Natural Resource Inventory

Norfolk, Connecticut

Natural Resource Inventory

Norfolk, Connecticut 2023

Second edition

Front cover: Pink ladyslipper (Cypripedium acaule).

Inside front cover: Marsh marigold (Caltha palustris).

Inside back cover: Northern spring peeper (Pseudacrif crucifer).

Back cover: Heron (Ardea herodias).

Dedication

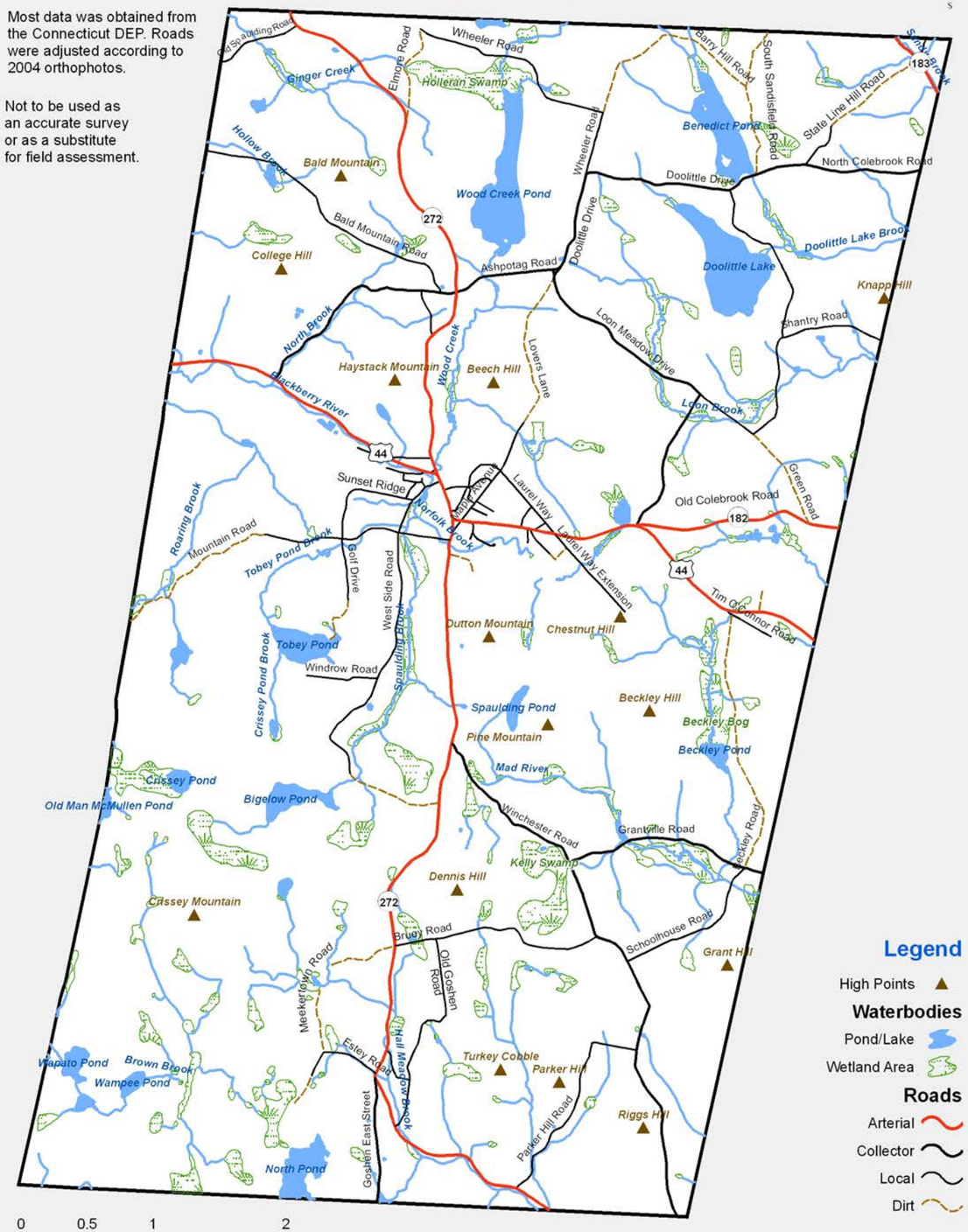
This edition of Norfolk's natural resource inventory is dedicated to Bruce Frisch. The many photographs he contributed to this work reflect his great love for Norfolk and its natural beauty. Over the course of 50 years, his search for rare plants and wildlife often took him to remote wetland habitats, where some of his favorite subjects, including lady slippers and herons, could be found.

Right page: Red trillium (Trillium erectum).

Base Map

Most data was obtained from the Connecticut DEP. Roads were adjusted according to 2004 orthophotos.

Not to be used as an accurate survey or as a substitute for field assessment.



Map prepared on 12/31/08 by Kirk Sinclair.

Introduction

The natural world—a web of animal, plant and mineral resources—sustains humanity. Our economies, our lifestyles, our very existence would not be possible without it. Both climate and human development have left many areas of the world relatively poor in natural resources, but Norfolk is fortunate to be rich in them. This inventory attempts to convey how many we have, to list what they are and to explain why they are important.

Each of the report's first eight chapters describes a type of resource and its importance. Chapter nine presents scenic resources; chapter ten, historic resources, and chapter eleven contains recommendations based upon the information in all the chapters. The first eight appendices present the meat of the inventory—the lists, tables and charts of data. The ninth is a bibliography and the tenth contains information about the report, its authors and its sources.

Although this project has gone on for more than three years and drawn on the talents of many people, we are still missing some significant portions, such as most of mycology and entomology, and air quality. We intend to produce periodic updates, which we hope will fill the gaps, and invite others to get in touch with the Conservation Commission to contribute information.

This work is being published on the town Web site (https://norfolkct.org), as well as in print.

Norfolk Conservation Commission, 2009
Sue Frisch, editor

Preface to the Second Edition

This update of the Norfolk Natural Resource Inventory has been a collaborative effort by many of the original contributors and some new ones as well. The first Norfolk NRI was published in 2009, created by a special subcommittee of the Conservation Commission lead by commission member Sue Frisch. One of the outcomes of this process was the separation of the Conservation Commission from the Inland Wetlands Agency. This allowed the Conservation Commission to focus on non-regulatory conservation matters, including the production of this NRI and following through with some the recommendations listed in the original document.

What's new since 2009?

A massive gasoline spill occurred near Norfolk center on Route 44 on November 5, 2022. A tanker truck rolled over and spilled nearly 8,000 gallons of fuel resulting in contaminated soils and the spill and further downhill west of the accident. So far, contamination of the ground water has not been detected and monitoring throughout the area is continuing. Quick action by the Town and many volunteer first responders and the CT DEEP kept residents and travelers safe. Clean up, remediation and monitoring began promptly and will continue for several months, if not years. The Conservation Commission will stay on top of the short- and long-term environmental concerns of this incident.

Renovation of City Meadow in the center of town began in 2017 which included the removal of invasive plants (mainly Phragmites, or common reed), reestablishing native plants and natural vegetation, and to make the area more accessible to the public by installing a boardwalk. The Commission has been involved in the planning and management for this project.

Many ash trees have recently been killed by the emerald ash borer, an exotic invasive species that has spread from the American Midwest. How well the three species of ash native to Norfolk survive? The Commission will be monitoring this.

There are now in Norfolk an established population of moose, likely breeding of sandhill cranes and several years of successful reproduction by the common loon. However, some species of plants and wildlife have not been seen recently and may no longer occur in Norfolk. The Commission and its members continue to monitor the biodiversity within the Norfolk town boundaries.

The Commission was involved in a stream connectivity and flood hazard abatement study in town and has advocated for fixes to the problems reported.

Local citizen science and environmental education programs had been part of the Commission's program for several years, including sponsoring talks, nature programs and walks, disseminating information, and hosting the annual plant exchange at the Farmers Market (native plants for invasive non-native plants).

And the Commission has been monitoring road salt and stream salinity testing and made recommendations to find alternatives to stop the environmental damage.

Many chapters in this second edition of the Natural Resource Inventory have been updated to reflect changes that have occurred over the past 13 years. Some chapters have been left unchanged such as Geography and Geology and Historic Resources. Others have had various degrees of modification. The Weather chapter has been updated to include weather data through 2020. The Soils chapter has new information on farmland soils of statewide and local importance. The Plantscape chapter has updated information on notable trees and invasive species and the Open Space chapter has been modified to reflect changes since 2009.

Several of the maps contained in these chapters have changed and one additional map was added (Core Forests in the Open Space chapter). The Public Act 490 Lands map was eliminated, though this information is available at the Norfolk Town Hall.

The original Recommendations have been retained and a few additional ones added. Please check these out; they will help us all conserve the natural and cultural resources described in this document.

There are updated and new species lists in the appendices. We have added sections on moths, dragonflies and damselflies, bees and rare plants. Several lists have been expanded and modified to reflect new records of species in Norfolk. It should also be noted that over the past decade there have been many scientific name changes, especially due to genetic taxonomic studies. Usually this has no effect on common names, though in some instances additional adjectives were added to clarify these differences. Changes in State of Connecticut conservation status have also been updated. Many of the lists have been modified so that like species are grouped together, to make the lists more user-friendly. Species are still listed in alphabetical order unless otherwise noted, but are grouped by taxonomic order, family or other type.

Climate change and global/local warming are here now! New information has been added regarding climate change, including data from two local long-term studies on plant flowering dates that demonstrate earlier first blooms occurring in Norfolk (see Appendix 1: Norfolk Weather).

A new invasive freshwater jellyfish was discovered in Tobey Pond in 2010, a widespread invasive species from the Yangtze River basin, a translucent organism, about the size of a penny and harmless to humans (see Appendix 3: Water Resources).

Many species have been added to the Wildflower list, which has grown from 286 species to 470 species. This is not to indicate that there are more native species today than in 2009, but rather the inclusion of more record sources from Norfolk. There are also some additional non-native species; again, many of these likely have existed in our local environment but did not make it onto the prior list (see Appendix 4: Norfolk Plantscape).

Taxonomic revisions have resulted in numerous scientific name changes in the plant lists. Some of these changes were anticipated in the 2009 NRI and noted in the Comments column. For example, the Asters have been divided into five genera (with modifications to the common names): Doellingera (white-aster); Eurybia (wood-aster); Ionactis (Stiff-aster); Oclemena (Nodding-aster), and Symphyotrichum (American-aster). The genus Aster refers only to Old World asters. The dogwoods have also been divided and renamed. Most are now in the genus Swida. Flowering dogwood is now Benthamidia florida and bunchberry, or dwarf-dogwood, is the mouthful Chamaepericlymenum canadense (see Appendix 4: Norfolk Plantscape).

A new list of Rare Plants occurring or potentially occurring in Norfolk has been added, with the purpose of raising awareness of plants that people should keep their eyes open for and protect sites and habitats of these species. There are records of forty-nine species of rare plants in Norfolk. Also, look for Connecticut Watch List Species in the Comments column of the Wildflower list, which are plants being considered for some future rarity designation.

Changes to the Mammals list have been primarily regarding the conservation status and occurrence in Norfolk. We can now include several new species of bats with occurrences in town based on acoustic sensing studies by the CT DEEP (see Appendix 5: Wildlife).

The Birds of Norfolk list has increased, with new observations of brant, pied-billed grebe, little blue heron, Cap May warbler, and cerulean warbler. The list has also been grouped and reorganized to match lists produced by the Connecticut Ornithological Society and the American Ornithological Union (see Appendix 5: Wildlife).

New areas of open space have been added to this inventory. Some are open to public recreation (but check the contact information for those that have limited access or require permission before entering; see Appendix 7: Open Space).

The Bibliography and Acknowledgements appendices have been updated and expanded as well, reflecting changes in organizations and website addresses and information about the contributions to this second edition of the Natural Resource Inventory.

Norfolk Conservation Commission, 2023
John Anderson, editor

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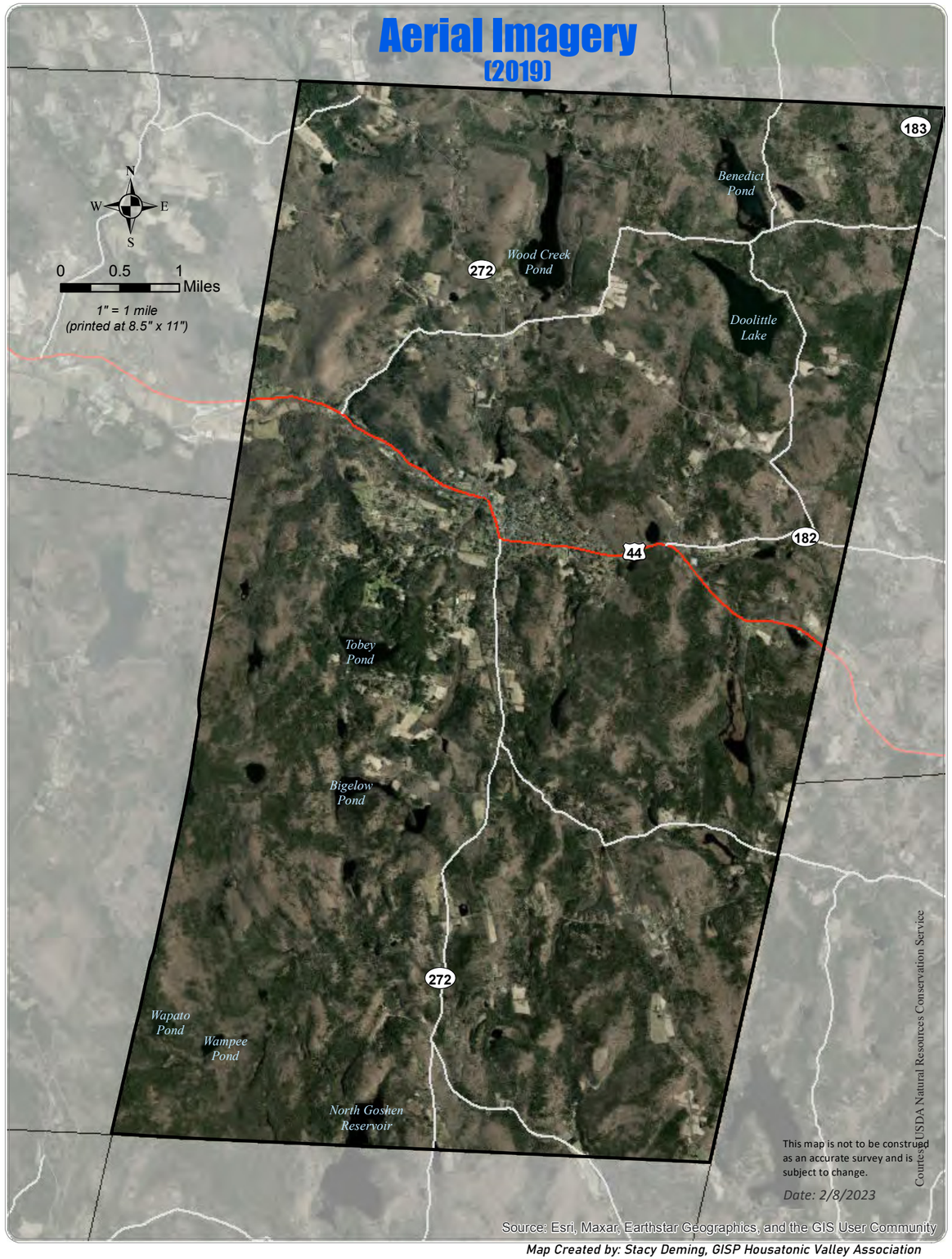
Sailboat on Tobey Pond.



Map Created by: Stacy Deming, GISP Housatonic Valley Association

Geography and Geology of Norfolk

The town of Norfolk lies in the northwest corner of Connecticut. Shaped like a parallelogram 9 miles tall and an average 4.5 miles wide, it covers a little more than 40 square miles or approximately 30,000 acres of land. The town is bordered on the west by North Canaan and Falls Village, on the south by Goshen, on the east by Winchester and Colebrook, and on the north by the Massachusetts towns of Sandisfield and New Marlborough. Norfolk's highest points are Bald Mountain and Crissey Mountain at 1,770 feet above sea level. Its lowest point is in the Blackberry River valley at just under 820 feet, for a total relief of 950 feet.

Geography

Norfolk is located in the southernmost foothills of the ancient Berkshire Mountains in the area known as the Northwest Highlands. The area, also called the Litchfield Hills and the Berkshire Plateau, is the area of the greatest elevation and coolest climate in the state. One of the last sections of the state to be settled, Norfolk lies along the old Albany Turnpike, established in the 1700's, the highway connecting Hartford, Connecticut, to Albany, New York. Winding in a more or less east-west direction, it is now known as Connecticut Route 44. The other main highway through town is Connecticut Route 272 that links Norfolk with Torrington to the south and the Massachusetts towns of Southfield and New Marlborough to the north. A rail line once ran through town, but was abandoned in the 1950's; the railroad bed has now mostly been converted to hiking trails. Despite its location at this crossroads, the town's generally non-agricultural and poorly drained, stony soils; its limited natural resources, and its often harsh weather have kept it relatively remote and undeveloped.

Norfolk's hilly topography is primarily determined by its bedrock and secondarily by the erosional action of glaciers, streams and lakes. In the south central part of town is the dome-like Dennis Hill (1,627 feet), at the top of three watersheds. The north-south valley of the upper Blackberry River is the only considerable depression in the town. Significant hills in town are Bald Mountain, Crissey Mountain, Dennis Hill, Haystack Mountain (1,677 feet), Dutton Mountain (1,620 feet) and Pine Mountain (1,560 feet). These hilltops are the remnants of a relatively flat

View of western hills from Litchfield Road.

erosion plain that has been shaped by ice and water into its present contours. The bedrock is intensely folded as a result of past continental plate collisions; outcrops punctuate the countryside.

Norfolk sits at the top of the division between the watersheds of the two largest rivers in the state: the Connecticut and the Housatonic. Rain running off the summit of Dennis Hill reaches the Connecticut River to the east, the Housatonic River to the west and the Naugatuck River to the south (eventually joining the Housatonic farther down stream).

Of the many watercourses in Norfolk, both named and unnamed, the Blackberry River is the largest. Its headwater tributaries are Spaulding Brook, which flows over Buttermilk Falls and has as its tributaries Tobey Pond Brook and Norfolk Brook; Wood Creek, which drains Wood Creek Pond, and the Whiting River. The Whiting does not enter Norfolk but by the time it meets the Blackberry in Canaan it includes Ginger Creek, which drains Holleran Swamp; Hollow Brook, and another, unnamed Norfolk stream. North Brook and Roaring Brook are also tributaries of the Blackberry.

Next in size is Sandy Brook in the northeast corner of town. Only a short quarter-mile section lies within Norfolk, but two longer tributaries begin in town. Doolittle Lake Brook, also known as Brummagem Brook, drains Benedict Pond and Doolittle Lake, the two largest ponds in Norfolk. Loon Brook is the other tributary and both join Sandy Brook in Colebrook. The Mad River begins at Spaulding Pond near the middle of Norfolk and runs through Grant Swamp at the east edge of town, where it is joined by a tributary, Beckley Pond Brook. Hall Meadow Brook, which flows eventually to the Naugatuck River, drains land in South Norfolk and has several unnamed tributaries. Many of these rivers and streams have or have had dams and were used in the past for water power.

Norfolk has many ponds, most of which have had the water levels managed by landowners. Besides those already mentioned, Tobey Pond is an important deep cold-water pond, with minimum development; it is the location of the town beach. There is also a cold, acid bog next to the pond. Beckley Pond and the associated Beckley Bog are well-known in town, forming one of the oldest preserved natural areas owned by the Nature Conservancy. The state-owned Wood Creek Pond is man-made, but its wetlands include Holleran Swamp, a forested bog also owned by the Nature Conservancy. North Pond, partially in the south end of town, is owned by a water company. Norfolk's own town water comes from Wangum Lake, which lies entirely in the adjacent town of Falls Village and is owned by a private water company. Except in the center of town where public water and sewer service is available, most residents have ground water supplies from deep drilled wells, although a few people may still have water from spring-fed sources.

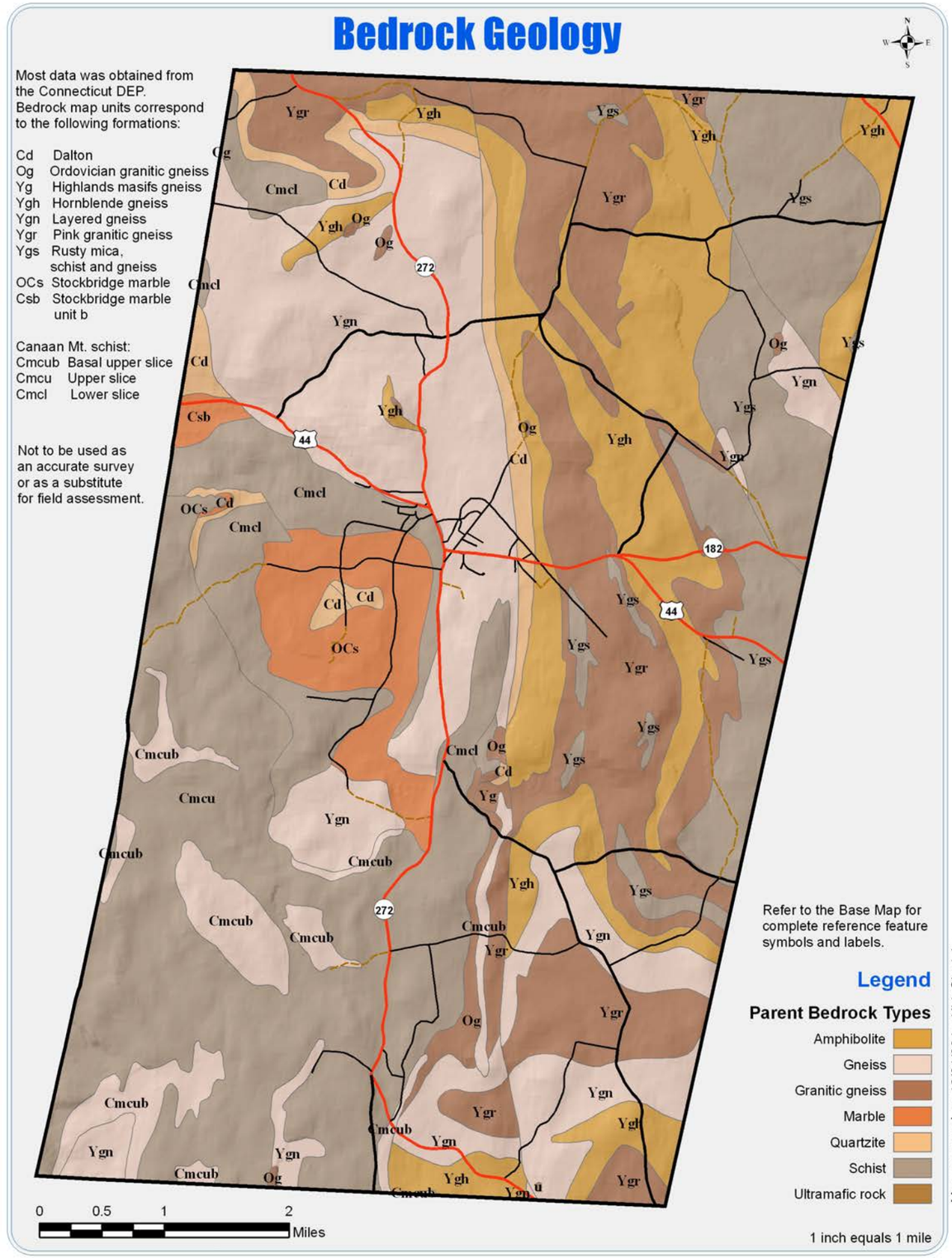
More information about Norfolk's aquatic resources appears in Chapter 4.

© Alexandra Childs

Typical rock with contorted banding.

Geology

A great array of forces shaped the topography and geology of the land we know as Norfolk. Beginning nearly a billion years ago, continental collisions and break-ups resulted in submerged marine deposits folding back upon themselves, creating high mountains with an elevation of perhaps as much as 30,000 feet. About 200 million years ago, these mountains began to erode until they largely disappeared, leaving Connecticut's bedrock behind. Then, around 60 million years ago, a phenomenon called tertiary uplift caused Connecticut's surface to tilt upward. The region around Norfolk, the Northwest Highlands, became the highest. It inclines a few degrees to the south-southeastward, accounting for the southerly flow of most of its rivers toward Long Island Sound.



The glacial epoch began approximately 3 million years ago and featured successive advances and retreats of deep ice cover. At the height of the last ice age, ice sheets up to a mile thick covered parts of New England. Advancing ice carried much of Norfolk's soil southward, replacing it with till and boulders. The ice moved from northwest to southeast, accentuating the northwest-southeast axis of Norfolk's hills. The glaciers left striations in the bedrock from material dragged by the ice, and large "erratics," boulders such as Meetinghouse Rock in Great Mountain Forest. As the ice melted, its front blocked the north end of the Blackberry River valley, damming the waters into a lake and forcing them to find a new outlet into the Mad River Valley. In this prehistoric Norfolk Lake, the ice deposited the delta-shaped terrace plain on the west of the present valley, at the north end of which are the Norfolk Downs.

Around 15,000 years ago, as the ice sheet retreated and floodwaters receded, vegetation reappeared. Water remained in beautiful "kettle holes" such as Tobey Pond.

Bedrock and Surficial Materials

Norfolk's underlying bedrock consists of igneous and metamorphic rock. The upland areas are underlain by crystalline rock such as granite, gneiss and schist. The prevailing rock is a gray, quartzose biotite gneiss, sometimes with straight but more frequently with much contorted banding. Over considerable areas, particularly in the western part of town, a similar rock occurs, but with abundant glistening scales of white mica and nodules of feldspar and garnet. On the weathered surface this rock presents a peculiarly knotted or knobby appearance. Associated with the gray biotitic gneiss are areas of hornblende gneiss, in many places with abundant minute red garnets. The ordinary gray and the hornblende gneiss are often intermingled. Gneiss is an acidic rock, resulting in soils that tend to have a low (acid) pH. Pegmatite, a coarsely crystalline granite, is also found in veins in the gneiss; one of the largest exposures of this rock occurs about a mile south of the village, uphill from Route 272.

Areas of marble occur around Crissey Mountain and in the broad valley of the Blackberry River. Some of this marble occurs buried under more recent (glacial) sediments and some groundwater may be of a higher pH if it passes through this buried layer. Because of its limited extent, however, marble bedrock generally contributes little to Norfolk's soils. Any occurrence of marble in Norfolk's soil is glacially transported material from the Housatonic Marble Valley farther north-west. Marble generally neutralizes soil acidity.

A small but noticeable area of talc serpentine, a rock formation that is very unusual for Connecticut, is located in the eastern wall of Hall Meadow Brook near the Goshen line. Serpentine is composed of magnesium silicate and appears green. Such rocks generally contain unusual minerals, including asbestos. Soils derived from these rocks are toxic and supply habitat for some unusual plants, ones that can survive such hostile environments. The vegetation over serpentine is generally low scrub or grasslands.

Materials above the stable base of bedrock, such as till, sand, gravel, silt, clay, swamp deposits, stones and boulders, are known as unconsolidated materials. Norfolk's till is stony, from 10 to 50 feet deep in most places and characterized by many boulders.

Our Geologic Heritage

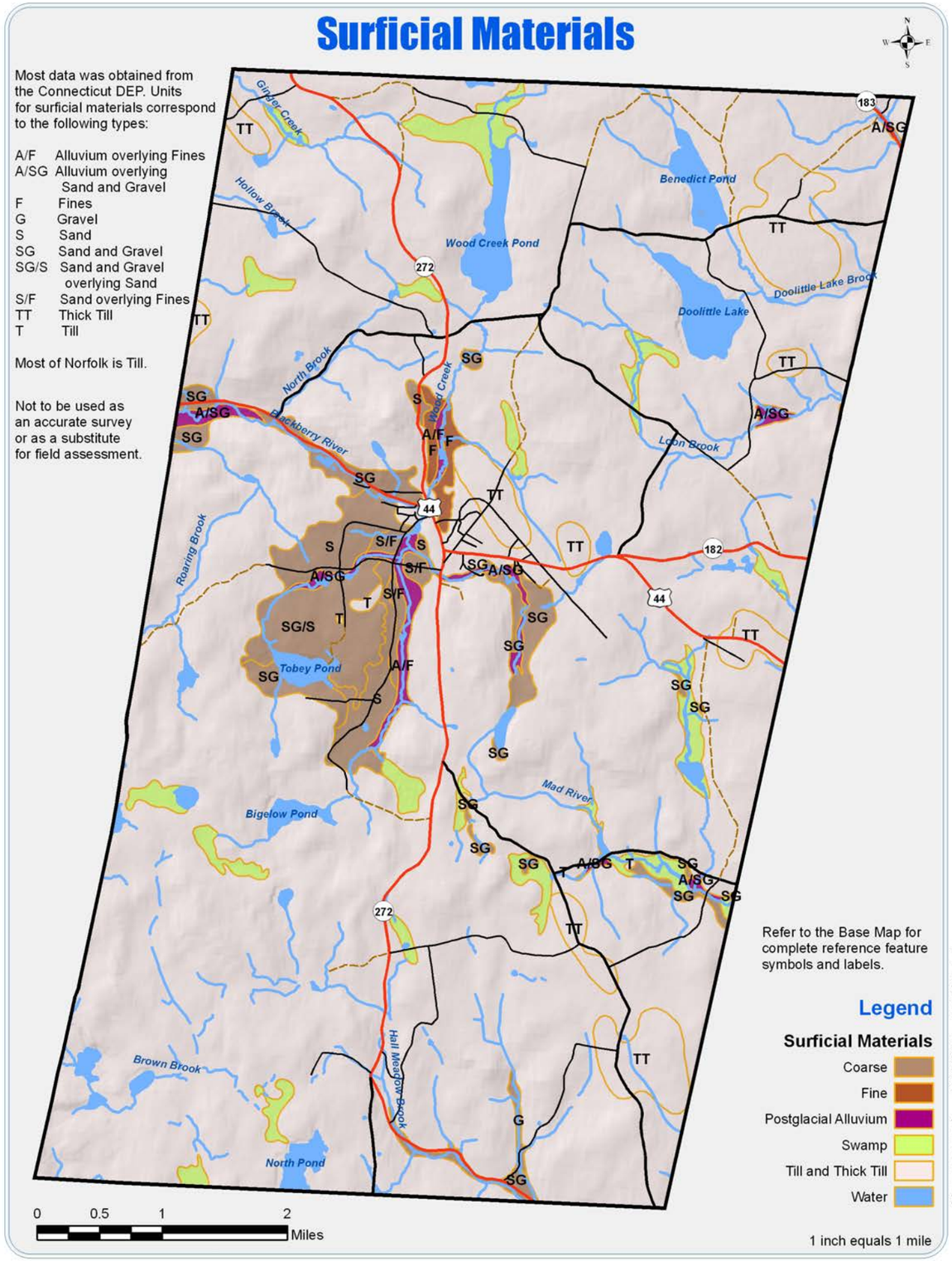
Over the years, the geology of the region has provided an economic base for the town. Among the mineral resources found here are gneiss, granite, gravel, mica, semi-precious stones and a variety of soils. Many old granite and gravel quarries are present, including a granite quarry on the east side of Bald Mountain and a gravel quarry at Spaulding Pond. Two pits were also opened for the exploitation of iron, one on Dutton Mountain and the other northwest of Beckley (formerly known as Blakely) Pond. A portion of Norfolk's geologic heritage exists in the buildings, foundations, industrial structures and stone walls constructed in the eighteenth and nineteenth centuries.

Bedrock and past glacial action are the primary determinants that shaped Norfolk's present landscape, but its history has been complex. Norfolk sits atop a rise of an ancient continent's edge. Rocks originally laid down in horizontal layers on the continental margin have been compressed, folded, thrust over, fractured, shifted, deeply buried, uplifted and eroded like an canvas that has been repainted many times. What we see now is a rough slice of that composition; it provides the variety of terrain, minerals and materials that help make Norfolk unique.

Geologic features are a nonrenewable resource. Many are scenic, some provide habitat for sensitive lichens and mosses, as well as specialized habitat for animals, and some are an integral part of storage areas for drinking water. For recommendations based on the information in this chapter, see Chapter 11 on page 72. For a short bibliography, see Appendix 9.

© Jean Grasmere

Glacial erratic.



Norfolk's Weather

© Bruce Frisch

*T*wo factors strongly contribute to Norfolk's standing as the coldest and snowiest town in the state and earn it its nickname "the Icebox of Connecticut." Because of its relatively high elevation, described in the previous chapter on geography and geology, along with its relative lack of built-up areas, Norfolk typically records temperatures 5 to 10 degrees Fahrenheit cooler than the regions that are lower and more built-up, such as Torrington and Hartford. And its location more than 60 miles from the coast generally insulates Norfolk from the moderating influence of Long Island Sound. In fact, Norfolk's temperate continental climate is more similar to that of Albany, New York, or Pittsfield, Massachusetts, than it is to the rest of Connecticut.

It often is snowing in Norfolk while it is raining in Hartford, Torrington and Winsted. During winter nor'easter-type storms Norfolk can record snowfalls of 20 to 30 inches. It is fairly common for Connecticut's snow/rain borderline to be situated in the vicinity of Interstate 84 with heavier snowfall recorded as one moves higher in elevation and farther away from the coast. The Litchfield Hills often record the highest snow totals from these and other winter storms, with Norfolk frequently at the top of the list for snowfall amounts. When the snow/rain borderline moves north, as it does on occasion, Norfolk, with its higher elevation and cooler temperatures, can often be hit with freezing rain and damage to trees and power lines from heavy ice build-up.

Hurricane force winds are extremely uncommon this far from the coast, but hurricanes can bring record rainfalls to Norfolk. The Great Hurricane of 1938 produced 7.07 inches from September 21 to 22, part of a nine-day period in which 12.14 inches fell. In 1955, Hurricane Connie produced 9.02 inches from August 11 to 14, followed by Hurricane Diane, which produced 12.88 inches from August 17 to 19, or 21.90 inches of rain in nine days.

Weather Data

Norfolk's weather station, founded by Edward C. Childs, has recorded a comprehensive set of weather observations every day since January 1, 1932. The station is located on Windrow Road and is currently maintained and operated by the Great Mountain Forest Corporation. It is one of the few weather stations in a location that has changed very little over time, making its observations more consistent. More charts and more information about the station appear in Appendix 1.

Norfolk's annual average mean temperature is 45.0 degrees Fahrenheit. The warmest month of the year is July with an average mean temperature of 68.3 degrees Fahrenheit, and the coldest month is January with an average mean temperature of 20.9 degrees Fahrenheit. The average minimum temperature is 37.3 degrees Fahrenheit; the low month is February with 9.0 degrees Fahrenheit and the highest, July with 63.9 degrees Fahrenheit. The average maximum temperature is 52.5 degrees Fahrenheit; the low month is February with 30.7 degrees Fahrenheit and the highest is July with 73.1 degrees Fahrenheit. On average, the temperature in Norfolk reaches 90 degrees Fahrenheit or higher just 2.5 times per year.

Since January 1932, the highest temperature recorded at this station was 101 degrees Fahrenheit on June 29, 1933, and the lowest temperature was minus 26 degrees Fahrenheit recorded on February 16, 1943. Also on February 16, 1943, a temperature of minus 37 degrees Fahrenheit was recorded at a satellite station in the valley on Westside Road. According to the National Weather Service this was the coldest official temperature ever recorded in Connecticut.

Norfolk's average annual precipitation amount of 52.53 inches is well distributed throughout the year. The average annual snowfall of 89.1 inches usually produces a snow cover that typically lasts from early December well into April. It is not uncommon to have snow as early as October and as late as May.

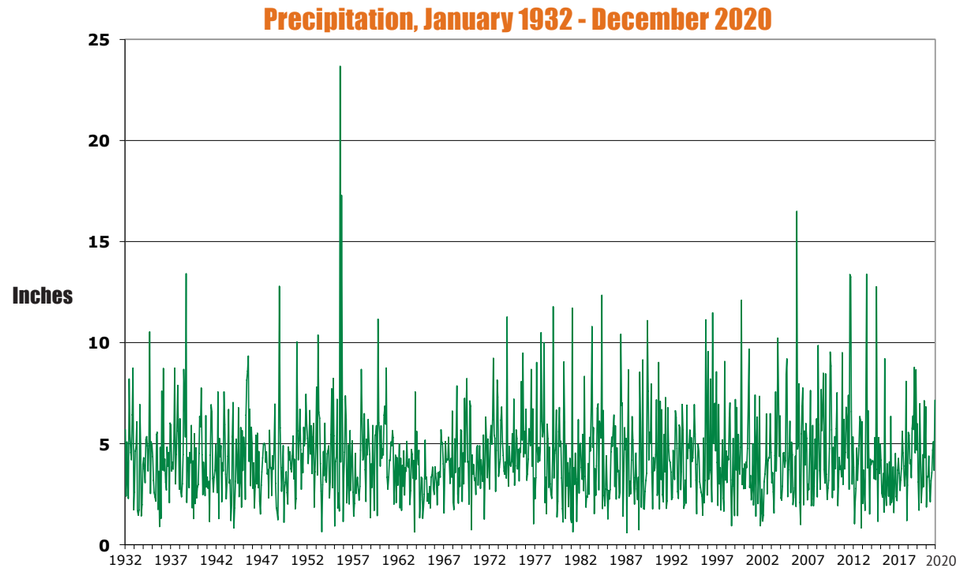
© Bruce Frisch

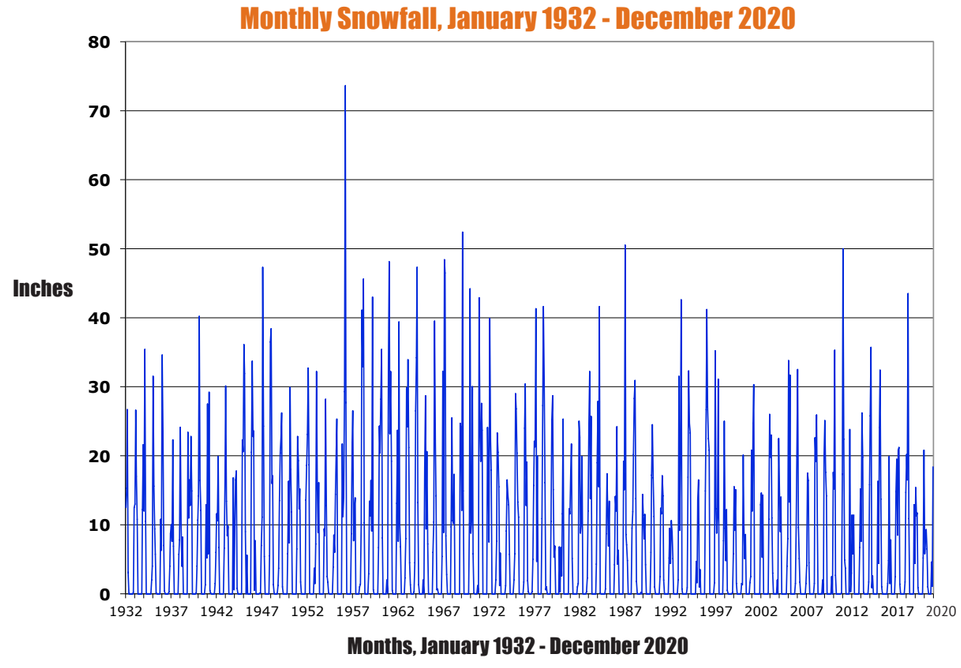
View south from Bruey Road after ice storm.

The annual average mean barometric pressure is 30.02 inches, with the monthly average mean pressure ranging from 30.00 to 30.06. The prevailing wind direction is typically from the northwest during most of the year. During July, August and September the prevailing wind typically comes from the southwest.

The graphs below show precipitation and snowfall trends from January 1932 through December 2020. Precipitation includes rain and melted snow, sleet and freezing rain. More information, in the form of graphs and tables, appears in Appendix 1.

The recommendations that are based on the information in this chapter and Appendix 1 appear in Chapter 11 starting on page 72.





Soils of Norfolk

© Bruce Frisch

Soil is a vital part of Norfolk's natural environment. It is just as important as plants, animals, rocks and landforms. In fact, life as we know it could not exist without soil. Soils are important for growing food, disposing of our waste, supporting our buildings and roads, growing timber, providing habitat for wildlife and collecting and filtering all the drinking water we consume. Norfolk would be unlivable if not for the existence of healthy soils.

Soils not only reflect natural processes but also record human activities both at present and in the past and therefore make up part of our cultural heritage. The modifications of soils by agriculture and historical settlement patterns are well recorded in the soil profiles all over Norfolk.

Soil, together with the plant and animal life it supports, the rocks and glacial till on which it develops, its position in the landscape and the climate it experiences, forms an amazingly intricate natural system. It is constantly changing and developing through time, responding to changes in environmental factors, including the influence of human use. Some changes in the soil can be short lived and reversible, others can permanently degrade a soil's function; although it takes an average of 500 years for an inch of new soil to develop in Norfolk (Hollis soils take 1,000 years), it can be completely degraded in only a couple of minutes.

What is Soil?

Soil is a mixture of components, including rocks and minerals, air, water and organic matter in varying ratios. These soil components, acted upon by 15,000 years of weathering action from gravity, water, wind and freeze-thaw cycles, have all played a role in the 100 or so soils that have been found and described in Norfolk.

Glacial processes make the soils of Norfolk relatively young. The most recent glacier age ended about 15,000 years ago and is responsible for the shape of the present land surface. As an immensely thick sheet of ice scraped, crushed, ground, compacted and washed its way across Norfolk, it extensively modified the landscape. When the glacier melted, material ranging in thickness from a few inches to hundreds of feet was deposited over the remains of the pre-glacial landscape. The glacial deposits make up the parent materials in which most of Norfolk's soils were formed.

The soils of Norfolk have been described mainly using their parent materials (the components from which the soil is formed), their textures and how well drained they are. Soil scientists have been collecting and describing these data, along with site information, for many years. These 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 generally is derived from a town or landmark in or near the area where the soil was first recognized. For example, the Loonmeadow soil series was named for the area of east Norfolk, historically called Loon Meadow, near Loon Meadow Drive and Loon Brook.

