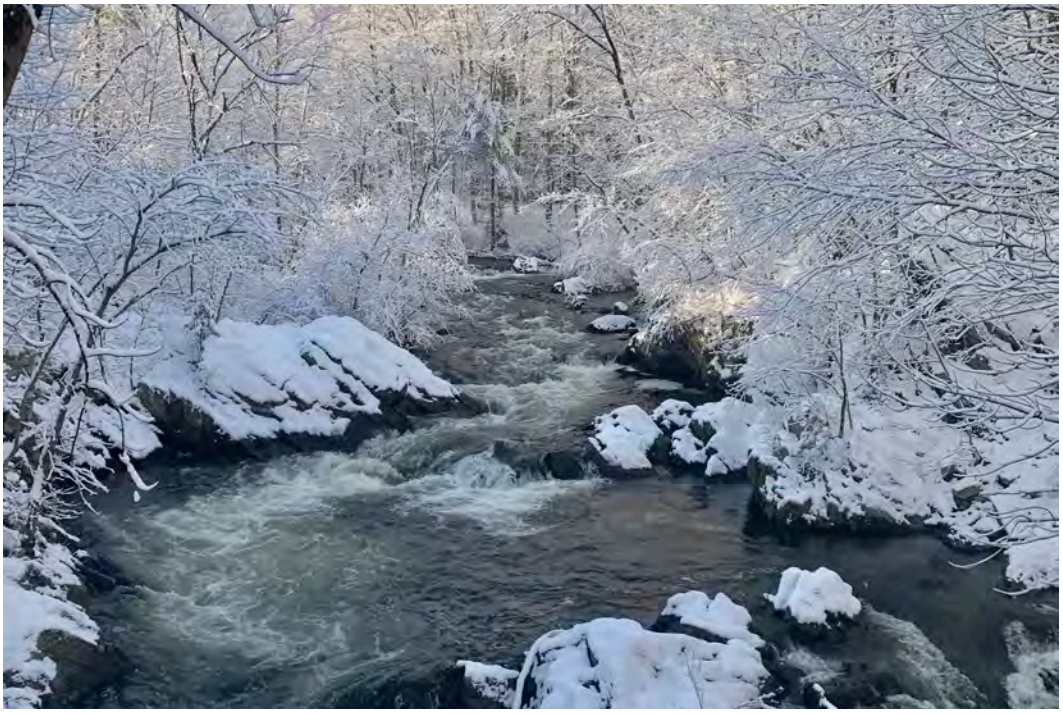
Natural Resources Inventory 2024
Colebrook, Connecticut



As approved by the Planning and Zoning Commission March 10, 2025

Natural Resources Inventory 2024
Colebrook, Connecticut

ACKNOWLEDGEMENTS

The Colebrook Conservation Commission is deeply grateful to the Farmington River Coordinating Committee for its grant supporting the Natural Resources Inventory. Commission members and alternates who worked on the inventory over the past two years were Linda Bickford, Michael Corbin, Joyce Hemingson, Kim Janak, Roberta Lawton, Jane McAndrew, Elizabeth Norman, Edna Travis, Shayne Young, and Duncan Wilber.

Many thanks go to those who contributed in myriad ways—John Auclair, Mike Beauchene, Brad Bremer, Carole Cheah, The Colebrook Land Conservancy, CT Department of Environmental Protection, Elizabeth Corrigan, Stacy Deming, Mark Dunn, Farmington River Watershed Association, John X. Fernandez, Patty and Erich Fritz, Sigrun Gadwa, Shelley Harms, Kathy Herz, William Hobie, Housatonic Valley Association, Ken Inadomi and Melinda Wolfe, Ashley Jasmin, Gerry Kassel, Kathleen Kelley, Gediminas Keras, Lukas Keras, John Lossin, Alesia Maltz, Joe Mcclean, Steve Messier, Martha Neal, Scott Norton, Cynthia Rabinowitz, David Rosgen, Jim and Elizabeth Rossman, Juan Sanchez, Meghan Seremet, Randolph Steinen, Jake Thompson, Robin and Rick Tillotson, Sukey Wagner, Harry White, and YMCA Camp Jewell.

We also appreciate the Colebrook photographers, young and older, who submitted images taken in our town to the Natural Resources Inventory Photo Contest. Their photos have enlivened these pages, and a Natural Resources Inventory Photo Gallery is also on the town website. Photographer credits are listed on page 98.

Natural Resources Inventory 2024
Colebrook, Connecticut

TABLE OF CONTENTS

INTRODUCTION

Each town is mandated to update its Town Plan of Conservation and Development every ten years. The Natural Resources Inventory (NRI) is part of that plan, and its goal is to create a baseline inventory of the town's natural resources to be used as a tool in land use and open space planning activities, supporting the goals of natural resource conservation and economic development.

The 2024 NRI was made possible by a grant from the Farmington River Coordinating Committee, whose support is greatly appreciated. This is the first time that the Colebrook Conservation Commission solicited field surveys and created lists to highlight and celebrate the biodiversity that is in Colebrook's 32.9 square miles. The number of maps was expanded to 19, and information on geology, soils, birds, lichens, insects, mammals, fish, reptiles and amphibians, plants, and historic resources is new. Climate and fungi deserve to be added in the future.

The 2024 NRI lists are a beginning to what could be found. The Colebrook Conservation Commission hopes they will add to the appreciation and enjoyment of the natural world around us, which is one of the benefits of living in our rural town. We hope it will also encourage those growing up here to explore and be inspired by those who have already done so and left a record of what they have seen and what has been conserved.

Previous Natural Resource Inventories

The Farmington River Watershed Association (FRWA) worked with the Town of Colebrook on the 2004 and 2014 NRIs. In 2014 it helped with new data and provided information about critical habitats and potential vernal pools that was originally prepared for the Farmington River Coordinating Committee Management Plan.

In 1991, the first Plan of Conservation and Development for the Town of Colebrook noted that the town is "fortunate to enjoy extensive natural resource areas in an unspoiled and protected condition." That Town Plan encouraged the improvement of the local economy, job opportunities, and tax base "in a form that is compatible with the Town's rural character, its water resources and the limitations of its road and utility systems." The 2004 Town Plan surveyed local residents and found that they "ranked the quality of the town's natural environment as one of their highest community values." The Plan recommended: "Economic development in the town should continue to be implemented within the framework of respecting and enhancing the town's unique rural character."

Project Overview

A very difficult question facing local communities today is how best to direct growth and development in a way that is compatible with protecting a community's natural resources. The first step in any effort to address such an issue is to understand the current status of natural resources and land use in an area.

The Natural Resources Inventory is a summarization, in map, report and list form, of Colebrook's natural resources and the current natural resource management structure. The maps express the existing state of a community's natural resource base, and help identify areas that are of critical concern for natural resource conservation, as well as areas that are most appropriate for development. The resource inventory is completed in a Geographic Information Systems (GIS) environment. GIS assembles, stores, and manipulates geographic (spatial) data and can analyze the data for conservation and planning purposes. Municipalities and natural resource conservation groups are increasingly turning to GIS as the tool for developing resource studies because of its flexibility and power in adding, manipulating and analyzing data.

It is important to reiterate that NRI can be used not only to identify appropriate areas for protection in a community, but also appropriate areas for development based on their natural resource features. The purpose of the process is to establish an information baseline that can empower local decision makers with the data they need to make informed decisions regarding development and natural resource management issues.

Note:

Data Accuracy: The GIS data used in this report comes from many different sources and therefore has different levels of accuracy. It should be considered appropriate for town level planning exercises, but may not be adequate for parcel level analysis. Some of the data is general in nature, and some provides significant detail. It will be important to field verify any information used in an actual decision making process. As the availability of GIS data grows and improves it will be a relatively simple process to update and improve this document.

Map Descriptions

1. Locator: Farmington River Watershed & Colebrook
This map shows the extent of the Farmington River and its watershed, the route of the Farmington River through Massachusetts and Connecticut, and the location of the Town of Colebrook. The watershed is 609 square miles total, and Colebrook is about 33 square miles of that. Sandy Brook and the Still River are the two most significant tributaries of the Farmington River that flow through Colebrook.

2. Aerial Imagery
Data Source: State of Connecticut Aerial Imagery (Spring 2024).

3.Topographic Map
Colebrook lies in the western highlands of Connecticut, an area that has the highest elevations in the state (the highest point being roughly 2,100ft at Bear Mtn in Salisbury). The highest point in Colebrook is 1,552ft at an unnamed peak near McClaveville. Longtime residents know this area of the Litchfield hills was called the “icebox of Connecticut” for good reason. The microclimate caused by elevation and atmospheric moisture can produce hot, humid summers, sometimes with very violent thunderstorms (even tornadoes), and cold winters with heavy snowfall or icestorms. However, in recent years Connecticut has experienced warmer temperatures year round. The topography also makes this part of the state very beautiful, and holds an interesting array of plant and animal life. Data Source: National Geographic Society, i-cub.

4. Parcels & Zoning
The Colebrook Planning & Zoning Regulations specify districts and zones within the town. The two Historic Districts were established by the Colebrook Historic District Commission in 1963.
The R-1 Village District is the area in and near Colebrook’s historic village center where special provisions are established in order to maintain and protect the distinctive character, landscape, and historic value identified in the Town Plan of Conservation and Development.

The R-2 Residential District comprises most of the town and is for rural, agricultural, and/or residential uses appropriate to the environmental characteristics of the land (such as soil types, terrain, and infrastructure capacity).

The General Business (GB) District designates areas for business uses appropriate to the environmental characteristics of the land (such as soil types, terrain, and infrastructure capacity).
As authorized by CGS Section 8-2j, the Village District Overlay Zone is established in the Colebrook Planning & Zoning Regulations Section 4.A in certain areas in order to encourage development consistent with the village aspects of Colebrook and to help preserve and enhance the distinctive character, landscape, and historic structures.
The Flood Hazard Area Overlay Zone is established in the Colebrook Planning & Zoning Regulations Section 4.B to implement the provisions of the National Flood Insurance Program. See Map 4, Areas of Special Flood Hazard.
Data Sources: Colebrook Assessor (2024); Colebrook Planning & Zoning Regulations (2021); Connecticut Statewide LiDAR (2016).

5. Subwatershed Basins
There are five subwatershed basins in Colebrook: Farmington River, Mad River, Sandy Brook, Slocum Brook, and Still River. Within each of these five subwatersheds are sub-basins, shown by their boundaries to be of various size and shape. Based on topography, the water from these sub-basins drains from spring, creeks, ponds, and wetlands into the larger tributaries. Data Source: CT DEEP (2023).

6. Wetland Soils
In Connecticut, wetlands are officially designated by soil type. The Connecticut Inland Wetlands and Watercourses Act, Connecticut General Statutes Section 22a-38, defines wetland soils to include "Any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soil Survey”. This map shows the general location of soils that are defined as Inland Wetlands and may be subject to regulation. It is useful for planning purposes, but “does not eliminate the need for onsite sampling, testing, and detailed study of specific sites for intensive uses” (U.S. Dept. of Agriculture’s Natural Resources Conservation

Service). Data Sources: Wetland Soils: CT DEEP, USGS SSURGO (2024), Watercourses & Waterbodies: USGS NHD 2.0 (2024).

7. Water Quality
This map shows information related to the quality of Colebrook's surface and groundwater features. Data includes:
Water Quality Classification—Section 303 of the Federal Clean Water Act requires states to adopt water quality standards and classifications for both surface and groundwater. Each classification is based on certain standards and the water bodies' ability to support certain uses such as drinking, boating and swimming. Water Quality Standards set an overall policy for DEEP in accordance with Section 22a-426 of the General Statutes. The Water Quality Standards and Classification Fact Sheet is available on the DEEP website. Source: CT DEEP (2023).

Dams and Sewage Treatment Plant—While dams can be beneficial for flood control and hydropower productions they also can limit fish and energy passage up and down river and stream systems. The CT DEEP lists 18 dams present in the town of Colebrook. Further study should be done to assess the impacts and utility of the dams to determine if opportunities exist to improve aquatic habitat. Appendix III provides a list of the dams. The treatment plant shown near the outflow of Lake Triangle is under the jurisdiction of DEEP. Source: CT DEEP (2023).

US Geological Survey (USGS) Stream Gage—Colebrook has one USGS stream gage on the Still River in the Robertsville section of town. Since 1951 the gage has provided ongoing data regarding stream flow in the Still River. This information is extremely important for many reasons, including flood warnings, diversion and discharge permitting and establishing baseline data for comparison use with other streams of similar characteristics. The latest information of the gage can be found at hydrograph and station description for 01186500 on the USGS website https://waterdata.usgs.gov/monitoring-location/01186500/#parameterCode=00065&period=P7D&showMedian=false
Data Sources: CT DEEP (2023); USGS NHD 2.0 (2024)

8. Drinking Water Resources
Potential groundwater supply refers to areas of surficial materials that show characteristics of supplying groundwater. These areas are deposits of stratified drift left by the last glacial period, which ended roughly 12,000 years ago. These deposits are of various sized clay, silt, sand and gravel, which allows for groundwater recharge through the increase pore space in the materials. They also can play an important role in providing surface water flow. In general, the courser the material, the greater ability the material has to store groundwater. The lowest yield areas are sand, while the highest yield areas are the much coarser grained gravel, which has larger pore space and can hold and transmit water at higher volumes. Colebrook possesses several areas of surficial materials that have an established groundwater source potential, or a possible future groundwater source potential for public water supply needs. Such availability of ground water for drinking water supply must be assessed in the context of the impacts to hydrologically connected and surface water areas. Any such proposed withdrawals are regulated under Connecticut General State Diversion Law. Data Sources: CT DEEP (2010, 2024).

9. Areas of Special Flood Hazard
The Federal Emergency Management Agency (FEMA) works with communities across the country to help them understand and prepare for emergencies, such as floods. The agency produces the Flood Insurance Rate Map (FIRM), the official map of a community which delineates both the special flood hazard areas and the insurance risk premium zones applicable to a community. The Colebrook Planning & Zoning Regulations effective July 11, 2021, Section 4.B, pages 36-56 state the purpose and objectives for the Flood Hazard Area Overlay District: "The Town of Colebrook has voluntarily participated in the National Flood Insurance Program (NFIP) since August 3, 1981. The NFIP is founded on a mutual agreement between the federal government and each participating community. Local, state, and federal governments must share roles and responsibilities to meet the goals and objectives of the NFIP. The community's role is of paramount importance. Property owners are able to receive federally- subsidized flood insurance only if the community enacts and enforces the minimum floodplain regulations required for participation in the NFIP." Data Sources: FEMA (2024); Town of Colebrook Planning & Zoning Regulations (2021).

10. Road Salt Permeability
This map shows soil water potential, which is a measure of whether soil water will move and how much water is available for biological processes. Soil with high water potential is the best, because road salt can move through it

quicker and less is retained, which is good for plants and organisms living in the soil. At the other end of the scale, soil with low water potential does not move road salt well, and the salt is likely to accumulate there, leading to problems in the soil. We depend on road salt to keep roads safe when there is ice and snow, however according to the United States Environmental Protection Agency (EPA) the benefits come with opportunities for improvement: "Road salt can contaminate drinking water, kill or endanger wildlife, increase soil erosion, and damage private and public property. Alternative methods are needed to mitigate these drawbacks."

DEEP has a road salt FAQ online:
https://portal.ct.gov/deep/remediation--site-clean-up/road-salt/road-salt-faqs
and a potable water program page about steps to take for concerns with well water:
https://portal.ct.gov/deep/remediation--site-clean-up/road-salt/salt-investigations
Data Sources: Natural Resources Conservation Service (NRCS); CT DEEP (2024); USGS NHD 2.0 (2024); EPA (2024).

11. Bedrock Geology
This map from shows the types of bedrock that underlie the town and the fault lines where the different types meet. These rocks are among the oldest in the state, formed under great pressure as pieces of the continental crust collided. Much later (20,000 to 30,000 years ago) the last glacier slowly travelled through Colebrook in a south-southeast direction, eroding the bedrock, carving valleys, rounding hilltops, and depositing debris as boulders, gravel, sand and mud. See Randolph Steinen's report, *Topographic and Geological Resources of Colebrook*, for a full description. Data Sources: Rodgers Bedrock Geology of CT, CT DEEP (1985); Connecticut DEEP (2024); USGS NHD 2.0 (2024).

12. Surficial Materials
This map shows the deposits that are over the town's bedrock but beneath the organic soil layer. Surficial material ranges from very small in size, such as sand, up to gravel and till and then boulders. It may be a mix of those. Swamps and artificial fill are other categories, as is allium — deposits from lakes and streams that is over sand and gravel. Data Sources: Connecticut DEEP (1985, 2024).

13. Farmland Soils
This map indicates soils that are prime farmland, farmland of statewide importance, and farmland of local importance. These categories are based on soil type, following the Code of Federal Regulations, CFR Title 7, part 657. It identifies the location and extent of the most suitable land that is available for producing food, feed, fiber, forage, and oilseed crops. Data Sources: Natural Resources Conservation Service (USDA); CT DEEP (2024); USGS NHD 2.0 (2024).

14. Land Use
The land use information on this map is from the most recent valuation of Colebrook properties by the Assessor's office. Land use is broken down into the categories of Single Family; Multi-family; Church; Commercial; Forest; Industrial; Municipal; Public Service; Vacant Land; Tillable C/D; Permanently Protected Land (Committed); Uncommitted Open Space (land that has historically been open space but is not guaranteed to remain so); Utility/ Water Company; and Camp Jewell (YMCA). Sources: Land Use, Town of Colebrook (2023); Parcel Boundaries, Town of Colebrook Assessor (2024).

15. Forest Resources
This map shows Core Forest Habitat in Colebrook and the percentage of protection that it has. The term Core Forest means a forest surrounded by other forests, and in Connecticut, it is defined as being relatively far (more than 300 feet) from the forest-nonforest boundary, such as a road. Colebrook has many acres of Core Forest Habitat comprised of oak, hickory, beech, maple, birch and hemlock that provide a stable space for many species of wildlife that cannot tolerate significant disturbance.

The goal of Connecticut's 2020 Forest Action Plan is "Keeping forest as forest." Since 1985, our state has lost more than 15% of its Core Forest. The loss diminishes water purification and habitat values, and could result in heavier runoff, which might lead to poorer water quality and impaired habitat. Data Sources: DEEP (2024), Colebrook Land Conservancy (2024), Litchfield Hills Greenprint (2024), Housatonic Valley Association (2024), The Nature Conservancy (2024).

16. Open Space & Permanently Protected Lands
Open space lands make up approximately 50.3% of Colebrook. The two primary owners of this open space are the Metropolitan District Commission (MDC) with 3,941 acres and the State of Connecticut with 2,885 acres, totaling almost two-thirds of the 10,602 acres of open space. The Division of Forestry of the Department of Energy and Environmental Protection (DEEP) manages the Algonquin and Tunxis State Forest parcels in Colebrook. Other owners of open space include the Town of Colebrook, the YMCA, non-profit land conservation groups, private sportsman's clubs, and private associations. Colebrook's open space is also categorized as "committed" and "uncommitted." "Committed" open space is described as land that is permanently protected, either by outright ownership or through conservation easements. "Uncommitted" open space is land that historically has been open space, but is not guaranteed to remain so, such as sportsman's clubs. Data Sources: Town of Colebrook Assessor (2024), Colebrook Land Conservancy (2024), Litchfield Hills Greenprint (2024).

17. Development Constraints
This map provides an indication of where future development is limited and where it may be possible in town. Specific site investigations will be needed to confirm or deny the actual conditions on the ground. Areas shown with limited future development include Class I or II water utility land, state forest land, other committed open space, steep slopes (15% or greater), wetlands, or water bodies. Most of the constraints are due to the large MDC and state forest holdings. Data Sources: Town of Colebrook Assessor (2024); Connecticut Statewide LiDAR (2016).

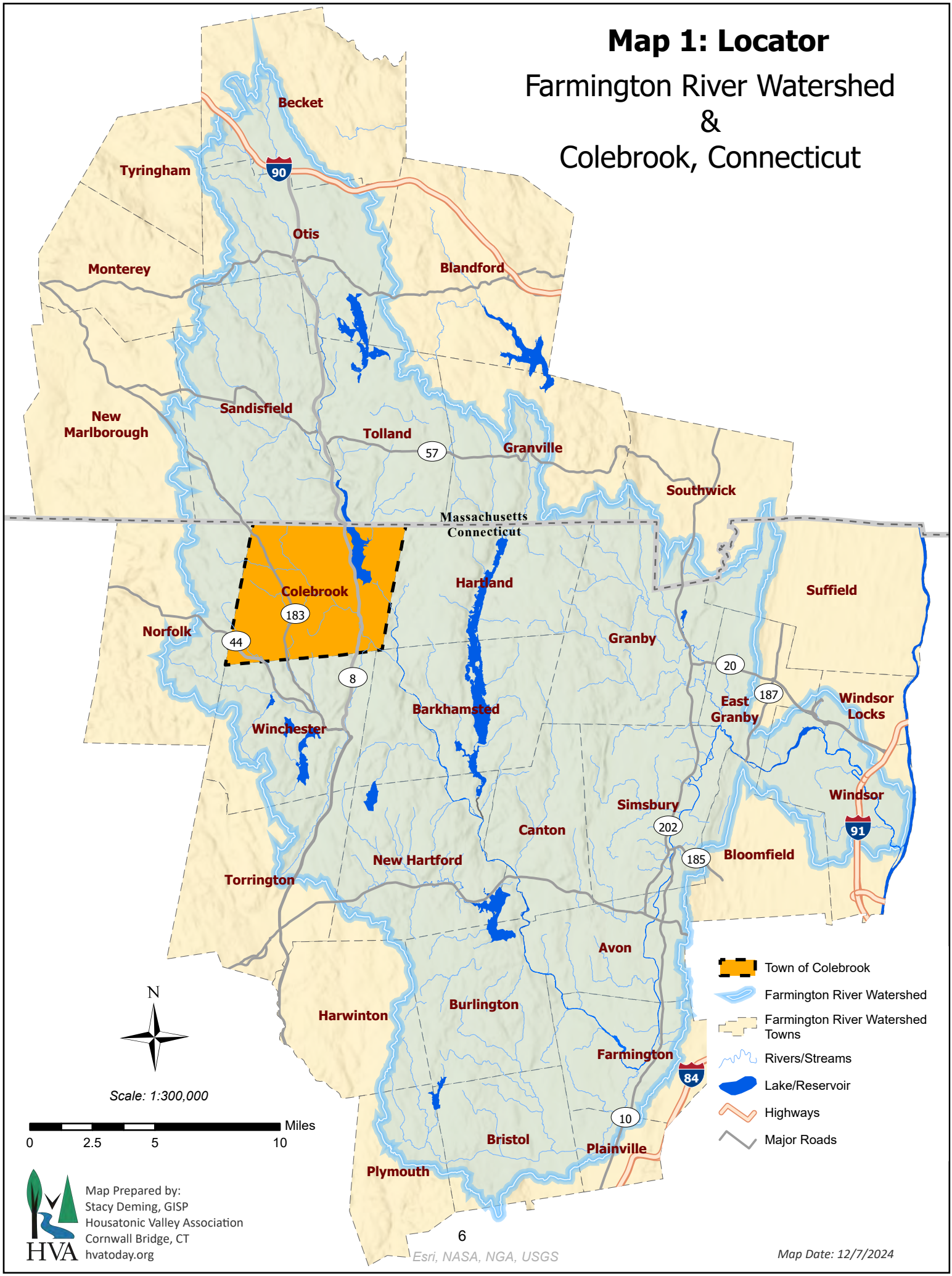
18. Critical Habitats & Vernal Pools
This map shows the DEEP's Critical Habitats, which are rare and specialized habitats that may in turn be home to rare wildlife. They are identified in the CT State Wildlife Action Plan (SWAP), currently being revised and formerly called the CT Comprehensive Wildlife Conservation Strategy of 2015. Colebrook has a critical habitat called Dry Subacidic Forest, defined as "slow-growing forests, primarily on or near the summit of basalt or other mafic rocks; often dominated by white ash, hickories and hophornbeam, with few shrubs and an open grassy ground cover." The town-owned Charles Arnold Recreation Area has such a forest summit, characterized by oak, hickory and hophornbeam with a Pennsylvania sedge ground cover.

The potential vernal pools were derived from aerial photo interpretation through a project funded by the Farmington River Coordinating Committee in 2011. Some pools were verified through that project.
Data Sources: CT DEEP (June 2024); Farmington River Coordinating Committee report (2011); Homeowner on Pinney Street (2024).

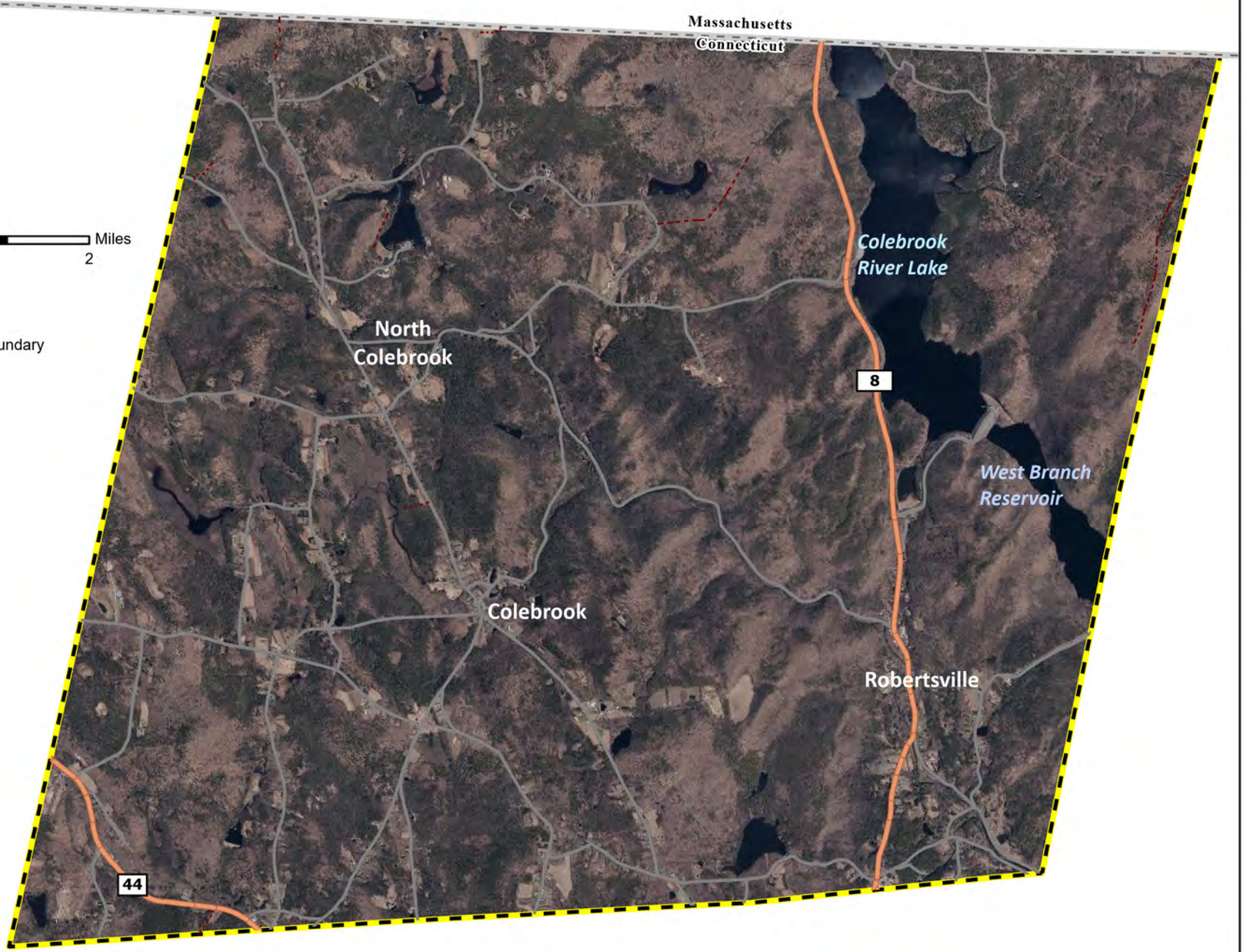
19. Natural Diversity Data Base Areas
The Natural Diversity Data Base (NDDB) maps show approximate locations of endangered, threatened, and special concern species and important natural communities in Connecticut. The locations shown on the maps are based on information collected over the years by DEEP staff, scientists, and others. In some cases, an occurrence is from a historic record. The maps are intended to be a tool to show potential impacts to state-listed species. They are also used by groups wishing to find areas of potential conservation concern. The maps are updated periodically and new information is continually added to the data base. It is important to always use the most current version. Lichens are not presently included in the data base. Data Sources: NDDB, Connecticut DEEP (June 2024); USGS NHD 2.0 (2024).

MAPS

The 19 Natural Resources Inventory maps shown in the pages that follow are also available on the Colebrook Planning and Zoning website in PDF format.


Map 1: Locator
Farmington River Watershed
&
Colebrook, Connecticut
Becket
Tyringham
Otis
Monterey
Blandford
New Marlborough
Sandisfield
Tolland
Granville
Southwick
Massachusetts
Connecticut
Colebrook
Hartland
Suffield
Norfolk
Granby
Barkhamsted
East Granby
Windsor Locks
Winchester
Windsor
Simsbury
Canton
Bloomfield
New Hartford
Torrington
Avon
Harwinton
Burlington
Farmington
Bristol
Plainville
Plymouth
90
57
183
44
8
20
187
202
185
91
84
10
N
Scale: 1:300,000
Miles
0
2.5
5
10
Town of Colebrook
Farmington River Watershed
Farmington River Watershed Towns
Rivers/Streams
Lake/Reservoir
Highways
Major Roads
Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org
HVA
6
Esri, NASA, NGA, USGS
Map Date: 12/7/2024

Map 2: Aerial Imagery
Colebrook, Connecticut



N

Scale: 1:54,000

0 1 2 Miles

State Boundary

Colebrook Town Boundary

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map/Aerial Image Date: 12/6/2024

Map: 3
Topographic Map

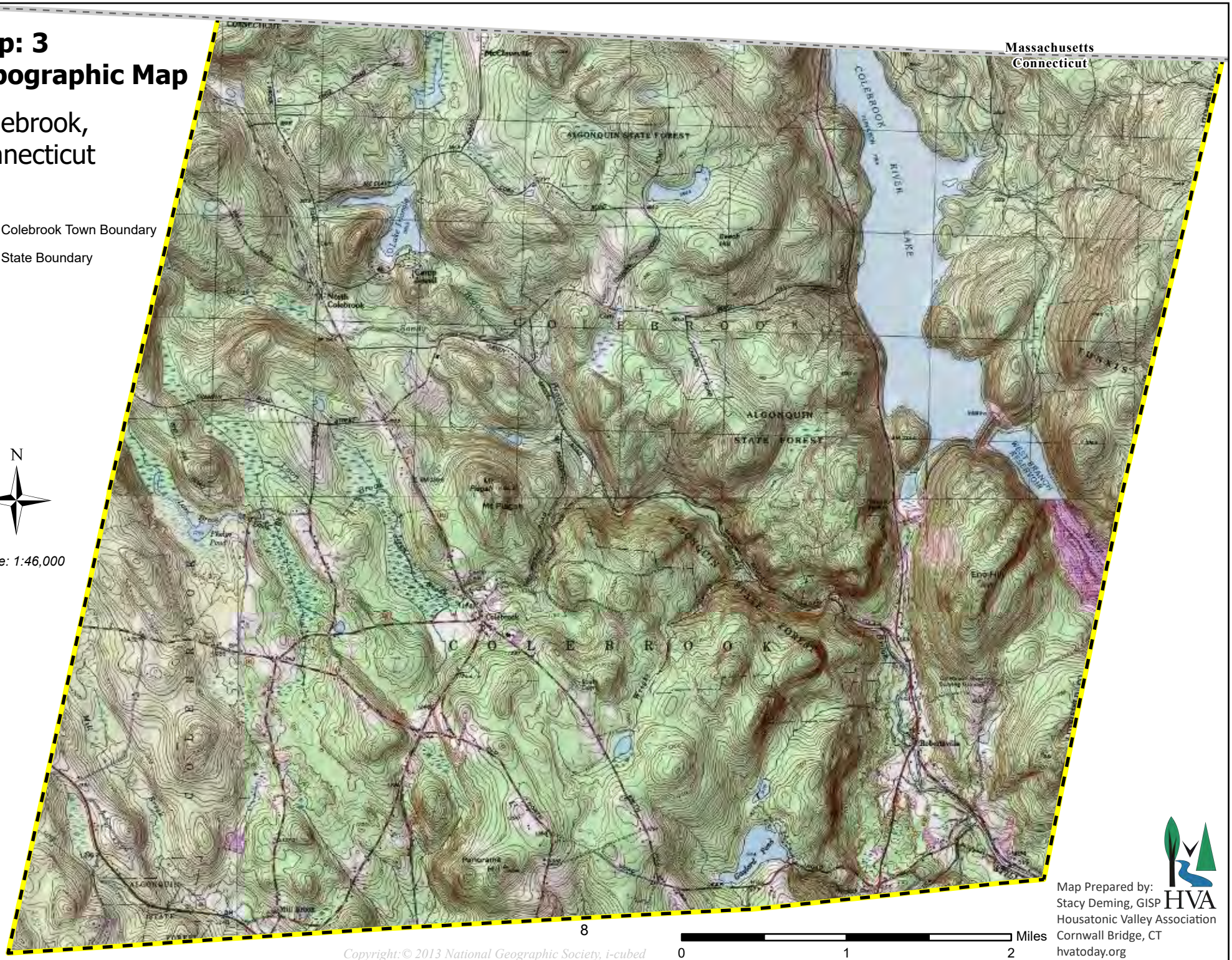
Colebrook, Connecticut

Colebrook Town Boundary

State Boundary

N

Scale: 1:46,000



8

Miles

0 1 2

Map Prepared by:
Stacy Deming, GISP
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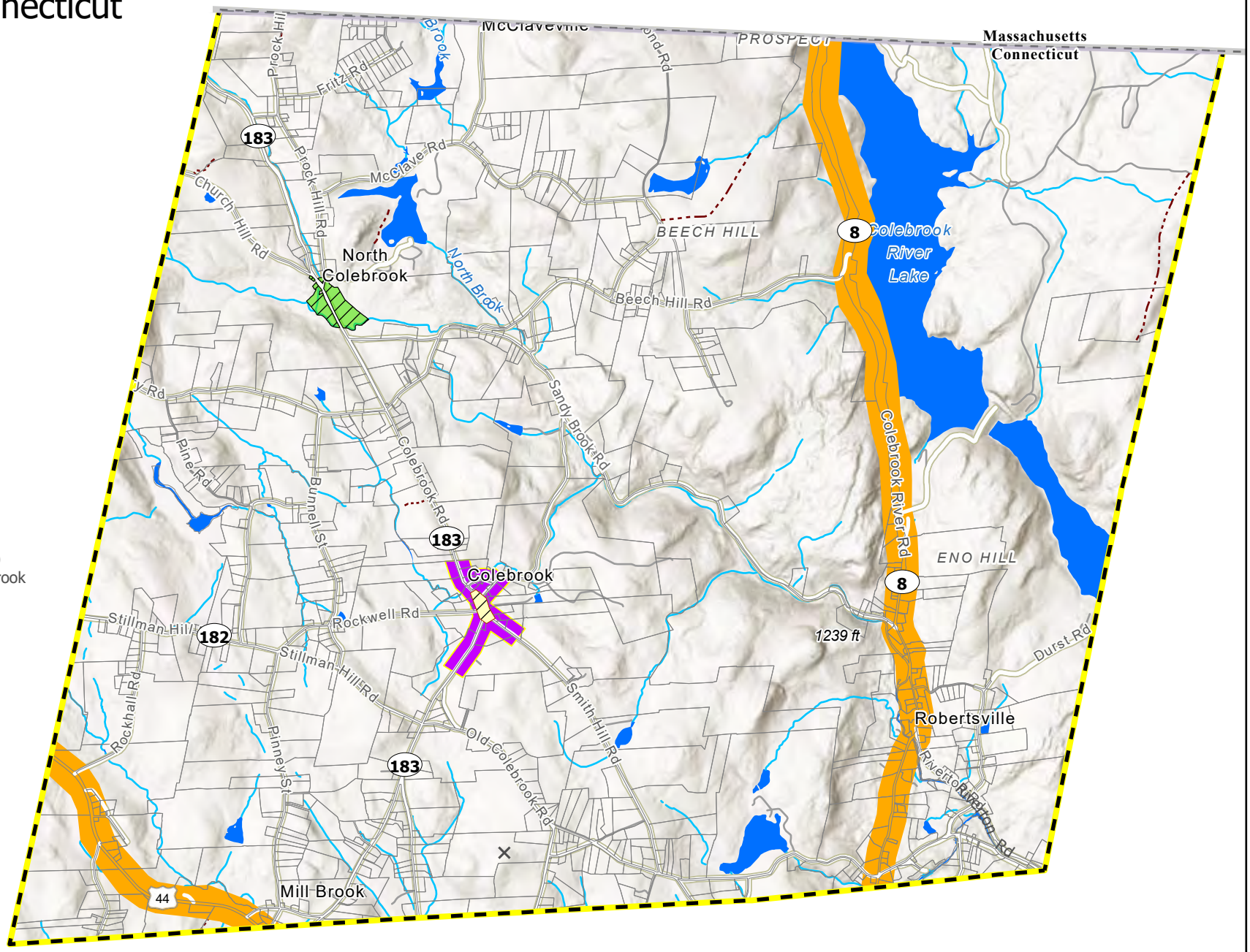
Cornwall Bridge, CT
hvatoday.org

Map 4: Parcels & Zoning

Colebrook, Connecticut



Map Elements

- State Boundary
- Colebrook Town Boundary
- Streams/Rivers
- Lake/Pond
- Colebrook Parcel Boundaries
- North Historic District
- Center Historic District

Zoning

- General Business Zone
- Village District Overlay Zone

Data Sources:
Zoning: Town of Colebrook (2015)
Parcel Boundaries: Town of Colebrook Assessor (2024)

N

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map 5: Subwatershed Basins

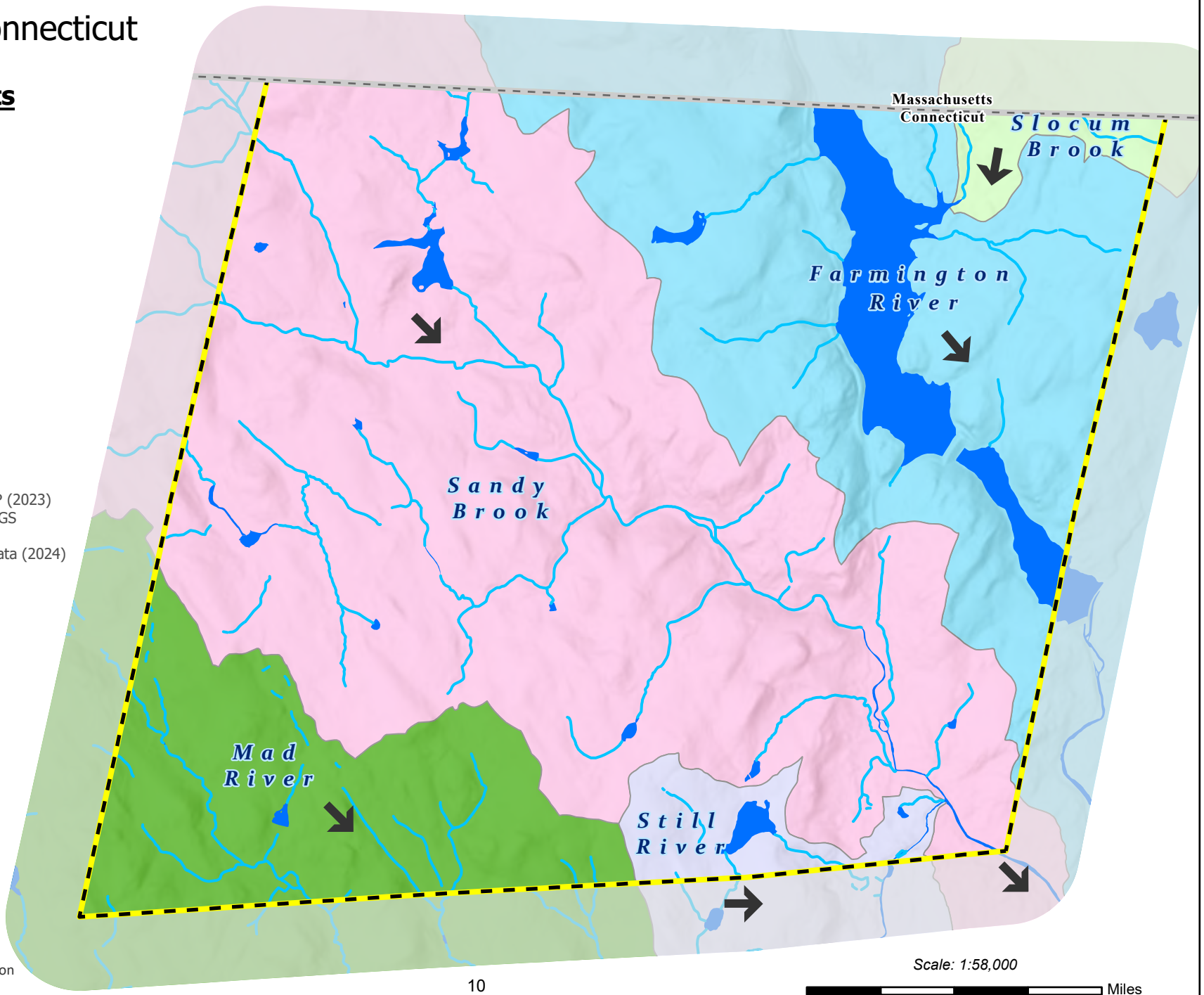
Colebrook, Connecticut

Map Elements

- Lake/Pond
- Streams/Rivers
- Flow Direction

Subwatershed Basins

- Farmington River
- Mad River
- Sandy Brook
- Slocum Brook
- Still River



Data Sources:
Basins & Flow Direction: CT DEEP (2023)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)

N

Scale: 1:58,000

0 1 2 Miles

Esri, NASA, NGA, USGS, FEMA

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map 6: Wetland Soils

Colebrook, Connecticut

Map Elements

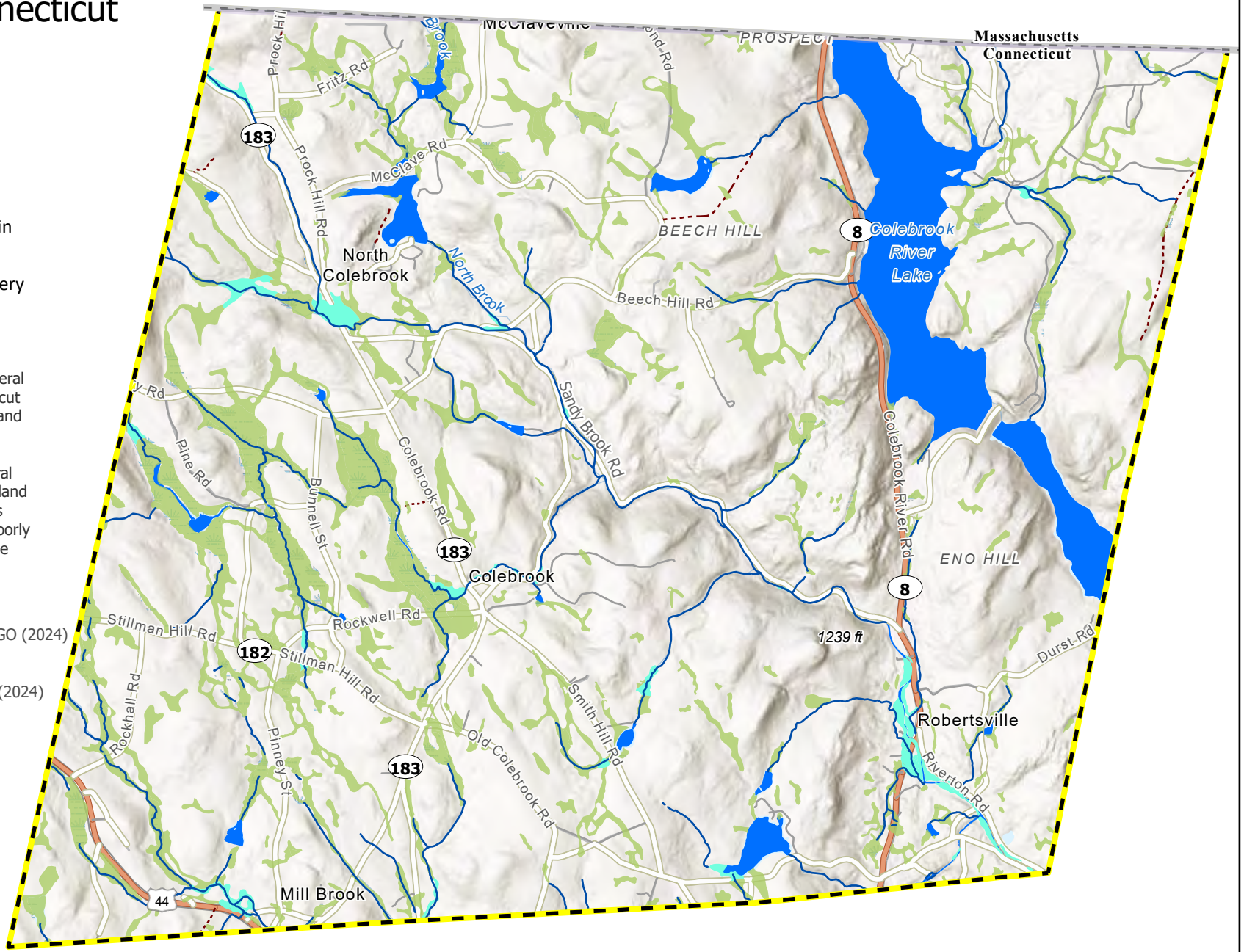
- Lake/Pond
- Streams/Rivers

CT Wetland Soils

- Alluvial and Floodplain Soils
- Poorly Drained and Very Poorly Drained Soils

Inland Wetland Soils provide the general location of soil map units in Connecticut that are defined as Inland Wetlands and may be subject to regulation. The Connecticut Inland Wetlands and Watercourses Act, Connecticut General Statutes Section 22a-38, defines wetland soils to include, "Any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soil Survey.

