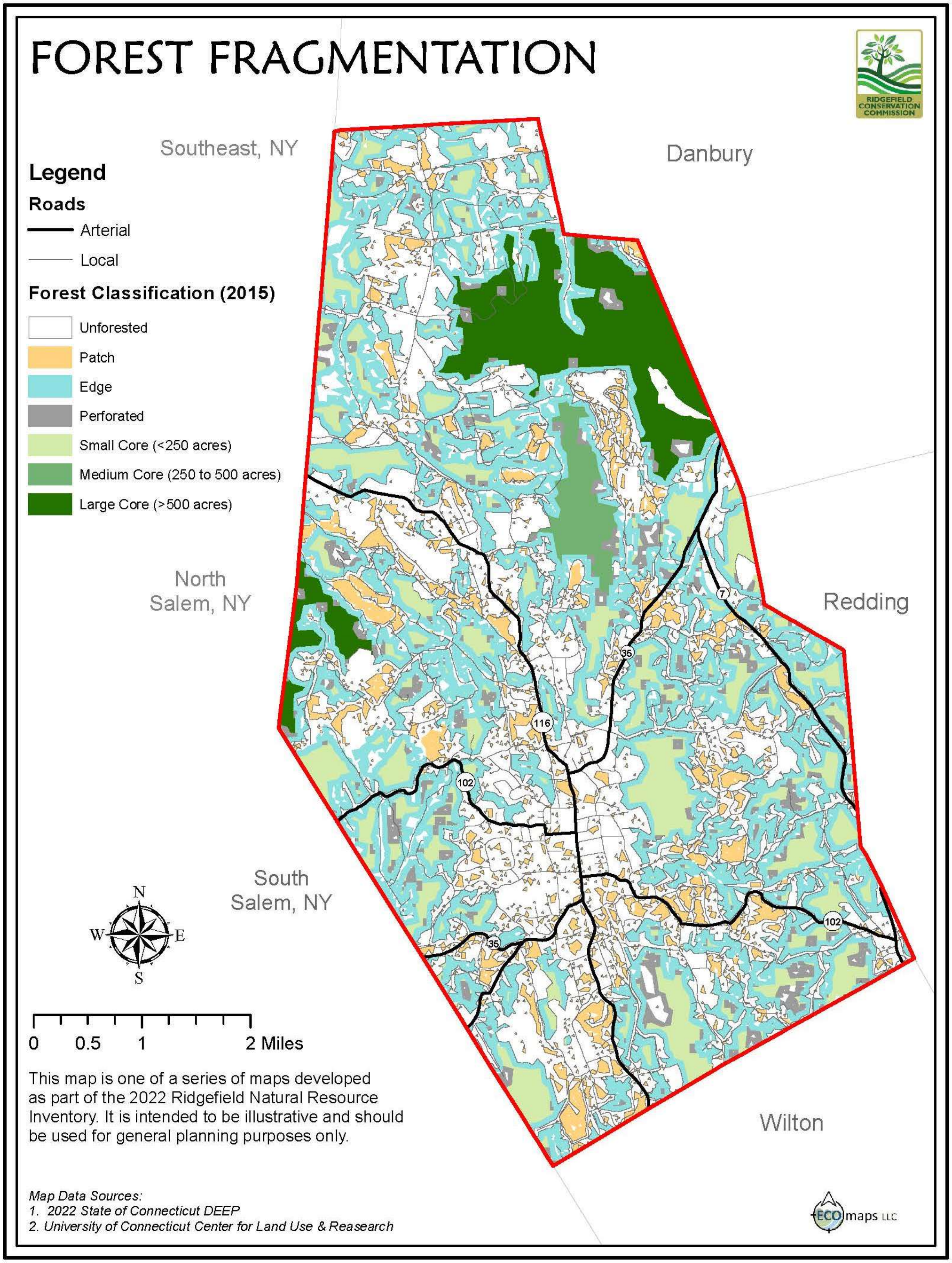

Figure 6-2: Forest Fragmentation

Photo 6-1: Deciduous Forest in Southern Ridgefield

Over the last decade many core forested parcels greater than 100 acres have remained intact (Table 6-1). These core parcels were identified using the Western Connecticut's Council of Government's GIS system that is linked to the Town's property data. Examples of Ridgefield's wildlife that are dependent upon large intact forest blocks include the scarlet tanager, ovenbird, wood thrush and eastern wood pewee. Large blocks of forest are critical to these noted species because they provide forest-interior habitat.

Forest interior habitat is forest located away (approximately 100-300 feet) from the forest edge (i.e., the boundary between forest and another habitat or development). This edge forest is often degraded and in a transitional state. These parcels, as well as the ones identified in the last chapter as areas of highest conservation value, represent the land in Ridgefield that is most apt to support a wide and healthy ecosystem that supports biodiversity.

Connecting these parcels are habitat corridors, which are smaller tracts of undeveloped land that connect one or more habitat blocks. Habitat corridors that link intact habitat blocks are extremely important features in the landscape. They support natural processes that occur in a healthy environment, including the movement of species to find resources, such as food and water, and most importantly connect species populations. Such corridors are discussed in Section 5.3.

6.2 Forest Composition

The age of Ridgefield's forests is highly variable and dependent upon current and past land-use practices. Few are thought to be older than 200 years due to the almost complete absence of forest in 1808 (Bedini, 1958). The 2012 NRI stated that, "hemlock, ash and beech were dominant species… but, due to diseases and the presence of harmful invasive insects, all three are struggling to survive. Older sugar maples are also on the decline." The current population of native trees in Ridgefield is listed in Table 6-2.

Table 6-1: Contiguous Ridgefield Property Plots Greater than 100 Acres

Plot	Plot Name	Acres	Location / Characteristics
1*	Keeler Drive	28	Uplands and wetlands south of Keeler Drive and contiguous with forest in North Salem, NY
2*	Mopus Bridge Road (N)	42	Uplands northwest of Mopus Bridge road contiguous with forest in North Salem, NY
3*	Ives Court	60	Ridgetops and wetlands boarding State and Town open space
4*	Great Pond	72	Ridgetop and wetlands bordering Greatly Pond Brook contiguous with forest in Redding
5*	Pumping Station Swamp	86	Pumping Station Swamp west of Oscaleta Road; forest is contiguous with land in adjacent Lewisboro, NY
6*	Turner Road/Keeler Place/Schoolhouse Road	92	Uplands and wetlands connecting to contiguous forest in North Salem, NY
7	Farmingville Road	100	Predominantly forested wetlands north of Farmingville Road
8	Silver Springs Road (E)	104	Forested wetlands to the east of Silver Spring Road
9*	Mopus Bridge Road (S)	137	Forested floodplains and wetlands bordering the Titicus River south of Mopus Bridge Road
10*	Silver Spring Road (W)	141	Slopes and headwater wetlands along the Lewisboro, NY, line and west of Silver Spring Road
11	Round Pond/Sturges Park	149	Uplands and wetlands connecting to contiguous forest in North Salem, NY
12	Bennett's Farm Road (S)	156	Ridgetop forest located between Bennett's Farm Road and Route 7
13*	Rippowam and Oreneca Roads	166	Uplands and wetlands connecting to contiguous forest in North Salem, NY
14	Spectacle Brook	237	Uplands and forested wetlands bordering Spectacle Brook; forestland is contiguous with forest in adjacent Wilton
15	Great Swamp	271	Great Swamp forested wetlands
16*	Pierrepont State Park	386	Predominantly uplands and ridgeline located on Barlow and Ridgebury Mountains
17*	Bennett's Pond/Hemlock Hills/ Pine Mtn/Wooster Mtn	1,443	Upland and ridgeline forest located on Pine Mountain, Ned's Mountain, Wooster Mtn (Danbury) and south of Bennett's Ponds

Note: *Indicates forest blocks larger than 100 acres including lands in contiguous towns. Acreage stated does not include those located in adjacent towns or forest blocks.

(Table 6-2 includes only native trees of Ridgefield, native being defined as trees that were in existence prior to the colonization of the Town in the 17th century). Because of climate change as well as introduced pathogens (e.g., bacterial, viral, animal), the existence and range of viable trees has changed and is expected to continue to change.)

Table 6-2: Native Tree Species Currently Observed in Ridgefield

Common Name	Scientific Name
American Elm	*Ulmus americana*
Ash	*Fraxinus americana*
Basswood	*Tilia americana*
Beech	*Fagus grandifolia*
Birch, Black	*Betula lenta*
Birch, Yellow	*Betula alleghaniensis*
Black Gum	*Nyssa sylvatica*
Cedar, Atlantic white	*Chamaecyparis thyoides*
Cedar, Eastern red	*Juniperus virginiana*
Cedar, Northern white	*Thuja occidentalis*
Cherry, Black	*Prunus serotina*
Dogwood, Flowering	*Cornus florida*
Fir, Balsam	*Abies balsamea*
Eastern redbud	*Cercis canadensis*
Hawthorn	*Crataegus sp.*
Hemlock, Eastern	*Tsuga canadensis*
Hickory, Mockernut	*Carya tomentosa*
Hickory, Pignut	*Carya glabra*
Hickory, Shagbark	*Carya ovata*
Hophornbeam	*Ostrya virginiana*
Ironwood (hornbeam)	*Carpinus caroliniana*
Maple, Red	*Acer rubrum*
Maple, Sugar	*Acer saccharum*
Oak, Black	*Quercus velutina*
Oak, Chestnut	*Quercus prinus*
Oak, Red	*Quercus rubra*
Oak, Scarlet	*Quercus coccinea*
Oak, White	*Quercus alba*
Pine, Eastern white	*Pinus strobus*
Pine, Red	*Pinus resinosa*
Sassafras	*Sassafras albidum*
Spruce, White	*Picea glauca*
Tamarack (Eastern larch)	*Larix laricina*
Tulip	*Liriodendron tulipifera*

In early 2023, David Beers, Service Forester for the Western District of Connecticut, revisited the sites documented in 2011 along with several RCC Commissioners. Almost everything in the forest descriptions in the 2012 NRI still holds true, with one important exception – white ash death from the emerald ash borer. The largest change is the death of a high percentage of ash trees to the emerald ash borer. This is a significant loss for Richardson Park, Kiah's Brook (Photo 6-2), Levy Park, and West Mountain. This loss has created large canopy gaps. Some of these gaps will fill in over time by the expanding canopies of the remaining trees. Other gaps will hopefully be filled by young understory trees reaching for the sunlight. Unfortunately, these gaps allow more sunlight to reach understory invasives.

*(It will be important to monitor these spaces to ensure invasive species don't take over, preventing the many young sugar maple saplings that are present from maturing. The predominant threat from invasives in Ridgefield's forests is coming from Japanese barberry (*Berberis thunbergii*) and porcelain berry (*Ampelopsis brevipedunculata*) vines. However, another invasive, Norway maple (*Acer platanoides*), is also a major threat as it outcompetes native sugar maple trees and wildflowers. Ironically, the largest Norway maple in Connecticut is over 100 years old, nearly 80-feet high, and is located in Ridgefield.)*

Hemlock populations continue to decline in Ridgefield dramatically with only a few stands left in Town, (such as Hemlock Hills). Treatment for the hemlock wooly adelgid *(Adelges tsugae*), which are killing the trees, is practical for only homeowners. Beech trees appear to be on a similar downward trajectory like that of the ash. A microscopic worm *(Litylenchus crenatae*) has been identified in trees with beech leaf disease but it has not been confirmed if this nematode is the root cause of the problem. As of 2023, there is no standardized treatment for the disease though a number of studies have shown encouraging results.

Ridgefield is fortunate to still have several great examples of old, second-growth forest, with many notable red and white oak trees present. Ridgefield's forest continues to be a combination of sugar maple dominated sites, red maple dominated sites and oak dominated sites. Each has its own significance: sugar maples grow well where the soil is less acidic, and therefore are common in Ridgefield's limestone valleys; red maples are the dominant species in wet soils, where they predominate in forested wetlands. Oaks are found on dryer ground, such as the slopes and peaks of Ridgefield's ridges and hilly terrain. There are few stands of evergreen trees in Ridgefield; hemlocks once dominated certain areas but as stated before have fallen into extreme decline.

Many a decade ago, the common understory (shrubs and saplings) consisted of a variety of native shrubs– primarily spicebush (*Lindera benzoin*), witch hazel (*Hamamelis virginiana*), low and highbush blueberry (*Vaccinium*) and winterberry (*Ilex verticillata*), but the predominant plant found throughout the forest floor is Japanese barberry. Barberry is a non-native invasive plant that isn't subject to deer browse, it leafs out earlier than other shrubs (stunting growth) and it provides the perfect habitat for white-footed mice *(Peromyscus leucopus)*, a key host-species for the deer tick.

The lack of a diverse native shrub layer can have a negative effect on biodiversity, as many species require a structurally diverse forest understory (Photo 6-3). The lack of diversity in the forest understory can be attributed to a combination of factors including deer browse, acidic soils, older forests with limited light availability, and the negative impact of non-native earthworms on soil composition.

The recent survey complements a 2011 report by Connwood Foresters. In that report, and the most recent one, recommendations were made as to how to best manage Ridgefield's trees and natural assets. Key was the hiring of a forester to manage a wide variety of chores that are needed within these properties including invasive plant removal, tree removal, etc. Though many of these properties are under the stewardship of the RCC, it has neither the budget nor the manpower to implement the needed maintenance on these properties. To execute these recommendations, the Town would need to dramatically increase its investment pertaining to forest management.