Courtesy USDA Natural Resources Conservation Service

Profile of Paxton soil, which is formed in glacial till.

Parent Material

Most of the soils of Norfolk are formed from one of six parent materials: till, glaciofluvial deposits, glaciolacustrine deposits, alluvium, loess or organic deposits.

Till or Glacial Till

Till is an unstratified heterogeneous mixture 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. Dense tills are often informally described as hardpan. Compact, slowly permeable till will often cause a perched water table in the soil.

Most of the soils in Norfolk are formed in glacial till. These soil series 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

These materials are sorted into stratified layers of contrasting textures by rivers and streams flowing from melting glaciers. Glaciofluvial soils are dominated by sandy textures, 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 the soil 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.

Norfolk has many soils formed in glacial river deposits located near the town center. 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 Norfolk soils were formed in deposits from glacial Lake Norfolk: Brancroft, Raynham and Belgrade. They are located just east of Route 272 and north of Route 44, near the town center, underlying the Wood Creek dry dam area.

Alluvium

Alluvium is gravel, sand and sediment that is 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 on these materials are referred to as flood plain soils with a range of textures from sand to silt loams. These soils are often very fertile and some are prime agricultural soils.

Courtesy USDA Natural Resources Conservation Service

Hollis-Chatfield-Rock outcrop complex.

The Norfolk 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

Loess is relatively uniform, fine material, mostly silt loam, very fine sandy loam and fine sandy loam. It 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. However, in Norfolk only thin layers of wind-blown soil deposited on tills and glaciofluvial deposits are still evident today.

The Norfolk 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 so as to make identification of the plant material impossible are called muck.

Two organic soils are found in Norfolk, Bucksport and Wonsqueak. There is a concentration of organic soils in the southwest section of Norfolk.

Soil Texture

Most of the soils in Norfolk 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 soil grains or particles in a specific size class: sand, silt or clay.

Sand particles are larger than those of silt and clay, with diameters from 0.05 to 2.0 millimeters; they feel gritty when rubbed between the fingers. The water-holding capacity of sand is low due to the large spaces between particles. Soils with large amounts of sand possess good drainage and aeration, and are usually referred to as "light soils" or "coarse soil." Most of the soils of Norfolk 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. 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 process of the soil. Soils in which silt predominates are fine texture, and water moves through them slowly. Soils high in silt are hard to work and are referred to as "heavy soils."

Clay has the finest of soil particles. These are smaller than 0.002 millimeters in diameter. Clay particles are the most chemically active, which 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 Norfolk.

Soil Catenas

A soil catena is a related sequence of soil profile types created by changes from one drainage condition to another. Looking at soil catenas makes it easier to group the soils by their similarities. The soil catenas of Norfolk are shown in a table in Appendix 2.

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 (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.

Most Norfolk soils are cold enough to classify as frigid soil in the USDA classification, creating a unique ecosystem that is not found in other areas of Connecticut. Frigid soils have a mean annual soil temperature of between 32°F and 47°F, and also vary significantly from season to season. The identification of the frigid soils in the updated Soil Survey of the State of Connecticut (2005) is a big change from the information in the old USDA report, Soil Survey of Litchfield County (1970). There are new names for the frigid soils in the town.

A large area of predominantly frigid soils extends from northern New England to northern Connecticut and eastern New York State. Norfolk is the heart of the area of frigid soils in Connecticut. Some frigid soils extend into all of the Connecticut towns that border Norfolk, but are not the dominant soil types in those towns. Frigid soils do dominate in the towns to the north in the state of Massachusetts.

The frigid soils are located throughout Norfolk. The frigid soils include Ashfield, Bice, Boscawen, Brayton, Bucksport, Loonmeadow, Medomak, Millsite, Moosilauke, Rumney, Schroon, Shelburne, Westminster and Wonsqueak. Bice is the most common soil in Norfolk. The warmer soils (at mesic soil temperature) are concentrated along the Blackberry River in the west-central part of Norfolk and in lower elevations.

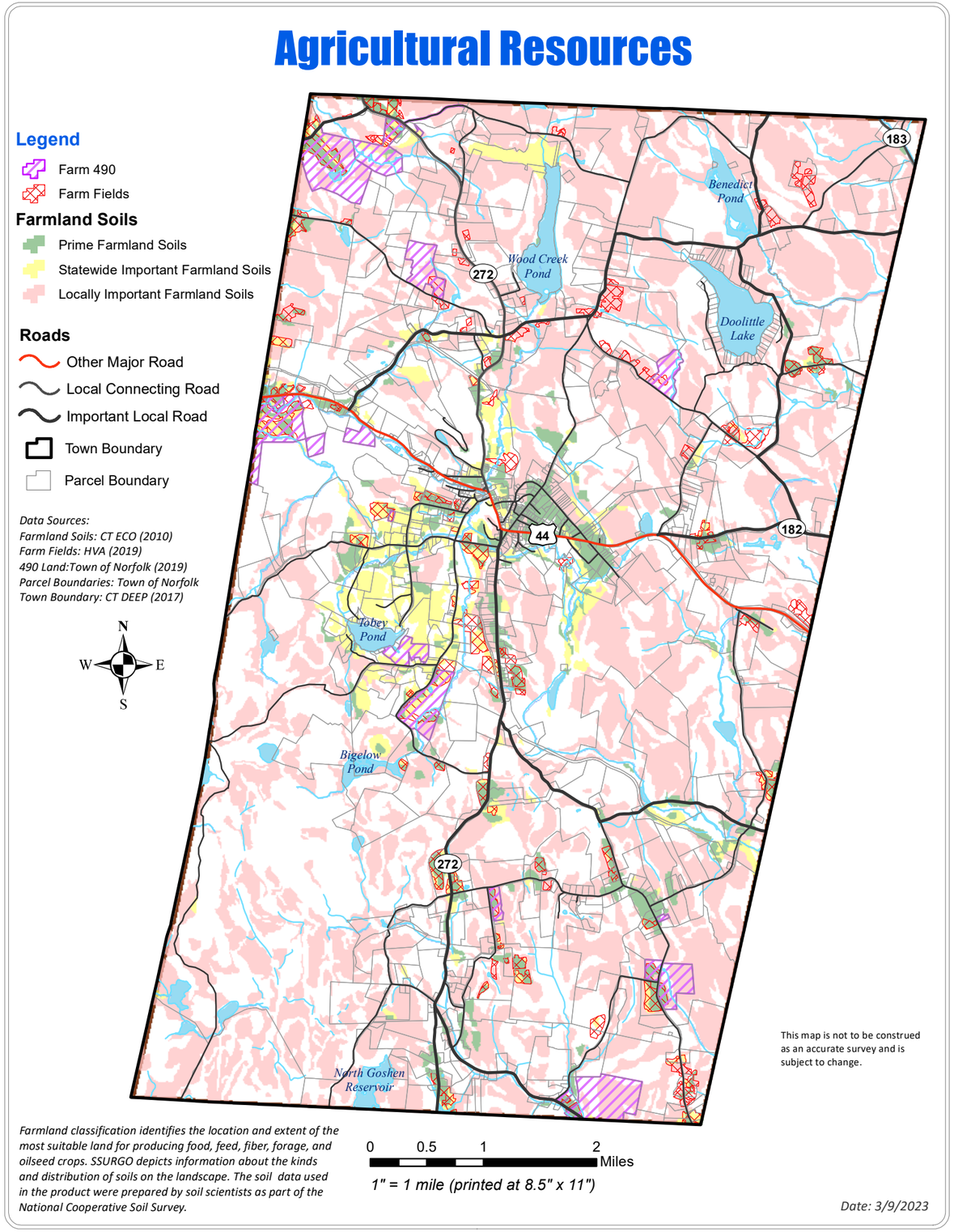
Prime and Important Farmland Soils

According to a recently completed evaluation by the United States Department of Agriculture's Natural Resources Conservation Service, 15,189 acres of Norfolk, or 51.2 percent of the town, have soils that are important for agriculture. A new soil map prepared for the Norfolk Conservation Commission shows the coverage of three categories of agricultural soil.

- Prime farmland soil – 1,435 acres (4.8 percent of the town)
- Farmland soil of statewide importance – 1,237 acres (4.2 percent of the town)
- Farmland soil of local importance – 12,517 acres (42.2 percent of the town)

This is a huge increase from the farmland soils previously identified in Norfolk. When the Natural Resource Inventory was completed in 2009, it found that Norfolk had less than 6 percent, or 1,718 acres, of prime farmland soil and farmland soil of statewide importance for agriculture.

This is important because many USDA grants that support farming or conservation of farmland are only available where the soil is of importance to agriculture.



© Bruce Frisch

Ploughed, tilled and harrowed, this garden waits for seed.

Wetland Soils

The USDA also uses drainage classes as a large category 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 in terms of soils that are poorly drained or very poorly drained. Connecticut also regulates use of all soils formed in flood plain deposits as wetland even though some of these soils are well drained.

Approximately 13 percent of Norfolk is 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, Medomak, Mudgepond, Occum, Pootatuck, Raynham, Raypol, Ridgebury, Rippowam, Rumney, Saco, Scarboro, Walpole, Whitman and Wonsqueak.

Norfolk's wetland complexes perform important functions, with efficiency well above the average. These functions may include, but are not limited to, floodwater storage, wildlife habitat, nutrient retention, sediment trapping and water recharge to streams and ground water. Many of Norfolk's wetlands feed public drinking water supplies in towns downstream.

Slopes

Norfolk has many areas with steeply sloping soil. Soil slope affects the erosion risk and the rate of water flow.

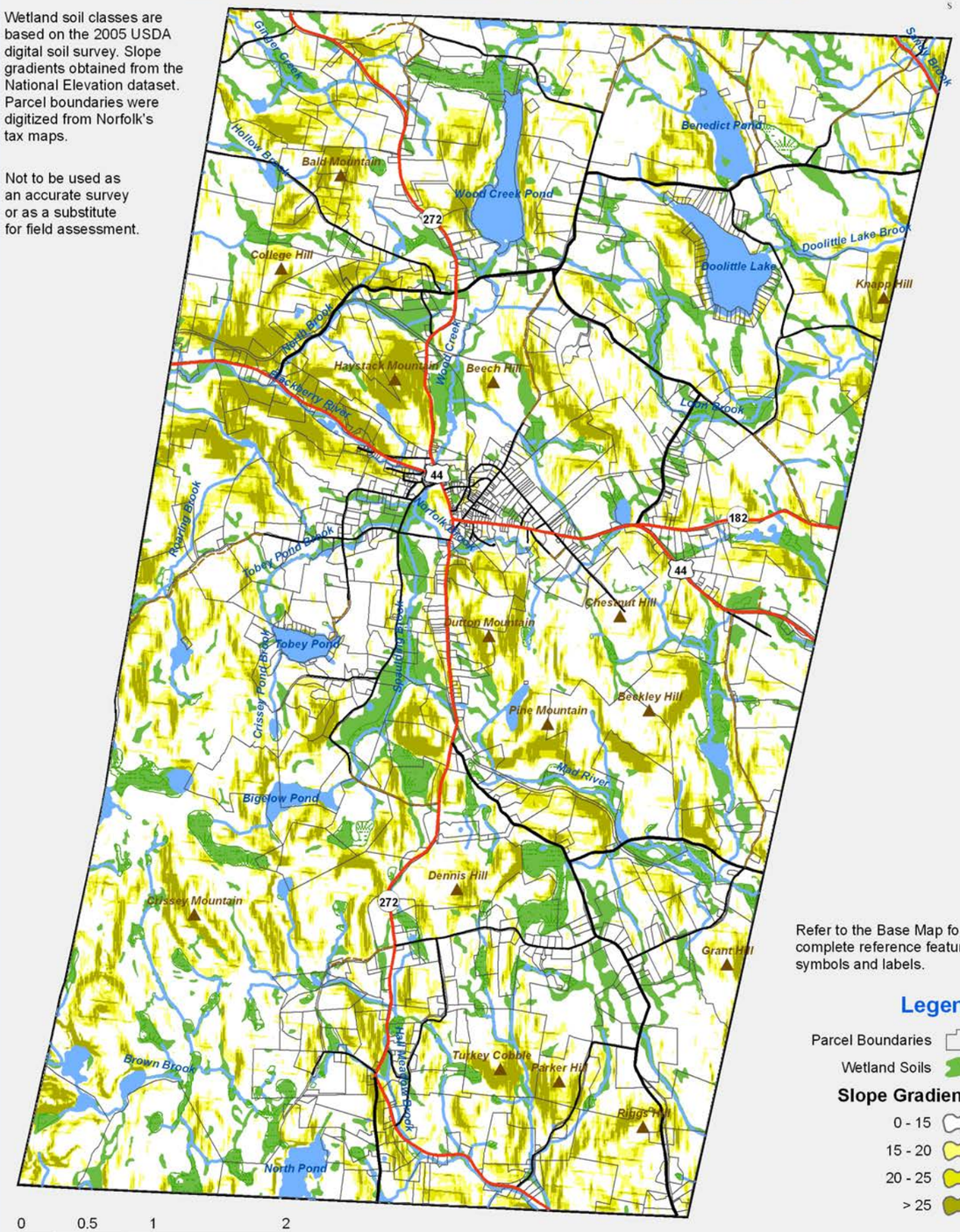
The soil survey maps show mapping unit symbols that combine a number and a letter. The number reflects the name of the dominant soil in the map unit. The letter, if listed, reflects how steep the soil map unit is. The letters range from A (indicating the flattest areas) to E (steepest). Soil mapping 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 Norfolk with many areas that could readily be damaged by uncontrolled storm water, if left unprotected. The topographic map of Norfolk shows how steep the land is by how close together the topographic lines are. The map on the opposite page generally combines areas with similar slopes, highlighting extremely steep slopes.

For a complete list of Norfolk soils with USDA map symbols and acreages, for descriptions of every soil type and for a chart showing soil family relationships, see Appendix 2. For recommendations based upon the information in this chapter, see Chapter 11 starting on page 72, and for a short bibliography see Appendix 9.

Wetland Soils and Slope Gradients

Wetland soil classes are based on the 2005 USDA digital soil survey. Slope gradients obtained from the National Elevation dataset. Parcel boundaries were digitized from Norfolk's tax maps.

Not to be used as an accurate survey or as a substitute for field assessment.



Aquatic Resources

© Christohper Little

The town of Norfolk has few lakes or rivers, but it is endowed with a diverse array of aquatic resources from open water to marshes and bogs, and an abundance of small streams. These resources form the headwaters for two major drainage basins and four regional watersheds that feed water to our neighboring towns, provide diverse habitats for both plant and animal communities, offer numerous recreational opportunities and are of a beauty that greatly enhances life in Norfolk.

Currently, the quality of the water within Norfolk's streams is second to none; only one short stretch of the Blackberry River has a "B" water quality designation. All remaining streams, lakes and ponds within the town's borders are classified as "A" or "AA" water quality, meaning that they provide excellent habitats for fish and wildlife and are potential contributors to public drinking water supplies.

This chapter outlines the importance of each type of aquatic environment, and any available data on the fauna using these resources is included in each segment. It is critical that Norfolk residents understand the importance of our aquatic resources and how humans affect them.

Watersheds

A watershed is a collection area for rainwater, snowmelt and ground water seeps, drained via networks of small perennial and intermittent streams that move the water to progressively larger streams. Within a watershed streams are classified by size. The smallest headwater streams are classified as first order and change to second, third, fourth and so on as more and more tributaries come together, ultimately forming the main outlet river/stream of the watershed.

As water flows through a drainage area, physical, chemical and biological changes occur. In a typical system, most headwater streams are steep, rocky, swift flowing and low in nutrients. As one moves along a watercourse, the steep, rocky "upland" streams often turn into "meadow" streams with higher flow volume, lower gradient and slower movement. As a stream changes from upland to meadow classification, its rocky substrate often turns into a softer stream bottom, rich in organic material. As stream size and nutrient accumulation increase, there is typically an increase in species diversity and a shift in aquatic insects from the hunter/gatherers of headwater streams to the detritivores/shredders of lower gradient streams.

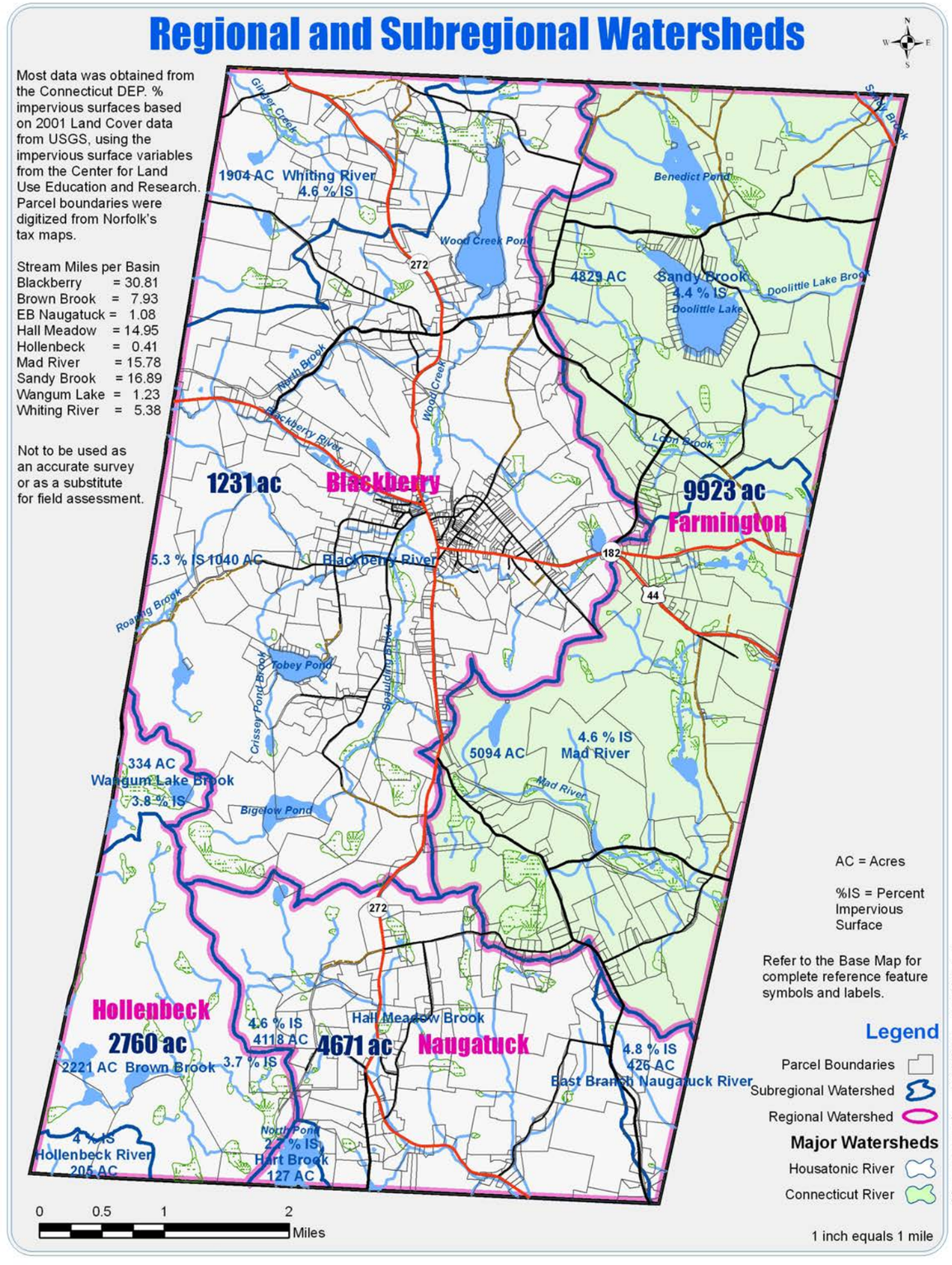
Norfolk's elevation and topography, and its position between two river systems, combine to create a unique situation in which the town's streams and rivers drain into four regional watersheds and then again into 10 sub-regional basins, as shown on the map opposite this page.

- *Blackberry River regional basin (to the west)*
  - Blackberry River sub-regional basin
  - Whiting River sub-regional basin
- *Hollenbeck River regional basin (to the southwest)*
  - Hollenbeck River sub-regional basin
  - Wangum Lake Brook sub-regional basin
  - Brown Brook sub-regional basin
- *Naugatuck River regional basin (to the southeast)*
  - Hart Brook sub-regional basin
  - Hall Meadow Brook sub-regional basin
  - East Branch Naugatuck River sub-regional basin
- *Farmington River regional basin (to the east)*
  - Sandy Brook sub-regional basin
  - Mad River sub-regional basin

Norfolk's aquatic resources are also unique in that they set the stage for water quality far from the town's boundaries. Wetlands and streams are products of the land they drain and their water quality reflects stream-side land use practices, both good and bad. It is therefore imperative that proper land use guidelines be identified, maintained and followed if wetlands are to protect drinking water supplies, protect and provide aquatic habitat for fish and wildlife, conserve especially sensitive habitats, filter pollutants and buffer against floods.

Streams and Rivers

Five main components make up a stream's ecosystem: connectivity, hydrology (flow), biology, water quality and geomorphology. Each one of these components can be, and often is, altered by human activity. Typically, both plant and animal stream species respond negatively to any human (and sometimes non-human) disturbances. Reductions in fish and/or insect abundance, reductions in species richness and shifts in fish/insect assemblages to more tolerant species are common responses to human impacts within a stream. Stream alterations may also reduce habitat diversity, which has been shown to be directly and positively



© Peter Coffeen

Caught and eaten in Norfolk: largemouth bass (Micropterus salmoides).

correlated to species diversity; thus, species diversity is an attribute of a healthy stream ecosystem.

Small or intermittent streams are often considered ecologically insignificant. However, these streams are necessary for specific life stages of certain aquatic organisms. Many stream fish, for example, migrate into these small feeder streams to spawn. In turn, newly hatched fry then use them as nursery areas before migrating downstream to larger rivers.

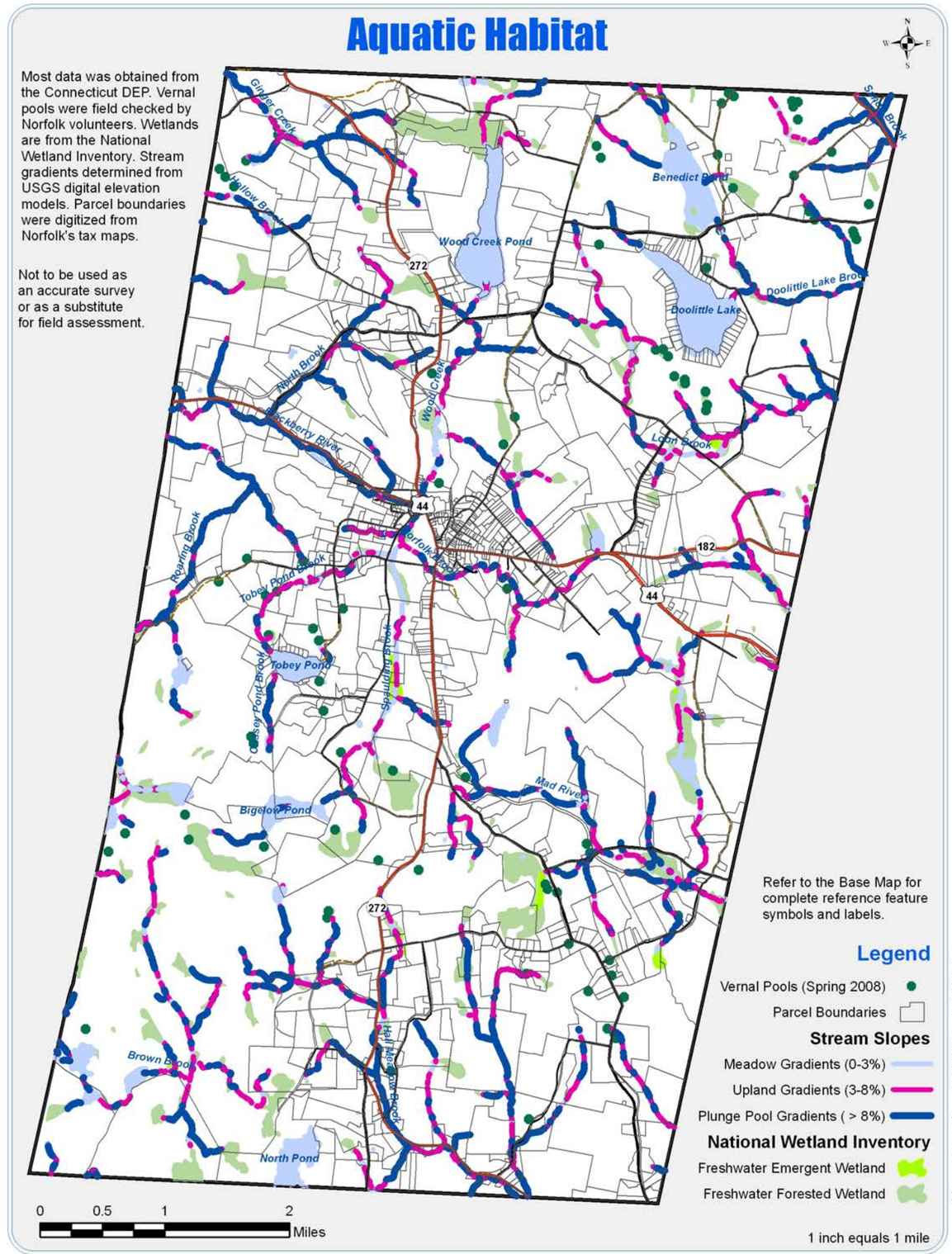
There are two general types of riverine habitats: coldwater and warmwater. The most obvious distinction between the two is temperature. In fact, temperature and flow are the two variables that have the greatest effect on physical, chemical and biological parameters of any stream. Temperature can alone regulate fish and insect respiration and metabolism, timing and success of fish spawning, dissolved oxygen content in the water, water density and types of algae present, while fluctuations in flow may affect fish migration, fish spawning success, feeding behavior, amount and quality of available stream habitat, bank erosion and stream sedimentation. Each variable by itself or some combination of the two can greatly determine the fish and insect assemblages of any stream. Although a warmwater stream is in itself not necessarily bad, the health of an overall ecosystem is largely determined by the amount of coldwater stream habitat available.

In total there are approximately 95 miles of streams in Norfolk, ranging in size from unnamed intermittent streams to the Blackberry River and in habitat type from high gradient upland streams (North Brook) to low gradient meadow streams (lower reaches of Hall Meadow Brook). The town's streams not only have exceptional water quality but are, at present, relatively unaffected by dams, industrial pollutants and channelization. Human activity does affect Norfolk's streams (with sedimentation from runoff, for example) the overall impacts are minor compared to other towns.

Norfolk has both warm- and coldwater stream communities but most of the town's riverine resources have been found to be coldwater. Data collected as part of a statewide stream survey conducted by the Connecticut DEP from 1988 to 1994, plus subsequent stream sampling efforts in 2007, show that most of the town's stream resources support diverse and healthy fish and insect communities reflective of coldwater habitats. See the map opposite, and Appendix 3 for tables summarizing the findings.

Of the stream sections sampled in Norfolk, 80 percent supported naturalized populations of brown trout (Salmo trutta) and/or native brook trout (Salvelinus fontinalis). In addition, 30 percent of the streams had slimy sculpin (Cottus cognatus) present. The sculpin (not a state listed species, but recognized as a species in decline) requires exceptional water quality (cold, well oxygenated water and clean gravel substrate) to survive. While by no means the only two aquatic organisms indicative of good water quality, the presence of both wild trout and sculpin strongly suggests that most of Norfolk's stream resources are exceptionally healthy. The fact that naturally reproducing populations of both brown and brook trout exist in such a high percentage of Norfolk's streams substantiates this fact even further.

Warm water fishes, such as bluegill and pumpkinseed sunfish (Lepomis macrochirus and L. gibbosus), largemouth bass (Micropterus salmoides) and yellow perch (Perca flavescens), were found in a small number of the town's streams. These fish were migrants from ponds either upstream or downstream of the sample areas. They are not ideal stream inhabitants, but their presence is not always an indicator of poor water quality.



Lakes and Ponds

Most water bodies in Connecticut were formed some 11,000 years ago as runoff from retreating glaciers filled pockets and holes in the landscape. Many of Norfolk's lacustrine resources are remnants of that historic time and the remaining ponds in town are manmade.

The difference between a lake and a pond is determined by both depth and surface acreage, with depth being the primary factor. Lakes are deeper than ponds, and this increased depth limits light penetration and allows them to thermally stratify.

Generally, most lakes in Connecticut thermally stratify if depths are greater than 20 feet. Thermal stratification occurs from July to September and simply means that water within the lake separates into distinct layers based on temperature with the warmest (lightest) water on top and the coldest (heaviest) water at the bottom. This stratification has many implications for fish species, especially those, such as trout, that require cold, well oxygenated water to survive.

The upper layer is well oxygenated, but temperatures are at times warm and may be stressful to fish. In contrast, the bottom layer is cold in temperature, but is usually very low in dissolved oxygen. The middle layer is where ideal conditions exist for many lake dwelling fish, but even this varies from lake to lake. Stratification does not exist during the spring, fall and winter when water temperatures are more homogeneous throughout the lake.

In shallower ponds, sunlight typically penetrates to the bottom allowing rooted plants to produce oxygen. However, unless the pond has adequate cold ground water inflows, summer temperatures may become very warm, limiting the types of aquatic organisms that can inhabit the pond to more temperature tolerant species.

In relative terms, even Norfolk's largest lake (Doolittle Lake, 190 acres) and three largest ponds (Wood Creek Pond, 145 acres; Benedict Pond, 98 acres; Tobey Pond, 53 acres) are small in overall surface acreage when compared to water bodies in other areas of the state. Of all the impoundments and natural bodies of water in Norfolk, Doolittle Lake is the town's only true lake. Doolittle Lake is a natural lake whose water has been elevated by a small dam. Although Doolittle Lake has some warmwater fish species—largemouth bass, yellow perch, bluegill and pumpkinseed sunfish and golden shiner (Notemigonus crysoleucas)—the lake is managed by the Doolittle Lake Company specifically for trout. Historically, native brook trout spawned every fall in the northwest arm of the lake. Currently, the lake is home to both brown and brook trout.

© Pat Harms

Paddlers on Wood Creek Pond.

Norfolk has one state owned and managed pond. Wood Creek Pond, located off Ashpohtag Road, is a manmade, shallow, weedy, eutrophic waterbody. Fed by Holleran Swamp to the north, it drains into Wood Creek, which is a tributary to the Blackberry River. The pond has no special fisheries management, but fishing does exist for largemouth bass, chain pickerel (Esox niger), brown bullhead (Ameiurus nebulosus), black crappie (Pomoxis nigromaculatus) and yellow perch. The pond was drained for dam repairs in the late 1990's and fish populations are slowly rebuilding.

Benedict Pond is located off Doolittle Drive and is privately owned by the Doolittle Lake Company. This pond is natural in origin, but the water level has been raised by construction of a small concrete dam. Unlike its Doolittle Lake sister, the pond is a shallow, weedy and eutrophic home to a very robust population of largemouth bass and sunfish. Its outlet is a tributary to Doolittle Lake Brook (also known as Brummagem Brook) that eventually flows into Sandy Brook in Colebrook.

Tobey Pond is privately owned and is located within the Great Mountain Forest property. There is recreational access to the pond for town residents. Like Doolittle Lake, Tobey Pond is natural in origin, but a small dam was constructed to raise the water level. Surprisingly, Tobey Pond has a maximum depth of 45 feet, which is considerable given the surface acreage of the pond. Trout are not typically found in Tobey Pond although its cold, well-oxygenated water is capable of supporting them, but it does provide some fishing for largemouth bass, black crappie, yellow perch, sunfish and chain pickerel.

Each waterbody in Norfolk has ecological importance regardless of its size. Most lakes and ponds have some direct connection with either groundwater or surface water sources, and they also provide necessary habitats for a variety of aquatic organisms. Not only is each lake or pond part of a larger ecosystem, but also within each waterbody are numerous—in some cases countless—microhabitats. These specific habitat areas are home to different life stages of plants, animals and insects. Loss of these highly specific/sensitive areas or habitats could cause major shifts in the lake's ability to support sensitive species and allow more tolerant species to then thrive. As with streams, a shift in the fish and insect community from sensitive species to tolerant species indicates a decline in water quality and/or a loss of critical habitats. Loss of habitat is typically due to development pressures.

Wetland Habitats

The term "wetland" may carry with it a meaning that is different from one group to another. Therefore, before describing the different types of wetlands and their importance, a clear definition must be adopted. An extensive wetland classification system was developed as part of the National Wetlands Survey conducted in 1979 (https://www.fws.gov/program/national-wetlands-inventory). From this survey, the wetlands definition that has been accepted by the U.S. Fish and Wildlife Service (USFWS), and currently is the most widely accepted definition, reads as follows:

> *Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. . . wetlands must have one or more of the following three attributes: (1) At least periodically, the land supports predominately hydrophytes, (2) the substrate is predominately undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.*

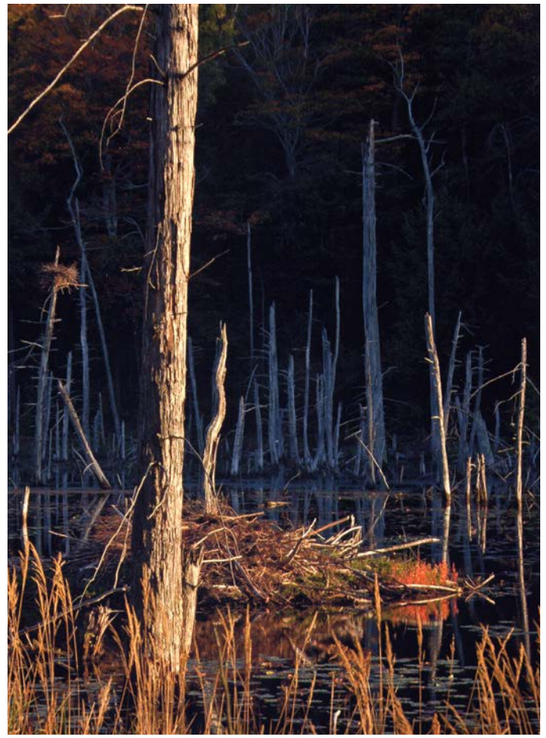
It should be noted that the state of Connecticut has adopted a somewhat narrower definition of wetlands (although it separately defines watercourses, which includes swamps, bogs, etc., by hydrology and biology) that primarily focuses on soil type:

> *Land, including submerged land…which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial and floodplain by the National Cooperative Soils Survey…whether or not shown on the wetlands inventory map as issued. Such areas may include filled, graded or excavated sites which possess an aquic (saturated) soil moisture regime as defined by the USDA Cooperative Soil Survey.*

Even with these definitions, categorizing the different types of wetlands can be complex. For the purpose of this inventory, an elaborate wetlands classification system such as those used by the USFWS or the state is unnecessary, but it is impossible or at least difficult to "properly" manage any wetland or natural resource if that resource is not properly mapped and defined.

Wetland values are as numerous as the vast array of types of wetlands themselves. Wetlands provide crucial life cycle habitats for fish and wildlife, economic benefits in the form of fish and wildlife harvests, breeding areas for an estimated 80 percent of America's bird population, peat harvest, critical habitats for a disproportionate number of threatened and endangered species, natural water purification by the removal of organic and inorganic nutrients and toxins, and the pleasure conferred by their natural beauty.

The following list describes typical wetlands and wetland habitats found in Norfolk. Note that lakes, ponds and streams are not included; they are classified as watercourses, not wetlands, although changes affecting them are regulated by the town's wetlands agency.



© Alexandra Childs

Swamps are home to many kinds of life.

Marshes

Marshes are characterized by shallow water; emergent aquatic vegetation such as cattail, arrowhead, pickerelweed, reeds and a variety of grasses and sedges, and peat deposits that are generally shallow.
Example in Norfolk: Kelly Swamp off Winchester Road across from Grantville Road.

Swamps

A swamp is a wetland dominated by trees (typically red maple/Acer rubrum) and shrubs such as spicebush (Lindera benzoin), highbush blueberry (Vaccinium corymbosom) and alders (Alnus incana var. rugosa). A swamp is typically wet throughout the growing season and the dominant vegetation type found in any given swamp wetland will largely determine the diversity and types of wildlife in the area.
Example in Norfolk: Holleran Swamp.

Wet Meadows

A wet meadow is not as wet as a swamp or marsh. It may have standing water through some of the year, but has waterlogged soil and is dominated by grasses, sedges, rushes and other vegetation. It is generally kept open by periodic mowing, or is short lived.
Example in Norfolk: Meadow on the south side of the east-west section of Westside Road.

© Alexandra Childs

Another of Norfolk's many beautiful wetlands.

Bogs

A bog is a peat-accumulating wetland, acidic and typically without a significant inflow or outflow. Acresidophilic mosses such as sphagnum (Sphagnum spp.) are common in bogs along with such shrubs as leatherleaf (Chamaedaphne calyculatat) and stunted trees, such as black spruce (Picea mariana).

Examples in Norfolk are: Beckley Bog, Tobey Pond Bog.

Vernal Pools

A vernal pool is an ephemeral wetland that generally does not have standing water during the summer. Water accumulates in forested depressions via snowmelt or rain. Water depth is typically very shallow. Fish are not found in vernal pools, but these wetlands are host to certain animals that require this very specific habitat to complete their life cycle. Direct indicator or "obligate" species found in vernal pools are the wood frog, fairy shrimp and several salamanders.

Examples in Norfolk: see the vernal pools on the aquatic habitat map on page 27.

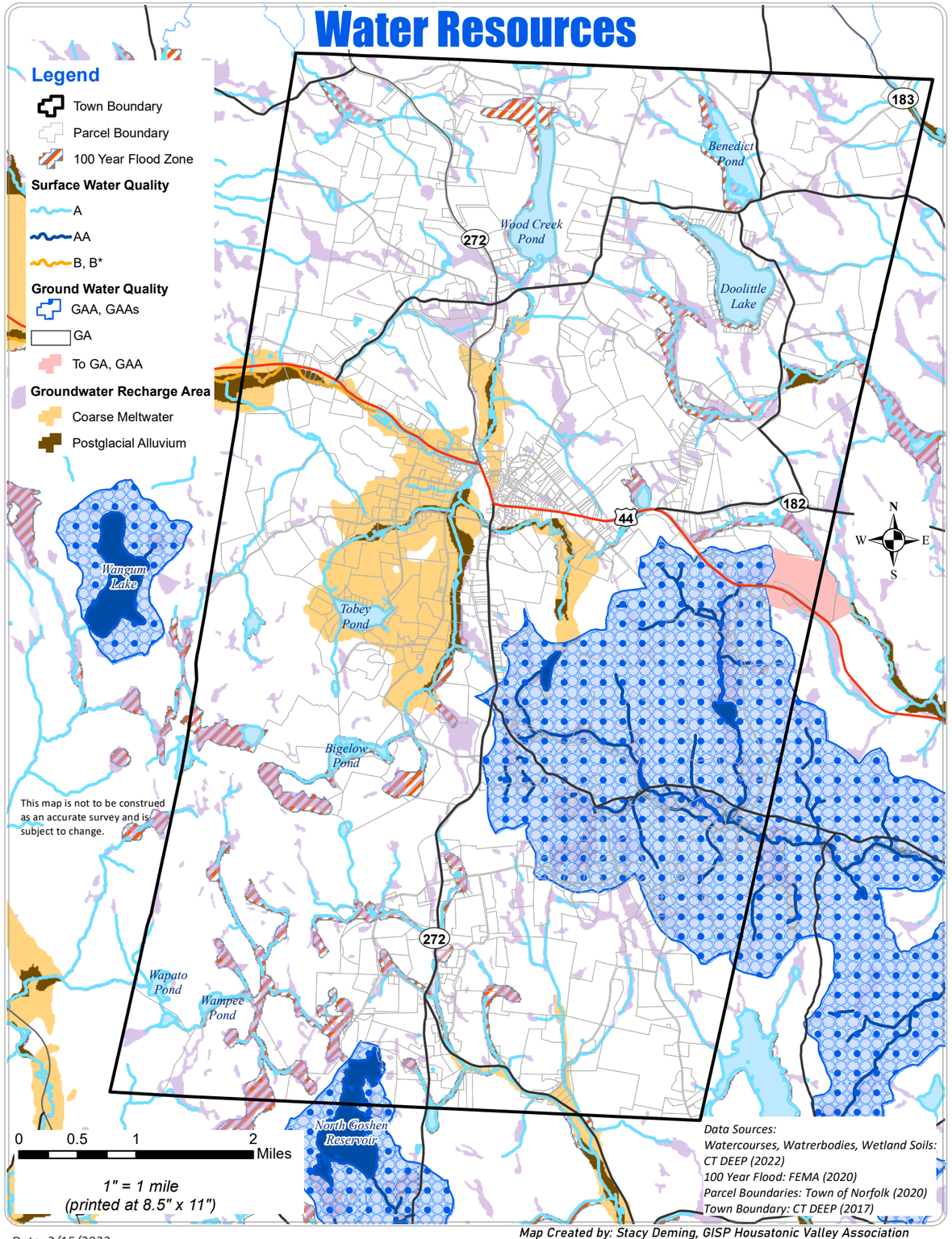
Groundwater

Groundwater fills spaces between soil particles and fractures in rocks below the ground's surface. Water infiltrates the ground at recharge points and enters surface water ecosystems at discharge locations. Although groundwater may issue at natural springs, most of us obtain it by drilling into an aquifer—a porous geologic material that releases usable amounts of ground water. The pore spaces may be the tiny spaces between grains of sand or gravel in our shallow aquifers, in the narrow space between the walls of a fracture in the bedrock aquifers that underlie most of Norfolk or in solution-enlarged openings in those areas of town underlain by marble. See the bedrock map on page 13.

Shallow wells, which may be dug or drilled, produce groundwater from unconsolidated material, usually sand and gravel deposited at the end of the last Ice Age by glacial melt-water streams. A large area just west and southwest of Norfolk Village and a small area just south of the village are covered by deposits of sand and gravel (designated Coarse Meltwater Recharge Area on the water resources map on the opposite page). The deposits contain little or no mud, and hence are both porous and permeable. Most wells completed in shallow aquifers will produce high yields of groundwater if the aquifer is thick enough.