Data Sources:
Wetland Soils: CT DEEP, USGS SSURGO (2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)



N

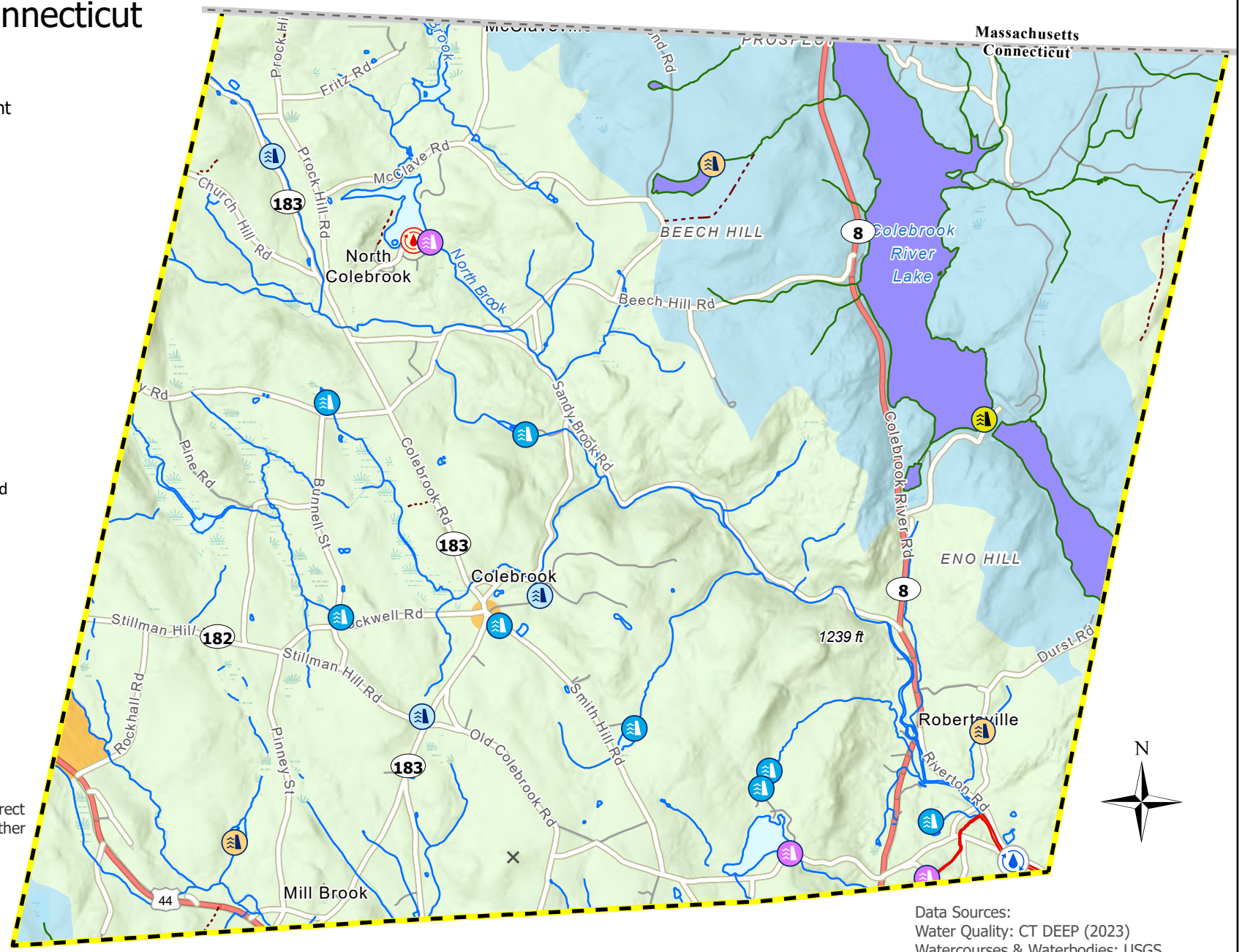
Scale: 1:54,000

0 1 2 Miles

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map 7: Water Quality

Colebrook, Connecticut



Water Quality

- Sewage Treatment Plant
- USGS Robertsville Gauge

Dam Hazard Rating

- A
- AA
- B
- BB
- C

Ground Water Classification

- GA
- GAA, GAAs
- GA, GAA May be impaired

Surface Water Quality (Watercourses)

- A
- AA
- B, B*

Surface Water Quality (Waterbodies)

- A
- AA
- B, B*

B* is a subset of Class B where no direct wastewater discharges are allowed other than those consistent with Class AA, A and SA surface waters

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Data Sources:
Water Quality: CT DEEP (2023)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)

Map 8: Drinking Water Resources

Colebrook, Connecticut

Map Elements

- State Boundary
- Colebrook Town Boundary
- Lake/Pond
- Streams/Rivers
- *Drinking Water Resource

Surficial Aquifer Potential

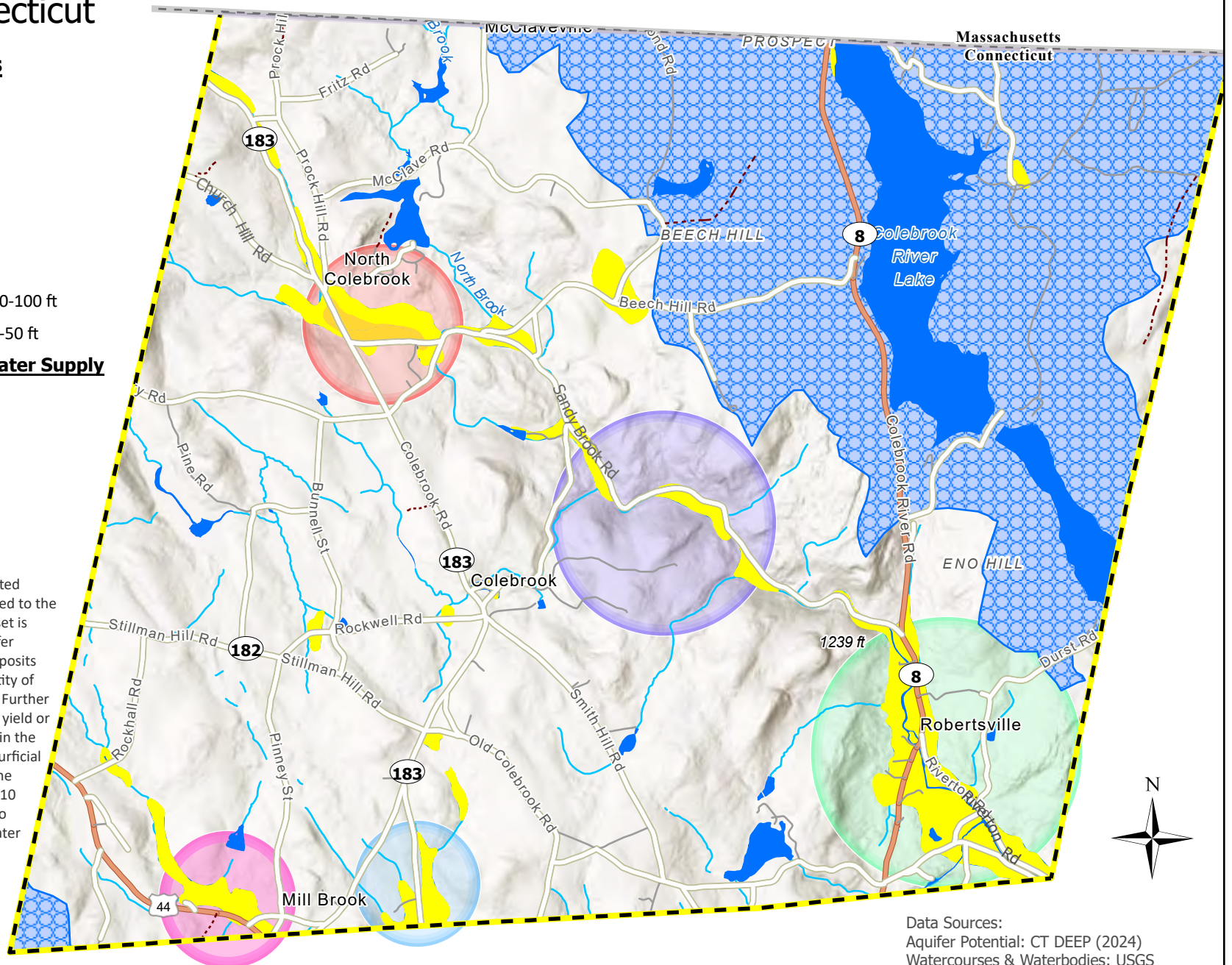
- Coarse-Grained Deposits, 50-100 ft
- Coarse-Grained Deposits, 0-50 ft

Areas of Potential Groundwater Supply

- Colebrook Brook
- Mill Brook
- Phelps Corners
- Robertsville
- Sandy Brook

***DRINKING WATER RESOURCES**

The Drinking Water Resource Area was created from the combination of two data sets related to the availability of drinking water. The first data set is derived from the 2010 CTDEP Surficial Aquifer Texture database. The Glacial Meltwater Deposits groups capable of yielding a sufficient quantity of water for groundwater wells were selected. Further classification was not done, other than high yield or lower yield categories, due to less accuracy in the depth to bedrock data needed to rank the surficial materials textures. The second data set is one containing local basins selected from the 2010 CTDEP Basins database that are important to maintaining high quality surface drinking water sources for public supplies.



Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Data Sources:
Aquifer Potential: CT DEEP (2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)

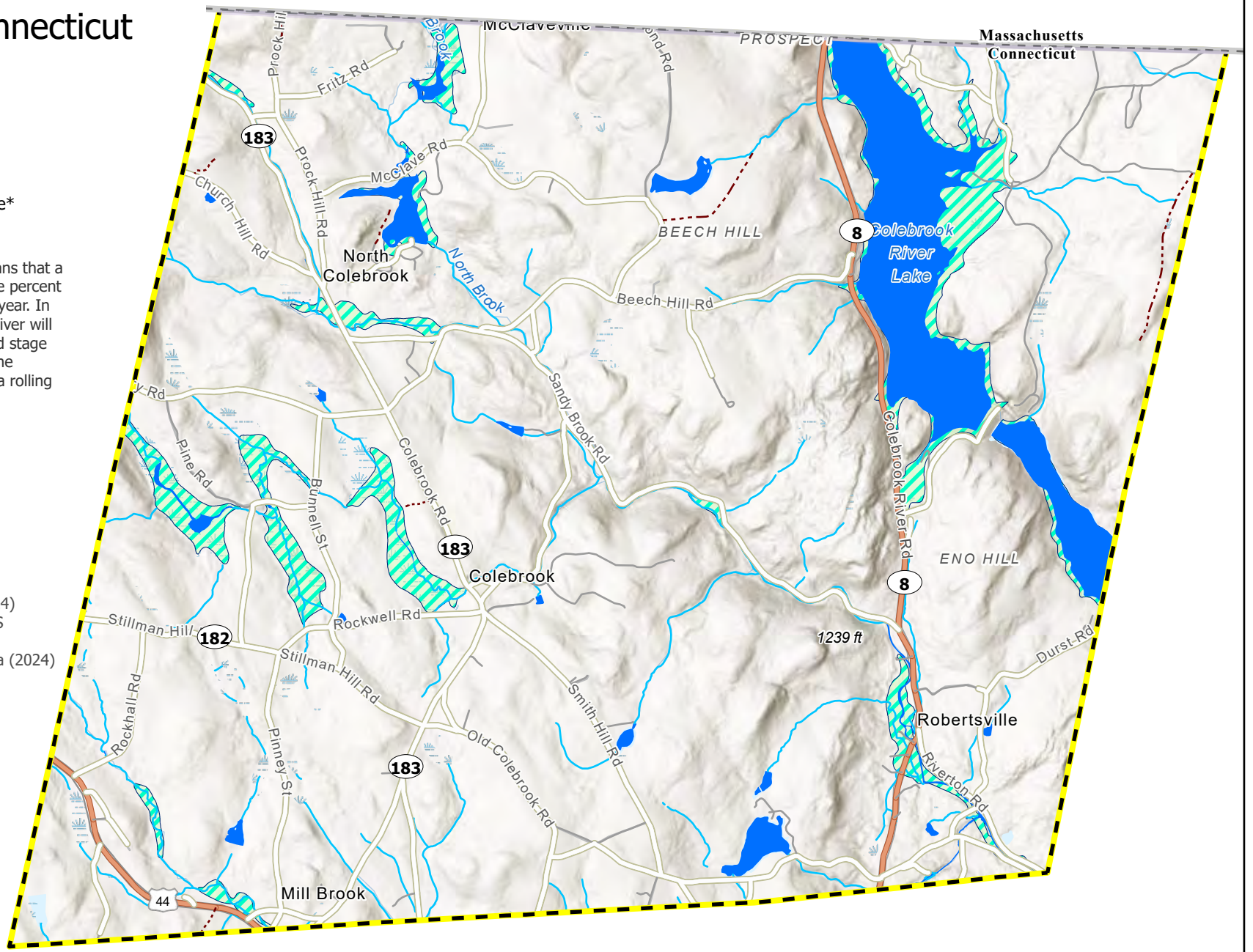
Map 9: Areas of Special Flood Hazard

Colebrook, Connecticut

Map Elements

- Streams/Rivers
- Lake/Pond
- 100 Year Flood Zone*

*The 100-year Flood interval means that a flood of that magnitude has a one percent chance of occurring in any given year. In other words, the chances that a river will flow as high as the 100-year flood stage this year is 1 in 100. FEMA is in the process of updating this data on a rolling basis.



Data Sources:
Flood Hazard Layer: FEMA FHL(2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)

N

Scale: 1:54,000

0 1 2 Miles

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map 10: Road Salt Permeability

Colebrook, Connecticut

Map Elements

- Lake/Pond
- Streams/Rivers

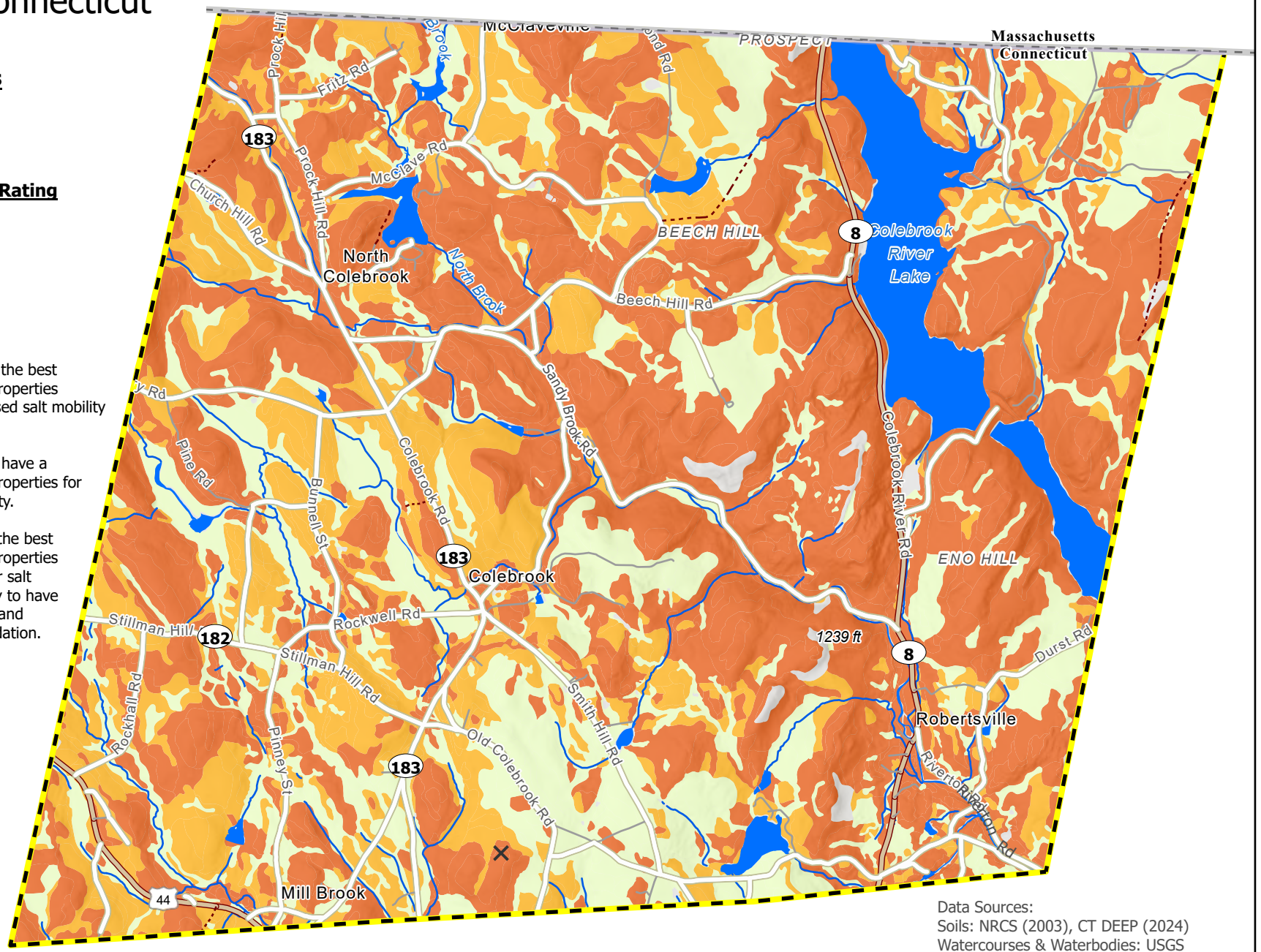
Road Salt Permiability Rating

- High potential
- Moderate potential
- Low potential
- Not rated

High Potential: These soils have the best combination of characteristics or properties for lower salt retention and increased salt mobility in soils.

Moderate Potential: These soils have a combination of characteristics or properties for moderate salt retention and mobility.

Low Potential: These soils have the best combination of characteristics or properties for greater salt retention and lower salt mobility in soils. The soils are likely to have a buildup or accumulation of salts and continued salt-induced land degradation.



N

Scale: 1:54,000

0 1 2 Miles

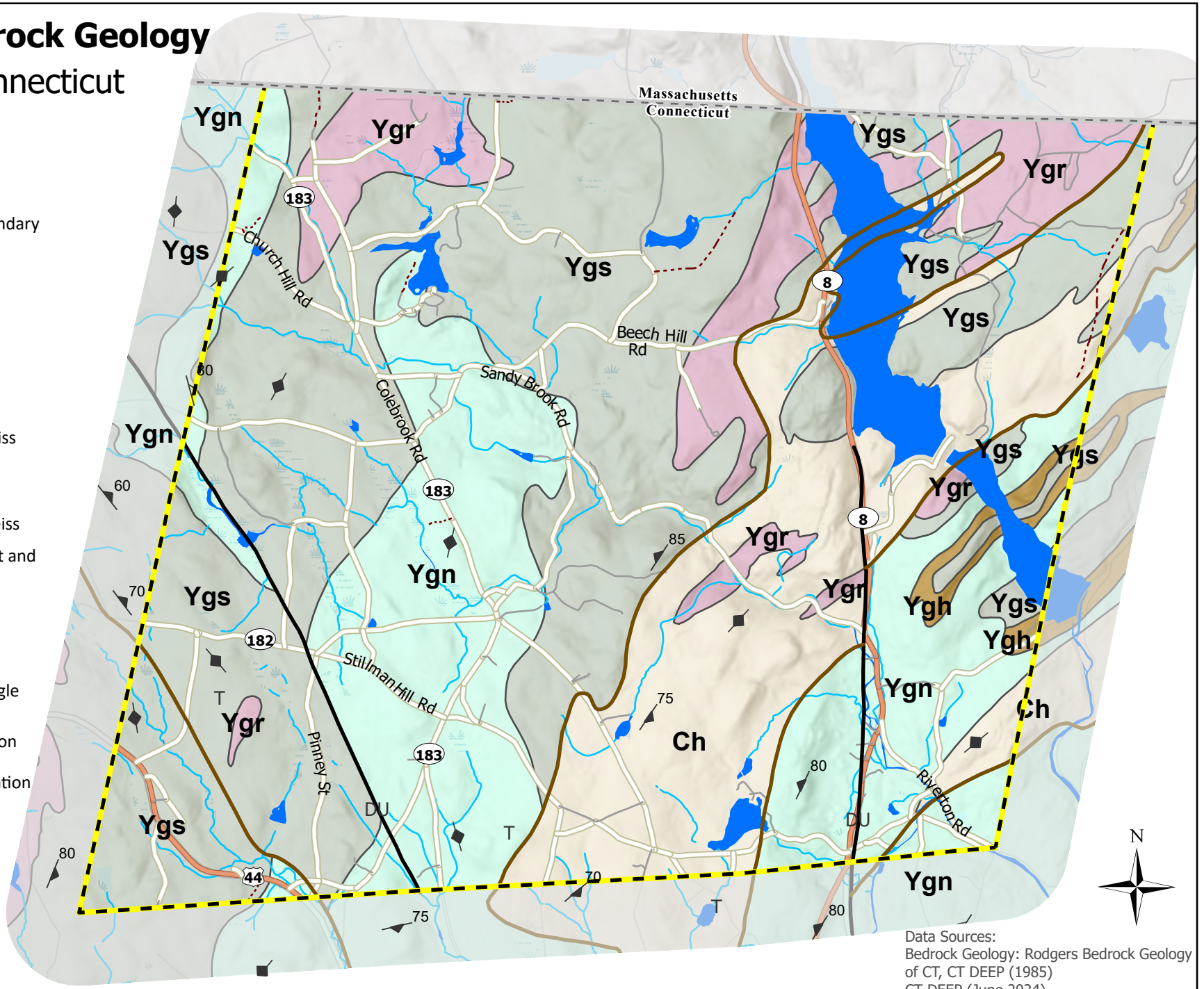
15

Data Sources:
Soils: NRCS (2003), CT DEEP (2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map 11: Bedrock Geology

Colebrook, Connecticut



Map Elements

- State Boundary
- Colebrook Town Boundary
- Roads
- Lake/Pond
- Streams/Rivers

Geologic Map Units

- Ch, Hoosac Schist
- Ygh, Hornblende gneiss and amphibolite
- Ygn, Layered Gneiss
- Ygr, Pink Granitic Gneiss
- Ygs, Rusty Mica Schist and Gneiss

- Contacts
- Thrust Fault
- Brittle Fault (High Angle Fault)
- Strike & Dip of Foliation
- Strike of Vertical Foliation

N

Scale: 1:58,000

0 1 2 Miles

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Data Sources:
Bedrock Geology: Rodgers Bedrock Geology of CT, CT DEEP (1985)
CT DEEP (June 2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)

Map 12: Surficial Materials

Colebrook, Connecticut

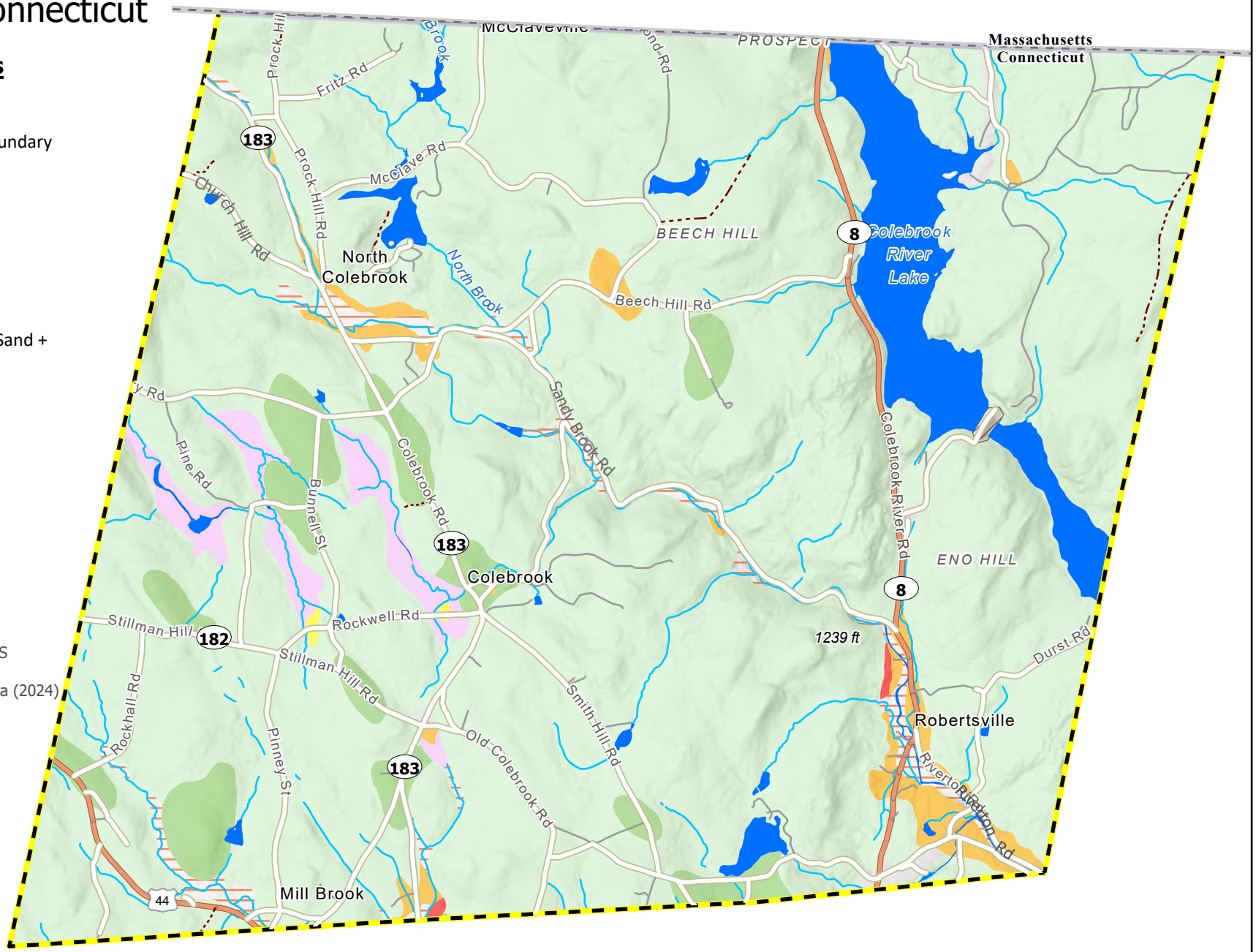
Map Elements

- State Boundary
- Colebrook Town Boundary
- Lake/Pond
- Streams/Rivers

Surficial Materials

- Artificial Fill
- Swamp
- Alluvium overlying Sand + Gravel
- Sand
- Sand + Gravel
- Gravel
- Till
- Thick Till
- Till, Sand + Gravel, Boulders

Data Sources:
Surficial Material: CT DEEP (2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)



N

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Scale: 1:54,000

0 1 2 Miles

Map 13: Farmland Soils

Colebrook, Connecticut

Map Elements

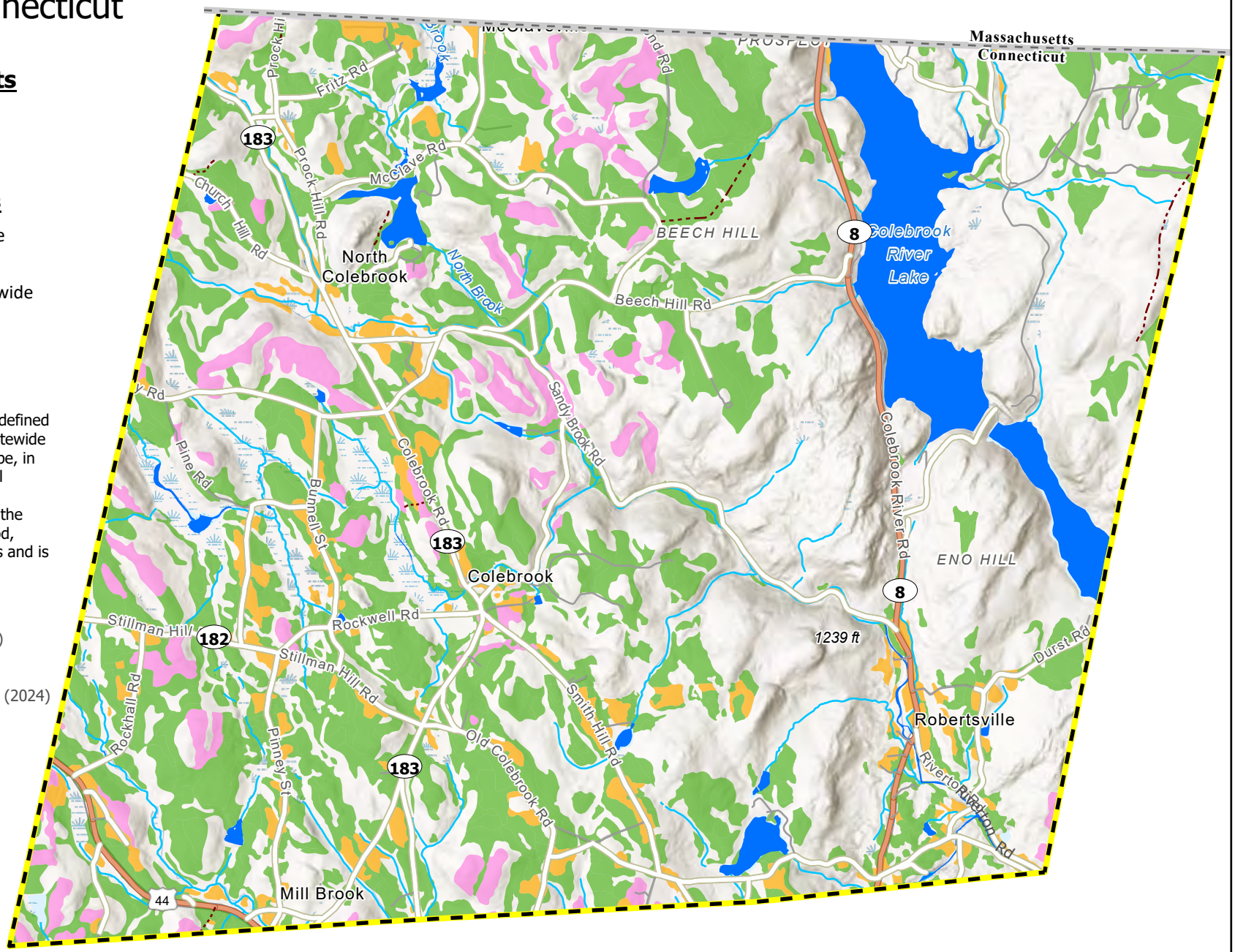
- Lake/Pond
- Streams/Rivers

Farmland Soils Class

- All areas are prime farmland
- Farmland of statewide importance
- Farmland of local importance

Farmland Soils includes land that is defined as prime, unique, or farmland of statewide or local importance based on soil type, in accordance with the Code of Federal Regulations, CFR title 7, part 657. It identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops and is available for these uses.

Data Sources:
Soils: NRCS (2003), CT DEEP (2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)



N

Scale: 1:54,000

0 1 2 Miles

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map 14: Land Use

Colebrook, Connecticut

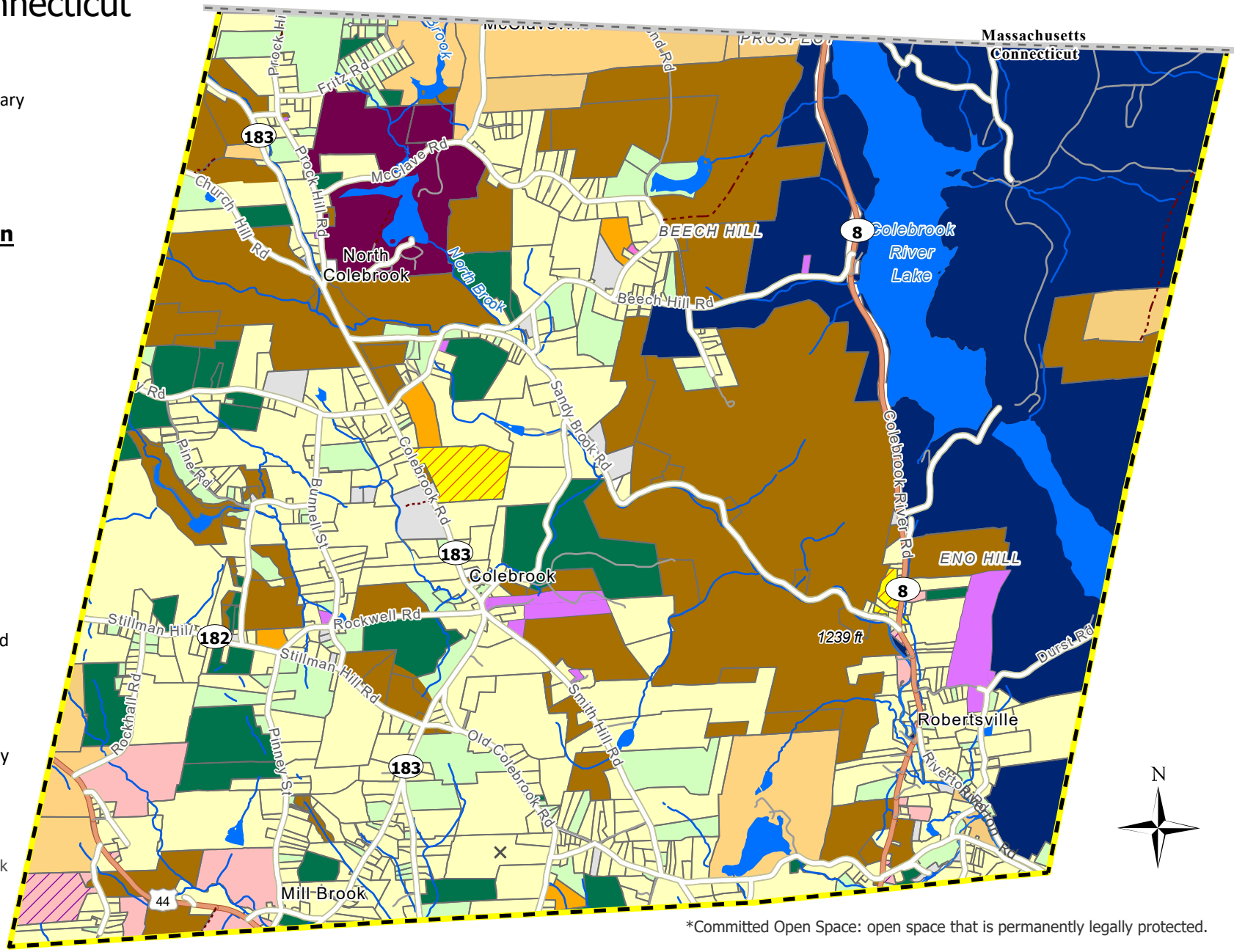
Map Elements

- Colebrook Town Boundary
- State Boundary
- Lake/Pond
- Streams/Rivers

Land Use Description

State Use Description

- Single Family
- Multi Family
- Church
- Commercial
- Forest
- Industrial
- Municipal
- Public Service
- Vacant Land
- Till C/D
- No Data
- Permanently Protected Land (Committed)*
- Uncommitted Open Space**
- Utility/Water Company
- Camp Jewell (YMCA)



Scale: 1:54,000

0 1 2 Miles

N

Data Sources:
Land Use: Town of Colebrook (2023)
Parcel Boundaries: Town of Colebrook Assessor (2024)

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

*Committed Open Space: open space that is permanently legally protected.

**Uncommitted Open Space: land that has historically been open space but is not guaranteed to remain so.

Map 15: Forest Resources

Colebrook, Connecticut

Map Elements

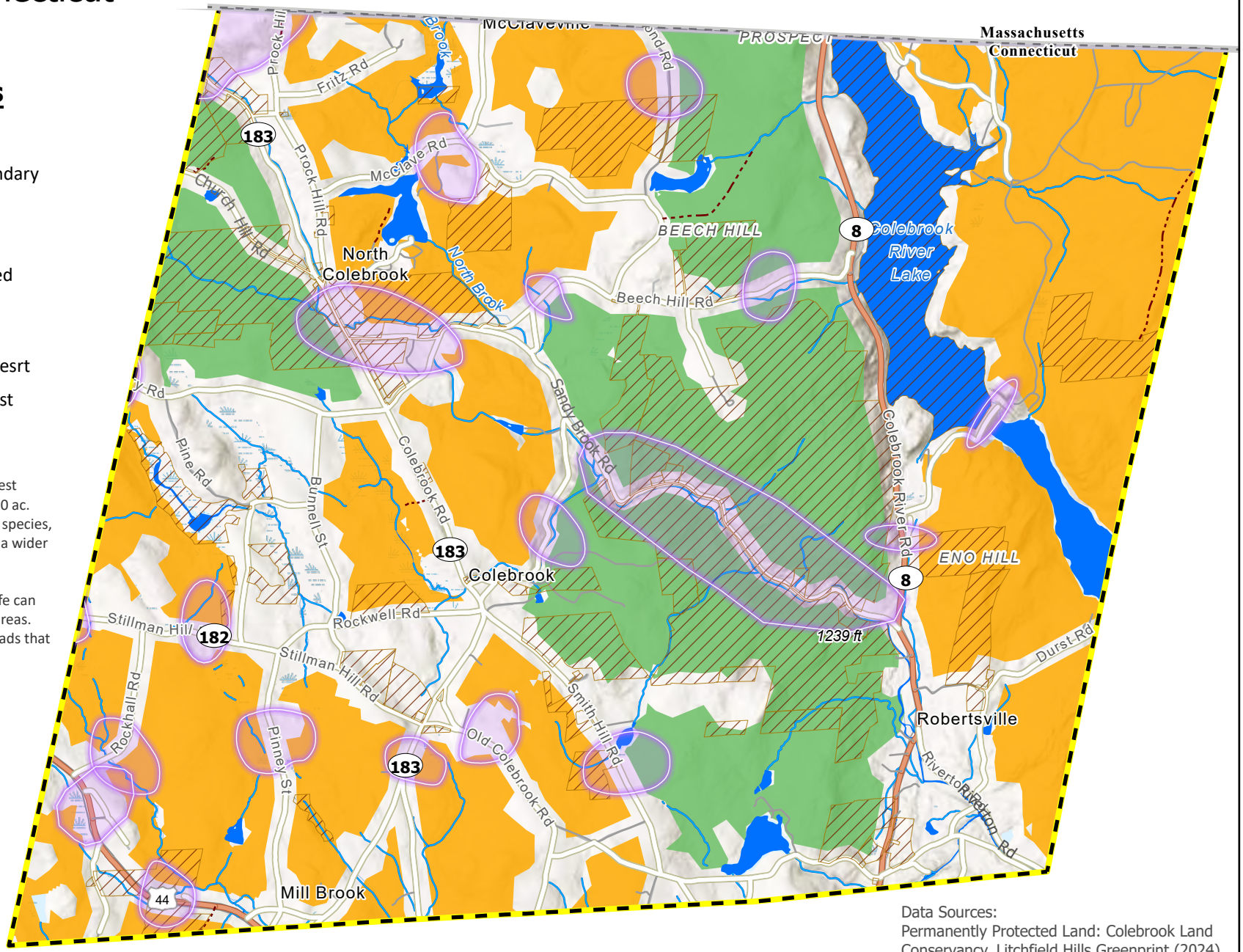
- State Boundary
- Colebrook Town Boundary
- Lake/Pond
- Streams/Rivers
- Permanently Protected Land

Core Forest Habitat*

- >= 50% Protected Foresrt
- < 50% Protected Forest
- Wilfdlife Linkage

*Core Forest Habitat represent the forest (deciduous & coniferous) of at least 250 ac. Core forests provide a stable home for species, protect biodiversity, and allow species a wider range to search for shelter or food.

Wildlife linkage is an area where wildlife can move between two or more forested areas. This map focuses on linkages across roads that connect large forests of 250+ acres



N

Scale: 1:54,000

0 1 2 Miles

20

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Data Sources:
Permanently Protected Land: Colebrook Land Conservancy, Litchfield Hills Greenprint (2024)
Forest & Linkages: HVA & TNC (2024)

Map 16: Open Space & Permanently Protected Lands

Colebrook, Connecticut

Conservation Easements

Easement Holder

- Colebrook Land Conservancy
- Municipal
- Historic New Engalnd
- The Nature Conservancy
- Aton Forest

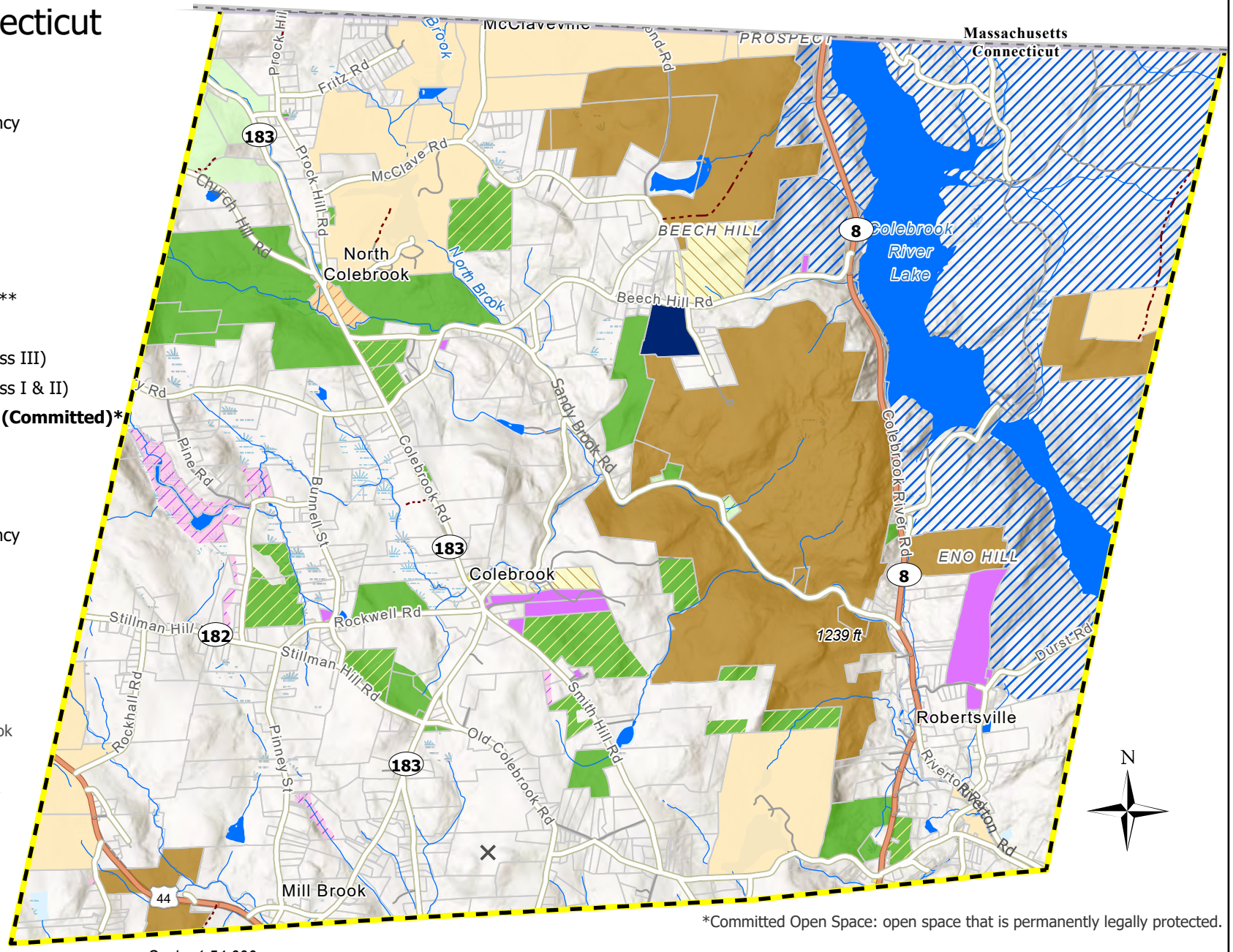
Uncommitted Open Space**

- Uncommitted Open Space**
- Municipal Land
- Water Company Land (Class III)
- Water Company Land (Class I & II)

Permanently Protected Land (Committed)*

Conservation Entity

- Aton Forest
- Cemetery
- Colebrook Land Conservancy
- Fund For Animals
- Municipal
- State of CT



Data Sources:
Permanently Protected Land: Colebrook Land Conservancy, Litchfield Hills Greenprint (2024)
Parcel Boundaries: Town of Colebrook Assessor (2024)

*Committed Open Space: open space that is permanently legally protected.

**Uncommitted Open Space: land that has historically been open space but is not guaranteed to remain so.

Scale: 1:54,000

0 1 2 Miles

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Map 17: Development Constraints

Colebrook, Connecticut

Map Elements

- Colebrook Town Boundary
- State Boundary
- Colebrook Parcel Boundaries
- Swamp/Marsh

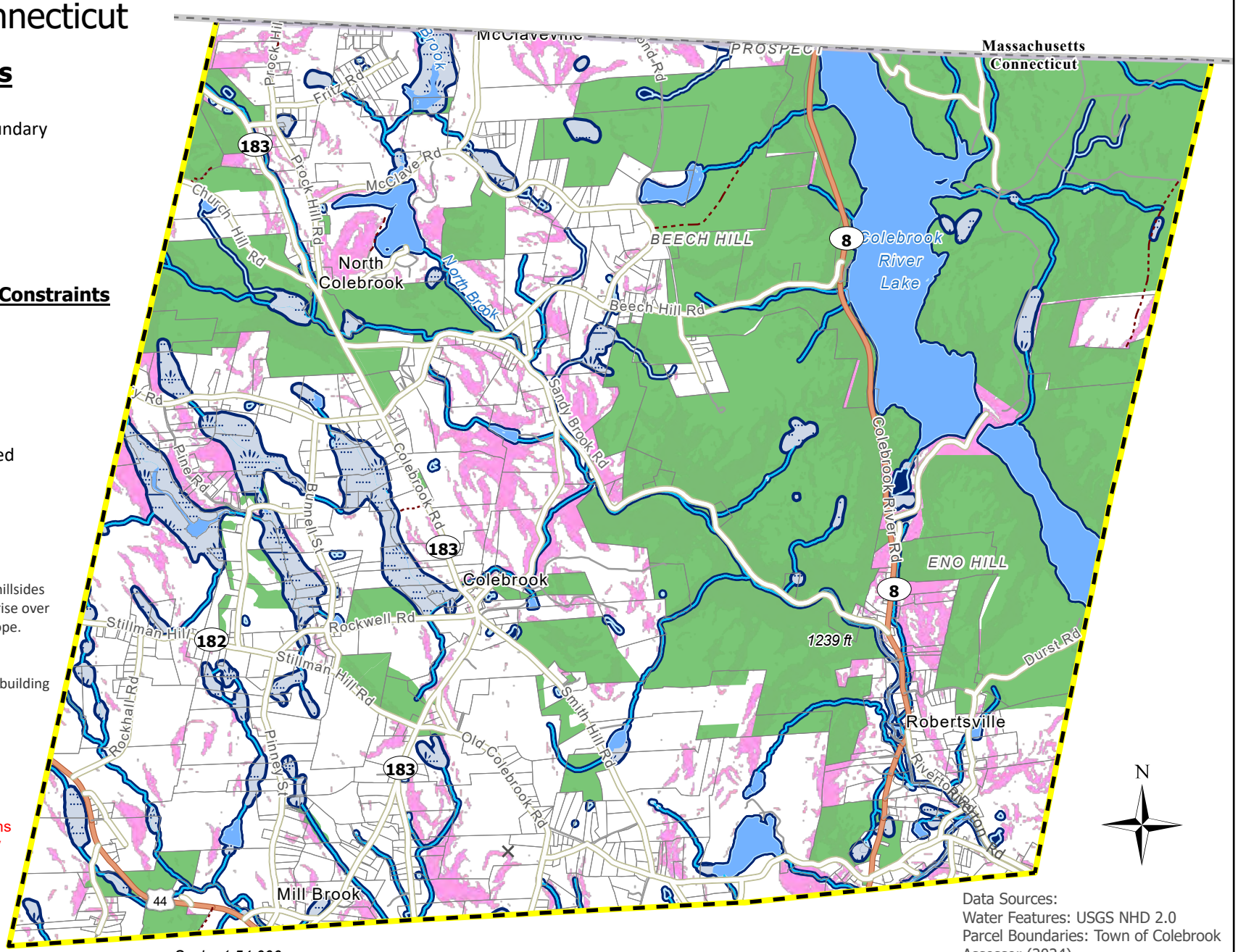
Areas of Development Constraints

- Upland Review Area (100ft)
- Streams/Rivers
- Lake/Pond
- Permanently Protected Land
- Swamp/Marsh
- Steep Slopes*

*Steep slopes are legally defined as hillsides having a 15 foot, or greater, vertical rise over 100 feet of horizontal run, or 15% slope.

They are often undesirable areas for development due to the difficulty of building on steep grades.

Data contained on this map is not intended to accurately reflect actual conditions on the ground. Specific site investigations will be needed to confirm or deny the attributes that are reflected on this map.



Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Data Sources:
Water Features: USGS NHD 2.0
Parcel Boundaries: Town of Colebrook Assessor (2024)
Steep Slopes: Derived from 2016 Connecticut Statewide LiDAR

Map 18: Critical Habitats & Vernal Pools

Colebrook, Connecticut

Map Elements

- Lake/Pond
- Streams/Rivers

Critical Habitat*

- Dry Subacidic Forest

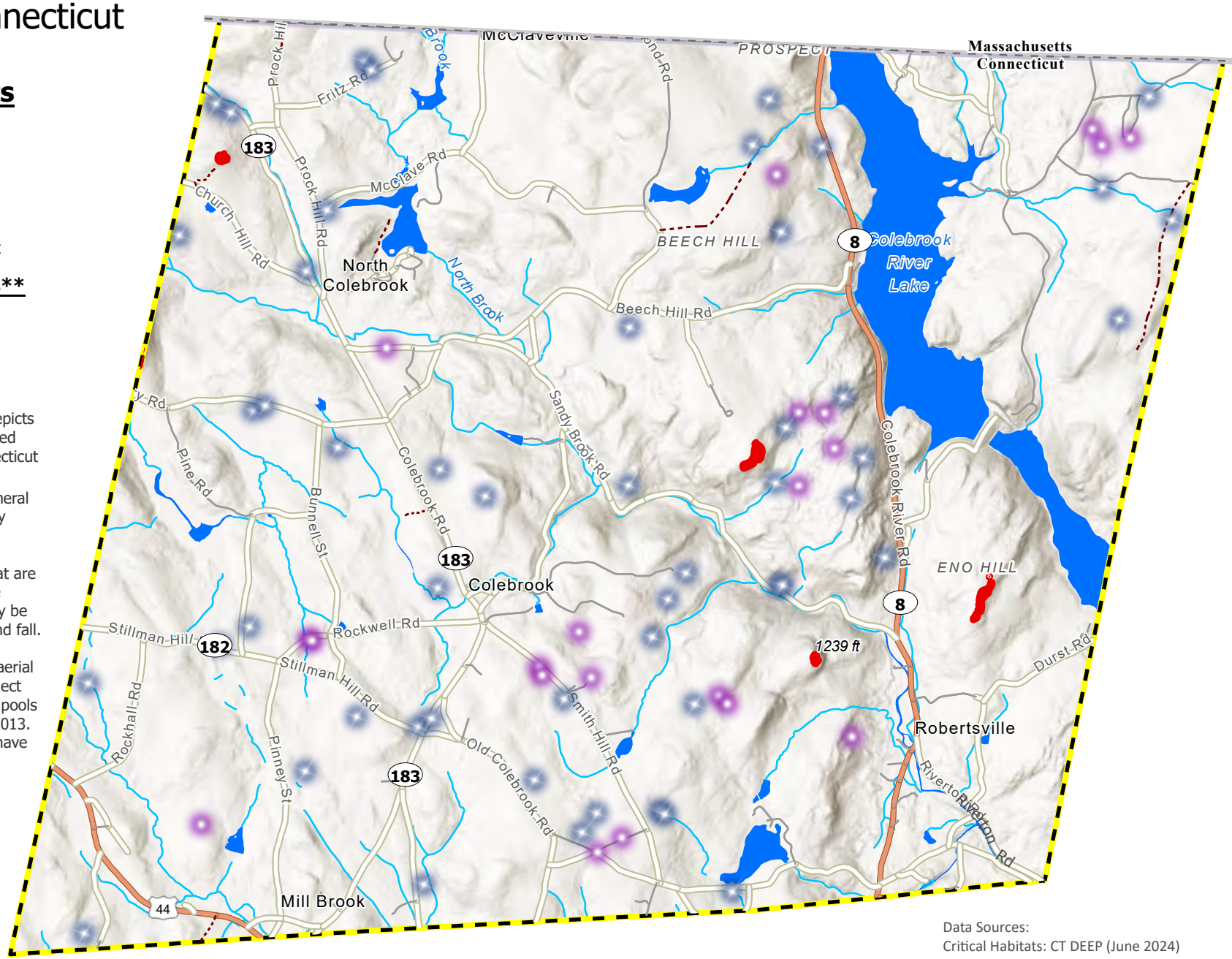
Potential Vernal Pools**

- Confirmed
- Potential

*Connecticut Critical Habitats data depicts the location and distribution of selected Critical Habitats in the state of Connecticut

**Vernal pools, also known as ephemeral pools, autumnal pools, and temporary woodland ponds, are seasonal depressional wetlands, which in the northeast 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.

Potential Vernal Pools: Derived from aerial imagery interpretation through a project funded by FRCC (2011) & Confirmed pools were surveyed By E. Corrigan 2011-2013. Locations are approximate and may have an error of +/- 30ft.



Scale: 1:54,000

0 1 2 Miles

N

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

Data Sources:
Critical Habitats: CT DEEP (June 2024)
Watercourses & Waterbodies: USGS NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)

Map 19: Natural Diversity Database Areas

Colebrook, Connecticut

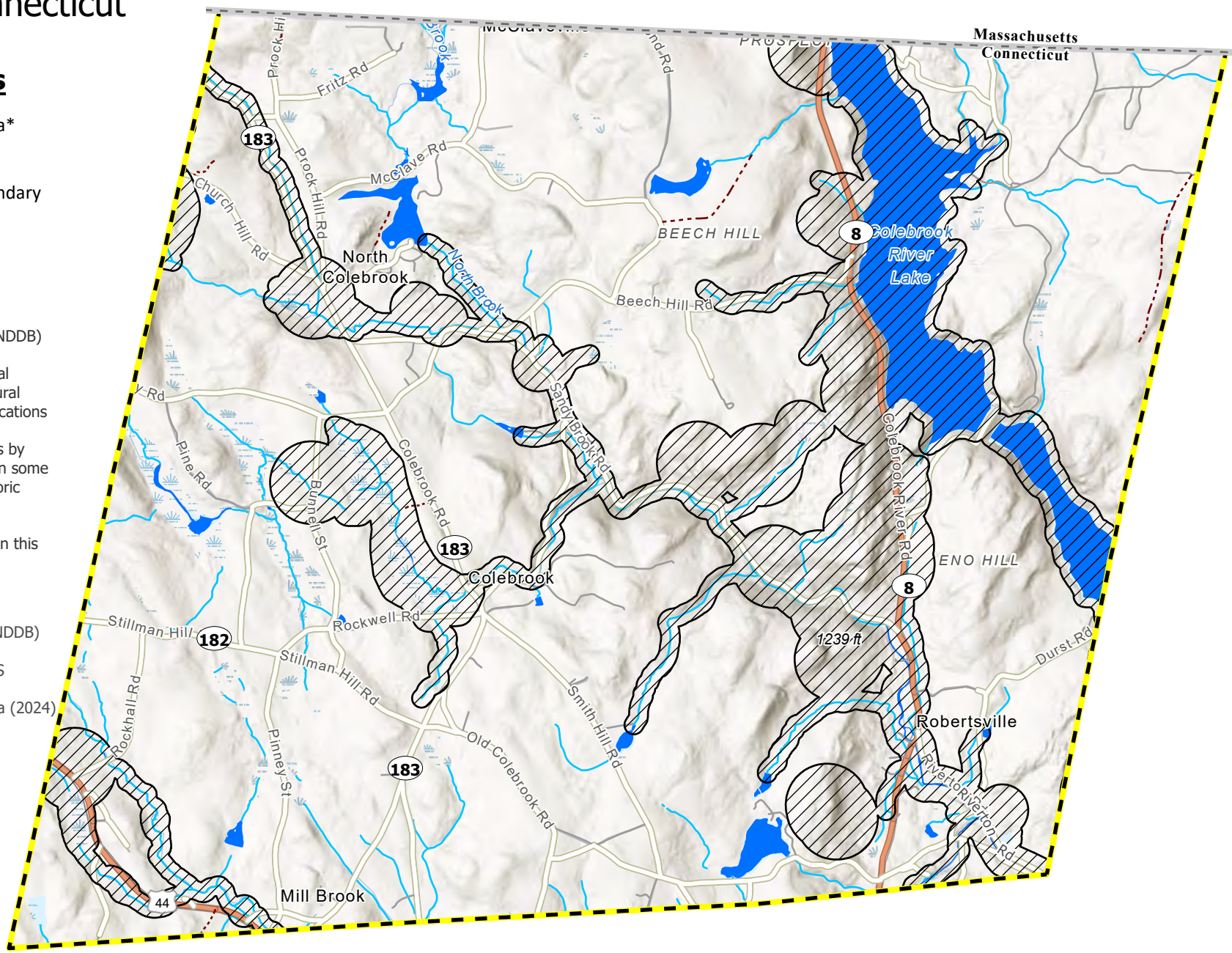
Map Elements

- Natural Diversity Area*
- State Boundary
- Colebrook Town Boundary
- Lake/Pond
- Streams/Rivers

*The Natural Diversity Data Base (NDDB) shows approximate locations of endangered, threatened, and special concern species and important natural communities in Connecticut. The locations shown on the maps are based on information collected over the years by DEEP staff, scientists, and others. In some cases, an occurrence is from a historic record.

Lichens are not presently included in this data.

Data Sources:
Natural Diversity Database Area: (NDDB)
CT DEEP (June 2024)
Watercourses & Waterbodies: USGS
NHD 2.0 (2024)
Roads & Highways: ESRI Road Data (2024)



N

Scale: 1:54,000

0 1 2 Miles

Map Prepared by:
Stacy Deming, GISP
Housatonic Valley Association
Cornwall Bridge, CT
hvatoday.org

COLEBROOK BIODIVERSITY AND LANDSCAPE

New for the 2024 edition of the Natural Resources Inventory, the following section contains information about the town's geology, soils, birds, lichens, moths and butterflies, other insects and their relatives, mammals, amphibians and reptiles, fish and aquatic habitats, plants and historic resources. Inventory lists for most of these follow at the end of this report in an Appendix. However, soils and moths and butterflies each have lists within their reports. Corrections and additions to lists are welcome; the lists should be considered a work in progress.

Two areas recommended for future Natural Resource Inventories are weather and fungi.

Topographic and Geological Resources

Town of Colebrook, Connecticut

Randolph Steinen[1,2]

Introduction

In the nineteenth century the Federal Government established what would become the Geological Survey to map and describe the resources of the country. That survey divided the country into quadrangles of various sizes. The basic topographic and geological mapping was, and still is, done on 7.5 minute quadrangles; portions of four 7.5 minute quadrangles are found in Colebrook (Figure 1).

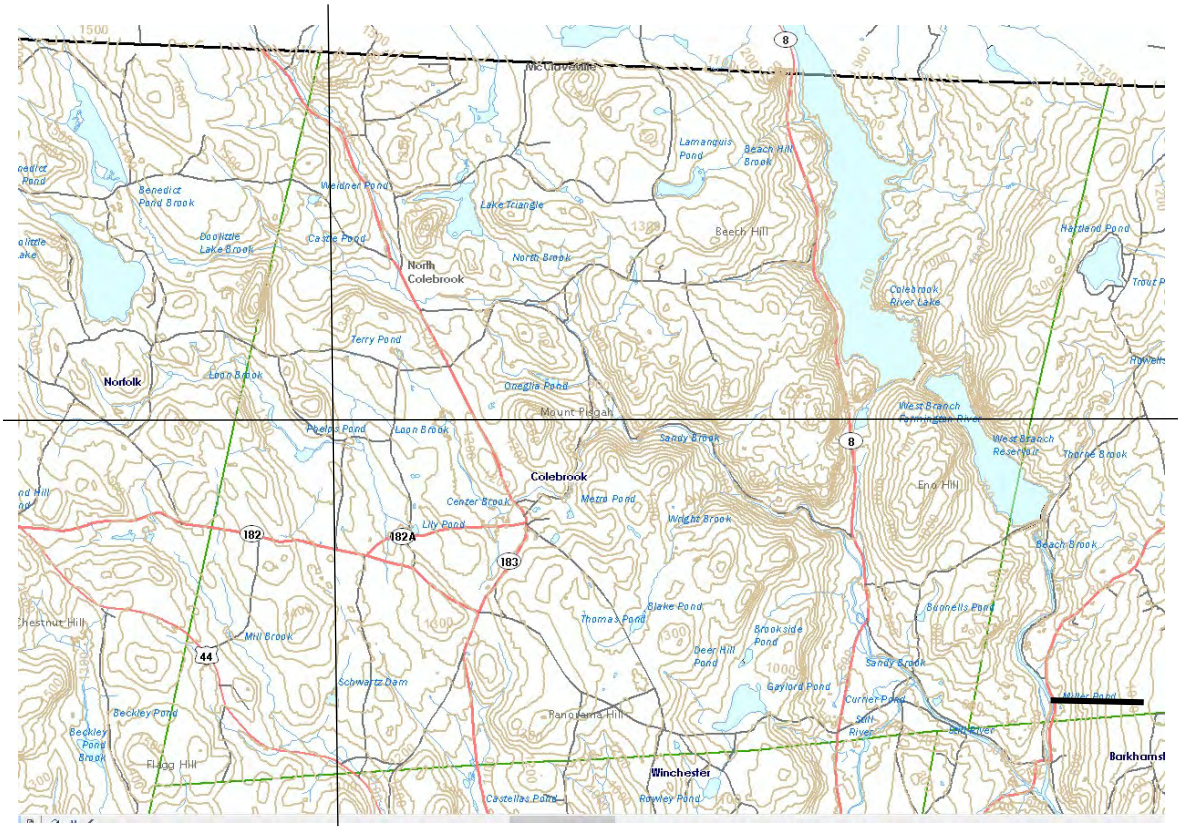


Figure 1. Topographic map of the Town of Colebrook showing the four quadrangle boundaries (north-south and east-west black lines): South Sandisfield quadrangle in the northwest, Norfolk quadrangle in the southwest, Tolland Center quadrangle in the northeast, and Winsted quadrangle in the southwest. Black scale bar is ~1 mile. Contour interval= 50 ft.

1. Volunteer at Connecticut Geological and Natural History Survey, DEEP, Hartford, Connecticut.
2. Field assistance of Riley Flannagan-Brown, Hamden, CT, and Kaliann Magalhaes, CGNHS, DEEP, Hartford, CT. Joyce Hemingson provided a resident's guidance to notable locations. Brad Bremer provided access to his property and recounted some town history to us.

Topography

The topography of the Town of Colebrook is composed of numerous round top hills cut by two steep sided valleys and numerous shallow tributary valleys. The shape of the land surface in Colebrook was greatly affected by the passage of the last Ice Age glacier over the area 20-30,000 years ago. This shape, that is the topography, is graphically illustrated using LiDAR technology, used to make the image below.

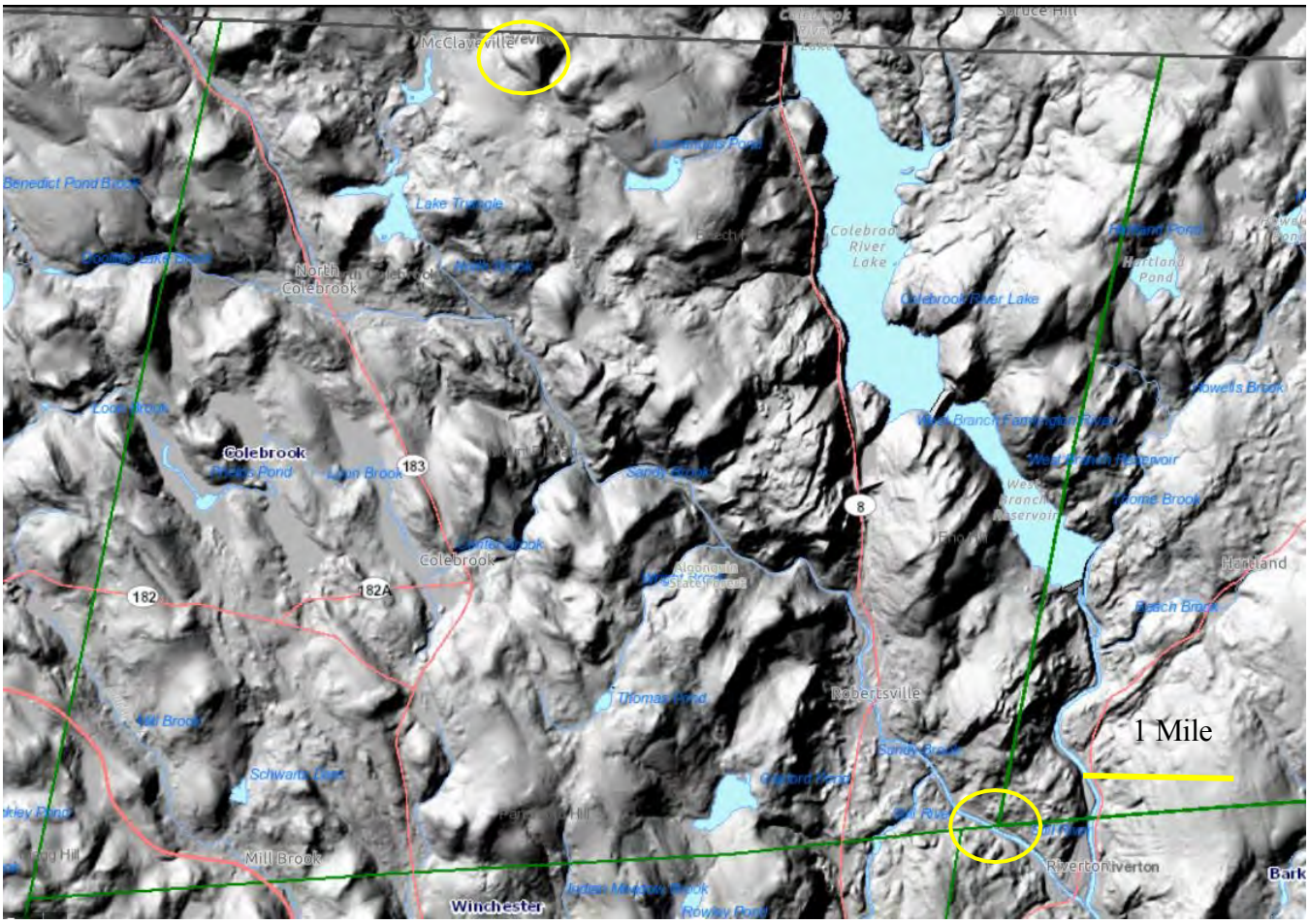


Figure 2. LiDAR digital elevation model of Colebrook. This is an image that looks somewhat similar to what one might expect a black and white picture of the topography to look like, but without the cover of trees (radar sees right through the trees) or buildings (a computer program removes regular geometric shaped reflections). Major roads are shown in red; the town border in green. Yellow circles outline the highest and lowest elevations in the town.

LiDAR, which stands for Light Detection And Ranging, is a remote sensing technology that uses light in the form of a pulsed laser to measure distances (ranges) from a source to a target-object. The light pulses, along with GIS data, in an airborne system, generate precise three-dimensional information about the shape of the earth and its surface characteristics and can be used to produce a variety of maps, one of which (Figure 2) shows the shape of Colebrook's hills and valleys.

The highest elevation in Colebrook, 1566 ft above SL, is a hilltop just east of McClaveville near the northern border of town; the lowest elevation, 506 ft, is along the Still River where it leaves the southeastern corner of town (both are indicated by yellow circles on Figure 2). Total relief (difference between highest and lowest elevation) in Colebrook is 1060 feet.

The topographic grain in Colebrook is dominated by the structure of the bedrock (Figure 3). The resistant bedrock layers in the northeast and central part of town are oriented northeast-southwest and are steeply dipping (tilted) to the northwest and hence they hold up NE-SW ridges

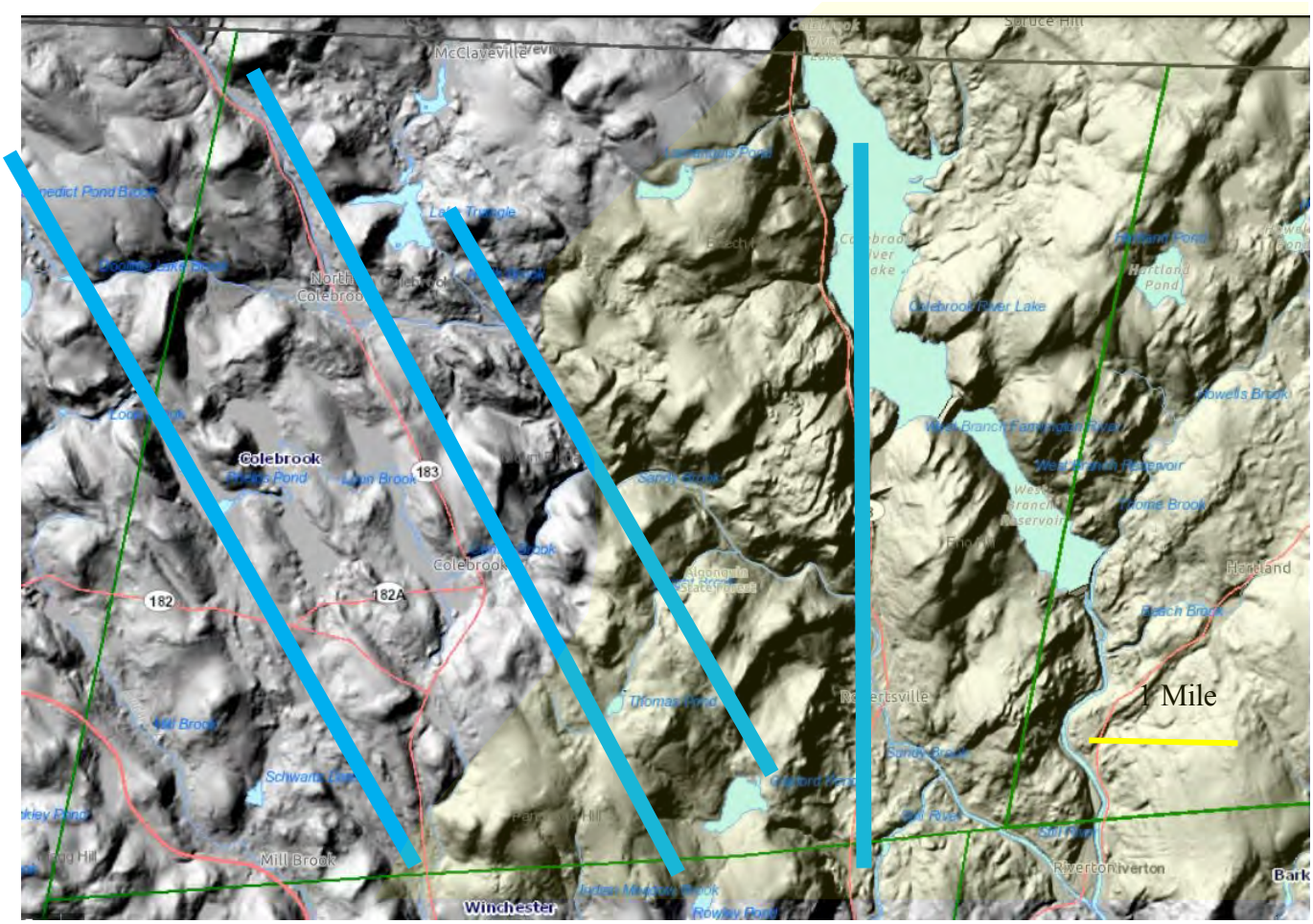


Figure 3. LiDAR DEM image showing area in yellow where topographic grain is dominated by resistant ridges in northeastern part of Colebrook. Blue lines indicate valleys that result from brittle fracturing of the bedrock in the western part of Colebrook.

that are separated by valleys of the same orientation (Figure 3). In the west and west central part of town, brittle faults[3] fractured the bedrock ridges, making them less resistant to erosion. Glaciers eroded those fractured sections more easily; the topographic grain there is controlled by the orientation of those faults and associated fractures. They are oriented northwest-southeast.

3. See discussion in Appendix.

The northern part of Sandy Brook follows the trace of one of those faults. Another major fault is oriented north-south; the Still River flows through the valley formed by glacial erosion of that brittle fault.

The west branch of the Farmington River flows through a deep valley. Its water has been impounded by two dams forming reservoirs in the northeastern corner of Colebrook. The other major drainage in Colebrook is Sandy Brook, which feeds into the Still River in the southeastern corner of town. The Still River flows northward into town and then abruptly turns toward the southeast and flows into the Farmington River about a mile southeast of the town border. Streams in the southwestern part of town flow more-or-less westward into the Still River Basin.

Bedrock geology

Colebrook is located on the southern part of the Berkshire massif, a group of old, complexly deformed metamorphic rocks. The rocks range in age from about 600 million years to about 1.2 billion years and are among the oldest rocks in Connecticut. The older rocks are labelled **Ygh, Ygn, Ygr**, and **Ygs** on the accompanying map (Figure 4). These old rocks formed by convergent plate tectonic processes (see Coleman, 2005) that brought together several relatively small plates containing continental crust to form a super continent around a billion years ago; geologists refer to that supercontinent as Rodinia. When Rodinia broke apart around 600+ million years ago, it formed the eastern edge of the ancient North Amerian continent, which geologists refer to as Laurentia; this became the western shore of an ancient ocean, Iapetus. The Iapetus basin formed by divergent plate tectonic processes east (by todays geography) of Laurentia. The continental margin stretched from northeast to southwest across the northwestern part of present-day Connecticut. The youngest rocks in Colebrook (labelled **Ch**, Hoosac Schist, on the map) were initially formed around 600 million years ago as deposits of sand, silt and mud washed into the Iapetus Ocean on the continental slope of Laurentia. The mud lithified and later was metamorphosed into schist and gneiss seen today. The metamorphism occurred during the Taconic orogenic event (~445 mya) when convergent tectonic processes reoccurred and resulted in large sheets of rock being thrust on top of each other and metamorphosed. Latest geologic research suggests some of the thrusting and metamorphism continued into a later event called the Salinic orogeny (~430 mya).

During the orogeny, the rocks were thrust westward and intricately folded. They were hot and ductile at the time. This has resulted in the geology of this area in Connecticut and Massachusetts being extremely complex and difficult to understand. Rock units have been sheared and tectonically juxtaposed[4].

4. This can be appreciated by viewing the variety of rocks currently being quarried by Mountaintop Trucking at a quarry on Route 8 just south of the Colebrook-Winchester town line. Every variety of rock mapped across the town of Colebrook and described in the coming section can be seen within the confines of the rocks being blasted and processed in that small quarry.

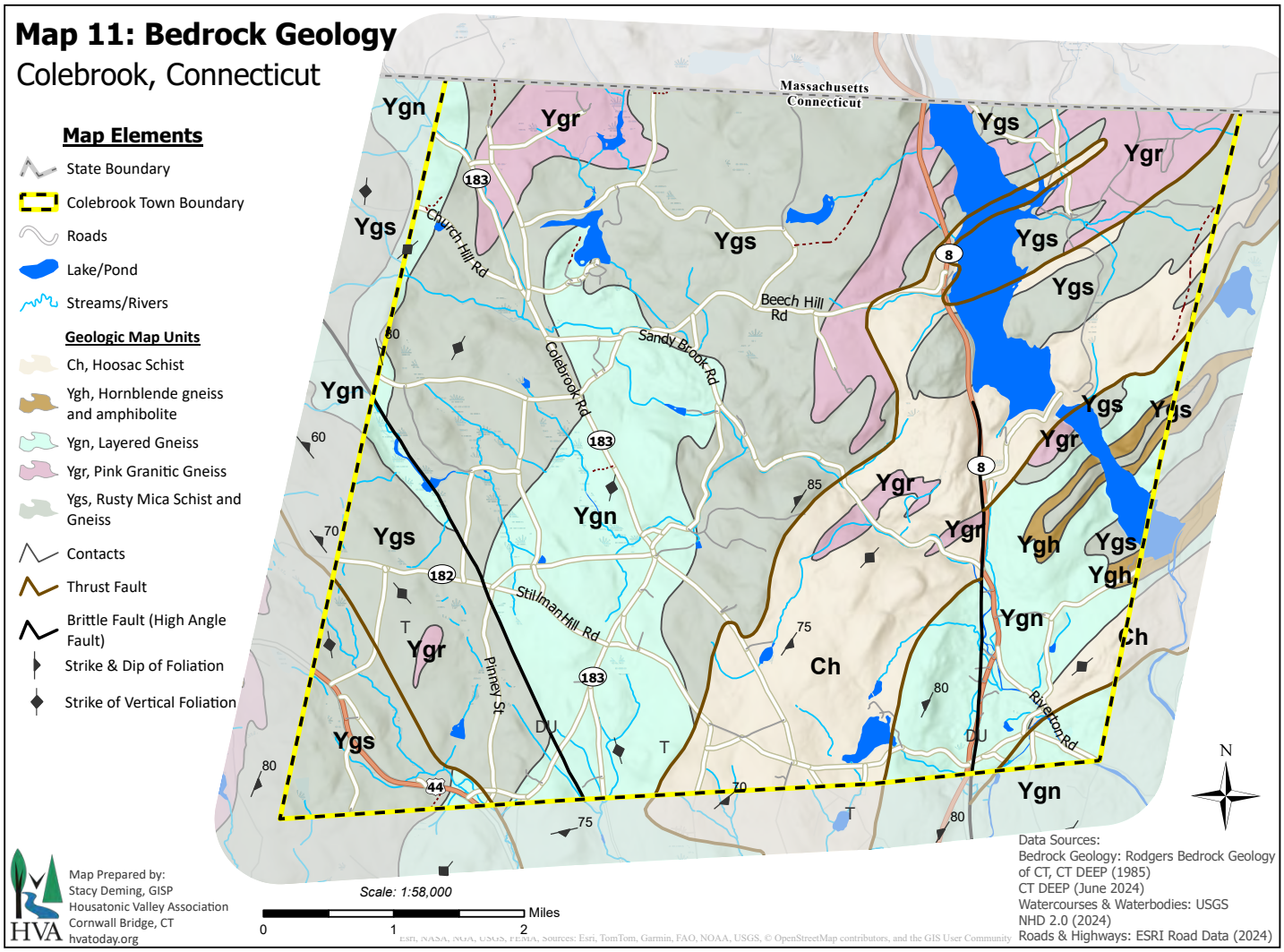


Figure 4. Bedrock geologic map of Colebrook. The map was compiled by Rodgers (1985) from maps by Harwood (1979, South Sandisfield quadrangle, 1979 Norfolk quadrangle, Martin, 1972, Winsted quadrangle), and unpublished data for the Tolland Center quadrangle from Radcliffe and Harwood.

Description of the map units.

Ch: *Hoosac Schist* is labelled "Cambrian(?)" on the Connecticut state geological map compiled by Rodgers in 1985. It has since been determined to be Neo-Proterozoic, originally formed as a sedimentary rock around 600 million years ago and metamorphosed during the Silurian (430 mya; Karabinos and others 2008). It is composed of medium-gray, rusty weathering, fine- to medium-grained schist and poorly layered schistose gneiss. It is composed of quartz, biotite, plagioclase, muscovite mica, and in most places, contains garnet and sillimanite or kyanite. The Hoosac schist underlies a broad swath from the Colebrook River Lake Reservoir through the Kitchel Wilderness Natural Area Preserve and southwestward into the town of Winchester. Outcrops may be seen easily in roadcuts made for the lower part of Beech Hill Road and along the east side of Sandy Brook Road adjacent to the preserve.

Figure 5. Rusty weathering Hoosac schist and gneiss at roadcut outcrops along Beech Hill Road. Lighter layers of the gneisses are dominated by quartz and feldspar and darker layers have increasing amounts of biotite mica, depending on the darkness. Note the layers are folded indicating they were hot enough to be ductile during the orogenic event.

Ygh: Hornblende gneiss and amphibolite. Dark-gray to mottled fine- to medium-grained, massive to foliated amphibolite and gneiss. It is composed of hornblende and plagioclase feldspar, also commonly biotite and minor quartz. It is generally interlayered with banded felsic gneiss. Locally contains calc-silicate rock or calcite marble containing diopsite. Rocks mapped as Hornblende gneiss and amphibolite underlie rather limited areas in Colebrook. On the east side of town underlies a narrow area under Eno Hill and the West Branch Reservoir and another narrow area beneath the Goodwin Dam. It is not well exposed. Rocks of the same composition, however, may be found accessory to the felsic gneisses of the other rock types.

Figure 6. Hornblende gneiss glacial erratic seen on grounds of Norbrook Brewery. Darker minerals are hornblende and biotite. Lighter layers are more felsic. This picture is a glacial erratic found near the observation tower at Norbrook Brewery. Hammer is 16 inches long.

Ygn: Layered gray gneiss. Medium-grained, well-foliated and generally well layered, light and dark, but locally wispy gneiss. It is composed of quartz and plagioclase feldspar with microcline in the light layers and abundant biotite and common hornblende in the dark layers. Garnet and epidote are found locally. Layers and lenses of calc-silicate rock and amphibolite are found in some areas. Layered gray gneiss underlies large areas in the central part of town, the southeastern and the northeastern parts of town. In particular good examples of layered gneiss

are seen along the Deer Hill, the Rockwell, and the western half of the Sandy Brook trails of the Colebrook Land Conservancy.

Figure 7. Wispy layered gray gneiss. Most of the rock is light-gray and composed of plagioclase feldspar and quartz. Thin dark-gray laminations are composed of biotite mica. Notice that the layers are folded and discontinuous attesting to their having been deformed. These two rocks are glacial boulders found trail-side along the Deer Hill Trail in southern Colebrook and crop-out in the cliffs north of the trail. Pencils are about 6" long for scale.

Ygr: Pink granitic gneiss. Light pink to gray, medium-to coarse-grained granitic gneiss that may be foliated but generally is massive or poorly layered. It is composed of quartz, microcline or sodic plagioclase, and either biotite or muscovite or both. Locally amphibole or epidote is found. These granitic rocks underlie two areas, one in the northeastern part of town on the east side of Beech Hill, the other west of McClaveville in the northern part of town. The

Figure 8. Gray to slightly pink granite gneiss along the Rockwell Trail. It is composed of microcline feldspar, quartz and minor muscovite mica. It is poorly foliated. Drill holes on top surface and "feathers" (no wedges were seen) in an adjacent outcrop attest to this rock having been quarried in the past. Quarry activities were not extensive. In part because this is limited (small) outcrop. Indeed, it is a large glacial erratic (evidence for this is that the orientation of the foliation in this rock is at odds with outcrops of bedrock on adjacent hillsides). Surrounding outcrops off the trail are composed of amphibolite gneiss. Drill holes are about 4" deep.

quarried granite seen on the Rockwell Trail is a glacial erratic likely derived from west of McClaveville.

Ygs: Rusty mica schist and gneiss. Dark-gray, rusty weathering, well-foliated and well to poorly layered schist and gneiss. It is composed of quartz, plagioclase, biotite, muscovite, sillimanite and locally garnet. Layers of feldspathic quartzite and garnetiferous amphibolite are locally found. Rusty weathering rocks appear to underlie the largest area in town. They may be seen on the Norbrook Brewery trails. The northern part of Sandy Brook flows over rusty weathering gneiss.

Figure 9. Rusty weathering gneiss seen along trails at Norbrook Brewery area in western part of Colebrook. Image on right is low outcrop but picture on left is a small glacial boulder. Lighter layers are more felsic (composed of feldspar and quartz), darker rusty weathering layers contain more biotite mica.

Quaternary Geology

The most recent geologic events we can interpret occurred during the past few tens of thousand years as a result of the last Ice Age. 25,000 years ago this part of the world was in the grips of an Ice Age, as were parts of Europe and Asia. A polar ice cap formed and spread southward as far as Long Island in eastern North America. During the height of the glacial age ice was more than a mile thick in Colebrook. Glacial ice flows (it actually slowly moves) from areas where it accumulates (excess winter snow-fall) resulting in thicker ice, toward areas where the ice is thinner because of summer melting. In mountain valleys, glacial ice flows downhill. Ice flow was toward the south-southeast in the Colebrook area. As you might imagine flowing ice a mile thick is a powerful agent of erosion. It scrapes soil from the bedrock (ledge) over which it slowly moves and abrades the rock below. The glacier freezes around chunks of rock, pulling them into the flow and using them as gouging (and grinding) tools. Flowing glacial ice grinds up rock along the way, producing a poorly sorted mixture of mud, sand, and gravel (even cobbles and boulders). In some places this glacial debris, which we call till, was plastered onto the rock under the moving glacier. In other places, till was only deposited as a soil mixture left behind when the glacier melted. Thus, as the glacier moves along it 1). erodes the land, and in the process sculpts the land, 2). grinds up the rock it erodes, forming glacial till, and 3). deposits

till in some places beneath the ice as it slowly moves along and in most places as debris left behind when the glacial ice melted.

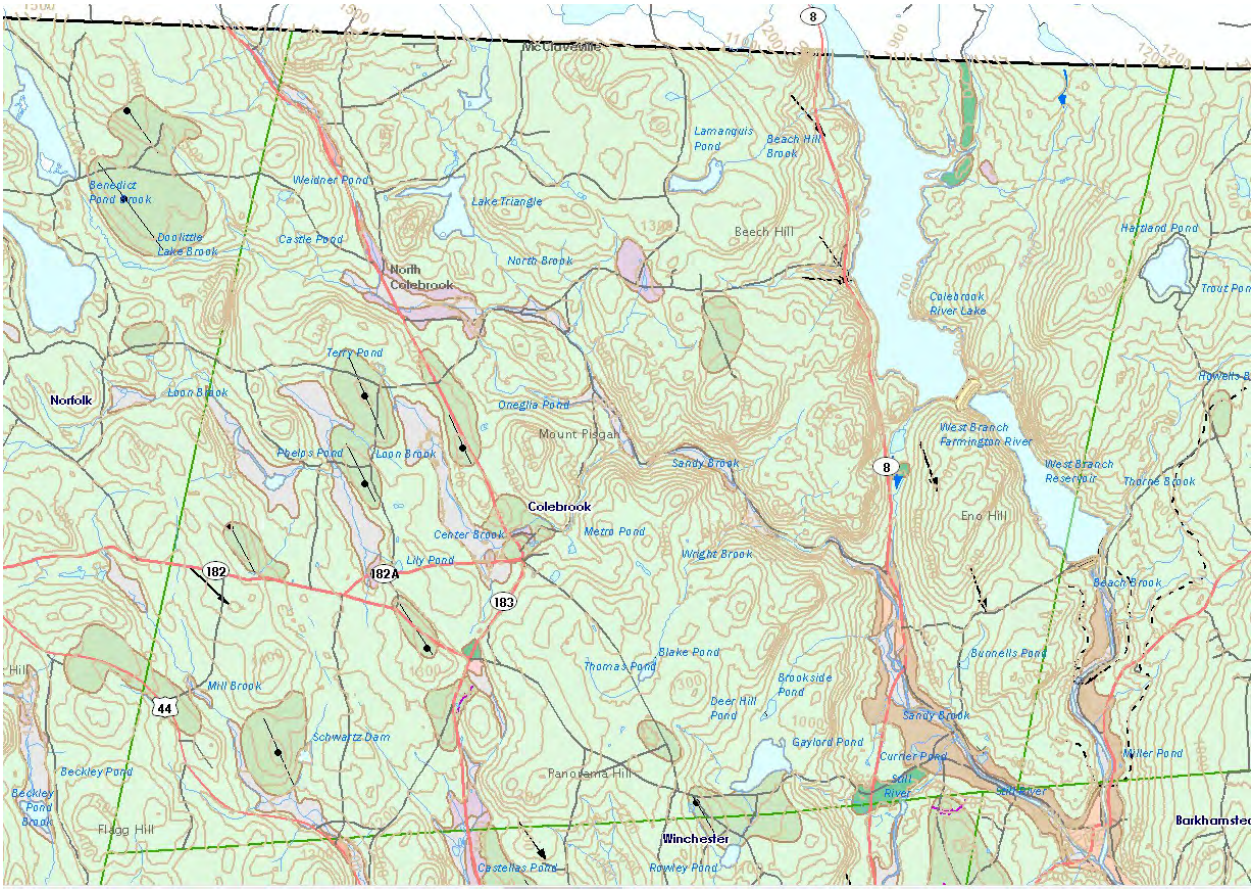


Figure 10. Quaternary map of Colebrook. Light green area covered by thin till deposits (glacial soil, usually several feet thick); dark green areas covered with thick till (>15 ft thick). Purple, brown and beige designate areas of sand and gravel deposited by glacial meltwater streams. Arrows indicate glacial striations and record the direction of ice movement. Lines with a dot map the axis of drumlins, which also record ice movement. Dashed lines are mapped southern edges of the ice sheet as it melted. Compiled by Stone and others, (2005) from data contained in Warren 1970, 1970, 1978, Warren and Harwood, 1978, and Harwood, 1979b.

Glacial Till. Glacial till is poorly sorted debris left behind by glacial ice when it melted from 17,000 to 15,000 years ago. It is composed of a mixture of mud, sand, and gravel and may include cobbles and boulders. Sand and pebbles generally are angular to subangular whereas cobbles and boulders may be angular to rounded. Till may be deposited under the still moving glacier in which case it is generally compact. This till is called lodgement till. In some places it is so compact that it is nearly impermeable to water. Impermeable till may be referred to as hard-pan locally. Most till, called melt-out or ablation till, is deposited when the ice melts and leaves all the debris behind. Melt-out till is generally sandy and well drained. Till thickness is quite variable. In some places it may be tens of feet thick. But in most places, bedrock is encountered within 15 feet. Thick till, in some places is composed of till deposited at two different times. The lower, older, till is usually compact till (and therefore poorly drained) and has a weathering or soil surface. The older till was probably deposited several tens of thousands

of years ago, possibly 150,000 kya. We say probably because suitable material with which to obtain an absolute date is lacking. Most drumlins have a core of older till and a relatively thin veneer of young till (see next section).

Figure 11. Glacial till. Note mixture of cobbles and sand and mud. Cobbles are angular to rounded. Height of excavation on left is about 6 ft. Pencil on image on right is about 6 in. (These images were not taken in Colebrook.)

Drumlins. Drumlins are oval shaped hills that were deposited (formed) under a moving (active) glacier. They are composed of till greater than 15 ft in thickness. They are elongate in the direction that the ice moved. Drumlins, as mapped in Connecticut (Stone and others, 2005) consist of thick piles of glacial till that contain distinct deposits of two different ages. Similar sculpted oval hills that are not covered by thick till are referred to as drumlin-shaped (drumlinoid by some authors) hills (see Figure 12 below). Drumlins in Colebrook are scattered, mostly on the southwestern side of town.

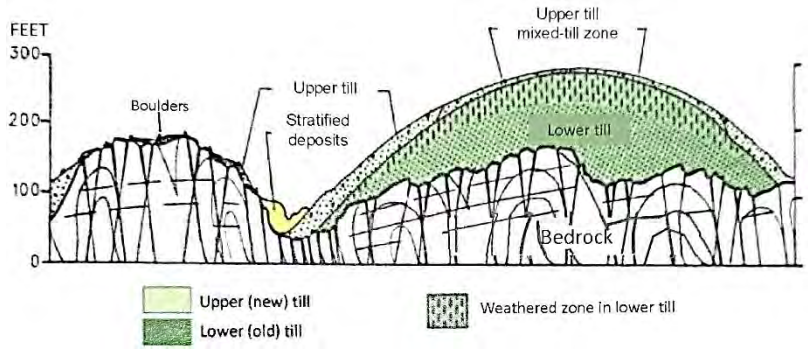


Figure 12. Idealized cross section of drumlin (right) and drumlin-shaped hill (left). This figure is reproduced from Stone, 2013.

Figure 13. Picture on left of drumlin on Stillman Hill Road about a quarter mile west of Route 183, looking east toward residence. Note smooth rounded shape of hill top which was sculpted by moving ice. Drumlin has steeper north facing slope on other side of road. Drumlin tops form preferred farming locations because of their smooth contours and gentle slopes. Picture on right is view of same drumlin from Old Colebrook Road east of its intersection with Colebrook Road (CT-Route 183). This drumlin is oriented NW-SE from which we interpret the ice movement was toward the southeast. See also Picture in Appendix of nearby drumlin (Figure A-8).

Glacial Boulders and Glacial Erratics. Two boulders at trail fork (divide/split) on the Deer Hill Trail (Figure 14) are both glacial boulders, not glacial erratics. The difference in terminology is a subtly that only geologists adhere to: A glacial boulder is a large rock of a given composition, transported a variable distance by the glacier, and deposited, when the ice melted, on ground overlying bedrock (ledge) of the same composition. A glacial erratic is a boulder of a given composition, transported by the glacier and left atop bedrock of a different composition (perhaps under several feet of glacial soil) when the ice melted. Although we have not dug

Figure 14. Glacial boulders on Deer Hill Trail. Image on left shows fork at the beginning of the trail loop showing two large boulders. Image on right is closer look at boulder on right. It is composed of felsic gneiss and pegmatite. (Pegmatite is a coarse-grained rock that occurs in veins and irregular areas in a rock. Pegmatites crystallize from hot solutions or from magma and is younger than the rest of the rocks into which it intruded). The bedrock below the glacial soils here is the same composition as the boulders and thus this is a glacial boulder. See additional pictures of boulders in Appendix.

through the soil to verify the composition of the ledge on the Deer Hill Trail, bedrock in the greater area is composed of similar rocks and hence we refer to these boulders as glacial boulders.

Figure 15. Glacial erratics. Left image is an erratic seen in field near lookout tower on property of the Norwood Brewery in western Colebrook. This rock is composed of hornblende gneiss (Ygh) but the rock underlying the Norbrook property is rusty weathering schist and gneiss (Ygs). The nearest area with hornblende gneiss is many miles north of the Norbrook Brewery in Massachusetts. Image on right is small boulder of Dalton Quartzite seen along the Sandy Brook Trail. The underlying rocks at this location are rusty weathering schist and gneiss (Ygs). The closest outcrops of Dalton Quartzite are several miles northwest in Massachusetts (Radcliffe and Aleinikoff, 2008, Fig. 3).

Sand and Gravel. Meltwater streams transport sand and gravel away from the melting end (edge) of the glacier during the end of the ice age. These streams also deposited the sand and gravel at various locations, mostly in the valley-bottoms in Colebrook. Sand and gravel deposits may be found on hilltops or hillsides (Figure 16) if streams flowed at appropriate

Figure 16. Picture of gravel bank in on an upper valley setting at the Mountaintop Trucking quarry immediately south of the Colebrook-Winchester town border. Bedding between sand and cobble layers is visible indicating that stream flow was of low to medium velocity.
Stream from which the sand and gravel were deposited flowed against the upper valley wall constrained by stagnant ice that had not melted on the valley floor. Valley bottom sand deposits are found in several locations in Colebrook (see Figure 10).

velocities (i.e. not too fast) in cracks and crevasses within or against a stagnant portion of the glacier. In Colebrook we have identified areas of cobbles and boulders that were deposited in upland areas, but to date, no sand or gravel banks. Deposits in the river valleys usually are deltaic into sediment dammed ponds in the valley bottom. These deposits are usually deposited sequentially going up stream as the glacial ice melts out of the valley bottom. Such gravel banks can be found in the Farmington River, Still River and Sandy Brook valleys.

Figure 17. Elevated terrace along Sandy Brook. Image on left shows two terraces. The lower is the present flood plain. The other is related to stream deposition during the deglaciation. Image on right shows elevated terrace, approximately 25 ft above modern flood plain. In the past, sand and gravel from a terrace at the same elevation on the other side of the river was mined by the Town of Colebrook at the town garage parcel on Sandy Brook Road.

In some places deposits of cobbles and boulders appear to be out of place and were deposited where found because ice constrained the streams which transported them.
A narrow, shallow stream valley is encountered on the Deer Hill Trail just before the trail bends around to the north (when travelling the trail in a clockwise direction). The stream runs rather straight and is lined with rounded, moss-covered cobbles and small boulders, typical of what one

Figure 18. Bottom of stream with limited catchment basin (water shed). Stream bottom is lined with cobbles larger than any possible flow could move. Higher flow volumes and velocities must have existed to transport these cobbles.

finds in rivers of a larger size. The boulders and cobbles are confined to the specific area within the stream belt, along the bottom.

Examination of a topographic map shows that the stream's current watershed (drainage basin) is not large enough to collect water in sufficient volume to move the boulders now in the stream bed. In addition, if it were, it would overflow the channel banks and cobbles and boulders would be left outside the area where they are found. This suggests that the sides of the river had barriers that confined water to flow in a narrow channel.

We suggest that at the end of the last Ice Age, when the glaciers were rapidly melting, during the summer months anyway, that large cracks or crevasses developed in the ice that captured meltwater from the surface of the glacier and sent it cascading down through the crack at velocity great enough to move the boulders. The crack was only as wide as the boulder covered stream bottom. The ice walls of the crevasse kept the boulders from access to the adjacent banks now exposed. Flow through this particular crevasse was short-lived before a larger stream on the glacier surface or another crack captured the stream flow.

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APPENDIX

Brittle faults and fractures. All of the rocks in Colebrook have been involved in at least two orogenic (mountain-building) events. Orogenic events are caused by several mechanisms: the event that formed and/or metamorphosed the rocks in the Berkshire massif occurred when earth's continental crust on one plate collides with crust of another plate during convergence of the plates. When this occurs, crust on one plate gets shoved under or on top of crust of the other plate. Either way, rocks of the crust of both plates get deformed. Some get broken up and erode. Some get hot and are squeezed. When they get hot they become soft and ductile and the layers within the crust get folded. When the rock becomes hot parts of it (felsic minerals in particular) may start dissolving into hot fluids leaving behind biotite mica which act as shear zones to accommodate the stress. Then large sheets of hot rock can slide around on top of other large sheets of rock forming thrust faults along the shear zones. Over time, the hot rocks cool when the rock above them (which acted as a layer of insulation) gets worn away. When they cool they become brittle.

When Iapetus Ocean formed, the Laurentian seaboard was broad similar to the current eastern seaboard of North America. But because it was located in the tropics, instead of a sandy coastal plain and beaches, there was a barrier reef and lagoon where carbonate sediments formed limestones. Far offshore thick layers of sand and mud were deposited on the continental slope (these would become the Hoosic schist). Those mud layers would become lithified to form rock such as shale. When the tectonics changed and the plates began to converge, sheets of rock were thrust over the shale, the rocks became hotter, and metamorphism began; the shale layers were converted to schist and gneiss. Eventually the convergence became so extreme that the layers under the Hoosic were sheared off and with the Hoosic schist were thrust westward on top of the carbonate sediments (which by this time had been metamorphosed to marble). Today those layers form the marble valleys west of Colebrook.