Photo 6-2: Canopy Opening Due to Ash Die-Off from Emerald Ash Borer

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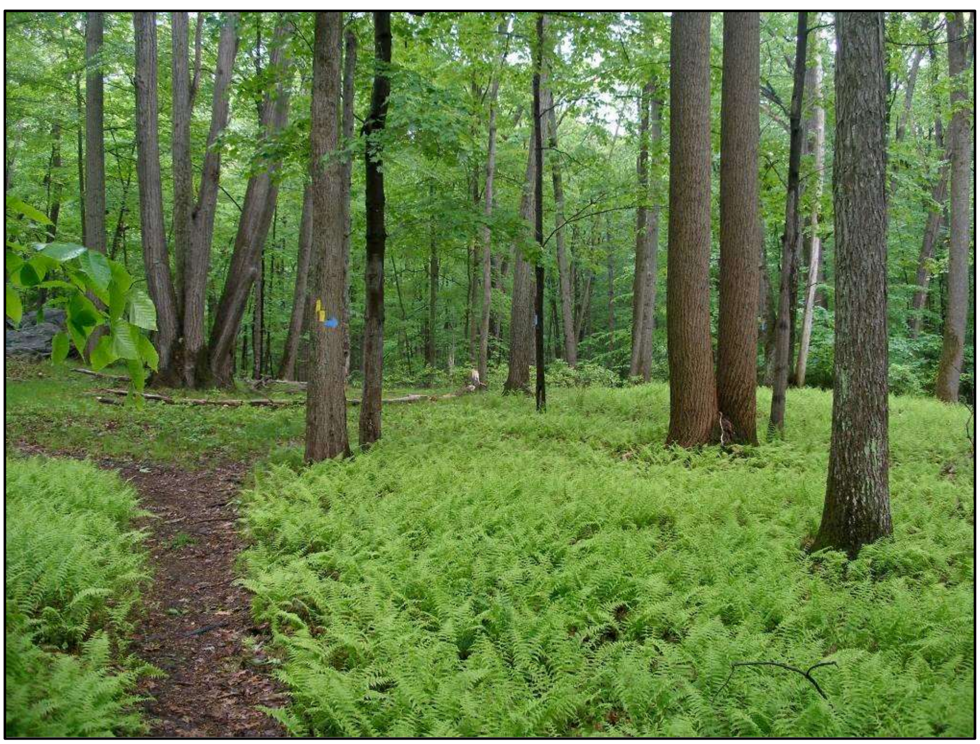


Photo 6-3: Mixed Deciduous Forest

6.3 Habitat Fragmentation

Habitat fragmentation occurs when large contiguous habitat areas are broken into smaller pieces, either through natural or man-made processes. These habitat fragments are subsequently surrounded by non-suitable habitat for a given species. The most common cause of habitat fragmentation is residential development resulting from sprawl (Photo 6-4).

Photo 6-4: Example of Forest Fragmentation

Populations of some wildlife species increase in response to suburbanization. These species, referred to as development-tolerant focal species, are usually habitat generalists, having non-specific habitat requirements. Human alterations to landscapes favor, or subsidize these generalists, which tend to be found in areas that have already been degraded or along edges, such as highway rights-of-way (Mitchell and Klemens, 2000). Examples of such species include crows and jays (*Corvids*), Canada geese (*Branta canadensis*), bullfrogs (*Rana catesbiena*), raccoons *(Procyon lotor*) and white-tailed deer (*Odocoileus virginiana*). As suburbanization proceeds, development-sensitive species are out-competed by the more development-tolerant ones. In this manner, the biomass of development-tolerant species tends to increase, while the overall biodiversity of development-sensitive species declines.

Much of Ridgefield is dominated by medium-to-large-lot residential development, characterized by large homes surrounded by mature trees and lawns interspersed with small woodlots. These areas are not devoid of wildlife, but are most suitable for development-tolerant or backyard wildlife. Typical birds include the American robin (*Turdus migratorius*), northern cardinal *(Cardinalis cardinalis)*, and blue jay *(Cyanocitta cristata).* Typical mammals include squirrel (*Sciuridae*), eastern chipmunk (*Tamias striatis*), and the white-footed mouse. While these residential areas can give the appearance of being forested, they are incapable of supporting less common forest-specialists; including the spotted salamander (*Ambystoma maculatum*) or scarlet tanager *(Piranga olivacea).*

These fragmented habitats also create a host of other ecological problems including degraded water quality and stream flooding due to increased stormwater and chemical runoff, disruption of phenological (cycles of flowering) patterns due to light pollution, increased nocturnal species activity, increased predation due to dogs and cats, and noise pollution that interferes with species such as birds and frogs that depend upon aural cues for breeding and territorial defense. The reduced biodiversity of small mammals in fragmented habitats increases the risk of Lyme disease and West Nile Virus.

Forest fragmentation in Ridgefield can be easily seen by comparing aerial photos from 1934 and 2023 (Photos 6-5 and -6).

6.4 Native Plants and Invasive Species

Native plant is a term to describe plants endemic or naturalized to a given area in geologic time. This includes plants that have developed, occur naturally, or existed for many years in an area. In North America a plant is often deemed native if it was present before colonization. Native plants serve a vital function for our landscapes. They co-evolved with the insects and other wildlife endemic to its ecoregion, providing food for the small creatures that reside in fields and forests. They provide the biodiversity that is both functional and beautiful in the Northeast.

Invasive plant species are plants that are invasive locally and did not originate in this area of the country. They have arrived intentionally (e.g., ornamental plantings) and unintentionally (e.g., packaging, ship ballast, soil, etc.). They spread rapidly because no native or natural control mechanism exists to contain their growth. They overwhelm entire landscapes, eliminating diversity and providing little to no benefit to native wildlife. The presence of invasive plant species can cause economic and environmental costs and harm to human and animal health. It is important to note that not all non-native plants are invasive. Many plants used as ornamental plantings have not become invasive. There are many resources that provide information on native and invasive plants.

Native plant resources:

- RCC compiled list of native plants (https://www.ridgefieldct.gov/sites/g/files/vyhlif4916/f/pages/connecticut_native_plant_list.pdf)
- CT DEEP Native landscaping book (https://portal.ct.gov/-/media/DEEP/wildlife/pdf_files/outreach/NativeLandscapingpdf.pdf)
- UConn native plant initiative (https://nenativeplants.psla.uconn.edu/native-plants/)
- Audubon native plantings for birds (https://ct.audubon.org/news/getting-started-native-plants)
- Connecticut Botanical Society Gardening with Natives (https://www.ct-botanical-society.org/gardening-with-natives/)
- State of CT native plants for purchase list (2019)--Native plants (https://portal.ct.gov/-/media/CAES/DOCUMENTS/Publications/pollinators/Conference-2019/Native-Plant-Nursery-List---2019.pdf)

Invasive plant resources:

- Invasive Plant Atlas of New England (IPANE) (https://www.eddmaps.org/)
- CT DEEP, Invasive Species (https://portal.ct.gov/DEEP/Invasive-Species/Invasive-Species)
- US Department of Agriculture, Plants (https://www.invasivespeciesinfo.gov/resources/search?f%5B0%5D=field_subject%3A248)

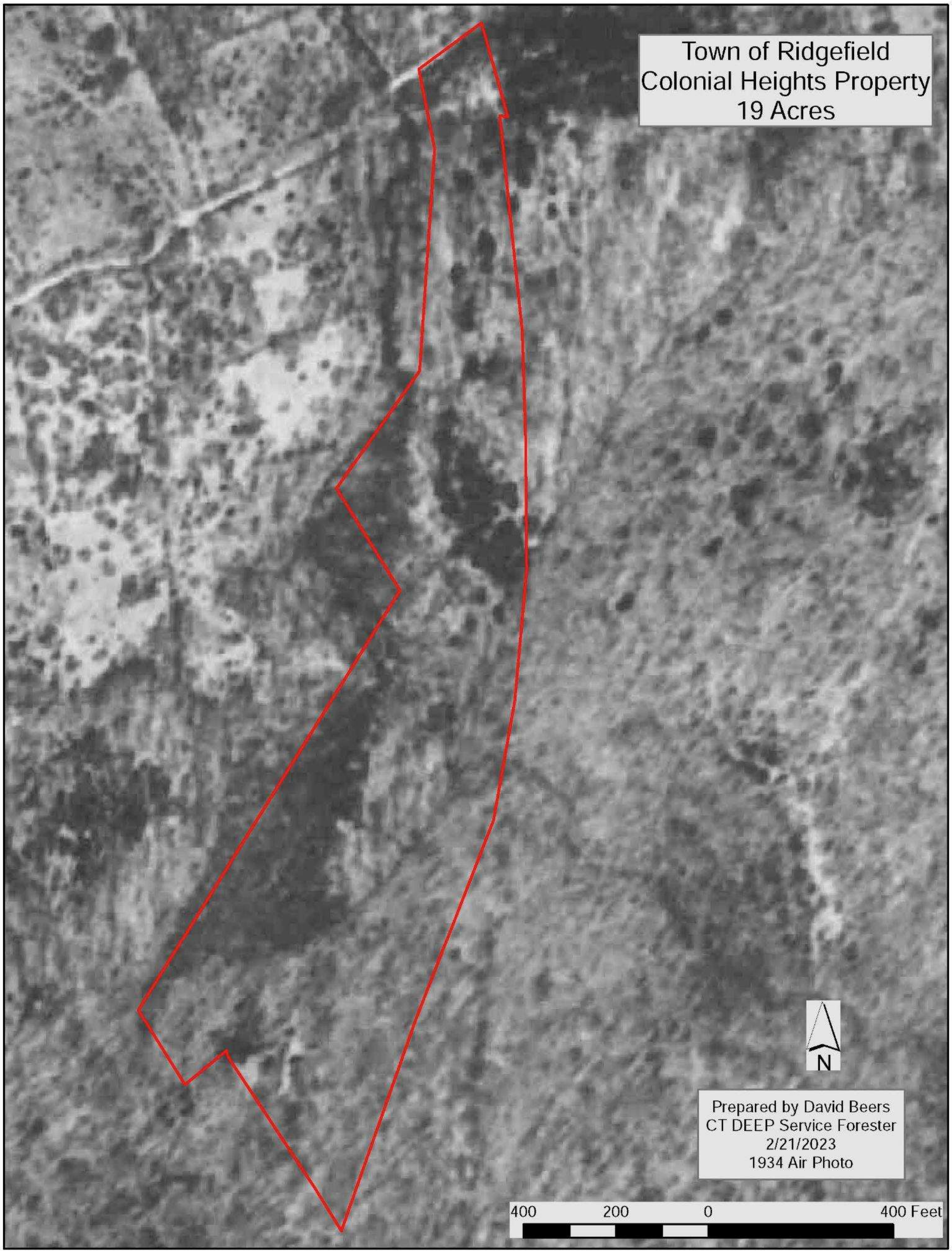


Photo 6-5: Colonial Heights (1934)

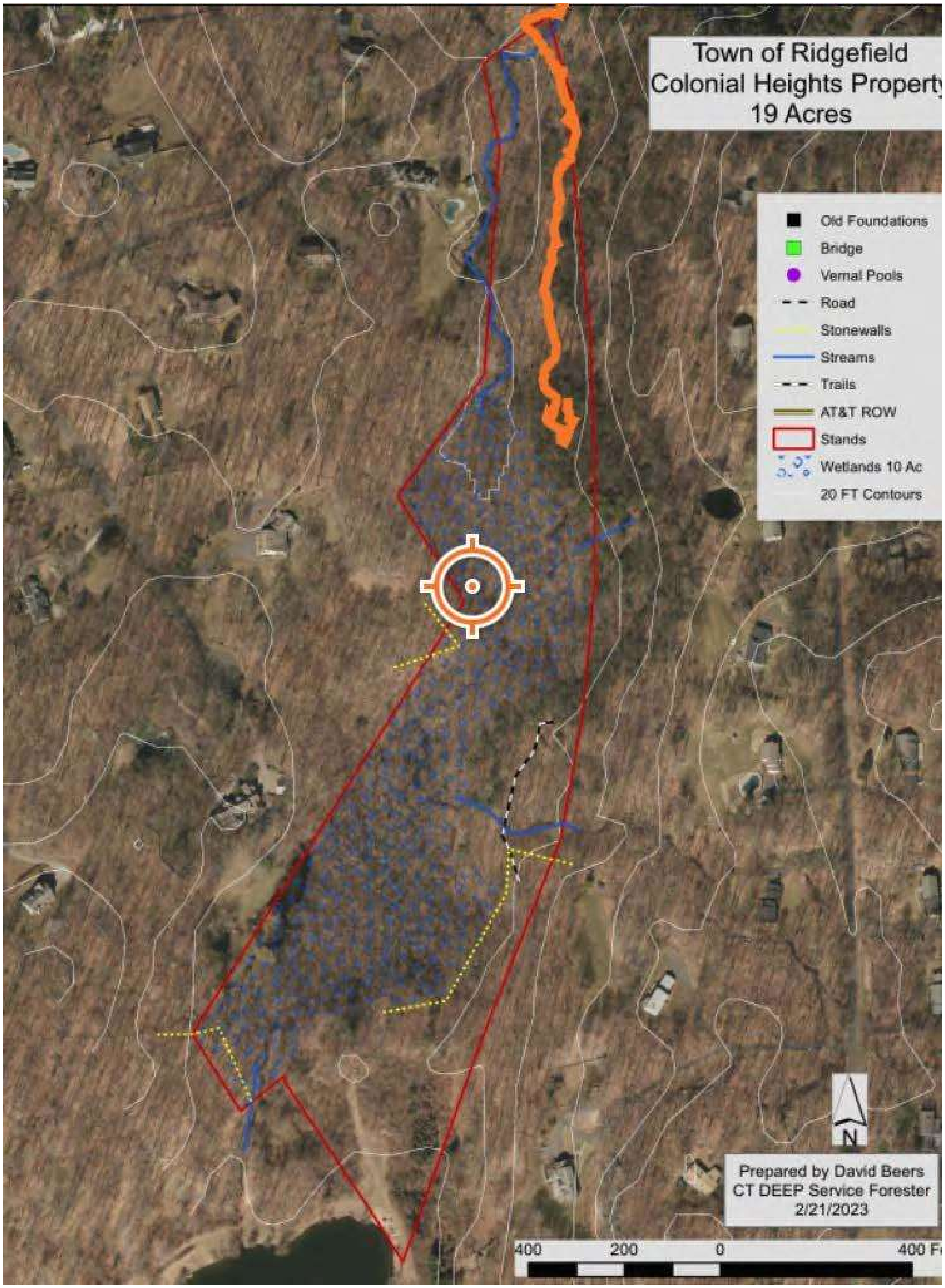


Photo 6-6: Colonial Heights (2023)