Deep wells must be drilled and most are drilled into bedrock (ledge). Norfolk's bedrock is composed of metamorphic and igneous rock formations with little or no intergranular porosity. The only place for groundwater in such formations is in fractures, which may be abundant in some areas. Fracture porosity is usually not as abundant as intergranular porosity and it is usually not as permeable. Nonetheless, there are usually enough water filled fractures to let wells drilled into metamorphic rocks fill with groundwater that can be pumped for domestic water supply.

In areas underlain by marble, such as parts of the Blackberry River valley where it leaves town, groundwater may dissolve and enlarge fractures as it moves through them. Solution-enlarged fractures have more room to store water and offer less hindrance to the flow of groundwater: they are more porous and permeable. Marble aquifers produce "hard" water that contains relatively high levels of



dissolved calcium and/or magnesium; such water may have to be treated to avoid calcium build-up within pipes, faucets and appliances. However, groundwater rich in calcium increases the overall productivity of aquatic ecosystems and buffers the effects of acid rain.

Groundwater quality in Norfolk is generally good or excellent. There are few (only 15 reports in the state DEP files) areas of contamination from underground storage tanks or other potential sources of direct and non-point pollution, although agriculture and grounds care activities could threaten ground water quality if not carefully controlled and regulated.

Rain and melted snow (meteoric water) recharge groundwater as they infiltrate through the soil. The shallow aquifers are recharged directly by meteoric water infiltration. Bedrock aquifers may also be recharged in that manner during the wet seasons, but it is thought that the shallow aquifers recharge the bedrock more efficiently during both wet and dry seasons. Shallow aquifers may warrant protection for this reason.

Invasive Aquatic Animals and Plants

Most plant and animal assemblages in Connecticut have been strongly influenced by decades of planned and accidental introductions of non-native species. For example, in Connecticut there are 26 naturally occurring fish species and more than 50 fish species that have been introduced. Similarly, all of our crayfish and most of our snail species have been introduced. In fact, most Connecticut lakes and some streams are dominated by introduced species. It is likely that the reason that many introduced species have done so well in Connecticut waters is because of naturally low species diversity.

Over the years, planned introductions have created very popular fisheries resources, and other introductions have had very negative effects. Exotic plants and animals can be extremely prolific when introduced into environments where there are no predators or controls to keep their numbers in check. These species are invasive and once established will often extirpate many of the native species.

Examples of invasive aquatic animals: landlocked alewife, tench, zebra mussel, rusty crayfish and apple snail.

Examples of aquatic invasive plants: Eurasian and variable-leaved milfoil, purple loosestrife, curly pondweed, fanwort, water chestnut, eutrophic water nymph, hydrilla and Brazilian waterweed.

The town of Norfolk is fortunate that it currently has very few highly invasive invertebrates, fish or aquatic plant species. The quality of Norfolk's surface and ground water, and the diversity of its aquatic habitat are excellent. Not only do these resources support a diverse array of aquatic plants, invertebrates, fish and wildlife, but they also provide town residents with good drinking water, recreation and beautiful surroundings.

Recommendations based on the information in this chapter appear in Chapter 11, starting on page 72. Lists of fish and invasive species appear in Appendix 3, starting on page 99, and some suggested readings are included in the bibliography (Appendix 9). Some of Norfolk's flowering aquatic plants are included in Appendix 4; a complete list may be published at a later date.

Road Salt

New England and states across the northern tier of the U.S. have seen increasing dangers to human health and to aquatic ecosystems due to many years of salting the roads in winter. Elevated levels of sodium in wells can affect human health and elevated levels of chloride in streams and wetlands can endanger invertebrates, amphibians and fish. Sodium chloride separates into charged ions in water. The positive sodium ions tend to bond quickly with soil minerals replacing important soil nutrients like potassium and magnesium. Negative chloride ions do not attach to soil minerals and instead are borne into bodies of water. In the past couple of years, several wells along Ashpohtag and Rte. 272 were found to be contaminated with sodium, requiring expensive sleeving of the well or even more expensive reverse osmosis systems. Because this is a problem years in the making, it isn't easy to turn it around. The town public works department and the selectmen's office have been working to reduce the application of salt for both environmental and budgetary reasons, using sand with a small amount of salt on secondary roads and sweeping that material up in the spring to reduce environmental impacts.

Stream Connectivity

Just as forests can be fragmented by development, so too can streams, inhibiting the movement of fish and wildlife up and down stream. Bridges don't cause this type of interference, but many pipe culverts do. Additionally, often these culverts will not perform well during floods and may result in road washouts. The Town of Norfolk and the Housatonic Valley Association, with support from several local organizations and individuals, undertook a project to inventory and map all the road-stream crossings in Norfolk and an assessment of each crossing for fish and wildlife passage (stream habitat connectivity) and flood resiliency. The result of this was a document produced in 2018, "Town of Norfolk Road-Stream Crossing Management Plan." The document binder (held in the Norfolk Town Hall offices) explains the project and contains detailed inventory information and management recommendations, such as culvert replacement prioritization results and general best management practices for road-stream crossings, and a detailed design for culvert replacement on Loon Brook. Data from this inventory, and others throughout the country, are stored with the North Atlantic Aquatic Connectivity Collaborative (https://streamcontinuity.org/naacc), which developed the protocol for evaluating road-stream crossings.

The Norfolk Plantscape

Most people show a greater affinity for animals than plants, but the plant kingdom is crucial to our ecosystem. Plants clean the air and water, prevent erosion, help reduce greenhouse gases by absorbing and storing carbon, and are the greater part of the habitat providing food, water and shelter both for humans and for all those other, charismatic animals. Plants also are the source of many of the nutrients and medicines that sustain human health and supply a significant amount of material for construction and manufacturing.

A landscape is a repeating pattern of land forms and vegetation—the whole of all the plants living within a given area. This landscape is created by geology, climate and the compatible plant species. The vegetation, composed of many plant communities, is influenced by climate, soils, terrain, water availability and disturbances that include storms, wind, floods, fires and, of course, human intervention. Even the animals that live within the vegetation shape it, especially deer, which often eat much of the forest understory, including woodland flowers. In our region of high hills the landscape is composed of the sparse woodlands on dry hilltops; the shady, moist hillside forests; the marshes, swamps, streams and ponds that lie between the hills, and the various plants that clothe them.

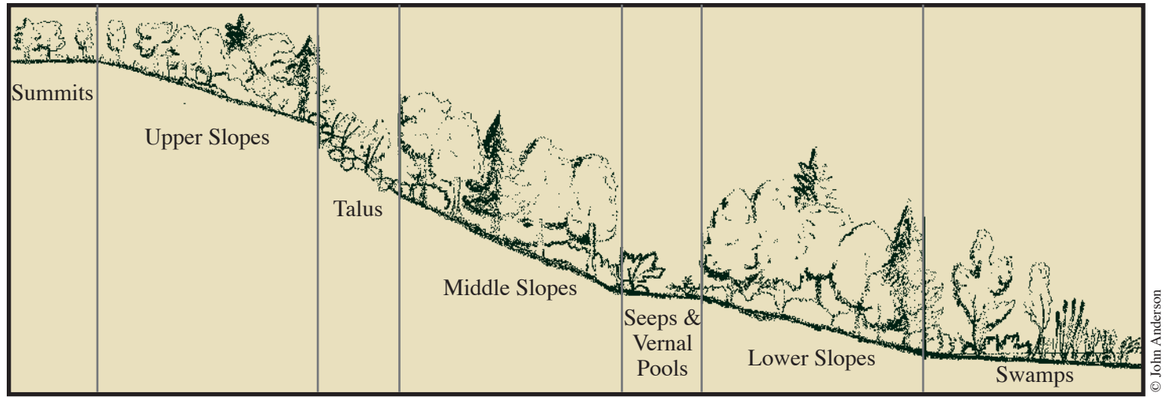
The native plants of Norfolk must endure the coldest climate in the state. Our soils are generally nutrient-poor and acidic, so the plants of the limestone region directly to our west are also uncommon or absent. The dominant deciduous hardwood tree species are sugar maple, American beech and yellow birch. Eastern hemlock is the most-common evergreen component, generally mixed with these deciduous trees. Northern red oak is common and chestnut oak, shagbark hickory and bitternut hickory occur on dry sites. The wildflowers of Norfolk include many with northern affinities (perhaps the greatest number in the state of Connecticut). Plants such as New England sedge, stiff clubmoss, wood sorrel and bluebead lily are often present. Common wildflowers include trilliums, trout lily, starflower, partridgeberry, wild sarsaparilla, goldenrods and asters. Several species of ferns are also common and often dominate the ground cover in forests and wetlands.

Plant Communities

Summits and Upper Slopes

Plant communities of upper slopes tend to be dry sites covered by short forests, sparse woodlands or open non-forested communities.

The Hickory Woodland, as found on Bald Mountain and Knapp Hill, is an unusual type of plant community, not fully understood scientifically. These communities are found on very shallow soils of summits and crests as open woodlands. They contain dry-site species such as shagbark hickory, white ash, white oak and hop hornbeam, more commonly found to the south of, or at lower elevations than, Norfolk with a ground cover of early sedge. Spring ephemerals, such as Carolina spring beauty, trout lily, wood anemone and dwarf ginseng are often abundant. The marginal wood fern is common. Shrubs are generally absent.



Sections of an idealized hillside. Their plant communities are described in the text.

© Bruce Frisch

Painted trillium (Trillium undulatum).

The Chestnut Oak Woodland, such as the one on the summit of Haystack Mountain, is another uncommon plant community, also found on shallow soils of summits. Red and white oaks, white ash and white pine are common and there is often a shrub layer of black huckleberry, lowbush blueberry and mountain laurel. Grasses such as little bluestem and poverty grass occur in the herb layer. Early sedge and many spring ephemerals are also common.

The Red Oak Forest is a common type of our summits and upper slopes, especially on south and west facing slopes. Though red oak frequently dominates, there are many trees associated with this species: black birch, red and sugar maples, beech, white ash and shagbark hickory. A shrub layer is usually present and may be sparse or dense, low or high, often including maple-leaved viburnum, beaked hazelnut, witch-hazel and mountain laurel. Young trees are common in the understory, although the oaks and hickories are generally absent in all but recently cut-over areas. Woodland flowers likely to be found include spotted geranium, common wood aster and wild sarsaparilla. On very rocky sites wild columbine, early saxifrage and pale corydalis can be found. Occasionally on very shallow summits, steep slopes and north slopes, hemlock can dominate. Often there is no shrub or herb layer present here. White pine sometimes produces relatively pure stands on summits as well.

Non-forested sites, often areas of exposed bedrock, are generally dominated by the shrub species that co-exist in the previously described woodlands. Sometimes grasses like little bluestem or sedges are common.

Mid-slope

Mid-slope sites are the average or mesic landscape site, neither dry nor wet, between the upper and lower slopes. Many forest trees achieve their best growth in these areas.

A number of hardwood species can dominate the mid-slopes of our region. Generally these are referred to as mixed or transition hardwood types. Forests dominated by red oak are common in town, many the result of past land clearing for agriculture, lumber and charcoal production. This is one of our fastest growing species, easily obtaining a diameter of three feet within 100 years. Many of our forests have an emergent tree layer of red oak, which is surpassed in height only by white pine. However, with the loss of farmland and the steady increase in mature forestland locally, these two species will have limited reproduction potential without active management. Common associates or co-dominants of the red oak include beech, red and sugar maple, black and paper birch, hemlock, big-tooth aspen, white pine and black cherry.

The Northern Hardwood plant community is common in Norfolk, although much less so in the rest of Connecticut. As its name suggests, this is the typical hardwood forest type of the North Woods. Here beech, sugar maple and yellow birch are the primary components and hemlock frequent or even co-dominant. The shrub layer, when present, includes striped maple, beech, hemlock and often hobblebush and American yew, which can survive under the shade of mature northern hardwoods. Christmas fern and wood ferns can be abundant in the herb layer and painted trillium and bluebead lily are typical wildflowers of the community.

© Alexandra Childs

Pink ladyslipper (Cypripedium acaule) is getting hard to find.

On richer or moister sites, a variation or Transition type occurs. Sugar maple, white ash and basswood dominate and red oak, beech, yellow birch and hemlock are frequent associates. Differing from the classic northern hardwoods, this community often has a richer shrub or herb layer. When shrubs are abundant, common species include red-berried elder, striped and mountain maples (which can develop into small trees), witch-hazel and round-leaved dogwood, along with sugar maple and beech, which commonly reproduce under the shrub layer. Winterberry is found on wetter sites, lower slopes and wetlands. Where shrubs are few, the herb layer can be thick with blue cohosh, wild leek, wild ginger, Dutchman's breeches, red trillium, bloodroot, trout lily, Carolina spring beauty, twin-leaf toothwort, maidenhair fern, Christmas fern, lady fern and wood ferns.

Old Fields

Following the abandonment of farm fields, the succeeding plant communities vary with the type of previous agricultural practice (ploughed land, hayfield, pasture), the seed sources available nearby, soil type and depth, soil moisture and other factors (drought and other weather extremes, insect outbreaks, native herbivore pressure, etc.). Initially, fields are dominated by non-native grasses and wildflowers such as orchard grass, timothy, common milkweed, ox-eye daisy, ragged robin, hawkweeds and common buttercup. Soon many of our native perennial wildflowers such as goldenrods and asters come to dominate and more showy flowers may arrive, like Canada and wood lilies, wild bergamot and black-eyed susan. Little bluestem is the common old-field grass on drier sites. Eventually shrubs and young trees (which may have become established unseen early on) become the obvious feature of the field. Typical plants are low- and high-bush blueberry, common juniper, meadowsweet, maleberry, chokecherry, black chokeberry, arrowwood, shadbush, staghorn sumac and musclewood. Tree species that can grow rapidly on such sites include white pine, white ash, red maple, red oak, black cherry, paper birch, quaking aspen and hop hornbeam. Red cedar and gray birch are not as common as they are in other parts of the state, but individuals may be found scattered throughout these sites. When there has been a good seed year for white pine following the succession of mowing in hayfields, this species can form dense stands and quickly dominate a field to the exclusion of any other plants. White pine, hemlock, mountain laurel, common juniper, Japanese barberry and multiflora rose may characterize old pasture lands, as livestock tend to avoid these species while consuming the coexisting hardwoods, grasses and wildflowers.

Talus Slope

Mesic talus slopes are areas covered by fallen rocks or boulders near the base of steep hills or cliffs. These are generally occupied by hardwoods typical of old fields or heavily logged sites, such as red oak, white ash and black birch, creating an open woodland. Witch-hazel,

© Bruce Frisch

Goldthread (Coptis trifolia) likes saturated soil.

striped maple, Virginia creeper and bindweeds are common plants, while hemlock can also dominate these sites. On north slopes yellow birch may be common as well, with red-berried elder, mountain maple, blackberry and polypody ferns in the understory of the sparse tree cover.

Lower Slope

Lower slope forests tend to be moister than the previously discussed sites and often are marginal to wetlands. These sites grade from moist hillsides to areas where the soils are sometimes saturated.

Hemlock dominated forests are very common on lower slopes, often mixed with white pine and hardwoods such as red oak, sugar maple, beech, yellow birch, red maple, white ash and black birch. The shrub layer in these evergreen-dominated sites is usually sparse but may include mountain laurel, maple-leaved viburnum and witch-hazel or hobblebush and American yew. Beech and striped maple also occur. The herb layer is also often sparse under these hemlock forests. Common wildflowers are wild sarsaparilla, starflower, partridgeberry, Indian pipe and Canada mayflower. Moister sites have a richer herb layer, which may include intermediate wood fern, marginal wood fern, shining clubmoss, partridgeberry, wild sarsaparilla, red trillium, whorled wood aster, wood-sorrel, bluebead lily, Indian cucumber, goldthread, blue cohosh, wild ginger, bloodroot, Dutchman's breeches and wild leeks.

© Bruce Frisch

Dutchman's breeches (Dicentra cucullaria).

Seeps, which are frequent within these lower slope sites, can create gaps in the forest canopy. Shrubs like red-berried elder and mountain maple occur on rocky sites and common herbs include wild leeks, maiden-hair fern, beech fern, oak fern and jewelweed.

Variants on the Northern Hardwoods and Mixed or Transition Hardwoods also occur on lower slopes. Red oak may be abundant and become massive trees. Tulip-poplar, a tree much more common in southern Connecticut, is occasionally found on these sites and can achieve great size. All the other Northern and Mixed Hardwoods commonly occur on lower slopes. Hobblebush, beech, striped maple, shadbush, red-berried elder and mountain maple may be found in the shrub layer. Intermediate wood fern, shining clubmoss, partridgeberry, wild sarsaparilla, red trillium, whorled wood aster, wood-sorrel, bluebead lily, Indian cucumber, goldthread, blue cohosh, wild ginger, bloodroot, Dutchman's breeches and wild leeks may be found in the herb layer.

Wetlands

Swamps are forested wetlands and Norfolk has not only an abundance of swamps, but some that are unusual types for Connecticut.

The extremely rare red spruce dominated swamps (such as Holleran Swamp) are mixed with hemlock, red maple and yellow birch. Dwarf mistletoe, a semi-parasitic species on red spruce, occurs in the upper canopy of this forest. The shrub layer includes mountain holly, mountain laurel, highbush blueberry and common winterberry. The herb layer has a base of sphagnum moss with cinnamon fern, bluebead lily, goldthread, lowbush blueberry and sedges common.

The rare black spruce dominated swamps (such as at Beckley Bog) are mixed with tamarack, red spruce and white pine. Common shrubs include mountain holly, highbush blueberry, withe-rod and common winterberry. Common plants of the herb layer include sheep laurel, leatherleaf, cranberry, roundleaf sundew, pitcher plant, sedges, rushes and sphagnum.

Red maple swamps are the most common types in town and probably the most familiar kind. Black ash and yellow birch are common associates in the tree layer. The shrub layer is often dense with several species easily found: spicebush, silky dogwood, speckled alder, arrowwood, poison sumac, willows, highbush blueberry and common winterberry. The herb layer may be equally developed and includes false hellebore, rue anemone, swamp saxifrage, sedges, jewelweed, sensitive fern, cinnamon fern, ostrich fern, royal fern, crested fern, Clinton's fern, false-nettle, clearweed, bunchberry and purple avens.

Hemlock swamps are very common also, and tend to be cool and deeply shaded, often with a sparse understory. Yellow birch, red maple and white pine are common associates in the tree layer. The shrub layer may include spicebush, common winterberry, highbush blueberry, mountain holly and mountain laurel. Common herbs include cinnamon fern, royal fern, goldthread, wood-sorrel, sensitive fern, painted trillium, jack-in-the-pulpit and sphagnum.

Forested floodplains occupy relatively small areas along the larger streams and rivers of Norfolk. Some high floodplain occurs along the Blackberry River where trees typical of such sites may be found: cottonwood, quaking aspen, black willow, red maple and white pine. A shrub understory is generally absent, but the herb layer is often rich in ferns and spring ephemerals. Riparian forests occur on the banks of larger streams and rivers. Some of the floodplain species occur, with the addition of hemlock and yellow birch, while cottonwood and black willow tend to drop out. Shrubs such

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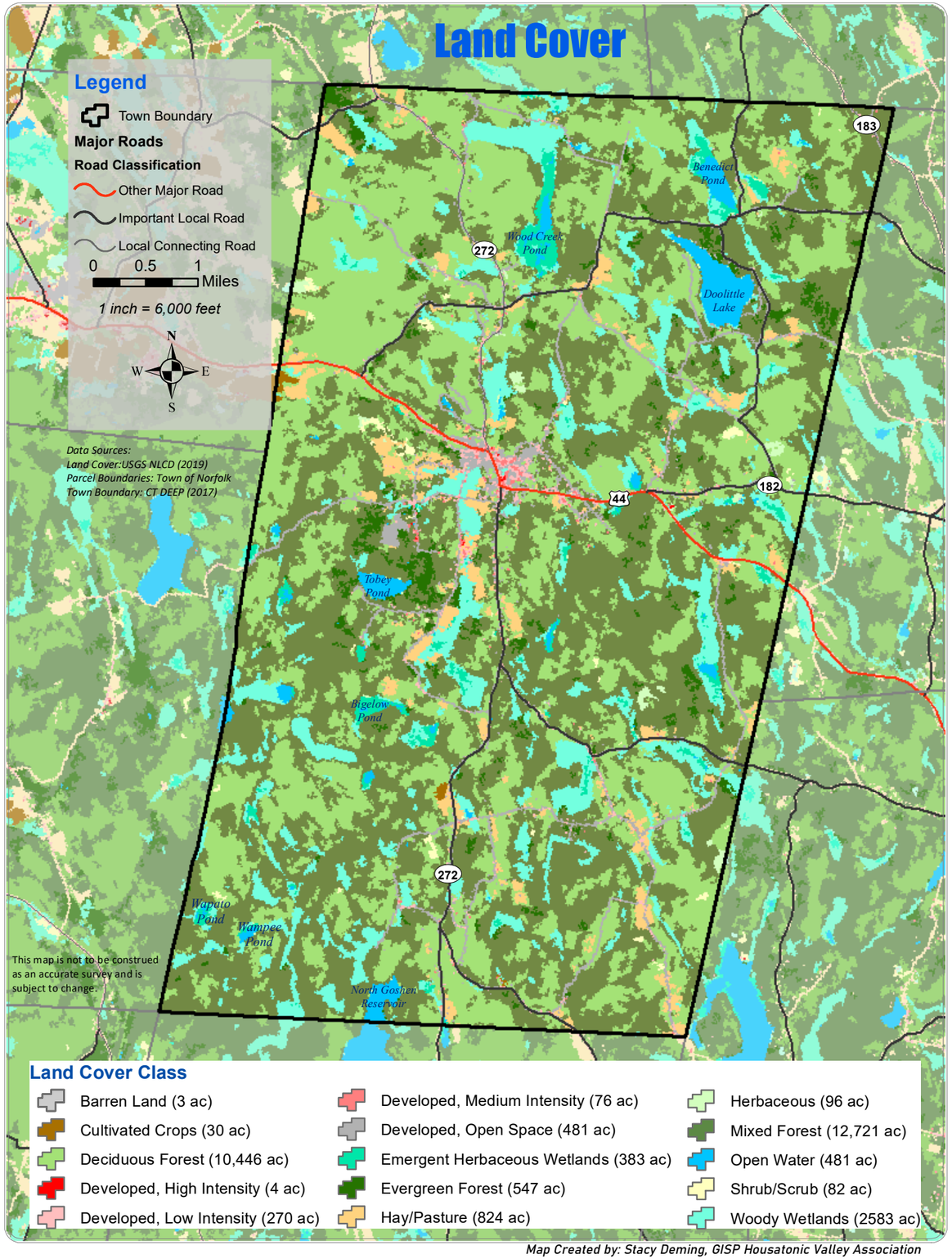
Staghorn sumac (Rhus typhina), typical of old fields.



Map Created by: Stacy Deming, GISP Housatonic Valley Association

as shadbush, hobblebush and American yew may also occur.

Several types of shrub wetland communities can be found in town. They may be dominated by speckled alder, pussy willow, common winterberry, meadowsweet, steeplebush, buttonbush, or a mixture of any of these. Highbush blueberry, withe-rod, common elderberry, mountain azalea and mountain laurel may also be present, often at the margins. Many ferns, sedges and rushes are common associates in the herb layer.

One rare type is the Leatherleaf Bog (found within Beckley Bog). Leatherleaf, a shrub more common in northern New England wetlands, is a low plant growing in the herb layer alongside sheep-laurel, cranberry, roundleaf sundew, pitcher plant and sedges. Orchids are noteworthy species here, often restricted to these sites. In the shrub layer, commonly found plants include stunted black spruce, tamarack and white pine; mountain holly; highbush blueberry; withe-rod, and common winterberry.

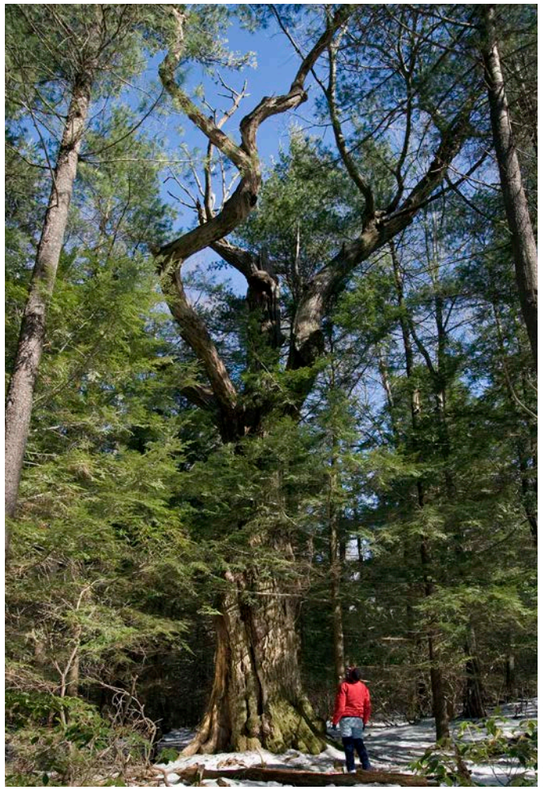
Marshes tend to be wetter sites where most shrubs do not thrive. Some are long-stable communities, from tall stands of common cattail and common reed to short tussock sedge and bur weed marshes. Others may be more dynamic, especially where beaver are active and water levels change periodically. Other emergent species may dominate some sites, such as pickerel weed, arrowhead and smartweeds. In deeper water, floating aquatics dominate with species like yellow and white pond lilies, watershield and bladderworts.

Wet Meadow communities generally are not submerged during the growing season. These communities are variable and diverse. Reed canary grass can dominate large sections of these meadows, much like the common reed. Other species that may be present are joe-pye weed, boneset, green-headed coneflower, St. Johnsworts, swamp candles, blue-flag iris, fowl grass, fringed gentian, cardinal flower, marsh fern and sensitive fern.

Lists of trees, shrubs and vines, wildflowers, ferns, and clubmosses appear in Appendix 4. Sightings of plants may be posted on the iNaturalist website and rare plants reported to the Natural Diversity Database, CT DEEP (see bibliography).

Notable Trees

Some of Norfolk's trees are remarkable because of their size, their beauty or their age. The Connecticut Notable Trees Database, which is maintained by the Connecticut Botanical Society, list 11 Notable Trees in Norfolk. The one State Champion Tree in town – a red spruce (*Picea rubra*) in Great Mountain Forest – died after a lightning strike about 2015. The last time it was measured it stood 100 feet high and was 27 inches in diameter. Wood from this tree was turned into a fireplace mantel for the new Norfolk Curling Club. In 2008, the Norfolk-Colebrook Garden Club (now defunct) and the NRI subcommittee cooperated on surveying the town for notable trees and came up with more than 20. See Appendix 4 for an explanation and a list.



© Bruce Frisch

Notable Northern red oak (Quercus rubra).

Invasive Plants

Weeds and noxious plants have always been with us, but in recent years the scope of the problems caused by introductions of exotic species has become more evident. Wetlands have been dominated by non-native species, ponds choked by newly invading aquatic plants and local biodiversity diminished. This subject has now found its way into the public forum and has many people concerned.

An invasive species is defined by the Invasive Plant Atlas of New England (IPANE) as "a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health." A non-native plant is one not native to the region where it occurs. A weed is an out-of-place plant that uses resources reserved for more desirable plants, such as agricultural crops.

Potentially invasive plants are introduced both unintentionally and intentionally—with unintended consequences. They are often transplanted with other plants; carried on tools, clothing and equipment to new sites, or distributed by birds and other animals. Most non-native species become established in disturbed sites: roadsides, lawns, gardens and agricultural fields. Wetlands are also susceptible because natural water fluctuations are constantly disturbing them. According to a 2005 study, total annual economic damages due to invasive plants in the U.S. exceeded $34 billion (Pimentel, 2005), but the problems caused by invasive plants are also environmental. Many non-native plants are common species and widely distributed. There are approximately 5,000 introduced plant species thriving without human assistance in the U.S. alone, and about 10 percent cause substantial economic and environmental damage. The U.S. Forest Service has reported that these non-native invasive plant species have contributed to the decline of 42 percent of endangered and threatened species and for 18 percent of these invasives are the main cause of their decline. Unfortunately, it may take as much as a century before a species becomes a widespread problem and our track record predicting which are potentially invasive has not been good.

Most non-native species introduced to our environs do not cause obvious problems. Dandelions and Kentucky blue grass are not as much of a problem as the human disturbances and habitat manipulations that give these species a foothold. But the plants from even the short list of invasive non-native species are already significant pests in our landscape. Although it is now illegal to buy or sell many of the most common invasive plants, homeowners and gardeners often exchange and introduce plants without understanding the potential consequences of their actions.

Although non-native invasions have never been known to exterminate any native plant, human disturbance has led to extinctions. Worldwide, there has been an overall decline in plant biodiversity and an increase in homogeneity. Hybrids between non-native plants and native species are further changing our natural environment. And, although little is known about how or if invading exotic species damage the structure and function of ecosystems or how they affect local biodiversity, the net effect has been a loss of global biodiversity.

A list of invasive plants in Norfolk appears in Appendix 4. Sightings of additional invasives should be reported to IPANE at www.eddmaps.org/ipane, to the state DEEP or to the Norfolk Conservation Commission.

The Future Plantscape

Norfolk's plantscape has seen continual change. Throughout its history the region's climate has been in flux and, from the time of their arrival, humans have had a significant effect. Since the last glaciers melted about 12,000 to 10,000 years ago, pollen analysis studies tell us that the region has been in turn tundra-like, covered in cold boreal coniferous forest, predominantly hemlock forest and drier chestnut-oak forest. Hemlocks declined precipitously around 500 AD, probably due to an infestation of thrips, and American chestnut increased in this changed environment. Hemlock returned to dominance after 1,000 years.

The poor soils, lack of major rivers and thickness of the evergreen forests may have limited American Indian use of these lands. However, the new European settlers quickly cleared the land, in part for lumber and fuel, but also to create the kind of agrarian and village landscapes with which they were familiar from their homelands. They brought with them European livestock and plants to complete the transformation. The peak of deforestation occurred around the mid-nineteenth century. Later, easier farming in theAmerican Midwest and other forms of fuel, including coal and eventually oil, decreased the pressure on the forests of New England and allowed them to start regenerating.

This was not the end of changes, however. People continued to influence the vegetation by logging the new forests, by purposeful or unintentional burning, and by purposeful or unintentional plant introductions. Additionally, following the new forest growth came some of the original denizens of the woods, but not the same blend and balance of the original forest. The feeding behavior of white-tailed deer in particular has significantly transformed the composition and structure of the region's vegetation. And scientists are only beginning to understand other influences, such as the often obligatory symbiotic relationships between plants and fungi.

We do not know yet what our landscape will become but we do know that we will be the primary influence on Norfolk's vegetation. Some changes will be intentional, as we try to preserve or enhance the natural environment, or when we decide to modify or destroy natural areas in exchange for other benefits. And there will be times when we will change the environment unintentionally, completely unaware of our heavy footprint on the earth. The saga of plant life here is not finished.

Extensive lists of native trees, notable trees, wildflowers and ferns, shrubs and vines, invasives and other plants are in Appendix 4. Recommendations based on the information in this chapter and on the lists in the appendix appear in Chapter 11, starting on page 72. A bibliography appears in Appendix 9.

© Bruce Frisch

Red-capped amanita.

Wildlife

© Pat Harms

The story of Norfolk's wildlife is one of change. During the Pleistocene and after the glaciers retreated, New England was populated with woolly mammoths, mastodons and saber-toothed lions. There were also bison, elk and caribou, in addition to many of our present-day animals. For thousands of years the Native Americans in New England coexisted with—and probably hunted—many of these species.

When Europeans first came to Norfolk, large predators such as mountain lion and eastern wolf, and large herbivores such as whitetail deer, moose and the now extirpated eastern elk may have been common. Deer, bear, rabbits and squirrels probably fed the first settlers until they cleared enough land to raise crops and rear livestock. Furs from these species, plus those of mink, beaver and others, certainly supplemented settlers' incomes as well.

The best-known wolves in Norfolk were those killed by townspeople on Haystack Mountain in 1787 and tales of encounters with mountain lions and black bears were well known. By the early 1800s the original native forests had been mostly cleared from the town, replaced by fields, or chards and cultivated land primarily containing European crop plants and weeds. When farms and land cut over for charcoal predominated, rabbits, foxes and raccoons would have been common, large predators would have been absent and even deer would have been rare (because of overhunting as well as loss of woodland cover). Until the mid 1800s, bounties were paid on foxes and bobcats, which were killing sheep and chickens.

After the Civil War much of New England was abandoned for more productive and easily cultivated land in the Midwest. As the landscape reforested, the common wildlife of the field became less abundant and others, such as deer, porcupine, beaver and bobcat, returned. In the 1950s the eastern coyote made its first appearance in New England, partially filling a niche left open by other large predators. The whitetail deer population exploded as laws protected these animals from excessive hunting, lands were set aside as wildlife refuges and farm fields grew into brush and forest lands, creating an abundance of feeding habitat. The opossum, a southern species, has extended its range into our region, probably in response to an increase in one of its preferred habitats, suburbia.

In the 1970s and 1980s wild turkeys and fisher were reintroduced in Connecticut into Norfolk and Falls Village at Great Mountain Forest. Turkeys have become common and fishers, mid-sized predators, seem to have established a stable population throughout much of the state. Black bear have extended their range south from Massachusetts and are now known to hibernate and rear their young in our area. In recent years even moose have been seen and may become regular denizens of our woods and wetlands.

On the other hand, we may lose some species due to forest fragmentation, disease, interspecies breeding and intraspecies competition, even the loss of farmland: eastern woodrat, northern flying squirrel and New England cottontail, for example. Some species, such as bear, moose and fisher, that have returned to our town as our forests matured may leave it once again. If hemlock woolly adelgid, an insect pest that can devastate eastern hemlocks, increases to the point that these conifers are wiped out, we will also lose the porcupine, which feeds exclusively on hemlocks during the winter in our area. Other animal species will be affected as well, and this could cause a cascade of losses.

Species whose presence is documented or likely in Norfolk are listed in Appendix 5.

© Shelley Harms

Bobcat (Lynx rufus) scans for hidden mice.

© Jim Jackson

Black bear (Ursus americanus).

Birds

Norfolk's varied habitats support birds during all seasons of the year. One hundred and seventy-six species have been observed in Norfolk.

The number and species of birds in Norfolk differ from much of the rest of Connecticut. Because of its northerly location and relatively high elevation, Norfolk is at the southern limit of the range of many northern species. Partners in Flight, an international bird conservation organization, places Norfolk in the Northern New England physiographic region of the country. For this reason, Norfolk is unusual in Connecticut with its healthy nesting populations of birds such as blue-headed vireo, slate-colored junco, purple finch and Canada warbler.

In addition, much of Norfolk remains undeveloped, so Norfolk has more intact habitat to support more birds. Species that are declining elsewhere, such as chestnut-sided warbler and American woodcock, remain relatively abundant in Norfolk.

© Julie Scharnberg

Wild turkeys (Meleagris gallopavo).

Eighteen of 50 state-listed bird species have been observed in Norfolk: common loon, American bittern, sharp-shinned hawk, northern harrier, American kestrel, bald eagle, bobolink, eastern meadowlark, northern parula, golden-winged warbler, savannah sparrow, northern saw-whet owl, barn owl, common nighthawk, common raven, alder flycatcher, eastern meadowlark and brown thrasher. Norfolk's birds also include species that environmental organizations are monitoring because they are in decline or in danger of declining, such as wood thrush, Canada warbler and American woodcock.

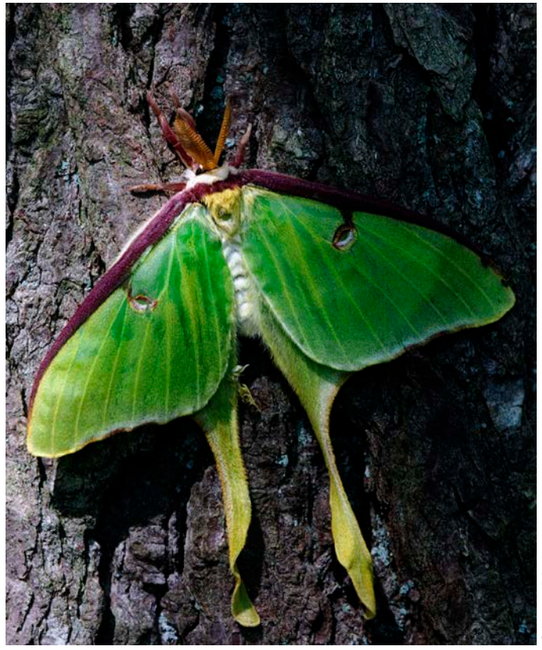
In 2022, the U.S. Committee of the North American Bird Conservation Initiative released the State of the Birds. It reported that many common birds continue their steep declines. Habitat loss, both in the U.S. and on the birds' wintering grounds, is believed to be the most significant factor in the declines. Grassland birds such as bobolinks and savannah sparrows, known to breed in Norfolk, are of concern because grassland in Connecticut is being lost rapidly to development. State plans of conservation are currently placing special emphasis on conserving grassland habitat for these birds.

© Barbara Gridley

Pine grosbeak (Pinicola enucleator) feasts on crabapples.

Norfolk is also the summer home to many migratory birds that require intact forests in order to breed. Forest fragmentation due to development is rapidly destroying habitat for deep-forest-nesting birds like the ovenbird, Canada warbler, blue-headed vireo and black-throated blue warbler. Early successional habitat (shrubby growth) is also disappearing in the state, creating concern for species such as the chestnut-sided warbler and ruffed grouse. Some new breeders in town are sandhill crane and common loon, rare for our state.

A list of Norfolk's birds appears in Appendix 5.



© Bruce Frisch

Luna moth (Actias luna) on tree.

Butterflies and Moths

The number of species of butterflies and moths in a given area is an indicator of the health of its environment. A 1995-1999 butterfly atlas survey of Connecticut found 110 species in the state; specimens or photos are housed at the Yale Peabody Museum in New Haven. Norfolk had 53 species and another was found later; they are all listed in Appendix 5.

More than 630 species of moths were caught in Norfolk. A list of Norfolk's moths appears in Appendix 5. Specimens of more than 350 are housed at the headquarters of Aton Forest here in Norfolk. There are probably many more species in the area and a comprehensive survey needs to be done.

Most moths are beneficial as pollinators. The exceptions include imported species, such as the spongy (gypsy) moth, which often have few natural predators and diseases and can multiply to the extent of completely defoliating vulnerable plants.

The changing environment affects which species live in an area. For example, when the land was cleared for farming regal fritillary butterflies could be found in open grass areas. Now that the woodlands have recovered, there are no regal fritillaries in Connecticut. During the butterfly atlas survey the Arctic skipper was found in Norfolk, its first known appearance in northern Connecticut; it is a woodland species not usually found south of Canada.

Other Animal Life

Some of the more obvious and well-known animal species have been discussed above and more are listed in Appendix 5. However, there are many others that we know little to nothing about: beetles and flies, spiders and mites, worms and leeches, and innumerable microorganisms. It would be impossible to find and list every species in Norfolk, although the ongoing observations of amateur naturalists and professional scientists are expected to expand our knowledge and this inventory.

Natural ecosystems are extremely complex, made up of many parts—species and individuals—and operate through these parts by many processes. Every species depends on others to live, creating food chains that connect all things: an insect feeds on a plant, a bird eats the insect, a weasel catches the bird, a raptor devours the weasel. Every part of the web of life ultimately affects the whole: the extirpation of wolves leads to an overpopulation of deer, which results in the loss of flowering plants that many other species depend upon, as well as the elimination of tree seedlings, which affects other species and changes the landscape for decades or more.

We ourselves are parts of this system. To keep the whole system healthy and functional, we must actively learn to understand and protect the natural world around us.

Recommendations addressing concerns about Norfolk's wildlife appear in chapter 11 starting on page 72. See Appendix 5 for extensive lists of species and Appendix 9 for a bibliography.

The Conservation Commission would welcome new data for future publication. To contribute information about Norfolk wildlife or report sightings of the rare animals, please contact the Norfolk Conservation Commission. To send reports to the Connecticut DEEP, see https://authoring-stage.ct.egov.com/DEEP/Endangered-Species/Contributing-Data and for the Connecticut Natural Diversity Database, see https://portal.ct.gov/DEEP/NDDB/Contribute-Data-to-the-NDDB.

© Pat Harms

Juvenile red eft (Notophthalmus viridescens).

Areas of Ecological Importance

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The town of Norfolk is located in Connecticut's Northwest Highlands, an area characterized by topographical extremes ranging from wide, open valleys to the highest elevations in the state. It is no wonder that this region is considered by many to be the most beautiful area in our state. But beyond the beauty there is tremendous content. Few realize that this region is also one of the most biologically diverse places in New England.

One factor that contributes to the area's biodiversity is the combination of rugged terrain and the presence of limestone, a geology that is rare east of the Appalachian Mountains and limited to a narrow corridor running from southwestern Connecticut into northern Vermont. A second is the largely unfragmented landscape that is still ecologically functional, unlike most areas of our state where dense matrices of roads and developments confine nature into small, isolated islands of habitat where only the most adaptable species can survive.

Yet another is Norfolk's climate, which allows many northern and southern species to reach their range limits in this region. New York's Hudson Highlands and its Taconic Mountains, and the southern portion of Massachusetts' Berkshire Mountains extend into this part of the state. Other species are at or near their easternmost range limits, such as the prairie plants that spread into the region during a hypsithermal, or warming trend, after the last ice age, and remained as relicts after the temperatures adjusted to current levels.

This chapter describes Norfolk's known natural communities and habitats, as well as areas that are likely to support such features. Because the "potential" areas are derived mostly from secondary sources such as aerial photographs and topographic maps, it is very much a work in progress—really the beginning of a compilation of Norfolk's habitats and natural communities, most of which can only be verified in the field.

Natural Communities and Habitats

Norfolk has its share of rock outcrops, talus and ravines. The **rock outcrop** areas depicted on the map include rocky balds and cliffs on sparsely vegetated hilltops, one of Connecticut's natural community types. Rock outcrop areas include rocky balds and cliffs on sparsely vegetated hilltops, one of Connecticut's natural community types. In this region of Connecticut, rock outcrop areas are one of the habitats used by the eastern smooth green snake (Liochlorophis vernalis), an uncommon, insectivorous species believed to have declined in their preferred meadow habitat due to the use of pesticides and power mowing equipment.