Notable boulders in town

Figure A-1. Glacial boulder at corner of Sandy Brook and Colebrook Roads. Boulder is composed of gray granitic gneiss and was probably derived from areas of gray gneiss some distance away. Although local bedrock at this location is layered gray-gneiss this boulder is well rounded, which suggests it has been transported some distance by the glacier and possibly ground against the ledge over which the ice travelled along the way. This boulder weighs in excess of 750,000 pounds. Near edge of boulder was broken to provide space when the Rock School House was moved to accommodate widening of the highway. Photograph by K.Magalhaes, DEEP.

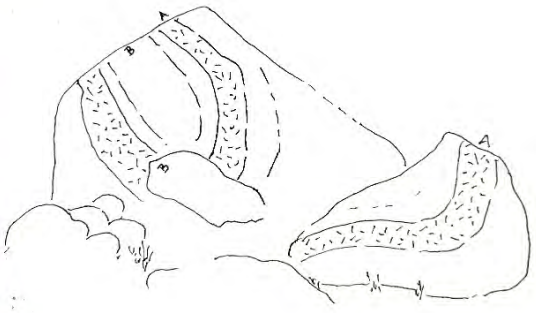


Figure A-2. Image of south side of boulder and a sketch showing the layered structure of the rock. Layers of the rock are composed of two distinct lithologies; weakly foliated gray granitic gneiss and a non-foliated granitic pegmatite (layer with stipple). The granitic gneiss is composed of fine-grained feldspar, quartz and biotite mica. The pegmatite is composed of coarse-grained microcline feldspar and quartz. It is likely that a small amount of muscovite mica is also found in the pegmatite. Note the layers have been folded into a syncline (as the rock currently sits). It appears that large chunks of the boulder broke off after the ice deposited the boulder: A and B on the fragments were probably attached to A and B of the boulder.

Boulders at Sandy Brook Trail

The Sandy Brook Trail traverses are area of boulders twice: once along the eastern part of the trail loop and also on the western portion of the trail (see Figures 19 and 20). Large and small boulders are found in a swath indicated by the blue area on Figure 19. Boulders are relatively rare outside the swath shown on the map. The boulders are composed of locally derived amphibolite and felsic gneiss, both of which are found in the local rocks underlying

the soil. The boulders range in size up to 15 feet. Because they are arrayed in a linear fashion we suggest these boulders may mark the edge of the ice for a time during the melting process. This could be referred to as a recessional moraine.

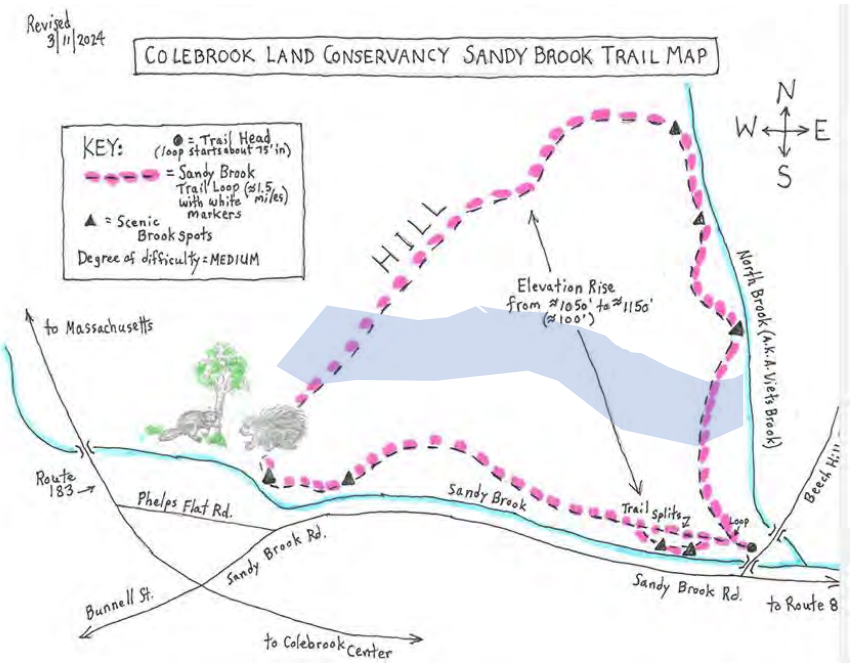


Figure A-3. Map of the Sandy Brook Trail showing in blue the area in which boulders are concentrated. Because the boulder field appears to be linear we suggest that it may be a moraine that was deposited at the southern end of the ice age glacier as it melted back.

Figure A-4. Boulder field as seen along two segments of the Sandy Brook Trail. Image on left looks northwest from the western portion of the trail. Boulders in this image are about 8 feet in maximum diameter. Image on right looks southwest along the eastern segment of the trail. Boulders seen here are about 15 feet long.

Boulders along Smith Hill Road

Figure A-5. Boulders in hay-fields along Smith Hill Road. Picture on left is east of the town elementary school and the one on the right is near the intersection of Smith Hill and Bricklemaier Roads. Both are not as grand a size as the boulder at Sandy Brook Road intersection (Figure A-1) or as large as those along the possible recessional moraine along the Sandy Brook Trail (Figure A-4). Nonetheless, they stand out because farming activities took place around them in spite of their hindrance.

Glacial erratic boulders at the Colebrook Pond in town recreation area

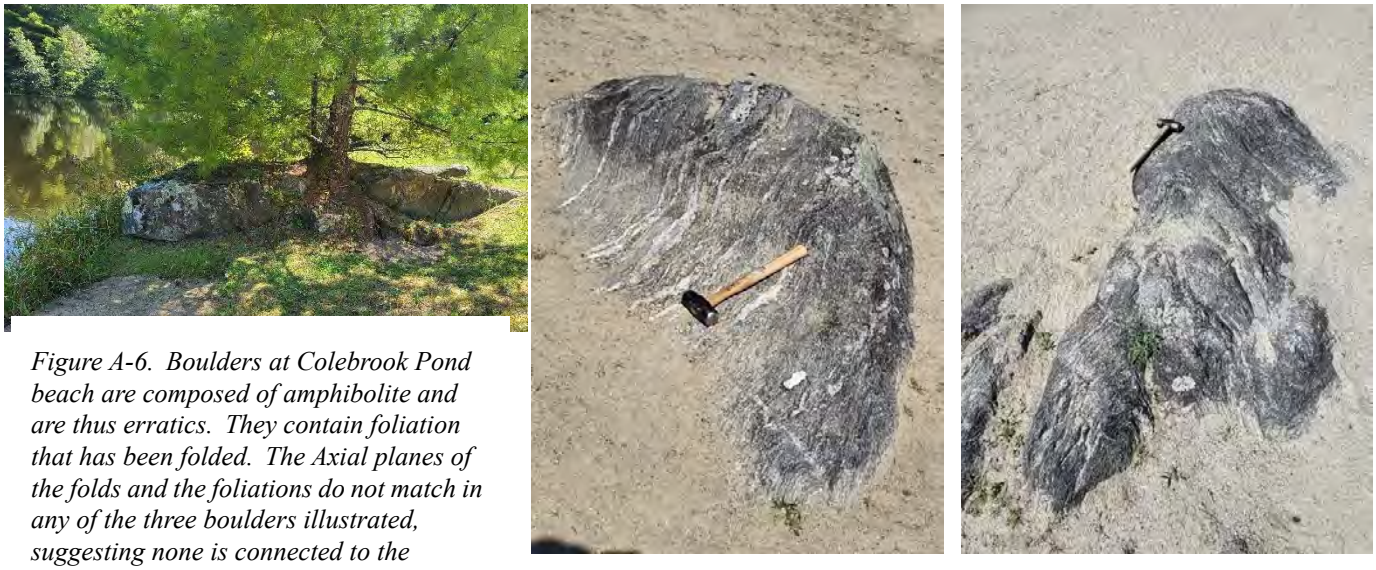


Figure A-6. Boulders at Colebrook Pond beach are composed of amphibolite and are thus erratics. They contain foliation that has been folded. The Axial planes of the folds and the foliations do not match in any of the three boulders illustrated, suggesting none is connected to the underlying ledge.

Boulders on talus slopes at Deer Hill Trail

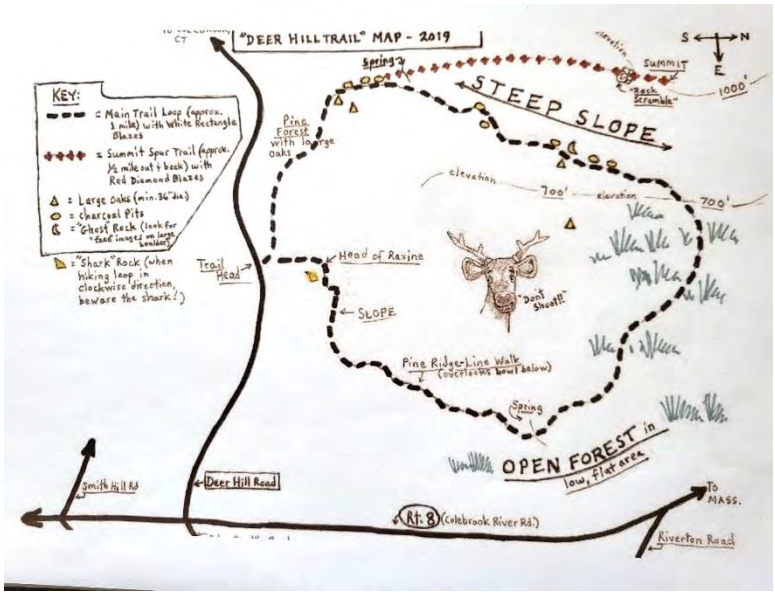


Figure A-7. The Deer Hill Trail traverses the side of hill and then goes down into a deep ravine (located at "Steep Slope" on map) and then comes back to street level near trailhead. An off-shoot to the trail traverses up to the summit of Deer Hill. To the south of the Deer Hill ridge are steep slopes and cliff faces.

The glacier coming over the cliff faces freezes into fractures at the top of the cliff and is thus able to pull large chunks of rock off the cliff face, to accumulate on the slope below. After all the glacial ice melted broken fragments of the cliff face continue to fall and litter the slope below. A slope littered with broken stone at the base of a cliff is referred to as talus or in some places, scree. Picture on left is large block broken from the cliff face above. Picture on right below is talus slope.

Additional drumlin photograph

Figure A-8. View of another drumlin located southwest from the Stillman Hill drumlin, as seen from top of the Stillman Hill Road drumlin shown in Figure 13. This drumlin is located northwest of the intersection of Pinney Street with Winsted-Norfolk Road (U.S. 44) and exhibits the same smooth rounded top. This drumlin is oriented NW-SE, the same as the Stillman Hill drumlin.

Groundwater

Domestic water supply for most rural Connecticut homes and businesses is supplied by on-site water wells. The wells are dug or drilled into soil or rock until underground source of water is accessed. That underground water is referred to as groundwater. It is rain water and snow melt that soaks into the pore-space (tiny spaces between sand grains) in soil and into fractures and any irregular holes in the underlying bedrock. Gravity pulls water slowly downward through the soil and fractures until the pores are completely filled (saturated). The depth at which the pores are completely saturated is called the water table. The water table more or less follows the topography and has a elevation that is higher in the hills and lower in the valleys. Saturated water continues to flow from areas where the water table has a high elevation toward areas where the water table has a low elevation. There are some places where the water table elevation is greater than the elevation of the ground surface. Those sites are the places where rivers, lakes, ponds and springs are found.

Because much of Colebrook has shallow soils, water wells could not be dug in many locations, and that may have restricted early settlement. However, a number of springs occur around town. The Rockwell Spring near the center is a well-known example. It supplied water to quite a few properties once a means of distribution could be built.

If you have ever been swimming in a pond or lake you know there are areas where the water is slightly cooler; those slightly colder areas are locations of subaqueous springs. Similar areas occur in rivers: fishermen know that's were the trout hang-out during warmer weather.

The advent of mechanical well drilling allows domestic water supplies to be developed almost anywhere. Fractures are viable sources for water to seep into a borehole. The more fractures generally results in more water. In that respect, the areas affected by brittle faulting (see Figure 3) tend to be areas where water wells produce more water. Lithostatic pressure tends to close fractures at depths greater than 300-350 feet. Wells drilled deeper than that usually are done so to provide an inground reservoir of water for times when water demand is greater than the rate at which water seeps into the borehole.

Glacial till and bedrock are readily seen along the sides of Colebrook River Lake Reservoir when the water level is low.

Miles of stone walls silently testify to the labor it took to clear land for agriculture. A New York City friend visiting Nancy Blum once quipped that she "loved coming to Colebrook to see the cows out in the fields eating rocks."

SOILS IN COLEBROOK — Cynthia Rabinowitz, Northwest Conservation District, Torrington, CT

Before the end of the last ice age, 12,000 to 14,000 years ago, there was no soil in Connecticut. When the mile-high glacier started to recede (it took a long time) the earth's surface slowly became exposed to the elements and soil formation started.

Soil takes a very long time to form. Consider that the parent material, previously embedded inside a gigantic glacier, comprises rocks, boulders, and scraped unsorted and sorted smaller material. Some of the material fell out underneath melting glaciers in a big heap that created drumlins (rounded hills) that can be seen in Colebrook and other Connecticut hilly areas. The rocky debris varied from a few inches deep to hundreds of feet deep. Soil forms at the surface of the parent material—at the interface of the parent material and the air above.

Drumlins are often used for farming. Many corn and hay fields, as well as orchards and livestock farms are on drumlins. This material is known as glacial till and has rocks of different sizes, usually angular and irregular in shape. It is an unstratified, heterogeneous mixture of mineral material with varying amounts of sand, silt and clay along with angular-shaped gravel, cobbles, stones and boulders that were deposited by the ice with little or no water transportation. Till ranges from very friable melt-out types to extremely firm and dense lodgement types.

Other material was carried forward from the southernmost face of melting glaciers in meltwater. This material is known as glacial outwash or glaciofluvial material and comprises rocks and cobbles washed and smoothed by the meltwater.

Glaciolacustrine deposits, alluvium, loess and organic deposits are other types of parent materials in which soils in Colebrook have formed.

Over the thousands of years since the end of the ice age, forces of weathering proceeded continuously, but slowly, acting on rock surfaces. Rain, snow, hail, wind, freeze-thaw cycles, primitive plants (e.g.. lichens), and microorganisms all degrade rocks into smaller and smaller fragments. Eventually, over the eons, small mineral particles form and the upper surface of Planet Earth becomes soil.
These mineral particles fall into three size categories:

- Sand, the largest soil particle ranges from 2.0mm to 0.6mm
- Silt particles are smaller than sand and range from 0.6mm to 0.002mm
- Clay is the smallest particle and is smaller than 0.002mm.

Although the 12,000 years of soil formation in Connecticut seems like a long time, in geological terms, it is a blink of an eye. Soils in Colebrook, and throughout Connecticut are considered "young soils". They are generally shallow to the undifferentiated parent material lower down in the earth. For example, some of Colebrook's soil may be only a foot to bedrock, or 20 inches to glacial till. Depths vary from location to location but the fertile

topsoil and underlying subsoil is generally considered shallow when compared to other locations such as the Great Plains of North America where prairie soils are deep in comparison despite the loss of soil through erosion.

Soil is a living entity and is always evolving, but at a pace we humans cannot see. Human activities, like land development, or other types of disturbances, can degrade soil quality, as can environmental factors such as floods, fires, and agriculture (tilling and grazing). While these circumstances may radically affect soil health for the long term. Some degradations are more easily reversed.

Although it takes an average of 500 years for an inch of new soil to develop in Colebrook's climate (Hollis soils take 1,000 years), it can be completely degraded in only a couple of minutes. (Town of Norfolk, Natural Resources Inventory).

Humans generally think of soil as an inert body of material, sometimes referring to it as "dirt". In fact, soil is a rich ecosystem full of life from the smallest bacteria to large animals like worms, insects and rodents. The soil with its living inhabitants make up the Soil Food Web (SFW). The SFW connects the carbohydrates created by photosynthesis in plants with animal life underground, and eventually to higher animals including humans. It is safe to say that without soil and plants, anchored and growing in the soil, there would be no life on earth that includes humans.

The soils of Colebrook have been described mainly using their parent materials, their textures, and how well drained they are. Soil scientists have been collecting and describing these data, along with site information, for many years. Both field and laboratory data are used to classify and map soils to produce a comprehensive soil survey. Areas with similar soils are grouped and labeled as soil series because their similar origins and properties cause the soils to perform similarly for land use purposes.

A soil series name sometimes is derived from a town or landmark in or near the area where the soil was first recognized. Some soils series are found in numerous towns in Connecticut and the name may or may not refer to a specific feature of Colebrook. One example of the latter is the Paxton soil, which formed in glacial till and is found widely throughout Connecticut.

Most of the soils of Colebrook are formed from one of six parent materials: glacial till, glaciofluvial deposits, glaciolacustrine deposits, alluvium, loess or organic deposits. Till or glacial till is an unstratified, heterogeneous mixture of mineral material with varying amounts of sand, silt and clay along with angular-shaped gravel, cobbles, and stones and boulders that were deposited by the ice with little or no water transportation. Till ranges from very friable melt-out types to extremely firm and dense lodgement types.

Glacial Till: are dense tills common in Colebrook and often underlie agricultural soils. The density of the till as a parent material is seen as a hardpan beginning at a depth of 15 to 20 inches from the soil surface. Hardpan is compact, slowly permeable till which can cause a perched water table in the soil. Soil series formed in till and exhibiting hardpans include Gloucester, Westminster, Hollis, Chatfield, Millsite, Charlton, Canton, Bice, Paxton, Montauk, Shelburne, Sutton, Schroon, Woodbridge, Ashfield, Leicester, Ridgebury, Mudgepond, Loonmeadow, Whitman and Alden soils.

Glaciofluvial deposits: are materials which were sorted into stratified layers of contrasting textures by rivers and streams flowing from melting glaciers. Glaciofluvial soils are dominated by sandy textures, and, in some cases, accompanied by surface mantles or thin strata of loamy or silty soil. The finer silt and clay particles generally were carried off and deposited separately by the flowing melt waters. Rock fragments in glaciofluvial soils are normally rounded and polished, and are often stratified by size. The coarse texture results in highly permeable soils that are important ground water aquifers. Colebrook has soils formed in glacial river deposits.These include Hinckley, Merrimac, Agawam, Enfield, Haven, Copake, Sudbury, Ninigret, Tisbury, Walpole, Moosilauke, Raypol, Fredon and Scarboro soils.

Glaciolacustrine deposits: These fine textured deposits are found in areas where glacial meltwaters formed quiet fresh water lakes that have subsequently drained. They typically lack rock fragments and are often laminated with varves, which are thin layers formed from annually deposited sediment. Soils formed in these deposits are slowly permeable and often have a shallow seasonal high water table. Three Colebrook soils were formed in deposits from glaciolacustrine deposits: Brancroft, Raynham and Belgrade.

Alluvium: is sediment comprised of gravel and sand moved by flowing water and later deposited along stream banks by active flooding, forming the terraces found along many streams and rivers. Often soils formed in these materials are referred to as floodplain soils with a range of textures from sand to silt loams. These soils are often very fertile and some are prime agricultural soils. The Colebrook soils that have formed in modern day alluvial deposits include Occum, Hadley, Pootatuck, Rippowam and Rumney. The extent of these soils is fairly limited in the community, occurring adjacent to streams and rivers.

Eolian Deposits or Loess: is relatively uniform, fine material, mostly silt loam, very fine sandy loam and fine sandy loam that was transported by wind during periods of dry weather right after the melting of glacial ice. Sand dunes even formed in it and still exist today in the Windsor area of Connecticut. However, in Colebrook, only thin layers of wind-blown soil deposited on tills and glaciofluvial deposits are still evident today. The Colebrook soils that show evidence of this thin layer of wind-blown material include Agawam, Enfield, Haven, Ninigret, Raypol and Tisbury soils.

Organic Deposits: Because plants re-established quickly after the glaciers retreated, organic materials started accumulating in shallow water. As successive generations of plants died, the residues gradually filled the shallow, saucer-like depressions as either peat or muck deposits. Plant material that can still be identified is regarded as "peat". Organic accumulations that have decomposed past being identifiable as plant material are called "muck". Organic soils found in Colebrook are Bucksport and Wonsqueak.

Soil Texture: Most of the soils in Colebrook are sandy loam or fine sandy loam texture. There is also a small amount of silt loam. Texture refers to a soil's coarseness or fineness. It is determined by the proportions of individual mineral particles in a specific size class: sand, silt and clay are the three particle sizes that make up the mineral fraction of soil, as described above.

Sand particles are the largest with diameters from 0.05 to 2.0 millimeters and can usually be identified with the naked eye and they feel gritty when rubbed between the fingers. The water-holding capacity of sand is low due to the large pore spaces between particles. Soils with large amounts of sand possess good drainage and aeration, and are usually referred to as "light soils" or "coarse soils." They do not contribute greatly to the chemical processes of the soil. Most of the soils of Colebrook are dominated by the presence of sand.

Silt particles vary from 0.002 to 0.05 millimeters in diameter. These are so small that it is hard to identify single particles with the naked eye or feel them when the soil is rubbed between fingers. Silt particles are similar in shape to the finer sands, but have a greater surface area. Like sand, silt takes little part in the chemical processes of the soil. Soils in which silt predominates are fine-textured, and water moves through them slowly. Soils high in silt are hard to work and are referred to as "heavy soils."

Clay soils have the finest of soil particles. These are smaller than 0.002 millimeters in diameter. Because of their small size, clay particles are the most chemically active, and can affect soil nutrient storage, water storage and the action of agricultural chemicals, such as fertilizers, in the soil.

Of the three soil texture components, clay is the rarest in the soils of Colebrook.

Soil Catenas: A soil catena is a related sequence of soil profile types created by changes from one drainage condition to another influenced by position in the landscape. Similar soils that formed in the same kind of parent material may differ in drainage class. For example, the Paxton, Woodbridge, Ridgebury and Whitman soils all formed in dense till and share many similarities such as particle size and presence of hardpan. They demonstrate visible differences in their soil profile based on their location in the landscape affecting drainage. Paxton is higher in the landscape and is the well-drained soil of the group while Whitman is lowest and is very poorly drained. Looking at soil catenas makes it easier to group the soils by their similarities.

Soil Temperature: Soil temperature is very important because it affects the length of the growing season for plants, water movement and chemical processes. Most Connecticut soils are classed as being in the mesic range and have medium soil temperature. Mesic soils have mean annual soil temperatures ranging from 47°F to 59°F, and a significant difference between mean summer and mean winter soil temperatures at 50 centimeters (approximately 20 inches) below the surface.

Some Colebrook soils are cold enough to classify as frigid soil in the USDA classification. These soils create unique ecosystems not found in other areas of Connecticut. Frigid soils have a mean annual soil temperature of between 32°F and 47°F, but can vary significantly from season to season.

The frigid soils were mapped by Donald Parizek and team from the USDA-NRCS, and correlated in the higher elevation areas above approximately 1,300 feet.

A large area of predominantly frigid soils extends from northern New England to northern Connecticut and eastern New York State. Colebrook is close to the heart of the area of frigid soils in Connecticut located in neighboring Norfolk. Some frigid soils extend into all of the Connecticut towns that border Norfolk, but are not the dominant soil types in those towns.

The frigid soils include Ashfield, Bice, Boscawen, Bucksport, Loonmeadow, Medomak, Millsite, Mooslauke, Rumney, Schroon, Shelburne, Westminster and Wonsqueak.

Prime and Important Farmland Soils: According to a recently completed analysis by Housatonic Valley Association (HVA), Colebrook has soils of great value to farming, as shown in the following chart:

Farmland Soils Class	Acres
Prime farmland	966.457193
Farmland of local importance	874.554162
Farmland of statewide importance	6306.93708

Soil acres contributed by Stacy Deming, Housatonic Valley Association

Many USDA grants that support farming or conservation of farmland, are only available where the soil is of importance to agriculture.

Wetland Soils: The USDA uses drainage classes to distinguish soils that are excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained and very poorly drained.

The State of Connecticut defines wetlands as soils that are poorly drained or very poorly drained. Connecticut also regulates - as wetlands - all soils that formed in floodplain deposits even though some of these soils are well drained. Approximately 17% of soils in Colebrook are currently classified as wetland or floodplain soils, compared to 16 percent in all of Litchfield County. The following soils are all wetland or floodplain soils: Brayton, Bucksport, Fluvaquents, Fredon, Hadley, Halsey, Leicester, Loonmeadow, Catden, Freetown, Medomak, Mudgepond, Occum, Pootatuck, Raynham, Raypol, Ridgebury, Rippowam, Rumney, Saco, Scarboro, Walpole, Whitman and Wonsqueak.

Wetlands are often magical landscape settings where water, soil and plants, perform important functions that may include some or all of the following: floodwater storage, wildlife habitat, nutrient retention, sediment trapping and water recharge to streams and groundwater. Many of Colebrook's wetlands support private wells and public drinking water supplies in towns downstream.

83% of soils in Colebrook are considered nonwetland while 17% are considered wetlands.

The following acreages of wetland and nonwetland soils in Colebrook are based on the Connecticut inland wetland definitions:

Row Labels	Sum of acreage	
Nonwetland	17,506.13	83%
Wetland	3,563.97	17%
Grand Total	**21,070.10**	

(Sum of acreage contributed by Jacob Isleib, USDA-NRCS)

Slopes: Colebrook has many areas with steeply sloping soil. Soil slope affects the erosion risk and the rate of water flow. The soil survey maps show mapping unit symbols that combine a number and a letter. The number reflects the name of the dominant soil in the map unit. The letter, if listed, reflects how steep the soil map unit is. The letters range from A (indicating the flattest areas) to E (steepest). Soil mapping units with a C, D or E slope class have a high risk of erosion if they are disturbed, because of the steep slopes.

The combination of many C, D and E class slopes and predominantly sandy soils leaves Colebrook with many areas that could easily be damaged by uncontrolled storm water, if left unprotected. The topographic map of Colebrook, included in this document, shows how steep the land is by how close together the topographic lines are.

A complete list of Colebrook soils, with USDA map symbols and descriptions of every soil type, is shown in the 3-column chart at the end of this report.

Other Contributors and Credits:

Jacob Isleib, State Soil Scientist, Connecticut and Rhode Island; USDA-Natural Resource Conservation Service (NRCS)

Donald C. Parizek, Certified Professional Soil Scientist, Long Island Sound Coastal Zone Soil Survey Project Leader; Special Projects Office, USDA-NRCS

Stacy Deming, GIS Manager, Housatonic Valley Association

Sean Hayden, Soil Scientist; Town of Norfolk Natural Resources Inventory, Soil Section

Sand accumulation along Sandy Brook.

List of Colebrook Soils with USDA map symbols and descriptions (page 1 of 2)

40 1C	Macomber-Taconic complex, 3 to 15 percent slopes, very rocky
40 2D	Taconic-Macomber-Rock outcrop complex, 15 to 25 percent slopes
40 3C	Taconic-Rock outcrop complex, 3 to 15 percent slopes
40 3E	Taconic-Rock outcrop complex, 15 to 45 percent slopes
40 3F	Taconic-Rock outcrop complex, 45 to 70 percent slopes
40 5C	Dummerston gravelly loam, 3 to 15 percent slopes, very stony
40 5E	Dummerston gravelly loam, 15 to 45 percent slopes, very stony
40 7C	Lanesboro loam, 3 to 15 percent slopes, very stony
40 7E	Lanesboro loam, 15 to 45 percent slopes, very stony
40 8C	Fullam silt loam, 3 to 15 percent slopes, very stony
40 9B	Brayton mucky silt loam, 0 to 8 percent slopes, very stony
41 2B	Bice fine sandy loam, 3 to 8 percent slopes
41 2C	Bice fine sandy loam, 8 to 15 percent slopes
41 2D	Bice fine sandy loam, 15 to 25 percent slopes
41 3C	Bice-Millsite complex, 3 to 15 percent slopes, very rocky
41 3E	Bice-Millsite complex, 15 to 45 percent slopes, very rocky
41 4	Fredon silt loam, cold
41 5C	Westminster-Millsite-Rock outcrop complex, 3 to 15 percent slopes
41 5E	Westminster-Millsite-Rock outcrop complex, 15 to 45 percent slopes
41 6E	Rock outcrop-Westminster complex, 8 to 45 percent slopes
41 6F	Rock outcrop-Westminster complex, 45 to 70 percent slopes
41 7B	Bice fine sandy loam, 3 to 8 percent slopes, very stony
41 7C	Bice fine sandy loam, 8 to 15 percent slopes, very stony
41 7D	Bice fine sandy loam, 15 to 25 percent slopes, very stony
41 8C	Schroon fine sandy loam, 2 to 15 percent slopes, very stony
42 0A	Schroon fine sandy loam, 0 to 3 percent slopes
42 0B	Schroon fine sandy loam, 3 to 8 percent slopes
42 1A	Ninigret fine sandy loam, cold, 0 to 3 percent slopes
42 3A	Sudbury sandy loam, cold, 0 to 3 percent slopes
42 4B	Shelburne fine sandy loam, 3 to 8 percent slopes
42 4C	Shelburne fine sandy loam, 8 to 15 percent slopes
42 4D	Shelburne fine sandy loam, 15 to 25 percent slopes
42 5B	Shelburne fine sandy loam, 3 to 8 percent slopes, very stony
42 5C	Shelburne fine sandy loam, 8 to 15 percent slopes, very stony
42 6D	Shelburne fine sandy loam, 15 to 35 percent slopes, extremely stony
42 7B	Ashfield fine sandy loam, 2 to 8 percent slopes, very stony
42 7C	Ashfield fine sandy loam, 8 to 15 percent slopes, very stony

428A	Ashfield fine sandy loam, 0 to 3 percent slopes
428B	Ashfield fine sandy loam, 3 to 8 percent slopes
428C	Ashfield fine sandy loam, 8 to 15 percent slopes
429A	Agawam fine sandy loam, cold, 0 to 3 percent slopes
429B	Agawam fine sandy loam, cold, 3 to 8 percent slopes
429C	Agawam fine sandy loam, cold, 8 to 15 percent slopes
433	Moosilauke sandy loam
434A	Merrimac sandy loam, cold, 0 to 3 percent slopes
434B	Merrimac sandy loam, cold, 3 to 8 percent slopes
434C	Merrimac sandy loam, cold, 8 to 15 percent slopes
435	Scarboro muck, cold
436	Halsey silt loam, cold
437	Wonsqueak mucky peat
438	Bucksport muck
440A	Boscawen gravelly sandy loam, 0 to 3 percent slopes
440C	Boscawen gravelly sandy loam, 3 to 15 percent slopes
440E	Boscawen gravelly sandy loam, 15 to 45 percent slopes
442	Brayton loam
443	Brayton-Loonmeadow complex, extremely stony
448B	Hogansburg loam, 3 to 8 percent slopes
449B	Hogansburg loam, 3 to 8 percent slopes, very stony
449C	Hogansburg loam, 8 to 15 percent slopes, very stony
450B	Pyrities loam, 3 to 8 percent slopes
450C	Pyrities loam, 8 to 15 percent slopes
450D	Pyrities loam, 15 to 25 percent slopes
451B	Pyrities loam, 3 to 8 percent slopes, very stony
451C	Pyrities loam, 8 to 15 percent slopes, very stony
451D	Pyrities loam, 15 to 25 percent slopes, very stony
457	Mudgepond silt loam, cold
458	Mudgepond and Alden soils, extremely stony, cold
501	Ondawa fine sandy loam
503	Rumney fine sandy loam
508	Medomak silt loam

BIRDS

Colebrook has varied habitats that support birds in all seasons. Partners In Flight places Colebrook in its Northern New England physiographic region. Located on the Atlantic Flyway, Colebrook has waterways that support migratory species of waterfowl and shorebirds that are not usually seen in Connecticut's northwest corner. The large Colebrook River Lake Reservoir is really special for birding. Over two hundred species, many of whom are considered rare, have been identified in Colebrook. Resident birds and neotropical migrants breed in Colebrook's intact forests. Northern finches migrate south into Colebrook in the winter when food is scarce further north. Other northern species such as Dark-eyed Junco, Canada Warbler, Purple Finch, and Blue-headed Vireo can be found nesting in Colebrook.

Scientists have been sounding the alarm about declining bird species. Habitat loss is the most significant factor. Window strikes, roaming house cats, and now avian flu are also driving the decline. Non-native species of plants, many of them invasive, deprive birds of the caterpillars and other insects they need to survive.

Ebird.org is a good place to look for the locations of Colebrook birding hotspots and bird species that can be found during all seasons of the year. Merlin, an app of the Cornell Lab of Ornithology, is an excellent way to identify birds by their calls using your phone. The app quickly identifies each bird, along with photos, and offers other features as well.

See Appendix 2 for list of Colebrook birds.

Above: Barred owls live in mature forests and wooded swamps. They are easy to identify by their call, "who cooks for you, who cooks for you all."

Below right: Large parcels of mixed hardwoods, hemlock and white pine in Colebrook are ideal habitat for scarlet tanagers.

Below left: Robin's nests usually contain 3-4 eggs.

LICHENS

Lichens have many interesting shapes, ranging from crusty (crustose) to leafy (foliose) to upright or hanging (fruticose), but all are composed of a fungus and either a green alga or a cyanobacteria. It's a mutually beneficial arrangement, with the green alga or cyanobacteria using sunlight to produce sugars for the fungus, and the fungus creating a structure that holds and protects its roommate from too much sun and drying out. Lichens grow on rocks, tree bark, or soil in full sun or light shade. A few are even aquatic. Certain lichens will not grow where the air is polluted. Some grow high up in tree canopies where there is good light and are seen once a branch falls to the ground.

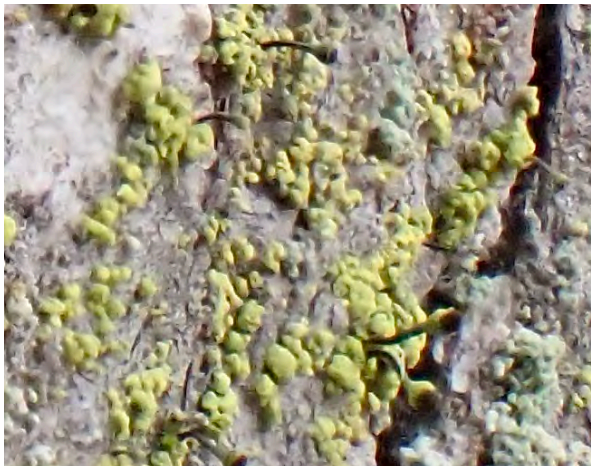
As a teenager, Mason Hale, Jr., lived on the family farm at the intersection of Stillman Hill Road (Rt. 182) and Colebrook Road (Rt. 183). His earliest research, while still a student at Yale, was a study of lichens at nearby Aton Forest in Norfolk. The study of lichens became his career and path to becoming a great scientist. He worked at the Smithsonian Institution in Washington, D.C. for 33 years (1957-1990), traveled around the world collecting lichen specimens for its herbarium, and published nearly 200 papers.

Steve Messier is a retired teacher and the author of *Traprock Ridge Lichens of Connecticut*. He recently relocated many lichens that Mason Hale, Jr. found at Aton Forest in Norfolk. See below for his report for the Colebrook Natural Resources Inventory and Appendix 3 for a list of over 180 species he identified.

Fruticose and foliose lichens on bark

Crustose lichen on a rock

Bright orange lichen on headstone



Tiny pin lichens on bark

Lichens of Colebrook, Connecticut — Steve Messier

This summary of lichen species found in natural areas, cemeteries, and surrounds in Colebrook covers 15 different sites visited during the 2023-2024 field seasons and represents 30 to 35 hours of exploration. Since Colebrook has many forested tracts with little disturbance or pollution from traffic, it was expected that a good number of species should be uncovered. The trees themselves, as well as the rocky slopes and glacial boulders they now conceal, are worth checking for lichens. One factor that might act against a larger number of species is the scarcity of open rocky ledges, as many lichens prefer sun rather than light shade. The full list of lichens found follows at the end.

Sandy Brook has a very bouldery bed and edge that is well lit and constantly moistened by a large stream. A significant mix of light-loving crust lichens can be found on the boulders there. Accompanying the crustose lichens was a sizable population of *Lecanora saxigena*, along with *Rhizocarpon lavatum*, two new state records. There was a sizable population of *Pyrenula pseudobuffonia* on large beech trees not far from the water. In general, the surrounding woods were dark and moist, providing several lichens that were found earlier in similar sites. However, the most valuable area for lichens is along the brook corridor where moisture and sunlight provide ideal conditions for lichen growth.

In a large swamp, hemlock branches contain lichens requiring both light and high moisture, such as *Platismatia tuckermanii, Evernia mesomorpha*, and the beard lichen (*Usnea subfloridana*). A swiftly flowing brook affords good habitat for shade-tolerant, streamside cyanolichens such as *Leptogium cyanescens*, the uncommon scaly pelt lichen (*Peltigera lepidophora*) and the tree jelly lichen (*Collema subflaccidum*), which can be found on the base of tree trunks as well as moistened rock faces.

At the edge of a large open swamp along a road, red maples and trembling aspens had some nitrogen-loving orange and yellow *Caloplaca* and *Candelaria* lichens on them. Another common light-loving crust on the branches of these trees is the camouflage lichen *(Melanelixia subaurifera)*, which turns chocolate brown with exposure to bright sunlight. Along the edge of another swamp, fallen trees with raised mounds were covered with a mix of moss species and *Cladonia* lichens that like the thick humus. Some aerial fruticose lichens requiring moisture that occur in this type of habitat include the beard lichen (*Usnea subfloridana*), boreal oakmoss (*Evernia mesomorpha*) and the hooded tube-lichen (*Hypogymnia physodes*).

A small hemlock wetland along a slow stream had abundant blue jelly-skin lichen (*Leptogium cyanescens*) and patches of the red apothecial *Arthonia helveola* on yellow birch. There were many moss-covered logs and rocks with some *Trapeliopsis viridescens*. Fallen branches from the canopy contain leafy species like wrinkle lichens (*Tuckermanopsis*) which do best in bright light.

Forested, rocky areas, of which there are many in Colebrook, provide habitat for other lichens. In one such place, I followed a steep, sloped edge on an escarpment with a relatively small area of large angular talus six to twelve feet in diameter all jumbled together. Many of the upper rock faces with collected detritus are covered with mosses and ground dwelling *Cladonia* lichens. The northeast exposure of the boulders has a dense population of smooth rock tripe (*Umbilicaria mammulata*). Most of the moist forest is deeply shaded beech mixed with white pine and yellow birch. Several white pines with sticky seeping sap provide a substrate for the tiny yellow apothecia of *Sarea resinae*. Since it does not lichenize (form an association with an alga), it is not technically a lichen, but it is normally listed with lichen surveys. There are numerous rotting pine stumps with *Micarea*, leek-colored lichens with a granular thallus, easily mistaken for algae.

Several hills were surveyed as well. On one walk, the best habitat was on the way to the summit of an 1100-foot hill. The brighter conditions here there compared to the lower forest promotes a wide variety of tree and rock lichens. Large outcrops and ledges near the summit have a variety of crusts and patches of a small fruticose lichen, *Ramalina petrina,* perching from a protected rock face. There are a few ground dwelling *Cladonia*s, but aerial fruticose lichens are rare in these hilltop woods due to breezes that dry them and potentially expose them to toxic air pollutants (probably more of a problem in the past, but now a legacy effect from the last century). A medium-size foliose lichen typical of mature forests, the shaggy-fringe lichen (*Anaptychia palmulata*), can occasionally be seen in the area on tree bases. The bottom of trunks of white oak (uncommon in Colebrook) can become a special microhabitat for other lichens that prefer a higher pH. When a thick carpet of *Anomodon*

*attenuatu*s moss grows a the base of the tree, it can keep the area moist, and the calcium-enriched flow of water down the tree trunk raises the pH, making it less acidic.

On another hill there was a forest of mixed oak, maples, yellow birch, hemlock and white pine until you reach the southeastern edge, where there is a steep dropoff. Here it abruptly forms an expansive hickory-oak-ash-ironwood, Pennsylvania sedge glade forest with scattered angular erratics and outcrops. Hickory-ash glades among talus piles and rock outcrops can occur at the tops of hills or eastern slopes in Colebrook, and the lichens there are similar. Several lichens that like partial light and an eastern exposure on lightly shaded silicious rocks can be found—e.g. the dust lichens (*Lepraria*), the large foliose and warty thallus of the toad lichen (*Lasallia papulosa*), *Halecania pepegospora* (an ugly black crust lichen named after Mason Hale who first described the species from Norfolk) and another common crust, *Rhizocarpon infernulum*. Several Cladonia species grow on thin soil and humus over the rocks. Several lichens like the smooth and slightly neutral shagbark hickory bark, such as the common clam lichen (*Hypocenomyces scalaris*), the frosted comma lichen (*Chrysothrix caesia*), the uncommon crust with yellow pruinose apothecia—*Cresponea chloroconia*, the light gray thalli of the pustule crust lichen (*Lepra pustulata*) and the rimmed wart lichen (*Varicellaria vellata*).

Another wooded area explored was mostly hemlock, yellow birch, white pine forest with some beech and maples. Two common non-lichenized fungi growing on dead or dying tree trunks included the tiny snag pins (*Mycocalicium subtile*) and fairy pins (*Phaeocalicium polyporaeum*). The former can be found on the decorticated trunks of snags while the latter grows on the algae-covered caps of the violet-toothed polypore fungus (*Trichaptum biforme*). Most of the property is hemlock woods with scattered large old white pines with coppice growth. Fallen branches from the canopy contain leafy species like wrinkle lichens (*Tuckermanopsis*) which do best in bright light.

Within the Algonquin State Forest and Kitchell Natural Area Preserve on Sandy Brook Road there are steep wooded slopes with hemlock and mixed hardwoods and even a large open exposure of talus. Several sun-loving foliose rock-loving lichen species occur on this exposed talus slope, such as the rosette lichens (*Physcia*), as well as the peppered rock shield (*Xanthoparmelia conspersa*) and the large yellowish-green thalli of the smooth rock shield (*Flavoparmelia baltimorensis*). The attractive yellowish crustose golden moonglow lichen (*Dimelaena oreina*) was also seen here. Other common crust species on this talus include frequent dirty white thalli of the cinder lichen (*Aspicillia cinerea*), map lichens (*Rhizocarpon*) and the dark brown smooth crust of *Rimularia badioatra*. The large rock walls have abundant and aggressive thalli of the coral saucer lichen (*Ochrolechia yasudae*) and broad expanses of smooth rock tripe (*Umbilicaria mammulata*).

There is also a pine plantation with very few lichens, but an eastern slope has an extensive hickory-ash-Pennsylvania sedge glade. Small to medium-size boulders litter the hillside providing habitat for crust species like *Aspicilia laevata, Rhizocarpon grande, Dimelaena oreina* and *Trapelia stipitata*, and the common rock-loving foliose lichens and the bottlebrush shield lichen (*Parmelia squarrosa*). Shagbark hickory bark harbors some uncommon lichens such as two stubble lichens (*Chaenotheca* species)—new Connecticut records suggestive of a mid-successional forest (Selva 2003)—and *Arthonia susa*. Along the lower slope, at the base of an ash tree one large specimen of a pelt (or dog) lichen with its pruinose lobe tips (*Peltigera praetextata*) was discovered, one of the few locations of this large ground lichen seen in Colebrook. It is very uncommon in these woods as it requires a slightly higher pH than afforded by the acidic bedrock and soils in the immediate area. However, enrichment and a slightly elevated pH from the white ash bark creates a favorable microhabitat for the lichen. A large hemlock and yellow birch wooded Sphagnum swamp with a large variety of associated mosses drains to an outlet stream with brown water stained from organic acids. Moss-loving lichens such as the green dot lichen (*Micarea prasina*) can be found here.

Stone walls and cemeteries are other good habitats to explore for lichens. The rock walls around cemeteries are usually in full sun and probably undisturbed for many decades. They offer a good selection of light-loving, rock-loving lichens unseen in forest stands. Crater lichen (*Diploschistes scrupsus*), a diminutive foam lichen (*Stereocaulon pileatum*), a small thallus of powdered camouflage lichen (*Montanelia sorediata*) and some shingled rock-shield lichen (Xanthoparmelia viriduloumbrina) was spotted, as well as the bright green sulfur-dust lichen (*Psilolechia lucida*) in crevices between some of the rocks. There were also lime-loving species on some headstones. Two *Physcia* species, an uncommon lichen only known in New England from cemeteries (*Phaeophyscia kairamor*), and the bright yellow common sunburst lichen (X*anthoria parietina*) were seen here and there, as well as the ubiquitous orange crustose *Caloplaca* species.

One cemetery is an interesting site for ground lichens such as *Peltigera* that require nutrient enhanced substrate. A large population of *Peltigera canina* and *praetextata* lie between the old marble/limestone headstones. Because the burying ground is situated on a hillside, moisture travels from the stones to the lichens, providing a buffering effect raising the pH of the soil and protecting the cyanolichens from the harmful effects of acid rain that eliminated so many of the group in the last century. Two cemeteries did not yield many different lichens on their walls as many were more shaded than the other cemeteries. However, in one section of a shaded wall a mostly southeastern *Bacidina* lichen was found that is new to Connecticut and only known in New England from a rubble pile on an island in Boston Harbor. One cemetery has numerous headstones and monuments of various stone substrates that yielded a variety of *Caloplaca* and *Candelariella* species. Bright orange *Xanthomendoza fallax*, the hooded sunburst lichen, grows on the edge of one headstone. There were very few ground lichens due to the thick turf grass. One small patch of *Cladonia furcata*, which is very similar looking to the reindeer lichens except for the presence of squamules on its branches, was located between the headstones.

The recreation area on Cooper Lane yielded several lichen species. Sandy soil provided a substrate for the pink earth lichen, *Dibaeis baeomyces*, a sizable population of *Peltigera rufescens*, and a few *Cladonia* species, notably the stalkless *Cladonia*, *C. apodocarpa*, which hadn't been seen elsewhere. A large clump of *Cladonia furcata* also grows along the woods edge here. Walking down to the pond provided access to lichens that required light and moisture, such as *Imshaugia aleurites* and *Tuckemanopsis* on the bark of the large white pines along Cooper Lane. These tree trunks were also covered in a lush population of *Hypogymnia physodes*. On a nearby maple tree a large (6") specimen of *Usnea* was noted about 8 feet up on the trunk. On a fallen tree base in a wetland near the road, the bright lime-green color coating the exposed root tips alerted me to the presence of *Chaenotheca furfuracea*, another of the pin lichens.

Further work should be done to explore any open dry sites near cliffs (if any exist) to locate ground *Cladonia* species, such as "reindeer" lichen species *Cladonia uncialis*, *arbuscula*, or *rangiferina*. There should also be "British soldier" lichens, especially *Cladonia cristatella*. and *Caloplaca flavocitrina* on some concrete structures or rock walls in open areas.

Finally, there is a 1962 collection of lungwort, (*Lobaria pulmonaria*) from C. F. Reed from a site "2 miles north of Colebrook", which would place it near Phelps Flat Road. Mason Hale found it several times nearby in Norfolk in 1949. Keeping an eye out for it might be a worthwhile venture as *Lobaria pulmonaria* is a large foliose cyanolichen that has largely disappeared from our landscape as a result of air pollution from the last century. Finding a current population would be quite significant for the town of Colebrook.

One of the beard lichens growing on bark

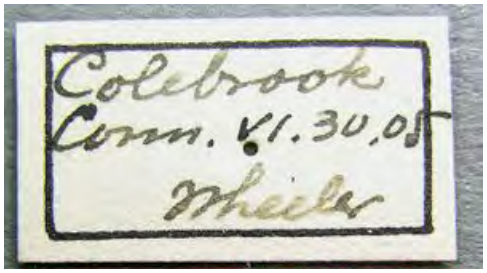
Finding lichens on cliffs in Colebrook

Left: Great spangled fritillary on white clover. *Right:* Caterpillars of the dogbane saucrobotys moth.

INSECTS

In the pages that follow, you will find a field study of moths by an outstanding high school student, Lukas Keras, and in Appendix 4, lists of other insects and their relatives created for this Natural Resources Inventory. Aton Forest Fellow Charley Eiseman surveyed several areas of Colebrook for his specialty, understudied plant-feeding insects. He is the author of *Leafminers of North America* and is preparing a guide to North American sawfly larvae. His photos are available online. We hope the various lists will be expanded on in coming years. Observations made in Colebrook can also be shared and followed online with the free app iNaturalist.