- US Department of Agriculture, CT State Resources (https://www.invasivespeciesinfo.gov/us/connecticut)
- CT Audubon, Remove Invasive Plants (https://ct.audubon.org/conservation/scoop-invasive-plants)
- Connecticut River Coastal Conservation District, Invasive Plants in Your Backyard (https://sustainablect.org/fileadmin/Action_Files/2.10/Invasives_guide_2016_web.pdf)

Since the last NRI there has been a proliferation of invasive plants to the detriment of native ones. While not all non-native plants are invasive, local ecosystems are best served by environments that minimize the use of non-natives. This is because non-native plants tend not to be as nutritious for wildlife as native ones and can introduce pathogens into the environment. As a result, the RCC believes that native plants should be maximized in Ridgefield. To that end the Town passed and adopted a policy in 2022 (modified in 2023) dictating that the use of native plants will be maximized on Town lands.

7 Wildlife

Ridgefielders are no strangers to wildlife ranging from the reports of cougars in Connecticut, a video of a moose in Danbury, the increasingly frequent presence of black bears in Town, or the concern with an overabundant deer population. Wildlife figures prominently into public discourse. Understanding their needs provides important lessons and information on how best to protect local ecosystems and all the creatures that inhabit them (Photo 7-1).

The data on wildlife in Ridgefield is based on the following:

- NRI fieldwork conducted in 2022.
- BioBlitz effort conducted in Spring 2022.
- A trip-camera project conducted by Pace University in 2022.
- Data collected on iNaturalist by citizen scientists.
- Observations and data collected by the RCC.

Photo 7-1: Dragonfly

The RCC collaborated with Pace University, the Woodcock Nature Center, local experts and community volunteers to conduct a comprehensive survey of plants and animals in Ridgefield, aiming to document its biodiversity. To identify the species found, the citizen-science app iNaturalist was also used. This user-friendly and freely accessible app enables its users to contribute to the knowledge base by submitting photos to an online database. Experts from all over the world can then assist in identifying the encountered species. As of June 2023, 588 individuals have participated, submitting 7,054 photos that have successfully identified 1,831 distinct species in Ridgefield (Figure 7-1).

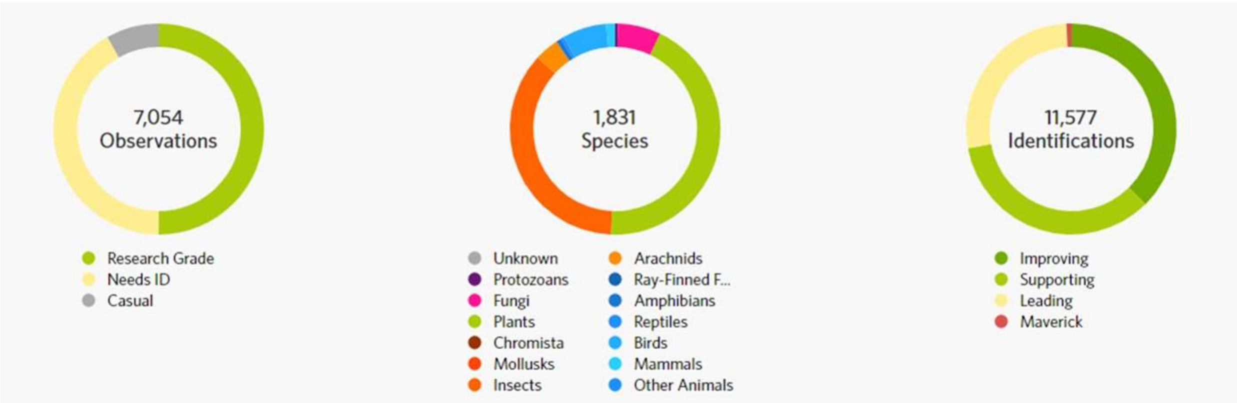


Figure 7-1: iNaturalist data for Ridgefield Natural Resource Inventory (June 2023)

7.1 Birds

Ridgefield is home to a diverse range of bird species and has a rich history when it comes to birding. The area's mix of woodlands, wetlands, and fields make it an ideal habitat for both resident and migratory bird species. There are several bird species that used to be found in Ridgefield but are now considered rare or have disappeared entirely from the area. These birds include:

- **Bobolink (*Dolichonyx orizvorus):*** This species of grassland bird was once common in Ridgefield, but has seen a steep decline in numbers due to habitat loss and changes in agricultural practices.

- **Whip-poor-will (*Antrostomus vociferus*):** This nocturnal bird was once heard regularly in Ridgefield, but is now rarely heard due to habitat loss and pesticide use.

- **Barn swallow (*Hirundo rustica*):** This migratory bird was once a common sight in Ridgefield during the summer, but has declined due to loss of nesting sites and changes in farming practices.

- **Eastern meadowlark (*Sturnella magna*):** This species of grassland bird was once a common sight in Ridgefield, but has declined sharply in recent years due to habitat loss and changes in agricultural practices.

- **Northern bobwhite (*Colinus virginianus*):** This species of quail was once found in Ridgefield, but is now considered extirpated from the area due to habitat loss and hunting pressure.

It is important to note that conservation efforts can help these species recover and return to Ridgefield in the future. The RCC is working to provide habitat and housing structures that will attract a wide variety of birds.

Its most expansive effort is at McKeon Farm where it has funded the construction of 36 purple martin *(Progne subis)* nesting gourds. This effort has been very successful with an estimated population of 111 purple martins in 2023 (28 adults and 83 young) (Photo 7-2).

Photo 7-2: Purple Martin Eggs at McKeon Farm

The RCC has also set up dozens of bluebird (*Sialia sialis*) houses over Town open space, as well as owl (*Strigiformes*) and wood duck (*Aix sponsa*) nesting boxes that have attracted many native birds.

The RCC has identified over 160 different species of birds (Appendix B) that can be found in Ridgefield at various times in the year. This number has changed little in the past 20 years indicating that the Town continues to be a favorable environment for birds. Many species are migrating through to breeding grounds further north. Approximately 75 species of birds have been confirmed nesting in Ridgefield between 2021 and 2023.

In recent years, Ridgefield has continued to be a popular destination for birders. The town's conservation efforts, such as the RCC's acquisition of open space land, have helped preserve important habitats for bird species. Additionally, the Connecticut Audubon Society operates sanctuaries near Ridgefield that offer educational programs and birdwatching opportunities.

7.2 Amphibians

The data on Ridgefield's amphibians are more comprehensive than most other groups of organisms because of the studies conducted by Klemens (1993) and subsequent surveys of Mole salamanders (Bogart and Klemens, 1997, 2008). According to iNaturalist, 13 species of amphibians (e.g., frogs, toads, newts, and salamanders) have been spotted in Ridgefield over the past few years. Since the last NRI, a variety of amphibians have not been seen in Ridgefield. They include the Jefferson salamander (*Ambystoma jeffersonianum*), blue-spotted salamander (*Ambystoma laterale*), slimy salamander (*Plethodon glutinosus*), and Fowler's toad (*Bufo fowleri*). All of these species were considered rare or endangered over a decade ago. However, the Jefferson and blue-spotted salamander have been identified in adjacent Connecticut counties recently.

Some of the key amphibians that can be found in Ridgefield are:

- **Four-toed salamander *(Hemidactylium scutatum)* -** Once considered rare, this diminutive swamp-dwelling species is secretive and frequently overlooked. It breeds in swamps that have sphagnum tussocks, where eggs are deposited and brooded, hatching, and falling into the water followed by an abbreviated aquatic larval stage.
- **Green frog (*Lithobates clamitans*) -** The green frog is the most frequently spotted amphibian in Ridgefield according to iNaturalist; its egg masses were spotted in local vernal pools during 2022. They are very common, acting as a food source for other animals.
- **Marbled salamander *(Ambystoma opacum)* -** This is the only mole salamander that breeds in the autumn, where eggs are deposited in dry vernal pool basins and subsequently hatch and develop over Winter, Spring and in early Summer. Because of the extended development period, marbled salamanders require pools that have a long hydroperiod. These pools are often embedded in larger swamp systems ensuring a steady supply of water.
- **Spring peepers (*Pseudacris crucifer)* -** Ridgefield populations of spring peepers are plentiful as they can be widely heard during evenings in Spring. They enter a state called torpor in Fall under logs and other pond/swamp material before emerging in Spring to breed.

- **Spotted salamander *(Ambystoma maculatum)* -** This is the most widespread of the mole salamanders within Ridgefield and occurs not only within vernal pools, but also within deeper pooled areas of swamps termed *cryptic vernal pools*, as well as some man-made ponds. Many populations of this salamander have declined in the more developed portions of Town because of the loss of upland habitats associated with development.

- **Wood frog (*Rana sylvatica*) -** Along with the spotted salamander, this is one of the most widespread vernal pool species in Ridgefield, breeding in a variety of seasonally inundated wetlands. Wood frogs require extensive tracts of moist woodland adjacent to their natal wetland, and easily move 1,000-1,500 feet from their breeding sites for foraging and dispersal purposes. As such, they form an important part of the nutrient and energy cycling within the deciduous forest biome.

Additional iNaturalist sightings in Ridgefield include the American toad (*Anaxyrus americanus*), Pickerel frog (*Lithobates palustris*), Dusky salamanders (D*esmognathus fuscus*), Eastern newt (*Notophthalmus viridescens*), Northern Two-lined salamander (*Eurycea bislineata*), Eastern red-backed salamander (*Plethodon cinereus*), Red-spotted newt (*Notophthalmus viridescens viridescens*), and Gray tree frog (*Dryophytes versicolor*). (Additional information on amphibians is in Section 4.1 that reviews vernal pools.)

7.3 Reptiles

Reptiles (Photo 7-3) are another key group of animals whose existence or absence indicates the health of the underlying ecosystem. They play an important part as both predator and prey. There are only a few species of reptiles in Ridgefield as well as in the State. Their numbers vary by source. According to iNaturalist, for the State, there are 34 listed species of reptiles that have been identified. Yale University puts the number at 24; the State at 27. (Those identifications on iNaturalist for Ridgefield are incomplete.) Since the last survey in 2011, there has not been a sighting of either the spotted *(Clemmys guttata)* or wood turtle (*Glyptemys insculpta*) in Ridgefield, though they have been seen in adjacent towns. Key species of reptiles that can be found in Ridgefield include:

Photo 7-3: Painted Turtle

- **Common and Eastern garter snake *(Thamnophis sirtalis sirtalis)* -** One of the more common reptiles in Ridgefield, the common and Eastern garter snakes can be found in many areas throughout the Town. They live in a wide variety of habitats. They have multiple appearances, sometimes having three yellow stripes down a dark body while others exhibit a checkered body pattern with light stripes and a grayish or reddish body color.

- **Eastern box turtle (*Terrapene carolina carolina*) -** The box turtle is a long-lived terrestrial species that prefers the lower-lying areas of Connecticut below 500 feet elevation (Klemens, 1993: 191). Ridgefield may never have been an optimal habitat for this species, and populations may never have been as widespread and abundant as in other parts of the State. Box turtles favor a mosaic of habitats, with edge areas for sunning, wetlands for hydration, and forested areas for hibernation and protection from summer heat.

- **Musk turtle (*Sternotherus odoratus*) -** The musk turtle is a highly aquatic species that is distributed in the river and stream systems of Ridgefield. They reach high densities in impoundments that are part of a riparian system. Musk turtles are small, extremely secretive, primarily nocturnal and live on the bottom of streams and impoundments, frequently obscured by turbid waters. They can on occasion be seen basking; terrestrial activity is limited to nesting, which often occurs very close to their aquatic habitats.