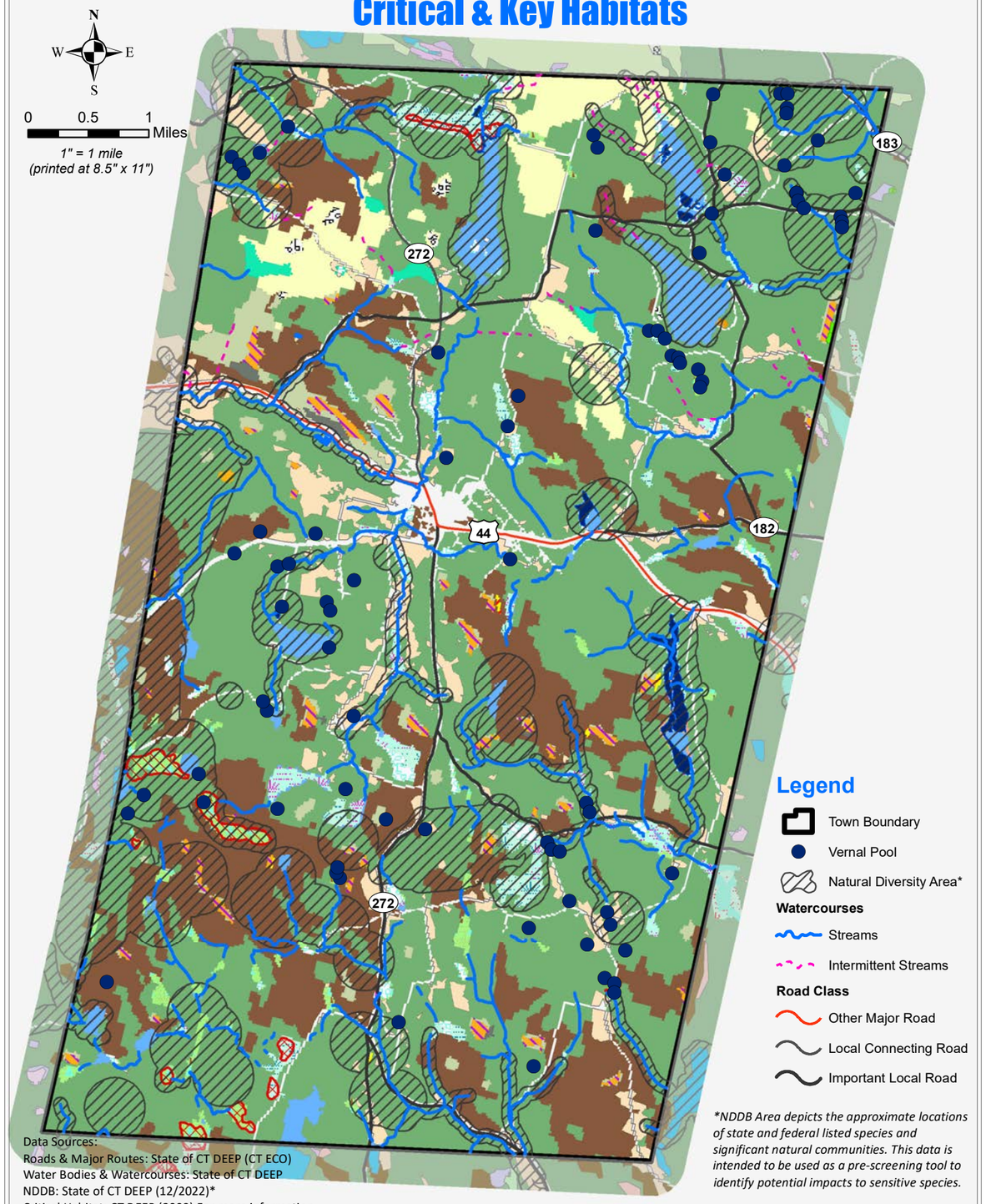
Cliff areas can have interesting plant communities with unusual ferns rooting in moist cracks; the state-threatened wall rue (Asplenium ruta-muraria) and maidenhair spleenwort (Asplenium trichomanes) are limestone associates. Cracks and crevices in acidic cliffs occasionally support mountain spleenwort (Asplenium montanum), another threatened species. Cliffs can also provide important nesting sites for birds of prey like the turkey vulture (Cathartes aura) and the endangered peregrine falcon (Falco peregrinus) that prefer the protection that high elevation locations afford. The warming rocks create columns of air called thermals that raptors can ride without expending much energy in their search for food.

The hickory summit plant community can be present on hilltops at higher elevations. A good example can be found on Bald Mountain and is characterized by an open understory with few shrubs and a groundcover layer comprised primarily of sedges with some grasses. The dominant trees in these slow-growing, sub-acidic forests are usually white ash (Fraxinus americana), hickory (Carya spp.) and hop hornbeam (Ostrya virginiana).

Norfolk also has many **ravines**. Ravines are narrow valleys with moderately steep to very steep, rocky sides, usually shaded by trees, and are associated with cold, fast flowing streams though sometimes the water can be intermittent. A ravine that is deep and carved out of rock by fast flowing water is known as a gorge. Streams in northwestern Connecticut's ravines are usually cold, highly oxygenated and contain pools. This is one of the habitats preferred by the native brook trout (Salvelinus fontinalis), a species requiring cold, well-oxygenated water. Heavy forest cover, usually dominated by hemlock (Tsuga canadensis), helps maintain a cool microclimate by blocking out sunlight. Ravines may also support unique plant communities such as old growth forest—one of New England's rarest natural communities—where inaccessible terrain helped to limit logging.

Talus is another ecologically important landscape feature that is usually present in areas with rugged terrain. These are sites where rock has accumulated at the base of

Critical & Key Habitats



Map Created by: Stacy Deming, GISP Housatonic Valley Association

Connecticut Critical Habitats depicts the classification and distribution of twenty-five rare and specialized wildlife habitats in the state. It represents a compilation of ecological information collected over many years by state agencies, conservation organizations and many individuals.

CT Key Habitats as listed in the 2015 CT Wildlife Action Plan were compiled using The Nature Conservacy Terrestrial Habitat Data (2014).

For more information consult the data page at conservationgateway.org

Connecticut Critical Habitat

PALUSTRINE FORESTED

Palustrine Forested, Acidic Red/Black Spruce Basin Swamp

PALUSTRINE NON-FORESTED

Palustrine Non-forested, Poor Fen, PF

CONNECTICUT KEY HABITATS & ASSOCIATED TNC HABITATS

Connecticut Key Habitats listed in bold as found in Table 2.1 pp. 2-26 through 2-27 in Section 2 of the 2015 Connecticut Wildlife Action Plan

1. Upland Forest

- Laurentian-Acadian Pine Hemlock
- Laurentian-Acadian Hardwood Forest
- Appalachian (Hemlock)-Northern Hardwood Forest
- Northeastern Interior Dry-Mesic Oak Forest
- Dry Oak-Pine Forest, Central Apps and Southern Piedmont
- Central Appalachian Pine-Oak Rocky Woodland

2. Upland Woodland & Shrub

- Central Appalachian Pine-Oak Rocky Woodland
- Central Appalachian Alkaline Glade and Woodland
- Acidic Rocky Outcrop

4. Forested Inland Wetland

- North-Central Appalachian Acadian Conifer
- North-Central Appalachian Acidic Swamp
- Laurentian-Acadian Alkaline Conifer-Hardwood Swamp

5. Shrub Inland Wetland

- Laurentian-Acadian Wet Meadow
- North-Central Interior and Appalachian Acidic Peatland

6. Herbaceous Inland Wetland

- Laurentian-Acadian Freshwater Marsh
- North-Central Interior and Appalachian Rich Swamp

8. Freshwater Aquatic

- Open water

10. Unique*

- Acidic Cliff and Talus
- Circumneutral Cliff and Talus

*Agricultural and developed land are not incuded in this map

cliffs and ledges. The rocky build-up can range in steepness according to terrain, or in depth depending on the number of rock fragments that are present. Aspect, canopy cover and the presence or absence of water sources, such as seeps or intermittent watercourses, determine the moisture regime of talus areas; they can be dry or moist. Soils of south-facing slopes are usually significantly drier and warmer than those oriented to the north.

The quantity and arrangement of rocks help create pockets of differing microclimates, that, in areas with rich soils, often support a diversity of plant species. The spaces between the rocks in talus can provide quality hibernaculae for an assortment of animal species, some of which are little known such as the long-tailed shrew (Sorax dispar), a tiny, secretive mammal restricted to talus habitats. Although it has been documented just over the border in adjacent Marlborough, Massachusetts, and suitable habitat exists, records from Norfolk are lacking; further research is needed to determine its presence in Norfolk and to shed additional light on its biology. Some snake species, like the black rat snake (Elaphe obsoleta), are known to spend the winter in communal hibernaculae with other species like the copperhead (Agkistrodon contortrix) deep within the talus. Black bear (Ursus americanus) will sometimes hibernate between rocks, even if fully exposed to the elements.

Old growth forests also can be present in talus areas. Here, old trees are often overlooked—they can be unexpectedly small when stressed by sites that have limited nutrients, water and space.

The cove forest, which is dominated by sugar maple (Acer saccharum) and white ash, is another example of a unique community that grows in moist talus. The rich nutrients needed to support this community are provided primarily by surficial run-off from the mineral-rich slope or from enriched groundwater discharge. Cove forests support a botanically diverse understory.

A small portion of **limestone bedrock** extends eastward into Norfolk from the northern marble valley along the Blackberry River. There is a larger area near the center of town, and a very small site lies approximately halfway between the two. Limestone or marble ledges overlain with **excessively drained soils** also have the potential to support unique plant communities. Rare species like side oats grama grass (Bouteloua curtipendula) and the prairie goldenrod (Oligoneuron album), examples of the previously mentioned hypsithermal relicts, are associated with eastern red cedar–hop hornbeam woodlands, an uncommon plant community that grows on marble ledges and in abandoned fields on **limestone-derived soils**. Reptiles prefer open, sunlit areas in dry, sandy soils for laying eggs. The substrate can be easily excavated for egg deposition; both drainage and heat-retention are good—characteristics that make for excellent incubation.

Areas with limestone-derived soils are limited to two sites in Norfolk. Both are associated with limestone bed

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Laurel blooms at the edge of Beckley Pond.

rock areas; a relatively narrow strip flanks the western edge of Spaulding Pond and the other is located along the Blackberry River in west Norfolk. Norfolk's limestone features are Connecticut's easternmost extensions of this geology, which corresponds to the eastern range limits of rare limestone-dependent natural communities, including a suite of their insect associates.

Limestone-dependent communities may also occur at groundwater discharge sites (known as **seeps**), either on hillsides or on flat terrain. Although calcium-rich (calcareous) seeps sometimes appear to lack a direct connection to limestone, underground water dissolving calcium as it passes through limestone bedrock can surface in areas farther away. Known examples of seeps occur along the Blackberry River and on private property adjacent to Campbell Falls State Park. Seeps can also form seasonal, highly ephemeral wetland pockets, often identifiable solely by the plant species that are present. They are generally small and typically lack both indicator wetland soils and standing water. Soil scientists and others tend to overlook them during land-use site inspections. Due to the lack of data, this feature is not represented on the map.

Some groundwater discharge areas, however, are readily detectable. Those that have more significant and definable flows than seeps are evident in the landscape because they are the **origins of streams (headwaters)**, easy to locate on topographic maps. Often manifested as springs, they can remain open in winter, with water flowing year round. This is particularly important for wildlife during times when other upland water sources are either frozen or absent altogether. They can also provide a winter food source for birds and small mammals, when resources are scarce; insects can often be observed congregating around the unfrozen spots.

Non-calcareous cold-water discharge sites in steep, dark rocky areas may support rare plants like the Appalachian gametophyte (Trichomanes intricatum) a bizarre filamentous fern believed to perpetually remain in the juvenile stage. Cold springs and well-oxygenated brooks percolating from hillsides are the favored habitats of the northern spring salamander (Gyrinophilus porphyriticus), a species reaching the southern limit of its range in the Connecticut Highlands. State-listed as threatened, it is highly intolerant of disturbance and thermal pollution. The spring salamander can also be found in cold, well-oxygenated seeps. Native brook trout sometimes seek refuge in **intermittent stream** segments where water remains in pools

Headwater areas are represented on the map by small squares. The ponds shown as headwaters were probably originally wetlands or springs dug out by farmers. Brook trout may inhabit the cold, fast moving, well-oxygenated streams that can be found in ravines and high gradient landscapes. The wood turtle (Clemmys insculpta), a species of special concern, on the other hand, prefers low-gradient streams. It hibernates underwater and by the end of spring disperses into adjacent floodplains, upland woods and meadows. Its large home range, which is linear in shape due to its corresponding riparian habitat, makes the wood turtle particularly sensitive to landscape fragmentation and it has consequently been extirpated from many areas in our state. Low reproductive rates, habitat loss and road mortality are also contributing factors to the wood turtle's decline. Considered to be an intelligent and agile climber, the wood turtle can actually scale a six-foot chain link fence!

Norfolk has many **lakes and ponds**. Some ponds are anthropogenic, man-made from wetlands or groundwater seepage areas that have been excavated or from streams that have been dammed. Spring-fed ponds are potential sources of clean, cold water, another habitat for native brook trout. Tobey and Doolittle are clear, deep ponds that support a breeding native brook trout population.

There are also many other different kinds of **wetlands** in Norfolk, most of which are not differentiated on the map. Their diversity disproves the commonly held notion that all wetlands are the same. In fact, they are incredibly diverse. For map simplicity, the various communities are not represented according to type but most types are described below.

Lake and pond shores often support important wetland plant communities. For example, seasonally flooded grasslands throughout Connecticut support tussock sedge (Carex stricta) or, in the limestone region only, rare hairy sedge-cattail (Carex lacustris-Typha spp.) communities. in seasonally flooded grasslands that are limited to the limestone region.

Swamps and marshes are the most common types of wetland. Swamps are generally defined as wetlands dominated by trees and/or shrubs, while marshes are dominated by herbaceous vegetation. Basin swamps, for example, are found in depressions and are characterized by slow moving water over peat and muck soils and can be acidic or circumneutral in pH. Acidic eastern hemlock basin swamps develop, as the name implies, under acid conditions while circumneutral northern white cedar basin swamps occur in limestone areas. Seepage swamps are another type of swamp. These, too, can be acidic or circumneutral but have minimal peat accumulation, are seasonally flooded and develop on gently sloping to sloping hillsides with surface flow. The dominant tree cover is red maple (Acer rubrum) but the understory varies and accordingly can be further classified. Like basin swamps, basin marshes are also found in depressions and again, depending on type, are dominated by certain plants such as swamp loosestrife (Dodecadon verticillatus) or tussock sedge.

Another type of wetland present in Norfolk is the topogenic peatland. These, too, are confined to basins. They are groundwater-influenced and develop on poorly decomposed peats and are further classified according to pH. Highly acidic peatlands influenced by groundwater and dominated by ericaceous shrubs (those in the mountain laurel family) are known as bogs or poor fens. A well known Norfolk example is Beckley Bog. Medium fens are

dominated by both ericaceous shrubs and sedges, and are flooded by surface water. Rich fens, on the other hand, are influenced by limestone enriched water and can be dominated by shrubby cinquefoil (Dasiphora floribunda) or woollyfruit sedge (Carex lasiocarpa).

Groundwater discharge sites with minimal peat accumulation in open woodlands are also considered to be a type of fen. Referred to as spring fens, they, too, can be either acidic or circumneutral. Acidic spring fens are dominated by golden saxifrage (Chrysosplenium americanum) while inland sedge (Carex interior), bristlystalked sedge (Carex leptalea) and yellow sedge (Carex flava) dominate circumneutral spring fens.

Vernal pools are temporary woodland ponds that usually fill with autumnal rains, not in the spring as the name implies. Unlike lakes and ponds where microscopic green plants (algae) form the basis of the food chain, they derive their energy from decaying leaf-litter from the surrounding forest. Energy from decomposing leaf litter cycles back out into the forest in the form of organisms, such as the metamorphosed salamanders whose larvae fed on the aquatic insects that broke down the leaves in the first place.

Vernal pools are fed directly by precipitation, surface run-off and/or groundwater and typically lack a permanentinlet or outlet. They cannot sustain fish populations because they tend to dry out, particularly during the drier summer months. Free from fish predation, vernal pool organisms can successfully complete their life-cycle. Those whose entire existence depends on these ephemeral waters are known as obligate species. Good examples are the wood frog (Rana sylvatica) and the fall breeding marbled salamander (Ambystoma opacum), an uncommon species in Norfolk as it is near the northern limit of its range.

Areas with vernal pools are extremely diverse and biologically productive. Mole salamanders and wood frogs spend more than 90 percent of their adult lives in the surrounding upland forest, returning to their natal pools only to breed. Insects and other invertebrates dependent on vernal pools for parts of their life cycle abound as well, attracting and sustaining a diversity of insectivorous forest dwelling songbirds. In addition, vernal pools serve as watering holes for other types of animals such as mammals in what may otherwise be dry uplands. The data layer on the map includes only those pools that have been verified by direct field inspection since 2008 or have been historically known to exist. Most of the pools are apparent on aerial photographs taken in early spring before leaf-out. Those associated with coniferous forests cannot be mapped from photos because the canopy obscures them.

Other critical habitats present in Norfolk include **grassland** and **early successional habitat**. Grasslands can range widely in plant composition and structure, consisting of nearly all grass as in hayfields, to the early stages of forest succession in which shrubs, trees and other woody growth like vines are becoming established.

Historically, natural grasslands in the Connecticut forested landscape were mostly restricted to floodplains, salt marshes, beaver meadows, coastal sand plains and areas burned either naturally by lightning or by fires deliberately set by Native Americans to clear undergrowth from their hunting grounds. But as settlers began to develop the land and agriculture expanded, these natural areas gave way to larger expanses of open landscapes, providing widespread habitat for grassland-dependant birds and other wildlife. Eventually when the inevitable erosion and depletion of farmland soils occurred in steep and rocky areas like those of northwestern Connecticut and the prospect of better economic opportunities in cities prompted many to abandon farming, grassland habitats began to decline. Agricultural land reverted to forest or, like natural grassland communities, eventually succumbed to development, and disturbance factors such as fires are prevented and or rapidly extinguished for safety reasons. Today, grassland habitats in Connecticut are, for the most part, limited to remnant agricultural lands, many of which are small and isolated; grassy areas associated with airports and landfills, and to the remnant sand plains of North Haven.

Good examples of grassland bird habitat in Norfolk are at Yale and Broadfield farms. Both have extensive acreage that has been traditionally devoted to hayfields and both support a breeding population of bobolink (Dolichonyx oryzivorous), a Connecticut species of special concern. The eastern meadowlark (Stumella magna), another grassland specialist, has been documented in Norfolk but is not known to nest here. The brown thrasher (Toxostoma rufum), also state-listed as special concern, prefers early successional growth and is just one example of a species dependent on this type of habitat.

It is important to note that grassland habitats are not limited to birds—they are also critical to other organisms such as insects and even certain plants. Certain species of butterflies and moths as well as dragonflies require these habitats to complete their life cycle.

Grassland bird and early successional habitats are not depicted on the map, as they are indistinguishable in the aerial photographs that were used for this report. Please refer to the Agricultural Resources map on page 21 instead.

The Natural Diversity Data Base (NDDB) is a compilation of the State's imperiled flora and fauna. NDDB circles on the map represent locations of state-listed species and/or rare habitats. Each circle is one-half mile wide and may contain more than one species or rare habitat. This convention is used to flag their presence while protecting exact locations; sometimes, rare species are the victims of

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A typical woodland vernal pool.

© Tammy Andrews

Black spruce bog, South Norfolk.

© Bruce Frisch

Pitcher plant (Sarracenia purpurea).

© John Anderson

Woodland bog (Knox Swamp).

poaching or are deliberately destroyed by the uninformed. It is important to realize that the circles represent only those species and habitats that are mappable; the NDDB has many additional records on file that lack sufficient locational information and therefore cannot be represented on a map. Plants and animals can be rare for a variety of reasons, the most common ones being habitat loss from outright destruction, habitat change due to natural succession and over-collecting. Non-native invasive species also cause species declines by direct competition for resources and alteration of habitat. Some species are restricted to rare habitat types and are therefore regionally rare. One example is Labrador tea (Ledum groenlandicum), a plant that was abundant in New England during the last ice age, but has become restricted to peat bogs since the glaciers retreated.

Clearly, Norfolk has a variety of ecologically important features, some of which are more common than others. However, little is known about the "potential" areas shown on the map. Areas that may support important natural communities and habitats are just as important to consider as known areas because they, too, may have ecologically valuable elements. By not exploring all Norfolk's natural communities and habitats, we could be losing a wealth of scientific information that would help us better understand the distribution and needs of our flora and fauna. We could also be losing the chance to preserve and encourage the biodiversity that is so important to the health and character of our town.

For recommendations based on the information above, see Chapter 11, starting on page 72. See Appendix 6 for a short discussion of biodiversity and Appendix 9 for a short bibliography.

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Tussock Sedge marsh on Brummgen Brook.

Open Space

© Bruce Frisch

Norfolk's abundant natural resources and biodiversity depend on the quality of its open space—largely a mosaic of unfragmented forests, undisturbed wetlands and fields. Open space is land that has not been developed or built on. Some think of it as space for recreation. For others, it means wildlife habitat, tranquil lakes and woods, beautiful views over forested hills—or that our children have the good fortune to be surrounded by the natural world, to be able to explore a marsh, catch fireflies on summer nights and hear owls calling over a field. All of these are important aspects of open space but certainly not the whole story. Open space also determines the feel of a place and it can protect our environment by affecting air quality and the local climate, helping to keep streams and watersheds clean and diminishing erosion. It can even have an economic value by reducing the need for town services, enhancing property values and supporting forestry and agriculture.

Norfolk is rich in open spaces, and we have grown used to having them as part of our daily lives. The school athletic field, the baseball field, the town green, the snake fence meadow, the meadows along Westside Road, the wooded ridge of Canaan Mountain, Haystack Mountain State Park, Barbour Woods, Great Mountain Forest and Tobey Pond Beach are just a few. Norfolk would be a very different place without them. The map on page 56 shows some of the recreation opportunities in town.

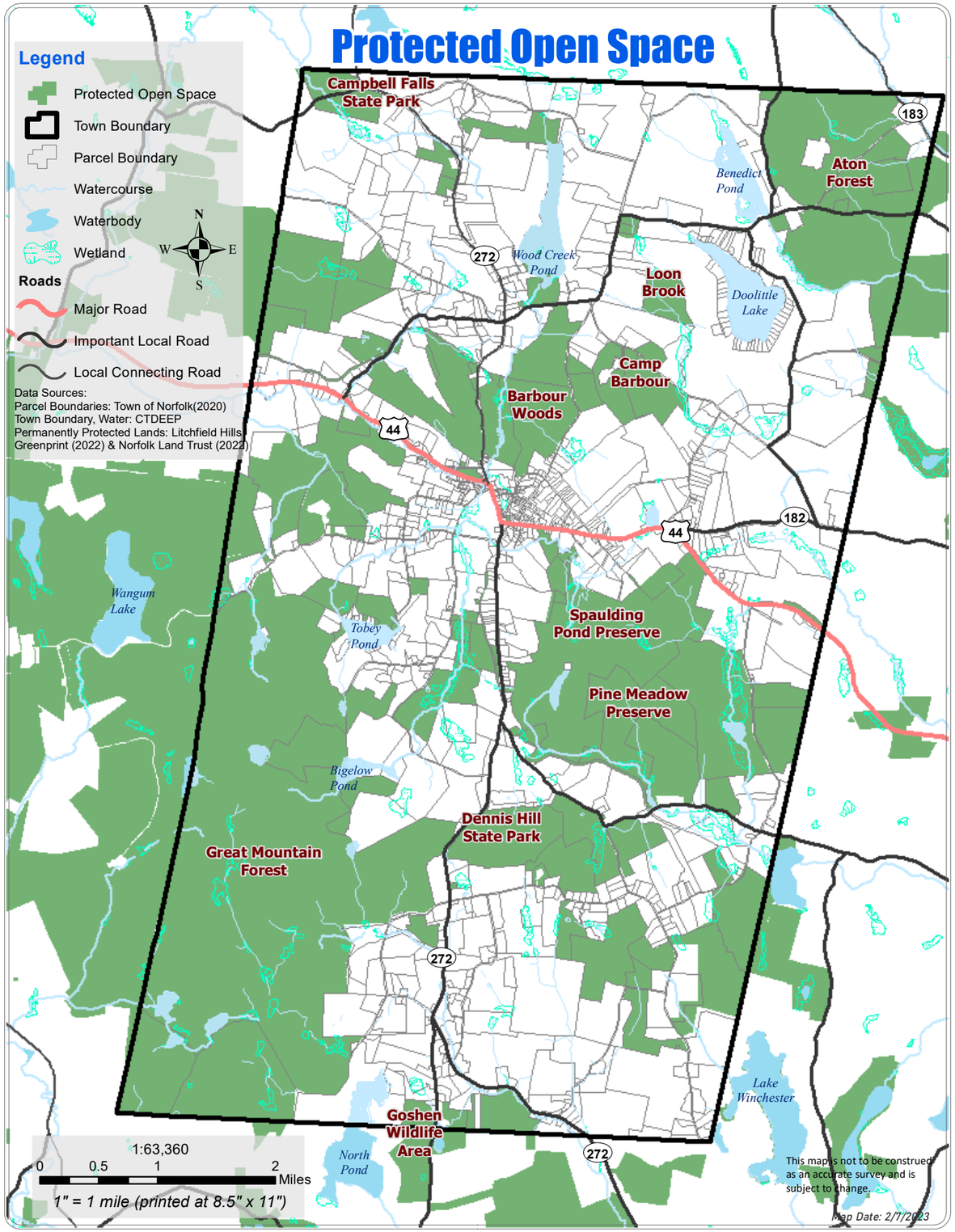
According to several recent government reports, about 7 percent of the state was agricultural fields and 59 percent was forested, but only half of that forestland was un-fragmented interior (aka core) forest best suited for wildlife habitat. As reported in Connecticut's 2020 Forest Action Plan, Connecticut's forests have remained relatively stable in the past 10 years. Forest cover has decreased in the state by only 1 percent since 2013, covering about 58 percent of the state. However, the report notes that fragmentation and a trend toward smaller parcels of land means that large blocks of mature forest are increasingly in short supply. The greatest loss of forest habitat is in this category, with a 16 percent reduction between 1985 and 2015. Together, the towns of the northwest corner contain most of the state's remaining unfragmented forest; Norfolk's large forest tracts represent a rare and disappearing resource.

Forest fragmentation is still a conservation concern in Norfolk. The term Core Forest has come into use to describe large blocks of forest land (often at least 250 acres in size). Core forests are necessary for many species that require large areas, such as forest-interior birds and large animals like some of our large predators: bear, moose, coyote and fisher. Larger forests are also likely to contain more biodiversity given the greater connectivity of habitats with less disturbance.

The findings of the 2020 Governor's Council on Climate Change, Working and Natural Lands Working Group, Forests Sub-Group emphasized the importance of forests and trees in the state, providing many benefits to people and nature, even as forest resiliency is threatened. One of the report's major recommendations was to adopt a statewide "No Net Loss of Forest." This included keeping forests as forests; protecting healthy, intact forests; offsetting all planned or permitted forest losses; providing financial incentives for stewardship, forest retention and forest resiliency, and protecting urban forests, building more parks and planting more trees.

The State of Connecticut has set the modest goal of preserving 21 percent of the state as open space by 2023. A new federal goal was recently established setting the mark at 30 percent of the nation's land by 2030. In contrast, in Massachusetts the Harvard Forest has proposed a sweeping program calling for the protection of 50 percent of the state's forested land, most of which is in the western part of the state. This would protect extensive wildlife habitat, plant communities and watersheds; connect forest preserves and reduce fragmentation, and offer opportunities for scientific study, education, sustainable timber harvesting and recreation. The Town of Norfolk is doing a good job with nearly 33 percent, approximately 9,719 acres, of its lands protected open space.

As of 2015, Norfolk had 24,858 acres of forestland or approximately 84 percent of the town (based on a total town acreage of 29,663 acres). There were 1,359 acres of agricultural fields or about 4.6 percent of the town. In addition, 5 percent was developed and 2 percent was turf and grass. This can be compared to statewide land cover statistics: forest cover 59 percent, agricultural field 7 percent, developed 19 percent, and turf and grass 8 percent.



Map Created by: Stacy Deming, GISP Housatonic Valley Association

Maintaining open space

Open space can be vulnerable to development, depending on its ownership and legal status. There are three main categories, with various levels of protection: protected open space, managed open space and Public Act 490 land.

Permanent open space is protected at the highest level, through a conservation easement or deed restriction. It is land on which development is limited or prohibited and can include properties with public access as well as properties for private use only. Conservation easements that limit development of a property offer the most enduring level of protection because the easement is transferred with the deed to each subsequent owner. Organizations that hold such easements are responsible for their enforcement and include the federal government, the state of Connecticut, Aton Forest Incorporated, the Housatonic Valley Association and the Norfolk Land Trust. Although development rights are given up under conservation easements, the land itself remains the property of the owner.

In Norfolk, owners of these lands include many private individuals and non-profit organizations like Great Mountain Forest Corporation and Aton Forest Incorporated. Such land continues to produce economic value for the community through timber harvest, research opportunities, hunting, public recreation or reduced costs of town services and, at the same time, protects watersheds, air quality, many different types of habitat and the rural character of the town. Some of the land that is currently under conservation easement in Norfolk also carries a PA-490 designation (see below), so there has been very little change in tax status due to easement. And studies by the Trust for Public Land and the American Farmland Trust (see bibliography) suggest that preserving open space can actually be a net gain for a town.

Managed open space is land that is currently used as open space and will probably remain so, but which has no permanent protection. This includes property that belongs to a wide variety of organizations such as the Doolittle Lake Company, the Old Newgate Coon Club, the Norfolk Land Trust, the Nature Conservancy, the Connecticut Rivers Council (Boy Scouts of America), Aton Forest Incorporated and the Town of Norfolk.

PA-490 land is tax abated, but not protected. The state of Connecticut established this program under Public Act 490 (PA-490) to encourage preservation of agricultural, forested and open lands. Such land is taxed at a lower rate to reflect its current use, not its potential value as developed property. It is important to know that PA-490 lands have no protection beyond the intentions of the owner, who can sell or develop it at any time, albeit with a penalty in some circumstances. There are approximately 13,090 acres of PA-490 land in Norfolk as of 2022 or about 44 percent of lands in town, almost all of it in forestland designation (12,290 acres), and the remainder in farmland designation (800 acres). Although the PA-490 statute established open space as a category of land that should be promoted through reduced property tax rates, Norfolk's regulations do not designate it as such. By doing so, the town could encourage open space preservation without having to acquire it.

Protected open space map

The map on page 52 shows land (green) that has some degree of protection, such as a conservation easement (the highest form of legal protection), ownership by a non-profit conservation organization or a deed restriction. Lands under PA-490 are not shown on this map and vary from year to year. Some of the lands shown on the map are owned by non-profit conservation organizations, formed to preserve open space and natural resources, but lack the protection a conservation easement supplies.

Core Forest Habitat map

The map on page 54 shows Core Forest Habitat. Core forests represent a forest (deciduous & coniferous) of at least 250 acres. Core forests provide a stable home for species, protect biodiversity and allow species a wider range to search for shelter or food.

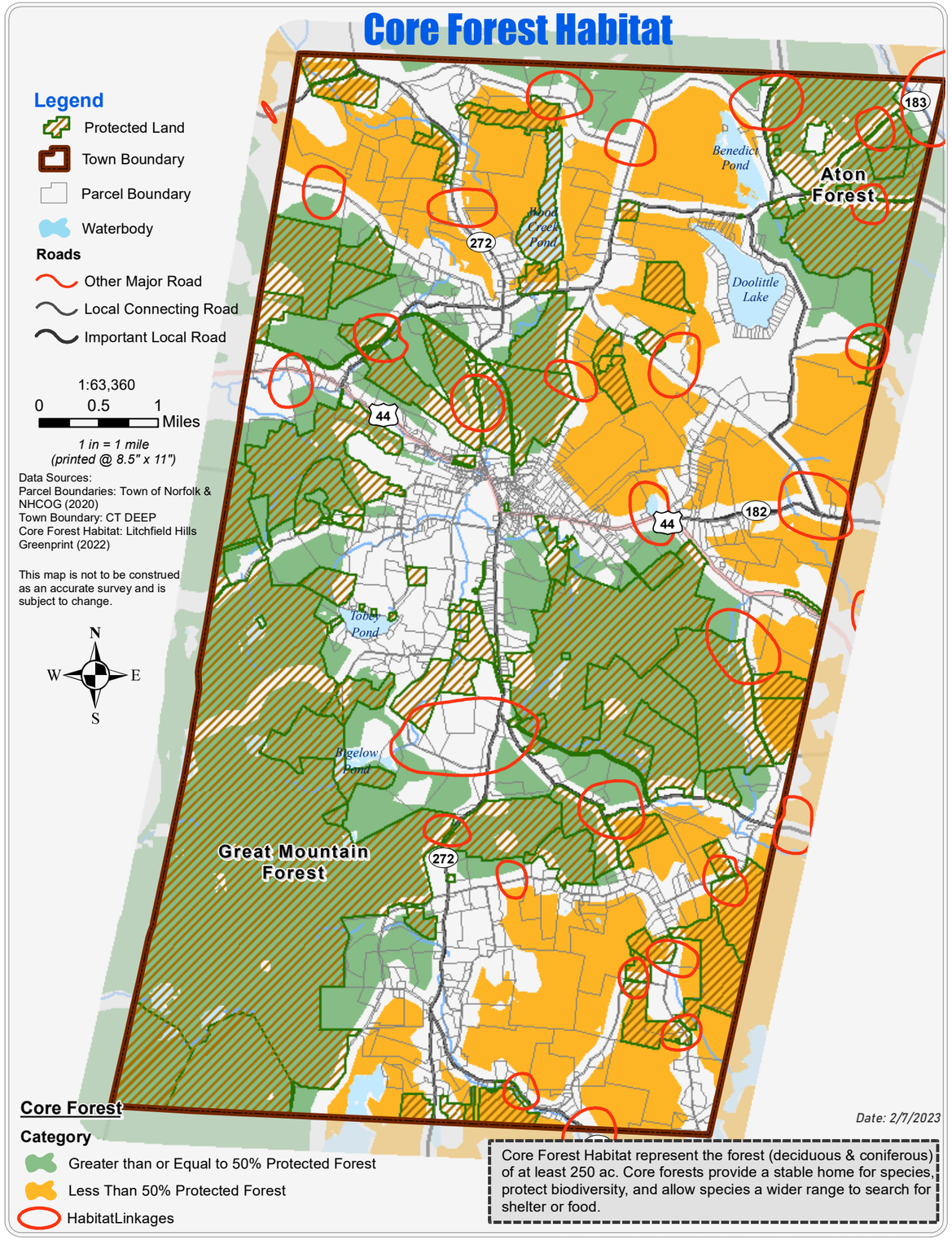
Recreation opportunities map

The map on page 56 shows some of the recreational opportunities in Norfolk on open space lands. Public access trails are shown, but many are on private preserves, which may require sign-in or permission to use. The fact that properties are shown or labeled on this map is no indication that the public has free access to these lands.

For recommendations see Chapter 11 starting on page 72. A list of lands open to public recreational use appears in Appendix 7 and Appendix 9 contains a short bibliography.

City meadow with Haystack Mountain in the distance.

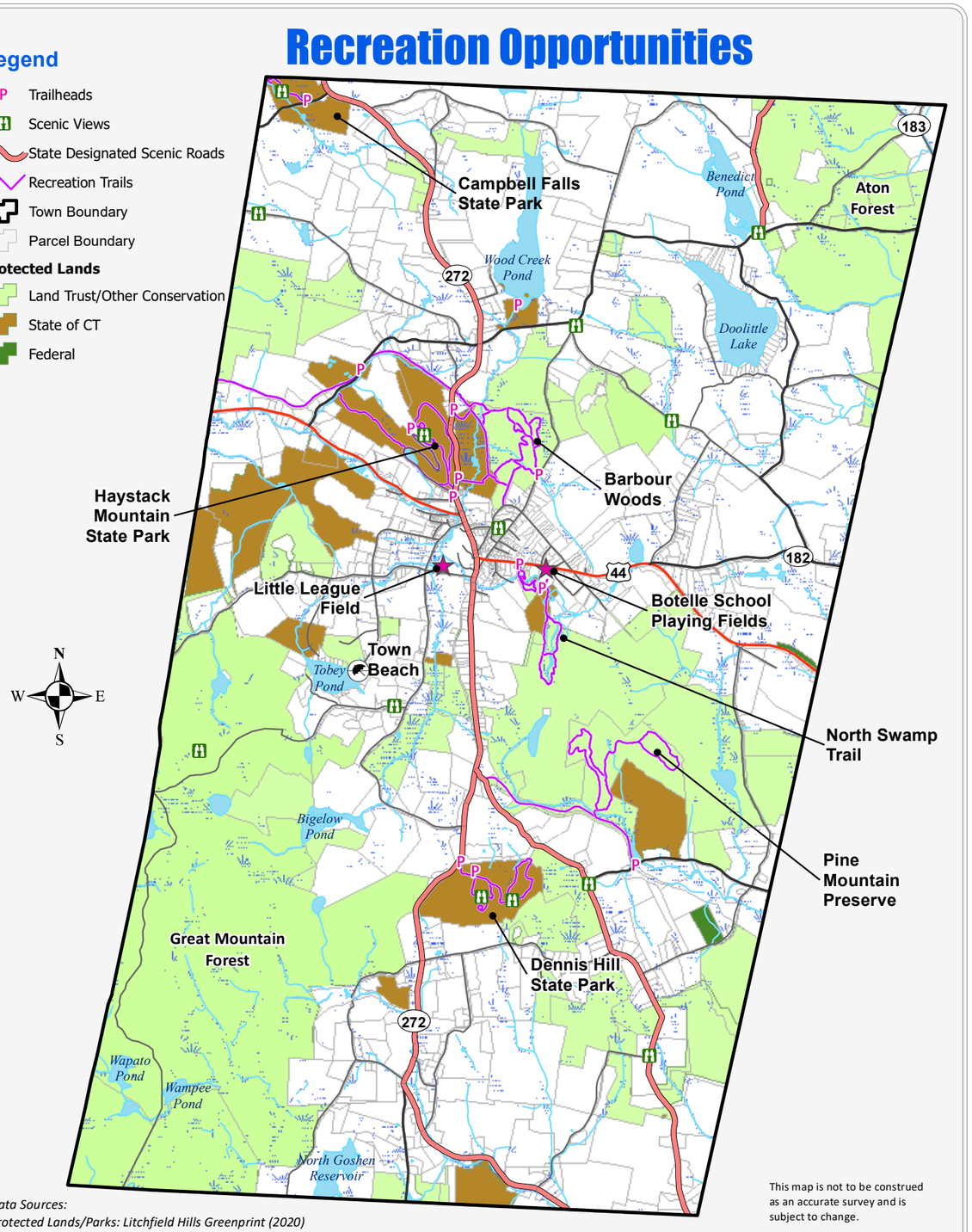
Core Forest Habitat



Map Created by: Stacy Deming, GISP Housatonic Valley Association

Mergansers (Lophodytes cucullatus) enjoying a Norfolk swamp.

Recreation Opportunities



Data Sources:
Protected Lands/Parks: Litchfield Hills Greenprint (2020)
Trails, POI & Trailheads: NHCOG & HVA (2018)
Scenic Roads: Town of Norfolk (2019)
Parcel Boundaries: Town of Norfolk (2020)
Town Boundary: CT DEEP (2017)

This map is not to be construed as an accurate survey and is subject to change.

1" = 1 mile (printed at 8.5" x 11")

Date: 2/7/2023

Map Created by: Stacy Deming, GISP Housatonic Valley Association

Clockwise from top left: Girl meets frog, © Shelley Harms; On the lake, © Christopher Little; Mountain bikers, © Christopher Little; Valley view, Courtesy Great Mountain Forest

Scenic Resources

© Katherine Griswold

Norfolk's Scenic Views

When traveling throughout Norfolk, one cannot help noticing its natural beauty. The myriad hills surrounding the village offer views to ridges and across valleys, fields and woods. The many unfettered views help give one a sense that nature here in Norfolk is accessible to all who want to enjoy it.

A 1911 article from the Winsted Evening Citizen says, "If there is one place upon this green earth where one cannot help gaining light and inspiration from nature, living face to face with her, upon whose quiet heights 'day unto day uttereth speech and night unto night showeth knowledge,' where the tranquil earth rejoices continually in the beauty of her being, and one has time to realize how good life is, that is none other than the beautiful Village of Norfolk." Norfolk's natural beauty has changed very little since that article was written almost 100 years ago.

What makes a view scenic can be very subjective. Everyone has his or her own ideas about beauty. To identify scenic views, committee members held meetings with groups of local people. When two or more people picked the same view, it was accepted as a scenic view provided that its viewpoint (the point from which it could be seen) was accessible by a paved road.

After the views and their viewpoints were determined, the information was used to create a map showing scenic resources. It appears on the opposite page.

The scenic features were then used to determine and map gateway views (views seen along the roads where they enter Norfolk), scenic views of high visibility and scenic views of high prominence. The resulting map appears on page 63. A prominent scenic view is a view that envelops most of one's field of view, such as Haystack Mountain seen from downtown above the city meadow. Traveling north on Route 272, before entering town, there is a beautiful gateway view up Hall Valley. Looking west and south from Litchfield Road across the open fields in the Westside Road valley toward Crissey Mountain is a beautiful, changeless view that perfectly represents Norfolk's natural beauty. Ridgelines, of which Norfolk has many, are both highly visible and highly prominent scenic features.

These uncluttered views—of open fields, forested hills and ridges that have been left mostly in their natural state—are an integral part of what makes Norfolk special.