Why are insects important? Just five years ago, an article in the New York Times, The Insect Apocalypse is Here: What does it mean for the rest of life on Earth? answered that question. Even if you don't like "bugs", you have probably noticed there are fewer of them than there were decades ago. A drop in the overall quantity of insects is now recognized a serious matter worldwide. Insects help pollinate plants so they can produce seeds and fruit that feed us and other animals. Insects in turn are food for birds, bats and other mammals, plus fish, reptiles, amphibians, and even insects, such as dragonflies that eat mosquitoes. Certain insects specialize in decomposing all kinds of dead and decaying matter. A number are pests of crops and native plants. Insects are the most diverse group of organisms on our planet, with a million species described and an estimate that there may be as many as 10 million or more yet unknown.



Photos by April Nobile.
Specimen code casent01015608
from www.antweb.org

One species was discovered right here in Colebrook. A world-famous entomologist specializing in ants, William Morton Wheeler, had connections to Colebrook. He married Dora Bay Emerson, a descendant of the Rockwells who were important first settlers in town. Some readers will remember their daughter, Adaline Wheeler, who lived at the family home on Colebrook Road south of the center. Dr. Wheeler found a new species of ant, *Formica nepticula*, on the top of Mount Pisgah and published it in the Bulletin of the American Museum of Natural History in 1905:

"Described from numerous workers and females and two males from a single colony found near the summit of Mt. Pisgah (altitude about I400 feet), at Colebrook, Litchfield County, Conn., and several workers taken at Black Hawk Spring, near Rockford, Ill."

Pollinators

Some of the most important insects are those that pollinate flowers on our food crops—tomatoes, squash, pumpkins, beans, apples, blueberries, and raspberries, to name just a few. Many kinds of insects pollinate flowers while collecting or feeding on pollen and nectar. The flashiest of these pollinators may be butterflies, but moths, bees, wasps, flies and beetles contribute in greater numbers. Bees, and then flies, are the most important pollinators. The recent decline in native bees and honeybees has been attributed to loss of habitat and to a class of pesticides called neonicotinoids. The Connecticut legislature has considered bills to regulate these pesticides, but has yet to pass one. Decisions we make when caring for our lawns and gardens, such as not using harmful chemicals, can help protect pollinators.

Invasive Insects

Modern means of transportation by ground, air and shipping have made worldwide travel possible for invasive insects, such as the hemlock woolly adelgid (*Adelges tsugae*). The Connecticut Agricultural Experiment Station (CAES) first detected hemlock woolly adelgid in Connecticut in 1985, and it spread across the state over the next 12 years, causing hemlocks to die or decline. The result was alarming, as hemlocks provide shade for wetlands, keeping water cooler. The CAES brought in a predator from Japan, a tiny ladybeetle (*Sasajiscymnus tsugae*) that specifically feeds on hemlock woolly adelgid, rearing and releasing thousands throughout the state. Starting in 2017, this ladybeetle was released on hemlocks in Colebrook along Sandy Brook and the Metropolitan District Commission watershed. In 2023-2024, over 1,000 were released in the Algonquin State Forest and a few private properties. Warm winters help the hemlock woolly adelgid increase, however CAES found that just one day of very cold weather, when the jet stream brought arctic air down to Connecticut, caused adelgid mortality rates of 97-100% at the Colebrook River Lake reservoir. Hemlocks have also been stressed by recent droughts and other insects, the elongate hemlock scale (*Fiorinia externa*) and the native hemlock borer (*Phaenops fulvoguttata*).

The invasive emerald ash borer beetle (*Agrilus planipennis*) also moved quickly from its introduction in Michigan in 2002 to Colebrook by 2018. The CAES has introduced several species of tiny, stingless wasps as biocontrols in some towns, which have established, but the emerald ash borer kills trees in as little as three years. Many dead or dying ash trees are evident along our roadsides, and we hope ash trees won't disappear the way that American chestnut did in the 1920s. One bit of good news is that over 100 mature ash trees have been found in the Northeast that have survived the peak invasion and remained healthy. These so-called "lingering ash" are providing material for Cornell University's resistance breeding program.

The white bodies of the Hemlock woolly adelgid are easy to spot on the underside of hemlock leaves.

Left: Bark of ash tree stripped away to show emerald ash borer larva and its tunnels. *Right:* Woodpeckers remove the ash bark looking for larvae, which emerge from D-shaped holes.

2023-2024 NRI Survey of Lepidoptera Species in Colebrook, Connecticut

Lukas Keras

Above: Red-Spotted Purple, *Limenitis arthemis* ssp. *astyanax,* photographed in Colebrook.

1. Summary

From Fall 2023 to Fall 2024, multiple public and private sites across Colebrook were surveyed for their Lepidoptera diversity using high- and low- intensity UV lights, fermenting fruit baits, searching for immatures on host plants, and daytime search for nectaring adults, as described in references [1-3]. In total, over 320 species of Lepidoptera were recorded during the survey.

2. Acknowledgements

I would like to thank Sigrun N. Gadwa, MS, for suggestions on potential survey areas;

Joyce Hemingson for coordinating access to the sites, suggesting surveying locations for different habitats, for contributing Lepidoptera observations, and for managing the overall survey project;

The Colebrook Conservation Commission for their financial support on the project;

Jim Rossman, Will Hobbie, Kathleen Kelley, and Ashley Jasmin for allowing access to their properties for surveying;

Dr. David Wagner of UCONN for his advice on finding the larvae of *Papaipema* species and for confirming the identification of *Lithophane laticinerea*;

Dr. Lawrence Gall of the Yale Peabody Museum for his advice regarding the behavior of species in the genus *Catocala*;

And Victor DeMasi for his entomological expertise, mentorship, and inspiration.

3. Species representative of specific habitats

The survey targeted 3 general habitat types:

- Mesic mixed oak/red maple/pine/hemlock forest
- Well-drained Meadow and Woodland Edge
- Floodplain and Wet Meadow

3.1. Mesic mixed oak/red maple/pine/hemlock forest

Surveying of mixed forest in Colebrook produced numerous woodland - inhabiting species, including:

Cercyonis pegala (Common Wood-Nymph) - Very common in this habitat; especially near larval foodplants. Larval foodplant: various woodland grasses

Lethe anthedon (Northern Pearly-Eye) - Local; found in Colebrook habitats with *C. pegala* but at much lower densities than that species. Larval foodplant: various woodland grasses

Hypoprepia fucosa (Painted Lichen Moth) - Very common throughout Colebrook. Larval foodplant: Lichens

Above: Painted Lichen Moth, *Hypoprepia fucosa,* from Colebrook.

3.2. Well-drained Meadow and Woodland Edge

Surveying early - successional habitat in Colebrook produced a large diversity of woodland - and meadow - inhabiting species including:

Apantesis virgo (Virgin Tiger Moth) - Locally common; found at one site in Colebrook. Larval foodplant: Generalist on low forbs

Phyciodes tharos (Pearl Crescent) - Common throughout Colebrook; found in abundance at all sites with this habitat. Larval foodplant: Asteraceae

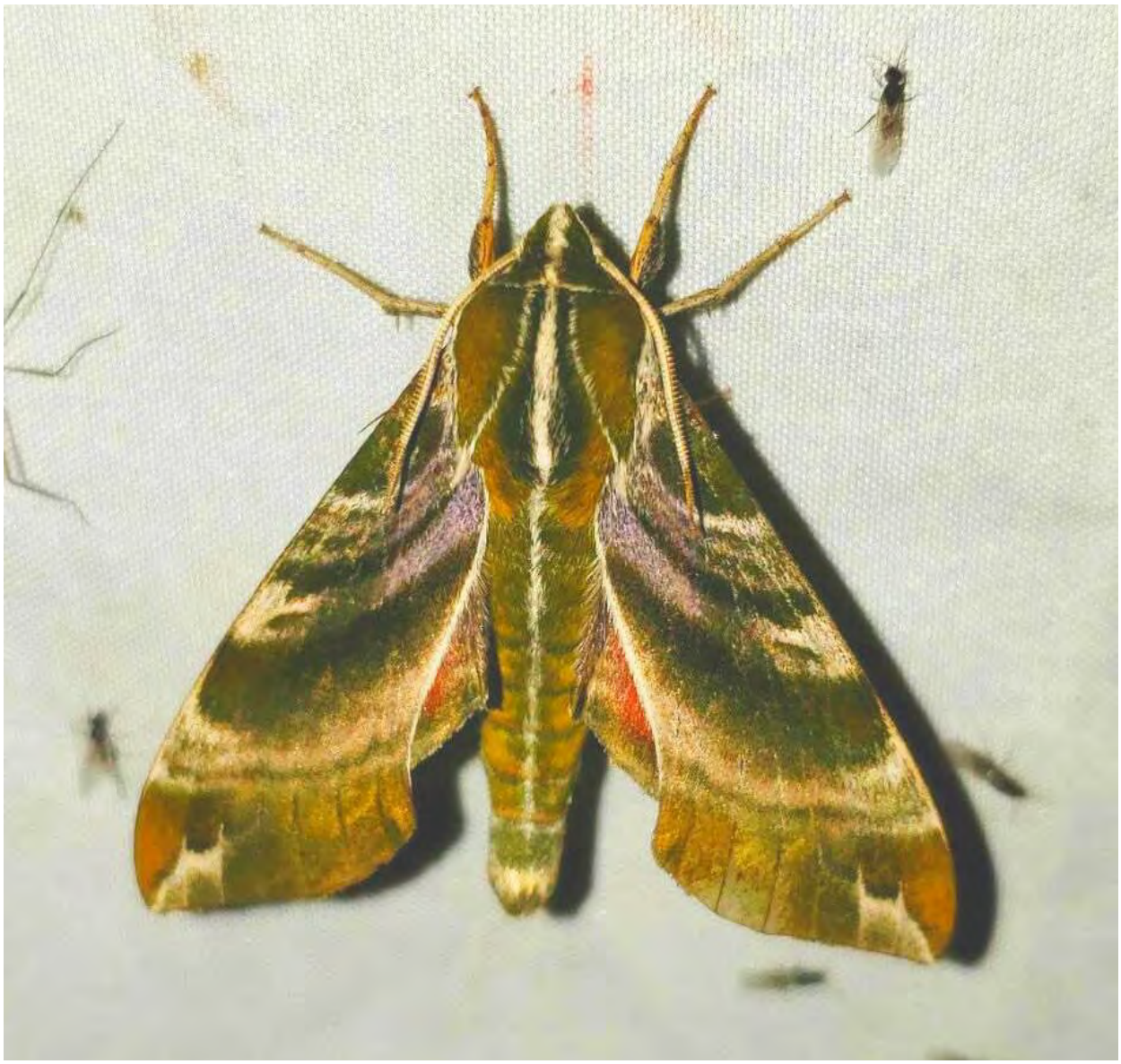
Papaipema rigida (Rigid Sunflower Borer) - Common throughout Colebrook in association with the larval foodplant. Larval foodplant: likely utilizes *Zizia aurea* in Colebrook.

Above: *Apantesis virgo*, a local species often found in high-quality meadows, from a Colebrook meadow.

Also of note: *Bombus terricola,* a bumblebee listed as “Threatened” according to CT DEEP, found in a Colebrook meadow.

3.3. Floodplain and Wet Meadow

Some of the most specialized Lepidoptera in Connecticut are restricted to floodplain and wet meadow habitat. Colebrook's numerous wetlands provide refugia for these otherwise uncommon species. *Ceratomia undulosa* (Waved Sphinx), a species declining in Connecticut, was found on three instances as a larva on Ash trees in Colebrook wetlands. *Catocala concumbens, Lithophane laticinerea, Eulithis testata, Falcaria bilineata,* and *Apotomis removana*, northern species otherwise not often found in Connecticut, were located during the survey period in Colebrook wetlands. Several highly wetland-specific species, such as *Poanes massasoit* (Mulberry Wing Skipper), which feeds on sedges as a larva, and *Darapsa versicolor* (Hydrangea Sphinx), which feeds on buttonbush as a larva, were found in association with their food plants at wetlands in Colebrook.



Above: *Darapsa versicolor* found in a Colebrook wetland.

4. List of species observed during the survey

Latin Name	Common Name	Family	Superfamily
Bombycoidea: Saturniidae			
Antheraea polyphemus	Polyphemus Moth	Saturniidae	Bombycoidea
Dryocampa rubicunda	Rosy Maple Moth	Saturniidae	Bombycoidea
Bombycoidea: Sphingidae			
Ceratomia undulosa	Waved Sphinx	Sphingidae	Bombycoidea
Darapsa versicolor	Hydrangea Sphinx	Sphingidae	Bombycoidea
Deidamia inscriptum	Lettered Sphinx	Sphingidae	Bombycoidea
Dolba hyloeus	Pawpaw Sphinx	Sphingidae	Bombycoidea
Eumorpha pandorus	Pandorus Sphinx	Sphingidae	Bombycoidea
Hemaris diffinis	Snowberry Clearwing	Sphingidae	Bombycoidea
Hemaris thysbe	Hummingbird Clearwing	Sphingidae	Bombycoidea
Lapara bombycoides	Northern Pine Sphinx	Sphingidae	Bombycoidea
Paonias excaecata	Blinded Sphinx	Sphingidae	Bombycoidea
Paonias myops	Small-eyed Sphinx	Sphingidae	Bombycoidea
Smerinthus jamaicensis	Twin-spotted Sphinx	Sphingidae	Bombycoidea
Sphinx kalmiae	Laurel Sphinx	Sphingidae	Bombycoidea
Sphinx poecila	Northern Apple Sphinx	Sphingidae	Bombycoidea
Cossoidea: Cossidae			
Zeuzera pyrina	Wood Leopard Moth	Cossidae	Cossoidea
Cossoidea: Sesiidae			
Synanthedon acerni	Maple Callus Borer Moth	Sesiidae	Cossoidea
Drepanoidea: Drepanidae			
Drepana arcuata	Arched Hooktip Moth	Drepanidae	Drepanoidea
Falcaria bilineata	Two-lined Hooktip	Drepanidae	Drepanoidea
Oreta rosea	Rose Hooktip	Drepanidae	Drepanoidea
Pseudothyatira cymatophoroides	Tufted Thyatirine Moth	Drepanidae	Drepanoidea
Gelechioidea: Blastobasidae			
Blastobasis glandulella	Acorn Moth	Blastobasidae	Gelechioidea
Gelechioidea: Depressariidae			
Agonopterix robiniella	Four-dotted Agonopterix Moth	Depressariidae	Gelechioidea
Agonopterix thelmae	Thelma's Agonopterix Moth	Depressariidae	Gelechioidea
Machimia tentoriferella	Gold-striped Leaftier Moth	Depressariidae	Gelechioidea

Gelechioidea: Gelechiidae			
Anacampsis conclusella		Gelechiidae	Gelechioidea
Coleotechnites atrupictella	Spruce Micromoth	Gelechiidae	Gelechioidea
Dichomeris flavocostella	Cream-edged Dichomeris Moth	Gelechiidae	Gelechioidea
Geometroidea: Geometridae			
Aethalura intertexta	Four-barred Gray	Geometridae	Geometroidea
Antepione thisoaria	Variable Antepione Moth	Geometridae	Geometroidea
Biston betularia	Peppered Moth	Geometridae	Geometroidea
Cabera erythemaria	Yellow-dusted Cream Moth	Geometridae	Geometroidea
Cabera variolaria	Vestal Moth	Geometridae	Geometroidea
Campaea perlata	Pale Beauty	Geometridae	Geometroidea
Caripeta divisata	Gray Spruce Looper Moth	Geometridae	Geometroidea
Caripeta piniata	Northern Pine Looper Moth	Geometridae	Geometroidea
Chlorochlamys chloroleucaria	Blackberry Looper Moth	Geometridae	Geometroidea
Cladara atroliturata	The Scribbler	Geometridae	Geometroidea
Cyclophora pendulinaria	Sweetfern Geometer Moth	Geometridae	Geometroidea
Dyspteris abortivaria	Bad-wing Moth	Geometridae	Geometroidea
Ecliptopera silaceata	Small Phoenix	Geometridae	Geometroidea
Ennomos magnaria	Maple Spanworm Moth	Geometridae	Geometroidea
Epirrhoe alternata	White-banded Toothed Carpet	Geometridae	Geometroidea
Euchlaena serrata	Saw-wing	Geometridae	Geometroidea
Eulithis diversilineata	Lesser Grapevine Looper Moth	Geometridae	Geometroidea
Eulithis gracilineata	Greater Grapevine Looper Moth	Geometridae	Geometroidea
Eulithis testata	Chevron Moth	Geometridae	Geometroidea
Euphyia intermediata	Sharp-angled Carpet	Geometridae	Geometroidea
Eupithecia absinthiata	Wormwood Pug	Geometridae	Geometroidea
Eupithecia miserulata	Common Eupithecia Moth	Geometridae	Geometroidea
Eupithecia palpata	Small Pine Looper Moth	Geometridae	Geometroidea
Eusarca confusaria	Confused Eusarca Moth	Geometridae	Geometroidea
Homochlodes fritillaria	Pale Homochlodes Moth	Geometridae	Geometroidea
Horisme intestinata	Brown Bark Carpet Moth	Geometridae	Geometroidea
Iridopsis larvaria	Bent-line Gray	Geometridae	Geometroidea
Lambdina fervidaria	Curved-lined Looper Moth	Geometridae	Geometroidea
Lambdina fiscellaria	Hemlock Looper Moth	Geometridae	Geometroidea
Lobophora nivigerata	Powdered Bigwing Moth	Geometridae	Geometroidea
Lomographa glomeraria	Gray Spring Moth	Geometridae	Geometroidea
Macaria bisignata	Red-headed Inchworm Moth	Geometridae	Geometroidea
Macaria fissinotata	Hemlock Angle	Geometridae	Geometroidea
Macaria minorata	Minor Angle	Geometridae	Geometroidea

Macaria pinistrobata	White Pine Angle	Geometridae	Geometroidea
Macaria pustularia	Lesser Maple Spanworm Moth	Geometridae	Geometroidea
Melanolophia canadaria	Canadian Melanolophia Moth	Geometridae	Geometroidea
Metanema determinata	Dark Metanema Moth	Geometridae	Geometroidea
Nematocampa resistaria	Horned Spanworm Moth	Geometridae	Geometroidea
Nemoria bistriaria	Red-fringed Emerald	Geometridae	Geometroidea
Nepytia canosaria	False Hemlock Looper Moth	Geometridae	Geometroidea
Orthonama obstipata	Gem Moth	Geometridae	Geometroidea
Pasiphila rectangulata	Green Pug	Geometridae	Geometroidea
Plagodis phlogosaria	Straight-lined Plagodis Moth	Geometridae	Geometroidea
Plagodis pulveraria	Barred Umber	Geometridae	Geometroidea
Pleuroprucha insulsaria	Common Tan Wave	Geometridae	Geometroidea
Prochoerodes lineola	Large Maple Spanworm Moth	Geometridae	Geometroidea
Protoboarmia porcelaria	Porcelain Gray	Geometridae	Geometroidea
Rheumaptera meadii	Barberry Geometer Moth	Geometridae	Geometroidea
Scopula limboundata	Large Lace-border Moth	Geometridae	Geometroidea
Synchlora aerata	Wavy-lined Emerald	Geometridae	Geometroidea
Trichodezia albovittata	White-striped Black	Geometridae	Geometroidea
Xanthorhoe ferrugata	Red Twin-spot Carpet	Geometridae	Geometroidea
Xanthorhoe lacustrata	Toothed Brown Carpet	Geometridae	Geometroidea
Geometroidea: Uraniidae			
Calledapteryx dryopterata	Brown Scoopwing	Uraniidae	Geometroidea
Gracillarioidea: Gracillariidae			
Caloptilia belfragella	Dogwood Caloptilia Moth	Gracillariidae	Gracillarioidea
Lasiocampoidea: Lasiocampidae			
Malacosoma disstria	Forest Tent Caterpillar Moth	Lasiocampidae	Lasiocampoidea
Phyllodesma americana	American Lappet Moth	Lasiocampidae	Lasiocampoidea
Tolype laricis	Larch Tolype Moth	Lasiocampidae	Lasiocampoidea
Noctuoidea: Erebidae			
Apantesis phalerata	Harnessed Tiger Moth	Erebidae	Noctuoidea
Apantesis virgo	Virgin Tiger Moth	Erebidae	Noctuoidea
Caenurgina crassiuscula	Clover Looper Moth	Erebidae	Noctuoidea
Calyptra canadensis	Canadian Owlet	Erebidae	Noctuoidea
Catocala cerogama	Yellow-banded Underwing	Erebidae	Noctuoidea
Catocala coccinata	Scarlet Underwing	Erebidae	Noctuoidea
Catocala concumbens	Pink Underwing	Erebidae	Noctuoidea
Catocala gracilis	Graceful Underwing	Erebidae	Noctuoidea
Catocala habilis	Habilis Underwing	Erebidae	Noctuoidea
Catocala lineella	Little Lined Underwing	Erebidae	Noctuoidea

Catocala palaeogama	Oldwife Underwing	Erebidae	Noctuoidea
Catocala praeclara	Praeclara Underwing Moth	Erebidae	Noctuoidea
Catocala serena	Serene Underwing	Erebidae	Noctuoidea
Catocala ultronia	Ultronia Underwing	Erebidae	Noctuoidea
Cisseps fulvicollis	Yellow-collared Scape Moth	Erebidae	Noctuoidea
Clemensia albata	Little White Lichen Moth	Erebidae	Noctuoidea
Clemensia umbrata	Little Shaded Lichen Moth	Erebidae	Noctuoidea
Colobochyla interpuncta	Yellow-lined Owlet	Erebidae	Noctuoidea
Crambidia pallida	Pale Lichen Moth	Erebidae	Noctuoidea
Ctenucha virginica	Virginia Ctenucha Moth	Erebidae	Noctuoidea
Cycnia tenera	Delicate Cycnia Moth	Erebidae	Noctuoidea
Dasychira plagiata	Northern Pine Tussock Moth	Erebidae	Noctuoidea
Dyspyralis illocata	Visitation Moth	Erebidae	Noctuoidea
Euparthenos nubilis	Locust Underwing	Erebidae	Noctuoidea
Haploa clymene	Clymene Moth	Erebidae	Noctuoidea
Hypena baltimoralis	Baltimore Snout	Erebidae	Noctuoidea
Hypena scabra	Green Cloverworm Moth	Erebidae	Noctuoidea
Hypenodes caducus	Large Hypenodes Moth	Erebidae	Noctuoidea
Hypoprepia fucosa	Painted Lichen Moth	Erebidae	Noctuoidea
Idia aemula	Common Idia Moth	Erebidae	Noctuoidea
Idia diminuendis	Orange-spotted Idia Moth	Erebidae	Noctuoidea
Idia lubricalis	Glossy Black Idia Moth	Erebidae	Noctuoidea
Idia rotundalis	Rotund Idia Moth	Erebidae	Noctuoidea
Idia scobialis	Smoky Idia Moth	Erebidae	Noctuoidea
Macrochilo louisiana	Louisiana Owlet	Erebidae	Noctuoidea
Metalectra discalis	Common Fungus Moth	Erebidae	Noctuoidea
Orgyia leucostigma	White-marked Tussock Moth	Erebidae	Noctuoidea
Palthis angulalis	Dark-spotted Palthis Moth	Erebidae	Noctuoidea
Panopoda carneicosta	Brown Panopoda Moth	Erebidae	Noctuoidea
Panopoda rufimargo	Red-lined Panopoda Moth	Erebidae	Noctuoidea
Parallelia bistriaris	Maple Looper Moth	Erebidae	Noctuoidea
Phalaenostola eumelusalis	Dark Phalaenostola Moth	Erebidae	Noctuoidea
Phragmatobia fuliginosa	Ruby Tiger Moth	Erebidae	Noctuoidea
Pyrrharctia isabella	Isabella Tiger Moth	Erebidae	Noctuoidea
Renia adspergillus	Speckled Renia Moth	Erebidae	Noctuoidea
Renia discoloralis	Discolored Renia Moth	Erebidae	Noctuoidea
Renia factiosalis	Sociable Renia Moth	Erebidae	Noctuoidea
Renia sobrialis	Sober Renia Moth	Erebidae	Noctuoidea
Rusicada privata	Hibiscus Leaf Caterpillar Moth	Erebidae	Noctuoidea

Zale horrida	Horrid Zale Moth	Erebidae	Noctuoidea
Zale lunata	Lunate Zale Moth	Erebidae	Noctuoidea
Zanclognatha dentata	Toothed Fan-foot	Erebidae	Noctuoidea
Zanclognatha jacchusalis	Wavy-lined Fan-foot	Erebidae	Noctuoidea
Zanclognatha laevigata	Variable Fan-foot	Erebidae	Noctuoidea
Zanclognatha marcidilinea	Yellowish Fan-foot	Erebidae	Noctuoidea
Zanclognatha protumnusalis	Complex Fan-foot	Erebidae	Noctuoidea
Noctuoidea: Euteliidae			
Paectes abrostoloides	Large Paectes Moth	Euteliidae	Noctuoidea
Noctuoidea: Noctuidae			
Abagrotis alternata	Greater Red Dart	Noctuidae	Noctuoidea
Achatia distincta	Distinct Quaker	Noctuidae	Noctuoidea
Acronicta fallax	Green Marvel	Noctuidae	Noctuoidea
Acronicta hasta	Cherry Dagger	Noctuidae	Noctuoidea
Acronicta oblinita	Smeared Dagger	Noctuidae	Noctuoidea
Acronicta superans	Splendid Dagger	Noctuidae	Noctuoidea
Agrotis ipsilon	Ipsilon Dart	Noctuidae	Noctuoidea
Agrotis venerabilis	Venerable Dart	Noctuidae	Noctuoidea
Allagrapha aerea	Unspotted Looper Moth	Noctuidae	Noctuoidea
Amphipoea americana	American Ear Moth	Noctuidae	Noctuoidea
Amphipyra pyramidoides	Copper Underwing	Noctuidae	Noctuoidea
Amphipyra tragopoginis	Mouse Moth	Noctuidae	Noctuoidea
Anagrapha falcifera	Celery Looper Moth	Noctuidae	Noctuoidea
Anaplectoides prasina	Green Arches	Noctuidae	Noctuoidea
Anathix ralla	Dotted Sallow	Noctuidae	Noctuoidea
Anicla illapsa	Snowy Dart	Noctuidae	Noctuoidea
Apamea amputatrix	Yellow-headed Cutworm Moth	Noctuidae	Noctuoidea
Apamea dubitans	Doubtful Apamea Moth	Noctuidae	Noctuoidea
Apamea helva	Yellow Three-Spot	Noctuidae	Noctuoidea
Apamea lignicolora	Wood-colored Apamea Moth	Noctuidae	Noctuoidea
Athetis tarda	Slowpoke Moth	Noctuidae	Noctuoidea
Autographa precationis	Common Looper Moth	Noctuidae	Noctuoidea
Callopistria mollissima	Pink-shaded Fern Moth	Noctuidae	Noctuoidea
Chaetaglaea sericea	Silky Sallow	Noctuidae	Noctuidae
Chytonix palliatricula	Cloaked Marvel	Noctuidae	Noctuoidea
Condica sutor	Cobbler Moth	Noctuidae	Noctuoidea
Cosmia calami	American Dun-bar Moth	Noctuidae	Noctuoidea
Crocigrapha normani	Norman's Quaker	Noctuidae	Noctuoidea
Diachrysia balluca	Hologram Moth	Noctuidae	Noctuoidea

Eudryas grata	Beautiful Wood-nymph	Noctuidae	Noctuoidea
Euplexia benesimilis	American Angle Shades	Noctuidae	Noctuoidea
Eupsilia devia	Lost Sallow	Noctuidae	Noctuoidea
Eupsilia morrisoni	Morrison's Sallow	Noctuidae	Noctuoidea
Feltia herilis	Master's Dart	Noctuidae	Noctuoidea
Feltia jaculifera	Dingy Cutworm Moth	Noctuidae	Noctuoidea
Feltia tricosa	Tricose Dart	Noctuidae	Noctuoidea
Galgula partita	Wedgling Moth	Noctuidae	Noctuoidea
Helotropha reniformis	Kidney-spotted Rustic Moth	Noctuidae	Noctuoidea
Hyppa xylinoides	Common Hyppa Moth	Noctuidae	Noctuoidea
Lacinipolia renigera	Bristly Cutworm Moth	Noctuidae	Noctuoidea
Leucania commoides	Two-lined Wainscot	Noctuidae	Noctuoidea
Leucania inermis	Unarmed Wainscot	Noctuidae	Noctuoidea
Leucania lapidaria		Noctuidae	Noctuoidea
Leucania multilinea	Many-lined Wainscot	Noctuidae	Noctuoidea
Lithophane grotei	Grote's pinion	Noctuidae	Noctuoidea
Lithophane laticinerea	Broad Ashen Pinion	Noctuidae	Noctuoidea
Magusa divaricata	Variable Narrow-wing	Noctuidae	Noctuoidea
Marimatha nigrofimbria	Black-bordered Lemon Moth	Noctuidae	Noctuoidea
Meropleon diversicolor	Multicolored Sedgeminer Moth	Noctuidae	Noctuoidea
Mythimna unipuncta	Armyworm Moth	Noctuidae	Noctuoidea
Nedra ramosula	Gray Half-Spot	Noctuidae	Noctuoidea
Neoligia exhausta	Exhausted Brocade	Noctuidae	Noctuoidea
Nephelodes minians	Bronzed Cutworm Moth	Noctuidae	Noctuoidea
Noctua pronuba	Large Yellow Underwing	Noctuidae	Noctuoidea
Ochropleura implecta	Flame-shouldered Dart	Noctuidae	Noctuoidea
Orthodes majuscula	Rustic Quaker	Noctuidae	Noctuoidea
Orthosia revicta	Subdued Quaker	Noctuidae	Noctuoidea
Panthea furcilla	Eastern Panthea Moth	Noctuidae	Noctuoidea
Papaipema baptisiae	Indigo Stem Borer Moth	Noctuidae	Noctuoidea
Papaipema inquaesita	Sensitive Fern Borer Moth	Noctuidae	Noctuoidea
Papaipema rigida	Rigid Sunflower Borer Moth	Noctuidae	Noctuoidea
Peridroma saucia	Variegated Cutworm Moth	Noctuidae	Noctuoidea
Plusia contexta	Connected Looper Moth	Noctuidae	Noctuoidea
Phlogophora periculosa	Brown Angle Shades	Noctuidae	Noctuoidea
Polia purpurissata	Purple Arches Moth	Noctuidae	Noctuoidea
Protodeltote albidula	Pale Glyph	Noctuidae	Noctuoidea
Protolampra brunneicollis	Brown-collared Dart	Noctuidae	Noctuoidea
Pseudeustrotia carneola	Pink-barred Pseudeustrotia Moth	Noctuidae	Noctuoidea

Pseudohermonassa bicarnea	Pink-spotted Dart	Noctuidae	Noctuoidea
Raphia frater	Brother Moth	Noctuidae	Noctuoidea
Schinia rivulosa	Ragweed Flower Moth	Noctuidae	Noctuoidea
Schinia rivulosa	Arcigera Flower Moth	Noctuidae	Noctuoidea
Spodoptera ornithogalli	Yellow-striped Armyworm Moth	Noctuidae	Noctuoidea
Sympistis chionanthi	Fringe-tree Sallow	Noctuidae	Noctuoidea
Tricholita signata	Signate Quaker	Noctuidae	Noctuoidea
Xestia badicollis	Northern Variable Dart	Noctuidae	Noctuoidea
Xestia c-nigrum	Lesser Black-letter Dart	Noctuidae	Noctuoidea
Xestia dilucida	Dull Reddish Dart	Noctuidae	Noctuoidea
Xestia dolosa	Greater Black-letter Dart	Noctuidae	Noctuoidea
Xestia normanianus	Norman’s Dart	Noctuidae	Noctuoidea
Xestia smithii	Smith's Dart	Noctuidae	Noctuoidea
Noctuoidea: Notodontidae			
Cecrita biundata	Wavy-lined Prominent	Notodontidae	Noctuoidea
Clostera albosigma	Sigmoid Prominent	Notodontidae	Noctuoidea
Coelodasys unicornis	Unicorn Prominent	Notodontidae	Noctuoidea
Datana drexelii	Drexel's Datana Moth	Notodontidae	Noctuoidea
Gluphisia septentrionis	Common Gluphisia Moth	Notodontidae	Noctuoidea
Nadata gibbosa	White-dotted Prominent	Notodontidae	Noctuoidea
Peridea angulosa	Angulose Prominent	Notodontidae	Noctuoidea
Peridea basitriens	Oval-based Prominent	Notodontidae	Noctuoidea
Peridea ferruginea	Chocolate Prominent	Notodontidae	Noctuoidea
Pheosia rimosa	Black-rimmed Prominent	Notodontidae	Noctuoidea
Schizura ipomaeae	Morning-glory Prominent	Notodontidae	Noctuoidea
Papilionoidea: Hesperiidae			
Ancyloxypha numitor	Least Skipper	Hesperiidae	Papilionoidea
Poanes massasoit	Mulberry Wing	Hesperiidae	Papilionoidea
Papilionoidea: Lycaenidae			
Cupido comyntas	Eastern Tailed-Blue	Lycaenidae	Papilionoidea
Papilionoidea: Nymphalidae			
Cercyonis pegala	Common Wood-Nymph	Nymphalidae	Papilionoidea
Lethe anthedon	Northern Pearly-eye	Nymphalidae	Papilionoidea
Limenitis arthemis astyanax	Red-Spotted Purple	Nymphalidae	Papilionoidea
Phyciodes tharos	Pearl Crescent	Nymphalidae	Papilionoidea
Vanessa atalanta rubria	American Red Admiral	Nymphalidae	Papilionoidea
Papilionoidea: Papilionidae			
Papilio glaucus	Eastern Tiger Swallowtail	Papilionidae	Papilionoidea
Papilio polyxenes	Black Swallowtail	Papilionidae	Papilionoidea

Papilionoidea: Pieridae			
Colias eurytheme	Orange Sulphur	Pieridae	Papilionoidea
Pieris rapae	Cabbage White	Pieridae	Papilionoidea
Pterophoroidea: Pterophoridae			
Emmelina monodactyla	Morning-glory Plume Moth	Pterophoridae	Pterophoroidea
Pyraloidea: Crambidae			
Agriphila vulgivagellus	Vagabond Sod Webworm Moth	Crambidae	Pyraloidea
Chalcoela iphitalis	Sooty-winged Chalcoela Moth	Crambidae	Pyraloidea
Chrysoteuchia topiarius	Topiary Grass-veneer	Crambidae	Pyraloidea
Crambus agitatellus	Double-banded Grass-veneer	Crambidae	Pyraloidea
Crambus albellus	Small White Grass-veneer	Crambidae	Pyraloidea
Crambus praefectellus	Common Grass-veneer	Crambidae	Pyraloidea
Diacme adipaloides	Darker Diacme Moth	Crambidae	Pyraloidea
Elophila icciusalis	Pondside Crambid Moth	Crambidae	Pyraloidea
Eudonia heterosalis	McDunnough's Eudonia	Crambidae	Pyraloidea
Eudonia strigalis	Striped Eudonia Moth	Crambidae	Pyraloidea
Framinghamia helvalis		Crambidae	Pyraloidea
Herpetogramma aeglealis	Serpentine Webworm Moth	Crambidae	Pyraloidea
Herpetogramma aquilonalis		Crambidae	Pyraloidea
Herpetogramma sphingealis		Crambidae	Pyraloidea
Herpetogramma thestealis	Zigzag Herpetogramma Moth	Crambidae	Pyraloidea
Microcrambus elegans	Elegant Grass-veneer	Crambidae	Pyraloidea
Nomophila nearctica	Lucerne Moth	Crambidae	Pyraloidea
Pantographa limata	Basswood Leafroller Moth	Crambidae	Pyraloidea
Parapoynx allionealis	Watermilfoil Leafcutter Moth	Crambidae	Pyraloidea
Parapoynx maculalis	Polymorphic Pondweed Moth	Crambidae	Pyraloidea
Pediasia trisecta	Sod Webworm Moth	Crambidae	Pyraloidea
Perispasta caeculalis	Titian Peale's Moth	Crambidae	Pyraloidea
Pyrausta bicoloralis	Bicolored Pyrausta Moth	Crambidae	Pyraloidea
Scoparia biplagialis	Double-striped Scoparia Moth	Crambidae	Pyraloidea
Scoparia cinereomedia	Sooty Scoparia Moth	Crambidae	Pyraloidea
Udea rubigalis	Celery Leaftier Moth	Crambidae	Pyraloidea
Urola nivalis	Snowy Urola Moth	Crambidae	Pyraloidea
Pyraloidea: Pyralidae			
Acrobasis angusella	Hickory Leafstem Borer Moth	Pyralidae	Pyraloidea
Arta statalis	Posturing Arta Moth	Pyralidae	Pyraloidea
Condylolomia participialis	Drab Condylolomia Moth	Pyralidae	Pyraloidea
Euzophera semifuneralis	American Plum Borer Moth	Pyralidae	Pyraloidea

Hypsopygia olinalis	Yellow-fringed Dolichomia Moth	Pyralidae	Pyraloidea
Pococera expandens	Striped Oak Webworm Moth	Pyralidae	Pyraloidea
Sciota vetustella	Belted Leafroller Moth	Pyralidae	Pyraloidea
Sciota virgatella	Black-spotted Leafroller Moth	Pyralidae	Pyraloidea
Tortricoidea: Tortricidae			
Acleris forsskaleana	Maple Leaftier Moth	Tortricidae	Tortricoidea
Acleris nivisellana	Snowy-shouldered Acleris Moth	Tortricidae	Tortricoidea
Aethes argentilimitana	Silver-bordered Aethes	Tortricidae	Tortricoidea
Aethes biscana	Reddish Aethes	Tortricidae	Tortricoidea
Ancylis burgessiana	Oak Leaffolder Moth	Tortricidae	Tortricoidea
Apotomis albeolana		Tortricidae	Tortricoidea
Apotomis removana	Green Aspen Leafroller	Tortricidae	Tortricoidea
Archips purpurana	Omnivorous Leafroller	Tortricidae	Tortricoidea
Argyrotaenia velutinana	Red-banded Leafroller Moth	Tortricidae	Tortricoidea
Celypha cespitana	Celypha Moth	Tortricidae	Tortricoidea
Cenopis reticulatana	Reticulated Fruitworm Moth	Tortricidae	Tortricoidea
Choristoneura pinus	Jack Pine Budworm Moth	Tortricidae	Tortricoidea
Clepsis clemensiana	Clemens' Clepsis Moth	Tortricidae	Tortricoidea
Clepsis virescana	Greenish Apple Moth	Tortricidae	Tortricoidea
Cochylichroa hoffmanana	Hoffman's Cochylid Moth	Tortricidae	Tortricoidea
Coelostathma discopunctana	Batman Moth	Tortricidae	Tortricoidea
Cydia latiferreana	Filbertworm Moth	Tortricidae	Tortricoidea
Endothenia hebesana	Verbena Bud Moth	Tortricidae	Tortricoidea
Epinotia medioviridana	Raspberry Leafroller Moth	Tortricidae	Tortricoidea
Epinotia nisella	Yellow-headed Aspen Leaftier	Tortricidae	Tortricoidea
Epinotia trigonella	Birch Epinotia Moth	Tortricidae	Tortricoidea
Eucosma ochroterminana	Buff-tipped Eucosma Moth	Tortricidae	Tortricoidea
Eucosma parmatana	Aster Eucosma Moth	Tortricidae	Tortricoidea
Eucosma raracana	Reddish Eucosma Moth	Tortricidae	Tortricoidea
Eucosma tomonana	Aster-head Eucosma Moth	Tortricidae	Tortricoidea
Gymnandrosoma punctidiscanum	Dotted Gymnandrosoma Moth	Tortricidae	Tortricoidea
Olethreutes fasciatana	Banded Olethreutes Moth	Tortricidae	Tortricoidea
Pandemis lamprosana	Woodgrain Leafroller Moth	Tortricidae	Tortricoidea
Pandemis limitata	Three-lined Leafroller Moth	Tortricidae	Tortricoidea
Pelochrista similiana	Similar Pelochrista	Tortricidae	Tortricoidea
Platynota idaeusalis	Tufted Apple Bud Moth	Tortricidae	Tortricoidea
Proteoteras aesculana	Maple Twig Borer Moth	Tortricidae	Tortricoidea
Sparganothis sulfureana	Sparganothis Fruitworm Moth	Tortricidae	Tortricoidea
Syndemis afflictana	Gray Leafroller Moth	Tortricidae	Tortricoidea

Yponomeutoidea: Attevidae			
Atteva aurea	Ailanthus Webworm Moth	Attevidae	Yponomeutoidea
Yponomeutoidea: Plutellidae			
Plutella xylostella	Diamondback Moth	Plutellidae	Yponomeutoidea
Zygaenoidea: Limacodidae			
Adoneta spinuloides	Purple-crested Slug Moth	Limacodidae	Zygaenoidea
Apoda y-inversa	Yellow-collared Slug Moth	Limacodidae	Zygaenoidea
Lithacodes fasciola	Yellow-shouldered Slug Moth	Limacodidae	Zygaenoidea
Packardia elegans	Elegant Tailed Slug Moth	Limacodidae	Zygaenoidea
Prolimacodes badia	Skiff Moth	Limacodidae	Zygaenoidea
Tortricidia flexuosa	Abbreviated Button Slug Moth	Limacodidae	Zygaenoidea

5. References

1. Wagner, D. L. (2011). *Owlet caterpillars of eastern North America*. Princeton University Press.

2. Wagner, D. L. (2005). *Caterpillars of Eastern North America : a guide to identification and natural history*. Princeton University Press.

3. O'Donnell, J. E., Gall, L. F., & Wagner, D. L. (2007). *The Connecticut butterfly atlas*. State Geological and Natural History Survey, Dept. of Environmental Protection.

It's not unusual for a black bear to have three cubs.
Red squirrels know no boundaries when it comes to birdfeeders.

MAMMALS

It's easy to spot Colebrook's wildlife from house windows, backyards, roads, and areas with public access. Some mammals are most active during the day, others are more readily observed at dawn or dusk, and a few, such as fishers, are good at rarely being seen. Beavers and river otters leave their traces in the wetlands. White-tailed deer and black bears are commonplace. Moose are also around. For a list of mammals, see the Appendix.

Since the town's beginning, the number and kinds of mammals changed as its population and land use changed. Early on, trees were cut for timber, firewood and charcoal production, and fields were established for crops and grazing. Brooks and rivers supplied energy for mills and an iron forge, and a waste stream for a tannery. The peak of 1,375 residents in the 1860 census was followed by a decline, ending with a low of 492 in 1920. With less agriculture, tree cutting, and water-powered industry, most of the land slowly proceeded back to forest and wetlands. The return of appropriate habitat allowed some mammals to make a comeback; others have moved in from neighboring states to expand their range; a few have been deliberately reintroduced. DEEP released fishers in the northwest corner in 1988.

The State of Connecticut has been concerned with natural resources for centuries. It's hard to believe that white-tailed deer were ever scarce, given the all-too frequent signs of browsing on ornamental plants, crops and native vegetation we see today. The Connecticut Bureau of Natural Resources timeline records that deer hunting was prohibited in 1648, and in 1893 white-tailed deer were given "complete protection" for 10 years, which was extended to 1917. However, according to DEEP, not even a hundred years later their population peaked at 152,000 in the early 2000s. It has since dropped, with an estimate of about 110,000 in 2024. Their numbers can increase when there is a mild winter or abundant acorn crop, but several diseases affect them, plus predators such as black bears, coyotes and bobcats.

Colebrook's human population has also recovered (1,361 in the 2020 Census). Land use is still an important factor in understanding and conserving the town's natural resources. However, broad issues are affecting our habitat for mammals, including climate change, more extreme weather events, and dying ash, hemlock, and beech trees.

On a final note, the explorer, naturalist and writer Roy Chapman Andrews lived on Church Hill Road in North Colebrook after retiring as Director of the American Museum of Natural History in New York in 1942. On expeditions around the world, he discovered fossil mammals, dinosaurs and dinosaur eggs.

A quartet of gray tree frogs showing different coloration.

The red-spotted newt, better known as the red eft, is often seen during wet weather. It is born in water, then spends 3-5 years on forested land before returning to water to breed and live as an adult.

AMPHIBIANS AND REPTILES

The frog-jumping contest has been a tradition for years at the Colebrook Fair. Contestants have ranged from giant bullfrogs to the tiniest spring peeper, although size doesn't always indicate a willingness to jump on demand. Frogs are commonly heard rather than seen — a chorus of those tiny spring peepers coming from wetlands is a sure sign of spring. Wood frog and gray tree frog vocalizations are sometimes mistaken as bird calls. Other amphibians we may often see are toads and red-spotted newts (red efts are the juvenile stage). Unfortunately, warm rainy nights often motivate them to cross roads, where some won't survive traffic. See Appendix for a list of amphibians and reptiles.

Wood frogs and spotted salamanders must have vernal pools to lay their eggs in; other amphibians may use vernal pools as well. Forests, all kinds of wetlands —wooded swamps, bogs, streams, springs, plus meadows, grasslands, and rocky slopes are important habitat for reptiles or amphibians during their adult life. Even a small salamander can travel hundreds of feet away from the area where it was born. See Map 18 Critical Habitats and Vernal Pools.

There are no venomous snakes in Colebrook, although the Eastern milk snake can be confused with the copperhead because of its patterning. Milk snakes are harmless. They hunt mice, and because they frequented cow barns looking for their prey, were given the common name.

Michael W. Klemens did field work in Colebrook for his 1993 book, *Amphibians and Reptiles of Connecticut and Adjacent Regions*. Last year, DEEP published *Conservation of Amphibians and Reptiles in Connecticut* by Michael Klemens, Hank Gruner, Dennis Quinn and Eric Davison. The chapter on conservation at the municipal level discusses how land-use decisions can help keep amphibians and reptiles in our landscape. The Town Plan, Natural Resources Inventory (NRI), Planning & Zoning and Inland Wetlands regulations are all important parts of this, as are actions by landowners.

The Eastern garter snake is slender and grows 18-40 inches long. It feeds on insects, slugs, worms and other small animals. In turn, it becomes food for other larger animals.

FISH AND AQUATIC HABITATS

Colebrook has always been a friendly haven for fisherman. Whether you are a fly fisherman or wielding a spinning rod from the banks, Colebrook waterways offer wonderful opportunities.

Colebrook's elevation and hilly terrain are ideal to support cold water fish species such as the native eastern brook trout and the tiny, exotic-looking slimy sculpin. Because of this, Colebrook's waters are part of an important network in northwestern Connecticut to maintain populations of these species. More about the state's Coldwater Fisheries and their importance may be found at https://portal.ct.gov/deep/water/inland-water-monitoring/cold-water-stream-habitat-map. The town also has warmwater fish habitat in several reservoirs, ponds, and other open water areas embedded in wetlands. Some streams have intermediate temperatures. For a list of fish in Colebrook, see Appendix 7.

State Stocking Program

The Fisheries Division of the Department of Energy and Environmental Protection (DEEP) helps conserve and restore fish populations as well as raises and stocks certain fish to support recreational fishing. Trout and Atlantic salmon are popular stocked fish. While there are wild brook trout and wild brown trout in Colebrook, those species and rainbow trout have all been stocked here as well.

Sandy Brook was once part of a federal program to restore Atlantic Salmon to the Connecticut River watershed, but that program ended in 2013. The Fisheries Division still raises the Connecticut River strain of salmon at the Kensington State Fish Hatchery and continues stocking in the Naugatuck River and Shetucket River Atlantic Salmon Management Areas.

Freshwater Record Fish

The DEEP online list of Freshwater Record Fish includes two from Colebrook: a northern pike weighing 29 pounds caught in the West Branch Reservoir in 2020, and a rock bass weighing 1 pound 3 ounces caught in the Colebrook Reservoir in 1989. https://portal.ct.gov/deep/fishing/freshwater-fishing-guide/freshwater-record-fish.

DEEP Fish Surveys

Over the years, the Fisheries Division of DEEP has conducted non-lethal electroshock surveys in some of Colebrook's waterways, such as Sandy Brook and its tributaries, Center Brook, Loon Brook, North Brook, and smaller unnamed feeder streams, Slocum River, West Branch Reservoir and its tributaries, and Colebrook River Lake Reservoir. Information for the list of Colebrook fish was obtained from the Fisheries Department. Its statewide fish sampling data can be found online in the at https://cteco.uconn.edu/projects/fish/viewer/index.html — the Fish Community Data Viewer. Two stations in Colebrook have been sampled multiple times between 1992 and 2017. With less frequent sampling, the other 14 stations provide informative snapshots of the fish communities in different locations and habitats. This data was used in the narrative below. In the absence of land

use changes or infestations that would have altered aquatic habits and water quality, fish communities are likely to be similar in 2024. Exceptions would be stocked game fish and migratory fish species. With ongoing climate change, there is a greater need for repeat surveys. Some water quality tests were conducted for this Natural Resources Inventory. Water quality in Sandy Brook continues to be excellent.