- **Worm snake (*Carphophis amoenus*) -** This is one of Connecticut's smallest snakes, totally adapted for subterranean life. Its hard, smooth body allows it to move through loose, sandy soil aided by its wedge-shaped head. Worm snakes are very difficult to sample in any predictable manner.

Other reptiles identified by iNaturalist sighted within Ridgefield include Dekay's brownsnake (S*toreria dekayi*), painted turtle (*Chrysemys picta*), and snapping turtle (*Chelydra serpentina*).

7.4 Mammals

Ridgefield hosts a wide range of mammals (Table 7-1). From large black bear and deer, to medium-sized scavengers including raccoons and skunks, to tiny rodents such as the white-footed mouse and eastern chipmunk, it is a rare day when the typical resident does not spot one of these wildlife residents.

Mammals are anecdotally known to be present by casual, non-systematic sightings or recently reported roadkill. Some were discovered by a survey by Pace University. The absence of a mammal from the Pace University list does not imply its absence from Ridgefield, but rather the non-systematic nature of the data collection.

Since the last NRI, certain populations have changed dramatically. Perhaps the largest decrease has been in the population of bats, which have been devastated by white-nose syndrome. All but one, big brown bat *(Eptesicus fuscus)* is listed on Connecticut's List of Endangered, Threatened, and Special Concern Species. They are important consumers of insects and typically eat up to 1,000 a night.

White-tailed deer *(Odocoileus virginianus)* represent another group of mammals that has seen its population decline since the last NRI. A deer-hunting/population study was conducted by the RCC in 2019. It was estimated that upwards of 80 deer per square mile were living in Ridgefield in 2005 and that number has been decreased to between 20-40 deer per square mile by 2019. Auto accident data supports this estimated decrease. The Town continues to support a controlled hunt, as do many other adjoining towns, to keep deer populations in check. Deer populations in excess of 20 deer per square mile will impair forest health.

Black bears *(Ursus americanus)* (Photo 7-4) are a recent addition to Ridgefield's mammal population. Moving steadily down from more northern states, they have adapted to more suburban ecosystems and are increasing in numbers. Their frequent sightings by Town residents are often posted on social media. To avoid more close encounters, the RCC advises residents to not make food sources such as bird feeders, compost piles, etc. available and close to dwellings when bears are roaming (April-November) and not in hibernation (December-March).

Table 7-1: Mammals Observed in Ridgefield 2021-2023

Common Name	Scientific Name	Sighting	Location
American red squirrel	*Tamiasciurus hudsonicus*	Frequent	Multiple
Bat	*Chiroptera*	Occasional	Multiple
Beaver	*Castor canadensis*	Occasional	Multiple
Black bear	*Ursus americanus*	Frequent	Multiple
Bobcat	*Lynx rufus*	Occasional	N/A
Cottontail rabbit	*Sylvilagus*	Frequent	Multiple
Coyote	*Canis latrans*	Frequent	Multiple
Eastern chipmunk	*Tamias striatus*	Frequent	Multiple
Eastern mole	*Scalopus aquaticus*	Occasional	Multiple
Fisher cat	*Martes pennanti*	Rare	N/A
Gray fox	*Urocyon cinereoargenteus*	2022	N/A
Grey squirrel	*Sciurus carolinensis*	Frequent	Multiple
Groundhog	*Marmota monax*	Frequent	Multiple
Long-tailed weasel	*Mustela frenata*	Rare	N/A
Meadow vole	*Microtus pennsylvanicus*	Occasional	N/A
Mink	*Neovison vison*	Rare	N/A
Muskrat	*Ondatra zibethicus*	Frequent	Multiple
Norway rat	*Rattus norvegicus*	Occasional	N/A
Opossum	*Didelphis virginiana*	Frequent	Multiple
Otter	*Lontra canadensis*	Occasional	Multiple
Raccoon	*Procyon lotor*	Frequent	Multiple
Red fox	*Vulpes*	Frequent	Multiple
Red squirrel	*Sciurus vulgaris*	Frequent	Multiple
Skunk	*Mephitis*	Frequent	Mutiple
White-footed mouse	*Peromyscus leucopus*	Frequent	Multiple
White-tailed deer	*Odocoileus virginianus*	Frequent	Multiple
Note: N/A: Not available.			

Photo 7-4: Black Bear Foraging in Ridgefield

Other notable mammals observed in Ridgefield include area-sensitive carnivores such as the bobcat (*Lynx rufus*) and fisher (*Martes pennanti*) found in less-developed properties, as well as various mustelids (carnivorous mammals such as minks and otters), indicative of high quality, prey-rich habitats. The bobcat is sparsely distributed in less-developed portions of Connecticut (Hammerson, 2004). Bobcats inhabit forest and various types of successional habitats, feeding on a variety of small vertebrates. While they hunt in fields and forests, they require rocky ledges for denning. Ridgefield's abundant ledges and rocky outcrops may account for the persistence of this species in an increasingly sub-urbanized setting.

Fishers occur in large tracts of forest, feeding on a variety of small mammals. Once extirpated from Connecticut as a result of forest clearing, the fisher has re-colonized Connecticut from northern New England, benefitting from the large tracts of second-growth forest, which now cloak the State. Coyotes *(Canis latrans)* are another predator that have become more commonly sighted by residents. Pets, such as cats and small dogs, have increasingly become prey for these and other animals. As many of these predators are nocturnal hunters, keeping animals inside at night is key to their protection.

In late Winter/early Spring of 2022, Pace University conducted a comprehensive mammal survey on a number of open-space properties (Figure 7-2). For the purposes of their study, Ridgefield was divided into North and South sections and a grid made of 1 km^2 cells was placed over the Town. Forty-two cameras were deployed within this grid, with one camera per cell assigned only to cells containing publicly accessible open space. Data was recorded over a two-month period.

Data collected from both the north and south sections of Town resulted in a count of 44 red and 2 gray foxes, various racoons, 107 coyotes (Photo 7-5), 31 bobcats, and 6 black bears. No fishers were captured by any of the cameras. Overall, it was determined that both the northern and southern sections exhibited similar species and carnivore richness. This study shed light on the growing diversity of wildlife in Ridgefield, showcasing the coexistence of both familiar and less commonly observed species.

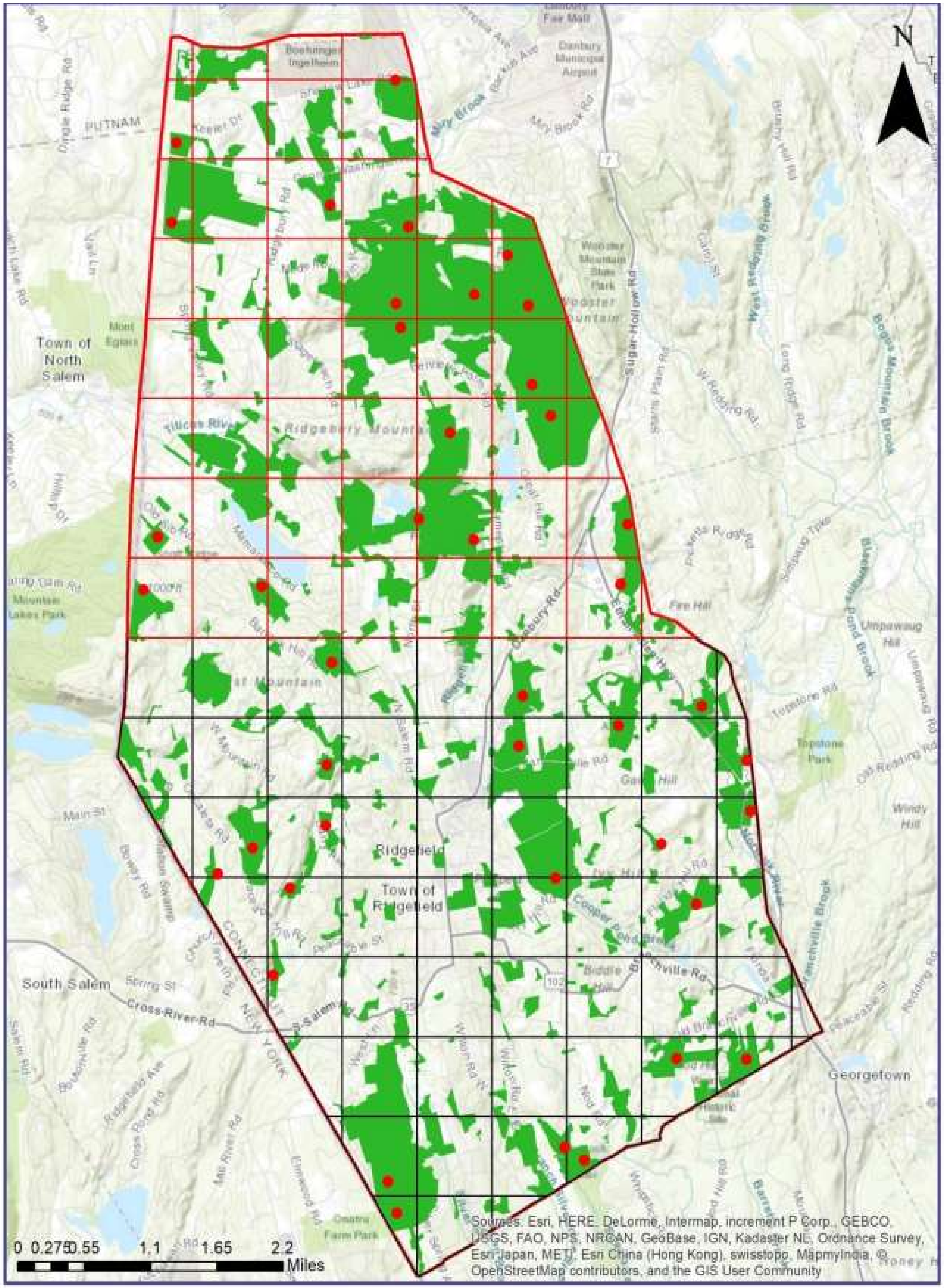


Figure 7-2 - Location of Pace University Trip Cameras

Photo 7-5: Trip Camera Images (Fox, Racoon, Coyote)

7.6 Butterflies and Moths

Butterfly and moth surveys were conducted during the Bioblitz in June, and throughout Spring and Summer of 2022. The 2022 NRI butterfly species survey was conducted April through September averaging two field sessions per month, at selected sites in different habitats throughout Ridgefield. Key findings from this survey include:

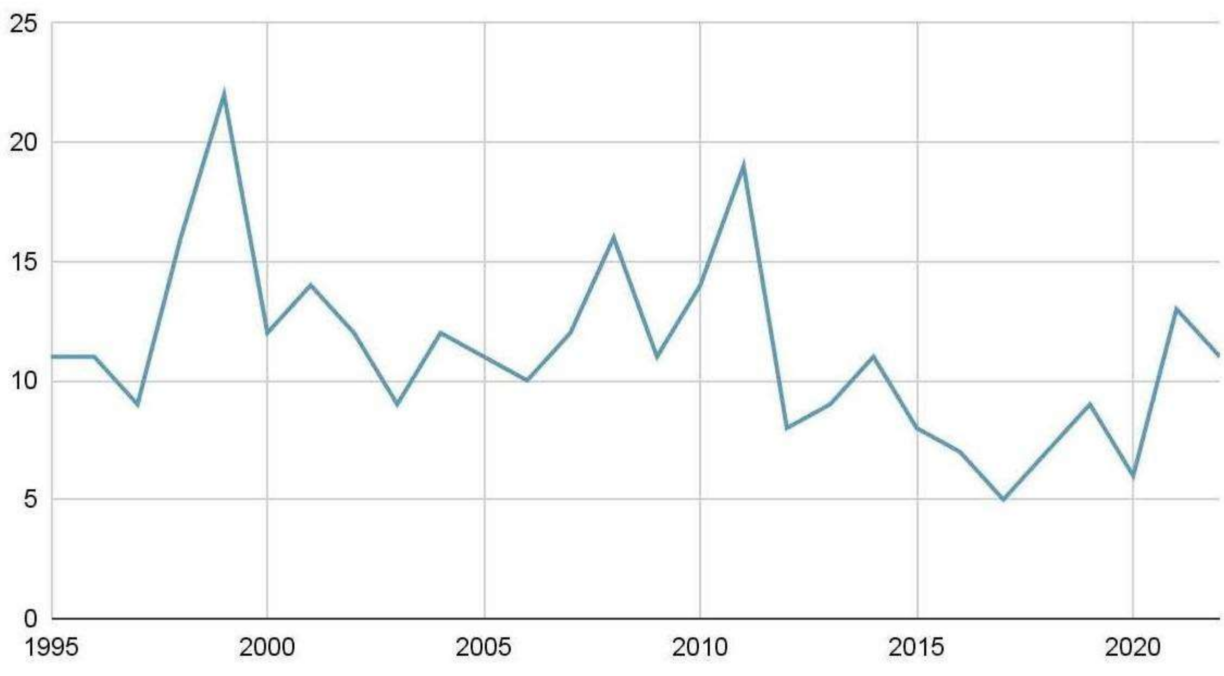
- Four species were recorded that are new for both the Ridgefield NRI and iNaturalist, one of these listed as vulnerable in Connecticut by NatureServe, and one as special concern by CT DEEP.
- Fourteen new species for the Ridgefield NRI were recorded.
- Five species not previously recorded on iNaturalist from Ridgefield were added to the Ridgefield list of butterflies on iNaturalist.