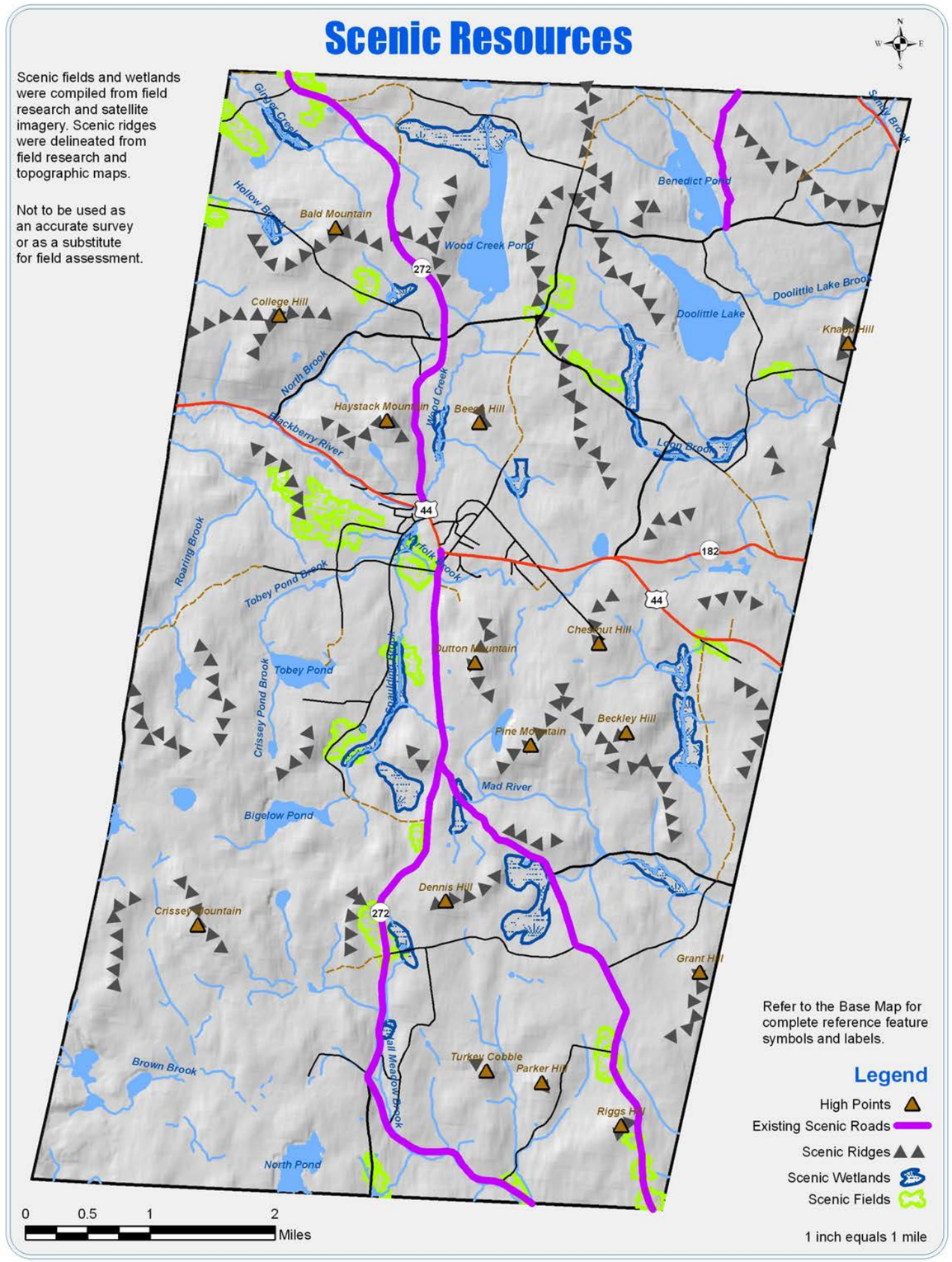
Norfolk's Rural Roads

Norfolk's roads form a 54-mile network that has remained relatively unchanged over the years (8 miles remain unpaved). Residents and visitors using them can still enjoy a wealth of wildflowers, shady forests, streams and ponds, fields, stone walls and boulders, wildlife and historic places while walking, running, cycling, riding on horseback or in a carriage, or simply going somewhere in a car.

According to Norfolk's 2000 town plan, both its town roads and state highways "are an important aspect of the overall attractiveness of the town." In 2005, the town adopted a scenic road ordinance stating that "the scenic and rural roads of the Town of Norfolk are irreplaceable resources," and providing that, either in response to a petition from property owners who live along a road or on its own initiative, the Planning and Zoning Commission may designate a road or road segment as a scenic road. This designation means that the road must be maintained in a way that preserves its scenic characteristics. Any road work beyond routine or emergency maintenance requires the town to notify landowners along the road and give them a hearing. Thus far, two roads, South Sandisfield Road and Winchester Road, have been designated town scenic roads.

© Katherine Griswold

Clouds mirrored in sunlit water.



© Katherine Griswold

View of Kelly Swamp from Winchester Road, with Dennis Hill in the background.

The state scenic highway statute is similar. Route 272 from Goshen to the Massachusetts line was designated a state scenic highway in 1996.

The town ordinance specifies that, to qualify for scenic road status, a road must possess at least one of the following characteristics:

- It is unpaved.
- It is bordered by mature trees or stone walls.
- It is 20 feet wide or less.
- It offers scenic views.
- It blends naturally into the surrounding terrain.
- It parallels or crosses over streams or other water.

Other features that must be considered are:

- Historic significance.
- Recreational uses.
- Whether the road is near open space, farm or forest land.
- Wildflowers and attractive vegetation.
- Notable geologic or other natural features.

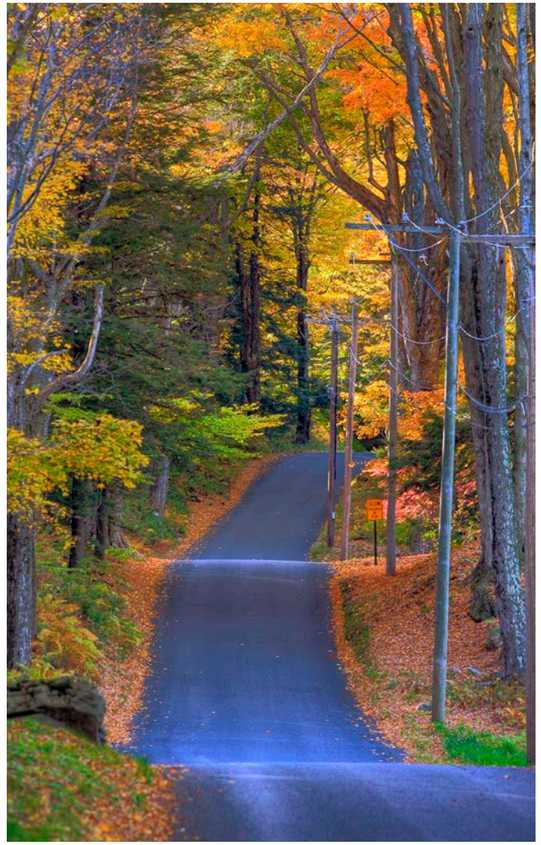
Survey of Roads

In 2007, subcommittee members and other volunteers surveyed all Norfolk's rural town roads to determine whether they have any or all of the characteristics listed in the scenic road ordinance. They also surveyed all of Norfolk's state highways, to ascertain whether they possess the characteristics that would qualify them as state scenic highways. They drove the length of each road and checked for each of the qualifying characteristics listed in the ordinance or the statute, and measured the width of the town roads to determine whether they were 20 feet wide or less. The list of roads also was reviewed by Richard Byrne of the Norfolk Historical Society for features of historic interest. The 15 private roads in Norfolk are not included; they are owned and maintained by individuals.

The inventory, which appears in Appendix 8, found that all Norfolk's rural roads possess most of the characteristics that qualify a road for scenic designation.

© Shelley Harms

Roadside stone walls often shelter wildlife.



© Christopher Little

Blue highway, Norfolk-style (Mountain Road, facing west).

Four roads have all 13 characteristics listed in the ordinance, both essential and discretionary: Beckley Road, Elmore Road, Meekertown Road and South Sandisfield Road. An additional three roads have all seven qualifying characteristics and only lack one of the secondary characteristics: Barry Hill Road, Gamefield Road and Lovers Lane.

In addition, the survey conducted by the subcommittee concludes that all the state highways passing through Norfolk possess most of the characteristics required of a state scenic highway. Characteristics that qualify a state highway for scenic status are similar to those for scenic roads.

Dark Night Sky

Stargazing, counting falling stars, finding the Big Dipper and wishing on a star are part of humankind's connection with the universe. A National Park Service survey found that 94 percent of park visitors agreed that "a dark night sky is important to that park's purpose and visitor experience."

Much of Norfolk is still dark at night. Residents can view the stars and events such as meteor showers and the northern lights. However, the lights of Winsted and Torrington are visible in parts of Norfolk, and the lights of Norfolk's town center impede viewing of the stars.

The proliferation of artificial outdoor light use, particularly light projecting into the sky, has caused a new form of environmental degradation: light pollution. Light pollution is the scattering of light into places and the sky where it is not wanted or needed. It is caused by unshielded lights, spotlights and ornamental lights that direct light up or at wide angles.

Under ideal conditions, about 2,500 stars are still visible in the night sky in the United States but only 10 percent of Americans can see the majority of these stars regularly from where they live, according to the National Parks and Conservation Association. NASA says that two-thirds of the world's population can no longer see the Milky Way, and within 10 years, the stars could fade from view entirely in all but the most remote locations.

Migratory birds and sea turtles are known to rely on the moon and stars for guidance, and many are killed when attracted by artificial light sources. Studies have shown that artificial light may adversely affect foraging, reproduction and hormone levels in other wildlife. Norfolk's dark night sky is an important resource.

A bibliography appears in Appendix 9 and recommendations based on the data in this chapter and Appendix 8 appear in Chapter 11 starting on page 72.

© Katherine Griswold

Winter scene along Westside Road.

Town Character and Gateway Viewpoints

Map Key*	Viewpoints	Scenic Views
G1	North Colebrook Road	West to Benedict Pond
G2	Colebrook Road (Route 182)	West to tree-lined rural road
G3	Greenwoods Road East (Route 44)	West to farm field, winter view of Chestnut Hill and Beckley Hill
G4	Grantville Road	West to rural road, old farm, stone walls
G5	Winchester Road	North on rural road and houses, winter view west
G6	Litchfield Road (Route 272)	North to farm fields and forested hills
G7	Goshen East Street	North to Hoover Pond and Arcadia Farm, winter views east to Turkey Cobble, Parker and Riggs Hills
G8	Mountain Road	East to unpaved rural road through forest
G9	Greenwoods Road West (Route 44)	East to Haystack across field, College Hill and unnamed north central ridge
G10	North Street (Route 272)	South across farm field to Haystack, College Hill and Bald Mountain
V1	Wheeler Road	Winter view north to unnamed ridge, east to unnamed north-central ridge
V2	Bald Mountain Road	Winter views to Bald Mountain and distant western ridges, views of Haystack, farm fields, winter view to unnamed north-central ridge
V3	Route 272 north of Ashpohtag Road	Haystack
V4	Doolittle Dr north of Ashpohtag Road	Unnamed north-central ridge, farm fields, orchard, stone walls
V5	Ashpohtag Road west of Bald Mountain Road near North Brook crossing	Haystack
V6	Route 272 south of Ashpohtag Road	Eastern view of unnamed north-central ridge
V7	Loon Meadow	Loon Brook wetland
V8	North Street (Route 272) at dry dam	View across dry dam to Beech Hill & Loon Meadow, unnamed north-central ridge
V9	Route 44 at Memorial Green	Panoramic views to Haystack, Buttermilk Falls
V10	Sunset Ridge	Winter views to Dutton Mt., Haystack, Beech Hill & unnamed north-central ridge
V11	Station Place, downtown	Haystack, College Hill
V12	Laurel Way	Historic houses, winter views of Chestnut Hill and Dutton Mountain
V13	Town Green, Routes 44 and 272	Historic district, Haystack
V14	Yale gazebo	Yale school grounds, distant western ridges
V15	Near Botelle School	View across fields to Dutton Mountain
V16	Rtes 44 & 182 (George's Garage)	Pond Hill Pond, south to wetland, unnamed north-central ridge
V17	Mountain Road at Westside Road	Haystack and Dutton Mountain
V18	Mountain Road at Yale school	Winter views south, open fields, Swift Hill, Dennis Hill, Dutton Mt., Haystack
V19	Route 272 south of Mountain Road	Winter views southwest to Crissey Ridge
V20	Westside Road	Numerous views to Dutton Mt., Haystack, Swift Hill, stone walls & farm fields
V21	Route 272 north of Winchester Road	Western view to Crissey Mountain across Westside valley
V22	Westside Road	North view across farm fields to Dutton Mountain and Swift Hill
V23	Route 272 at Dennis Hill	Panoramic view northwest, Swift Hill
V24	Grantville and Winchester Roads	Kelly Swamp, Dennis Hill
V25	Bruey Road at Old Goshen Road	Panoramic view south across field toward Turkey Cobble and Parker Hill
V26	Bruey Road	Stone walls, fields, winter views to Grant Hill and Dennis Hill
V27	Bruey Road at Winchester Road	Dennis Hill
V28	Old Goshen Road at Smith Road	Stone walls, fields, pine woods
V29	Winchester Road south of Parker Hill	Panoramic view south across Broadfield Farm field to Parker and Riggs Hills

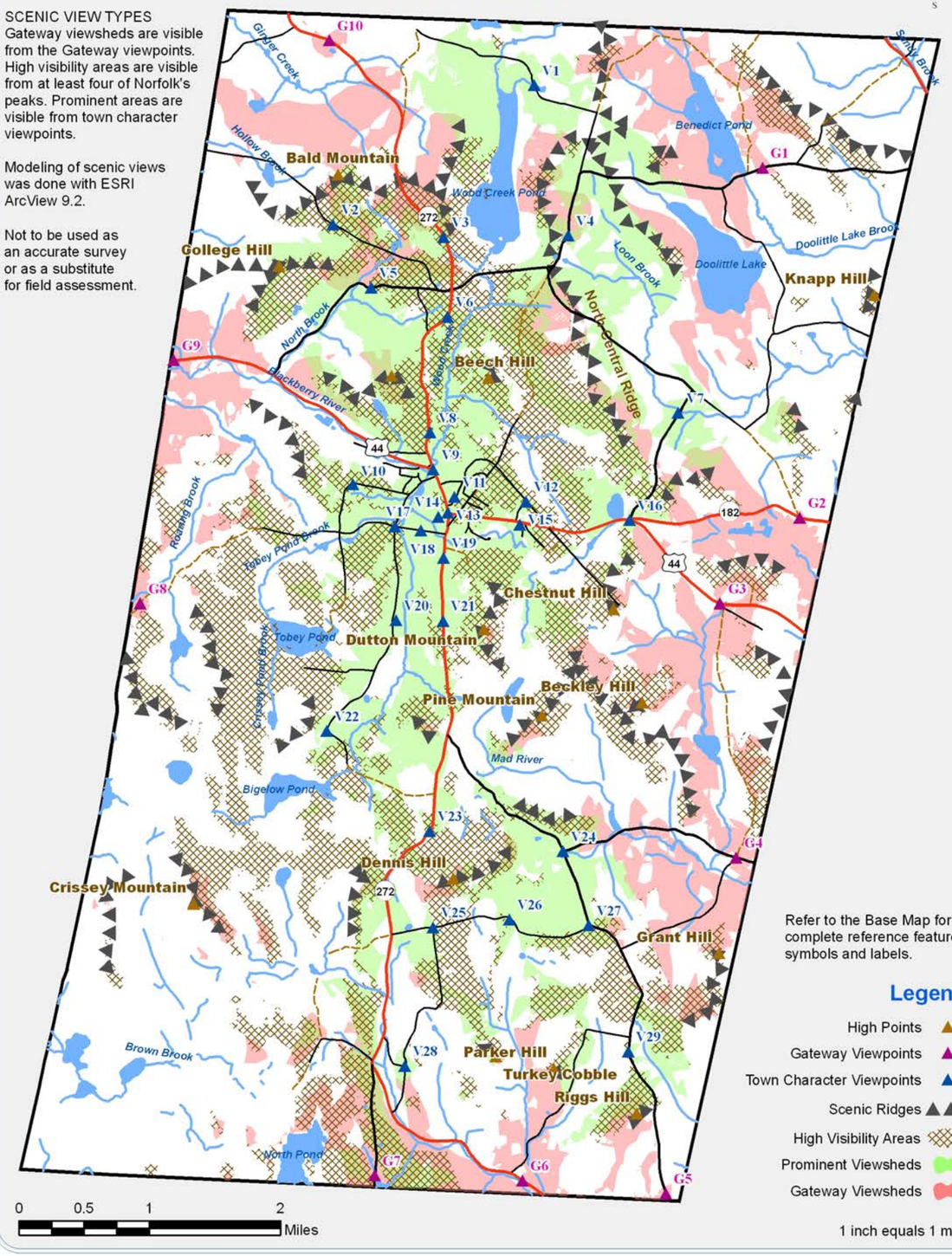
* G = Gateway viewpoint * V = Town character viewpoint

Scenic Views

SCENIC VIEW TYPES
Gateway viewsheds are visible from the Gateway viewpoints. High visibility areas are visible from at least four of Norfolk's peaks. Prominent areas are visible from town character viewpoints.

Modeling of scenic views was done with ESRI ArcView 9.2.

Not to be used as an accurate survey or as a substitute for field assessment.



Refer to the Base Map for complete reference feature symbols and labels.

Legend

- High Points
- Gateway Viewpoints
- Town Character Viewpoints
- Scenic Ridges
- High Visibility Areas
- Prominent Viewsheds
- Gateway Viewsheds

Map prepared on 12/31/08 by Kirk Sinclair.

Historic Resources

When the tract of land that would become the township of Norfolk was divided into 53 rights of 400 acres each and offered for sale by the Colony of Connecticut in 1738, few buyers were interested. The Green Woods, a dense hemlock forest riddled with swamps and rock ledge, did not appeal to prospective settlers.

It took six years for the first of the original proprietors, as the buyers of these rights were called, to settle in Norfolk. In 1744 Cornelius Brown built his log dwelling just east of the Norfolk-North Canaan town line, probably choosing that location (**A-1** on the Historic Resources map opposite) for its proximity to the relatively well-established community of Canaan. Although settlement was slow, by 1758 with 43 families in residence the community was sizable enough to petition the General Assembly for town privileges. On October 12, 1758, Norfolk was incorporated and the business of civic life began in earnest.

In one of the first actions the town took following its incorporation, villagers voted to build a meeting house and hire a preacher. The meeting house was raised in 1759, its chosen location carefully calculated and measured to be near the geographical center of all the settlements. In 1760 the Church of Christ was gathered, and the following year Ammi Ruhamah Robbins accepted the call. The small wooden church, painted peach-blow pink, was not fully completed for 10 years. By the end of Rev. Robbins' pastorate in 1813, it had become too small for the growing population of Norfolk, and a more commodious and elegant church designed by noted church architect David Hoadley; it overlooks the Green today (**H-1**). For (H-1)-(H-23), see Norfolk Center map on page 65. For all other letters refer to the map opposite.

In 1757 the oldest of the town's burial grounds, Center Cemetery (**M-1**), was established on Old Colony Road. Here can be found the grave of James Mars, who in 1798 at the age of eight years was the last slave bought or sold in Norfolk. The gravesite is now a stop on the African-American Freedom Trail in Connecticut. Other cemeteries include Pond Town (**M-2**), located near Doolittle Lake; South Norfolk Cemetery (**M-3**), opened in 1790, and Grantville Cemetery (**M-4**) on Winchester Road near the hamlet of Grantville. Remnants of a burial ground can also be found in Meekertown (**A-2**), once a well-populated settlement in the southwest corner of the township.

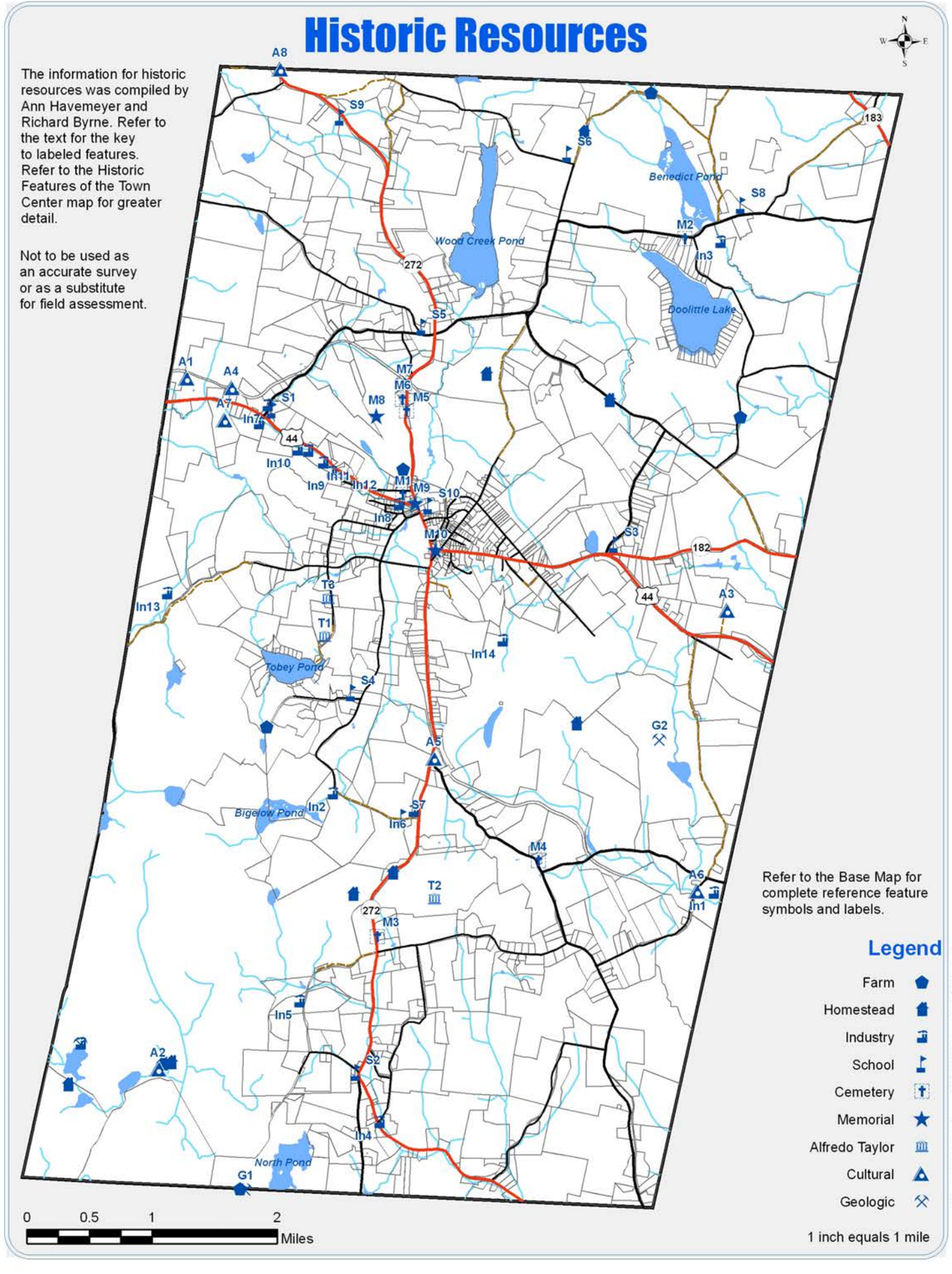
Schools

Education was an early priority for the residents of Norfolk. Town leaders voted in 1767 to cover the expense if 10 or more families would set up an approved school. Given Norfolk's widely scattered settlement, this was intended to encourage the building of neighborhood schools; later the required number of families was reduced to three. The district school system eventually grew to include 11 grammar schools, each managed by a local school committee. Schoolhouses were simple one-room structures with a wood stove providing heat. The district schools served a varying number of children, and teachers were usually boarded in neighboring homes.

The West Norfolk Schoolhouse (**S-1**), now a private residence, opened in 1839. After an addition was built in 1900, it was the only two-room schoolhouse in the outlying districts. Also still standing as private residences are the South Norfolk School (**S-2**); the East Middle District School (**S-3**), known as Pond Hill School, and the Crissey District School (**S-4**). The North Middle School (**S-5**) has been restored as the Little Red Schoolhouse. Foundations remain of the Norton District School (**S-6**), sometimes called the Curtiss Family School; the South Middle School (**S-7**); the Pond District School (**S-8**), and the North Norfolk District School (**S-9**). The South End School, also known as the Grantville School, was moved from its original site on the southeast corner of Winchester and Schoolhouse Roads to a site farther north on Winchester Road and was altered to a private residence.

The most populated of the school districts, the Center District required the construction of increasingly larger facilities. The original schoolhouse built on the east side of the Green in 1777 was replaced in 1819 with a building known as the Schoolhouse and Conference Room just south of the Church of Christ. In 1886 a four-room schoolhouse was built on Shepard Road. When it became too small, a two-story brick building was built just south and east of the Catholic Church. Center School (**S-10**) was demolished following the opening of Botelle Elementary School in 1970. A commemorative fountain is all that remains.

For those going beyond grammar school, the Norfolk Academy (**H-2**), now the Norfolk Historical Museum, was built on the east side of the Green in 1840. The first floor of this building also functioned as the Town Hall. In 1884 the



Robbins School, a private secondary school, was founded in memory of Norfolk's first pastor, Ammi Ruhamah Robbins. Located on the site of the original Robbins Parsonage, it closed its doors in 1912. The former headmaster's residence (**H-4**) and schoolhouse (**H-3**) are now private dwellings.

Churches

Although the Church of Christ initially served the needs of the entire community, it was not long before other religious groups began to make an appearance. An Episcopal Society was organized as early as 1786 with five members. Served by itinerant missionaries who faced difficult travel to the isolated town, the congregation remained small, and it was not until 1885 that regular services were held. The erection of the Church of the Transfiguration (**H-22**), a summer chapel on Mills Way, followed in 1894.

Baptists had been active in the north part of town since the First Baptist Society was organized in 1812 with members from Colebrook, Canaan, New Marlboro and Norfolk. In 1876 they built the North Norfolk Chapel in the northwest corner of the township (**A-8**).

The first Catholic mass was held in Norfolk in 1836 following the arrival of the Ryan family, who established a woolen mill in town. The handful of Catholics worshipped in the Ryan home and in the woolen mill until 1859 when the Church of the Immaculate Conception (**H-21**) was built. By then Roman Catholics numbered 18 percent of the town population. The adjacent rectory was constructed only after Norfolk became an independent parish in 1889. As Catholicism flourished, the church was enlarged and transformed in 1924 by architect Alfredo Taylor. The church acquired three cemetery areas on North Street: the Old Cemetery (**M-5**) given to the parish by the Ryan family, St. Mary's Cemetery (**M-6**) located across the street and additional land given in memory of William O'Connor (**M-7**).

© Julie Schamberg

Church of Christ Congregational.

1840 marked the beginning of Methodist worship in Norfolk. The church, built on North Street in 1841, was a mission church served by a circuit minister until about 1900 when it acquired its own pastor. Methodist services were also held at Pond Hill and North Norfolk. Sunday afternoon church services were held on the steps of the Aetna Silk Mill for families who lived on what was known as Patmos Island, the site of several factories. Financial difficulties brought an end to Methodist worship in Norfolk, and in 1918 the congregation merged with that of the Church of Christ. The church is now a private residence (**M-23**).

Industry

The growth of both the Catholic and Methodist congregations in the second half of the nineteenth century reflects the rise of industry in Norfolk. The early settlers of Norfolk had established a sawmill (1750) and a grist mill (1757) to provide for the necessities of shelter and food. Both were located at Buttermilk Falls. Tanneries were built to convert hides into leather. The Blackberry River provided a source of power enhanced by water wheels and dams. Settlers in outlying areas took advantage of the many brooks running through the Norfolk hills to build their own mills and tanneries. Scattered throughout town are the foundations of several sawmills (**In-1, In-2, In-3**) and tanneries (**In-4, In-5**).

The region was rich in ore (**G-2**), and ample forests provided fuel for the iron industry. In 1770 an iron works was established near the foot of Buttermilk Falls. Blacksmiths (**In-6**) produced horseshoes, parts for farm implements, hardware, nails and other essential tools for building. Legend has it that Norfolk iron was used to manufacture some of the links of the chain that was stretched across the Hudson River near White Plains in an unsuccessful attempt to thwart advancing British troops during the Revolutionary War. Decades later, when the War of 1812 threatened the young republic, Hanchett's Iron Works on the shore of Lake Wangum manufactured anchors for the United States Navy.

The plentiful supply of water power, primarily along the Blackberry River, allowed industry to flourish and by the mid-nineteenth century Norfolk was in its heyday as a manufacturing town. Dams were built along the river and water wheels were installed to harness that power. Initially, most industries were small and individually owned: the Ryan brothers manufactured shears and operated a woolen factory, Jonathan Kilbourn's carding machine produced rolls of wool and, in West Norfolk, Captain John Dewell built the Stone Shop to produce grass and grain scythes. West Norfolk became an industrial hub of sorts, as several large tanneries (**In-7**) and an iron works were located there. Another sizable tannery, the S.D. Northway Manufacturing Company, operated in South Norfolk. The foundation of the old mill wheel is visible today (**In-4**). Among the many items manufactured in Norfolk were wooden bowls and dishes, cheese boxes, clocks and clock plates, scythes, shears, planters' hoes and axles.

As the century progressed, local men organized and financed large companies employing a workforce that increasingly brought immigrant families to Norfolk. Boarding houses were established to accommodate the workers. The Ryan brothers built a large boarding house, later known as Sunset Lodge, now a private residence (**H-18**) on Aetna Lane. The foundations of the Ryan Brothers factory (**In-8**) built in 1850 can still be seen on the south side of the Blackberry River. This site was later occupied by the Aetna Silk Company, organized in 1878, manufacturing silk thread. The Lawrence Machine Company was situated nearby. It occupied the Long Stone Shop, built in 1854. The complex included a foundry and a 42-foot diameter iron water wheel, reported to be the second largest water wheel in the country at the time. The foundations of both the Long Stone Shop and the water wheel can be found today (**In-9**). The plant later housed the Connecticut Arms Company, which produced Springfield rifle muskets for the United States Army during the Civil War. The E.G. Lawrence Iron Works (**In-10**) and Stevens Hoe Factory (**In-11**), formerly a silk mill, were located on Patmos Island, a strip of land surrounded by man-made water channels, just west of the Long Stone Shop.

The Norfolk Manufacturing Company was founded in 1852 for the manufacture of cotton warp, knitting cotton and warping twine. Its factory, known as the Stone Mill, with its iron water wheel was later sold to the Norfolk Hosiery Company whose founder, Edward E. Kilbourn, invented an automatic knitting machine that revolutionized the manufacture of underwear and hosiery. The factory (**In-12**) still stands as part of what was more recently the General Electric Plant. With additional investors and the purchase of a mill in New Brunswick, New Jersey, the company expanded to become the Norfolk and New Brunswick Hosiery Company, at one time a giant in the manufacture of knitted garments, and Norfolk's largest industrial concern.

During the course of the nineteenth century, Norfolk's rich forests were tapped for industry. Hemlock stands were felled to provide bark for the local tanneries. Broad swaths of woodland were cleared and the lumber produced charcoal to smelt iron ore. Some wooded areas still bear traces of the circular hearths (**In-14**) where piles of lumber smoldered. By the late-nineteenth century, vistas that no longer exist today had been opened, while much of the forestland had been reduced to burned-over scrub and brush. Through the careful stewardship and sustainable forest management of such properties as the Great Mountain Forest, the Green Woods have regenerated, and timber harvesting is once more an economically viable business.

© Rebecca Ward

Infinity Hall, built as the Village Hall in 1883.

An 1828 census recorded that 191 of 232 families in Norfolk lived on farms. Many operated sawmills and grist mills to supplement income. Some were even more enterprising. In South Norfolk, about two dozen families raised mulberry trees on their farms, harvesting silk from silk worms. Sheep provided wool for domestic industry. Butter and cheese were made in great quantity and were an important source of income to farmers whose land was not suitable for cultivation. In 1844 Auren Roys wrote in A Brief History of the Town of Norfolk that an average of 200,000 pounds of cheese was made in Norfolk annually, shipped to market in locally made cheese casks. The foundations of a cheese box factory (**In-13**) can be found off Mountain Road. Dairy farming remained a thriving enterprise in Norfolk well into the twentieth century. Breezy Hill Farm on Winchester Road, Bruey Farm and Maple-side Farm operated by the Spaulding brothers on Litchfield Road were among the many farms that delivered fresh bottled milk and cream. The Town Farm (**A-3**) was established in the nineteenth century to provide food and shelter for Norfolk's indigent population.

Transportation

Transportation was critical to the success of both farming and industry. By 1800 the Greenwoods Turnpike (now Route 44) had been completed and became the principal route between the Connecticut and Hudson Rivers for travel and trade. Merchant Joseph Battell strategically placed his store on the turnpike and made a fortune selling thousands of pounds of cheese across the eastern seaboard. His stately residence (**H-12**) known as Whitehouse overlooks the Village Green. Taverns also sprang up along the turnpike to service the needs of travelers. Among the many taverns in Norfolk, three were located at stagecoach stops on the Greenwoods Turnpike: the widow Wilcox operated a tavern at the junction of Greenwoods Road and Laurel Way, once the business center of town known as Beech Flats; the Pettibone Tavern (**H-5**) faced the Village Green, and the Lawrence Tavern (**H-6**) was found at the corner of Greenwoods Road and Mill Street. The Lawrence Tavern also housed the post office where mail was delivered twice weekly. All three taverns still stand and are private residences.

The railroad arrived in Norfolk in 1871. In an effort to boost industry and prevent Norfolk from becoming an abandoned mill town, Egbert T. Butler, then president of the Norfolk Bank (**H-7**), proposed building a railroad through the hill towns of northwest Connecticut. Unlike the north-south rails, an east-west route across the state would have to be circuitous and often at steep grade, two factors that had made its construction seem impractical. Butler paid for a survey to be done and applied for a charter for the Connecticut Western Railroad Company; this was granted by the Connecticut State Legislature in 1866. Ground was broken in Winsted in October of 1869.

The route to Norfolk brought the line through the Grantville hamlet in the southeast part of town and then north along Litchfield Road to the town center where engineers had set the easiest, and least expensive, route across the Village Green. Thanks to the efforts of the Reverend Joseph Eldridge, an alternate route to the east was selected, sparing the Village Green an intrusion that would have destroyed it. Beyond the village center, the tracks wound around Haystack and Bald Mountains, passed through a blasted-out rocky gorge known as Stoney Lonesome (**A-4**) and skirted the precipitous side of Ragged Mountain on the way to East Canaan. A celebration was held on the Village Green in September of 1871 shortly before the last rail was spiked.

The original station in the village center was a simple wooden structure. In 1898 a new station (**H-8**) was constructed of native granite. A sign in brass letters read: Norfolk, the Highest Railroad Station in Connecticut. Two years later another station was built at what was in fact the highest elevation reached by the railroad. Situated a mile south of the Green on Litchfield Road just before the Winchester Road turn-off, it was appropriately called the Summit Station (**A-5**). It later burned down. The train also made a stop in Grantville (**A-6**) and near Ashpohtag Road in West Norfolk. Known for most of its existence as the Central New England, the railroad was never financially successful and ceased to run through Norfolk in 1938.

Summer visitors

The railroad did not prevent the demise of industry in Norfolk, but it did bring an influx of vacationers enticed by company booklets describing the attractive scenery of the Litchfield Hills. This steady stream of summer visitors changed the character of the town, and by the end of the nineteenth century Norfolk had become a fashionable summer resort celebrated for its pure mountain air and fresh spring water. Large hostelries were built. The Stevens House, later known as the Norfolk Inn, opened in 1874 with 57 guest rooms. Many people would spend the entire summer at the Hillhurst Hotel on Laurel Way, some returning year after year. Boarding houses were a popular alternative to the large hotels. Miss Louise Rowland was the proprietor of Fairlawn on Maple Avenue and Cora Brown operated Crissey Place (**H-9**) at the south end of the Village Green. Although the hotels are gone, the two boarding houses are now private residences.

© Rebecca Ward

Yale Music Shed.

Norfolk's appeal only increased with the building of the Eldridge Gymnasium (**H-10**) in 1892, the opening of the Norfolk Downs Golf Links (**T-1**) in 1897, and the building of a country club (**T-3**) in 1916. Carl and Ellen Battell Stoeckel founded the Norfolk Music Festival, attracting thousands of concert-goers to the Music Shed (**H-11**) in the first quarter of the twentieth century. Special trains brought visitors to the Norfolk Agricultural Fair and Horse Show, an annual three-day event held at the fairgrounds on Mountain Road. Swimming at Tobey Pond and carriage rides to the lodge at Lake Wangum on Canaan Mountain or to Tipping Rock (**G-1**) near the Norfolk-North Goshen town line were other popular activities. Sportsmen came for the hunting and fishing opportunities. Many vacationers stayed on, calling upon architectural firms to design country houses. Some built camps bordering Doolittle Lake.

Three state parks were established, helping to ensure the preservation of the town's rural beauty: Ellen Battell Stoeckel sold her property on Haystack Mountain to the state, building a stone lookout tower (**M-8**) and a roadway for access; the White Memorial Foundation created Campbell Falls State Park Reserve in 1923, and Dr. and Mrs. Frederic Dennis gave their 240-acre estate known as Dennis Hill (**T-2**) to the state in 1935.

Summer was not the only recreational season in Norfolk. In the 1930's the town became known as the winter sports center of Connecticut. Following the 1932 Olympics held in Lake Placid, the newly-formed Norfolk Winter Sports Association sponsored an annual ski-jump competition, which drew some of the nation's best skiers to compete on the natural slope jump (**A-7**) built without scaffolding on the side of Canaan Mountain.

Notable buildings

By 1900 Norfolk had an unusual number of public services that made it an especially attractive place to call home. It was one of the first towns in Connecticut to have telephone (1894) and electrical service (1897). In 1896 the water system was installed, piping fresh water from Lake Wangum to the center of town, and in 1899 a public sewer system was completed. The town center had been enhanced with the construction of an attractive railroad station (**H-8**). A Village Hall (**H-13**) was built in 1883 and provided commercial space as well as a theater upstairs. With the completion of the Royal Arcanum building (**H-19**) in 1904, housing the newly-founded Norfolk Volunteer Fire Department, and of the Hardware Store in 1906, it was reported in the local press that Norfolk could boast one of the finest business districts of a town of its size in Connecticut.

The Royal Arcanum building (**H-19**) is one of more than 50 buildings and houses built in the early years of the twentieth century that were designed by architect Alfredo Samuel Guido Taylor, who arrived in Norfolk just as the town entered its heyday as a popular summer resort.

© Rebecca Ward

Norfolk Library, built in 1888 as a gift to the town.

Of the many architects who worked in Norfolk, no one left a greater imprint on this small village, and his work in Norfolk has been designated a Thematic Group on the National Register of Historic Places. Along with residential commissions and commercial projects, Taylor designed the Norfolk Country Club (**T-3**), the Dennis Pavilion (**T-2**), the Norfolk Downs Shelter (**T-1**), the remodeling of the Church of the Immaculate Conception (**H-21**) and, in 1921, the War Memorial (**M-9, H-20**) on the small triangle of green opposite the Catholic Church. Other monuments built to honor Norfolk's sons and daughters who gave their lives for their country are the Revolutionary War Memorial (**M-9**) near Buttermilk Falls and the Soldiers Monument (**M-10**), erected in 1868 on the Village Green.

When Frederic Dennis wrote his book The Norfolk Village Green in 1917, he hoped that it would inspire future generations to preserve the beauty of what had become a magnificent visual centerpiece of the town and the epitome of the classic New England green: a broad expanse of grass shaded by majestic trees and dotted with monuments over which soared the elegant white steeple of a historic church. The Green had been the center of communal life and a place of gathering since the town was founded. Although the triangle that was to become the Green had been cleared of the original growth of hemlock and maple, plowed and leveled, and planted with elms as early as 1788, it was not until the second half of the nineteenth century that it began to take on its distinctive appearance. When the town voted in 1849 to enclose the Green with a fence, those who had been accustomed to driving their vehicles across it objected. In compromise, the north was fenced and the south left

open. The following year William Rice, principal of the Norfolk Academy (**H-2**), began a program of tree planting that included one of every species of tree native to Norfolk. In the late nineteenth century winding footpaths, rustic twig furniture and covered gateways gave the Green a particular charm as townsfolk gathered for mid-summer concerts and Fourth of July fireworks. A new library (**H-14**), built in 1888 through the generosity of Isabella Eldridge, and Battell Chapel (**H-15**), erected by the Battell family in memory of Joseph and Sarah Battell, provided an attractive backdrop. At the southern tip of the triangle, Battell Fountain (**H-16**), carved in granite and designed by Stanford White with bronze-work attributed to Augustus Saint-Gaudens, was the gift of the Eldridge sisters, whose house and gardens faced the Green. The Village Green is now the center of the Norfolk Historic District (see Historic Features map on the opposite page).