Fish Communities

Different fish assemblages occupy different habitat categories. Colebrook has multiple types of fish habitat, ranging from large water bodies such as Colebrook River Lake Reservoir to small ponds and low gradient waterways bordered by organic marsh and shrub swamp (e.g., Loon Brook). Sandy Brook and its tributaries are relatively fast-flowing watercourses with a rocky-gravelly substrate; this is termed "lotic" habitat. Some lotic watercourses are small, steep, headwaters streams, while others are sizable brooks or small rivers. Some are outlet streams from a pond or lake. Others are fed by seepage from a forested hillside.

Coldwater Streams

Blacknose dace and longnose dace are the most abundant, widespread fish of Colebrook's, rocky, shaded, fast-flowing streams. They are two small, native species in the Cyprinidae (Carp - minnow) family: Creek chub, a third native Cyprinid, is also characteristic of Colebrook's small fast-moving streams (called lotic water). A fourth native cyprinid, fall fish, was recorded by DEEP only in Thorne Brook, in the far northwestern, forested corner of Colebrook. Cyprinid characteristics include a single dorsal fin and three ventral fins. Many of them develop red coloration during spawning season, and some, like creek chub, construct nests. White suckers are large, bottom-feeding fish (up to two feet) that spawn in shallow riffles in the spring, though they move to larger rivers or lakes for the rest of the year.

Wild brook trout and slimy sculpin are two declining native fish species that prefer small, shaded, cool streams. Low numbers of wild brook trout were recorded in most samples from fast-flowing, rocky (lotic) streams. However, this species has been abundant in a few small tributaries with forested, entirely undeveloped headwaters (not downgradient of ponds). Slimy sculpin and another small fish called tesselated darter occurred in only a very small fraction of samples. Slimy sculpin was abundant in only one small stream in Algonquin Forest, with a pristine forested watershed.

Instream Habitat Characteristics

Sandy Brook and portions of most of its tributaries was inspected in 2023 and 2024 through the grant from the Farmington River Coordinating Committee for the Natural Resources Inventory (NRI). Habitat features like pools, variable water depths, tree canopy cover, and large woody debris were noted, but fieldwork focused most on the substrate. A clean, rocky-gravelly substrate, not depleted of oxygen, is important for the reproduction of all these fish species, and also as substrate for their invertebrate food. Both of the dace species, common shiners, and white suckers all spawn in riffle areas. Creek chub and fall fish piles up stones to build a nest. Trout make a "rudd": they lay eggs in a dug-out depression and then cover them with gravel. Field inspections showed that rocks and gravel were largely free of silt or algal scum, and were not embedded by thick sand deposits. Ample suitable spawning habitat was available.

Rocks at several locations along Sandy Brook and its tributaries were also checked for macroinvertebrates, which serve as food for these coldwater fish species (along with smaller fish). Many were still evident, though protracted, high velocities due to the frequent heavy rains in the summer of 2024 had washed some of the aquatic insects downstream, reducing abundance in some areas. The DEEP Fisheries Division has also sampled macroinvertebrates at some of the fish sampling stations. The DEEP and NRI surveys all found diverse taxa of macroinvertebrates, including many families of pollution-sensitive mayflies, stoneflies and caddisflies. Results of water quality testing for nutrient levels, conductivity, and pH were excellent, consistent with field observations, and robust populations of sensitive taxa of both fish and macroinvertebrates.

Lentic, Warmwater Habitats

The Reservoirs

These are the town's largest still, fresh water bodies (called lentic water). They are a public fishing area and have been stocked with game fish for several decades. Non-native fish species comprised a large portion of the DEEP samples from the West Branch Reservoir: The 2017 DEEP sample had 20 small mouth bass, 85 rock bass, 29 blue gills, and 10 stocked rainbow trout—all non-native. The native species are yellow perch (9) and white sucker (7). This station has been sampled six times since 1992. Recent samples no longer included brown bullhead and golden shiner, both native species of lentic habitats.

Rainbow smelt was abundant until 2013, and has since dropped out of the community. This schooling, streamlined fish can be anadromous (only in the Housatonic basin in Connecticut) or non-anadromous. White sucker numbers have also dropped to a low, but apparently stable level. Small mouth bass numbers, however, have increased. Numbers of stocked trout continue to be abundant, in support of the recreational fishery.

Loon Brook Wetland System

In 1988, on the east side of town, six native warmwater fish species were collected from the slow flowing waters of the Loon Brook system, a tributary of Sandy Brook. They were red-breast sunfish; pumpkinseed; and golden shiner, which is also round like a sunfish, not stream-lined like common shiner; the brown bullhead catfish; American eel; and the large, fierce-looking, chain pickerel. Loon Brook is bordered by shrub swamp and emergent marsh. It is a headwaters stream and not stocked.

A resurvey would be helpful, to find out whether these six native fish species are still present in the Loon Brook wetland complex. It is likely that at least five of them are, since minimal land use changes have taken place there. The exception may be the migratory, catadromous American eel, which was also in most of the Sandy Brook samples collected before 2000. The 2004 sample from lower Sandy Brook had 11 eels, but numbers have dropped sharply at that station in recent years. Eels may encounter assorted hazards on their long journeys to and from the Sargasso Sea. No recent data from Loon Brook is available.

Other Lakes and Ponds

DEEP data is available only for the reservoirs and for the downgradient, southern portion of Loon Brook. Lake Triangle, Gaylord Pond, Wright's Brook Pond, Phelps Pond, and Simons Pond. Many other smaller ponds were not sampled by DEEP. Samples from stream reaches close to an upstream or downstream pond did include low numbers of fish species typical of still-water (lentic) habitats.

For example, a few bullhead catfish and pumpkinseed sunfish were in a 2009 sample from North Brook, a quarter mile upstream of Lake Triangle. Two native species found in samples from both Loon Brook and West Branch Reservoir are likely to be in other water bodies as well: golden shiner and bullhead catfish. Also expected are species recorded in lotic habitats but known to occur in still waters as well, like white sucker and spottail shiner. The common Centrarchids (sunfish family) are expected: introduced blue gill, pumpkinseed, rock bass, and smallmouth bass; also yellow perch. Redbreast sunfish would also be possible in streams flowing slowly through marshland and shrub swamp.

Lentic Habitat Characteristics

Colebrook lakes and reservoirs do have vegetation in near shore waters, which is needed for spawning and as a refuge for several fish species, such as yellow perch. Though bathymetric surveys have not been done, each of the larger water bodies has a central section free of vegetation and deep enough that there will be water below the ice through the winter.

Shorelines are largely vegetated, such that shade prevents excessive temperatures, and soils do not erode. Leaf litter from near-shore trees and shrubs and from beds of burreeds, cattails, and other emergent plants are sources of decomposing plant matter. Along with the fungi that grow on the dead leaf fragments, they comprise the foundation of the food chain. They are food for zooplankton, snails, and other assorted benthic organisms, eaten by the smaller warmwater fish. However, persistent algal blooms have not been reported to the town; such blooms often occur in ponds and lakes due to excessive nutrients from decaying vegetation, fertilizer runoff, or septic system leachate.

So far, the town has not received reports of submerged aquatic plants so thick that they impede boating. There has not yet been a need to request a lake vegetation survey by the Connecticut Agricultural Experiment Stations to identify and map the potential invasive aquatic plants.

However, dense stands of cattails or common reed were observed near several residential lots, which were likely supplying excessive nutrients in runoff. The marsh vegetation intercepts excessive nutrients, using them for dense, rapid growth, and protecting the fisheries habitat in lakes and ponds. The extensive forested buffers along Colebrook's waterbodies also keep nutrient levels low. Tree roots also take up nutrients, and microbes in saturated wetland soils transform bioavailable nitrogen into atmospheric nitrogen.

The Fish Communities and Aquatic Habitats narrative was contributed by Sigrun N. Gadwa, Carya Ecological Services.

The Importance of Macroinvertebrates

DEEP defines a healthy waterbody as "one that supports a variety of uses, including aquatic life use." The presence of very sensitive organisms known as macroinvertebrates in a sample indicates the water is healthy for aquatic life, including larger organisms such as fish that feed on them. Since 1999, macroinvertebrates have been collected by volunteers in streams across the state and sent to DEEP for identification through a water quality monitoring program called Riffle Bioassessment by Volunteers. The results are published in an annual report, available online with an interactive map that includes historic data. Through this program, the water quality of brooks in Colebrook have been rated as excellent and very good. Sites monitored in Colebrook include Center Brook, Sandy Brook, Doolittle Lake Brook, Slocum Brook and North Brook. The list of macroinvertebrates identified include various species of mayfly, stonefly, caddisfly, water penny, dobsonfly/fishfly, dragonfly, non-biting midge, aquatic worm, crane fly, and aquatic snipe fly. Protecting the land surrounding our brooks has an important role in maintaining high water quality for these small, often unseen organisms.

Above: There is a scenic trail open to the public around the beaver pond at the U.S. Army Corps of Engineers property on Rt. 8.

Left: Eastern view across Lemanquis (Simons) Pond from Simons Pond Road.

Below left and right: A female dobson fly and giant mayfly, both macroinvertebrates in the aquatic food chain. They spend their nymph and larval stages in water, where they recycle nutrients and provide food for other organisms, especially fish.

TABLE 1. SURFACE WATER ANALYTICAL RESULTS FOR SANDY BROOK AND TWO TRIBUTARIES, WRIGHT BROOK AND CENTER BROOK, TESTED IN COLEBROOK, CONNECTICUT FOR THE 2024 NATURAL RESOURCES INVENTORY

Sampling Station:	***Sandy Brook***	***Wright Brook***	***Wright Brook***	***Center Brook***	***Center Brook***	***Standards***
Date:	6/4/2024 3:10 PM	5/28/24 3 PM	6/4/2024 1:15 PM	5/28/24 3 PM	6/4/24 2:05 PM	
Conductivity (µS/cm)	99.1	98.1	98.0	100.5	124.0	NE
Salinity (ppt)	0.1	414.0	0.1	0.1	0.1	NE
Temperature (°C)	22.2	0.1	23.1	16.0	18.2	NE
pH	6.19	5.45	5.22	5.22	5.85	as naturally occurs[1]
ORP (mv)	173.0		214.0		196.0	NE
NUTRIENTS	6/4/2024 3:11 PM					***Standards***
Total Phosphorus as P (mg/l)	0.150					only of natural origin (ug)[1] 0.02375[2]
Nitrate-N (mg/l)	0.09					0.31[2]
Nitrite-N (mg/l)	0.01					NE
Kjeldahl Nitrogen	0.870					NE
Total Nitrogen (calculated)	0.97					5[1]; 1.26[2]
METALS						***Standards***
Calcium (mg/l)	6.41					non-toxic, low
Magnesium (mg/l)	2.36					low
Manganese (mg/l)	0.002					low (recommended health threshold is 0.05)
Sodium (mg/l)	10.0					low (recommended health threshold is 20)
Zinc (mg/l)	<0.004					0.0048 (chronic tox.)[1]
Copper (mg/l)	<0.005					0.00582 (chronic tox.)[1]
NOTES:						

[1] CT Standards.

[2] EPA Nutrient Criteria (draft) for EcoRegion 1V, Level 11 Ecoregion 59 (coastal New England).

Metering Instruments: YSI 30 for specific conductivity, salinity, and temperature. Milwaukee pH 58max for pH and ORP.

Samples for Metals and Nutrient analyses collected by Carya Ecological Services, LLC.

Nutrient and Metals Analyses by Phoenix Environmental Laboratories, Inc.,Manchester, CT. Phoenix report included.

TABLE 2. IN-STREAM AND RIPARIAN HABITAT ALONG TYPICAL SEGMENTS OF SANDY BROOK AND FOUR TRIBUTARIES IN COLEBROOK, CONNECTICUT

	STREAM MORPHOLOGY	INSTREAM HABITAT AND SUBSTRATE	VEGETATION BY WATERCOURSE	FAUNA
Sandy Brook Just north of of Sandy Brook Rd., at bridge 0.4 mi west of Rt. 8 5/27/2024; 6/4/2024	**Width of Stream Channel:** 38' **Stream depth:** ~ 8-11" **Meanders?** 120' straight reach **Bank height:** 3.5' from water surface up to sand deposit at flooding limit; bank armored with boulders, 2.5:1 slope **Pool:** 13' across, 15' deep, usual flooding limit	**Habitat Type:** Riffle-run-pool, moderate to fast flow **Substrate:** boulders 5% scattered, small **cobbles:** 80% **sand/small gravel:** 20% **large woody debris** present; clean substrate, no black slime	**Trees:** black oak, yellow birch, basswood, tree of heaven **Shrubs:** witch hazel, *Lyonia*, smooth alder, *Spiraea*, striped maple saplings and seedlings **Herbs:** royal fern, Robert's geranium, partridgeberry, tree-clubmoss	See **Table 3. Bioassessment** for invertebrates; Northern water snake, Northern two-lined salamander (*Eurycea bislineata*)
Doolittle Lake Brook Just west of Rt.183 along marsh 12/1/2023	**Width of Stream Channel:** 5-6' a moat between marsh and forest; 8-10' open "bench" between forest and marsh with emergent/ sapling vegetation **Banks:** stable—moss, sedge tussocks, fern clumps	**Habitat Type:** Sandy bottom, low-gradient, slow flow	**Trees:** Large, 3-4' dbh white pines, smaller hemlocks, yellow birch **Shrubs:** mountain laurel, beech, *Lyonia*, alder, *Spiraea*, striped maple saplings and seedlings **Herbs:** royal fern, tree-clubmoss, cinnamon fern, partridgeberry	signs of coyote, otter, beaver and deer
Wright Brook Just southwest of Smith Hill Rd. below culvert 5/27/2024, 6/4/2024	**Stream Width:** 35', fills channel wider downstream **Meanders?** Yes **Bank height:** 6.5' from fill bank down to water surface	**Habitat Type:** low-moderate gradient, slow flow. Nearby pond downgradient — see **NRI Map 3 Topographic Map**. Sunny streamside with meadow species; close to moderately busy road	**Trees:** sugar maple, tulip tree, cottonwood **Shrubs:** elderberry, elm sapling, Virginia creeper (*Clematis virginiana*) **Herbs:** ragged robin patches, bracken fern, orchard grass, mugwort	damsel fly, gomphid dragononfly, common blue damselfly, pearl crescent butterfly, adult alderfly
Center Brook Downstream of bridge on Pisgah Mountain Rd. 5/27/2024, 6/4/2024	**Width of Stream (fills channel):** 28' **Stream depth:** 7-9" **Meanders?** Yes **Banks:** boulders, moss and leaf litter on stable banks (3:1 slope)	**Habitat Type:** riffle-run-pool, high-gradient, fast flowing **Substrate:** boulders 5% **cobbles:** 40% **sand/small gravel:** 60% clean substrate, no black slime, very pollution-sensitive macro-invertebrates present	**Trees:** sugar maple, 4' white pine, large healthy hemlocks, yellow birch **Shrubs:** hobblebush, locust and yellow birch saplings, striped maple saplings and seedlings **Herbs:** Christmas fern, seedlings of native yew, Intermediate wood fern, sparse under hemlocks	many crayfish, case caddisflies, netspinner caddisflies, mayflies, adult fishfly, stoneflies, Northern dusky salamander and odontocerid caddisfly in feeder seep[1]
North Brook North of Beech Hill Rd., west of brook 11/15/2023	**Stream Width:** 10-12', fills channel, wider downstream **Stream depth:** 1-7" **Meanders?** Yes **Pool:** 13' wide, 12" deep **Banks:** mossy, small boulders, stable, ~ 1 foot, usual flooding: 2.5" over bank based on limit of sand deposition.	**Habitat Type:** low gradient **Substrate:** gravel (to 3") dominates, some rounded cobbles, boulders; flows through broad, shaded, level area. Several side channels. Adjacent ground is undulating, not tilled in the past. North Brook is outlet stream of Lake Triangle, with dam structure managing water levels. Stream is lower in summer when lake is full.	**Trees:** mature (~20") hemlocks dominate, red oak, beech, few black cherry **Shrubs:** beech sprouts, hemlock sapings **Herbs:** sparse under hemlocks, partridge berry, clubmosses (*Dendrolycopodium obscurum*), Christmas fern, long-awned wood grass	Low densities of stream macro-invertebrates is likely related to water level manipulation. Lake mussels common in drawdown zone.

[1]The odontocerid (strong case-maker caddisfly) and dusky salamander caught in the feeder seep to Center Brook indicate excellent clean water.

Prepared by Sigrun Gadwa and Juan Sanchez (Carya Ecological Services, LLC) for the Town of Colebrook 2024 Natural Resources Inventory.

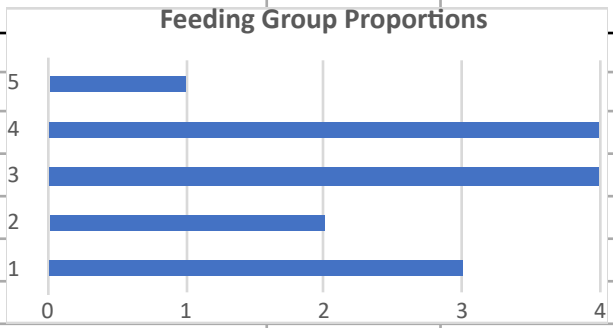
TABLE 3: BENTHIC MACRO-INVERTEBRATE BIOASSESSMENT

Site: Sandy Brook, riffle just upstream of bridge on Sandy Brook Rd., 0.25 miles west of Rt. 8, Colebrook, CT

Date: 9/30/2024, with limited sampling on 5/28/2024 | **Sample Collector:** Juan Sanchez, Kaitlyn White

Identification: Juan Sanchez, Sigrun Gadwa | **Tabulation:** Sigrun Gadwa

Scientific Name	Common Name	Number of Families	Number of Specimens	Family Pollution Tolerance Score	Comments
Order Trichoptera	**Caddisflies**	3			
Glossomotidae	Saddleback casemakers		6	0	Scraper. May collection.
Hydropsychidae	Net-spinners		5	4	Collector-filterer, one was very dark
Polycentropodidae	Tube-makers		5	6	Collector-filterer; feeder on organic matter particles
Order Plecoptera	**Stoneflies**	3			
Leuctridae	Needleflies		2	0	Shredder; small, slender, live in fast streams
Perlidae	Common stonefly		2	1	Predator
Perlodidae	Stripetail stonefly		1	2	Predator
Order Ephemeroptera	**Mayflies**	4			
Baetidae	Minnow mayfly		4	4	Collector-gatherer
Heptageniidae	Flat-headed mayfly		2	4	Scraper; nutrient tolerance varies
	Epeorus spp.		4	0	
Oligoneuriidae	Brushleg mayflies			2	Collector-filterer
	Isonychia spp.		3	0	
Siphlonuridae	Small minnow mayfly		1	7	Collector-gatherer
Order Coleoptera	**Beetles**	1			
Psephenidae	Water penny beetle		1	4	Scraper
Order Diptera	**Flies**	3			
Athericidae	Aquatic snipe fly		4	2	Predator
Blephariceridae	Net-winged midges		2	0	Scraper; suction cups adhere to rocks in fast-moving water. May collection.
Tabanidae	Horse flies		1	6	Predator
Non-insects					
Hydrachnidae	Aquatic mites	1			
	Totals	**15**	**43**		



Feeding Group	**Metrics**
Shredders 1	**Total Specimens: 43**
Predators 5	**% Chironomids: 0**
Scrapers 4	**Taxa Richness: 15 families**
Collector-gatherers 2	**EPT families: 11**
Collector-filterers 3	**EPT specimens: 39**
	% EPT specimens: 83
	Community balance: good

Notes:

1. The **ETP** familes are those in the orders Ephemeroptera, Plecoptera, and Trichoptera, with more sensitive taxa.

2. Good representation of each of the feeding groups indicates a diverse mix of feeding strategies and a healthy community.

Excessive numbers of collector-gathers/filterers can result when stream nutrient levels are elevated.

This report was prepared by Carya Ecological Services, LLC for the 2024 Colebrook Natural Resources Inventory.

View east across Colebrook, showing the extent of forest

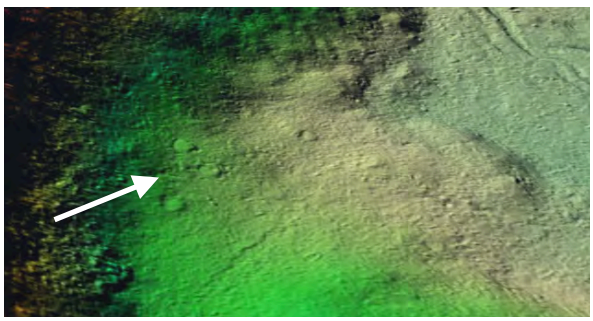
Plants: Seeing the Forest and the Trees

A Brief History

Colebrook lies in the northwest highlands of Connecticut, often called the Litchfield Hills or foothills of the Berkshires, with elevations ranging from 506 to 1,566 feet and temperatures historically cooler than most of the state. The vegetation we see today is the result of plants and animals moving in and interacting since the last Ice Age about 10,000 years ago. Indigenous people likely only used the area seasonally, for hunting, fishing and other foods. European settlers came to stay in the 1760s and established a sawmill on Center Brook as one of the first priorities. An account by founder Reuben Rockwell, Sr., said "the whole town [was] one entire forest covered with heavy timber" and land was cleared by girdling trees, waiting three years, and then removing the fallen wood. Trees became lumber, fencing and fuel.

Charcoal Production

The iron industry was active in Connecticut from 1734-1923 and Colebrook was part of it, contributing both bloomery forges and charcoal. The Richard Smith forge by the Still River in Robertsville operated from about 1771-1810; Rockwell forges along Center Brook were operating from 1773 (or earlier)-1803; the Phelps forge by Doolittle Lake Brook in North Colebrook operated from 1788-1807. Bloomery forges reworked pig iron made by blast furnaces, such as those on Lower Road in Canaan. The charcoal used by forges and blast furnaces was made by colliers who cut wood in the winter, then burned it in spring and summer in charcoal hearths (charcoal pits). The hearths measured 25-30 feet wide by 15 feet tall, and it took about two acres of forest to build one. Each required 30 cords of wood, carefully arranged and then covered with soil and leaves or charcoal dust from a previous burn to allow a controlled burn over two weeks. One collier could manage the burning of 3-4 hearths at a time, so they were often clustered together. Colliers were paid by the species of tree used, with hardwoods yielding the best charcoal and pine giving the lowest grade. The hearths were reused and the area previously cut could be harvested again after regrowing for 20-30 years.



LiDAR image of a cluster of 3 charcoal hearths (charcoal pits) in Colebrook

Charcoal hearths can be readily spotted by their size and shape. Remnants of black dust and small bits of charcoal are also there. Studies in Litchfield County and around the world confirm that the soil on charcoal hearths is chemically and physically different than surrounding soil. Little grows on these areas even today, making them easy to find during a walk in the woods.

Old-Growth Forest

Early settlers encountered trees of remarkable size. In 1789, Capt. Arah Phelps built a house and inn in North Colebrook, which his descendant Nancy Phelps Blum described in her book, *One Old House: Its People and Its Place*:

"…these builders could indulge their natural bent for working with massive timbers, and carrying on the English tradition, most of the Inn's frame is oak. Surprisingly, however, the four long timbers which carry the roof, called the plates, are of beech.…A stand of beech of such immensity, containing trees huge enough to obtain four plates with a girth of twelve by eighteen inches over a length of thirty-eight feet, is unbelievable."

The 630-acre Phelps farm remained in the family for generations and included a sawmill on Sandy Brook. An area of old growth trees remained until it was cut in 1912 for financial reasons, but fortunately, the area was studied beforehand. In a *Forest Survey of Litchfield County* in 1909, State Forester Austin Hawes wrote that Carrington Phelps in North Colebrook "has from two to three hundred acres of timber, the equal of which it would be difficult to find in New England. It is for the most part a mixture of immense hemlock, beech, yellow birch, sugar maple, fine black cherry, ash, chestnut and oak, with a few giant white pines, and represents the most perfect mixture of the northern and southern New England forest types that the writer has ever seen." In his 1913 paper, *The Vegetation of Connecticut,* Yale professor George Nichols further described the massive size of the mature trees: from 23-39 inches in diameter, usually clear of branches from 39-59 feet above ground, an average age of mature trees about 275 years, with a maximum of about 350 years. He noted the "surprisingly small" diversity of wildflowers likely due to the deep shade and lack of diverse habitats in the forest, and also commented "the scarcity of autumn flowering plants is remarkable."

Sigrun N. Gadwa, Carya Ecological Services, contributed to the Plant narrative below, using Botanist William Moorhead's 2001 report on the Kitchel Wilderness Natural Area Preserve as an important source.

Plant Communities Today

Overview

Colebrook continues to be distinguished by its forests, which clothe the landscape in much of the town. Many wooded areas are now under protection of some kind, such as the Algonquin and Tunxis State Forests, Kitchel Wilderness Natural Area Preserve, lands of Aton Forest and the Colebrook Land Conservancy. A conservation easement is planned for the watershed lands of the Metropolitan District Commission now that abandonment of its drinking water rights has been approved. See Map 16 Open Space & Permanently Protected Lands.

Map 15 Forest Resources shows where the town is still largely forested. While no tree in town would now match Nichols' description, you can find enormous white pines, sugar maples and oaks that got their start more than a century ago. Trees have grown back everywhere in Colebrook after repeated clearings and cuttings, and the mix of northern and transition forest types remains—hemlock, beech, birch, maple, cherry, ash, chestnut, elm, oak, aspen and white pine. You can also still find the shrubs, ferns and most wildflowers listed by Nichols in 1913, and by ecologist Frank Egler in his 1940 thesis, *Berkshire Plateau Vegetation*, which included Colebrook. A wide variety of native plant communities are associated with the landscape features, soil types, and hydrologic regimes in Colebrook. Some plant species are limited to a narrow ecological niche, such as a cool habitat; others are widespread. A species may be dominant in its preferred habitat, but also occur in lower numbers in other habitat types. Invasive plants can benefit from the increased sunlight, disturbed soils and mowing under powerlines and along roadsides.

There are hillsides, ravines, cliffs, bedrock outcrops, summits, talus slopes and wetlands, all supporting interesting trees, shrubs, vines, wildflowers, mosses, fungi and lichens. Several distinctive types of upland forest and woodland can be differentiated depending on landscape and soil characteristics, such as position in the landscape, slope aspect (direction facing the sun), rock cover, soil depth, and slope steepness. These key ecological factors affect the moisture levels, light levels, and soil temperatures. They also influence soil nutrient levels and affect vulnerability to windthrow and flooding and to competition with other plants.

Forests on Gentle Terrain

Forest communities have grown back on gentle terrain that was likely farmed and/or frequently logged in the past. Successional forest occupies two such areas with soils derived from thick, loamy, compact till (dark olive green on Map 12 Surficial Materials). One area is to the southwest of Beech Hill, near Simons Pond. The second, a drumlin, borders marshland in the Loon Brook basin. Other examples of second growth northern hardwood forests on even, boulder-free soils include soils derived from glacial outwash (shades of rufus and orange on Map 12 Surficial Materials). They include the Hale Farm near the center of town and the forest near Doolittle Lake Brook with magnificent, large white pines. Both areas support mature forest in level to gentle-sloping terrain that has not been farmed or logged for decades.

Forests on gentile terrain have the same suite of trees as in hilly areas: sugar maple, red maple, white pine, northern hemlock, beech, yellow and black birch. However, post-agricultural land in the early stage of regrowth has more more linear strips of forest—hedgerows and roadside buffers. It is also more likely to have large patches of a single tree species that seeded in from a nearby seed source, such as a white pine grove or a dense stand of black birches on formerly tilled ground. Light-loving colonizers such as black cherry, gray birch, willows, and common cottonwood are also present along the edges of roads, fields, and ponds.

Post-agricultural wooded areas have widespread shrub species such as mountain laurel, winterberry, and witch hazel. The understory is less diverse than in rocky forests, but still can have native understory herbaceous species, such as hay-scented fern, Christmas fern, wild-lily-of-the-valley, white wood aster, wild lettuce, spotted wintergreen, violets, shinleaf, cucumber root, and Jack-in-the-pulpit. These native shrub and herbs are also found in the Algonquin State Forest.

Fine second growth, northern hardwood forests may be readily observed by the general public along gentle terrain —for example, the Cooper Trail at the Town Recreation Area or the town-designated scenic road, Pisgah Mountain Road. Uncommon or rare wildflowers with limited dispersal capacity have not recolonized most formerly farmed or logged areas, though higher botanical diversity persists in forested areas that had limited man-made disturbance.

Finally, regrowing hardwood forest can have many edges and embedded well-lit old fields and clearings. They are more vulnerable than unfragmented forests to infestation by light-loving invasive species such as Asiatic bittersweet and burning bush. Asiatic bittersweet can kill and damage trees, incurring high costs for tree-work. It also impedes tree and shrub regeneration, and reduces native herb diversity, especially along forest edges.

Forests on Rocky, Hilly Terrain

In rugged, hilly, forested areas the soils are mostly coarse-loamy and stony, derived from glacial till. They are light green on Map 12 Surficial Materials. Shallow-to-bedrock soils in the Chatfield and Hollis series are associated with bedrock outcrops and higher elevations. Plant communities may be dominated by oaks, black birch, white pine, and/or hemlocks and drought-tolerant herbs. On exposed summits, very steep slopes, and knolls tree growth is reduced or prevented by shallow rooting depth and/or and exposure to high winds and temperatures. Characteristic sedges, grasses, and shrubs can survive these conditions.

The full range of rocky, forested plant communities may be found in the Kitchel Wilderness Natural Area Preserve, a state property located on the northeastern side of Sandy Brook, bordered by Algonquin State Forest. Botanist William Moorhead described the preserve in depth in a 2001 state report, an important source for this section. Botanist Elizabeth Farnsworth wrote a management plan for the preserve in 2003. The preserve is also bordered by the Sandy Brook Natural Area Preserve. Ecologist Harry White wrote its management plan in 2011.

On the lower slopes of substantial hills, the soils are usually deeper, richer, and somewhat moister. Sugar maple is a dominant hardwood and wildflowers and ferns are noticeable, especially in spring.

East-facing slopes are often very steep in Colebrook, and east/southeast facing slopes and summits can support a unique hickory glade plant community now identified by CT DEEP as a critical habitat (see Map 18 Critical Habitats and Vernal Pools). It was recognized by Norfolk ecologist Frank Egler in 1940 and occurs in several places in Colebrook, with red oak, shagbark hickory, hop-hornbeam and Pennsylvania sedge as main components. An example of this dry, subacidic forest is on the town's Charles Arnold Recreation Area.

Mesotrophic Forest Communities

As in post-agricultural areas, soils with a moderate level of nutrients (mesotropic) also support sugar maple, yellow birch, black birch, red oak, beech, basswood, Eastern hemlock and white pine. Yellow birch trees are limited to moist or wet sites and may be common. Basswood, ironwood and hop-hornbeam can occur as well. Eastern hemlock occurs in single species stands on shaded (north-facing), very steep hillsides with shallow soil, on upper slopes intermixed with black and scarlet oaks, pignut hickory, and white pine and on moist to wet lower slopes.

Within the “catchall” category of “mixed hardwood forest,” sugar maple is the dominant tree in the rich, low-slope community with diverse spring wildflowers, ferns and shrubs. On concave hillsides, sugar maple is also dominant in the mid-slope landscape position, but the understory consists of species which do not need such rich soil, such as witch hazel, New York fern, hay-scented fern, wild cucumber root, and Jack-in-the-pulpit. Sugar maple is an important, beautiful tree townwide, in relatively moist but well-drained habitats with moderately high nutrient status. It grows in woodlots, hedgerows, residential yards, and along roadsides, often associated with black cherry, white pine and hemlock.

Lower Slope Forests

Landscape position affects soil moisture regime and nutrient status. Lower slopes and concave hillsides, tend to have rich, moist soil. In contrast, on upper and mid-slopes, soils are drier and less fertile. Groundwater picks up minerals as it flows downhill, especially where pervious surface soils are underlain by bedrock or compact till. A suite of rich-site spring ephemeral wildflowers such as blue cohosh, foam flower, and yellow violet may be found on the lower slopes of Corliss Mountain in the Kitchel Natural Area Preserve, along with generalist moist-site herbs such as jack-in-the pulpit. Associated woody species include yellow birch, which needs moist soil, and sugar maple, which thrives in moist, fertile soils. Basswood, alternate-leaf dogwood, striped maple, and hobblebush are also present. Christmas fern, long beech fern, ferns in the Dryopteris genus, and interrupted fern are characteristic. Rich slope-base communities may be also be found near Pisgah Mountain Road, at YMCA Camp Jewel, on Eno Hill, and at the base of the highlands in the Algonquin State Forest along Sandy Brook. The low slope communities described above occur both upslope and downslope of the wetland boundary, but not in soils with protracted saturation to the surface. Many plant species occur in both uplands and wetlands. The riparian buffer forests along the larger brooks may have layers of rich alluvial soil, and may also support many of the “low rich site” plants, though not if there is frequent flooding of the banks. Wildflowers such as spring beauty and Dutchman’s breeches are sometimes observed on wooded riparian terraces.

Note that in contrast to rich site specialists, limited to moist rich, shaded conditions, many species have wide ecological tolerance. For example, Eastern red maple is dominant in forested wetlands, but is also occasional on hilltops. Sensitive fern, jack-in-the-pulpit, jewelweed, and rough goldenrod occur in both forested and open wetlands, and also grow in moist uplands. They tolerate a wide spectrum of nutrient and light regimes.

Cliff Base, Boulder Concentration and Talus Slope Communities

In Colebrook, cliffs occur west of Route 8 and along Beech Hill Road. A rock face or cliff is another habitat that can support diverse minerotrophic plants, regardless of landscape position. The predominant bedrock types in Colebrook are all metamorphic gneisses and schists; more weathering of their feldspar minerals takes place where rock surfaces are exposed. Schists are prone to develop cracks between their layers. Where mineral-rich seepage saturates soils at the base of a cliff, one can find uncommon species such as brittle fern and Dutchman’s breeches.

Another variant of Northern hardwood forest, featuring sugar maple and basswood, is the community that has developed on the east-facing talus slope at the Kitchel Natural Area Preserve. The common polypody fern is associated with this rocky habitats. End moraine deposits have high densities of surface boulders, and soils are a pervious mix of sandy and fine materials; they occur along Thorne Brook in northwestern Colebrook and near the junction of Routes 182 and 183. Talus slopes have deep humus between the rocks; characteristic plants are marginal wood fern, intermediate wood fern, Robert’s geranium, red elderberry, Virginia creeper, striped maple, and mountain maple. Cliffs, boulder fields and talus slopes also support diverse mosses and lichens.

Forest edge communities

Edge habitat along roads, farm fields, residences, and large open wetlands are colonized mostly by woody species with effective and abundant seed dispersal. These include white pine, hemlock, red maple and sugar maple, common cottonwood, Virgin’s bower (Clematis virginiana), and all the birches and willows. Paper birch is infrequent within mature northern hardwood forests, but was common in young woods by Shantry Road. If a productive red oak tree is nearby, oak seedlings will be abundant. Woody, bird-dispersed edge colonizers include blackberry, staghorn sumac, black cherry, and the dogwoods. Winterberry and spiraea have colonized the roadside swales on the east side of Route 183, heading north towards town. A patch of uncommon, thornless red raspberry grows along Route 183, on the embankment close to Doolittle Lake Brook. In much of Connecticut invasive shrubs and vines are the predominant colonizers of edge habitat. They also colonize edges

throughout Colebrook, especially along Route 8, but so far numbers are low in most places. However, glossy buckthorn (*Frangula alnus)* was moderately common near Phelps Pond, and burning bush is locally abundant near the center of town.

Many streams flow downhill through the forests and converge into the larger brooks, bordered by diverse, lush, riparian plant communities. Another type of well-lit forest edge is created by the canopy gap above a broad brook channel. Stream terraces have moist soils enriched by past alluvial deposits. Characteristic herbaceous species include robust perennial wildflowers, such as Joe-pye-weed, purple stem aster, tall meadow rue, turtlehead, and tall goldenrods. Many of these colorful wildflowers also grow well in moist roadside soil, for example the golden alexanders along Smith Hill Road near the Wrights Brook Pond. Several dense ragged robin patches were also observed there on moist road sides. This species is considered potentially invasive, but it remains an open question where it is able to outcompete and exclude native herbs in natural riparian areas.

Along a few sections of Sandy Brook underlying soils are sandy/gravelly, derived from glacial meltwaters, suitable for farming, being level and relatively free of rocks. Some fields remain, but many have reverted to forest Near Phelps Flat Road in an early successional wetland underlain by sand, we found swamp saxifrage, golden ragwort, early meadow rue, abundant swamp buttercup, and a large patch of Mexican muhle grass mixed with sensitive fern. Sand mining has eliminated the prior vegetation on sandy outwash deposits bordering lower Sandy Brook, near Route 8.

Many decades ago, the former riparian plant communities on terraces along the West Branch of the Farmington River were eliminated when the river was dammed and the two reservoirs were created. However, Metropolitan District Commission land bordering the reservoirs still includes much mesic mixed hardwood forest, with the variants described above.

Wetlands

Stream Corridors and Vernal Pools

In rocky, hilly terrain, linear wetland communities border fast-flowing watercourses and range from a few water-loving mosses and herbs on the incised banks of a small, steep, headwater stream, to a well-developed riparian corridor along Sandy Brook and Mill Brook. Wetlands are also found in forested areas in isolated depressions, which may be fed by springs. Many of these depressions are vernal pools, which provide an exclusive breeding habitat for many species of invertebrates and amphibians. These include the striking 4.5 to 8-inch spotted salamander, whose shiny black body covered with large bright yellow spots enchants all who are lucky enough to see it in the spring months when it ventures to vernal pools to breed. See Map 18 Critical Habitats & Vernal Pools.

Wetland Basins

Loon Brook

A very different landscape occupies the drainage basins for Loon Brook and Doolittle Lake Brook. The Loon Brook system includes three broad, elongated depressional wetlands, each about a mile long, separated by low, upland hills, including a drumlin with compact till soils. A mosaic of forest and fields occupies the linear upland areas; which continue to be used for hay farming. Mowing is more feasible on a low drumlin than in rocky terrain, because the ground surface has been smoothed and stripped of boulders by ice shear.

Although they are largely common species, the abundant wildflowers in these fields, wood edges and marsh edges are good nectar sources for insects. The east end of Doolittle Lake Brook is also bordered by a large pond and shrub swamp, underlain by sand, and by a broad, level, forested terrace—former farmland, with soils derived from sandy glacial outwash. Two brooks and their feeder streams meander slowly through very large wetland areas: mosaics of marshland, shrub swamp, and sapling thickets growing on deep Wonsqueak and Bucksport organic mucks. Open water is sufficient to support populations of six native warmwater fish species. The highest plant diversity occurs on the swamp margins.

In the Loon Brook system, the deep, well-decomposed organic mucks in large expanses in the open wetlands are underlain by loamy, fine-textured till, not by sand, as is typical for large marshes in Connecticut. The Geology report explains that these elongated basins were created by a combination of geologic faulting and fracturing of brittle rock types. The central, elongated hill in the Loon Brook system is a low drumlin, traversed by Bunnell Street. Its fine-textured soils are loams in the Shelburne and Ashley soil series, which developed in thick till, as indicated by dark olive green on Map 12 Surficial Materials. Because these soils were compacted by the weight of

the ice during several successive glaciations, they have a dense substratum (Cd horizon or hardpan layer). This increases the proportion of precipitation that reaches the bordering marshes as shallow seepage and runoff. Their nutrient status is naturally moderately high, due to the fine-textured soil type, so adjacent wetland vegetation reflects that. As discussed below, Phelps Pond is bordered by different soils (shallow, pervious till) with lower nutrient status and supports a very different plant community.

Loon Brook—Emergent Marsh Community

Broad leaf cattail, a nutrient-loving, rhizomatous, emergent reed, is the predominant plant species throughout most of the extensive Loon Brook marsh system, but it is not a monoculture. There are embedded patches with other emergent species such as spike rush, wool grass and *Phragmites*, among others. Better drained sections support willows, alders, common cottonwood, and trembling aspen.

Loon Brook—Fringe Wetland Community

Diversity is highest in the marsh edge plant community. The Connecticut Botanical Society inventoried vegetation on a wooded shoreline in the Loon Brook Basin just south of Route 182A in 1991. The adjacent marsh has deep, well decomposed Wonsqueak muck and the marsh fringe formed in poorly drained, loamy, compact till in the Brayton-Loon meadow complex. Nutrient status, at least for macronutrients nitrogen and phosphorus, is higher than that at Phelps Pond. Species recorded on this partly shaded marsh edge included soft rush, swamp candles, common arrowhead, jewelweed, turtlehead, arrow-leaved tearthumb, water dock, royal fern, lady fern, New York fern, goldthread, and bulb-bearing water hemlock and skunk cabbage. Northern arrowwood, silky dogwood, winterberry, and meadowsweet are also common in the marsh-fringe community. Adjacent trees are those of the moist variant of the Northern Hardwoods suite: yellow birch and eastern hemlock.

Loon Brook —Low-Nutrient Wetland Communities at Phelps Pond

Phelps Pond is the northwestern lobe of the Loon Brook Basin and has several acres of open water. It is bordered to the north and south by bedrock-controlled hills with shallow, coarse-loamy soils. The natural nutrient status is much lower. The southwestern shore contains a bog with a dense peat mat once measured as 23 feet deep. There is a small watershed to the west with a steep, rocky hillside, 150 feet in elevation. The soil in this small watershed is coarse-loamy till in the Bice soil series, not loamy compact till, which generates nutrient-rich seepage and runoff. The diverse bog community includes scattered larch and black spruce and characteristic bog herbs: cranberry, pitcher plant, round-leaved sundew, northern bugleweed, bog willow-herb, tufted loosestrife, and wild calla.

The other shorelines of Phelps Pond are also acidic but more mesotrophic (low-moderate nutrient status); bordering soils are coarse loamy, but the watershed is somewhat larger than that for the southwestern bog community. The plant community was very diverse as recorded in a past field trip of the Connecticut Botanical Society: fifteen woody species and twenty-two herbs. Five were ericaceous shrubs: highbush blueberry, swamp azalea, leatherleaf, sheep laurel, and maleberry; also, winterberry, buttonbush, speckled alder, sweet gale, meadow-sweet, steeplebush, chokeberry, white pine seedlings, and swamp rose. Invasive buckthorn was also present. Wildflowers grew in saturated peat or shallow water: blue flag, cardinal flower, dwarf St. John's wort, common and Engelman's arrowhead; and bullhead and white water lilies. Spotted Joe-Pye-weed grew higher on the shoreline. Shoreline vegetation also included marsh fern, royal fern, mermaid weed bulb-bearing water hemlock, ditch stonecrop, water purslane, Clayton's bedstraw, three-way sedge, tussock sedge, bottlebrush sedge, common and narrow-leaved cattail, spikerush and *Phragmites australis*.

Doolittle Lake Brook

Forested Buffer and Fringe Wetlands

Doolittle Lake Brook, which enters from Norfolk just north of the Loon Brook basin system, is another substantial, low-gradient brook bordering a large open wetland and a mature forest, all underlain by sandy outwash. The mature forest has white pine, red oak, beech, yellow birch, sugar maple and red maple. White pine is dominant, and some individuals are very large, four to five feet in diameter. The sapling stratum includes hemlock, beech, and striped maple. The limited groundcover visible in winter included partridge berry, evergreen wood ferns, and princess pine.

As at Phelps Pond, shrubs form a transition zone between the wetland and the adjacent forest. Speckled alder, maleberry, highbush blueberry, and mountain laurel are dominant on the abrupt, irregular bank, intermixed with meadowsweet, royal fern, cinnamon fern, swamp buttercup, and tussock sedge.

In December 2023, water levels were high in the pond. Otter scat, coyote scat, and a beaver lodge in good repair were observed.

Northern-Affinity Species

The flora of Colebrook includes northern-affinity plant species that are largely limited to far northern Connecticut because they require a cool microhabitat. In Colebrook, they can be found in forests where evergreens (Eastern hemlocks or white pines) cast deep shade, or in the shadow of a steep east- or north-facing hillside. Striped maple, mountain maple, and hobble bush are northern woody species. They can be seen along Pisgah Mountain Road. Purple-flowering raspberry and broad beech fern also have northern distribution. In the Kitchel Wilderness Natural Area Preserve, Eastern hemlock is associated with several specialized herbs that need cool shady conditions: painted trillium and bluebead lily. Gold thread is typically present as well, but it also grows moist, well-shaded habitats throughout the state. Native American yew occurs in shaded sites, usually on north or east-facing lower slopes, boulders or roadsides. Paper birch is considered a northern tree. It is present but not common in Colebrook, absent or very scarce in most of Connecticut, and much more common in northern New England. Conversely, several species common in central and southern Connecticut have a very limited presence in Colebrook, such as white oak and skunk cabbage.

Roadside Vegetation

Almost all the roads in Colebrook would be designated scenic in other parts of the state. Traffic levels are low. Most roads are no wider than necessary and are lined by beautiful mature trees that are the same as those in the adjacent mixed hardwood forest: sugar maple, white pine, red oak, birches, hemlock, beech, ash and an occasional basswood. Where a road passes wooded swamp, it is flanked by red maples and dead green ash trees. Common woody species in the understory along upland forest edges include mountain laurel, hobblebush, hemlock, spiked maple, moosewood and gray birch.

Mowing frequency and soil moisture regime influence the composition of low-growing roadside plants. Mowing is done often enough to maintain meadow plant communities close to the road, and discourage colonization by woody species, including widespread woody invasives. Early fall mowing prevents seed set and spread of the mugwort plants present on most roadsides, slowing their spread. The suite of grasses and wildflowers is similar to that in Colebrook's meadows and hayfields: a mix of robust cool season forage grasses, deer tongue grass, and several species of goldenrods, summer daisies (*Erigeron*) and aster. Where mowing is more frequent, low-growing forbs predominate, such as madder (*Galium* species), clovers, common cinquefoil, bluets, hawkweeds, and rosette panic grasses. In wetter roadside soil goutweed and coltsfoot may spread by underground stems; cinnamon fern and interrupted fern form clumps. Well-drained soils support hay-scented fern and bracken fern. Periwinkle escaped from landscaped areas has spread into a few large patches. Native white wood aster, goldenrods, sensitive fern and long beech fern can flank wood edges. Wildflowers of European origin, naturalized centuries ago, are important for pollinators. They include clovers, ox-eye daisies, bugle, and Queen Anne's lace. Most provide nectar and pollen for insects.

Roadside swales may support linear thickets of winterberry, with abundant red berries in late fall and winter, elderberry, sumac, meadowsweet (*Spiraea alba*) and Joe-pye-weed. Near stream crossings elderberry shrubs are common, with large, showy white flower clusters followed by berries. Wetland crossings may also have golden alexanders blooming in June and red cardinal flower in late summer.

Invasive Plants

Japanese knotweed is a widespread roadside invasive in Connecticut, and Colebrook has some patches. Several years ago, the CT Department of Transportation removed one at the intersection of Rt. 182-A and Rt. 182 by cutting and spraying. Asiatic bittersweet, burning bush, Morrow's honeysuckle, mugwort, garlic mustard, Japanese stiltgrass, goutweed and wild parsnip infestations occur on some roadsides. The fleshy fruit of Japanese barberry, multiflora rose, autumn olive, buckthorn, Asiatic bittersweet and burning bush are eaten by birds, which spread the seeds to new areas. Several dense patches of ragged robin, a pink early-summer bloomer, were noted in moist soil along Smith Hill Road and elsewhere. Like mugwort, garlic mustard and wild parsnip, seeds of this can be spreading by mowing. Wild parsnip is especially troublesome as its sap causes a chemical burn if it gets on skin and is exposed to sunlight. Invasive plants will continue to spread in the absence of a concerted town-wide roadside control campaign. The Colebrook Conservation Commission is planning to map invasive plants along roadsides as a first step in developing a control program.