Butterflies (Photo 7-6) were identified visually while flying or nectaring. Those that had more subtle characteristics (or were rare) were captured with a net for positive identification and photography, and released unharmed. When in flight, for elusive or distant individuals, characteristics such as color, flight pattern, behavior, size, date, and habitat were used for identification.

To determine changes in butterfly biodiversity in Ridgefield since the surveys in 2010, data from the 2022 field surveys, North American Butterfly Association (NABA) annual Fourth of July counts, and records from iNaturalist were used. For the 10 years since the last Ridgefield NRI survey, some of the butterfly species statistics can be obtained from the annual NABA 4th of July counts. NABA counts are only available for two combined Ridgefield sites, the DeMasi-Metowski meadow (private property) and adjacent Norwalk River floodplain.

While it is only available for this single area in Ridgefield, the 4th of July count has been conducted consistently each year since 1995, and so is the most comprehensive record available of species density change over time at Ridgefield sites. Looking at the NABA counts, there is a slight downward trend in the number of species seen from 1995 to 2022. However, there does not seem to be a clear trend in species numbers from 2009 and 2010 (species from both years were included in the 2010 NRI report) to 2022 (Figure 7-3).

Photo 7-6: Brown Elfin Butterfly



Source: (Victor DeMasi, Yale University)

Figure 7-3: NABA 4th of July Species Count Near Norwalk River

The 2022 and 2009-2010 NRI surveys were both conducted over the complete duration of the season and throughout Ridgefield, as opposed to surveying two adjacent sites for one day each year (i.e., the annual 4th of July counts).

During the Ridgefield NRI surveys, 28 species were recorded in 2010, and 35 in 2022. Of these, 21 species recorded in both surveys were identical. Seven species that were recorded in 2010 were not observed during the 2022 field surveys: American Copper, Common Buckeye, Common Wood-Nymph, Painted Lady, Peck's Skipper, Tawny-edge Skipper, and Wild Indigo Duskywing. Thirteen of the species recorded in 2022 field surveys were not observed in 2010: Black Swallowtail, Brown Elfin, Dion Skipper, Eastern Comma, Giant Swallowtail, Juvenal's Duskywing, Least Skipper, Little Wood Satyr, Mourning Cloak, Orange Sulphur, Red-Banded Hairstreak, Spring Azure Species Complex, and Zabulon Skipper. (See Appendix C for more data and scientific names.)

During this same time period, 121 different types of moths were spotted (Photo 7-7). Ironically, because of the decline of ash trees, new habitats are opening up for moths in Town. For example, The Norwalk River Floodplain has extensive growth of buttonbush (*Cephalanthus occidentalis*), the main food plant for a rare sphinx moth *(Darapsa versicolor*). Ash tree saplings, not yet vulnerable to the emerald ash borer, growing in the Norwalk River floodplain may support populations of declining moths such as the Great Ash Sphinx (*Sphinx chersis*), the Laurel sphinx (*Sphinx kalmiae*), and the critically endangered Ash sphinx (*Manduca jasminaerium*), which has been recorded at this site previously.

Photo 7-7: Pale Metarranthis Moth

One of the most promising moth habitats in Ridgefield are the woods near Lake Windwing. There are many large oak (*Quercus*) and hickory (*Carya*) trees that would support many species of underwing moths (*Catocala*). Several uncommon species were found at Lake Windwing and there is potential to discover many other species, as it is a suitable habitat in a less-explored area by Catocala moth experts.

7.7 Threatened and Endangered Species

Even if development were to cease, increased pressure on and declining health of various ecosystems puts stress on some species. Some of the declines, however, are not necessarily because of human interaction. For example, the increased number of deer per square mile during the 1900s contributed to the decline in native understory plants such as the yellow-fringed orchid *(Platanthera ciliaris).*

Listed in Table 7-2 are those species that are threatened, endangered or of special concern known to occur in Ridgefield based on historical data, data collected during the 2010 NRI survey work, and records from DEEP's Natural Diversity Database (NDDB).

Table 7-2: Examples of Rare and Declining Species Known to Occur in Ridgefield

Common Name	Scientific Name	Required Habitat
Amphibians & Reptiles		
Blue-spotted salamander complex (SC)	*Ambystoma laterale*	Breeds in floodplain wetlands, vernal pools, pond/lake margins and wooded swamps, with forested uplands used for terrestrial habitat
Jefferson salamander complex (SC)	*Ambystoma jeffersonianum*	Breeding occurs in vernal pools; deciduous or coniferous forests are used as terrestrial habitat
Mudpuppy (SC)	*Necturus maculosus*	Streams, rivers, riparian areas
Northern slimy salamander (T)	*Plethodon glutinosus*	Deciduous or hemlock forest on moist, rocky slopes covered with thick duff and rotten logs
Birds		
Bobolink (SC)	*Dolichonyx oryzivorus*	Native and cultivated grasslands, hay meadows, open grasslands
Northern goshawk (T)	*Accipiter gentilis*	Mature or old-growth conifer, mixed hardwood-conifer forests
Red-headed woodpecker (E)	*Melanerpes erythrocephalus*	Open woodlands along the margins of fields or swamps
Plants		
Small water pond lily (SC)	*Nuphar microphylla*	Shallow, slow-moving aquatic habitats
Smooth blackhaw (T)	*Viburnum prunifolium*	Forests to field edges; full sun to partial shade
Wild currant (SC)	*Ribes rotundifolium*	Shady, moist woods or wetlands
Mammals		
Silver-haired bat (SC)	*Lasionycteris noctivagans*	Woodland areas bordering lakes and streams
Notes: SC – Species of special concern, T – Threatened species, E – Endangered species, Fed-T – Federally threatened species		

8 Community Engagement and Partnership

One of the most important aspects of the continuing mission of the RCC and the process of updating this NRI has been to engage the community. The RCC does this in a variety of ways, as described below.

8.1 RCC Rangers

Conservation rangers are volunteers who help the RCC maintain Ridgefield open spaces. Rangers often live near open spaces, enjoy them, and want to help maintain them. Rangers keep trails clear of limbs and other debris, maintain the painted blazes that mark the trails, and report open-space violations to the RCC. Ranger responsibilities include:

- Walk a trail (or open space) at least four times per year.
- Keep trails free of any debris or litter.
- Observe and report any damage.
- Check to see if trails are clearly marked.
- Communicate comments to the RCC.

The RCC greatly appreciates the time and energy devoted by rangers and is always looking to increase their ranks.

8.2 Eagle and Gold Award Scouts

The RCC collaborates with Ridgefield's scout troops to develop and execute proposals to enhance its outdoor spaces. The scouts have created a wide variety of projects including bridge and bench building, invasive species removal, and trail rerouting.

8.3 Summer Workers and Volunteers

Each summer, the RCC hires summer workers to create new trails, tend the many miles of existing trails, and work on a variety of projects to maintain its thousands of acres of open space. In addition, volunteer opportunities involve tasks including removing invasive plants and maintaining trails. These boots on the ground and eyes in the sky help the RCC be aware of changes occurring in its open spaces.

8.4 iNaturalist

Engaging the entire community in the conservation efforts of Ridgefield is a top priority for the RCC. As part of the ongoing update to this NRI, residents of all ages were invited to actively participate in documenting the local fauna and flora. One tool that facilitates this process is iNaturalist, a user-friendly platform that allows individuals to upload photos and contribute valuable observations. By simply capturing images of the plants and animals encountered while exploring the Town's scenic trails, residents can contribute to the collective knowledge of Ridgefield's biodiversity.

8.5 Woodcock Nature Center

The Woodcock Nature Center is a non-profit nature center located in Wilton, CT, bordering the Town. The center is situated on 179 acres of state-protected land with three miles of trails traversing a mixture of habitats.

The Woodcock Nature Center and the RCC have joined forces to offer individuals meaningful opportunities to actively participate in the preservation and enrichment of our local environment. By partnering together, the Woodcock Nature Center and the RCC aim to foster a deeper connection between individuals, families, and the environment, inspiring a shared commitment to protect and enhance local surroundings.

8.6 Weir Farm National Historic Park

Weir Farm National Historical Park is located in Ridgefield and Wilton, CT. This park commemorates the life and artistic contributions of J. Alden Weir, a renowned American impressionist painter. It also honors other esteemed artists such as Childe Hassam, Albert Pinkham Ryder, John Singer Sargent, and John Twachtman, who either resided or visited this inspiring site. The park welcomes visitors daily from sunrise to sunset, offering a year-round opportunity to explore its captivating beauty.

In 2022, Weir Farm collaborated with the RCC and Woodcock Nature Center to host a BioBlitz on the grounds of the historic site. This event could never have occurred without the support of the park and its staff. Data collected from this event was entered into iNaturalist.

9 Conclusions and Recommendations

The current inventory of natural resources is unlikely to remain static (or improve) unless actions are taken to protect water resources, open space land, and areas of high conservation value.

Since the publication of the last NRI in 2011, Ridgefield has experienced less degradation in its ecosystems than might be expected. Though certain species that were on the margin of survival in 2011 are no longer found in Town and there has been a slight decrease in forested and other pristine areas, many core assets are similar to those observed over a decade ago. (Certain changes, such as loss of hemlock, ash (and potentially beech) trees, are out of the Town's control, being part of larger regional trends.) The destructive expansion of invasive species and decay of habitat corridors represent the largest threats to the Town's natural resource inventory.

The timing of the NRI update is fortuitous as the RCC believes that the health of Ridgefield's natural resources is at a crossroads. The quality and health trajectory of wildlife, habitats, etc. can be maintained or even improved if the Town (and residents in a private capacity) take action. A passive interest in the NRI will likely result in a continued decline in biodiversity, water quality, and wildlife habitats.

The Ridgefield 2020 Plan of Conservation and Development (POCD) is instructive in this regard as five of the top 10 policies or action items fall under the control of either the RCC or inlands wetlands board (IWB) indicating that environmental controls and concerns are key to the future quality of the Town. But these volunteer groups can only do so much and thus the Town (and its residents) need to take a more active role to protect their natural resource inventory.

To do this, the following recommendations are made:

- **Geology and Soils:** Much of the buildable land in Town has been developed leaving either wetland or steeply-sloped properties to potentially exploit. Since the last NRI, an independent IWB has been created that protects wetlands. Thus, the recommendation in this area would be to **create a steep-slope regulation** to manage the use of sensitive, sloped areas.

- **Water Resources:** Water quality in Town can only be protected if every resident plays a part. To do this, the RCC recommends an initial focus on two areas: **a reduction in use of pesticides/herbicides/fertilizers and increased maintenance of septic systems** (particularly in watershed areas). Both can be accomplished through a combination of education by the RCC and oversight/potential regulation by the Town, respectively. A protocol should be developed for lake monitoring that includes lakes owned by lake associations.

- **Aquatic Habitats:** The quality of these ecosystems is a function of how well or poorly water resources are protected. Thus, **continued monitoring of streams, rivers and lakes** is essential as well as the **protection of vernal pools** is required.

- **Land Use and Protection**: Nearly 60% of the Town is forested and it has a goal that 30% of its land should be open space. The land is, however, highly fragmented with development. Thus, the RCC recommends that the Town looks to **acquire or protect the largest contiguous undeveloped**

plots of land available based on identified areas of highest conservation value. In addition, it also recommends **a study on how to best protect key habitat corridors** that are on private lands in these areas.

- **Terrestrial Habitats:** Global climate and habitat changing forces that are out of the control of the Town necessitate an increased investment in the health and maintenance of its over 2,900 acres of open space and parks. Thus, the RCC recommends the **hiring of a forest manager** to maintain the health of Town properties as well as **a full-time Tree Warden**. Because these habitats are also being threatened by invasive plants, **residents need to be better educated and tasked with removing and controlling such plants**. In line with this is an educational program to **increase the population of native plants.** Native plants would have a major positive impact on water resources and biota.

- **Wildlife:** Wildlife populations are static in some ways and in flux in others. The changing environment is leading to more unpredictable interactions. Thus, residents need to **be better educated on how to best live with wildlife** in the coming years.

Ridgefield's natural resources are at a crossroads. The RCC believes that the following 10 steps should be taken to best protect the environment and enhance its NRI in the years to come.

- Implement a steep-slope regulation.
- Reduce use of pesticides/herbicides/fertilizers.
- Increase and monitor septic-system maintenance.
- Monitor streams, rivers, and lakes.
- Protect vernal pools.
- Acquire or protect the largest, contiguous, undeveloped plots of land.
- Study how to best protect key habitat corridors.
- Hire a forest manager and full-time Tree Warden.
- Educate and incent residents to remove invasive plants, replacing them with native ones.
- Educate residents on wildlife interactions.

10 Glossary

Alluvium (Overlying Sand & Gravel) - Sand, gravel, silt, and some organic material, on the floodplains of modern streams. The texture of alluvium commonly varies over short distances both laterally and vertically, and is often similar to the texture of adjacent glacial deposits. Along smaller streams, alluvium is commonly less than 5 feet thick. Alluvium typically overlies thicker glacial stratified deposits, the general texture of which is indicated by the stacked unit.

Alluvial Soils - Soils that occur along watercourses occupying nearly all level areas subject to periodic flooding. These soils are formed when material is deposited by flowing water. Such material can be composed of clay, silt, sand or gravel. Alluvial and floodplain soils range from excessively drained to very poorly drained. See also Floodplain Soils.