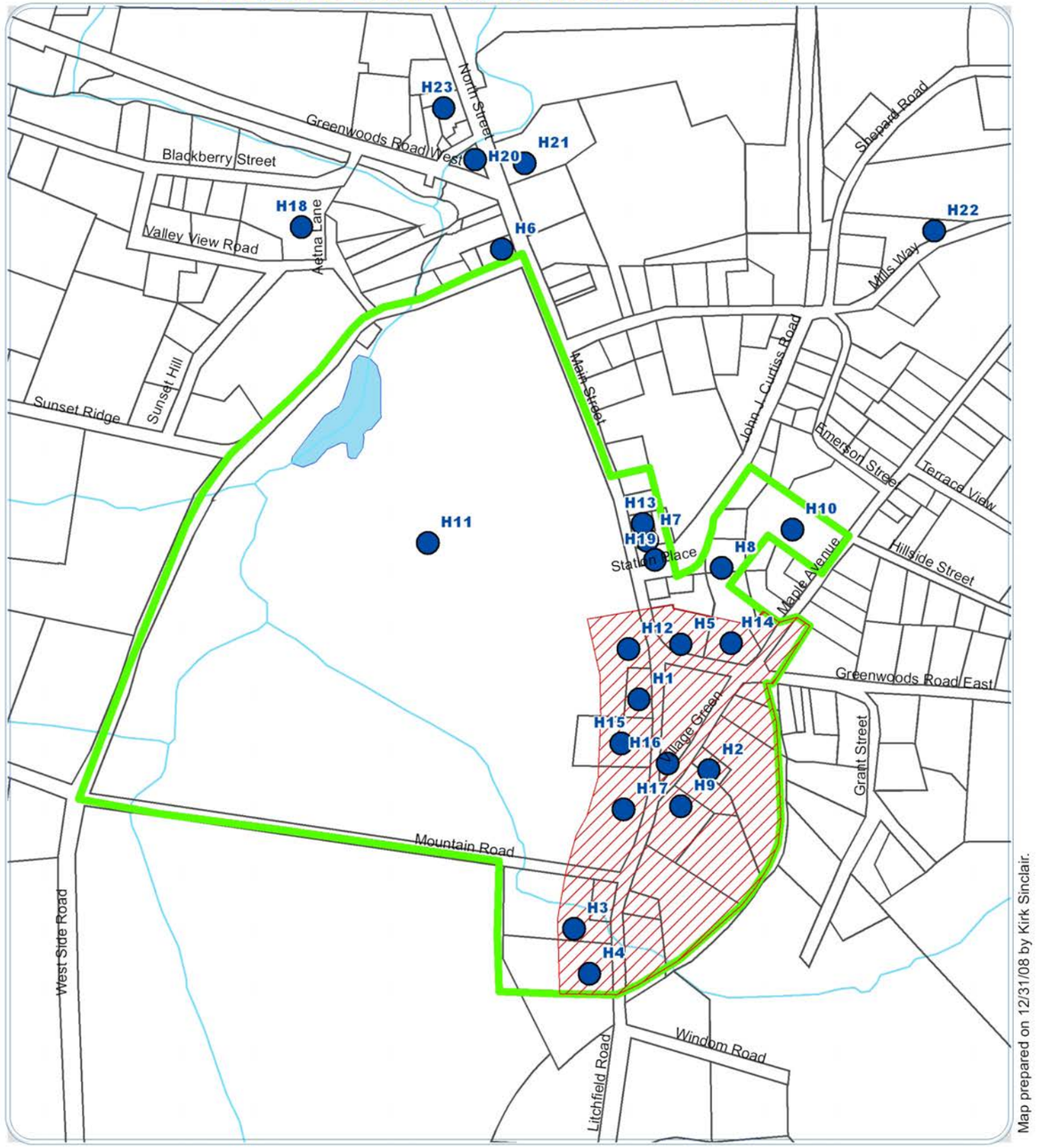
After the Eldridge sisters died, their cousin Ellen Battell Stoeckel remodeled their home as a community center known as Battell House (**H-17**). In her will she provided for the creation of a trust that would enable music, art and literary offerings to be carried on under the auspices of Yale University on her property. Following Ellen's death in 1939, Alfredo Taylor was engaged to transform the bucolic Stoeckel estate into a campus for the Norfolk Music School of Yale University. This evolved into the Yale Summer School of Music and Art where the arts continue to flourish today (**H-11, H-12, H-17**).

Norfolk's rich historic resources testify to the town's vibrant past and bring new life to the many different people who shaped our town.

For recommendations, see Chapter 11, starting on page 72, and for a short list of readings about Norfolk's history, see Appendix 9.

Whitehouse, formerly the home of Carl and Ellen Battell Stoeckel.

Historic Features of Norfolk Center



Historic features compiled by Ann Havemeyer and Richard Byrne. Refer to the text for the key to labeled features. The Local Historic District was approved by the Town of Norfolk. The National Historic District is listed in the National Register of Historic Places. Parcel boundaries were digitized from Norfolk's tax maps.

Not to be used as an accurate survey or as a substitute for field assessment.

N W E S

1:6,000

0 250 500 1,000 Feet

Legend

- Historic Features
- Parcel Boundaries
- Local Historic District
- National Historic District

Map prepared on 12/31/08 by Kirk Sinclair.

Recommendations

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Geography and geology

Geologic features are a nonrenewable resource. Many are scenic, some provide habitat for sensitive lichens and mosses as well as specialized habitat for animals, and some are an integral part of storage areas for drinking water.
The information used as a basis for these recommendations appears in chapter 1 on Norfolk's geology and geography, starting on page 11.

Recommendations:

1. Control or avoid development within talus slope and rock outcrop areas to minimize land disturbance, conserve sensitive habitats and water storage areas, and preserve the area's scenic character.

2. Create zoning regulations to afford greater protection for neighbors, and especially wells, from possible adverse effects of blasting, such as requiring pre-blast surveys, submission of professionally prepared reports evaluating the potential impacts of and alternatives to blasting, and requiring detailed reclamation plans for all mining operations.

3. Protect Norfolk's geologic heritage, such as kettle holes, glacial terraces and outwash deltas, moraines, glacial erratics and balancing rocks, rock outcrops, springs, unconstrained streams and natural ponds.

Climate and weather

Based on weather patterns observed at Great Mountain Forest since January 1932, Norfolk is significantly colder and wetter than most of the state. This means that design requirements for building site runoff, septic systems and road drainage, etc., will generally be different from the rest of the state.

Climate models for the northeastern United States suggest that changes associated with global warming can be expected, affecting Norfolk's weather and vegetation. The human input of atmospheric pollutants responsible for the unprecedented increase in the rate of carbon increase comes from many sources, but primarily from the consumption of fossil fuels. This includes everything from internal combustion vehicles and home heating to manufacturing and waste management. A multi-pronged approach to fixing these problems will be necessary.

The information on which these recommendations are based appears in chapter 2 on Norfolk's climate and weather starting on page 16, and in Appendix 1 starting on page 80.

Recommendations:

1. Educate business owners and residents on the effects of climate change and encourage them to use energy conservation measures whenever possible.

2. Reduce atmospheric pollutants in general by minimizing carbon dioxide, nitrous oxide, sulfur dioxide, black carbon and other manmade emissions. Monitor air quality to detect local pollution problems and, when necessary, regulate. Enforce existing burning regulations.

3. Use energy alternatives (solar, geothermal, electric and hybrid vehicles, etc.) where feasible for all town buildings and vehicles.

4. Conserve greenways and wildlife corridors to minimize stress of climate changes on plants and wildlife, and to allow for northward migration of species. To sequester more carbon, plant trees and minimize tree cutting. Protect and preserve more forestland.

5. Adopt regulations requiring the use of local Norfolk weather data in any calculations used for application and permit requirements, and in approving project start dates and project work periods.

6. Educate business owners and residents about the benefits of environmentally sound waste management practices to reduce greenhouse gases and pollutants.

7. Encourage composting, recycling, reuse, reduction and proper disposal of waste.

8. Maintain ecologically sensitive waste management, and improve and expand the town waste management program as needed.

9. Encourage and support proper sewer and storm water collection and treatment throughout town.

10. Consider a town ordinance to prevent the disposal and transportation of fracking oil waste within the boundaries of the town.

11. Consider a town ordinance to ban certain types of plastics, especially single-use plastic.

12. Monitor areas of potential pollution (sewer treatment plant, town land fill and transfer station).

Soils

It can take as long as 1,000 years to form one inch of soil, and vegetation is the most important factor in creating soils. Simply removing vegetation from the soil will expose it to erosion, and as much as a foot of soil can be lost in one rain storm. The best way to keep soil resources from degrading is to nurture the vegetation that is growing on it.

Additional information used as a basis for these recommendations appears in chapter 3 on Norfolk's soils, starting on page 18.

Recommendations:

1. Research and publish best management practices for preventing erosion, and encourage the town and its residents to follow them when removing vegetation and exposing soil to erosion.

2. Restrict development on slopes of greater than 15 percent and require engineered site plans for any such development. Exclude land with slopes of 25 percent or greater from buildable lot size calculations and do not allow development on such slopes.

3. Consider soil-based or natural resource-based zoning regulations.

4. Strictly enforce erosion and sedimentatio control plans for activities permitted by the town and require detailed restoration plans for activities that are not completed properly.

5. Require performance bonds to ensure proper and timely completion of permitted activities and to provide funding for any necessary restoration due to improperly conducted activities.

6. Use easements or other property restrictions to permanently protect prime agricultural soils and existing farmlands.

Aquatic resources

Norfolk is at the top of four watersheds, making the quality of most of its water dependent on our own actions. These actions will also affect many downstream areas elsewhere in Connecticut. Currently all but one of the streams that leave Norfolk are pristine (AA or A) in quality, and scientific evidence shows that maintaining vegetative buffers and limiting impermeable surfaces can preserve water quality.

Regardless of the size of water body, each has ecological importance. Most lakes and ponds have some direct connection with either groundwater or surface water sources, and they also provide specialized habitats for a variety of aquatic organisms. Loss of these highly specific habitats could cause major shifts in the water body's ability to support sensitive species and allow more tolerant species to then thrive. Such a shift from sensitive species to tolerant species usually indicates a decline in water quality and/or a loss of critical habitats, and is often the result of development pressures.

The information used as a basis for these recommendations appears in chapter 4 on Norfolk's aquatic resources, starting on page 24.

Recommendations:

1. Require or encourage landowners to maintain or restore an undisturbed natural vegetative buffer of at least 100 feet for lakes, ponds and streams.

2. Water quality should be protected by identifying and addressing sources of pollution.

3. Limit the impermeable surfaces that can be created and require or encourage the use of permeable surfacing materials and technologies. Studies show that impermeable surfaces covering more than 12 percent of a watershed diminishes water quality.

4. Protect Norfolk's groundwater and aquifer recharge areas from over-development and contamination.

5. Require engineering plans for construction in and around watercourses and wetlands to preserve aquatic habitats, and especially to avoid habitat segmentation. Identify specific situations in Norfolk (such as perched culverts or dams) where habitat continuity is disrupted and provide guidance to address these issues.

6. Protect vernal pools and surrounding habitats, and provide education on the ecological importance of vernal pool habitats. (For more recommendations on vernal pools, see areas of ecological importance below.)

7. Minimize or prevent damaging impacts to wetlands due to sedimentation, salt and other pollution, and excessive runoff by following the best road maintenance and construction practices, such as proper placement and maintenance of ditches, drains and sedimentation basins following engineered standards; minimizing winter salt applications or finding alternatives to salt; early spring road sweeping, and timely roadbed stabilization practices, especially for gravel roads.

8. Preserve wetlands, especially valuable and unique wetlands, and upland buffers, through conservation acquisitions and easements.

9. Make sure the Wetlands Agency has adequate resources to enforce its regulations. Ensure that other town regulations, ordinances and guidelines are compatible with wetlands protection.

10. Amend zoning regulations to exclude wetland acreage from buildable lot size calculations.

11. Require those conducting commercial logging or forest harvest activities in wetlands or watercourses or within 100 feet or wetlands or watercourses to submit detailed erosion and sedimentation control plans. Require bonds to ensure adherence to such plans and to fund any necessary restoration.

12. Require a permit for irrigation of areas greater than one acre. Limit large volume pumping of groundwater for nonessential uses, to avoid impacts on groundwater levels, wetlands and watercourses.

13. Encourage farmers to use practices that protect wetlands and watercourses, such as maintaining natural stream buffers and limiting livestock access to wetlands and watercourses.

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Queen Anne's lace (Daucus carota) fringes the edge of a pond.

© Bruce Frisch

Fringed gentian (Gentianopsis crinita).

14. Explore ways to control fertilizer and pesticide applications adjacent to or within wetlands or watercourses, over stratified drift aquifers and within 100 feet of wells.

The Norfolk plantscape

Humans will continue to be a significant influence on Norfolk's plantscape in numerous ways, from their changing use of land to their influence on climate. Vegetation may be enhanced or destroyed by these changes, whether they are intentional or unintentional, natural or man-made. An important unintentional consequence of human activity is the appearance of non-native invasive plants.

The biodiversity of plants is extremely significant to the maintenance of existing plant communities and for moderating future changes, such as those associated with climate change. The depletion of species not only diminishes our present ecosystems, but can result in a cascade of additional losses of species and ecosystem functions that depended on them. Invasive plants such as garlic mustard, Japanese barberry, purple loosestrife and Asian bittersweet are known to aggressively crowd out native plants, and even take over large areas and greatly reduce diversity. Invasive animal species, such as the hemlock woolly adelgid and the Asian long-horned beetle, could potentially devastate our plantscape.

Norfolk's notable trees also remind us of the importance of trees and forests. Old trees are homes to many birds and other animals, including microorganisms. They produce or harbor large quantities of food for wildlife. It is important to actively preserve these survivor trees, as their DNA may be needed in the future: they may possess one or more attributes that have given them a competitive advantage. Trees can live for a very long time and our venerable trees help us appreciate the value of life; they have withstood so much and are still surviving.

The information used as a basis for these recommendations appears in chapter 5 on Norfolk's plantscapes, starting on page 33.

Plant communities Recommendations:

1. Encourage smaller lawns and the use of native plants for landscaping and to protect pollinators and other organisms.

2. Avoid environmentally harmful pesticides, and educate the public about the benefits of organic gardening, farming and lawn care.

3. Educate the public about protecting rare plant communities and species.

Invasive species Recommendations:

1. Develop plans and procedures for eradicating harmful invasives and for preventing the establishment of new invasive species.

2. Prevent new occurrences of recognized invasive plant species and when possible eradicate existing populations of the most troublesome species.

3. Provide information on invasive species, especially state-prohibited species and existing populations of the most troublesome species in Norfolk, and offer educational programs on invasives.

4. Encourage all town residents and employees to report highly or potentially injurious invasive species to the Conservation Commission.

5. Inventory invasive plant sites in Norfolk to identify native species at risk, set priorities for removal efforts and assess the role of road and driveway maintenance practices that promote the establishment of invasive plants.

Notable trees Recommendations:

1. Preserve Norfolk's notable trees (see a list in Appendix 4 on page 105) in particular, and old trees in general; they are a valuable resource.

Wildlife

Norfolk's wildlife is abundant, but not all species are thriving. Like our native plants, some animal species are threatened by habitat loss, invasions of non-native species and human activity. We should strive to preserve the full range In particular, insect pollinators are under threat and require protection from pesticides and habitat loss.

These recommendations are based upon information in chapter 6 on Norfolk's wildlife, starting on page 40, and in Appendix 5 starting on page 126.

Recommendations:

1. Develop and implement conservation plans for town-owned open space, as appropriate, to provide protection for wildlife species and to preserve and enhance open space for wildlife use.

2. Compile guidelines for ecologically sound land management and agricultural practices. Provide them to the public and to town officials and employees, and encourage the use of these practices on public and private lands.

3. Follow sound conservation practices, such as protecting grassland birds by mowing hayfields late to allow fledging of young or by leaving large uncut patches until birds have fledged; minimizing disturbance to wildlife breeding, nesting or cover by scheduling maintenance, like tree removal, when these will be least affected whenever possible; minimizing outside lighting, so as not to disturb wildlife behavior, such as bird migration; using native plants as natural food sources for wildlife, and preserving standing and fallen dead wood to provide feeding and nesting sites for many species.

4. Protect lands that provide or potentially provide wildlife habitat. Especially important are large blocks of mature forest interior; grasslands; wet meadows, vernal pools and other wetlands; floodplains and riparian habitats; old fields, shrublands, sapling stands and low-intensity agricultural hayfields and grazing lands.

© Shelley Harms

American Robin (Turdus migratorius) on her nest.

5. Protect potential wildlife corridors that link core wildlife habitats, especially those that connect critical habitats or large permanently preserved properties.

6. Consult the map of areas of known and potential ecological importance (see pages 44 & 45) whenever a land use application is presented. Give exceptional consideration to endangered, threatened and special-concern species and their critical habitats, as listed by the Connecticut Department of Environmental Protection.

7. Encourage townspeople to report rare species to the Conservation Commission.

8. Balance management of beaver and their activities with maintaining a healthy and active local beaver population. Manage water levels without destroying beaver dams whenever possible. Encourage the use of physical barriers, such as exclusion fencing and pond levelers.

9. Protect pollinators and their habitats by growing and leaving pollinator-friendly plants, providing and protecting nest sites, and avoiding using insecticides.

10. Educate the public about the importance of pollinators and what individuals and organizations can do to help.

Areas of ecological importance

Norfolk is biologically diverse. Its landscape is largely unfragmented and it generally has a high degree of ecological integrity. To continue to preserve this biodiversity, land use decisions require scientifically based planning that considers an ecologically functioning landscape.

In particular, vernal pools provide breeding and nursery habitat for diverse animal species, several of which are obligated to use these habitats for their survival. Many of these species then go on to disperse over a much wider upland habitat, which must be protected along with the pools themselves if they are to persist as healthy biological systems.

The map on page 44 is only the beginning of a compilation of Norfolk's habitats and natural communities. A complete compilation will require extensive field work over a significant amount of time, but should be done.

The information on ecologically significant areas used as a basis for these recommendations appears in chapter 7, starting on page 43. See page 146 for an essay on biodiversity.

Recommendations:

1. Use the maps on page 44 and 45 to determine large areas and/or corridors of land with potential ecological significance and attempt to keep them intact. Carry out the necessary fieldwork to verify the actual value of "potential" areas already mapped and to determine others.

2. When approving changes in land use, investigate the known and potential ecological significance of a parcel or portion(s) thereof. Parcels that appear to lie within sensitive areas depicted on the map should be field checked by a qualified biologist.

3. Encourage the preservation of open space by the town, the state, land trusts, conservation organizations and private landowners, with a particular emphasis on grasslands, large forest blocks and other critical habitats. Develop and maintain a record of town land preservation needs, desires and priorities, with the assistance of the local land trust and other conservation organizations.

4. Require thorough and professional biological inventories for large development proposals, to be conducted at least once during the growing and breeding season, to evaluate possible impacts. Require applicants to prove that such development will not cause long-term negative impacts to areas of ecological significance or to plant and animal populations.

5. Through land use decisions, maintain a balance of forest cover, meadow and other potentially significant habitats (such as those named in Wildlife recommendation number 4). There should be a sufficient amount of each to adequately support Norfolk's plant and animal life.

6. Ensure enforcement of town regulations that protect environmental quality and provide adequate resources to permit their enforcement. Regularly consider additions or modifications to the regulations to ensure the high quality and integrity of the environment.

7. Educate town employees, commissioners and the general public in the importance of and protection needs for vernal pools.

8. Locate, authenticate and map all vernal pools in town.

9. Require all applicants for land use permits to locate, map and protect any vernal pool. These sites should be inspected and authenticated by an appropriate agent for the town.

10. Monitor a selection of vernal pools in town based on their indicator potential or threat of disturbance due to human activities.

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Heron (Ardea herodias) soaring over rookery.

11. Protect vernal pools by leaving a naturally vegetated 100-foot buffer around them, and by leaving at least 70 percent of a 750-foot upland buffer area intact.

12. Discourage the removal of beaver dams and find alternatives to control potential flooding problems.

Open space

Open space protects the environment in many ways. Forest and meadow buffers around ponds and streams reduce degradation of watersheds by minimizing pollution, absorbing run-off and securing habitat for wetland plants and animals. This affects both our immediate environment and that of surrounding communities because our upland streams harbor spawning grounds for native fish species and our healthy watersheds and wetlands reduce flooding and preserve water quality.

Open space is critical to maintaining biodiversity. Large forest tracts, for example, increase the survival of woodland songbirds. Norfolk's woodlands shelter many vernal pools where amphibians breed in early spring, species that are losing ground in much of their territory due to changing land use. Forest and contiguous open land form corridors that allow for the daily and seasonal movements not only of large animals such as bear, deer and bobcat but also, in the long term, shifts in the ranges of plants and all the smaller members of the animal kingdom that we hardly notice. As global warming makes itself felt, such passageways may become increasingly important.

Norfolk's citizens place high value on conservation and open space. While much of Norfolk's land remains undeveloped (approximately 83 percent), only a relatively small portion of it is permanently protected (approximately 31 percent). Other towns have obtained significant funding and succeeded in protecting places that are important to townspeople by actively engaging in open space planning.

The information used as a basis for these recommendations appears in chapter 8 on Norfolk's open space, starting on page 51.

Recommendations:

1. Develop an open space plan that identifies conservation goals, including the preservation of areas of ecological significance, wildlife corridors, large unfragmented habitats and open space that connects these areas, with the goal of having 75 percent of the land in the rural residential zone permanently protected.

2. Include recreational areas in developing the open space plan.

3. Create a fund or other means for acquiring targeted land or development rights for conservation purposes.

4. Pursue open space acquisitions, development rights, conservation easements and other legal instruments with willing landowners.

5. Prohibit or restrict activities that result in forest or grassland fragmentation and regulate development to favor open space (such as cluster development, set-asides and buffer zones for lands adjacent to existing protected open space).

6. Educate town officials and the public about the value of protected open space, natural ecosystems and biodiversity, including economic values and forest stewardship.

7. Establish assessment categories for open space and unbuildable land and create incentives for landowners to preserve them, especially in ecologically important areas.

Scenic resources

Norfolk's ridgelines are largely undeveloped, which contributes to the scenic quality of the town. A ridgeline protection regulation would help to protect highly visible, highly prominent scenic views.

Norfolk's rural roads possess many scenic qualities. Connecticut's scenic highway statute and Norfolk's scenic road ordinance provide mechanisms for protecting scenic roads, but only a few have been designated as scenic under these laws so far.

Norfolk's dark night sky is also a resource that should be protected.

The information used as a basis for these recommendations appears in chapter 9 on Norfolk's scenic resources, starting on page 58, and in Appendix 8 starting on page 148.

***Ridgelines* Recommendations:**

1. Enact a ridgeline protection regulation, which would help to protect these highly visible, highly prominent scenic views.

2. Identify areas best suited for telecommunications towers and windmills, and encourage all concerned to only use those sites.

***Scenic views* Recommendations:**

1. Consider scenic views in making decisions regarding any structure that might impede these views and require a viewshed analysis for building and subdivision applications.

2. Identify and protect those scenic views that are especially associated with Norfolk's character.

3. Protect waterfalls for their scenic and ecological values.

***Scenic roads* Recommendations:**

1. Maintain Norfolk's rural roads so as to preserve their scenic characteristics.

2. Use Norfolk's scenic road ordinance to protect rural roads that have a majority of the characteristics listed.

3. Develop or compile information about best management practices for rural road maintenance and improvement, such as limiting drainage work/ditching alongside roads to a minimum, getting approval of the tree warden before removing live trees from town rights-of-way, retaining some young trees for future replacements, protecting large boulders and leaving greenbelts along scenic road frontage.

4. Preserve stone walls along roads, as both scenic and boundary features.

5. Explore designation of additional segments of state highways as scenic highways.

***Dark night sky* Recommendations:**

1. Preserve Norfolk's dark night sky by promoting use of downward directional lighting on town buildings and residential homes while maintaining public safety.

2. Review and adopt appropriate outdoor lighting ordinances modeled after the Dark Night Sky Association's recommendations (see www.darksky.org).

Historic resources

The information used as a basis for this recommendation appears in chapter 10 on Norfolk's historic and cultural resources, starting on page 64.

Recommendation:

1. Protect stone walls, foundations and other archaeological remnants of Norfolk's history from disturbance.

General Recommendation:

Meet annually with the various town agencies and commissions, and the general public to discuss this Natural Resource Inventory and its recommendations.

Appendices

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Each of the first 10 chapters described a type of resource and explained its importance, and chapter 11 listed recommendations for conserving them. The appendices that follow present the data themselves, a bibliography and an explanation of how this inventory was compiled. Use this guide to locate specific information.

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1: Norfolk's Weather

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2: Soils of Norfolk

© Pat Harms

3: Aquatic Resources

© Bruce Frisch

4: The Norfolk Plantscape

© Jim Jackson

5: Wildlife

© Tammy Andrews

6: Areas of Ecological Importance

© Bruce Frisch

7. Open Space

© Katherine Griswold

8: Scenic Resources

Appendix 1: Norfolk's Weather

The description of Norfolk's climate in Chapter 2 is based on weather data recorded over 89 years at the National Weather Service Cooperative Weather Observer Station, Norfolk 2 SW. The database of information generated by members of the Cooperative Weather Observer Program (which Congress enacted in 1890) is the cornerstone of our nation's weather history and also serves as the primary data for research into global climate change. This station is one of about 12,000 in the United States and about 170 in Connecticut. Of the 170 Connecticut stations Norfolk 2 SW is one of only 25 that send readings to the National Climatic Data Center to be archived on a national level.

A comprehensive set of weather observations has been recorded every day since January 1, 1932, by a small group of observers following the same recording procedures and using, for the most part, the same instruments. The station is located on Windrow Road and, at 1,340 feet, is the station with the highest elevation in Connecticut. It was founded by Edward C. Childs and is currently maintained and operated by the Great Mountain Forest Corporation.

In 1964 Norfolk 2 SW became one of the first seven reference climatological stations in the country. There were eventually 21 such stations located all across the country. These special stations were used as benchmarks, because they were seen as places that were, and would remain, untouched by the ever-increasing development of the country. Sometime during the 1980's the government stopped singling out these stations and threw Norfolk 2 SW into the mix with all other cooperative observer stations, but Norfolk is still relatively unchanged.

Norfolk 2 SW also is part of the Eastern North American Phenology Network. Phenology is the science of periodic biological events in the animal and plant world as influenced by the environment, especially weather and climate. It is a critical contributor to global climate change research. Beginning in 1968 the dates of five phenophases, or stages, of three Persian lilac bushes located near the station have been recorded. The data from this station and many more stations across the country are compiled by the Phenology Network.

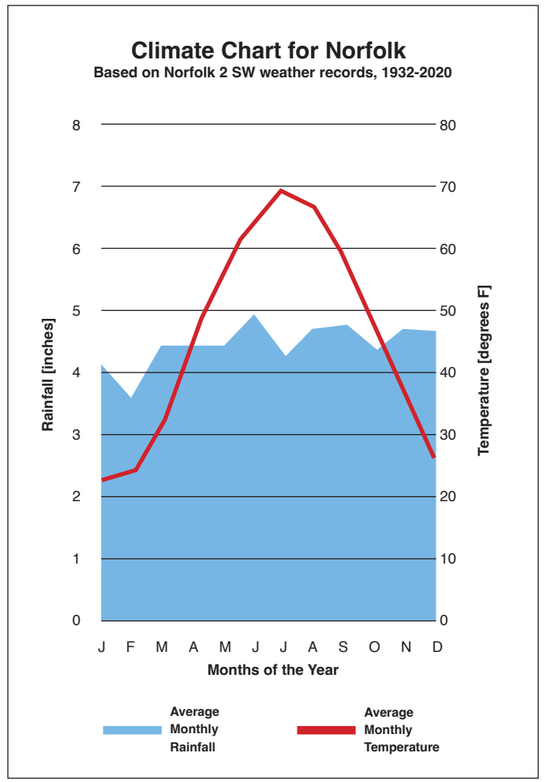
The tables on the accompanying pages present weather data from Norfolk 2 SW records.

Global heating, to which carbon dioxide and methane are the two top contributors, is unequivocally caused by human activity. The average annual temperature in New England has increased by about three degrees Fahrenheit since 1901. The changes already observed include increased rainfall intensity, higher intensity storms, longer freeze-free periods in winter and altered plant blooming times (see phenology data in Appendix 1 on Pages 86-87).

Some of these changes are having negative impacts on agriculture, forestry and tourism.

Norfolk may provide a ray of hope. Norfolk is located in an area that has the most intact forest and one of the highest carbon stocks in southern New England. Proforestation—growing existing, intact forest to its ecological potential—can rapidly sequester large amounts of carbon for long periods, can be started immediately, is inexpensive and benefits society in many other ways. This technique is a much quicker and cheaper climate mitigation strategy than afforestation or reforestation, which both require land acquisition, money and time.

Norfolk's forests also are valuable for wildlife connectivity and climate resilience (the ability to buffer us against climate extremes). The Nature Conservancy's Resilient and Connected Landscape Project mapped roughly 2 million acres in New England and New York that were the most climate resilient and of highest priority for conservation in order to preserve unique microclimates and the flora and fauna dependent on them. The Berkshire Wildlife Linkage, also known as the Green Mountains to Hudson Highlands, is one of nine focal areas in the northeastern U.S. at highest priority for conserving biodiversity in a changing climate. The more than 21,000 acres of its predominantly forested land that fall within Norfolk's borders contribute significantly to climate mitigation and future climate resilience.



Norfolk Weather: Years by Average Annual Mean Temperature, 1932-2020

Average annual mean temperature for the entire period: 45.0

Year(s)	Average mean temperature
2012	48.5
1998	48.4
2001	48.2
2020	48.0
2006	47.8
2002, 2016	47.7
2010	47.4
1990	47.2
1949, 2011	47.1
1991, 1999	46.8
1953, 2017	46.7
2018	46.5
1938, 1973	46.1
2007, 2008, 2015	46.0
2013	45.9
2005	45.7
1932, 2019	45.6
1937, 1946, 1957	45.5
1933, 1983	45.4
1952, 1959	45.3
1995	45.1
1951, 1984	45.0
1975, 2009	44.9
1945	44.2
1942, 1954, 1955, 1979, 1985, 1994, 2000, 2004	44.7
1986, 1987, 2014	44.6
1939, 1997, 2003	44.5
1939, 1997, 2003	44.4
1941, 1944, 1981	44.3
1934, 1961, 1988	44.2
1947, 1948, 1982	44.1
1950, 1964, 1966, 1971, 1974, 1977	44.0
1960, 1969	43.8
1970	43.7
1943, 1968, 1980, 1989	43.6
1956	43.5
1965, 1992	43.4
1976	43.2
1967	43.1
1972	42.9
1962	42.8
1958, 1978	42.7
1963	42.5
1940	41.9

Norfolk Weather: Record Warmest and Coolest Years, 1932-2020

Average annual mean temperature: 45.0

10 Warmest years			10 Coolest years		
Rank	Year(s)	Average mean temperature	Rank	Year(s)	Average mean temperature
1	2012	48.5	1	1940	41.9
2	1998	48.4	2	1963	42.5
3	2001	48.2	3	1978,'58	42.7
4	2020	48.0	4	1962	42.8
5	2006	47.8	5	1972	42.9
6	2002,'16	47.7	6	1967	43.1
7	2010	47.4	7	1976	43.2
8	1990	47.2	8	1992,'65	43.4
9	1949, 2011	47.1	9	1956	43.5
10	1991, '99	46.8	10	1989,'80,'68,'43	43.6

Norfolk Weather: Monthly Averages, January 1932-December 2020

Month	Mean Temperature	Low Temperature	High Temperature	Precipitation	Snow
January	20.9	11.7	31.7	4.02	20.5
February	22.2	9.0	30.7	3.63	20.3
March	30.7	21.2	41.8	4.34	17.5
April	43.1	36.8	49.4	4.28	6.1
May	54.9	46.8	51.8	4.34	0.4
June	63.4	58.8	68.3	4.81	0.0
July	68.3	63.9	73.1	4.33	0.0
August	66.4	61.5	71.0	4.60	0.0
September	59.0	53.6	64.7	4.67	0.0
October	47.8	42.0	55.3	4.36	0.9
November	37.1	30.7	43.2	4.58	6.6
December	25.8	11.5	39.5	4.57	16.8
Annual	44.7	37.3	51.9	52.46	91.2

Temperature in degrees Fahrenheit, precipitation in inches of rain plus melted snow, snow in inches

Norfolk Weather: Record Precipitation, 1932-2020

Normal annual precipitation: 52.53

10 Wettest Years			10 Driest Years		
Rank	Year	Total	Rank	Year	Total
1	2011	77.28	1	1965	33.89
2	1955	76.04	2	1935	38.06
3	1996	73.76	3	2016	38.36
4	1945	69.31	4	1946	39.52
5	2008	68.21	5	1964	39.59
6	1972	67.78	6	1957	40.61
7	2018	66.97	7	1949	40.76
8	1977	64.66	8	2015	41.57
9	1938	63.97	9	1939	42.09
10	1983	63.60	10	1980	42.17

Precipitation = inches of rain and melted snow, sleet or hail

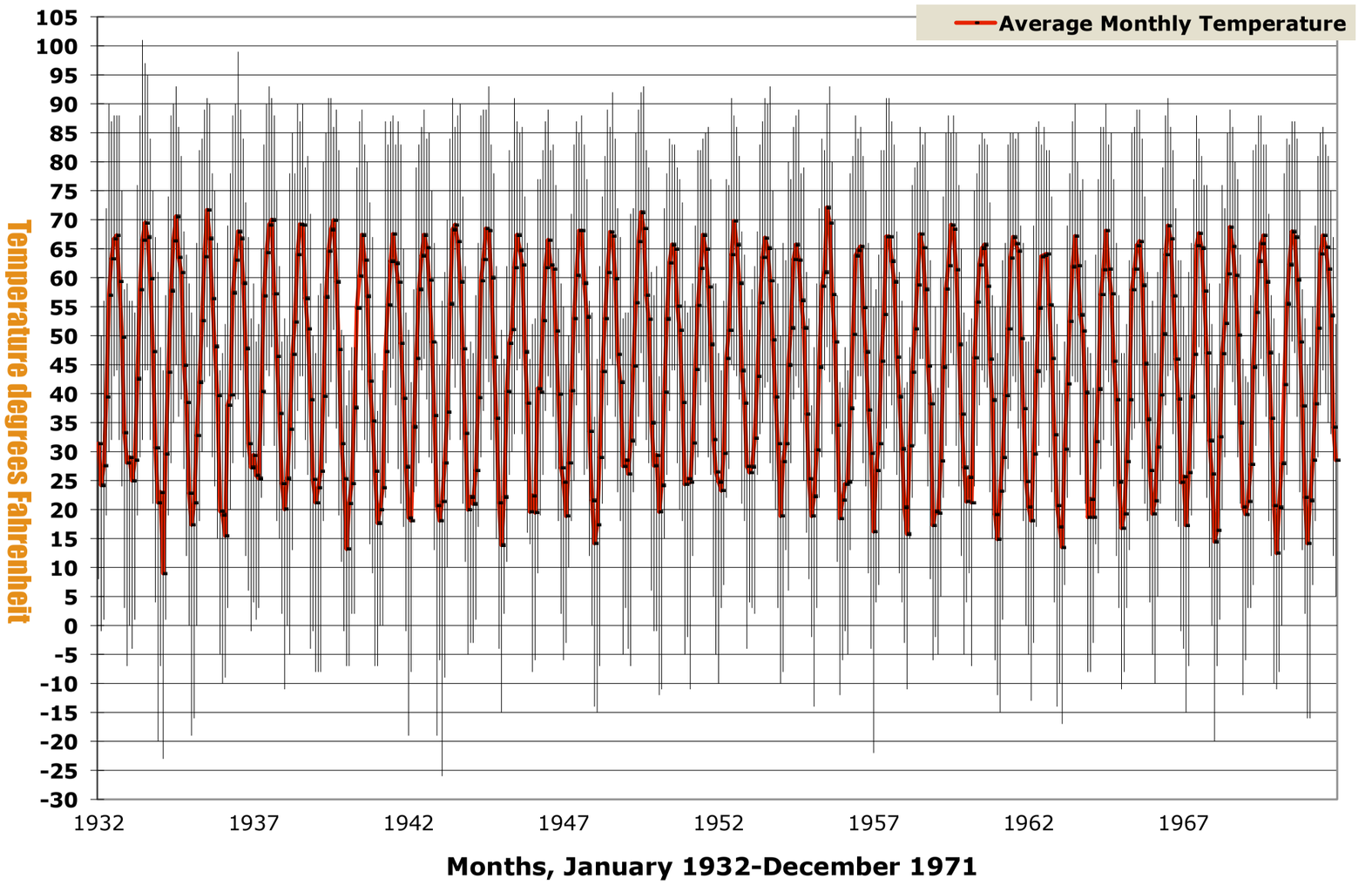
Norfolk Weather: Record Snowfall, 1932-2020

Normal annual snowfall: 89.1

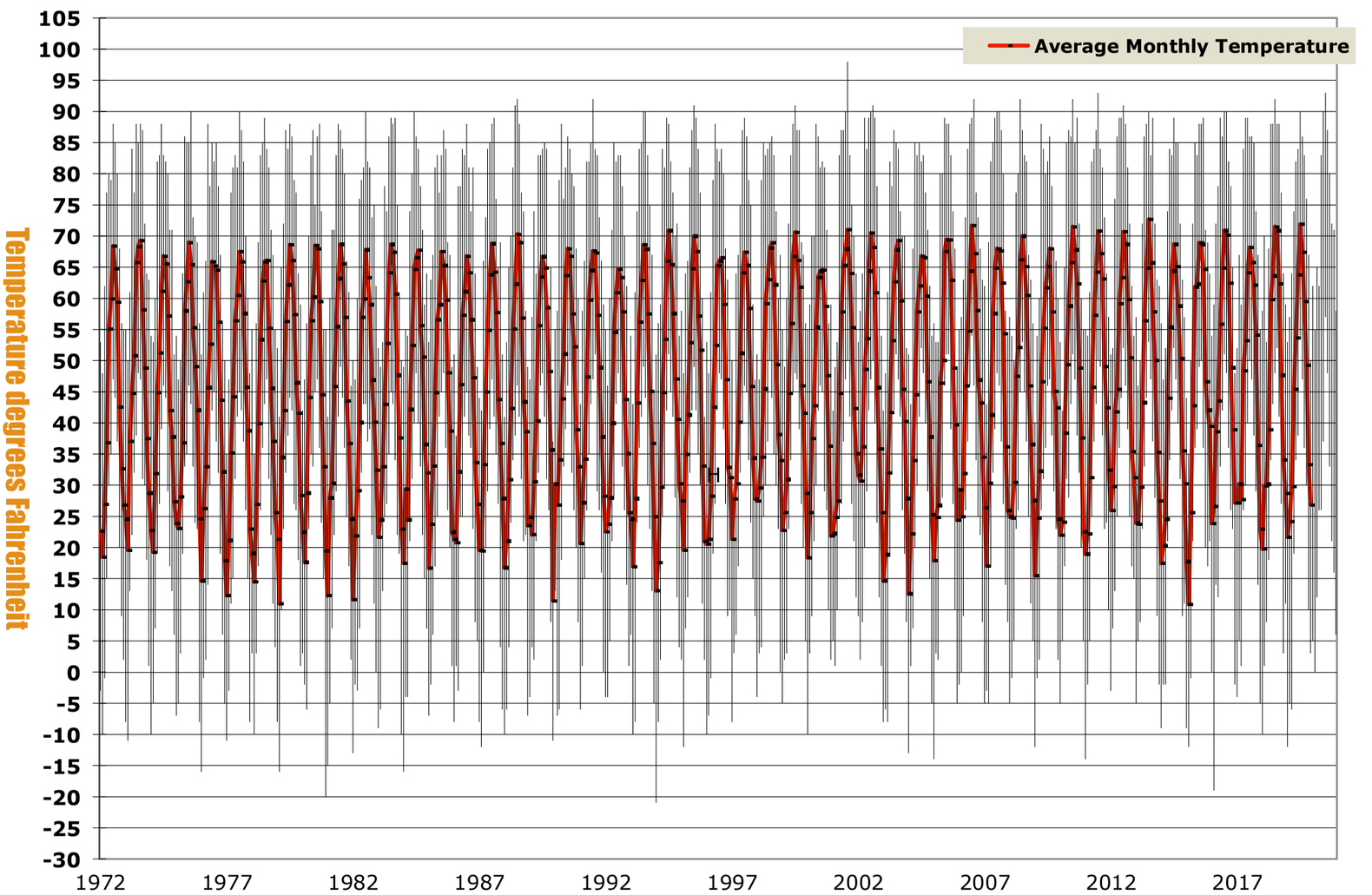
10 Snowiest Years			10 Least Snowy Years		
Rank	Year	Total	Rank	Year	Total
1	1956	175.1	1	1998	33.0
2	1961	160.0	2	1999	44.1
3	1958	156.3	3	2004	49.5
4	1967	150.2	4	2006	50.4
5	1996	148.4	5	2012	50.5
6	1977	147.6	6	1973	53.4
7	1945	136.8	7	1920	55.2
8	1971	136.6	8	1954	57.7
9	1969	133.8	9	1989	58.3
10	1947	130.1	10	1991	59.6

In inches, January-December

Monthly temperature highs, lows and average means



Monthly temperature highs, lows and average means



Persian Lilac Phenological Data, Great Mountain Forest

Three shrubs planted in 1965

Year	Breaking Leaf Buds	All leaf Buds Broken	Open Flowers	Full Flowering	End of Flowering
1968	4/21	No Data	5/21	6/1	6/7
1969	4/22	No Data	5/22	5/30	6/8
1970	5/1	No Data	5/22	5/29	6/6
1971	Data Lost	No Data	Data Lost	Data Lost	Data Lost
1972	Data Lost	No Data	Data Lost	Data Lost	Data Lost
1973	Data Lost	No Data	Data Lost	Data Lost	Data Lost
1974	Data Lost	No Data	Data Lost	Data Lost	Data Lost
1975	**5/3	No Data	5/23	5/30	6/7
1976	4/14	No Data	5/14	5/22	6/3
1977	4/15	No Data	5/16	5/23	6/3
1978	**5/5	No Data	**5/30	6/3	6/12
1979	4/21	No Data	5/16	5/26	6/6
1980	4/22	4/24	5/22	6/1	6/7
1981	4/7	4/9	5/20	5/27	6/6
1982	4/7	4/10	5/18	5/28	6/7
1983	4/24	**4/26	5/25	6/4	6/12
1984	4/27	**5/1	**5/27	**6/6	**6/13
1985	4/14	4/16	5/14	5/23	5/30
1986	4/8	4/12	5/15	5/22	5/31
1987	4/11	4/14	5/18	5/27	6/4
1988	4/18	4/21	5/23	5/30	6/12
1989	4/15	4/18	5/22	5/31	6/9
1990	4/4	4/8	5/18	5/29	6/8
1991	4/7	4/8	5/12	5/17	5/28
1992	4/23	4/25	5/23	6/4	6/10
1993	4/20	4/21	5/13	5/27	6/10
1994	4/20	4/22	5/23	6/1	6/12
1995	4/19	4/21	5/23	6/2	**6/13
1996	4/21	4/22	5/22	6/2	6/12
1997	4/20	4/23	**5/30	**6/10	**6/18
1998	*3/29	*3/31	5/8	5/18	5/30
1999	4/10	4/13	5/17	5/28	6/7
2000	4/3	*4/4	5/11	5/26	6/8
2001	4/14	4/20	5/12	5/23	6/6
2002	4/7	4/10	*5/7	5/22	6/7
2003	4/18	4/22	5/22	5/28	6/12
2004	4/19	4/23	5/14	5/18	5/28
2005	4/16	4/19	5/25	5/31	6/9
2006	4/13	4/15	5/20	5/25	6/4
2007	4/22	4/25	5/20	5/24	6/3
2008	4/15	4/18	5/21	5/25	6/5
2009	4/18	4/24	5/15	5/18	5/30
2010	4/3	*4/4	*5/5	*5/8	*5/26
2011	4/23	4/25	5/21	5/24	6/4
2012	*3/20	*3/22	5/9	*5/12	*5/24
2013	4/19	4/23	5/19	5/23	6/3
2014	4/15	4/21	5/26	5/29	6/9
2015	4/23	**4/26	5/17	5/20	5/31
2016	3/30	4/2	5/16	5/24	5/30
2017	4/10	4/13	5/17	5/20	6/1
2018	4/24	**4/26	5/21	5/23	6/2
2019	4/14	4/18	5/25	5/27	6/9
2020	4/5	4/9	5/25	5/28	6/7
2021	4/8	4/11	5/15	5/18	5/31

* 1st or 2nd earliest date ** 1st or 2nd latest date

Record Earliest and Latest dates for years that observation data is available:					
*Record Earliest					
1st	3/20/12	3/22/12	5/5/10	5/8/10	5/24/12
2nd	3/29/98	3/31/98	5/7/02	5/12/12	5/26/10
**Record Latest					
1st	5/5/78	5/1/84	5/30/78 & /97	6/10/97	6/18/97
2nd	5/3/75	4/26/83 & /15 & /18	5/27/84	6/6/84	6/13/84 & /95

First Bloom Dates Summary Analysis for Aton Forest, Norfolk, CT

		Egler data 1948-78					Anderson data 2013-20			
Species	Common Name	Max. (latest)	Min. (earliest)	Range	Avg.	Average difference in bloom dates - earlier; + later	Avg.	Range	Max. (latest)	Min. (earliest)
Sanguinaria canadensis	**bloodroot**	29-Apr	12-Apr	17	20-Apr	+5	25-Apr	6	27-Apr	21-Apr
Forsythia suspensa	**forsythia**	7-May	17-Apr	20	26-Apr	+1	27-Apr	15	1-May	16-Apr
Houstonia caerula	**bluet**	12-May	15-Apr	27	27-Apr	0	27-Apr	23	4-May	11-Apr
Trillium erectum	**wakerobin**	14-May	2-Apr	42	30-Apr	+1	1-May	17	9-May	22-May
Amelanchier arborea	**shadbush**	19-May	23-Apr	26	5-May	-5	30-Apr	16	5-May	19-Apr
Uvularia sessilfolia	**bellwort**	21-May	28-Apr	23	7-May	-6	1-May	14	7-May	23-Apr
Syringa vulgaris	**lilac**	1-Jun	9-May	23	19-May	-3	16-May	15	25-May	10-May
Aronia melanocarpa	**chokeberry**	4-Jun	9-May	26	23-May	-4	19-May	16	26-May	10-May
Rhododendron prinophyllum	**azalea**	7-Jun	20-May	18	29-May	-6	23-May	11	28-May	17-May
Viburnum nudum cassinoides	**with-rod**	17-Jun	1-Jun	16	9-Jun	-1	8-Jun	11	13-Jun	2-Jun
Kalmia latifolia	**mt. laurel**	25-Jun	2-Jun	23	14-Jun	-3	11-Jun	11	16-Jun	5-Jun
		Combined averages				-2				
		Combined avgs. for native species				-2				
		Combined avgs. for non-native species				-1				
		Combined avgs. (natives) without Sanguinaria				-3				

Appendix 2: Soils of Norfolk

Brief Soil Series Descriptions

The soils found in Norfolk are briefly described below. The depth to a restrictive feature indicates the depth to hardpan or rock that might limit rooting depth or water flow. The available water capacity is the capacity of the soil to store water that is available for plants to use. The seasonal water table depth is the depth to saturated soil; it varies over the seasons due to rainfall amounts and evaporation. Frigid soil has an annual average soil temperature of between 32°F and 47°F, wide variation between mean summer and winter temperatures, and warm summer temperatures. One of these frigid soils, Bice, is Norfolk's most common soil.