Tree Decline

Introduced diseases and invasive organisms have been responsible for great changes in the relative diversity of our trees. Chestnut trees once towered here, reportedly taller than oaks. Nichols estimated that 6% of the Phelps forest trees were chestnuts. By 1917, the chestnut blight fungus (*Cryphonectria parasitica*) had killed American chestnut trees across Connecticut. However, the roots are able to survive and stems will resprout from the stumps. There are still small chestnut trees in Colebrook, but the stems eventually succumb because the fungus is still here as well. Ongoing agricultural research on resistance to the fungus may one day help bring American chestnut back. In the meantime, we can grow Chinese and Japanese chestnuts (which are more resistant to the disease) or their hybrids with American chestnut.

Dutch elm disease is also caused by a fungus. Starting in the 1930s, millions of elm trees died in the eastern United States, including those on the green by the Colebrook Church.

More recently, insects have killed trees. Many of our ashes have died quickly, in as little as three years, from the introduced emerald ash borer beetle. Hemlocks have also been under attack from a ladybird beetle and other pests. See the Insects section for more information.

Beech leaf disease (BLD) is caused by a nematode, a small worm that overwinters in beech buds and then tunnels inside the leaves when they emerge in spring. It was discovered in Connecticut in 2019 and is now widespread in Colebrook. There is another threat to beech trees—beech bark disease (BBD)—caused when a feeding scale insect makes holes in the bark, allowing access to certain fungi. These two diseases will likely cause another major change in our forests.

List of Colebrook Plants

The plant list in Appendix 8 is organized into categories: ferns and club mosses, mosses, trees, notable and ornamental trees, shrubs and vines, wildflowers, and invasive plants. In the Notes column, you may see the following CT DEEP codes:
SC = species of special concern
T = threatened
E = endangered
H = known from historic records.
"Escaped" indicates a plant that is cultivated but has now spread outside gardens. "Invasive" indicates a non-native plant that is likely to cause harm when introduced.

Elm trees in Colebrook center in 1914.

Small nematodes feeding inside beech leaves create a "striped" appearance.

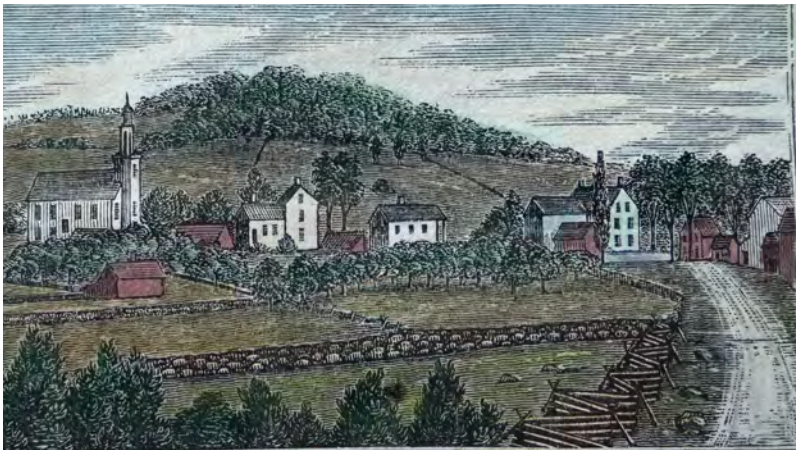
HISTORIC RESOURCES

"History is not the past. It is the present. We are our history." — James Baldwin

In each generation, Colebrook has been fortunate to have local people who wanted to tell and share its story. This section of the Natural Resources Inventory highlights only some of the individuals and volunteer organizations who have contributed, as there are many.

You could say that Colebrook had a slow start that took 50 years.. The land—remote, hilly and rocky, measuring about six miles by five miles—was part of a large tract given to the taxpayers of Windsor in 1729 and divided into towns in 1732. Much later surveyors came to Colebrook. A map dated 1760 divided it into tiers and rows of numbered parcels, allotted to each person based on how much they owned in Windsor. Some land was reserved to sell and finance future town roads. The first settler arrived in 1765, and the town was finally incorporated in 1779. Official town records from the very beginning, such as land deeds, tax records, town meetings, and estate inventories, are in the town hall vault. They are handwritten, of course, and reading them takes some patience and maybe a magnifying glass.

You can still find stone walls that mark the boundaries of the original parcels. Other stone walls line the roads that were built and mark where the land was cleared for pasture and crops. The stonework from early businesses that relied on water, such as mills, a tannery and iron forges, remain. Foundations of early houses are here, too, hidden among the forest that has now grown back.



Southwestern view of Colebrook (central part.) John Warner Barber, 1836. Buildings from left to right: first location of the Colebrook Church, Rockwell Hall, Colebrook Store, Rockwell House. Pisgah Mountain in the background, much cleared.

In 1929, Colebrook celebrated its 150th anniversary with a parade and speeches on the town green. The event was captured in black and white on reel-to-reel film by the Thompson family. In the same year, Frank L. Wentworth's book of legends and tales, *The Winsted Wildman and Other Stories,* was published and contained two chapters about Colebrook called the *Golden Era of Sandy Brook*. They described the mills and community of workers who lived along the brook.

Excerpts of the 150th anniversary speeches are given in Irving E. Manchester's *The History of Colebrook,* published in 1935. He and Lewis S. Mills were editors of a semi-annual magazine called the *Lure of the Litchfield Hills*, active from about 1940 to 1975 (the Avon Library has almost all issues). Its interesting historical accounts of Litchfield County included 32 articles about Colebrook written by Teresa Geddes Backman, Marjorie B. Coffin, Rev. Hollis M. French, Frederick T. Persons, Helen L. Seymour, Henry Hart Vining, and Claire Vreeland, among others.

Lewis S. Mills was also a photographer, and his collection from 1895-1955 contains 15 photos of Colebrook, now owned by the Connecticut State Library but viewable online. Winsted photographer Frank H. DeMars (1872-1942) bought Colebrook images from others, such as Una Clingan Rands, and some became popular black-and-white postcards mailed by summer visitors. The 251 DeMars images can be viewed online, and The Connecticut Museum of Culture and History owns the glass plate negatives.

Founded in 1935 with Mabel Newell as its first president, the Colebrook Historical Society became a museum of work and life as diverse items were donated. The Rock Schoolhouse on Rt. 183, moved from its enormous rock onto land donated by Nancy Phelps Blum, and the former Seymour Inn in the center of town serve as educational facilities. The archives include early farm ledgers, journals, letters, portraits, furniture, tools, clothing, and family stories. Equally important, the Society continues to bring together volunteers who restore, preserve, interpret, and publish and engagingly connect the public with many aspects of local and world experience.

In 1953, the Colebrook Associates deeded the Seymour Inn (aka Colebrook Inn) plus 47 acres and buildings to the Town. The inn became the town hall and home to the historical society. The lower level of the adjacent carriage house already garaged the Colebrook Center Volunteer Fire Department firetruck.

Two Colebrook Historic Districts, one in the center of town and a second in North Colebrook on Rt. 183, were established in 1963. The Historic District Commission consists of an elected board and approves changes to exteriors in those districts. Connecticut's State Historic Preservation Office (SHPO) supports the Commission by offering training and technical support from experts. It also partners with other preservation organizations on projects such as the Historic Barns of Connecticut. Two barns in Colebrook are on the State Register of Historic Places, the Fredsall barn on Pinney Street and Hale barn on Stillman Hill Road. The SHPO is responsible for the 5-year Statewide Historic Preservation Plan.

In 1979, Colebrook celebrated its 200th anniversary with special events over the course of the year, and many articles appeared in the Winsted Evening Citizen. Alan DeLarm's *Colebrook Stories* was printed and the Colebrook Center Volunteer Fire Department Ladies' Auxillary compiled the *Colebrook Cookbook* with favorite recipes from residents. Another parade was held and filmed in color this time. The Colebrook Historical Society aired the movie of the1929 parade after it was transferred to VCR tape. The Women's Church Union pieced a Bicentennial Quilt. Several townspeople told their stories as oral histories that were later transcribed. Married men challenged single men to a game on the new baseball field dedicated to Louis Jasmin at the Recreation Area.

In 1996, the Colebrook Historical Society published *Colebrook: A Historical Sketch* by William H. McNeill, world-renowned historian and summer resident on Schoolhouse Road. The following year, it published *One Old House: Its People and Its Place* by Nancy Phelps Blum. She spent her early and later years in North Colebrook at the farm and inn established by her great-great-grandfather Capt. Arah Phelps in the 1780s. The Library of Congress has seven photos of the inn taken during the 1940 Historic American Buildings Survey.

Town historian Robert Grigg, who grew up on Beech Hill Road, wrote hundreds of "Bob's Bytes" on a vast range of subjects until 2016, and the Society has made them available online and in print. Bob enjoyed photographing Colebrook events, places, people and natural beauty, too. Contact the present historian, Scott Norton, at Town_historian@colebrooktownhall.org.

There are numerous online resources for Colebrook as well, including a CTHumanities project at (ConnecticutHistory.org) and the Hale Collection of Connecticut Cemetery Records.

At the Town's Fourth of July, 2024 celebration in the Colebrook Congregational Church, the Colebrook Associates showed video interviews of several residents who had served in the military. When the celebration ended, Master-of-Ceremonies Todd Hiller asked the audience to continue sharing stories informally at the ice cream social waiting outside. The world is more complex than when Colebrook was incorporated during the Revolutionary War, but as the town prepares for its 250th anniversary in 2029, our community can remember the past, do its best in the present, and plan for the future.

Iron bridge at Colebrook River Lake Reservoir, exposed during low water in the summer of 2016.

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front cover Jaiden Hepburn (brook in winter)
26-45 Randolph Steinen (geology)
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46 Jeb Burrows (field); Joyce Hemingson (glacial till)
50 Joyce Hemingson (sand)
53 Parker Robichaud (barred owl); Maureen Bascetta (robin eggs); Ken Andresen (scarlet tanager)
54 Steve Messier (lichens); Joyce Hemingson (lichens)
57 Steve Messier (lichens)
58 Joey Vasaturo (great spangled fritillary butterfly); Joyce Hemingson (caterpillar);
April Nobile (ant; Specimen code casent01015608 from www.antweb.org
59 Joyce Hemingson (hemlock wooly adelgid; Emerald ash borer)
60-65 Lukas Keras (moths and butterflies)
77 Ken Andresen (bears); Amanda D'Urso (red squirrel)
78 Jaiden Hepburn (gray tree frogs; Eastern garter snake); Fae Larch (red eft)
79 Eli Bascetta (fish)
82 Andy Bakulski (LeManquis/Simons Pond); Joyce Hemingson (dobsonfly; giant mayfly; pond)
86 Joyce Hemingson (Colebrook forest); Connecticut Environmental Conditions Online (charcoal pits):
CTECO https://maps.cteco.uconn.edu/projects/lidar3d/lidar3d_layers/
93 DeMars (Colebrook Congregational Church elms); Joyce Hemingson (beech leaf disease)
94 John Warner Barber (Colebrook view)
95 Joyce Hemingson (Colebrook River Lake Reservoir)
99 Joyce Hemingson (Colebrook Pond dam)
115 Amanda D'Urso (snail)
117 Amanda D'Urso (baby deer)
131 Maureen Bascetta (Mountain laurel); Joyce Hemingson (Chinese chestnut)

APPENDIX 1 — Dams in Colebrook

The registration of dams in Connecticut was initiated in 1983 by Public Act 1983-38, within which, subsection (b) established Section 22a-409(b) of the Connecticut General Statutes (CGS) which requires the owner of a dam or similar structure to provide certain information concerning such structures to the Commissioner of Energy and Environmental Protection (DEEP or Commissioner) by registering by July 1, 1984. It is only necessary to register a dam once and pay the registration fee once. Subsequent owners or co-owners must identify themselves to the Commissioner when they take over as owners of property containing a dam, but do not need to re-register or separately register that dam. Source: DEEP (May 17, 2024); CT DEEP Dam Registration Fact Sheet.

Dam Number	Dam Name	Dam Town	Hazard Class
2901	ROBERTSVILLE DAM	COLEBROOK	B
2902	GAYLORD POND DAM	COLEBROOK	B
2903	LAKE TRIANGLE CAMP JEWELL DAM	COLEBROOK	B
2904	KLAHRE POND	COLEBROOK	A
2905	BUNNELL POND	COLEBROOK	BB
2906	LEMANQUAIS POND DAM	COLEBROOK	BB
2907	ONEGLIA POND DAM	COLEBROOK	A
2908	SCHWARTZ POND DAM	COLEBROOK	BB
2909	DEER HILL POND	COLEBROOK	A
2910	LOWER TROUT POND	COLEBROOK	A
2911	BLAKE POND	COLEBROOK	A
2912	COLEBROOK RIVER DAM	COLEBROOK	C
2913	CURRIER POND	COLEBROOK	A
2914	METRO POND DAM	COLEBROOK	AA
2915	HALE POND DAM	COLEBROOK	AA
2916	OPATRNY POND DAM	COLEBROOK	AA
2917	SANDY BROOK (SEE 2916)	COLEBROOK	AA
2918	THOMPSON POND DAM	COLEBROOK	A
2920	TERRY POND DAM	COLEBROOK	A

Dam at the Colebrook Pond ready for the Cardboard Regatta at the Colebrook Fair

APPENDIX 2 — Annotated Checklist of the Birds of Colebrook, Connecticut — June 2024

Common name	Scientific name	Spring	Summer	Fall	Winter	Place
Snow Goose #	*Anser caerulescens*	x		x		Colebrook River Lake; Goodwin Reservoir
Brant	*Branta bernicla*	x		x		Colebrook River Lake; Goodwin Reservoir
Canada Goose*	*Branta canadensis*	x	x	x	x	Wetlands
Wood Duck*	*Aix sponsa*	x	x	x		Wetlands
Blue-winged Teal#	*Anas discors*	x	x	x		Wetlands
Northern Shoveler#	*Anas clypeata*	x		x		Wetlands
Gadwall#	*Anas strepera*	x		x		Colebrook River Lake; Goodwin Reservoir
American Wigeon#	*Mareca americana*	x		x		Wetlands
Mallard*	*Anas platyrhynchos*	x	x	x	x	Wetlands
American Black Duck*	*Anas rubripes*	x	x	x	x	Wetlands
Northern Pintail#	*Anas acuta*	x		x		Colebrook River Lake; Goodwin Reservoir
Green-winged Teal#	*Anas crecca*	x	x	x		Wetlands
Ring-necked Duck	*Aythya collaris*	x		x		Wetlands
Greater Scaup#	*Aythya marila*	x		x		Colebrook River Lake; Goodwin Reservoir
Lesser Scaup#	*Aythya affinis*	x		x		Colebrook River Lake; Goodwin Reservoir
Surf Scoter#	*Melanitta perspicillata*	x		x		Colebrook River Lake; Goodwin Reservoir
White-winged Scoter#	*Melanitta fusca*	x		x		Colebrook River Lake; Goodwin Reservoir
Black Scoter#	*Melanitta nigra*	x		x	x	Colebrook River Lake; Goodwin Reservoir
Long-tailed Duck#	*Clangula hyemalis*	x	x	x		Colebrook River Lake; Goodwin Reservoir
Bufflehead	*Bucephala albeola*	x		x		Wetlands
Common Goldeneye	*Bucephala clangula*	x		x		Colebrook River Lake; Goodwin Reservoir
Hooded Merganser*	*Lophodytes cucullatus*	x	x	x	x	Wetlands
Common Merganser*	*Mergus merganser*	x	x	x	x	Wetlands
Red-breasted Merganser#	*Mergus serrator*	x		x		Colebrook River Lake; Goodwin Reservoir
Ruddy Duck	*Oxyura jamaicensis*	x		x		Lakes, Ponds
Wild Turkey*	*Meleagris gallopavo*	x	x	x	x	Anywhere
Ruffed Grouse#*	*Bonasa umbellus*	x	x	x	x	Forests
Ring-necked Pheasant	*Phasianus colchicus*	x	x	x	x	Fields: Stocked birds only
Pied-billed Grebe#	*Podilymbus podiceps*	x		x		Colebrook River Lake; Goodwin Reservoir
Horned Grebe#	*Podiceps auritus*	x	x			Colebrook River Lake; Goodwin Reservoir
Red-necked Grebe#	*Podiceps grisegena*	x	x			Colebrook River Lake; Goodwin Reservoir
Rock Pigeon*	*Columba livia*	x	x	x	x	Fields
Mourning Dove*	*Zenaida macroura*	x	x	x	x	Anywhere
Yellow-billed Cuckoo*	*Coccyzus americanus*	x	x			Forests, Shrubland, Fields
Black-billed Cuckoo*	*Coccyzus erythropthalmus*	x	x			Forests, Shrubland, Fields
Common Nighthawk	*Chordeiles minor*	x	x	x		Anywhere
Eastern Whip-poor-will#	*Caprimulgus vociferus*	x				Forests, Fields

Common name	Scientific name	Spring	Summer	Fall	Winter	Place
Chimney Swift*	*Chaetura pelagica*	x	x	x		Anywhere
Ruby-throated Hummingbird*	*Archilochus colubris*	x	x	x		Anywhere
Virginia Rail	*Rallus limicola*	x	x	x		Wetlands
American Coot#	*Fulica americana*	x		x		Wetlands
Sandhill Crane#	*Grus canadensis*	x	x	x		Fields, Marshes
Semipalmated Plover	*Charadrius semipalmatus*			x		Colebrook River Lake; Goodwin Reservoir
Killdeer*	*Charadrius vociferus*	x	x	x		Fields, Wetlands
Greater Yellowlegs	*Tringa melanoleuca*	x		x		Wetlands
Lesser Yellowlegs	*Tringa flavipes*	x		x		Wetlands
Solitary Sandpiper	*Tringa solitaria*	x	x	x		Wetlands
Spotted Sandpiper*	*Actitis macularia*	x	x	x		Wetlands
Sanderling#	*Calidris alba*			x		Colebrook River Lake
Dunlin#	*Calidris alpina*			x		Colebrook River Lake
White-rumped Sandpiper#	*Calidris fuscicollia*			x		Colebrook River Lake
Baird's Sandpiper#	*Calidris bairdii*			x		Colebrook River Lake
Western Sandpiper#	*Calidris mauri*			x		Colebrook River Lake
Least Sandpiper	*Calidris minutilla*	x	x	x		Wetlands
Semipalmated Sandpiper	*Calidris pusilla*	x	x	x		Colebrook River Lake
American Woodcock*	*Scolopax minor*	x	x	x		Fields, Wetlands
Wilson's Snipe#	*Gallinago gallinago*	x		x		Wetlands
Bonaparte's Gull#	*Larus philadelphia*	x		x		Colebrook River Lake; Goodwin Reservoir
Ring-billed Gull	*Larus delawarensis*	x	x	x		Lakes, Ponds, Rivers
Herring Gull#	*Larus argentatus*	x		x		Lakes, Ponds, Rivers
Great Black-backed Gull#	*Larus marinus*	x	x			Colebrook River Lake; Goodwin Reservoir
Red-throated Loon#	*Gavia stellata*	x	x			Colebrook River Lake; Goodwin Reservoir
Common Loon	*Gavia immer*	x	x	x		Colebrook River Lake; Goodwin Reservoir
Double-crested Cormorant	*Phalacrocorax auritus*	x	x	x		Lakes, Rivers
American Bittern#**	*Botaurus lentiginosus*	x	x			Wetlands
Great Blue Heron*	*Ardea herodias*	x	x	x		Wetlands
Great Egret#	*Ardea alba*	x	x	x		Wetlands
Green Heron**	*Butorides virescens*	x	x	x		Wetlands
Black Vulture	*Coragyps atratus*	x	x	x		Anywhere
Turkey Vulture**	*Cathartes aura*	x	x	x		Anywhere
Osprey**	*Pandion haliaetus*	x	x	x		Wetlands
Golden Eagle#	*Aquila chrysaetos*	x		x	x	Colebrook River Lake; Goodwin Reservoir
Northern Harrier#	*Circus cyaneus*	x		x	x	Fields, Marshes
Sharp-shinned Hawk#**	*Accipiter striatus*	x	x	x	x	Anywhere
Cooper's Hawk*	*Accipiter cooperii*	x	x	x	x	Anywhere

Common name	Scientific name	Spring	Summer	Fall	Winter	Place
American Goshawk#	*Accipiter gentilis*	x	x	x	x	Forests
Bald Eagle*	*Haliaeetus leucophalus*	x	x	x	x	Anywhere
Red-shouldered Hawk*	*Buteo lineatus*	x	x	x		Anywhere
Broad-Winged Hawk*	*Buteo platypterus*	x	x	x		Anywhere
Red-tailed Hawk*	*Buteo jamaicensis*	x	x	x	x	Anywhere
Rough-legged Hawk#	*Buteo lagopus*				x	Fields, Marshes
Eastern Screech Owl#	*Otus asio*	x			x	Forests
Snowy Owl#	*Nyctea scandiaca*				x	Fields
Great Horned Owl*	*Bubo virginianus*	x	x	x	x	Forests
Barred Owl*	*Strix varia*	x	x	x	x	Forests, Wetlands
Long-eared Owl#	*Asio otus*				x	Forests
Northern Saw-whet Owl#	*Aegolius acadicus*	x	x	x	x	Forests
Belted Kingfisher*	*Ceryle alcyon*	x	x	x	x	Wetlands
Yellow-bellied Sapsucker*	*Sphyrapicus varius*	x	x	x	x	Anywhere
Red-bellied Woodpecker*	*Melanerpes carolinus*	x	x	x	x	Anywhere
Downy Woodpecker*	*Picoides pubescens*	x	x	x	x	Anywhere
Hairy Woodpecker*	*Picoides villosus*	x	x	x	x	Anywhere
Pileated Woodpecker*	*Dryocopus pileatus*	x	x	x	x	Forests, Wetlands
Northern Flicker*	*Colaptes auratus*	x	x	x	x	Anywhere
American Kestrel#	*Falco sparverius*	x	x	x		Fields, Marshes
Merlin#	*Falco columbarius*	x		x		Anywhere
Peregrine Falcon#	*Falco peregrinus*	x	x	x		Anywhere
Olive-sided Flycatcher#	*Cantopus cooperi*	x	x	x		Forests, Wetlands
Eastern Wood-pewee*	*Contopus virens*	x	x	x		Forests
Yellow-bellied Flycatcher#	*Empidonax fluviventris*	x	x	x		Wetlands, Field Edges
Acadian Flycatcher#**	*Empidonax virescens*	x	x			Forests, Wetlands
Alder Flycatcher#**	*Empidonax alnorum*	x	x			Wetlands
Willow Flycatcher**	*Empidonax traillii*	x	x			Wetlands
Least Flycatcher*	*Empidonax minimus*	x	x	x		Wetlands
Eastern Phoebe*	*Sayornis phoebe*	x	x	x		Anywhere
Great crested Flycatcher*	*Myiarchus crinitus*	x	x	x		Forests, Wetlands
Eastern Kingbird*	*Tyrannus tyrannus*	x	x			Wetlands
White-eyed Vireo#	*Vireo griseus*		x			Fields
Yellow-throated Vireo*	*Vireo flavifrons*	x	x	x		Forests, Wetlands, Field Edges
Blue-headed Vireo*	*Vireo solitarius*	x	x	x		Forests
Philadelphia Vireo#	*Vireo philadelphicus*			x		Fields, Forest Edges
Warbling Vireo*	*Vireo gilvus*	x	x	x		Wetlands
Red-eyed Vireo*	*Vireo olivaceus*	x	x	x		Anywhere

Common name	Scientific name	Spring	Summer	Fall	Winter	Place
Northern Shrike#	*Lanius excubitor*			x	x	Fields
Blue Jay*	*Cyanocitta cristata*	x	x	x	x	Anywhere
American Crow*	*Corvus brachyrhynchos*	x	x	x	x	Anywhere
Common Raven*	*Corvus corax*	x	x	x	x	Anywhere
Fish Crow	*Corvus ossifragus*	x	x	x	x	Lakes
Black-capped Chickadee*	*Poecile atricapilla*	x	x	x	x	Anywhere
Tufted Titmouse*	*Baeolophus bicolor*	x	x	x	x	Anywhere
Horned Lark#	*Ermophila alpestris*			x		Colebrook River Lake
Bank Swallow*	*Riparia riparia*	x	x			Wetlands
Tree Swallow*	*Tachycineta bicolor*	x	x	x		Fields
Northern Rough-winged Swallow*	*Stelgidopteryx serripennis*	x	x			Wetlands
Barn Swallow*	*Hirundo rustica*	x	x	x		Anywhere
Cliff Swallow*	*Petrochelidon pyrrhonota*	x	x			Anywhere
Ruby-crowned Kinglet	*Regulus calendula*	x		x	x	Forests, Shrubland, Fields
Golden-crowned Kinglet**	*Regulus satrapa*	x	x	x	x	Forests
White-breasted Nuthatch*	*Sitta carolinensis*	x	x	x	x	Anywhere
Red-breasted Nuthatch*	*Sitta canadensis*	x	x	x	x	Forests
Brown Creeper*	*Certhia americana*	x	x	x	x	Forests
Blue-gray Gnatcatcher*	*Polioptila caerulea*	x	x	x		Forests, Wetlands
House Wren*	*Troglodytes aedon*	x	x	x	x	Anywhere
Winter Wren*	*Troglodytes troglodytes*	x	x	x	x	Forests
Marsh Wren#	*Cistothorus palustris*		x			Wetlands
Carolina Wren*	*Thyrothorus ludovicianus*	x	x	x	x	Anywhere
European Starling*	*Sturnus vulgaris*	x	x	x	x	Anywhere
Gray Catbird*	*Dumetella carolinensis*	x	x	x		Anywhere
Brown Thrasher#**	*Toxostoma rufum*	x	x	x		Fields
Northern Mockingbird#*	*Mimus polyglottos*	x	x	x	x	Anywhere
Eastern Bluebird*	*Sialia sialis*	x	x	x	x	Anywhere
Veery*	*Catharus fuscescens*	x	x	x		Forests
Gray-cheeked Thrush#	*Catharus minimus*	x		x		Forests
Swainson's Thrush	*Catharus ustulatus*	x		x		Forests
Hermit Thrush*	*Catharus guttatus*	x	x	x	x	Forests
Wood Thrush*	*Hylocichla mustelina*	x	x	x		Forests
American Robin*	*Turdus migratorius*	x	x	x	x	Anywhere
Cedar Waxwing*	*Bombycilla cedrorum*	x	x	x	x	Anywhere
House Sparrow*	*Passer domesticus*	x	x	x	x	Anywhere
American Pipit#	*Anthus rubescens*	x		x		Fields
Evening Grosbeak#	*Coccothraustes vespertinus*	x	x	x	x	Anywhere

Common name	Scientific name	Spring	Summer	Fall	Winter	Place
Pine Grosbeak#	*Pinicola enucleator*				x	Fields, Fruit Trees
House Finch*	*Carpodacus mexicanus*	x	x	x	x	Anywhere
Purple Finch*	*Carpodacus purpureus*	x	x	x	x	Anywhere
Common Redpoll#	*Carduelis flammea*				x	Fields, Feeders
Red Crossbill#	*Loxia curvirostra*	x	x	x	x	Forests
White-winged Crossbill#	*Loxia leucoptera*			x	x	Forests
Pine Siskin*	*Carduelis pinus*	x	x	x	x	Anywhere
American Goldfinch*	*Carduelis tristis*	x	x	x	x	Anywhere
Snow Bunting#	*Plectrophenax nivalis*			x	x	Fields
Chipping Sparrow*	*Spizella passerina*	x	x	x	x	Anywhere
Field Sparrow*	*Spizella pusilla*	x	x	x		Fields
American Tree Sparrow	*Spizella arborea*	x		x	x	Fields, Wetlands
Fox Sparrow	*Passerella iliaca*	x		x	x	Fields, Forests
Dark-eyed Junco*	*Junco hyemalis*	x	x	x	x	Anywhere
White-crowned Sparrow	*Zonotrichia leucophrys*	x		x		Fields
White-throated Sparrow	*Zonotrichia albicollis*	x	x	x	x	Anywhere
Vesper Sparrow#	*Pooecetes gramineus*	x		x		Fields
Savannah Sparrow**	*passerculus sandwichensis*	x	x	x	x	Fields
Song Sparrow*	*Melospiza melodia*	x	x	x	x	Fields
Lincoln's Sparrow	*Melowpiza lincolnii*	x		x		Fields
Swamp Sparrow*	*Melospiza georgiana*	x	x	x		Wetlands
Eastern Towhee*	*Pipilo erythrophthalmus*	x	x	x		Fields, Forest Edges
Bobolink#*	*Dolichonyx oryzivorus*	x	x			Fields
Eastern Meadowlark#	*Sturnella magna*	x	x	x		Fields
Orchard Oriole#	*Icterus spurius*	x				Fields
Baltimore Oriole*	*Icterus galbula*	x	x	x		Anywhere
Red-winged Blackbird*	*Agelaius phoeniceus*	x	x	x	x	Wetlands
Brown-headed Cowbird*	*Molothrus ater*	x	x	x	x	Anywhere
Rusty Blackbird#	*Euphagus carolinus*	x		x		Wetlands
Common Grackle*	*Quiscalus quiscula*	x	x	x	x	Anywhere
Ovenbird*	*Seiurus aurocapillus*	x	x	x		Forests
Worm-eating Warbler#	*Helmitheros vermivora*	x	x			Forests
Louisiana waterthrush*	*Seiurus motacilla*	x	x			Streams
Northern waterthrush*	*Seiurus novaboracensis*	x	x			Wetlands
Blue-winged Warbler*	*Vermivora pinus*	x	x			Fields
Golden-winged Warbler#	*Vermivora chrysoptera*	x				Fields
Black-and-white Warbler*	*Mniotilta varia*	x	x	x		Forests
Tennessee Warbler	*Vermivora peregrina*	x		x		Forests

Common name	Scientific name	Spring	Summer	Fall	Winter	Place
Orange-crowned Warbler#	*Vermivora celata*	x		x		Forest Edges
Nashville Warbler#*	*Vermivora ruficapilla*	x	x	x		Fields, Forests
Common Yellowthroat*	*Geothlypis trichas*	x	x	x		Fields, Wetlands
Hooded Warbler#	*Wilsonia citrina*		x			Forests, Wetlands
American Redstart*	*Setophaga ruticilla*	x	x	x		Anywhere
Cape May Warbler	*Setophaga ruticilla*	**x**		x		Forests
Northern Parula*	*Parula americana*	x	x	x		Forests
Magnolia Warbler*	*Dendroica magnolia*	x	x	x		Forests
Bay-breasted Warbler#	*Dendroica castanea*	x		x		Forests
Blackburnian Warbler*	*Dendroica fusca*	x	x	x		Forests
Yellow Warbler*	*Dendroica petechia*	x	x	x		Wetlands
Chestnut-sided Warbler*	*Dendroica pensylvanica*	x	x	x		Fields, Wetlands, Forest Edges
Blackpoll Warbler	*Dendroica striata*	x		x		Forests
Black-throated Blue Warbler*	*Dendroica caerulescens*	x	x	x		Forests
Palm Warbler	*Dendroica palmarum*	x		x		Anywhere
Pine Warbler*	*Dendroica pinus*	x	x	x		Forests
Yellow-rumped Warbler*	*Dendroica coronata*	x	x	x		Forests
Prairie Warbler**	*Dendroica discolor*	x	x	x		Fields
Black-throated Green Warbler*	*Dendroica virens*	x	x	x		Forests
Canada Warbler*	*Wilsonia canadensis*	x	x	x		Forests
Wilson's Warbler#	*Wilsonia pusilla*	x		x		Fields, Wetlands
Scarlet Tanager*	*Piranga olivacea*	x	x	x		Forests
Northern Cardinal*	*Cardinalis cardinalis*	x	x	x	x	Anywhere
Rose-breasted Grosbeak*	*Pheucticus ludovicianus*	x	x	x		Anywhere
Indigo Bunting*	*Passerina cyanea*	x	x	x		Fields
	*confirmed breeder; ** probable breeder; # uncommon/rare					
	Spring = March to May, Summer = June to August, Fall = September to November, Winter = December to February					
	Note: Goodwin Reservoir is also called West Branch Reservoir					
Compiled by Dave Rosgen and Shelley Harms. Sources: Connecticut Bird Atlas; Christmas & Summer Bird Count Records; Ebird records; Rosgen records; Field visits						

APPENDIX 3 — List of Lichens

Scientific Name	Notes
Acarospora fuscata	on silicious boulder along edge of Sandy brook
Agonimia gelatinosa	wet woods on moss on rotting log
Amandinea polyspora	moist woods on fallen Fraxinus americana branch
Anaptychia palmulata	at base of Quercus rubra tree near hilltop
Arthonia helveola	closed hemlock, yelow birch woods on Betula alleghaniensis
Arthonia susa	in hickory-ash glade on eastern summit on Carya ovata bark
Aspicillia cinerea	on boulder along edge of Sandy brook
Aspicillia laevta	on boulder along edge of Sandy brook
Bacidia laurocerasi	in lower slope mixed hardwood forest on large shaded Acer rubrum base
Bacidia schweinitzii	mid slope on east side hickory glade on pignut hickory
Bacidina delicata	on rock wall surrounding cemetery
Bacidina inundata	on boulder along edge of Sandy brook
Biatora appalachensis	moist Fagus grandifolia woods on rotting stump
Biatora longispora	on Betula alleghaniensis bark in moist woods below hilltop
Biatora printzenii	open swamp north of road on Acer rubrum
Biatora vernalis	at base of Acer saccharum in partial shade below hilltop
Buellia dialyta	moist woods on bark at base of Pinus strobus
Buellia stillingiana	in ash/hickory forest on Carya ovata
Caloplaca feracissima	on concrete culvert on side of Sandy Brook Road
Caloplaca flavovirescens	on headstone
Caloplaca pyracea	open swamp north of road on Populus tremuloides
Caloplaca subsoluta	on silicious outcrop in full sun by pond
Candelaria concolor	open swamp north of road on Populus tremuloides
Candelariella aurella	on limestone headstone
Candelariella efflorescens	on fallen Quercus rubra branch from canopy near hilltop
Candelariella vitellina	on boulder along edge of Sandy brook
Cetrelia olivetorum	on vertical rock wall in partial shade, western exposure
Chaenotheca brunneola	beside North Brook on Acer saccharum decaying bark
Chaenotheca chrysocephala	in hickory-ash glade on eastern summit on Carya ovata bark
Chaenotheca ferruginea	in hickory-ash glade on eastern summit on Carya ovata bark
Chaenotheca furfuracea	on upturned roots from fallen tree in wooded wetland by stream
Chrysothrix caesia	oak hickory glade on shagbark hickory bark in partial shade
Chrysothrix susquhannensis	oak hickory glade on silicious boulder in shaded overhang near hilltop
Circinaria caesiocinerea	on boulder along edge of Sandy brook
Cladonia apodocarpa	on shallow soil
Cladonia caespiticia	on shallow soil over rock in light shade near hilltop
Cladonia chlorophaea group	partial shade in hickory-ash-ironwood glade on thin soil over silicious boulder
Cladonia cristatella	on rotted stump in field
Cladonia coniocraea	in acidic swamp on fallen tree hummock on humus
Cladonia didyma v. didyma	in acidic swamp on fallen tree hummock on humus
Cladonia furcata	oak hickory glade on thin soil over silicious boulder in partial shade
Cladonia grayii	in acidic swamp on fallen tree hummock on humus
Cladonia macilenta	on decaying wood in partial shade near summit of hill
Cladonia macilenta v. bacillaris	in acidic swamp on fallen tree hummock on humus
Cladonia ochrochlora	on escarpment in moist woods on thin soil over silicious boulder
Cladonia parasitica	on decaying wood in partial shade near summit of hill
Cladonia pyxidata	on escarpment in moist woods on thin soil over silicious boulder
Cladonia ramulosa	by pond on base of red maple
Cladonia rei	oak hickory glade on thin soil over silicious boulder in partial shade
Cladonia squamosa	on escarpment in moist woods on thin soil over silicious boulder

Scientific Name	Notes
Collema subflaccidum	on northern side of large boulder along edge of stream
Cresponia chloroconia	partial shade in hickory-ash-ironwood glade on Carya glabra bark
Dermatocarpon luridum	on lower edge of boulder along edge of Sandy brook
Dibaeis baeomyces	on sandy soil
Dictyocatenulata alba	by ledges in rich sugar maple forest on Acer saccharum
Dimelaena oreina	on exposed silicious talus on steep southwestern exposure
Diploschistes scruposus	on silicious rock wall surrounding cemetery in full sun
Evernia mesomorpha	in acidic swamp on fallen pine branch
Fellhanera silicis	on upper portion of partly submerged streamside rock
Flavoparmelia baltimorensis	on boulder along edge of Sandy Brook
Flavoparmelia caperata	on red maple tree near rock wall
Fuscidea arboricola	on exposed root of red maple along edge of Sandy Brook
Graphis scripta	on exposed root of red maple along edge of Sandy Brook
Halecania pepegospora	on rock wall
Herteliana schuyleriana	by ledges on shaded siliceous rock
Heterodermia obscurata	on Quercus rubra bark near hilltop in partial shade
Hypocenomyce scalaris	partial shade in hickory-ash-ironwood glade on Carya glabra bark
Hypogymnia physodes	on fallen Tsuga canadensis branch from canopy near hilltop
Imshaugia aleurites	on large white pine near pond
Ionaspis alba	on silicious rock wall surrounding cemetery in full sun
Ionaspis lacustris	on boulder along edge of Sandy brook
Julella fallaciosa	oak hickory glade on shagbark hickory bark in partial shade
Lasallia papulosa	oak hickory glade on silicious boulder in partial shade near hilltop
Lecania croatica	on exposed root of red maple along edge of Sandy Brook
Lecanora argentata	by pond on large white pine
Lecanora chlarotera	on fallen branch from canopy near hilltop
Lecanora hybocarpa	on Carpinus caroliniana trunk
Lecanora layana	in ash/hickory forest on Quercus rubra
Lecanora minutella	in ash/hickory forest on Carya ovata with Rinodina efflorescens
Lecanora pulicaris	open swamp north of road on Acer rubrum
Lecanora saxigena	on sun exposed boulder along stream edge
Lecanora strobilina	on exposed root of red maple along edge of Sandy Brook
Lecanora thysanophora	summit in mixed hardwoods on Carya ovata bark
Lecidea berengeriana	in ash/hickory forest on Carya ovata base
Lecidea cyrtidia	on escarpment in moist woods on silicious boulder
Leimonis erratica	imbedded in roadside
Lepra pustulata	partial shade in hickory-ash-ironwood glade on Carya glabra bark
Lepra trachythallina	on silicious ledge outcrop in partial shade near hilltop
Lepraria caesiella	on exposed root of red maple along edge of Sandy Brook
Lepraria elobata	in mixed hardwood forest on shaded silicious boulder
Lepraria finkii	on lower edges of large blocks of gneiss at base of steep cliffs
Lepraria neglecta	on vertical wall of extensive gneiss ledges
Lepraria normandinoidies/oxybapha	on silicious boulders in shade near hilltop
Lepraria oxybapha	in mixed Pinus/Tusga/hardwoods forest on shaded rock
Leptogium cyanescens	on Anomodon moss at base of tree
Lichenostigma cosmopolites	on rock wall surrounding cemetery in full sun on Xanthoparmelia conspersa
Lithothelium hyalosporum	streamside in mixed hardwood/hemlock/white pine forest on Acer saccharum
Melanelixia glabratula	mid east slope in hickory-ash glade on shagbark hickory
Melanelixia subaurifera	open swamp north of road on Acer rubrum
Micarea peliocarpa	Tsuga bark
Micarea prasina	moist Fagus grandifolia woods on rotting log

Scientific Name	Notes
Montanelia sorediata	on silicious rock wall surrounding cemetery in full sun
Mycocalicium subtile	on decorticated snag in hemlock yellow birch woods
Myelochroa aurulenta	in sugar maple oak beech woods near hilltop on Quercus rubra
Myelochroa galbina	on fallen bark from canopy of mixed hardwoods and white pine forest
Myriospora smaragdula	on granite headstone
Ochrolechia arborea	on Quercus rubra bark near hilltop in partial shade
Ochrolechia pseudopallescens	mid eastern slope in mixed hardwood forest on maple
Ochrolechia yasudae	on vertical wall of extensive gneiss ledges
Parmelia squarrosa	oak hickory glade on silicious boulder in partial shade near hilltop
Parmelia sulcata	on Quercus rubra branch near hilltop in partial shade
Parmotrema hypotropum	on fallen branch along roadside
Parmotrema stuppeum	on large Acer Saccharum on lawn
Peltigera canina	on ground near marble headstones
Peltigera didactyla	on east facing seeping rock wall with moss beside road
Peltigera lepidophora	in deep shade on shore with mosses
Peltigera praetextata	in hickory-oak glade on lower eastern slope on Fraxinus americana base
Peltigera rufescens	growing with mown grass
Pertusaria globularis	on exposed root of red maple along edge of Sandy Brook
Pertusaria macounii	streamside in mixed hardwood/white pine forest on Fagus grandifolia
Pertusaria plittiana	on escarpment in moist woods on silicious boulder
Pertusaria pustulata	on Quercus rubra bark near hilltop in partial shade
Pertusaria rubefacta	on Quercus rubra bark near hilltop in partial shade
Phaeocalicium polyporaeum	in hemlock yellow birch woods on dead tree trunk on bracket fungi
Phaeophyscia adiastola	on large gneiss boulder at base of rock ledges
Phaeophyscia kairamoi	on limestone headstone
Phaeophyscia pusilloides	on bark of Fagus grandifolia in shady woods near hilltop
Phaeophyscia rubropulchra	on exposed root of red maple along edge of Sandy Brook
Phlyctis argena	open swamp north of road on Acer rubrum
Phlyctis petraea	on silicious boulders in shade near hilltop
Physcia adscendens	on limestone headstone
Physcia aipolia	moist woods on fallen Fraxinus americana branch
Physcia dubia	on limestone headstone
Physcia millegrana	oak hickory glade on shagbark hickory bark in partial shade
Physcia phaea	partial shade in hickory-ash-ironwood glade on silicious boulder
Physcia stellaris	on fallen branch along roadside
Physcia subtilis	in ash/hickory forest on lightly shaded boulder
Physcia thomsoniana	on upper portion of boulder along edge of Sandy brook
Physconia detersa	on old sugar maple near east wall of cemetery
Platismatia tuckermanii	along swamp edge at eastern base of hill
Polysporina simplex	on exposed boulder along edge of Sandy brook
Porpidia albocaerulescens	in mixed hardwood forest on shaded silicious boulder
Porpidia crustulata	on escarpment in moist woods on silicious boulder
Porpidia macrocarpa	on sun exposed boulder along stream edge
Porpidia subsimplex	on boulder along edge of Sandy brook
Psilolechia lucida	on rock wall surrounding cemetery in shaded niches
Punctelia caseana	on fallen branch
Punctelia rudecta	on red oak tree in forest by rock wall
Pyrenula pseudobufonia	near Sandy Brook on bark of Fagus grandifolia
Pyrrhospora varians	on fallen branch along roadside
Pyxine sorediata	on exposed root of red maple along edge of Sandy Brook
Ramalina petrina	on vertical surface of silicious outcrop near hilltop

Scientific Name	Notes
Rhizocarpon grande	oak hickory glade on silicious boulder in partial shade near hilltop
Rhizocarpon infernumulum f. sylvaticum	on boulder along edge of Sandy brook
Rhizocarpon lavatum	on boulder along edge of Sandy brook
Rhizocarpon rubescens	on boulder along edge of Sandy brook
Rimularia badioatra	on boulder along edge of Sandy brook
Rinodina efflorescens	in ash/hickory forest on Carya ovata
Rinodina excrescens	in ash/hickory forest on Acer rubrum
Rinodina maculans	oak hickory glade on fallen branch from canopy
Rinodina siouxiana	on vertical rock wall in partial shade, western exposure
Ropalospora chlorantha	on exposed root of red maple along edge of Sandy Brook
Sarea resinae	moist woods on sap at base of Pinus strobus
Scoliciosporum chlorococcum	in mixed hardwooods and pine forest, on lower branches of dead white pine
Scytinium teretiusculum	at base of Quercus alba with Anomodon moss near hilltop
Stereocaulon pileatum	on silicious rock wall surrounding cemetery in full sun
Thelenella muscorum	on Anomodon moss at base of tree
Trapelia coarctata	on escarpment in moist woods on silicious boulder
Trapelia glebulosa	on silicious rock wall surrounding cemetery in full sun
Trapelia placodioides	on silicious rock in shade
Trapelia stipitata	in hickory-mixed oak forest on silicious boulder
Trapeliopsis flexuosa	in mixed hardwoods/white pine forest, on decaying Juniperus virginiana stump
Trapeliopsis viridescens	moist Fagus grandifolia woods on rotting stump
Trypethelium virens	bark of red maple along edge of Sandy Brook
Tuckermanopsis ciliaris	free on ground, fallen from canopy
Tuckermanopsis americana	hemlock, white pine, yellow birch woods on fallen pine branch
Umbilicaria mammulata	on vertical wall of extensive gneiss ledges
Usnea subfloridana	moist woods on fallen Fraxinus americana branch
Usnocetraria oakesiana	on base of Pinus strobus near hilltop
Varicellaria vellata	oak hickory glade on shagbark hickory bark in partial shade
Verrucaria sp.	on boulder along edge of Sandy brook
Xanthomendoza fallax	on limestone tombstone edge
Xanthoparmelia conspersa	on upper side and top of boulder along edge of Sandy brook
Xanthoparmelia viriduloumbrina	on silicious rock wall surrounding cemetery in full sun
Xanthoria parietina	on limestone headstone

APPENDIX 4 -- Leafmining Insects, Other Insects and Relatives

COLEOPTERA — BEETLES		
Scientific name	**Common name**	**Family**
Altica kalmiae	a leaf beetle	Chrysomelidae
Baliosus nervosus	a leaf-mining beetle	Chrysomelidae
Dibolia borealis	northern plantain flea beetle	Chrysomelidae
Odontota dorsalis	a leaf-mining beetle	Chrysomelidae
Plagiodera versicolora	imported willow leaf beetle	Chrysomelidae
Sumitrosis inaequalis	a leaf-mining beetle	Chrysomelidae
Sumitrosis rosea	a leaf-mining beetle	Chrysomelidae
Orchestomerus eisemani	a leaf-mining weevil	Curculionidae
Exomala orientalis	oriental beetle	Scarabaeidae
Popillia japonica	Japanese beetle	Scarabaeidae
DIPTERA — FLIES		
Agromyza alnibetulae	a leaf-mining fly	Agromyzidae
Agromyza ambrosivora	a leaf-mining fly	Agromyzidae
Agromyza aristata	elm agromyzid leafminer	Agromyzidae
Agromyza idaeiana	a leaf-mining fly	Agromyzidae
Agromyza masculina	a leaf-mining fly	Agromyzidae
Agromyza vockerothi	a leaf-mining fly	Agromyzidae
Agromyza sp.	a leaf-mining fly	Agromyzidae
Amauromyza flavifrons	a leaf-mining fly	Agromyzidae
Aulagromyza luteoscutellata	a leaf-mining fly	Agromyzidae
Calycomyza flavinotum	a leaf-mining fly	Agromyzidae
Calycomyza promissa	a leaf-mining fly	Agromyzidae
Calycomyza solidaginis	a leaf-mining fly	Agromyzidae
Cerodontha angulata	a leaf-mining fly	Agromyzidae
Cerodontha incisa	a leaf-mining fly	Agromyzidae
Liriomyza arctii	a leaf-mining fly	Agromyzidae
Liriomyza asclepiadis	milkweed leafminer fly	Agromyzidae
Liriomyza blechi	a leaf-mining fly	Agromyzidae
Liriomyza brassicae	a leaf-mining fly	Agromyzidae
Liriomyza cracentis	a leaf-mining fly	Agromyzidae
Liriomyza eupatorii	a leaf-mining fly	Agromyzidae
Liriomyza limopsis	a leaf-mining fly	Agromyzidae
Liriomyza orilliensis	a leaf-mining fly	Agromyzidae
Liriomyza ptarmicae	a leaf-mining fly	Agromyzidae
Liriomyza taraxaci	a leaf-mining fly	Agromyzidae
Nemorimyza posticata	a leaf-mining fly	Agromyzidae
Ophiomyia kwansonis	daylily leafminer	Agromyzidae
Ophiomyia maura	a leaf-mining fly	Agromyzidae
Ophiomyia parda	a leaf-mining fly	Agromyzidae
Ophiomyia vockerothi	a stem-mining fly	Agromyzidae
Phytoliriomyza melampyga	a leaf-mining fly	Agromyzidae
Phytomyza agromyzina	a leaf-mining fly	Agromyzidae
Phytomyza aralivora	a leaf-mining fly	Agromyzidae
Phytomyza davisii	a leaf-mining fly	Agromyzidae
Phytomyza loewii	a leaf-mining fly	Agromyzidae
Phytomyza mitellae	a leaf-mining fly	Agromyzidae
Phytomyza pastinacae	a leaf-mining fly	Agromyzidae