Agricultural Land - Areas that are under agricultural uses such as crop production and/or active pasture.

Aquifer - An underground body of permeable rock, rock fractures or unconsolidated rock that can contain or transmit groundwater.

Artificial Fill - Earth and manmade materials that have been artificially emplaced. Artificial fill is common throughout the Town but has been shown on Figure 2-2 where extensive areas of made land occur.

Attenuation – Sequestration, typically through plant uptake, absorption or chemical bonding reactions, of pollutants within sediments.

Bald – In Ridgefield, this is considered an area of sparse vegetation and exposed bedrock where soil is generally absent or very thin typically located atop a mountain or ridge.

Basement rock -- Basement rock is the thick foundation of ancient, and oldest, metamorphic and igneous rock that forms the crust of continents, often in the form of granite.

Bedrock – The layer of solid rock located below the soil and glacial deposits/unconsolidated material.

Benthic macroinvertebrate – Small, aquatic invertebrates (i.e., those without backbones and the presence of exoskeletons such as insects) that are large enough to see without a microscope. Examples include aquatic worms and beetles and the larval stages of dragon and stoneflies.

Calcareous fen – An alkaline fen with a pH above 6.0 containing calcium-loving plants (calcicole/calciphile).

Calcicole – A plant that grows best in calcareous (calcium-rich) soils. Calcicoles can also be referred to as calciphiles.

Cameron's Line – A suture fault that formed as part of the continental collision known as the Taconic orogeny around 450 million year ago and is named for Eugene N. Cameron who first described it in 1950.

Cameron's Line ties together the North American continental craton, the prehistoric Taconic Island volcanic arc, and the bottom of the ancient Iapetus Ocean.

Core Forest – Forested areas that are surrounded by other forests. In Connecticut, these forests typically exist more than 300 feet from non-forested areas and are not degraded by edge effects. Core forests are classified as small (<250 acres), medium (between 250 and 500 acres) and large (>500 acres).

Desynchronization – The storage and slow release of ponded floodwater from within a natural system such as a floodplain.

Detritus – In a natural system, detritus is considered the dead, organic flora and fauna found on the ground surface. Detritus can also be referred to as leaf-litter.

Developed Land – High-density built-up areas typically associated with commercial, industrial and residential activities and transportation routes.

Drainage Basin – See Watershed.

Drainage Divide – The topographic separation between watersheds (e.g., drainage basins). Some examples of common drainage divides are ridges, hills, or mountains.

Edge Effects - Abrupt changes in vegetative populations or community structures found at the boundary of two or more different habitats.

Edge Forest – A forested area that borders core forest and non-forested land. It comprises the majority of forest types in Connecticut. Edge forest is typically 50 to 100 meters in width at which point core forest would begin.

FEMA 100-year Floodplain – An area identified on the Flood Insurance Rate Map by the Federal Emergency Management Agency (FEMA) as a Special Flood Hazard Area (SFHA) such that there is a 1% chance that anything at and below that elevation will flood in any given year.

Fen – A low, marshy or frequently flooded area of land covered wholly or partially with water unless artificially drained. Unlike a marsh, fens typically represent areas with deeper organic, peaty deposits.

Floodplain – A flat to gently sloping land adjacent to a watercourse that experiences occasional or periodic flooding from a river or stream.

Floodplain Soils – Soil deposited by moving water that forms during flood events and are deposited on the nearly level areas adjacent to streams and rivers. In Connecticut, areas having floodplain soils are regulated under the Connecticut Inland Wetlands and Watercourses Act.

Forest Understory – The area of a forest that exists beneath the forest canopy. The forest understory is typically comprised of saplings and shrubs.

Gneiss - Light and dark, medium- to coarse-grained metamorphic rock characterized by compositional banding of light and dark minerals, typically composed of quartz, feldspar, and various amounts of dark minerals; occurs with a variety of compositions and is a characteristic rock of the uplands.

Granitic Gneiss - Light-colored, medium- to coarse-grained, compositionally banded metamorphic rock of granitic composition. Quarried for use as dimension stone.

Grassland – A broad term that applies to larger, open land habitats dominated by grassy, herbaceous plants such as hayfields and pasture lands.

Gravel - Composed mainly of gravel-sized particles. Cobbles and boulders predominate, minor amounts of sand reside within gravel beds and sand comprises few separate layers. Gravel layers generally are poorly sorted and bedding commonly is distorted and faulted due to post-depositional collapse related to ice melt. Gravel deposits are shown only where observed in the field. Additional gravel deposits may be expected, principally in areas mapped as unit sg (proximal fluvial deposits or delta-topset beds).

Habitat – The physical and biological environment used by an individual or a population of a species.

Habitat Fragmentation – Describes the process by which large, contiguous habitat areas are broken up into smaller pieces, either through natural (e.g., hurricane, tornado, forest fire) or manmade (e.g., development, roadway installation) processes.

Habitat Loss – The conversion of one habitat type to another such that the new habitat type no longer supports a given species.

Habitat Succession – The process by which non-forested habitat such as fields will revert to forest over time naturally.

Hydroperiod – The duration of surface ponding within a wetland.

Lacustrine - A part of the Cowardin wetland classification system that describes systems wetlands associated with waterbodies such as lakes and ponds.

Limestone-derived Soil – Those soils that have developed from alkaline-rich marble parent material. Wetlands such as fens that develop in these soils are uncommon and also support rare plants and wildlife.

Macroinvertebrate – Any animal lacking a backbone that is large enough to see without a microscope.

Marble - A metamorphic rock that forms when limestone is subjected to the heat and pressure of metamorphism. It is composed primarily of the mineral calcite and usually contains other minerals, such as clays, micas, quartz, pyrite, iron oxides, and graphite. It is conspicuously white or gray, medium- to coarse-grained, massive to layered, and underlies several major valleys in the Western Uplands of Connecticut. Marble is quarried for use as agricultural lime and for industrial uses.

Non-point Source Pollutants – Any pollutant that comes from a diffuse source such as runoff, precipitation, or atmospheric deposition.

Old Field –A large, open land habitat similar to grasslands but with a greater abundance of shrubs and tree seedlings and saplings. The later stages of old field succession are commonly referred to as shrublands.

Open Space – Undeveloped land typically protected from development through deed restrictions or other legal or regulatory means.

Palustrine - A part of the Cowardin wetland classification system that describes systems wetlands not otherwise associated with rivers or lakes, i.e., non-riverine or lacustrine systems.

Patch Forest – Forested areas that comprise a small forested area surrounded by non-forested land cover.

Perforated Forest - Forested areas that define the boundary between core forest and relatively small clearings (perforations) within the forested landscape.

Point-source Pollution – Any single, identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or smokestack.

Prime Farmland – Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban land or built-up land or water areas.

Quartzite – Light-colored to gray, massive to layered, medium-grained metamorphic rock. Very hard and resistant; a metamorphosed sandstone composed primarily of quartz.

Regional Basin – Also referred to as a regional drainage basin includes the smaller subregional drainage basins and represents the drainage areas of all Connecticut rivers, streams, brooks, lakes, reservoirs and ponds as determined by the United States Geological Service between 1969 and 1984. In Connecticut there are 45 regional basins.

Riverine – A part of the Cowardin wetland classification system that describes systems wetlands associated with flowing water such as rivers, streams and brooks.

Sand - Composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles. Finer layers may contain some very fine sand, silt, and clay (delta-forest beds, very distal fluvial deposits, or windblown sediment).

Sand and gravel - Composed of mixtures of gravel and sand within individual layers and as alternating layers. Sand and gravel layers generally range from 25 to 50 percent gravel particles and from 50 to 75 percent sand particles. Layers are well to poorly sorted; bedding may be distorted and faulted due to post depositional collapse.

Sand overlying fines - Sand is of variable thickness, commonly in inclined forest beds and overlies thinly bedded fines of variable thickness (distal deltaic deposits overlying lake-bottom sediment).

Schist - Light, silvery to dark, coarse- to very coarse-grained, strongly to very strongly layered metamorphic rock whose layering is typically defined by parallel alignment of micas. Primarily composed of mica, quartz, and feldspar; occasionally spotted with conspicuous garnets.

Schistose Marble - Light-colored, fine- to coarse-grained, marble interlayered with schist or phyllite.

Soil Series – Also referred to as a soil type. It is a group of soils with similar profiles developed from similar parent materials under comparable environmental conditions. Typically, a soil series refers to soils within a family that have horizons (layers) similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Stream Order – The system used to evaluate the size of watercourses and their relative position within a watershed to define the sequence in which small streams flow into larger ones and the hierarchy of the various tributaries of larger rivers.

Stratified Drift – A glacially-deposited material that has been sorted and layered by the action of streams or meltwater.

Subregional Basin – Also referred to as a subregional drainage basin represents the drainage areas of all Connecticut rivers, streams, brooks, lakes, reservoirs and ponds as determined by the United States Geological Service between 1969 and 1984. In Connecticut there are 337 Subregional Drainage Basins.

Successional Habitat – Non-forested habitat typically dominated by shrubs, small trees and herbaceous vegetation.

Surficial Geology – The unconsolidated material overlying bedrock and underlying the soil.

Swamp deposits - Muck and peat that contain minor amounts of sand, silt, and clay, accumulated in poorly drained areas. Most swamp deposits are less than about 10 ft thick. Swamp deposits are underlain by glacial deposits or bedrock. They are often underlain by glacial till even where they occur within glacial meltwater deposits.

Talus - An outward sloping and accumulated heap or mass of rock fragments of any size or shape (typically coarse and angular) derived from and lying at the base of a cliff or a very steep, rocky slope and formed chiefly by gravitational falling, rolling or sliding.

Terrestrial Habitat – Refers to an upland or non-wetland habitat.

Till – Also referred to as glacial till, is a sediment originally deposited by glaciers and consists of a mixture of sand, silt, and gravel-size rocks and may also include numerous boulders. Till is derived directly from the ice and consists of unsorted, generally unstratified mixtures of grain-sizes ranging from clay to large boulders. The matrix of most tills is predominantly sand and silt and boulders can be sparse to abundant. Some tills contain lenses of sorted sand and gravel and occasionally masses of laminated fine-grained sediment. The lack of sorting and stratification typical of ice-laid deposits often makes them poorly drained, difficult to dig in or plow, mediocre sources of groundwater and unsuited for septic systems.

Vernal Pool - Also referred to as an ephemeral pool, autumnal pool, and a temporary woodland pond, it is a seasonal, depressional wetlands that occur in glaciated areas that are covered by shallow water for variable periods from winter to spring but may be completely dry during the summer and fall. Vernal pools serve critically important roles in the lifecycle of niche species such as fairy shrimp, wood frogs, spotted turtles, and several species of salamanders.

Watershed – It is an extent of land where water from rain and snowmelt drains downgradient into a body of water such as a stream, river, or lake. A watershed includes the waterbodies used to convey the water as well as the land surfaces from which the water drains. Also referred to as a drainage basin.

Wellhead Protection Area – In Connecticut, an area delineated by the CT DEEP for the designation and protection of water supply wells or well fields located in sand and gravel (i.e., stratified drift deposits) aquifers that serve more than 1,000 people.

Wetland Soils – In Connecticut, wetland soils are considered those that are either floodplain or alluvial soils or considered poorly to very poorly drained. Poorly drained soils occur where the water table is at or just below the ground surface, usually from late fall to early spring. The land where poorly drained soils occur is nearly level or gently sloping. Many red maple swamps are on those soils. Very poorly drained soils generally occur on level land or in depressions. In these areas, the water table lies at or above the surface during most of the growing season. Many marshes and bogs contain these soils.