Most Norfolk soils have three features in common. Except as noted, they typically do not have very much salt in them; in localized areas, a high-sodium test probably indicates the presence of pollution, such as road salt. There is no calcium carbonate within 40 inches of the surface in most Norfolk soils except for Alden, Copake, Fredon, Loonmeadow, Mudgepond and Raynham soils. The weighted average shrink-swell potential within 10 to 60 inches of the soil surface is low except for Brancroft and Wonsqueak soils, which have moderate potentials and Bucksport, which has a very high potential.

"Drumlin," "esker," "flood plain," "kame," "lodgement till," "outwash plain" and "terrace" are defined at the end of this set of descriptions. The chart of Norfolk soils starting on page 96 lists them by their symbols on the USDA Natural Resources Conservation Service map, soil type including percentages of slope, wetland classification, farmland classification and acreage. The soil catenas chart on page 95 shows how they are grouped into families, by characteristics.

Agawam soils

This soil occurs on valleys and outwash plain terraces. The parent material consists of wind blown deposits over deposits left by melting glaciers derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 4.8 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet. In Norfolk, some Agawam soils have a frigid temperature regime.

Alden soils

This soil occurs on upland drainageways and depressions. The parent material consists of till derived from schist, limestone and dolomite. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches isabout 0.20 inches per hour (moderately slow), with about 9.7 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is occasional. The minimum depth to a seasonal water table is about 9 inches. The maximum calcium carbonate within 40 inches is about 5 percent.

Ashfield soils

This soil occurs on upland hills and drumlins. The parent material consists of lodgement till derived from granite, gneiss and schist. The depth to a restrictive feature is 20 to 33 inches to firm or very firm material. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 3.4 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 18 inches. This soil has a frigid soil temperature regime.

Bash soils

This soil occurs on flood plains. The parent material consists of deposits left by present day streams and rivers derived from sandstone and shale. The depth to a restrictive feature is greater than 60 inches. The drainage class is somewhat poorly drained. The slowest permeability within 60 inches is about 0.20 inches per hour (moderately slow), with about 11.0 inches (very high) available water capacity. The flooding frequency is frequent. The ponding hazard is none. The minimum depth to a seasonal water table is about 12 inches.

Belgrade soils

This soil occurs on lake plain terraces. The parent material consists of silty glacial lake bed deposits. The slope ranges from 0 to 5 percent and the runoff class is low. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 10.8 inches (very high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 30 inches.

Bice soils

This soil occurs on upland hills. The parent material consists of loamy melt-out till derived from granite, gneiss and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 7.0 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet. This is the most common soil in Norfolk. This soil has a frigid soil temperature regime.

Boscawen soils

This soil occurs on valley outwash plains, terraces, eskers and kames. The parent material consists of sandy and gravelly deposits left by melting glaciers derived from gneiss, schist and granite. The depth to a restrictive feature is greater than 60 inches. The drainage class is excessively drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 1.5 inches (very low) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet. This soil has a frigid soil temperature regime.

Brancroft soils

This soil occurs on lake plain terraces. The parent material consists of silty and clayey glacial lake bed deposits. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 13.2 inches (very high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 3.0 LEP (moderate). The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 21 inches.

Brayton soils

This soil occurs on upland depressions and drainageways. The parent material consists of lodgement till derived from phyllite and schist. The depth to a restrictive feature is 10 to 20 inches to firm or very firm material. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 1.5 inches (very low) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 6 inches. This soil has a frigid soil temperature regime.

Bucksport soils

This soil occurs on depressions. The parent material consists of woody organic material. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.20 inches per hour (moderately slow), with about 20.8 inches (very high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 10.0 LEP (very high). The flooding frequency is rare. The ponding hazard is frequent. The minimum depth to a seasonal water table is about 9 inches. This soil has a frigid soil temperature regime.

Canton soils

This soil occurs on upland hills. The parent material consists of melt-out till derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 5.6 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Charlton soils

This soil occurs on upland hills. The parent material consists of melt-out till derived from granite, schist and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 6.4 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Chatfield soils

This soil occurs on upland hills and ridges. The parent material consists of melt-out till derived from gneiss, granite and schist. The depth to a restrictive feature is 20 to 40 inches to bedrock (lithic). The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 3.3 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Copake soils

This soil occurs on valley kames, outwash plains and terraces. The parent material consists of deposits left by melting glaciers derived from schist, limestone and dolomite. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 6.3 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet. The maximum calcium carbonate within 40 inches is about 2 percent.

Enfield soils

This soil occurs on valley outwash plains and terraces. The parent material consists of wind blown deposits over deposits left by melting glaciers derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 6.8 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Fluvaquents soils

This soil occurs on depressions and flood plains. The parent material consists of deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 7.2 inches (high) available water capacity. The flooding frequency is frequent. The ponding hazard is none. The minimum depth to a seasonal water table is about 4 inches.

Fredon soils

This soil occurs on outwash plain depressions, drainageways and terraces. The parent material consists of loamy deposits left by melting glaciers derived from schist, limestone and dolomite over sand and gravel. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 5.7 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 6 inches. The maximum calcium carbonate within 40 inches is about 5 percent. In Norfolk, Fredon soils have a frigid temperature regime.

Gloucester soils

This soil occurs on upland hills. The parent material consists of sandy and gravelly melt-out till derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is somewhat excessively drained. The slowest permeability within 60 inches is about 5.95 inches per hour (rapid), with about 4.4 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Hadley soils

This soil occurs on flood plains. The parent material consists of silty deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 11.0 inches (very high) available water capacity. The flooding frequency is occasional. The ponding hazard is none. The minimum depth to a seasonal water table is about 66 inches.

Halsey soils

This component occurs in depressions and drainageways on valley outwash plains and terraces. The parent material consists of loamy glacial deposits derived from schist, limestone and dolomite over sand and gravel. The slope ranges from 0 to 3 percent. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 6.2 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is occasional. The minimum depth to a seasonal high water table is about 4 inches. In Norfolk, this soil has a frigid temperature regime.

Haven soils

This soil occurs on valley outwash plains and terraces. The parent material consists of wind blown deposits over deposits left by melting glaciers derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 5.1 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Hinckley soils

This soil occurs on valley outwash plains, terraces, kames and eskers. The parent material consists of sandy and gravelly deposits left by melting glaciers derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is excessively drained. The slowest permeability within 60 inches is about 5.95 inches per hour (rapid), with about 2.3 inches (very low) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Hollis soils

This soil occurs on upland hills and ridges. The parent material consists of melt-out till derived from granite, gneiss and schist. The depth to a restrictive feature is 10 to 20 inches to bedrock. The drainage class is somewhat excessively drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 1.8 inches (very low) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet.

Leicester soils

This soil occurs on upland drainageways and depressions. The parent material consists of melt-out till derived from granite, schist and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 7.4 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 9 inches.

Loonmeadow soils

This soil occurs on upland depressions and drainageways. The parent material consists of lodgement till derived from dolomite, phyllite, granite, gneiss and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.06 inches per hour (slow), with about 7.3 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is frequent. The minimum depth to a seasonal water table is about 9 inches. The maximum calcium carbonate within 40 inches is 5 percent. This soil has a frigid soil temperature regime. This soil series is named for the Loon Meadow area of east Norfolk.

Medomak soils

This soil occurs on flood plains and depressions. The parent material consists of silty deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 11.3 inches (very high) available water capacity. The flooding frequency is frequent. The ponding hazard is frequent. The minimum depth to a seasonal water table is about 3 inches. This soil has a frigid soil temperature regime.

Merrimac soils

This soil occurs on valley outwash plains, terraces and kames. The parent material consists of sandy deposits left by melting glaciers derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is somewhat excessively drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 4.0 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet. In Norfolk, some Merrimac soils have a frigid temperature regime.

Millsite soils

This soil occurs on upland hills and ridges. The parent material consists of melt-out till derived from gneiss, granite and schist. The depth to a restrictive feature is 20 to 40 inches to bedrock (lithic). The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 3.8 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet. This soil has a frigid soil temperature regime.

Montauk soils

This soil occurs on upland hills and drumlins. The parent material consists of sandy lodgement till derived from granite and gneiss. The depth to a restrictive feature is 20 to 38 inches to firm or very firm material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 3.3 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 27 inches.

Moosilauke soils

This soil occurs on valley outwash plains, drainageways, depressions and terraces. The parent material consists of sandy deposits left by melting glaciers derived from granite, gneiss and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 5.1 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 6 inches. This soil has a frigid soil temperature regime.

Mudgepond soils

This soil occurs on upland drainageways and depressions. The parent material consists of till derived from schist, limestone and dolomite. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 8.9 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 6 inches. The maximum calcium carbonate within 40 inches is about 25 percent.

Ninigret soils

This soil occurs on valley and outwash plain terraces. The parent material consists of wind blown deposits over deposits left by melting glaciers derived from schist, granite and gneiss. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 6.2 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches. In Norfolk, some Ninigret soils have a frigid soil temperature regime.

Occum soils

This soil occurs on flood plains. The parent material consists of deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 5.7 inches (high) available water capacity. The flooding frequency is occasional. The ponding hazard is none. The minimum depth to a seasonal water table is about 63 inches.

Paxton soils
This soil occurs on upland hills and drumlins. The parent material consists of dense unsorted material deposited by a glacier (lodgement till) derived from granite, gneiss and schist. The depth to a restrictive feature is 20 to 40 inches to firm or very firm material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 3.4 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches.

Pootatuck soils
This soil occurs on flood plains. The parent material consists of deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 5.9 inches (high) available water capacity. The flooding frequency is frequent. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches.

Rainbow soils
A compilation error has been found on the digital soil survey map. The area known as Holleran Swamp at the north end of Woodcreek Pond is currently mapped as 43B (Rainbow silt loam, 3 to 8 percent slopes). This should actually be mapped as 438, Bucksport muck. There is no Rainbow soil in Norfolk. The maps accompanying this report have been adjusted accordingly.

Raynham soils
This soil occurs on lake plain terraces, drainageways and depressions. The parent material consists of silty glacial lake bed deposits. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.06 inches per hour (very slow), with about 11.5 inches (very high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 6 inches. The maximum calcium carbonate within 40 inches is about 5 percent.

Raypol soils
This soil occurs on outwash plain terraces, depressions and drainageways. The parent material consists of wind blown deposits over sandy and gravelly deposits left by melting glaciers. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 7.3 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 6 inches.

Ridgebury soils
This soil occurs on upland drainageways and depressions. The parent material consists of lodgement till derived from granite, schist and gneiss. The depth to a restrictive feature is 20 to 30 inches to firm or very firm material. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 2.6 inches (low) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 3 inches.

Rippowam soils
This soil occurs on depressions and flood plains. The parent material consists of deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 6.2 inches (high) available water capacity. The flooding frequency is frequent. The ponding hazard is none. The minimum depth to a seasonal water table is about 9 inches.

Rumney soils
This soil occurs on flood plains and depressions. The parent material consists of loamy deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 8.8 inches (high) available water capacity. The flooding frequency is frequent. The ponding hazard is none. The minimum depth to a seasonal water table is about 9 inches. This soil has a frigid soil temperature regime.

Saco soils
This soil occurs on flood plains, depressions and drainageways. The parent material consists of silty deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 10.1 inches (very high) available water capacity. The flooding frequency is frequent. The ponding hazard is frequent. The minimum depth to a seasonal water table is about 3 inches.

Scarboro soils
This soil occurs on outwash plain terraces, depressions and drainageways. The parent material consists of organic material over sandy deposits left by melting glaciers derived from gneiss, granite and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 4.8 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.8 LEP (low). The flooding frequency is none. The ponding hazard is occasional. The minimum depth to a seasonal water table is about 4 inches. In Norfolk, some Scarboro soils have a frigid temperature regime.

Schroon soils
This soil occurs on upland hills. The parent material consists of melt-out till derived from granite, gneiss and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 7.3 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches. This soil has a frigid soil temperature regime.

Shelburne soils
This soil occurs on upland hills and drumlins. The parent material consists of loamy lodgement till derived from granite, gneiss and schist. The depth to a restrictive feature is 20 to 30 inches to firm or very firm material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 3.5 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches. This soil has a frigid soil temperature regime.

Sudbury soils
This soil occurs on valley outwash plains and terraces. The parent material consists of sandy and gravelly deposits left by melting glaciers derived from granite, gneiss and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 4.2 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 27 inches. In Norfolk, Sudbury soils have a frigid temperature regime.

Sutton soils
This soil occurs on upland hills. The parent material consists of melt-out till derived from granite, gneiss and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 7.5 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches.

Tisbury soils
This soil occurs on valley and outwash plain terraces. The parent material consists of wind blown deposits over sand and gravel. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 6.6 inches (high) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches.

Udifluvents soils
This soil occurs on flood plains. Parent material is deposits left by present day streams and rivers. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 inches per hour (moderate), with about 4.0 inches (high) available water capacity. The flooding frequency is frequent. The ponding hazard is none. The minimum depth to a seasonal water table is about 72 inches.

Udorthents soils
This soil occurs on cuts (road, railroad, etc.), railroad or road beds, urban land, fill and spoil piles. The depth to a restrictive feature varies, but is commonly greater than 60 inches. The drainage class is typically well drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 9.0 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.4 LEP (low). The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 60 inches.

Urban Land
Urban land is land mostly covered by streets, parking lots, buildings and other structures of urban areas. The runoff class is very high.

Walpole soils
This soil occurs on outwash plain terraces, depressions and drainageways. The parent material consists of sandy and gravelly deposits left by melting glaciers from gneiss, granite and schist. The depth to a restrictive feature is greater than 60 inches. The drainage class is poorly drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 5.2 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 6 inches.

Westminster soils
This soil occurs on upland hills and ridges. The parent material consists of melt-out till derived from schist, granite

and gneiss. The depth to a restrictive feature is 10 to 20 inches to bedrock (lithic). The drainage class is somewhat excessively drained. The slowest permeability within 60 inches is about 1.98 inches per hour (moderately rapid), with about 2.2 inches (very low) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.0 LEP (low). The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 6 feet. This soil has a frigid temperature regime.

Whitman soils

This soil occurs on upland drainageways and depressions. The parent material consists of lodgement till derived from gneiss, schist and granite. The depth to a restrictive feature is 12 to 20 inches to firm or very firm material. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 1.9 inches (very low) available water capacity. The flooding frequency is none. The ponding hazard is occasional. The minimum depth to a seasonal water table is about 0 inches.

Wonsqueak soils

This soil occurs on depressions. The parent material consists of woody organic material over loamy unsorted rock debris left by glaciers. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.20 inches per hour (moderately slow), with about 6.8 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 3.6 LEP (moderate). The flooding frequency is rare. The ponding hazard is frequent. The minimum depth to a seasonal water table is about 2 inches. This soil has a frigid soil temperature regime.

Woodbridge soils

This soil occurs on upland drumlins and hills. The parent material consists of lodgement till derived from schist, granite and gneiss. The depth to a restrictive feature is 20 to 40 inches to firm or very firm material. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.00 inches per hour (very slow), with about 3.9 inches (moderate) available water capacity. The flooding frequency is none. The ponding hazard is none. The minimum depth to a seasonal water table is about 24 inches.

Definitions:

Drumlin

A low, smooth, elongated oval hill, mound or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Esker

A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Flood plain

A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Kame

An irregular, short ridge or hill of stratified glacial drift.

Lodgement till

Dense unsorted material deposited by a glacier.

Outwash plain

A landform of mainly sandy or coarse-textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Terrace

A step-like surface, bordering a stream that represents the former position of a flood plain or lake. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the dissected remnants of an abandoned flood plain, stream bed or valley floor produced during a former state of erosion or deposition.

Courtesy Kathy Griswold

Soil Catenas of Norfolk

Deposit	Lithology	Texture	Other	Drainage Class						
				Excessively Drained	Somewhat Excessively Drained	Well Drained	Moderately Well Drained	Somewhat Poorly Drained	Poorly Drained	Very Poorly Drained
Glacial Till (Unsorted Sand, Silt and Rock)	Granite and Schist	Sandy			Gloucester					
	Schist, Granite and Gneiss	Loamy	Shallow soil, less than 20 inches to bedrock		Westminster Hollis					
			Moderately deep soil, 20 to 40 inches to bedrock			Chatfield Millsite				
			Underlain by melt-out till			Charlton Canton Bice	Sutton Schroon		Leicester	Loonmeadow
			Underlain by compact till			Paxton Montauk Shelburne	Woodbridge Ashfield		Ridgebury Brayton	Whitman
	Shale, Sandstone, Basalt and Crystalline Rocks	Loamy	Underlain by compact till				Rainbow*			
	Mixed Limestone and Crystalline Rocks	Loamy							Mudgepond	Alden
Glaciofluvial (Stratified Sand and Gravel)	Acidic Crystalline Rocks	Sandy and Gravelly		Hinckley Boscawen	Merrimac*		Sudbury		Walpole Moosilauke	
		Sandy								Scarboro*
		Loamy/ Sand and Gravel				Agawam*	Ninigret*			
		Silty/Sand and Gravel				Enfield Haven	Tisbury		Raypol	
	Mixed Limestone and Crystalline Rocks	Loamy/ Sand and Gravel				Copake			Fredon	Halsey
Glaciolacustrine (Glacial Lake Deposit)	Mixed Crystalline and Sedimentary Rocks	Silty					Belgrade		Raynham	
		Silty and Clayey					Brancroft			
Alluvial (River Deposits)	Gneiss, Schist, Granite and Quartzite	Loamy				Occum	Pootatuck		Rippowam Rumney	
	Mixed Crystalline and Sedimentary Rocks	Silty				Hadley		Bash		Saco Medomak
Organic		Variable Substrate								Bucksport
		Loamy Substrate								Wonsqueak

Note: Blue type indicates a mean annual soil temperature less than 8º C (>1,300 ft in elevation in Litchfield County, Connecticut)–Frigid Soil Temperature Regime
* Some areas of these soils are frigid (cold) soils and some areas are not frigid. For example, unit 15 is Scarboro muck and unit 435 is Scarboro muck, cold (frigid). See the accompanying list of Norfolk soils for a detailed breakdown. †There is no Rainbow soil in Norfolk; Rainbow (43B) was mistakenly mapped instead of Bucksport muck (438).

Norfolk Soils Table

All Soils of Norfolk

USDA Map Symbol	Soil Type	Frigid	Wetland Classification	Farmland Classification	Acres
2	Ridgebury fine sandy loam		Poorly drained soils	Farmland of statewide importance	5.3
3	Ridgebury, Leicester, and Whitman soils, extremely stony		Poorly & very poorly drained soils	Not prime farmland	31.3
7	Mudgepond silt loam		Poorly drained soils	Farmland of statewide importance	3.9
8	Mudgepond and Alden soils, extremely stony		Poorly & very poorly drained soils	Not prime farmland	1.8
10	Raynham silt loam		Poorly drained soils	Farmland of statewide importance	22.9
12	Raypol silt loam		Poorly drained soils	Farmland of statewide importance	29.4
13	Walpole sandy loam		Poorly drained soils	Farmland of statewide importance	6.3
15	Scarboro muck		Very poorly drained soils	Not prime farmland	3.4
21A	Ninigret and Tisbury soils, 0 - 5% slopes		Non-wetland soils	All areas are prime farmland	18.0
25C	Brancroft silt loam, 8 - 15% slopes		Non-wetland soils	Farmland of statewide importance	4.0
27A	Belgrade silt loam, 0 - 5% slopes		Non-wetland soils	All areas are prime farmland	16.8
29A	Agawam fine sandy loam, 0 - 3% slopes		Non-wetland soils	All areas are prime farmland	8.9
29B	Agawam fine sandy loam, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	5.3
29C	Agawam fine sandy loam, 8 - 15% slopes		Non-wetland soils	Farmland of statewide importance	5.6
31A	Copake fine sandy loam, 0 - 3% slopes		Non-wetland soils	All areas are prime farmland	11.4
32B	Haven and Enfield soils, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	2.1
34B	Merrimac sandy loam, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	12.3
34C	Merrimac sandy loam, 8 - 15% slopes		Non-wetland soils	Farmland of statewide importance	12.5
38C	Hinckley gravelly sandy loam, 3 - 15% slopes		Non-wetland soils	Farmland of statewide importance	16.1
38E	Hinckley gravelly sandy loam, 15 - 45% slopes		Non-wetland soils	Not prime farmland	6.1
43B	Rainbow silt loam - should be mapped as 438		see 438	see 438	82.3
45A	Woodbridge fine sandy loam, 0 - 3% slopes		Non-wetland soils	All areas are prime farmland	2.5
45B	Woodbridge fine sandy loam, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	0.6
45C	Woodbridge fine sandy loam, 8 - 15% slopes		Non-wetland soils	Farmland of statewide importance	1.0
46B	Woodbridge fine sandy loam, 2 - 8% slopes, very stony		Non-wetland soils	Local important farmland	57.3
46C	Woodbridge fine sandy loam, 8 - 15% slopes, very stony		Non-wetland soils	Local important farmland	85.1
47C	Woodbridge fine sandy loam, 2 - 15% slopes, extremely stony		Non-wetland soils	Not prime farmland	13.7
50B	Sutton fine sandy loam, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	11.8
52C	Sutton fine sandy loam, 2 - 15% slopes, extremely stony		Non-wetland soils	Not prime farmland	4.5
57B	Gloucester gravelly sandy loam, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	2.9
57C	Gloucester gravelly sandy loam, 8 - 15% slopes		Non-wetland soils	Farmland of statewide importance	2.2
58B	Gloucester gravelly sandy loam, 3 - 8% slopes, very stony		Non-wetland soils	Local important farmland	3.0
58C	Gloucester gravelly sandy loam, 8 - 15% slopes, very stony		Non-wetland soils	Local important farmland	25.9
59C	Gloucester gravelly sandy loam, 3 - 15% slopes, extremely stony		Non-wetland soils	Not prime farmland	8.9
59D	Gloucester gravelly sandy loam, 15 - 35% slopes, extremely stony		Non-wetland soils	Not prime farmland	61.5
60B	Canton and Charlton soils, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	5.2
60D	Canton and Charlton soils, 15 - 25% slopes		Non-wetland soils	Not prime farmland	6.0
61C	Canton and Charlton soils, 8 - 15% slopes, very stony		Non-wetland soils	Local important farmland	34.1
62C	Canton and Charlton soils, 3 - 15% slopes, extremely stony		Non-wetland soils	Not prime farmland	6.0
62D	Canton and Charlton soils, 15 - 35% slopes, extremely stony		Non-wetland soils	Not prime farmland	92.0
73C	Charlton-Chatfield complex, 3 - 15% slopes, very rocky		Non-wetland soils	Local important farmland	4.2
73E	Charlton-Chatfield complex, 15 - 45% slopes, very rocky		Non-wetland soils	Not prime farmland	34.3
75E	Hollis-Chatfield-Rock outcrop complex, 15 - 45% slopes		Non-wetland soils	Not prime farmland	52.5
84B	Paxton and Montauk fine sandy loams, 3 - 8% slopes		Non-wetland soils	All areas are prime farmland	32.8
84C	Paxton and Montauk fine sandy loams, 8 - 15% slopes		Non-wetland soils	Farmland of statewide importance	19.1
84D	Paxton and Montauk fine sandy loams, 15 - 25% slopes		Non-wetland soils	Not prime farmland	2.7
85B	Paxton and Montauk fine sandy loams, 3 - 8% slopes, very stony		Non-wetland soils	Local important farmland	21.6
85C	Paxton and Montauk fine sandy loams, 8 - 15% slopes, very stony		Non-wetland soils	Local important farmland	17.8
86D	Paxton and Montauk fine sandy loams, 15-35% slopes, extremely stony		Non-wetland soils	Not prime farmland	16.9
101	Occum fine sandy loam		Alluvial and floodplain soils	All areas are prime farmland	3.6
102	Pootatuck fine sandy loam		Alluvial and floodplain soils	All areas are prime farmland	7.3
103	Rippowam fine sandy loam		Alluvial and floodplain soils	Farmland of statewide importance	5.2
104	Bash silt loam		Alluvial and floodplain soils	Farmland of statewide importance	1.0
105	Hadley silt loam		Alluvial and floodplain soils	All areas are prime farmland	9.4
108	Saco silt loam		Alluvial and floodplain soils	Not prime farmland	26.1
109	Fluvaquents-Udifluvents complex, frequently flooded		Alluvial and floodplain soils	Not prime farmland	160.7
302	Dumps		Non-wetland soils	Not prime farmland	23.6
306	Udorthents-Urban land complex		Non-wetland soils	Not prime farmland	88.5
307	Urban land		Non-wetland soils	Not prime farmland	6.7
308	Udorthents, smoothed		Non-wetland soils	Not prime farmland	50.3
309	Udorthents, flood control		Non-wetland soils	Not prime farmland	2.6
	Mesic (warm) soils, total acres				**1356.7**
409B	Brayton mucky silt loam, 0 - 8% slopes, very stony	x	Poorly drained soils	Local important farmland	5.3
412B	Bice fine sandy loam, 3 - 8% slopes	x	Non-wetland soils	All areas are prime farmland	231.0
412C	Bice fine sandy loam, 8 - 15% slopes	x	Non-wetland soils	Farmland of statewide importance	119.2
412D	Bice fine sandy loam, 15 - 25% slopes	x	Non-wetland soils	Not prime farmland	74.7
413C	Bice-Millsite complex, 3 - 15% slopes, very rocky	x	Non-wetland soils	Local important farmland	5175.4
413E	Bice-Millsite complex, 15 - 45% slopes, very rocky	x	Non-wetland soils	Not prime farmland	3545.9
414	Fredon silt loam, cold	x	Poorly drained soils	Farmland of statewide importance	47.3
415C	Westminster-Millsite-Rock outcrop complex, 3 - 15% slopes	x	Non-wetland soils	Not prime farmland	1665.6
415E	Westminster-Millsite-Rock outcrop complex, 15 - 45% slopes	x	Non-wetland soils	Not prime farmland	1988.9
416E	Rock outcrop-Westminster complex, 8 - 45% slopes	x	Non-wetland soils	Not prime farmland	162.4
416F	Rock outcrop-Westminster complex, 45 - 70% slopes	x	Non-wetland soils	Not prime farmland	125.4
417B	Bice fine sandy loam, 3 - 8% slopes, very stony		Non-wetland soils	Local important farmland	646.3

Norfolk Soils Table

All Soils of Norfolk

USDA Map Symbol	Soil Type	Frigid	Wetland Classification	Farmland Classification	Acres
417C	Bice fine sandy loam, 8 - 15% slopes, very stony	x	Non-wetland soils	Local important farmland	1566.0
417D	Bice fine sandy loam, 15 - 25% slopes, very stony	x	Non-wetland soils	Not prime farmland	1229.7
418C	Schroon fine sandy loam, 2 - 15% slopes, very stony	x	Non-wetland soils	Local important farmland	1074.3
420B	Schroon fine sandy loam, 3 - 8% slopes	x	Non-wetland soils	Farmland of statewide importance	52.4
421A	Ninigret fine sandy loam, cold, 0 - 3% slopes	x	Non-wetland soils	All areas are prime farmland	54.0
423A	Sudbury sandy loam, cold, 0 - 3% slopes	x	Non-wetland soils	All areas are prime farmland	73.4
424B	Shelburne fine sandy loam, 3 - 8% slopes	x	Non-wetland soils	Not prime farmland	355.6
424C	Shelburne fine sandy loam, 8 - 15% slopes	x	Non-wetland soils	Not prime farmland	116.6
424D	Shelburne fine sandy loam, 15 - 25% slopes	x	Non-wetland soils	Not prime farmland	18.8
425B	Shelburne fine sandy loam, 3 - 8% slopes, very stony	x	Non-wetland soils	Local important farmland	440.6
425C	Shelburne fine sandy loam, 8 - 15% slopes, very stony	x	Non-wetland soils	Local important farmland	1037.5
426D	Shelburne fine sandy loam, 15 - 35% slopes, extremely stony	x	Non-wetland soils	Not prime farmland	450.4
427B	Ashfield fine sandy loam, 2 - 8% slopes, very stony	x	Non-wetland soils	Local important farmland	785.0
427C	Ashfield fine sandy loam, 8 - 15% slopes, very stony	x	Non-wetland soils	Local important farmland	1539.0
428A	Ashfield fine sandy loam, 0 - 3% slopes	x	Non-wetland soils	Not prime farmland	55.3
428B	Ashfield fine sandy loam, 3 - 8% slopes	x	Non-wetland soils	Not prime farmland	226.1
428C	Ashfield fine sandy loam, 8 - 15% slopes	x	Non-wetland soils	Not prime farmland	75.0
429A	Agawam fine sandy loam, cold, 0 - 3% slopes	x	Non-wetland soils	All areas are prime farmland	6.6
429B	Agawam fine sandy loam, cold, 3 - 8% slopes	x	Non-wetland soils	All areas are prime farmland	58.2
429C	Agawam fine sandy loam, cold, 8 - 15% slopes	x	Non-wetland soils	Farmland of statewide importance	14.1
433	Moosilauke sandy loam	x	Poorly drained soils	Farmland of statewide importance	98.2
434A	Merrimac sandy loam, cold, 0 - 3% slopes	x	Non-wetland soils	All areas are prime farmland	4.1
434B	Merrimac sandy loam, cold, 3 - 8% slopes	x	Non-wetland soils	All areas are prime farmland	65.4
434C	Merrimac sandy loam, cold, 8 - 15% slopes	x	Non-wetland soils	Farmland of statewide importance	32.2
435	Scarboro muck, cold	x	Very poorly drained soils	Not prime farmland	98.5
436	Halsey silt loam, cold	x	Very poorly drained soils	Not prime farmland	6.9
437	Wonsqueak mucky peat	x	Very poorly drained soils	Not prime farmland	575.2
438	Bucksport muck	x	Very poorly drained soils	Not prime farmland	691.2
440A	Boscawen gravelly sandy loam, 0 - 3% slopes	x	Non-wetland soils	Farmland of statewide importance	48.8
440C	Boscawen gravelly sandy loam, 3 - 15% slopes	x	Non-wetland soils	Farmland of statewide importance	485.7
440E	Boscawen gravelly sandy loam, 15 - 45% slopes	x	Non-wetland soils	Not prime farmland	367.6
442	Brayton loam	x	Poorly drained soils	Not prime farmland	44.7
443	Brayton-Loonmeadow complex, extremely stony	x	Poorly drained soils	Not prime farmland	1744.9
503	Rumney fine sandy loam	x	Alluvial and floodplain soils	Farmland of statewide importance	21.5
508	Medomak silt loam	x	Alluvial and floodplain soils	Not prime farmland	158.4
	Frigid soils, total acres				**27459.1**
W	Water		Water	Not prime farmland	838.7

Appendix 3: Aquatic Resources

Fish Abundance in Norfolk

Abundance data for fish collected in streams using electrofishing samples taken by Connecticut DEP Fisheries Division personnel, Norfolk, Connecticut (1988-1994).

Location / Fish Species	Blackberry River BR Inn	Blackberry River above North Brook	Blackberry River STP bridge	Ginger Brook Spaulding Road	Roaring Brook Mountain Road	North Brook Ashpohtag Road	Wood Creek Ashpohtag Road	Spaulding Brook Mountain Road	Hall Meadow Brook Route 272	Hall Meadow Brook behind cemetary
	Fish Abundance									
Coldwater Species										
Brook trout (stocked)	--	P	--	--	--	P	--	--	p	--
Brook trout (wild)	--	--	--	--	--	C	C	C	P	A
Rainbow trout (stocked)	P	--	--	--	--	P	--	--	--	--
Brown trout (stocked)	C	P	P	P	--	P	--	--	--	--
Brown trout (wild) b	VA	A	A	--	--	--	--	--	--	--
Blacknose dace	A	A	VA	VA	VA	A	VA	VA	A	A
Longnose dace	A	C	VA	--	--	--	--	P	C	P
Common shiner	--	--	--	--	--	--	--	C	--	P
Fallfish	--	--	--	--	--	--	--	--	--	--
Tesselated darter	P	--	--	--	--	--	--	--	P	--
White sucker	C	C	C	--	--	--	--	A	C	P
Slimy sculpin	C	P	--	--	--	--	--	--	P	P
Warmwater Species										
Creek chub	P	--	P	VA	--	--	--	A	--	P
Largemouth bass	--		P	--	--	--	--	--	--	P
Bluegill sunfish	--	--	--	--	--	--	--	--	--	P
Pumpkinseed sunfish	P	--	P	--	--	--	P	--	--	P
Redbreast sunfish	--	P	--	--	--	--	--	--	--	--
Rock bass	--	--	--	--	--	--	--	--	--	--
Chain pickerel	--	--	--	--	--	--	P	--	--	--
Yellow perch	--	--	--	--	--	--	--	--	--	--
Golden shiner	--	--	--	--	--	--	--	--	--	--
Migratory Species										
American eel	--	--	--	--	--	--	--	--	--	--

Fish abundance coding:

--- = non-existent in samples
P = present, but in low abundance
C = common
A = abundant
VA = very abundant
b naturalized brown trout (naturally reproducing, but not native)

Freshwater Fishes Likely or Potentially to be Found in Norfolk

Native Fish Species	Common Name	Comments
Ameiurus nebulosus	Brown bullhead	*
Catostomus commersonii	White sucker	*
Erimyzon oblongus	Creek chubsucker	
Esox americanus vermiculatus	Grass pickerel	
Esox niger	Chain pickerel	*
Etheostoma olmstedi	Tessellated darter	*
Fundulus diaphanus	Banded killifish	*
Lepomis auritus	Redbreast sunfish	
Lepomis gibbosus	Pumpkinseed	*
Lepomis macrochirus	Bluegill	*
Luxilus cornutus	Common shiner	*
Notemigonus crysoleucas	Golden shiner	*
Notropis bifreuatus	Bridle shiner	SC
Notropis hudsonius	Spottail shiner	
Perca flavescens	Yellow perch	*
Rhinichthys atratulus	Blacknose dace	*
Rhinichthys cataractae	Longnose dace	*
Salvelinus fontinalis	Brook trout	*
Semotilus corporalis	Fallfish	
Cottus cognatus	Slimy sculpin	* SC
Semotilus atromaculatus	Creek chub	*
Exoglossum maxillingua	Cutlips minnow	
Native Anadromous & Catadromous Species	**Common Name**	**Comments**
Anguilla rostrata	American eel	H
Salmo salar	Atlantic salmon	H
Non- Native Fish Species	**Common Name**	**Comments**
Ambloplites rupestris	Rock bass	
Ameiurus catus	White catfish	
Ameiurus natalis	Yellow bullhead	
Ctenopharyngodon idella	Grass carp	*
Cyprinus carpio	Common carp	
Lepomis cyanellus	Green sunfish	*
Lepomis macrochirus	Bluegill	*
Micropterus dolomieu	Smallmouth bass	
Micropterus salmoides	Largemouth bass	*
Oncorhynchus mykiss	Rainbow trout	*
Salmo trutta	Brown trout	*
Pimephales notatus	Bluntnose minnow	
Pimephales promelas	Fathead minnow	
Pomoxis nigromaculatus	Black crappie	*

Aquatic Invasives

Plants	
Cabomba caroliniana	Carolina fanwort
Egeria densa	Brazilian waterweed
Hydrilla verticillata	Hydrilla, Water-thyme
**Iris pseudacorus*	Yellow iris
**Lythrum salicaria*	Purple loosestrife
Myriophyllum heterophyllum	Variable-leaved or Broadleaf water-milfoil
Myriophyllum spicatum	Eurasian water-milfoil
Najas minor	Brittle waternymph or naiad
**Phragmites australis*	Phragmites
Potamogeton crispus	Curly-leaf pondweed
Trapa natan	Water-chestnut
**Typha angustifolia*	Narrow-leaved cattail
Invertebrates	
Ampullariidae (family)	Apple snail
**Craspedacusta sowerbii*	Freshwater peach-blossom jellyfish
Dreissena polymorpha	Zebra mussel
**Faxonius rusticus*	Rusty crayfish

Key to comments:
* invasive species known to occur in Norfolk as of November 2021
(See page 115, Appendix 4, for non-aquatic invasive plants)
SC – listed as species of special concern by the CT DEEP
H – species known from historical records in Norfolk

Appendix 4: Norfolk Plantscape

This appendix contains lists of the many trees, shrubs, vines, wildflowers, ferns, clubmosses, tree fungi and rare plants to be found in Norfolk. Probably none of these lists is complete, but all the species presented are known to exist in Norfolk. (The Rare Plants list also includes potentially occurring species.) Norfolk's notable trees and a list of invasive species are also included.

The Conservation Commission would welcome any information about the species in this appendix and especially invites new listings or lists for future publication. Scientific (Latin) names for species listed in the following tables are from the Native and Naturalized Vascular Plants of Connecticut Checklist, Connecticut Botanical Society, 2014, and from the Native Plant Trust's Go Botany website (accessed November 2021).

Trees, shrubs and vines

Plants may have two forms of growth determined by the location of growth cells or meristems. All plants, herbaceous or woody, have primary growth that allows the extension of roots and branches. Secondary growth allows plants to put on girth that can result in stronger, long-lived stems and roots. Trees and shrubs have secondary growth, or wood, and are perennial; that is, they can persist for up to hundreds of years. They may be further divided as gymnosperms or conifers (cone-bearing, often referred to as softwoods) and angiosperms or flowering trees (often referred to as hardwoods).

The division between trees and shrubs is somewhat arbitrary. Shrubs are woody plants that have one to many stems and grow to a height of no more than 15 feet, to take a commonly accepted limit. Trees tend to have one stem or trunk and tend to grow to over 15 feet at maturity. Trees that have been injured or cut or live in poor soils may have multiple trunks and grow to less than 15 feet, but they are still trees. However, from a vegetation or habitat perspective these would exist within a shrub or subcanopy layer.

Trees and shrubs are ecologically important for several reasons: they dominate the vegetation of our New England landscape; they create the niches and habitats for our regions plants and animals, including important sources of food and cover for wildlife; they help keep our air and water clean; they help regulate the hydrologic cycle; produce oxygen, and sequester carbon dioxide, a significant greenhouse gas. They also supply us with building and landscape materials, fuel, food and other products. Trees in particular have special places in our history and have inspired people aesthetically, emotionally and spiritually.