Phytomyza plumiseta	a leaf-mining fly	Agromyzidae
Phytomyza tigris	a leaf-mining fly	Agromyzidae
Phytomyza sp. (*ilicis* group)	a leaf-mining fly	Agromyzidae
Chirosia filicis	a leaf-mining fly	Anthomyiidae
Chirosia sp.	a leaf-mining fly	Anthomyiidae
Pegomya setaria	a leaf-mining fly	Anthomyiidae
Pegomya sp. (*bicolor* section)	a leaf-mining fly	Anthomyiidae
Acericecis ocellaris	ocellate gall midge	Cecidomyiidae
Asphondylia pseudorosa	a gall midge	Cecidomyiidae
Asteromyia carbonifera	a gall midge	Cecidomyiidae
Asteromyia euthamiae	a gall midge	Cecidomyiidae
Asteromyia sp.	a gall midge	Cecidomyiidae
Contarinia verrucicola	linden wart gall midge	Cecidomyiidae
Lasioptera spiraeafolia	a gall midge	Cecidomyiidae
Macrodiplosis niveipila	a gall midge	Cecidomyiidae
Neolasioptera impatientifolia	a gall midge	Cecidomyiidae
Rhopalomyia capitata	a gall midge	Cecidomyiidae
Rhopalomyia solidaginis	a gall midge	Cecidomyiidae
Rhopalomyia sp.	a gall midge	Cecidomyiidae
Vitisiella sp.	a gall midge	Cecidomyiidae
undescribed species of unknown genus	a gall midge	Cecidomyiidae
Neochirosia nuda	a leaf-mining fly	Scathophagidae
Phytosciara greylockensis	a leaf-mining fungus gnat	Sciaridae
Sericomyia chrysotoxoides	oblique-banded pond fly	Syrphidae
Toxomerus geminatus	eastern calligrapher	Syrphidae
Eurosta solidaginis	goldenrod gall fly	Tephritidae
HEMIPTERA — TRUE BUGS		
Hormaphis hamamelidis	witch hazel cone gall aphid	Aphididae
Colladonus clitellarius	saddled leafhopper	Cicadellidae
Daktulosphaira vitifoliae	grape phylloxera	Phylloxeridae
HYMENOPTERA — SAWFLIES		
Caliroa lobata	a "slug" sawfly	Tenthredinidae
Euura tibialis	locust sawfly	Tenthredinidae
Nefusa ambigua	violet leafmining sawfly	Tenthredinidae
LEPIDOPTERA — MOTHS AND BUTTERFLIES		
Coleophora	a casebearer moth	Coleophoridae
Perittia herrichiella	a leaf-mining moth	Elachistidae
"Acrocercops" astericola	a leaf-mining moth	Gracillariidae
Callisto denticulella	a leaf-mining moth	Gracillariidae

Cameraria guttifinitella	a leaf-mining moth	Gracillariidae
Cremastobombycia solidaginis	a leaf-mining moth	Gracillariidae
Leucanthiza amphicarpeaefoliella	a leaf-mining moth	Gracillariidae
Leucospilapteryx venustella	a leaf-mining moth	Gracillariidae
Macrosaccus morrisella	a leaf-mining moth	Gracillariidae
Macrosaccus robiniella	a leaf-mining moth	Gracillariidae
Marmara fasciella	white pine barkminer moth	Gracillariidae
Parectopa plantaginisella	a leaf-mining moth	Gracillariidae
Parectopa robiniella	locust digitate leafminer moth	Gracillariidae
Parornix obliterella	a leaf-mining moth	Gracillariidae
Parornix spiraeifoliella	a leaf-mining moth	Gracillariidae
Parornix sp. (undescribed)	a leaf-mining moth	Gracillariidae
Phyllocnistis insignis	a leaf-mining moth	Gracillariidae
Phyllocnistis liriodendronella	a leaf-mining moth	Gracillariidae
Phyllocnistis populiella	aspen serpentine leafminer moth	Gracillariidae
Phyllocnistis vitegenella	a leaf-mining moth	Gracillariidae
Phyllocnistis vitifoliella	a leaf-mining moth	Gracillariidae
Phyllocnistis sp. (undescribed)	a leaf-mining moth	Gracillariidae
Phyllonorycter apparella	a leaf-mining moth	Gracillariidae
Phyllonorycter emberizaepenella	a leaf-mining moth	Gracillariidae
Phyllonorycter lucetiella	a leaf-mining moth	Gracillariidae
Phyllonorycter maestingella	a leaf-mining moth	Gracillariidae
Phyllonorycter sp. (*blancardella* group)	a leaf-mining moth	Gracillariidae
Mompha terminella	a leaf-mining moth	Momphidae
Bohemannia pulverosella	a leaf-mining moth	Nepticulidae
Stigmella argentifasciella	a leaf-mining moth	Nepticulidae
Stigmella populetorum	a leaf-mining moth	Nepticulidae
Stigmella prunifoliella	a leaf-mining moth	Nepticulidae
Stigmella tiliella	a leaf-mining moth	Nepticulidae
Furcula sp.	a prominent moth	Notodontidae
Coptotriche aenea	blackberry leafminer moth	Tischeriidae
Acleris viburnana	a leaf-tying moth	Tortricidae
ARACHNIDS — MITES AND SPIDERS		
Theridiosoma gemmosum	common eastern ray spider	Theridiosomatidae
Vasates aceriscrumena	maple spindle gall mite	Eriophyidae
Eriophyes laevis	alder beadgall mite	Eriophyidae
Colomerus vitis	grape erineum mite	Eriophyidae
Eriophyes emarginatae	plum fingergall mite	Eriophyidae
Phyllocoptes didelphis	a gall mite	Eriophyidae
Aceria parulmi	elm fingergall mite	Eriophyidae
Aceria fraxini	ash bead gall mite	Eriophyidae
Eriophyes tiliae	a gall mite	Eriophyidae
FUNGI		
Botryosphaeria dothidea	a fungus	Botryosphaeriaceae
Ganoderma tsugae	hemlock varnish shelf	Polyporaceae
Gymnosporangium juniperi-virginianae	cedar-apple rust	Gymnosporangiaceae

APPENDIX 4 — List of Additional Insects and Relatives

Scientific Name	Common Name
Coleoptera	Beetle
Calopteron sp.	Net-winged beetle
Orthosoma brunneum	Brown Prionid beetle
Prionus laticolis	Broad-necked Root Borer
Typocerus velutinus	Banded Longhorn beetle
Otiorhynchus sulcatus	Black Vine Weevil
Asiopus sp.	beetle
Popillia japonica	Japanese beetle
Harmonia axyridis	Asian Ladybug
Diptera	Fly
Archytas sp.	Fly
Eristalis tenax	Common Drone Fly
Eristalis transversa	Transverse-banded Flower Fly
Lucilia sp.	Greenbottle Flies
Physocephala tibialis	Thick-headed fly
Sericomyia chrysotoxoides	Oblique-banded Pond Fly
Platytipula sp.	Fly
Spilomyia fusca	Bald-faced Hornet Fly
Syrphus sp.	Common Flower Flies
Trichopoda pennipes	Swift Feather-legged Fly
Leskia sp.	Fly
Ephemeroptera	Mayflies
Hexagenia sp.	Giant Mayfly
Hemiptera	True Bugs
Adelges tsugae	Hemlock Wooly Adelgid
Flatomenis proxima	Northern flatid plant hopper
Palomena prasina	Green Shield Bug
Hymenoptera	Bees, Wasps, Sawflies
Abia sp.	Honeysuckle Sawfly larva
Apis mellifera	Honeybee
Bombus flavidus	Yellowish Cuckoo Bumble Bee
Bombus impatiens	Common Eastern Bumble Bee
Bombus subgenus Pyrobombus	Bumble Bee

Scientific Name	Common Name
Bombus terricola	Yellow-banded Bumble Bee
Hylaeus modestus	Modest Masked Bee
Megachile sculpturalis	Sculptured Resin Bee
Peponapis pruinosa	Pruinose Squash Bee
Xylocopa virginica	Eastern Carpenter Bee
Isodontia mexicana	Mexican Grass-carrying Wasp
Monobia quadridens	Four-toothed Mason Wasp
Polistes fuscatus	Northern Paper Wasp
Therion sp.	Wasp
Megaloptera	Dobsonfly
Corydalus cornutus	Eastern Dobsonfly
Odonata	Damselflies and Dragonflies
Calopterys maculata	Ebony jeweling (damselfly)
Libellula incesta	Slaty Skimmer
Sympetrum vicinum	Autumn Meadowhawk
Orthoptera	Grasshoppers, Katydids, Crickets
Melanoplus bivittatus	Two-striped Grasshopper
Melanoplus punctulatus	Pine tree Spur-throat Grasshopper
Scudderia furcata	Fork-tailed Bush Katydid
Neoconocephalus retusus	Round-tipped Conehead
Neoxabea bipunctata	Two-spotted Tree Cricket
Lepidoptera	Moths and Butterflies
Agnorisma badinodis	Pale-banded Dart
Argynnis cybele	Great Spangled Fritillary
Catocala cara	Darling Underwing
Cucullia convexipennis	Brown-hooded Owlet
Epirrita autumnata	Autumnal Moth
Eugonobapta nivosaria	Snowy Geometer Moth
Eupithecia absinthiata	Wormwood Pug
Feltia geniculata	Knee-joint Dart
Feltia herilis	Master’s Dart
Hypercome scribonia	Giant Leopard Moth
Lacinipolia reiger	Bristly Cutworm Moth
Lascoria ambigualis	Ambiguous Moth

Scientific Name	Common Name
Limenitis arthemis astyanax	Red-spotted Purple
Lithophane grotei	Grote's Pinion
Mythimna unipuncta	White-speck Moth
Operophtera bruceata	Bruce Spanworm Moth
Oreta rosea	Rose Hooktip
Palthis asopialis	Faint-spottted Palthis Moth
Phlogophora periculosa	Brown Angle Shades
Pyreferra sp.	Moth
Pyrrharctica isabella	Isabella Tiger Moth
Rivula propinqualis	Spotted Grass Moth
Saucrobotys futilalis	Dogbane Saucrobotys Moth
Sunira bicolorago	Bicolored Sallow
Tortricidia pallida	Red-crossed Button Slug Moth
Archaeognatha	Bristletail
Trigoniophthalmus alternatus	Jumping or Cave Bristletail
Arthropoda	Additional Arthropods
Cambarus robustus	Big River Crayfish (Crustacea; introduced)
Faxonius limosus	Spiny-cheek Crayfish (Crustacea)
Ixodes scapularis	Deer Tick (Arachnida)
Dermacentor variabilis	American Dog Tick (Arachnida)
Phidippus audax	Bold Jumping Spider (Chelicerata)
Dolomedes tenebrosus	Dark Fishing Spider (Chelicerata)
Arion subfuscus	Western Dusky Slug (Mollusca)
Succinea sp.	Amber snail (Mollusca)
photograph below, not identified	land snail (Mollusca)
Apheloria virginiensis	Black-and-gold Flat Millipede (Myriapoda)

APPENDIX 5 — List of Mammals

Scientific Name	Common Name	Notes
Alces alces	Moose	
Canis latrans	Eastern coyote	
Castor canadensis	North American beaver	
Clethrionomys gapperi	Red-backed vole	
Condylura cristata	Star-nosed mole	
Didelphis virginiana	Virginia opossum	
Eptesicus cuscus	Big brown bat	
Erethizon dorsatum	North American porcupine	
Felix rufus	Bobcat	
Glaucomys sabrinus	Northern flying squirrel	
Glaucomys volans	Southern flying squirrel	
Homo sapiens	Humans	
Lasionycteris noctivagans	Silver-haired bat	
Lasiurus borealis	Eastern red bat	
Lasiurus cinereus	Hoary bat	
Lepus americanus	Snowshoe hare	
Lutra canadensis	River otter	
Marmota monas	Woodchuck	
Martes pendanti	Fisher	
Mephitis mephitis	Striped skunk	
Microtus pennsylvanicus	Meadow vole	
Microtus pinetorum	Woodland vole	
Mus musculus	House mouse	
Mustela erminea	Short-tailed weasel	
Mustela frenata	Long-tailed weasel	
Myotis lucifugus	Little brown bat	
Myotis septentrionalis	Northern long-eared bat	
Napaeozapus insignis	Woodland jumping mouse	
Neovison vison	American mink	(*Mustela vison*)
Odocoileus virginianus	White-tailed deer	
Ondatra zibethicus	Muskrat	
Parascalops breweri	Hairy-tailed mole	
Peromyscus leocopus	White-footed mouse	
Peromyscus maniculatus	Deer mouse	

Scientific Name	Common Name	Notes
Procyon lotor	Raccoon	
Scalopus aquaticus	Common mole	
Sciurus carolinensis	Eastern gray squirrel	
Sylvilagus floridanus	Eastern cottontail	
Tamias striatus	Eastern chipmunk	
Tamiasciurus hudsonicus	Red squirrel	(*Sciurus vulgaris*)
Urocyon cinereoargenteus	Gray fox	
Ursus americanus	Black bear	
Vulpes vulpes	Red fox	
		( ) indicates older scientific name

APPENDIX 6 — Amphibians and Reptiles

Scientific Name	Common Name	Notes
	Amphibians	
Ambystoma jeffersonianum complex	Jefferson's Salamander	Special Concern - CT DEEP
Ambystoma maculatum	Spotted Salamander	
Bufo americanus	Eastern American Toad	
Bufo woodhousei fowleri	Fowler's Toad	
Desmognathus fuscus	Northern Dusky Salamander	
Eurycea bislineata	Northern Two-lined Salamander	
Gyrinophilus p. porphyriticus	Northern Spring Salamander	Threatened - CT DEEP
Hemidactylium scutatum	Four-toed Salamander	
Hyla versicolor	Gray Treefrog	
Notopthalamus viridescens	Red-Spotted Newt (red eft)	
Plethodon cinereus	Northern Redback Salamander	
Pseudacris crucifer	Northern Spring Peeper	(*Hyla crucifer*)
Rana catesbiana	Bullfrog	
Rana clamitana	Green Frog	
Rana palustris	Pickerel Frog	
Rana sylvatica	Wood Frog	
	Reptiles	
Chelydra serpentina	Common Snapping Turtle	
Chrysemys picta	Eastern Painted Turtle	
Coluber constrictor	Black Racer	
Diadophis punctatus edwardsii	Northern Ringneck Snake	
Lampropeltis triangulum	Eastern Milk Snake	
Nerodia sipedon	Northern Watersnake	(*Natrix sipedon*)
Opheodrys vernalis	Smooth Green Snake	Special Concern - CT DEEP
Storeria dekay	Northern Brown Snake	
Storeria occipitomaculata	Red-bellied Snake	
Terrapene carolina	Eastern Box Turtle	Special Concern - CT DEEP
Thamnophis sauritis	Eastern Ribbon Snake	Special Concern - CT DEEP
Thamnophis sirtalis	Eastern Garter Snake	
Glyptemys insculpta	Wood Turtle	Special Concern - CT DEEP
		( ) indicates an older scientific name

APPENDIX 7 — List of Fish

Scientific Name	Common Name
Ambloplites rupestris	Rock bass
Ameiurus catus	White catfish
Ameiurus nebulosus	Brown bullhead
Anguilla rostrata	American eel
Catostomus commersonii	White sucker
Cottus cognatus	Slimy sculpin — Special Concern, CT DEEP
Esox lucius	Northern pike
Esox niger	Chain pickerel
Etheostoma olmstedi	Tessellated darter
Lepomis auritus	Redbreast sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill sunfish
Luxilus cornutus	Common shiner
Micropterus dolomieu	Smallmouth bass
Micropterus salmoides	Largemouth bass
Notemigonus crysoleucas	Golden shiner
Notropis hudsonius	Spottail shiner
Oncorhynchus mykiss	Rainbow trout - Stocked
Osmerus mordax	Rainbow smelt
Perca flavescens	Yellow perch
Pomoxis nigromaculatus	Black crappie
Rhinichthys atratulus	Blacknose dace
Rhinichthys cataractae	Longnose dace
Salmo salar	Atlantic salmon - Stocked, last recorded by DEEP in 2017
Salmo trutta	Brown trout - Stocked
Salmo trutta	Brown trout - Wild
Salmo trutta × *Salvelinus fontinalis*	Tiger trout - Stocked, last recorded by DEEP in 2005
Salvelinus fontinalis	Brook trout - Stocked
Salvelinus fontinalis	Brook trout - Wild
Semotilus atromaculatus	Creek chub
Semotilus corporalis	Fallfish

APPENDIX 8 — List of Plants

Scientific Name	Common Name	Scientific Name Synonyms	Notes
	FERNS		
Athyrium felix-femina	Lady fern		
Botrychium matricariaefolium	Daisyleaf grapefern		
Botrychium virginianum	Rattlesnake fern		
Cystopteris fragilis	Fragile fern		
Dennstaedtia punctilobula	Hay-scented fern		
Deparia acrostichoides	Silvery spleenwort	(*Athyrium thelypteroides*)	
Dryopteris carthusiana	Shield fern		
Dryopteris cristata	Crested wood fern		
Dryopteris goldiana	Goldies fern		SC
Dryopteris intermedia	Intermediate wood fern		
Dryopteris marginalis	Marginal wood fern		
Dryopteris spinulosa	Spinulose wood fern		
Dryopteris thelypteris	Marsh fern		
Gymnocarpium dryopteris	Oak fern		
Homalosorus pycnocarpos	Narrow-leaved glade fern	(*Diplazium pycnocarpon, Athyrium pycnocarpum*)	
Matteuccia struthiopteris	Ostrich fern	(*Pteretis pensylvanica*)	
Onoclea sensibilis	Sensitive fern		
Osmunda claytoniana	Interrupted fern		
Osmundastrum cinnamomeum	Cinnamon fern	(Osmunda cinnamomea)	
Osmunda regalis	Royal fern		
Parathelypteris noveboracensis	New York fern	(*Thelypteris nove-boracensis*)	
Phegopteris connectilis	Long beech fern	(*Dryopteris phegopteris, Thelypteris phegopteris*)	
Phegopteris hexagonoptera	Broad beech fern	(*Dryopteris hexagonoptera*)	
Polypodium virginianum	Rock polypody		
Polystichum acrostichoides	Christmas fern		
Pteridium aquilinum	Bracken fern		
Thelypteris palustris	Marsh fern		
	CLUBMOSSES		
Dendrolycopodium obscurum	Flat-branched tree clubmoss	(*Lycopodium obscurum*)	
Diphasiastrum complanatum	Northern ground-cedar	(*Lycopodium complanatum*)	
Diphasiastrum digitatum	Southern ground-cedar	(*Lycopodium flabelliforme; L. digitatum*)	
Huperzia lucidula	Shining firmoss	(*Lycopodium lucidulum*)	
Lycopodiella inundata	Northern bog-clubmoss		
Spinulum annotinum	Bristly clubmoss	(*Lycopodium annotinum*)	
	HORSETAILS		
Equisetum arvense	Common horsetail		
Equisetum hyemale	Tall scouring-rush		
	MOSSES		
Anomodon attenuatus	Tree skirt moss		
Atrichum angustatum	Slender starburst moss		
Atrichum crispum	Oval starburst moss		
Bartramia pomiformis	Apple moss		
Calliergon cordifolium	Beech bud moss		
Campylium chrosophyllum	Bristle star moss	(*Campyliadelphius chrysophyllus*)	
Climacium americanum	Lobed leaf tree moss		
Dicranella heteromalla	Fine hair moss		
Dicranum flagellare	Asparagus broom moss		
Dicranum fulvum	Boulder broom moss		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Fissidens spp.	Maidenhair pocket moss		
Fontinalis dalecarlica	Fountain moss		
Funaria hygrometrica	Bonfire moss		
Hedwigia ciliata	Medusa moss		
Hylocomium splendens	Splendid feather moss		
Hypnum imponens	Brocade moss		
Leucobryum albidum	Pinchusion moss		
Plagiomnium ciliare	Sabertooth moss		
Plagiothecium denticulatum	Wet silk moss		
Polytrichum commune	Common hair-cap moss		
Pylaisia selwynii	Selwyn's Leskea moss		
Rauiella scita	Rauiella moss		
Rhynchostegium aquaticum	Black brook moss	(*Torrentaria riparioides*)	
Rhytidiadelphus squarrosus	Square goose neck moss		
Rosulabryum capillare	Cluster moss	(*Bryum capillare*)	
Sphagnum spp.	Peat moss		
Tetraphis pellucida	Four-tooth moss		
Thuidium delicatulum	Delicate fern moss		
Ulota crispa	Crispy tuft moss		
Ulota hutchinsiae	Tuft moss		
	TREES		
Acer pensylvanicum	Striped maple		
Acer rubrum	Red maple		
Acer saccharine	Silver maple		
Acer saccharum	Sugar maple		
Acer spicatum	Spiked maple		
Aronia arbutifolia	Red chokeberry	(*Pyrus arbutifolia*)	
Aronia melanocarpa	Black chokeberry		
Betula alleghaniensis	Yellow birch	(*Betula lutea*)	
Betula lenta	Black birch		
Betula nigra	River birch		
Betula populifolia	Gray birch		
Betula papyrifera	White birch		
Carpinus caroliniana	American hornbeam		
Carya cordiformis	Bitternut hickory		
Carya ovata	Shagbark hickory		
Castanea dentata	Chestnut		
Chamaecyparis thyoides	White cedar		
Eleagnus umbellatus	Autumn olive		invasive
Fagus grandifolia	American beech		
Fraxinus americana	White ash		
Gleditsia triacanthos	Honeylocust		
Juglans cinerea	Butternut		
Juglans nigra	Black walnut		
Juniperus virginiana	Red-cedar		
Larix laricina	American larch		
Lindera benzoin	Spicebush		
Liriodendron tulipifera	Tulip tree		
Nyssa sylvatica	Black-gum, Tupelo		
Ostrya virginiana	Ironwood		
Picea mariana	Black spruce		
Pinus strobus	White pine		
Platanus occidentalis	Sycamore		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Populus deltoides	Eastern cottonwood		
Populus grandidentata	Big-toothed aspen		
Populus tremuloides	Quaking aspen		
Prunus pensylvanica	Pin cherry		
Prunus serotina	Black cherry		
Prunus virginiana	Choke cherry		
Quercus alba	White oak		
Quercus rubra	Red oak		
Robinia pseudoacacia	Black locust		invasive
Salix babylonica	Weeping willow		
Salix nigra	Black willow		
Sassafras albidum	Sassafras		
Tilia americana	Basswood		
Thuja occidentalis	Northern white-cedar		
Tsuga canadensis	Eastern hemlock		
Ulmus americana	American elm		
Ulmus rubra	Slippery elm		
	NOTABLE & ORNAMENTAL TREES		
Abies fraseri	Fraser fir — Connecticut Champion		notable*
Aesculus hippocastanum	Horsechestnut		
Castanea mollissima	Chinese chestnut		notable*
Castanea sp.	chestnut		
Chamaecyparis obtusa	Hinoki false cypress		notable*
Fagus sylvatica 'Pendula'	Weeping beech		notable*
Magnolia acuminata	Cucumber-tree		
Metasequoia glyptoscrobiodes	Dawn redwood		
Pinus parviflora	Japanese white pine		notable*
Pinus strobus	The "Colonial Pine" in North Colebrook		notable*
Pinus strobus	Eastern white pine off Rt. 182-A		notable*
Prunus serotina	Black cherry		notable*
Pyrus malus	Apple	(*Malus pumila, M. domestica*)	
Pyrus x prunifoia	Crab apple		
Quercus alba	"Charter Oak" descendant in front of the	Colebrook Historical Society	historic
Sciadopitys verticillata	Japanese umbrella pine		notable*
Tsuga canadensis 'Pendula'	Sargent's weeping hemlock		notable*
Tsuga chinensis	Chinese hemlock		notable*
*Notable trees are designated by a program	of the Connecticut Botanical Society		
	SHRUBS & VINES		
Alnus rugosa	Speckled alder		
Amelanchier cf arborea	Downy Juneberry		
Berberis thunbergii	Japanese barberry		invasive
Celastrus orbiculatus	Oriental bittersweet		invasive
Celastrus scandens	American bittersweet		
Cephalanthus occidentalis	Buttonbush		
Chamaedaphne calyculata	Leatherleaf		
Clematis virginiana	Virgin's bower		
Comptonia peregrina	Sweet-fern		
Cornus canadensis	Bunchberry	(*Chamaepericlymenum canadense*)	
Corylus cornuta	Beaked hazelnut		
Crategus sp.	Hawthorne		
Cynanchum louiseae	Black swallow-wort	(*Vincetoxicum nigrum*)	invasive
Daphne mezereum	February daphne		escaped
Diervilla lonicera	Dwarf bush-honeysuckle		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Euonymus alatus	Burning Bush		invasive
Forsythia suspensa	Forsythia		escaped
Frangula alnus	Glossy false buckthorn	(*Rhamnus frangula*)	
Hamamelis virginiana	Witch hazel		
Ilex laevigata	Smooth winterberry		
Ilex mucronata	Mountain holly	(*Nemopanthus mucronata*)	
Ilex verticillata	Common winterberry		
Juniperus communis	Common juniper		
Kalmia angustifolia	Sheep laurel		
Kalmia latifolia	Mountain laurel		
Ligustrum sp.	Privet		escaped
Lonicera canadensis	American honeysuckle		
Lonicera morrowii	Morrow's honeysuckle		invasive
Lyonia ligustrina	Maleberry		
Myrica gale	Sweetgale		
Rhamnus sp.	Buckthorn		invasive
Rhododendron viscosum	Swamp azalea		
Rhus typhina	Staghorn sumac		
Ribes cynosbati	Eastern prickly gooseberry		
Ribes sativum	Garden red currant		
Rosa multiflora	Multiflora rose		invasive
Rosa palustris	Swamp rose		
Salix discolor	Pussywillow		
Salix eriocephala	Heart-leaved willow		
Salix sericea	Silky willow		
Sambucus nigra	Black elderberry	(*Sambucus canadensis*)	
Sambucus racemosa	Red elderberry	(*Sambucus pubens*)	
Smilax glauca	Sawbrier		
Sorbaria sorbifolia	False spirea		
Sorbus americana	American mountain-ash		
Spiraea latifolia	Meadowsweet		
Spiraea tomentosa	Steeplebush		
Swida alternifolia	Alternate-leaved dogwood	(*Cornus alternifolia*)	
Swida amomum	Silky dogwood	(*Cornus amomum*)	
Swida rugosa	Round-leaved dogwood	(*Cornus rugosa*)	
Taxus canadensis	American yew		
Toxicodendron radicans	Poison Ivy	(*Rhus radicans*)	
Vaccinium angustifolium	Lowbush blueberry		
Vaccinium corymbosum	Highbush blueberry		
Vaccinium macrocarpon	Large cranberry		
Vaccinium vacillans	Early lowbush blueberry		
Viburnum acerifolium	Maple-leaf viburnum		
Viburnum dentatum	Smooth arrowwood	(*Viburnum recognitum*)	
Viburnum lantanoides	Hobblebush	(*Viburnum alnifolium*)	
Viburnum lentago	Nannyberry		
Viburnum nudum	Withe-rod	(*Viburnum cassinoides*)	
Vitis labrusca	Fox grape		
Xanthoxylum americanum	Common pricklyash		
	WILDFLOWERS		
Achillea millefolium	Yarrow		
Actaea pachypoda	White baneberry		
Actaea rubra	Red baneberry		
Aegopodium podagraria	Goutweed		invasive

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Ageratina altissima	White snake-root	(*Eupatorium rugosum*)	
Agrimonia gryposepala	Agrimony		
Agrimonia sp.	Agrimony		
Agropyron repens	Quack grass		
Agrostis alba	Bent-grass		
Agrostis hyemalis var scabra	Rough Bent-grass		
Agrostis perennans	Autumn Bent-grass		
Alliaria petiolata	Garlic mustard		invasive
Allium tricoccum	Wild leek, Ramps		
Ambrosia artemisiifolia	Ragweed		
Amphicarpa bracteata	Hog-peanut		
Anaphalis margaritacea	Pearly everlasting		
Anemone acutiloba	Sharp-lobed hepatica	(*Hepatica acutiloba*)	
Anemone americana	Blunt-lobed hepatica	(*Hepatica americana*)	
Anemone quinquefolia	Wood anemone		
Anemone virginiana	Tall thimbleweed		
Antennaria neglecta	Pussytoes		
Antennaria neglecta var neodioica	Small pussytoes		
Antennaria parlinii	Parlin's pussytoes	(*Antennaria fallax*)	
Apios americana	Ground-nut		
Apocynum androsaemifolium	Spreading dogbane		
Apocynum cf sibiricum	Hemp dogbane	(*Apocynum cannabinum*)	
Arabis glabra	Tower mustard		
Aralia nudicaulis	Wild sarsaparilla		
Aralia racemosa	American spikenard		
Arisaema triphylla	Jack-in-the-pulpit	(*Arisaema atrorubens*)	
Arrhenatherum elatius	Oat grass		
Artemisia vulgaris	Mugwort		invasive
Asarum canadense	Wild ginger		
Asclepias atrorubens			
Asclepias incarnata	Swamp milkweed		
Asclepias syriacus	Common milkweed		
Barbarea vulgaris	Winter-cress		
Bidens frondosa	Sticktight		
Boechera laevigata	Smooth rockcress	(*Arabis laevigata*)	
Boehmeria cylindrica	False nettle		
Brachyelytrum erectum	Long-awned wood grass		
Bromus ciliatus	Brome grass		
Bromus inermis	Smooth brome grass		
Calamagrostis canadensis	Blue-joint grass		
Calla palustris	Wild calla		
Callytriche heterophyla	Water-starwort		
Caltha palustris	Marsh marigold		
Campanula aparinoides	Marsh-bellflower		
Cardamine pensylvanica	Bitter cress		
Cardamine pratensis	Cockoo flower		
Carex aestivalis	Summer sedge		SC
Carex appalachica	Appalachian sedge		
Carex arctata	Drooping woodland sedge		
Carex atlantica	Prickly bog sedge		
Carex brunnescens var sphaerostachya	Brownish sedge		
Carex communis	Fibrous-rooted sedge		
Carex comosa	Bristly Sedge		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Carex crinita	Fringed sedge		
Carex debilis	White-edged sedge		
Carex deweyana	Round-fruited short-scaled sedge		
Carex digitalis	Slender woodland sedge		
Carex folliculata	Northern long sedge		
Carex gracillima	Graceful sedge		
Carex gynandra	Northern bog sedge		
Carex intumescens	Greater bladder sedge		
Carex lacustris	Lakeside sedge		
Carex laxiflora	Broad loose-flowered sedge		
Carex leptalea	Bristle stalk sedge		
Carex lurida	Sallow sedge		
Carex normalis	Greater straw sedge		
Carex pedunculata	Long-stalked sedge		
Carex pensylvanica	Pennsylvania sedge		
Carex plantaginea	Plantain-leaved sedge		
Carex platyphylla	Broad-leaved sedge		
Carex prasina	Prairie sedge		
Carex radiata	Eastern star sedge		
Carex scoparia	Pointed broom sedge		
Carex stipata	Awl-fruited sedge		
Carex striatula	Lined sedge		
Carex stricta	Tussock Sedge		
Carex swanii	Swan's sedge		
Carex torta	Twisted sedge		
Carex trisperma	Three-seeded sedge		
Carex virescens	Ribbed sedge		
Caulophyllum thalictroides	Blue cohosh		
Centaurea cf maculosa	Spotted knapweed		invasive
Centaurea jacea	Brown knapweed		
Chelidonium majus	Celandine		
Chelone glabra	Turtlehead		
Chenopodium album	Pigweed, Lamb’s quarter		
Chenopodium simplex	Giant-seeded goosefoot		
Chrysosplenium americanum	Golden saxifrage		
Cicuta bulbifera	Bulb-bearing water-hemlock		
Cicuta maculata	Spotted water-hemlock		
Cinna latifolia	Slender wood-reed		
Circaea alpina	Small enchanter’s-nightshade		
Circaea canadensis	Broad-leaved enchanter’s Nightshade	(*Circaea lutetiana ssp. canadensis, Circaea quadrisulcata*)	
Claytonia caroliniana	Spring beauty		
Clintonia borealis	Bluebead-lily		
Convallaria majalis	Lily-of-the-valley		escaped
Coptis trifolia	Goldthread	(*Coptis groenlandica*)	
Corallorhiza maculata	Coral-root		
Corydalis sempervirens	Pink-corydalis		
Cypripedium acaule	Pink lady’s Slipper		
Dactylis glomerata	Orchard grass		
Danthonia spicata	Wild oat grass		
Daucus carota	Wild carrot		
Dentaria diphylla	Toothwort		
Desmodium canadense	Tick-trefoil		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Dicentra canadensis	Squirrel-corn		SC
Dicentra cucullaria	Dutchman's breeches		
Dichanthelium acuminatum	Hairy rosette-panicgrass		
Dichanthelium clandestinum	Deer-tongue rosette panicgrass	(*Panicum clandestinum*)	
Dichanthelium depauperatum	Starved rosette panicgrass	(*Panicum depauperatum v. psilophyllum*)	
Dichanthelium linearifolium	Linear-leaved rosette panicgrass		
Doellingeria umbellata	Tall white-aster	(*Aster umbellatus*)	
Drosera rotundifolia	Round-leaf sundew		
Dulichium arundinaceum	Threeway sedge		
Eleocharis acicularis	Needle spikesedge		
Eleocharis obtusa	Spike rush		
Elymus riparius	Eastern riverbank wild-rye		
Elymus virginicus	Virginia wild-rye		
Epifagus virginiana	Beechdrops		
Epigea repens	Trailing arbutus		
Epilobium leptophyllum	Narrow-leaved willowherb		
Epipactis helleborine	Broad-leaved helleborine		escaped
Eragrostis minor	Little lovegrass	(*Eragrostis poaeoides*)	
Erechtites hieraciifolia	Pilewort		
Erigeron annuus	Daisy Fleabane		
Erigeron canadensis	Horseweed		
Erigeron philadelphicus	Common Fleabane		
Erigeron pulchellus	Robin-plantain		
Erythronium americanum	Trout Lily		
Eupatorium perfoliatum	Boneset		
Eurybia divaricata	White wood-aster	(*Aster divaricatus*)	
Eurybia schreberi	Schreber's wood-aster	(*Aster schreberi*)	
Eutrochium maculatum	Spotted Joe-Pye weed	(*Eupatorium maculatum*)	
Eutrochium purpureum	Purple Joe-Pye weed	(*Eupatorium purpureum*)	
Fallopia ciliinodis	Fringed bindweed	(*Polygonum ciliinode*)	
Fallopia convolvulus	Black bindweed	(*Polygonum convolvulus*)	
Fallopia scandens	Climbing False Buckwheat	(*Polygonum scandens*)	
Festuca subverticillata	Nodding fescue		
Fragaria sp.	Strawberry		
Fragaria virginiana	Strawberry		
Galium asprellum	Rough bedstraw		
Galium lanceolatum	Lance-leaved licorice bedstraw		
Galium mollugo	Whorled bedstraw		
Galium sp.	Bedstraw		
Galium tinctorium	Clayton's bedstraw		
Galium trifidum	Three-petaled bedstraw		
Galium triflorum	Sweet-scented bedstraw		
Gaultheria procumbens	Teaberry		
Geranium maculatum	Wild geranium		
Geranium robertianum	Herb robert		
Geum canadense	White avens		
Geum rivale	Purple avens		
Geum virginianum	Cream avens		
Glechoma hederacea	Ground-ivy		
Glyceria canadensis	Rattlesnake grass		
Glyceria melicaria	Northeastern manna grass		
Glyceria striata	Fowl-meadow grass		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Goodyera pubescens	Rattlesnake-plantain		
Goodyera tesselata	Checkered rattlesnake-plantain		
Gratiola neglecta	Clammy hedge hissop		
Habenaria hyperborea	Northern green orchis		
Helianthus decapetalus	Thin-leaved sunflower		
Hemerocallis fulva	Common day-lily		
Hesperis matronalis	Dame's rocket		
Houstonia caerulea	Bluets		
Hydrocotyle americana	Marsh pennywort		
Hydrophyllum virginianum	Virginia waterleaf		SC
Hypericum mutilum	Dwarf St. John's-wort		
Hypericum perforatum	St. John's-wort		
Hypericum punctatum	Spotted St. John's-wort		
Impatiens capensis	Jewelweed		
Impatiens pallida	Yellow jewelweed		
Iris versicolor	Blue iris		
Juncus articulatus	Joint-leaved rush		
Juncus brevicaudatus	Short-tailed rush		
Juncus canadensis	Canada rush		
Juncus effusus	Common soft rush		
Juncus marginatus	Grass-leaved rush		
Juncus secundus	Lopsided rush		
Juncus tenuis	Path rush		
Lactuca canadensis	Tall lettuce		
Laportea canadensis	Canada wood-nettle		
Leersia oryzoides	Rice cut grass		
Leucanthemum vulgare	Ox-eye daisy		
Lilium canadense	Canada lily		
Lobelia cardinalis	Cardinal flower		
Lobelia spicata	Pale-spiked lobelia		
Lolium multiflorum	Italian rye grass		
Ludwigia palustris	Water purslane		
Ludwigia polycarpa	Many-fruited water-primrose		SC
Luzula multiflora	Common wood rush		
Lychnis alba	White campion		
Lychnis flos-cuculi	Ragged robin	(*Silene flos-cuculi*)	invasive
Lycopus americanus	American water-horehound		
Lycopus uniflorus	Northern water-horehound		
Lycopus virginicus	Virginia water-horehound		
Lysimachia ciliata	Fringed yellow-loosestrife		
Lysimachia terrestris	Swamp candles		
Lysimachia thrysiflora	Tufted yellow-loosestrife		
Lythrum salicaria	Purple loosestrife		invasive
Maianthemum canadense	Canada-mayflower		
Maianthemum racemosum	Feathery false Solomon's Seal	(*Smilacina racemosa*)	
Maianthemum trifolium	Three-leaved false Solomon's Seal	(*Smilacina trifolia*)	T
Matricaria matricarioides	Pineapple weed		
Medeola virginiana	Indian cucumber root		
Melilotus alba	White sweet clover		
Melilotus officinalis	Yellow sweet clover		
Mentha arvensis	Field mint		
Microstegium vimineum	Japanese stiltgrass		invasive
Mimulus ringens	Monkey-flower		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Mitchella repens	Partridgeberry		
Mitella diphylla	Two-leaf mitrewort		
Moneses uniflora	One-flowered-shinleaf		E
Monotropa hypopithys	Pine sap		
Monotropa uniflora	Indian pipes		
Muhlenbergia frondosa	Wire-stemmed muhly		
Muhlenbergia mexicana	Mexican muhly		
Muhlenbergia schreberi	Nimblewill muhly		
Muhlenbergia sylvatica	Woodland muhly		
Myosotis laxa	Smaller forget-me-not		
Myosotis scorpioides	Water forget-me-not		
Nabalus altissima	Tall rattlesnake-root	(*Prenanthes altissima*)	
Nabalus sp.	Lionsfoot	(*Prenanthes sp.*)	
Nabalus trifoliolatus	Three-leaved rattlesnake-root	(*Prenanthes trifoliolata*)	
Nuphar variegata	Bullhead pond-lily		
Nymphaea odorata	Fragrant white waterlily		
Oclemena acuminata	Sharp-toothed nodding-aster	(*Aster acuminatus*)	
Oenothera biennis	Evening-primrose		
Osmorhiza claytonii	Sweet cicely		
Oxalis montana	Northern wood-sorrel	(*Oxalis acetosella*)	
Oxalis striata	Common yellow wood-sorrel		
Packera aureus	Groundsel; ragwort	(*Senecio aureus*)	
Packera obovatus	Roundleaf ragwort	(*Senecio obovatus*)	
Panax quinquefolius	American ginseng		SC
Panax trifolius	Dwarf ginseng		
Parietaria pensylvanica	Pennsylvania pellitory		
Parthenocissus quinquefolia	Virginia creeper		
Pastinaca sativa	Wild parsnip		invasive
Peltandra virginica	Arrow arum		
Penthorum sedoides	Ditch stonecrop		
Persicaria amphibia	Water smartweed	(*Polygonum amphibium*)	
Persicaria arifolia	Halberd-leaved smartweed	(*Polygonum arifolium*)	
Persicaria careyi	Carey’s smartweed	(*Polygonum careyi*)	
Persicaria hydropiper	Water-pepper smartweed	(*Polygonum hydropiper*)	
Persicaria sagittata	Arrow-leaved tearthumb	(*Polygonum sagittatum*)	
Phleum pratense	Timothy		
Phragmites australis	Common reed	(*Phragmites communis*)	invasive
Pilea pumila	Clearweed		
Pilea sp.	Clearweed		
Plantago lanceolata	English plantain		
Plantago major	Common plantain		
Platanthera clavellata	Little club-spur bog-orchid	(*Habenaria clavellata*)	
Poa compressa	Flat-stemmed blue grass		
Poa nemoralis	Wood blue grass		escaped
Poa pratensis	Kentucky Blue grass		
Polygonatum biflorum	Solomon’s seal		
Polygonatum pubescens	Hairy Solomon’s seal		
Polygonum aviculare	Dooryard knotweed		
Pontederia cordata	Pickerelweed		
Potamogeton gramineus	Pondweed		
Potentilla fruticosa	Shrubby cinquefoil		
Potentilla simplex	Common cinquefoil		
Potomageton sp.	Pondweed		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Proserpinacea palustris	Mermaid weed		
Prunella vulgaris	Heal all		
Pyrola elliptica	Wintergreen		
Ranunculus abortivus	Kidney-leaved buttercup		
Ranunculus acris	Tall buttercup		
Ranunculus recurvatus	Hooked crowfoot		
Ranunculus septentrionalis	Northern swamp buttercup		
Reynoutria japonica	Japanese knotweed	(*Polygonum cuspidata*)	
Rhynchospora capitellata	Brownish beaksedge		
Rubus allegheniensis	Blackberry		
Rubus hispidus	Dewberry		
Rubus idaeus	Red raspberry		
Rubus idaeus inermis	Smooth red raspberry		
Rubus occidentalis	Blackcap		
Rubus odoratus	Flowering raspberry		
Rubus pubescens	Dwarf raspberry		
Rubus repens	Dewdrop	(*Dalibarda repens*)	E
Rudbeckia hirta	Black-eyed Susan	(*Rudbeckia serotina*)	
Rudbeckia laciniata	Greenheaded coneflower		
Rumex acetosella	Common sheep sorrel		
Rumex britannica	Greater water dock	(*Rumex orbiculatus*)	
Rumex obtusifolius	Bitter dock		
Rumex verticillatus	Swamp dock		
Sagina procumbens	Pearlweed		
Sagittaria engelmanniana	Engelmann’s arrowhead		
Sagittaria latifolia	Broad-leaved arrowhead		
Sanguinaria canadensis	Bloodroot		
Saponaria officinalis	Soapwort		
Sarracenia purpurea	Pitcher plant		
Saxifraga pensylvanica	Swamp saxifrage		
Saxifraga virginiensis	Early saxifrage		
Schedonorus pratensis	Meadow rye grass	(*Festuca elatior*)	
Schizachne purpurascens	False melic grass		SC
Schizachyrium scoparium	Little bluestem grass		
Schoenoplectus tabernaemontani	Soft-stemmed bulrush	(*Scirpus tabernaemontani, S. validus*)	
Scirpus atrocinctus	Black-girdled woolsedge		
Scirpus cyperinus	Woolgrass		
Scirpus expansus	Wool bulrush		
Scutellaria galericulata	Hooded skullcap		
Scutellaria lateriflora	Mad-dog skullcap		
Sedum purpureum	Live-forever		
Silene cucubalis	Bladder-campion		
Sium suave	Water-parsnip		
Smilax herbacea	Carrion-flower		
Solanum dulcamara	Climbing nightshade		invasive
Solanum nigrum	European black nightshade		
Solidago arguta	Forest goldenrod		
Solidago bicolor	White goldenrod, Silverrod		
Solidago caesia	Blue-stem goldenrod		
Solidago canadense	Canada goldenrod		
Solidago flexicaulis	Zig-zag goldenrod		
Solidago gigantea	Smooth goldenrod		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Solidago graminifolia	Grass-leaved goldenrod		
Solidago juncea	Early goldenrod		
Solidago patella	Rough-leaved goldenrod		
Solidago rugosa	Rough goldenrod		
Sparganium americanum	Larger bur-reed		
Sparganium androcladium	Branched bur-reed		
Spiranthes cernua	Nodding ladies-tresses		
Streptopus lanceolatus	Rose twisted-stalk	(*Streptopus roseus*)	
Symphyotrichum lanceolatum	Lance-leaved American-aster	(*Aster simplex, Aster lanceolatus*)	
Symphyotrichum lateriflorum	Calico American-aster	(*Aster lateriflorus*)	
Symphyotrichum novae-angliae	New England American-aster	(*Aster novae-angliae*)	
Symphyotrichum puniceum	Purple-stemmed American-aster	(*Aster puniceus*)	
Symphyotrichum racemosum	Small white American-aster	(*Aster vimineus*)	
Symplocarpus foetidus	Skunk-cabbage		
Taraxicum officinale	Dandelion		
Thalictrum dioicum	Early meadow-rue		
Thalictrum polygamum	Tall meadow-rue		
Tiarella cordifolia	Foamflower		
Tragopodon pratensis	Goat's-beard		
Triadenum virginicum	Marsh St. John's wort	(*Hypericum virginicum*)	
Trientalis borealis	Starflower		
Trifolium agrarius	Hop-clover		
Trifolium dubieus	Lesser hop-clover		
Trifolium pratense	Red clover		
Trifolium repens	White clover		
Trifolium spp.	Clover		
Trillium erectum	Red trillium, wakerobin		
Trillium undulatum	Painted trillium		
Tussilago farfara	Coltsfoot		invasive
Typha angustifolia	Narrow-leaved cat-tail		
Typha latifolia	Broad-leaved cat-tail		
Utricularia sp.	Bladderwort		
Utricularia vulgaris	Greater bladderwort		
Uvularia sessilifolia	Sessile-leaved bellwort		
Valeriana officinalis	Garden heliotrope		escaped
Veratrum viride	American false hellebore		
Verbena hastata	Vervain		
Vernonia noveboracensis	New York ironweed		
Veronica americana	American speedwell		
Veronica officinalis	Common speedwell		
Veronica scutellata	Narrow-leaved speedwell		
Vinca minor	Myrtle		escaped
Viola affinis	Common blue violet		
Viola blanda	Sweet white violet		
Viola canadensis	Canada white violet		SC
Viola conspersa	Dog violet		
Viola cucullata	Marsh blue violet		
Viola fibriatula	Sand violet		
Viola pallens	Northern white violet		
Viola palmata	Wood violet	(*Viola triloba*)	
Viola pubescens	Yellow forest violet		
Viola rostrata	Long-spurred violet		
Viola rotundifolia	Round-leaved violet		

Scientific Name	Common Name	Scientific Name Synonyms	Notes
Viola sagittata	Arrow-leaved violet		
Viola selkirkii	Great-spurred violet		SC (H)
Viola soraria	Wooly blue violet		
Zizia aurea	Golden alexanders		
	INVASIVE PLANTS		
Aegopodium podagraria	Goutweed		invasive
Alliaria petiolata	Garlic mustard		invasive
Artemisia vulgaris	Mugwort		invasive
Berberis thunbergii	Japanese barberry		invasive
Celastrus orbiculatus	Oriental bittersweet		invasive
Centaurea cf maculosa	Spotted knapweed		invasive
Cynanchum louiseae	Black swallow-wort	(*Vincetoxicum nigrum*)	invasive
Eleagnus umbellatus	Autumn olive		invasive
Euonymus alatus	Burning Bush		invasive
Lythrum salicaria	Purple loosestrife		invasive
Lonicera morrowii	Morrow's honeysuckle		invasive
Lychnis flos-cuculi	Ragged robin	(*Silene flos-cuculi*)	invasive
Microstegium vimineum	Japanese stiltgrass		invasive
Pastinaca sativa	Wild parsnip		invasive
Phragmites australis	Common reed	(*Phragmites communis*)	invasive
Rhamnus sp.	Buckthorn		invasive
Rosa multiflora	Multiflora rose		invasive
Solanum dulcamara	Climbing nightshade		invasive
Tussilago farfara	Coltsfoot		invasive
CT DEEP: SC = Special Concern	T = Threatened H = Historic	E = endangered	

Champion Chinese chestnut at Charles Arnold Recreation Area on Eno Hill.

Mountain laurel in full bloom.