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APPENDICES

RIDGEFIELD CONSERVATION COMMISSION

Appendix A – Soils

Table A-1: Soil Types Occurring in Ridgefield

KEY TO SOIL CATEGORIES

Wetland Soils	Floodplain Soils	Organic Wetland Soils	Shallow to Bedrock Soils	Limestone Soils	Other Non-Wetland Soils

Soil Type	Glacial Deposit	USDA Drainage Class	Farmland Soil	Landform
Wetland Soils – Soils in which the water table is at or near the soil surface for extended periods during the growing season				
Fredon	Glaciofluvial	PD	Statewide importance	Nearly level drainageways, depressions and terraces on outwash plains
Leicester	Glacial till	PD	Statewide importance	Nearly level to gently sloping depressions and drainageways in uplands
Raypol	Glaciofluvial	PD	Statewide importance	Nearly level depressions and drainageways on outwash plains
Ridgebury	Glacial till	PD	Statewide importance	Nearly level to gently sloping depressions and drainageways in uplands
Ridgebury, Leicester & Whitman	Glacial till	PD-VPD	No	Nearly level to gently sloping depressions and drainageways in uplands
Rippowam	Alluvial	PD	Statewide importance	Nearly level on floodplains
Saco	Alluvial	VPD	No	Nearly level on floodplains
Fluvaquents-Udifluvents complex	Alluvial	PD-VPD	No	Nearly level on floodplains
Timakwa and Natchaug	Glaciofluvial	VPD	No	Depressions
Catden & Freetown	Organic	VPD	No	Depressions
Fredon	Glaciofluvial	PD	Statewide importance	Depressions and drainageways on outwash plains and terraces
Halsey	Glaciofluvial	VPD	No	Nearly level terraces, depressions and drainageways on outwash plains

Walpole	Glaciofluvial	PD	Statewide importance	Nearly level drainageways and depressions on outwash plains
Floodplain Soils – *Soils subject to flooding by a streams and rivers*				
Fluvaquents-Udifluvents complex	Alluvial	PD-VPD	No	Nearly level on floodplains
Pootatuck	Alluvial	MWD	Prime	Nearly level on floodplains
Rippowam	Alluvial	PD	Statewide importance	Nearly level on floodplains
Saco	Alluvial	VPD	No	Nearly level on floodplains
Organic (muck) Wetland Soils - Peat and muck soils subject to prolonged flooding				
Timakwa and Natchaug	Glaciofluvial	VPD	No	Depressions
Catden & Freetown	Organic	VPD	No	Depressions
Shallow to Bedrock Soils – *Soils with shallow depth to bedrock as well as bedrock (ledge) outcroppings*				
Hollis-Chatfield-Rock Outcrop complex	Glacial till	WD-SED	No	Bedrock controlled hills and ridges
Rock Outcrop-Hollis complex	Glacial till	SED	No	Bedrock controlled hills and ridges
Chesire-Holyoke complex	Glacial till	SED-WD	No	Gently to strongly sloping on hills and till plains in uplands
Farmington-Nellis complex*	Glacial till	SED-WD	No	Gently sloping to steep on bedrock controlled hills and ridges in uplands
Limestone Soils – *Soils derived from marble geology*				
Fredon	Glaciofluvial	PD	Statewide importance	Nearly level depressions and drainageways on outwash plains and terraces
Georgia-Urban Land Complex	Glacial till	MWD	No	Anthropogenically altered; nearly level to gently sloping on hills in uplands
Georgia & Amenia	Glacial till	MWD	No	Nearly level to strongly sloping on hills and uplands
Halsey	Glaciofluvial	VPD	No	Nearly level on terraces, depressions and drainageways on outwash plains
Nellis	Glacial till	WD	No	Gently sloping to moderately steep on hills and uplands
Farmington-Nellis complex	Glacial till	SED-WD	No	Gently sloping to steep on bedrock controlled hills and ridges in uplands
Other Non-Wetland Soils – Non-wetland soils not included in other categories				
Ninigret & Tisbury	Glaciofluvial	MWD	Prime	Nearly level to gently sloping on terraces and outwash plains in valleys

Gloucester	Glacial till	SED	No	Gently sloping to moderately steep hills on uplands
Hinckley-Urban Land complex	Glacial till	ED	No	Anthropogenically altered; gently sloping to strongly sloping kames, terraces, eskers and outwash plains in valleys
Hinckley	Glaciofluvial	ED	Statewide importance	Nearly level to steep on terraces, eskers, kames & outwash plains on valleys
Bernarndston	Glacial till	WD	Statewide importance	Gently sloping to moderately steep on uplands and hills
Charlton-Chatfield complex	Glacial till	SED-WD	No	Gently sloping to steep on bedrock controlled hills in uplands
Canton & Charlton	Glacial till	WD	No	Gently sloping to steep on hills and uplands
Agawam	Glaciofluvial	WD	Prime	Nearly level to strongly sloping on terraces and outwash plains in valleys
Charlton-Urban Land complex	Glacial till	WD	No	Anthropogenically altered; strongly sloping in hills in uplands
Haven & Enfield	Glaciofluvial	WD	Prime	Nearly level to gently sloping outwash plains and terraces in valleys
Paxton-Urban Land complex	Glacial till	WD	No	Anthropogenically altered; strongly sloping on drumlins, hills and till plains in uplands
Paxton & Montauk	Glacial till	WD	Prime (3-8% slopes only)	Gently sloping to moderately steep on hills, till plains and drumlins in uplands
Stockbridge-Urban Land complex	Glacial till	WD	No	Anthropogenically altered; gently to strongly sloping on hills in uplands
Stockbridge	Glacial till	ED	No	Gently sloping to moderately steep on hills in uplands
Sutton	Glacial till	MWD	Prime (3-8% slopes, non-stony only)	Nearly level to strongly sloping on drainageways and depressions in uplands
Udorthents-Pits Complex, gravelly	Gravelly outwash	MWD	No	Anthropogenically altered; Nearly level to steep sand and gravel pits
Udorthents-Urban Land Complex	Drift	WD	No	Anthropogenically altered; Nearly level to moderately steep
Urban Land - Charlton-Chatfield complex	Glaciofluvial	WD	No	Anthropogenically altered; gently sloping to strongly sloping
Woodbridge-Urban Land	Glacial till	MWD	No	Anthropogenically altered; nearly level to gently sloping
Woodbridge	Glacial till	MWD	Prime (0-8% slopes only) statewide importance	Nearly level to strongly sloping on drumlins and hills in uplands

			(8-15% slopes)	

Farmland Soils

Prime farmland- land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban land or built-up land or water areas.

Additional farmland of statewide importance – includes those areas that are nearly prime farmland that economically produce high yields of crops when treated and managed according to modern farming practices.

"Udorthents" and "Urban Land"

Refer to soil map units that have been anthropogenically altered or are developed

USDA Drainage Classes

VPD – very poorly drained (wetland soil)

PD – poorly drained (wetland soil)

SPD – somewhat poorly drained

MWD – moderately well drained

WD – well drained

SED – somewhat excessively drained

ED – excessively drained

**Depth to bedrock varies in the Farmington-Nellis soil complex from shallow to deep*

Appendix B: Birds

The goal of the breeding bird survey was to investigate which bird species breed in Ridgefield. The documentation of breeding is considered to be of higher conservation interest than birds that are merely migrating through Ridgefield.

Sites were chosen throughout Ridgefield. None of these sites were randomized, but were picked as potentially productive.

The data were collected by surveyors experienced in recognizing the distinct audial cues (i.e., song patterns) of the various species. A conservative approach was employed; if the surveyor was unable to make a positive detection, the species was not added to the survey list.

As the goal of the inventory was an assessment of the birds that breed in Ridgefield, the survey was supplemented by species known to breed by repeated observations in past years, but not found during the survey. This was considered to be valid as the 2010 survey did not systematically cover the entire and excluded early-season breeding species.

Table B-1: Ridgefield Bird Species Observed in 2021, 2022

Common Name	Scientific Name	2021	2022
Alder Flycatcher	*Empidonax alnorum*	x	x
American Bittern	*Botaurus lentiginosus*	x	x
American Black Duck	*Anas rubripes*	x	x
American Coot	*Fulica americana*	x	
American Crow*	*Corvus brachyrhynchos*	x	
American Goldfinch*	*Spinus tristis*	x	x
American Kestrel	*Falco sparverius*	x	
American Redstart*	*Septophaga ruticilla*	x	x
American Robin*	*Turdus migratorius*	x	x
American Tree Sparrow	*Spizelloides arborea*	x	
American Wigeon	*Mareca americana*	x	x
American Woodcock*	*Scolopax minor*	x	x
Bald Eagle	*Haliaeetus leucocephalus*	x	x
Baltimore Oriole*	*Icterus galbula*	x	x
Barn Swallow*	*Hirundo rustica*	x	x
Barred Owl*	*Strix varia*	x	x
Bay-breasted Warbler	*Setophaga castanea*	x	x

Common Name	Scientific Name	2021	2022
Belted Kingfisher	*Megaceryle alcyon*	x	x
Black Vulture	*Coragyps atratus*	x	x
Black-and-white Warbler	*Mniotilta varia*	x	x
Black-billed Cuckoo	*Coccyzus erythropthalmus*	x	
Blackburnian Warbler	*Dendroica fusca*	x	
Black-capped Chickadee*	*Poecile atricapillus*	x	
Black-crowned Night Heron	*Nycticorax nycticorax*	x	
Blackpoll Warbler	*Setophaga striata*	x	
Black-throated Blue Warbler	*Setophaga caerulescens*	x	x
Black-throated Green Warbler	*Setophaga virens*	x	x
Blue Jay*	*Cyanocitta cristata*	x	x
Blue-gray Gnatcatcher*	*Polioptila caerulea*	x	x
Blue-winged Teal	*Spatula discors*	x	x
Blue-winged Warbler*	*Vermivora cyanoptera*	x	
Bobolink*	*Dolichonyx oryzivorus*	x	
Broad-winged Hawk	*Buteo platypterus*	x	x
Brown Creeper*	*Certhia americana*	x	x
Brown Thrasher	*Toxostoma rufum*	x	x
Brown-headed Cowbird*	*Molothrus ater*	x	x
Bufflehead	*Bucephala albeola*	x	
Canada Goose*	*Branta canadensis*	x	x
Canada Warbler	*Cardellina canadensis*	x	x
Cape May Warbler	*Setophaga tigrina*	x	
Carolina Wren*	*Thryothorus ludovicianus*	x	
Cedar Waxwing*	*Bombycilla cedrorum*	x	x
Chestnut-sided Warbler*	*Dendroica pensylvanica*	x	x
Chimney Swift*	*Chaetura pelagica*	x	x
Chipping Sparrow*	*Spizella passerina*	x	
Common Goldeneye	*Bucephala clangula*	x	x
Common Grackle*	*Quiscalus quiscula*	x	x
Common Loon	*Gavia immer*	x	x

Common Name	Scientific Name	2021	2022
Common Nighthawk	*Chordeiles minor*	x	x
Common Raven	*Corvus corax*	x	
Common Redpoll	*Acanthis flammea*	x	x
Common Yellowthroat*	*Geothlypis trichas*	x	x
Cooper's Hawk	*Accipiter cooperii*	x	x
Dark-eyed Junco	*Junco hyemalis*	x	x
Double-crested Cormorant	*Phalacrocorax auritus*	x	x
Downy Woodpecker*	*Picoides pubescens*	x	x
Eastern Bluebird*	*Sialia sialis*	x	x
Eastern Meadowlark	*Sturnella magna*	x	x
Eastern Phoebe*	*Sayornis phoebe*	x	x
Eastern Screech Owl*	*Megascops asio*	x	x
Eastern Towhee*	*Pipilo erythrophthalmus*	x	x
Eastern Wood Pewee*	*Contopus virens*	x	
European Starling*	*Sturnus vulgaris*	x	x
Field Sparrow*	*Spizella pusilla*	x	
Fish Crow	*Corvus ossifragus*	x	
Fox Sparrow	*Passerella iliaca*	x	
Gadwall	*Mareca strepera*	x	
Golden-crowned Kinglet	*Regulus satrapa*	x	
Gray Catbird*	*Dumetella carolinensis*	x	x
Great Crested Flycatcher*	*Myiarchus crinitus*	x	
Great Egret	*Ardea alba*	x	
Great Horned Owl*	*Bubo virginianus*	x	
Great-blue Heron	*Ardea herodias*	x	
Green Heron	*Butorides virescens*	x	
Green-winged Teal	*Anas carolinensis*	x	x
Hairy Woodpecker*	*Picoides villosus*	x	x
Hermit Thrush	*Catharus guttatus*	x	x
Herring Gull	*Larus argentatus*	x	x
Hooded Merganser	*Lophodytes cucullatus*	x	x

Common Name	Scientific Name	2021	2022
Hooded Warbler*	*Wilsonia citrina*	x	x
House Finch*	*Carpodacus mexicanus*	x	
House Sparrow*	*Passer domesticus*	x	
House Wren*	*Troglodytes aedon*	x	x
Indigo Bunting*	*Passerina cyanea*	x	
Killdeer*	*Charadrius vociferus*	x	x
Least Flycatcher	*Empidonax minimus*	x	
Lesser Scaup	*Aythya affinis*	x	x
Lincoln's Sparrow	*Melospiza lincolnii*	x	x
Louisiana Waterthrush*	*Parkesia motacilla*	x	x
Magnolia Warbler	*Setophaga magnolia*	x	
Mallard*	*Anas platyrhynchos*	x	
Marsh Wren	*Cistothorus palustris*	x	x
Merlin	*Falco columbarius*	x	
Mourning Dove*	*Zenaida macroura*	x	x
Mourning Warbler	*Geothlypis philadelphia*	x	x
Mute Swan*	*Cygnus olor*	x	
Nashville Warbler	*Leiothlypis ruficapilla*	x	
Northern Cardinal*	*Cardinalis cardinalis*	x	x
Northern Flicker*	*Colaptes auratus*	x	x
Northern Harrier	*Circus hudsonius*	x	
Northern Mockingbird*	*Mimus polyglottos*	x	
Northern Parula	*Setophaga americana*	x	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	x	
Northern Shoveler	*Spatula clypeata*	x	x
Northern Waterthrush	*Parkesia noveboracensis*	x	
Orange-crowned Warbler	*Leiothlypis celata*	x	x
Orchard Oriole	*Icterus spurius*	x	x
Osprey	*Pandion haliaetus*	x	x
Ovenbird*	*Seiurus aurocapillus*	x	
Palm Warbler	*Setophaga palmarum*	x	

Common Name	Scientific Name	2021	2022
Peregrine Falcon	*Falco peregrinus*	x	x
Pied-billed Grebe	*Podilymbus podiceps*	x	x
Pileated Woodpecker*	*Dryocopus pileatus*	x	
Pine Siskin	*Spinus pinus*	x	
Pine Warbler	*Setophaga pinus*	x	
Prairie Warbler	*Setophaga discolor*	x	x
Purple Finch	*Haemorhous purpureus*	x	
Purple Martin*	*Progne subis*	x	x
Red-bellied Woodpecker*	*Melanerpes carolinus*	x	
Red-breasted Nuthatch	*Sitta canadensis*	x	x
Red-eyed Vireo*	*Vireo olivaceus*	x	
Red-shouldered Hawk*	*Buteo lineatus*	x	
Red-tailed Hawk*	*Buteo jamaicensis*	x	
Red-winged Blackbird*	*Agelaius phoeniceus*	x	
Ring-billed Gull	*Larus delawarensis*	x	
Ring-necked Duck	*Aythya collaris*	x	
Rock Pigeon*	*Columba livia*	x	
Rose-breasted Grosbeak*	*Pheucticus ludovicianus*	x	x
Ruby-crowned Kinglet	*Regulus calendula*	x	x
Ruby-throated Hummingbird*	*Archilochus colubris*	x	x
Ruddy Duck	*Oxyura jamaicensis*	x	
Savannah Sparrow*	*Passerculus sandwichensis*	x	
Scarlet Tanager*	*Piranga olivacea*	x	
Sharp-shinned Hawk	*Accipiter striatus*	x	
Solitary Sandpiper	*Tringa solitaria*	x	
Song Sparrow*	*Melospiza melodia*	x	
Spotted Sandpiper	*Actitis macularius*	x	
Swainson's Thrush	*Catharus ustulatus*	x	
Swamp Sparrow*	*Melospiza georgiana*	x	
Tennessee Warbler	*Leiothlypis peregrina*	x	
Tree Swallow*	*Tachycineta bicolor*	x	

Common Name	Scientific Name	2021	2022
Tufted Titmouse*	*Baeolophus bicolor*	x	
Turkey Vulture	*Cathartes aura*	x	
Veery*	*Catharus fuscescens*	x	
Virginia Rail*	*Rallus limicola*	x	
Warbling Vireo*	*Vireo gilvus*	x	
White-breasted Nuthatch*	*Sitta carolinensis*	x	
White-crowned Sparrow	*Zonotrichia leucophrys*	x	
White-eyed Vireo	*Vireo griseus*	x	
White-throated Sparrow	*Zonotrichia albicollis*	x	
Wild Turkey*	*Meleagris gallopavo*	x	
Willow Flycatcher	*Empidonax traillii*	x	
Wilson's Snipe	*Gallinago delicata*	x	
Wilson's Warbler	*Cardellina pusilla*	x	
Winter Wren	*Troglodytes hiemalis*	x	
Wood Duck*	*Aix sponsa*	x	
Wood Thrush*	*Hylocichla mustelina*	x	
Worm-eating Warbler	*Helmitheros vermivorum*	x	
Yellow Warbler*	*Dendroica petechia*	x	
Yellow-bellied Sapsucker*	*Sphyrapicus varius*	x	
Yellow-billed Cuckoo*	*Coccyzus americanus*	x	x
Yellow-rumped Warbler	*Setophaga coronata*	x	
Yellow-throated Vireo*	*Vireo flavifrons*	x	

Note: * denotes confirmed breeder.

Appendix C: Butterflies and Moths

The NRI did not undertake formal, comprehensive surveys of butterflies and moths in Ridgefield. Surveys of these insects occurred at different times throughout 2022. Key collection data occurred at Weir Farm during the June 2022 bio-blitz. A detailed report of the butterflies found in Ridgefield may be found on the RCC web site within the NRI menu.

Table C-1: Butterflies Observed in Ridgefield 2022

Common Name	Scientific Name
Black Dash	*Euphyes conspicua*
Broad-Winged Skipper	*Poanes viator*
Dlon Skipper	*Euphyes dlon*
Dun Skipper	*Euphyes vestris*
European Skipper	*Thymelicus lineola*
Hobomok Skipper	*Lon hobomok*
Juvenal's Duskywlng	*Errynls juvenalls*
Least Skipper	*Ancyloxypha numitor*
Little Glassywing	*Vernia vema*
Northern Broken-Dash	*Wallengrenia egeremet*
Silver-Spotted Skipper	*Epargyreus clarus*
Zabulon Skipper	*Lon zabulon*
Banded Hairstreak	*Satyrium calanus*
Brown Elfin	*Callophrys augustinus*
Eastern Tailed-Blue	*Cupido comyntas*
Red-Banded Halrstreak	*Calycopls cecrops*
Spring Azure Species Complex	*complex Celastrina ladon*
Summer Azure	*Celastrina neglecta*
American Lady	*Vanessa vlrglnlensls*
Appalachian Brown	*Satyrodes appalachia*

Common Name	Scientific Name
Eastern Comma	*Polygonia comma*
Great Spangled Fritillary	*Speyeria cybele*
Little Wood Satyr	*Megisto cymela*
Monarch	*Danaus plexippus*
Mourning Cloak	*Nymphalis antiopa*
Pearl Crescent	*Phyciodes tharos*
Question Mark	*Polygonla Interrogatlonls*
Red Admiral	*Vanessa atlanta*
Black Swallowtail	*Papilio polyxenes*
Eastern tiger swallowtail	*Papilio glaucus*
Giant Swallowtail	*Papilio cresphontes*
Spicebush swallowtail	*Papilio troilus*
Cabbage white	*Plerls rapae*
Clouded Sulphur	*Colias philodice*
Orange Sulphur	*Colias eurytheme*

Table C-2: Moths Observed in Ridgefield 2022

Common Name	Scientific Name
Abbott's Sphinx	*Sphecodina abbottii*
Arched Hooktip Moth	*Drepana arcuata*
Astronomer Moth	*Olethreutes astrologana*
Azalea Leafminer Moth	*Caloptilia azaleella*
Baltimore Snout	*Hypena baltimoralis*
Banded Olethreutes Moth	*Olethreutes fasciatana*
Bent-line Gray	*Iridopsis larvaria*
Bent-lined Carpet	*Costaconvexa centrostrigaria*
Bent-winged Owlet	*Bleptina caradrinalis*
Bicolored Pyrausta Moth	*Pyrausta bicoloralis*
Black-banded Owlet	*Phalaenostola larentioides*
Black-dotted Glyph	*Maliattha synochitis*
Black-fringed Leaftier Moth	*Psilocorsis cryptolechiella*
Black-patched Clepsis Moth	*Clepsis melaleucanus*
Bristly Cutworm Moth	*Lacinipolia renigera*
Broken-banded Leafroller Moth	*Choristoneura fractivittana*
Brown Scoopwing	*Calledapteryx dryopterata*
Butterflies and Moths	*Lepidoptera*
Casebearers	*Coleophora*
Celery Leaftier Moth	*Udea rubigalis*
Changeable Grass-veneer	*Fissicrambus mutabilis*
Cloaked Marvel	*Chytonix palliatricula*
Close-banded Yellowhorn Moth	*Colocasia propinquilinea*
Coastal Plain Meganola Moth	*Meganola phylla*
Common Angle	*Macaria aemulataria*
Common Spring Moth	*Heliomata cycladata*
Confused Eusarca Moth	*Eusarca confusaria*
Cordovan Pyralid	*Acrobasis exsulella*
Crocus Geometer Moths	*Xanthotype*
Dagger Moths	*Acronicta*
Dame's Rocket Moth	*Plutella porrectella*
Delicate Cycnia Moth	*Cycnia tenera*
Disparaged Arches Moth	*Orthodes detracta*
Dotted Leaftier Moth	*Psilocorsis reflexella*
Doubleday's Notocelia Moth	*Notocelia rosaecolana*
Early Fan-foot	*Zanclognatha cruralis*
Eastern White-blotched Prominent	*Heterocampa pulverea*
Eclipsed Oak Dagger	*Acronicta increta*
Elegant Grass-veneer	*Microcrambus elegans*

Common Name	Scientific Name
Faint-spotted Palthis Moth	*Palthis asopialis*
Filbertworm Moth	*Cydia latiferreana*
Flowing-line Snout	*Hypena manalis*
Friendly Probole Moth	*Probole amicaria*
Garden Tortrix	*Clepsis peritana*
Giant Leopard Moth	*Hypercompe scribonia*
Green Budworm Moth	*Hedya nubiferana*
Green Marvel	*Acronicta fallax*
Green Pug	*Pasiphila rectangulata*
Hebrew Moth	*Polygrammate hebraeicum*
Hickory Tussock Moth	*Lophocampa caryae*
Hollow-spotted Blepharomastix Moth	*Blepharomastix ranalis*
Impudent Hulda Moth	*Hulda impudens*
Isabella Tiger Moth	*Pyrrharctia isabella*
Julia's Dicymolomia Moth	*Dicymolomia julianalis*
Large Lace-border Moth	*Scopula limboundata*
Large Yellow Underwing	*Noctua pronuba*
Leafroller Moths	*Tortricidae Tortricid*
Lemon Plagodis Moth	*Plagodis serinaria*
Little White Lichen Moth	*Clemensia albata*
Maple Callus Borer Moth	*Synanthedon acerni*
Maple Caloptilia Moth	*Caloptilia bimaculatella*
Metallic Coleophora Moth	*Coleophora mayrella*
Morbid Owlet	*Chytolita morbidalis*
Moss-eating Crambid Snout Moths	*Scopariinae*
Oak Beauty	*Phaeoura quernaria*
Oak Besma Moth	*Besma quercivoraria*
Oak Leafshredder Moth	*Acleris semipurpurana*
Oblique-banded Leafroller Moth	*Choristoneura rosaceana*
One-spotted Variant	*Hypagyrtis unipunctata*
Orange-patched Smoky Moth	*Pyromorpha dimidiata*
Pale Beauty	*Campaea perlata*
Pale Metarranthis Moth	*Metarranthis indeclinata*
Pale-winged Midget	*Elaphria alapallida*
Pasture Grass-veneer	*Crambus saltuellus*
Pink-legged Tiger Moth	*Spilosoma latipennis*
Poplar Leafroller Moth	*Pseudosciaphila duplex*
Porcelain Gray	*Protoboarmia porcelaria*
Pug Moths	*Eupithecia*
Red-bordered Emerald	*Nemoria lixaria*

Common Name	Scientific Name
Red-fringed Emerald	*Nemoria bistriaria*
Red-headed Inchworm Moth	*Macaria bisignata*
Red-lined Panopoda Moth	*Panopoda rufimargo*
Saddled Prominent	*Cecrita guttivitta*
Serviceberry Leafroller	*Olethreutes appendiceum*
Snout Moths	*Pyralidae Pyralid*
Snowy Urola Moth	*Urola nivalis*
Sooty-winged Chalcoela Moth	*Chalcoela iphitalis*
Splendid Palpita Moth	*Palpita magniferalis*
Spotted Phosphila Moth	*Phosphila miselioides*
Straw Besma Moth	*Besma endropiaria*
Striped Eudonia Moth	*Eudonia strigalis*
Sumac Leaftier Moth	*Episimus argutana*
Tawny Marbled Minor	*Oligia latruncula*
Three-lined Balsa Moth	*Balsa tristrigella*
Three-lined Leafroller Moth	*Pandemis limitata*
Three-spotted Fillip	*Heterophleps triguttaria*
Tufted Apple Bud Moth	*Platynota idaeusalis*
Tulip-tree Beauty	*Epimecis hortaria*
Unadorned Carpet Moth	*Hydrelia inornata*
Unarmed Wainscot	*Leucania inermis*
Virginian Tiger Moth	*Spilosoma virginica*
White Pine Coneborer Moth	*Eucopina tocullionana*
White Spring Moth	*Lomographa vestaliata*
White-spotted Leafroller Moth	*Argyrotaenia alisellana*
Yellow-dusted Cream Moth	*Cabera erythemaria*
Yellow-fringed Dolichomia Moth	*Hypsopygia olinalis*
Yellow-winged Oak Leafroller Moth	*Argyrotaenia quercifoliana*
Not available (N/A)	*Aethes interruptofasciata*
N/A	*Aethes promptana*
N/A	*Chionodes*
N/A	*Datana*
N/A	*Dichomeris*
N/A	*Elophila faulalis*
N/A	*Eucosmini*
N/A	*Eudonia*
N/A	*Holcocerini*
N/A	*Metarranthis*
N/A	*Proteoteras*
N/A	*Proteoteras naracana*

Common Name	Scientific Name
N/A	*Schreckensteinia erythriella*
N/A	*Zimmermannia*
Note: N/A-not applicable	

Since the publication of the last Natural Resource Inventory (NRI) in 2011, Ridgefield has experienced less degradation in its ecosystems than might be expected. Though certain species that were on the margin of survival in 2011 are no longer found in Town and there has been a slight decrease in forested and other pristine areas, many core assets are similar to those observed over a decade ago. (Certain changes, such as loss of hemlock, ash (and potentially beech) trees, are out of the Town's control, being part of larger regional trends.) The destructive expansion of invasive species and decay of habitat corridors represent the largest threats to the Town's natural resource inventory.

RIDGEFIELD CONSERVATION COMMISSION

The Ridgefield Conservation Commission consists of nine volunteer Ridgefield residents (and two alternates) who serve the town for staggered three-year terms. Commissioners are appointed by the Board of Selectmen to devote their efforts to the sound development, conservation, supervision and regulation of the Town's natural resources.

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