Vines may be woody or herbaceous. If herbaceous, they will lack secondary growth and the above-ground parts will die back at the end of the growing season. Woody vines may be thought of as climbing shrubs, although they often exceed 15 feet.

Wildflowers and ferns

Wildflowers may be any woody or herbaceous plants with showy flowers. These include monocots (such as lilies and orchids) and dicots (such as asters, roses and our flowering shrubs), collectively Angiosperms. Gymnosperms do not have showy flowers and include our conifers, such as pines, junipers and spruces.

Shrubs, which are woody plants, are discussed with trees. Herbaceous plants are not woody; that is, they only have primary growth that allows the extension of roots and branches. They may be annuals, which develop, flower and die in one growing season; biennials, which take two years to develop before they flower and then die, or perennials, which can live and flower for many years.

Our native wildflowers are important ecologically; they provide food and cover for many animals, especially insects, which in turn pollinate flowers or are food themselves. A few of our wildflowers supply us with food or medicine, or are important in the landscape trade. Many more wildflowers and other native plants could be used to landscape our yards instead of exotics.

Ferns are non-flowering plants that reproduce by spores rather than seeds. They are classified as Pteridophytes, which also includes clubmosses and horsetails. Their leaves are highly divided, sometimes lacy, fronds that unfurl from their coils in the spring. These plants can dominate wetlands and are common in our woodlands. Many are very attractive and are used for ornamental gardens and house plants.

Notable trees

Witnesses to Norfolk's history, some very old trees still stand here today, having escaped being cut down by farmers or charcoal burners—perhaps spared to shade houses or pastured animals, or to mark land boundaries. Some of them are listed in this appendix, along with others that are notable because of their beauty or size.

To find notable trees, the committee invited nominations from townspeople. The diameter of the trunk at breast height, the height of the tree and the spread of its crown were measured for each tree nominated, and the trees that were remarkable in these categories were selected for the list below. Two from the state's list of notable trees were then verified and added.

The list in this appendix probably could be much longer. Norfolk residents who want to nominate their trees for a future edition are invited to get in touch with the Conservation Commission.

Native Trees

Species	Common Name	Comments*
Abies balsamea	Balsam fir	CT E
Acer negundo	Ashleaf maple, Boxelder	
Acer pensylvanicum	Striped maple, Moosewood	
Acer rubrum	Red maple	
Acer saccharum	Sugar or Hard maple	
Acer saccharinum	Silver maple	
Amelanchier arborea	Downy shadbush	
Amelanchier laevis	Smooth shadbush	
Betula alleghaniensis	Yellow or Bronze birch	(*Betula lutea*)
Betula lenta	Black or Sweet birch	
Betula papyrifera	White or Paper birch	
Betula populifolia	Gray birch	
Carpinus caroliniana	Ironwood, American hornbeam, Bluebeech, Musclewood	
Carya cordiformis	Bitternut hickory	
Carya glabra	Pignut hickory, Sweet pignut	(*Carya ovalis*)
Carya ovata	Shagbark hickory	
Castanea dentata	American chestnut	
Fagus grandifolia	American beech	
Fraxinus americana	White ash	
Fraxinus nigra	Black ash	
Fraxinus pennsylvanica	Green ash	
Juglans cinerea	Butternut	CT W
Juniperus virginiana	Eastern red cedar	
Larix laricina	Tamarack	
Liriodendron tulipifera	Tulip tree, Yellow poplar, Whitewood	
Ostrya virginiana	American Hop-hornbeam	
Picea mariana	Black spruce	
Picea rubens	Red spruce	
Pinus rigida	Pitch pine	H
Pinus strobus	Eastern white pine	
Plantanus occidentalis	American sycamore	
Populus balsamifera	Balsam poplar	H CT W
Populus deltoides	Cottonwood	
Populus grandidentata	Big-tooth aspen	
Populus tremuloides	Quaking aspen	
Prunus americana	American Plum	
Prunus serotina	Black cherry	
Quercus alba	White oak	
Quercus coccinea	Scarlet oak	
Quercus montana	Chestnut oak	(*Quercus prinus*)
Quercus rubra	Northern red oak	
Quercus velutina	Black oak	
Salix nigra	Black willow	
Sorbus americana	American mountain ash	
Tilia americana	American basswood	
Tsuga canadensis	Eastern hemlock	
Ulmus americana	American elm	

CT E – plants listed as endangered by the CT DEEP,
H – plants known from historical records in Norfolk
CT W – CT draft watch list - plants being considered as rare species

* Latin name in ( ) indicates older, synonymous name; name without ( ) indicates a new name, not yet familiar to most; non-native indicates that the plant is not native to the Northeastern habitats found in Norfolk.

Ornamental & Naturalized Trees

Species	Common Name	Comments*
Acer platanoides	Norway maple	non-native, invasive
Acer pseudoplatanus	Sycamore maple	non-native, invasive
Benthamidia florida	Flowering dogwood	native nearby, (*Cornus florida*)
Castanea crenata	Japanese chestnut	non-native
Castanea mollissima	Chinese chestnut	non-native
Catalpa speciosa	Western catalpa	non-native
Chamaecyparis thyoides	Atlantic white cedar	non-native
Fagus sylvatica	European or Copper beech	non-native
Gleditsia triancanthos	Honeylocust	non-native
Juglans nigra	Black walnut	non-native
Larix decidua	European larch	non-native
Liquidambar styraciflua	Sweetgum	native farther south
Magnolia soulangiana	Saucer magnolia	non-native
Magnolia stellata	Star magnolia	non-native
Malus prunifolia/baccata	Crabapple	non-native
Malus pumila	Apple	non-native
Metasequoia glyptostroboides	Dawn redwood	non-native
Morus alba	White mulberry	non-native
Picea abies	Norway spruce	non-native
Picea glauca	White spruce	non-native
Picea pungens	Blue or Colorado spruce	non-native
Pinus nigra	Austrian or European black pine	non-native
Pinus resinosa	Red pine	native nearby
Pinus sylvestris	Scotch pine	non-native
Pinus thunbergiana	Japanese black pine	non-native
Populus nigra italica	Lombardy or Black poplar	non-native
Populus x *jackii*	Balm-of-Gilead	non-native
Pseudotsuga menziesi	Douglas-fir	non-native
Pyrus communis	Pear	non-native
Quercus palustris	Pin oak	non-native
Rhamnus cathartica	Buckthorn	non-native
Robinia pseudoacacia	Black locust	non-native, invasive
Salix alba	White willow	non-native
Salix cinerea	Gray willow	non-native
Salix x *sepulcralis*	Weeping willow	non-native
Sorbus aucuparia	Rowan tree	non-native
Thuja occidentalis	Northern white cedar	native nearby
Tilia cordata	Littleleaf linden	non-native
Tilia x *europaea*	Common linden	non-native

* Latin name in ( ) indicates older, synonymous name; name without ( ) indicates a new name, not yet familiar to most; non-native indicates that the plant is not native to the Northeastern habitats found in Norfolk.

Connecticut Notable Trees in Norfolk

Species	Common Name	DBH+	Height	Spread	Location
Acer pseudoplatanus	Sycamore maple	33.75 inches	73 feet	49.5 feet [A]	Old Colony Rd
Acer pseudoplatanus	Sycamore maple	32.8 inches	61 feet	63.5 feet [A]	Old Colony Rd
Castanea dentata	American chestnut	11 inches	52 feet	23.8 feet	
Cercidiphyllum japonicum	Katsura	50.9 inches *	49 feet	43.5 feet	
Picea rubens (dead)	Red spruce	25 inches	80 feet	28.5 feet	Great Mt. Forest
Pinus strobus	Eastern white pine	36 inches	140 feet	51 feet	Campbell Falls
Populus deltoides	Eastern cottonwood	66.5 inches	111 feet	81.5 feet	
Prunus serotina	Black cherry	45 inches	81 feet	67 feet	
Quercus macrocarpa	Bur oak	45 inches	78 feet	70 feet	
Quercus montana	Chestnut oak	35 inches	104 feet	63 feet	Village Green
Robinia pseudoacacia	Black locust	58 inches	97 feet	50.5 feet	

\+ diameter at breast height (4.5 feet) * measured at 2 feet
A averaged; others are largest in one direction ** measured at base

Other Notable Trees of Norfolk

Species	Common Name	DBH+	Height	Spread	Location
Acer pensylvanicum	Striped maple	8.15 inches	35 feet	20 feet	Aton Forest
Acer saccharinum	Silver maple	66.4 inches	69.3 feet	82.7 feet	Route 44
Acer saccharum	Sugar maple	53.4 inches	77.2 feet	67.2 feet	Route 272
Acer saccharum	Sugar maple	52.9 inches	81.6 feet	64.7 feet	Winchester Rd
Carpinus caroliniana	American hornbeam	8.54 inches			Aton Forest
Cercidiphyllum japonicum	Katsura	61 inches *	60 feet	69 feet	Laurel Way
Fagus grandifolia	American beech	52.5 inches	64 feet	70 feet	Route 272
Fagus grandifolia	American beech	77.2 inches	65.3 feet	77.5 feet	Sunset Ridge
Fagus sylvatica	European beech	51 inches	72 feet	81 feet	Roughland Rd
Fraxinus americana	White ash	40.9 inches	64.7 feet	60.4 feet	Route 272
Juglans nigra	Black walnut	32.5 inches	65.3 feet	55.7 feet	Roughland Rd
Liriodendron tulipifera	Tulip tree	54.7 inches	76.5 feet	91.1 feet	Village Green
Malus pumila	Common apple	42 inches	21.1 feet	32 feet	Laurel Way
Picea abies	Norway spruce	37.1 inches	75.9 feet	42.4 feet	Mountain Rd
Pinus strobus	Eastern white pine	69.8 inches	95.7 feet	42 feet	Mountain Rd
Pinus strobus	White pine (natural dwarf)	18 inches **	40 feet	20 feet	Aton Forest
Platanus occidentalis	American sycamore	35.7 inches	60.7 feet	53.8 feet	Mountain Rd
Quercus rubra (dead)	Red oak	61.8 inches	40.9 feet	22 feet	Old Goshen Rd
Quercus rubra	Red oak	57.5 inches	75.9 feet	97 feet	Shepard Rd
Robinia pseudoacacia	Black locust	59.7 inches	100.9 feet	57.8 feet	Route 272
Tilia americana	Basswood	22 inches	49 feet	20 feet	Aton Forest
Ulmus americana	American elm	30.9 inches	64.7 feet	64 feet	Winchester Rd

\+ diameter at breast height (4.5 feet) * measured at 2 feet
A averaged; others are largest in one direction ** measured at base

Native Shrubs

See invasives list for other, non-native shrubs

Species	Common Name	Comments*
Acer spicatum	Mountain maple	
Alnus incana var. *rugosa*	Speckled alder	(*Alnus rugosa*)
Alnus serrulata	Smooth alder	(*Alnus incana* var. *serrulata*)
Amelanchier canadensis	Eastern Shadbush	
Amelanchier nantucketensis	Nantucket shadbush	
Amelanchier sanguinea	Round-leaved shadbush	H
Andromeda polifolia var. *glaucophylla*	Bog-rosemary	CT T (*Andromeda glaucophylla*)
Aronia floribunda	Purple chokeberry	(*Aronia arbutifolia* var. *atropurpurea*, *Pyrus floribunda*)
Aronia melanocarpa	Black chokeberry	(*Aronia arbutifolia* var. *nigra*,
Pyrus melanocarpa)		
Cephalanthus occidentalis	Buttonbush	
Chamaedaphne calyculata	Leatherleaf	(*Cassandra calyculata*)
Comptonia peregrina	Sweetfern	
Corylus americana	American hazelnut	
Corylus cornuta	Beaked hazelnut	
Crataegus macrosperma	Large-seeded hawthorn	
Dasiphora floribunda	Shrubby cinquefoil	*Dasiphora fruticosa* (*Potentilla fruticosa*)
Decodon verticillatus	Swamp loosestrife, Water-willow	
Diervilla lonicera	Bush-honeysuckle	
Gaylussacia baccata	Black huckleberry	
Gaylussacia bigeloviana	Northern dwarf huckleberry	CT T (*Gaylussacia dumosa* var. *bigelov.*)
Hamamelis virginiana	Witch-hazel	
Ilex laevigata	Smooth winterberry	
Ilex montana	Mountain winterberry, Big-leaved holly	CT W (*Ilex ambigus* var. *montana*)
Ilex mucronata	Mountain holly	(*Nemopanthus mucronatus*)
Ilex verticillata	Common winterberry, Black alder	
Juniperus communis	Common or Pasture juniper	
Kalmia angustifolia	Sheep laurel	
Kalmia latifolia	Mountain laurel	
Kalmia polifolia	Bog laurel, Swamp or Pale laurel	
Lindera benzoin	Spicebush	
Lonicera canadensis	Fly honeysuckle	
Lyonia ligustrina	Maleberry	
Myrica gale	Sweetgale	
Prunus americana	American or Wild plum	
Prunus pensylvanica	Fire or Pin cherry	
Prunus virginiana	Chokecherry	
Rhododendron groenlandicum	Labrador-tea	CT T (*Ledum groenlandicum*)
Rhododendron prinophyllum	Early or Fragrant pink azalea	(*Rhododendron nudiflorum* var. *roseum*)
Rhus typhina	Staghorn sumac	
Ribes cynosbati	Eastern prickly gooseberry	
Ribes glandulosum	Skunk currant	CT SC
Ribes hirtellum	Hairy-stemmed gooseberry	
Ribes triste	Northern or Swamp red currant	CT E
Rosa caroliniana	Pasture or Carolina rose	
Rosa palustris	Swamp rose	
Rosa virginiana	Wild or Virginia rose	
Salix bebbiana	Long-beaked or Bebb's willow	
Salix candida	Sage or Hoary willow	CT W

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Native Shrubs

Species	Common Name	Comments*
Salix discolor	Pussy willow	
Salix eriocephala	Heart-leaved willow	
Salix lucida	Shining willow	
Salix pedicellaris	Bog willow	CT E H (*Salix myrtilloides*)
Salix pentandra	Laurel willow	H, non-native
Salix sericea	Silky willow	
Salix serissima	Autumn willow	CT W
Sambucus nigra ssp. *canadensis*	Black elderberry	(*Sambucus canadensis*)
Sambucus racemosa	Red elderberry	(*Sambucus pubens*)
Spiraea alba var. *latifolia*	White meadowsweet	(*Spiraea latifolia*)
Spiraea tomentosa	Steeplebush, Rosy meadowsweet	
Swida alternifolia	Alternate-leaved or Pagoda dogwood	(*Cornus alternafolia*)
Swida amomum	Silky dogwood	(*Cornus amomum*)
Swida racemosa	Gray dogwood	(*Cornus racemosa*)
Swida rugosa	Round-leaved dogwood	H (*Cornus rugosa*)
Taxus canadensis	American yew	
Vaccinium angustifolium	Lowbush or Late sweet blueberry	
Vaccinium corymbosum	Highbush blueberry	
Vaccinium macrocarpon	Large cranberry	
Vaccinium oxycoccus	Small cranberry	
Viburnum acerifolium	Maple-leaved viburnum	
Viburnum dentatum	Southern arrowwood	
Viburnum lantanoides	Hobblebush	(*Viburnum alnifolium*)
Viburnum lentago	Nannyberry	
Viburnum nudum var. *cassinoides*	Witherod, Northern wild raisin	(*Viburnum cassinoides*)
Viburnum opulus var. *trilobum*	American highbush-cranberry	(*Viburnum opulus* var. *americanum*, *V. trilobum*)

Native Woody Vines

See invasives list for other, non-native vines

Species	Common Name	Comments*
Parthenocissus quinquefolia	Virginia creeper, Woodbine	
Toxicodendron radicans	Poison-ivy	(*Rhus radicans, R. toxicodendron*)
Vitis labrusca	Fox Grape	

Wildflowers

Species	Common Name	Comments*
Achillea millefolium	Yarrow	native and non-native
Acorus calamus	Single-veined sweetflag	non-native
Actaea pachypoda	White baneberry, Doll's eyes	
Actaea racemosa	Black bugbane	W, native and introduced (*Cimicifuga racemosa*)
Actaea rubra	Red baneberry	
Aegopogium podagraria	Goutweed	non-native, invasive
Ageratina altissima	White snakeroot	(*Eupatorium rugosum*)

* Latin name in ( ) indicates older, synonymous name; name without ( ) indicates a new name, not yet familiar to most; non-native indicates that the plant is not native to the Northeastern habitats found in Norfolk.

Species	Common Name	Comments*
Agrimonia gryposepala	Common or Hairy agrimony	
Alisma triviale	Large or Northern water-plantain	
Alliaria petiolata	Garlic-mustard	non-native, invasive
Allium tricoccum	Wild leek, Ramps	
Amaranthus hybridus	Green amaranth, Smooth pigweed	
Ambrosia artemisiifolia	Common ragweed	
Amphicarpaea bracteata	Hog-peanut	
Anaphalis margaritacea	Pearly everlasting	
Anemone acutiloba	Sharp-lobed hepatica	SC (*Hepatica nobilis* var. *acuta, H. acutiloba*)
Anemone americana	Round-lobed or Blunt-lobed hepatica	(*Hepatica nobilis* var. *obtuse, H. americana*)
Anemone canadensis	Canada anemone	T, native and cultivated
Anemone cylindrica	Long-fruited anemone or windflower	
Anemone nemorosa	European windflower	non-native
Anemone quinquefolia	Wood anemone	
Anemone virginiana	Thimbleweed, Tall anemone	(*Anemone riparia*)
Angelica atropurpurea	Great or Purple-stemmed angelica	
Antennaria howellii ssp. *neodioica*	Small pussytoes	H (*Antennaria neodioica*)
Antennaria neglecta	Field pussytoes	
Antennaria parlinii	Smooth or Parlin's pussytoes	
Antennaria plantaginifolia	Plantain-leaved pussytoes	
Anthemis cotula	Stinking chamomile, Mayweed	non-native
Apocynum androsaemifolium	Spreading dogbane	
Apocynum cannabinum	Hemp or upright dogbane	
Aquilegia canadensis	Red columbine	
Arabidopsis thaliana	Mouse-ear thale-cress	non-native
Aralia hispida	Bristly sarsaparilla	
Aralia nudicaulis	Wild sarsaparilla	
Aralia racemosa	American spikenard	
Arceuthobium pusillum	Dwarf mistletoe	E
Arctium minus	Common burdock	non-native
Arethusa bulbosa	Dragon's-mouth	SC ^
Arisaema triphyllum	Jack-in-the-pulpit	
A. triphyllum ssp. *stewartsonii*	Stewartson's Jack-in-the-pulpit	H *(A. stewartsonii)*
Artemisia vulgaris	Mugwort, Common wormwood	non-native, invasive
Asarum canadense	Canada wild ginger	
Asclepias exaltata	Poke milkweed	
Asclepias incarnata	Swamp milkweed	
Asclepias syriaca	Common milkweed	
Asparagus officinalis	Asparagus	non-native
Aureolaria flava	Smooth false foxglove	(*Gerardia flava*)
Aureolaria virginica	Downy yellow false foxglove	(*Gerardia virginica*)
Barbarea vulgaris	Yellow-rocket, Bitter winter-cress	non-native
Bidens cernua	Nodding beggarticks, Marsh tickseed	
Bidens frondosa	Devil's beggarticks	
Blephilia hirsuta	Hairy wood-mint	SC
Boechera laevigata	Smooth rockcress	H, Borodinia laevigata (*Arabis laevigata*)
Boehmeria cylindrica	False nettle	
Brasenia schreberi	Water-shield	
Calla palustris	Wild calla, water arum	

* Latin name in ( ) indicates older, synonymous name; name without ( ) indicates a new name, not yet familiar to most; non-native indicates that the plant is not native to the Northeastern habitats found in Norfolk.

Species	Common Name	Comments*
Calopogon tuberosus	Tuberous grass-pink	(*Calopogon pulchellus*)
Caltha palustris	Marsh-marigold	
Calystegia sepium	Hedge false bindweed	(*Convolvulus sepium*)
Campanula rapunculoides	Creeping bellflower	non-native
Capsella bursa-pastoris	Shepard's purse	non-native
Cardamine diphylla	Two-leaved toothwort	(*Dentaria diphylla*)
Cardamine impatiens	Narrow-leaf bitter-cress	non-native, invasive
Cardamine pensylvanica	Pennsylvania bitter-cress	
Cardamine pratensis	Pink cuckoo flower	non-native
Caulophyllum giganteum	Giant or early blue cohosh	
Caulophyllum thalictroides	Common blue cohosh	
Centaurea stoebe	Spotted knapweed	non-native, invasive (*C. maculosa, C. biebersteinii*)
Cerastium fontanum	Mouse-ear chickweed	non-native (*Cerastium vulgatum*)
Ceratophyllum echinatum	Spineless hornwort, Coontail	
Chamaepericlymenum canadense	Bunchberry, Canada dwarf-dogwood	a sub-shrub (*Cornus candensis*)
Chamerion angustifolium	Narrow-leaved fireweed	(*Epilobium angustifolium*)
Chelidonium majus	Greater celandine	non-native
Chelone glabra	White turtlehead	
Chenopodium album	Lamb's quarters, White goosefoot	non-native
Chimaphila maculata	Spotted wintergreen	
Chimaphila umbellata	Pipsissewa	
Chrysosplenium americanum	American golden-saxifrage	
Cichorium intybus	Chicory, Blue sailors	non-native
Cicuta bulbifera	Bulb-bearing water-hemlock	
Cicuta maculata	Spotted water-hemlock	
Circaea alpina ssp. *alpina*	Small enchanter's-nightshade	
Circaea canadesis	Broad enchanter's-nightshade	(*Circaea quadrisulcata, C. lutetiana*)
Cirsium arvense	Canada or Creeping thistle	non-native, invasive
Cirsium muticum	Swamp thistle	
Claytonia caroliniana	Carolina spring-beauty	
Clematis virginiana	Virginia virgin's-bower	
Clinopodium vulgare	Wild basil	(*Satureja vulgaris*)
Clintonia borealis	Bluebead-lily	
Collinsonia canadensis	Northern horsebalm	
Comarum palustre	Marsh-cinquefoil, Marshlocks	(*Potentilla palustris*)
Conopholis americana	American cancerroot or squawroot	
Convallaria majalis	Lily-of-the-valley	non-native
Coptis trifolia	Goldthread	(*Coptis groenlandica*)
Corallorhiza maculata	Spotted or Large coralroot	
Corallorhiza trifida	Early coralroot	SC
Corydalis sempervirens	Pink corydalis, Rock harlequin	
Cuscuta gronovii	Common dodder	
Cynanchum louiseae	Black swallow-wort	non-native, invasive, *Vincetoxicum nigrum*
Cypripedium acaule	Pink lady's-slipper or moccasin flower	
Cypripedium parviflorum	Yellow lady's-slipper	
Cypripedium reginae	Showy lady's-slipper	E (*Cypripedium spectabile*)
Datura stramonium	Jimsonweed, Thorn-apple	non-native, invasive
Daucus carota	Queen Anne's-lace, Wild carrot	non-native
Decodon verticillatus	Swamp loosestrife, Water-willow	

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Dianthus armeria	Deptford pink	non-native
Dianthus barbatus	Sweet William	H, non-native
Dianthus deltoides	Maiden pink	H, non-native
Dicentra canadensis	Squirrel corn	SC
Dicentra cucullaria	Dutchman's-breeches	
Doellingeria umbellata	Flat-top white-aster	(*Aster umbellatus*)
Draba verna	Spring draba, Common whitlow-grass	non-native
Drosera intermedia	Spatulate-leaved sundew	
Drosera rotundifolia	Round-leaved sundew	
Echium vulgare	Common viper's-bugloss, Blueweed	H, non-native
Elodea canadensis	Common waterweed	
Elsholtzia ciliata	Crested late-summer-mint	non-native, invasive
Epifagus virginiana	Beechdrops	
Epilobium ciliatum	Fringed or Northern willow-herb	(*Epilobium glandulosum*)
Epilobium coloratum	Eastern or Purple-leaved willow-herb	
Epilobium leptophyllum	Bog or Narrow-leaved willow-herb	
Epilobium palustre	Marsh willow-herb	
Epilobium strictum	Downy willow-herb	
Epipactis helleborine	Broad-leaved helleborine	non-native
Erechtites hieracifolius	Fireweed, American burnweed	
Erigeron annuus	Annual fleabane	
Erigeron canadensis	Horseweed, Canada fleabane	(*Erigeron pusillus*, *Conyza canadensis*)
Erigeron philadelphicus	Philadelphia or Common fleabane	
Erigeron pulchellus	Robin's-plantain, Blue fleabane	
Erigeron strigosus	Daisy or Rough fleabane	(*Erigeron annuus* ssp. *strigosus*)
Eriocaulon aquaticum	Common or Seven-angled pipewort	(*Eriocaulon septangulare*)
Erysimum cheiranthoides	Wormseed wallflower	non-native
Erythronium americanum	Trout-lily	
Eupatorium perfoliatum	Boneset	
Euphorbia esula	Leafy spurge	non-native, invasive
Eurybia divaricata	White wood-aster	(*Aster divaricatus*)
Eurybia macrophylla	Large-leaved wood-aster	(*Aster macrophyllus*)
Eurybia schreberi	Schreber's wood-aster	(*Aster schreberi*)
Euthamia graminifolia	Grass-leaved goldenrod	(*Solidago graminifolia*)
Eutrochium maculatum	Spotted Joe-Pye-weed	(*Eupatorium maculatum*)
Fallopia cilinodis	Fringed bindweed	(*Polygonum cilinode*)
Fallopia cristata	Crested bindweed	(*Polygonum cristatum*)
Fallopia japonica	Japanese knotweed	non-native, invasive (*Polygonum cuspidatum*)
Fallopia scandens	Climbing false buckwheat	(*Polygonum scandens*)
Ficaria verna	Lesser celandine, Fig-crowfoot	non-native, invasive, *Ranunculus ficaria*
Fragaria vesca	Woodland strawberry	native and non-native
Fragaria virginiana	Common or Virginia strawberry	native and non-native
Galearis spectabilis	Showy orchid	(*Orchis spectabilis*)
Galeopsis tetrahit	Common or Brittle-stemmed hemp-nettle	H, non-native
Galinsoga quadriradiata	Quickweed, Shaggy soldier	non-native (*Galinsoga ciliata*)
Galium asprellum	Rough bedstraw	
Galium boreale	Northern bedstraw	H
Galium mollugo	Wild madder, White or Whorled bedstraw	non-native

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Galium palustre	Marsh bedstraw	
Galium tinctorium	Stiff three-petaled bedstraw	(*Galium trifidum* ssp. *tinctorium*)
Galium trifidum	Three-petaled or Small bedstraw	
Galium triflorum	Fragrant bedstraw	
Galium verum	Yellow bedstraw	non-native (*Galium wirtgenii*)
Gaultheria hispidula	Creeping snowberry	SC, a sub-shrub
Gaultheria procumbens	Wintergreen, Eastern teaberry	a sub-shrub
Gentiana clausa	Closed gentian or Meadow bottle gentian	
Gentianopsis crinita	Greater fringed-gentian	(*Gentiana crinita*)
Geranium bicknellii	Bicknell's northern crane's-bill	SC H
Geranium maculatum	Wild geranium, Spotted crane's-billl	
Geranium robertianum	Herb-Robert, Mountain crane's-bill	
Geranium sibericum	Siberian crane's-bill	non-native
Geum aleppicum	Yellow avens	
Geum canadense	White avens	
Geum rivale	Purple or water avens	
Geum urbanum	Wood avens, Herb-Bennet	non-native, invasive
Glechoma hederacea	Ground-ivy, Gill-over-the-ground	non-native, invasive
Goodyera pubescens	Downy rattlesnake-plantain	
Goodyera tesselata	Checkered rattlesnake-plantain	H
Helianthus decapetalus	Forest sunflower	
Helianthus tuberosus	Tuberous sunflower, Jerusalem-artichoke	non-native
Hemerocallis fulva 'Europa'	Orange day-lily	non-native cultivar
Heracleum maximum	American cow-parsnip	
Hesperis matronalis	Dame's rocket	non-native, invasive
Heuchera americana	American or Common alumroot	H
Hieracium aurantiacum	Orange hawkweed, Devil's paintbrush	non-native, *Pilosella aurantiaca*
Hieracium caespitosum	Yellow hawkweed	non-native, *Pilosella caespitosum* (*H. pratense*)
Hieracium kalmii	Canada hawkweed	*Hieracium umbellatum* (*H. canadense*)
Hieracium marianum	Maryland hawkweed	H (*Hieracium pennsylvanicum*)
Houstonia caerulea	Azure or Little bluet	
Houstonia longifolia	Longleaf bluet	T
Hydrocotyle americana	American marsh-pennywort	
Hypericum boreale	Northern St. John's-wort	(*Hypericum mutilum* ssp. *boreale*)
Hypericum canadense	Lesser Canada St. John's-wort	
Hypericum ellipticum	Pale St. John's-wort	
Hypericum majus	Greater Canada St. John's-wort	
Hypericum mutilum	Dwarf St. John's-wort	
Hypericum perforatum	Common St. John's-wort	non-native
Hypericum punctatum	Spotted St. John's-wort	
Hypopitys monotropa	Yellow pinesap	*Monotropa hypopitys*
Impatiens capensis	Spotted touch-me-not, Jewelweed	
Impatiens pallida	Pale touch-me-not, Jewelweed	
Iris pseudacorus	Yellow iris	non-native, invasive
Iris versicolor	Blue iris, Northern blue flag	
Krigia virginica	Virginia dwarf-dandelion	
Lactuca biennis	Tall blue lettuce	
Lactuca canadensis	Canada yellow lettuce	
Lactuca hirsuta	Tall hairy lettuce	H

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Laportea canadensis	Canada wood-nettle	
Leonurus cardiaca	Motherwort	non-native
Leucanthemum vulgare	Ox-eye daisy	non-native (*Chrysanthemum leucanthemum*)
Lilium canadense	Canada lily	
Lilium philadelphicum	Wood lily	
Linaria vulgaris	Butter-and-eggs	non-native
Lindernia dubia var. *dubia*	Yellow-seeded false pimpernel	
Linnaea borealis ssp. *americana*	American twinflower	E
Liparis loeselii	Fen or Loesel's wide-lipped orchid	H
Lobelia cardinalis	Cardinal flower	
Lobelia inflata	Indian-tobacco	
Lobelia kalmii	Brook lobelia	
Lobelia spicata	Pale-spike lobelia	
Lotus corniculatus	Birdfoot trefoil	non-native
Ludwigia palustris	Water-purslane, Water-primrose	
Lupinus polyphyllus	Garden or Blue lupine	non-native
Lychnis flos-cuculi	Ragged robin	non-native, invasive (*Silene flos-cuculi*)
Lycopus americanus	American water-horehound	
Lycopus rubellus	Stalked water-horehound	
Lycopus uniflorus	Northern water-horehound or bugleweed	
Lycopus virginicus	Virginia water-horehound, Sweet bugleweed	
Lysimachia borealis	Starflower	(*Trientalis borealis*)
Lysimachia ciliata	Fringed yellow-loosestrife	
Lysimachia nummularia	Moneywort, Creeping yellow-loosestrife	non-native, invasive
Lysimachia quadrifolia	Whorled yellow-loosestrife	
Lysimachia terrestris	Swamp-candles, Swamp yellow-loosestrife	
Lysimachia thyrsiflora	Tufted yellow-loosestrife	H
Lysimachia vulgaris	Garden yellow-loosestrife	non-native, invasive
Lythrum alatum	Winged loosestrife	E H
Lythrum salicaria	Purple loosestrife	non-native, invasive
Maianthemum canadense	Canada mayflower	
Maianthemum racemosum	Feathery false Solomon's seal	(*Smilacina racemosa*)
Maianthemum trifolium	Three-leaved false Solomon's seal	T (*Smilacina trifolia*)
Marsilea quadrifolia	European water-clover, Water-shamrock	H, non-native, invasive
Matricaria discoidea	Pineapple-weed, Rayless chamomile	non-native
Medeola virginiana	Indian cucumber-root	
Medicago lupulina	Black medick	non-native
Melampyrum lineare	Cow-wheat	
Melilotus albus	White sweet-clover	non-native
Melilotus officinalis	Yellow sweet-clover	non-native
Mentha arvensis	Ginger or Wild mint	non-native
Mentha x rotundifolia	Apple or Horse mint	non-native, invasive
Menyanthes trifoliata	Buck bean, Bog bean	
Micranthes pensylvanica	Swamp small-flowered-saxifrage	(*Saxifraga pensylvanica*)
Micranthes virginiensis	Early small-flowered-saxifrage	(*Saxifraga virginiensis*)
Mimulus guttatus	Seep monkeyflower or musk-flower	H, non-native *Erythranthe guttata* (*Mimulus luteus*)
Mimulus ringens	Allegheny monkey flower	
Mitchella repens	Partridgeberry	

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Mitella diphylla	Miterwort	
Mitella nuda	Naked miterwort	SC
Monarda fistulosa	Wild bergamot or bee-balm	
Monarda media	Purple bergamot or bee-balm	native nearby, may be a hybrid
Moneses uniflora	One-flowered shinleaf, Wood nymph	E (*Pyrola uniflora*)
Monotropa uniflora	Indian or Ghost pipe	
Myosotis scorpioides	Forget-me-not	non-native, invasive
Myriophyllum alterniflorum	Alternate-flowered water-milfoil	E
Nabalus altissimus	Tall rattlesnake-root	(*Prenanthes altissima*)
Nabalus trifoliolatus	Three-leaved rattlesnake-root	(*Prenanthes trifoliata*)
Najas flexilis	Nodding or Wavy water-nymph	
Nicandra physalodes	Apple-of-Peru	H, non-native
Nuphar x rubrodisca	Intermediate pond-lily	H
Nuphar variegata	Yellow or Bullhead pond-lily, Spatter-dock	(*Nuphar lutea* ssp. *variegata, N. variegatum)*
Nuttallanthus canadensis	Oldfield-toadflax, blue toadflax	(*Antirrhinum canadense, Linaria canadensis*)
Nymphaea odorata	White water-lily	
Oclemena acuminata	Whorled aster, sharp-toothed nodding-aster	(*Aster acuminatus*)
Oenothera biennis	Common evening-primrose	
Onopordum acanthium	Scotch cotton-thistle	non-native, invasive
Ornithogalum umbellatum	Star-of-Bethlehem	non-native, invasive
Osmorhiza claytonii	Bland sweet-cicely	
Osmorhiza longistylis	Anise-root, Long-styled sweet-cicely	
Oxalis montana	Northern wood-sorrel	(*Oxalis acetosella*)
Oxalis stricta	Common or Upright yellow wood-sorrel	(*Oxalis europaea*)
Pachysandra terminalis	Japanese pachysandra	non-native
Packera aurea	Golden ragwort or groundsel	(*Senecio aureus*)
Packera obovata	Round-leaved ragwort, Running groundsel	(*Senecio obovatus*)
Packera paupercula	Balsam groundsel or ragwort	T (*Senicio balsamitae*)
Panax trifolius	Dwarf ginseng	
Parnassia glauca	Fen grass-of-Parnassus	
Pastinaca sativa	Wild parsnip	non-native
Peltandra virginica	Green arrow-arum, Tuckahoe	
Penstemon digitalis	Foxglove beardtongue	
Penthorum sedoides	Ditch-stonecrop	
Persicaria arifolia	Halberd-leaved tearthumb or smartweed	(*Polygonum arifolium*)
Persicaria lapathifolia	Nodding, Pale or Dock-leaved smartweed	(*Polygonum lapathifolium*)
Persicaria longiseta	Oriental lady's-thumb	non-native, invasive (*Polygonum caespitosum*)
Persicaria maculosa	Spotted lady's-thumb	non-native (*Polygonum persicaria*)
Persicaria sagittata	Arrow-leaved tearthumb	(*Polygonum sagittatum*)
Persicaria virginiana	Jumpseed, Virginia knotweed	(*Polygonum virginianum, Tovara virginiana*)
Phlox paniculata	Garden phlox	non-native
Phytolacca americana	American pokeweed	
Pilea pumila	Canada clearweed	
Plantago lanceolata	English plantain, Narrow-leaved plantain	non-native
Plantago major	Common plantain, Broad-leaved plantain	non-native
Platanthera aquilonis	North wind bog-orchid	H (*Platanthera hyperborea*)
Platanthera blephariglottis	White fringed bog-orchid	E (*Habenaria blephariglottis*)

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Platanthera clavellata	Green wood orchid, Club-spur bog-orchid	(*Habenaria clavellata)*
Platanthera dilatata	White bog-orchid	SC H (*Habenaria dilatata*)
Platanthera grandiflora	Greater purple fringed bog-orchid	(*Blephariglottis grandiflora, Habenaria fimbriata*)
Platanthera hookeri	Hooker bog-orchid	SC H (*Habenaria hookeri*)
Platanthera lacera	Green fringed bog-orchid	(*Blephariglottis lacera, Habenaria lacera*)
Platanthera orbiculata	Round-leaved bog-orchid	SC H *(Habenaria orbiculata*)
Platanthera psycodes	Lesser purple fringed bog-orchid	(*Blephariglottis psycodes, Habenaria psycodes*)
Podophyllum peltatum	Mayapple	H (also extant introduced populations)
Pogonia ophioglossoides	Rose pogonia, Snakemouth orchid	
Polygonatum biflorum	Smooth or Great Solomon's seal	
Polygonatum pubescens	Hairy Solomon's seal	
Polygonum aviculare	Dooryard knotweed	non-native
Polygonum erectum	Upright or Erect knotweed	non-native
Pontederia cordata	Pickerelweed	
Potamogeton amplifolius	Big-leaved pondweed	
Potamogeton epihydrus	Ribbon-leaved pondweed	
Potamogeton natans	Floating-leaved pondweed	
Potamogeton nodosus	Long-leaved pondweed	
Potamogeton oakesianus	Oakes' pondweed	
Potamogeton pusillus	Small pondweed	
Potamogeton robbinsii	Robbins' pondweed	
Potamogeton spirillus	Northern snail-seed or Spiral pondweed	
Potamogeton zosteriformis	Flat-stemmed or Eel-grass pondweed	H
Potentilla argentea	Silvery or Silver-leaved cinquefoil	non-native
Potentilla canadensis	Dwarf or Early cinquefoil	
Potentilla indica	Indian or Mock strawberry	non-native, *Duchesnea indica* (*Fragaria indica*)
Potentilla recta	Sulphur cinquefoil	non-native
Potentilla simplex	Common or Old-field cinquefoil	
Proserpinaca palustris	Marsh mermaidweed	
Prunella vulgaris	Selfheal	native and non-native subspecies
Pycnanthemum tenuifolium	Narrow-leaved mountain-mint	(*Pycnanthemum flexosum*)
Pyrola americana	American or Round-leaved shinleaf	(*Pyrola rotundifolia* var. *americana*)
Pyrola chlorantha	Green-flowered shinleaf	W H (*Pyrola virens*)
Pyrola elliptica	Elliptic-leaved shinleaf	
Ranunculus abortivus	Small-flowered crowfoot	
Ranunculus acris	Common or Tall buttercup	non-native
Ranunculus bulbosus	Bulbous buttercup	non-native, invasive
Ranunculus caricetorum	Swamp buttercup	(*Ranunculus septentrionalis*)
Ranunculus hispidus	Bristly buttercup	
Ranunculus recurvatus	Hooked buttercup	
Rorippa palustris	Common or Marsh yellow-cress	(*Rorippa islandica, R. hispida*)
Rubus allegheniensis	Common blackberry	
Rubus canadensis	Smooth blackberry	
Rubus flagellaris	Common or Northern dewberry	
Rubus hispidus	Bristly dewberry	
Rubus idaeus	Red raspberry	native and non-native varieties
Rubus occidentalis	Black raspberry	

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Rubus odoratus	Flowering raspberry	
Rubus pensilvanicus	Pennsylvania blackberry	
Rubus pubescens	Dwarf raspberry	(*Rubus triflorus*)
Rudbeckia hirta	Black-eyed Susan	non-native (there is a native variety nearby)
Rudbeckia laciniata	Green-headed of Cutleaf coneflower	
Rumex acetosella	Sheep sorrel	non-native, invasive
Rumex crispus	Curly dock	non-native
Rumex obtusifolius	Bitter dock	non-native
Sagittaria latifolia	Common or Broadleaf arrowhead	
Sanguinaria canadensis	Bloodroot	
Sanicula marilandica	Maryland sanicle	
Saponaria officinalis	Soapwort, Bouncing Bet	non-native
Sarracenia purpurea	Northern purple pitcher-plant	
Scorzoneroides autumnalis	Fall-dandelion	non-native (*Leontodon autumnalis*)
Scrophularia lanceolata	Lance-leaved figwort	H (*Scrophularia leporella*)
Scutellaria galericulata	Common, Hooded or Marsh skullcap	(*Scutellaria epilobiifolia*)
Scutellaria lateriflora	Mad-dog or Side-flowering skullcap	
Securigera varia	Purple crown-vetch	non-native (*Coronilla varia*)
Sibbaldiopsis tridentata	Three-toothed-cinquefoil	T (*Potentilla tridentata*)
Silene antirrhina	Sleepy campion or catchfly	H
Silene dichotoma	Forked campion or catchfly	H, non-native
Silene latifolia	White campion or catchfly	non-native
Silene noctiflora	Night-flowering campion	H, non-native
Silene vulgaris	Bladder campion	non-native (*Silene cucubalus*)
Sinapis arvensis	Corn charlock	non-native
Sisymbrium officinale	Common hedge-mustard	non-native
Sisyrinchium angustifolium	Narrow-leaved or Stout blue-eyed-grass	
Sisyrinchium atlanticum	Eastern blue-eyed-grass	
Sisyrinchium montanum	Strict or Common blue-eyed-grass	
Sisyrinchium mucronatum	Needle-tipped or Slender blue-eyed-grass	H
Sium suave	Water-parsnip	
Smilax herbacea	Carrion-flower	
Sobaria sorifolia	False spiraea	non-native
Solanum dulcamara	Bittersweet nightshade	non-native, invasive
Solidago altissima	Tall goldenrod	(*Solidago canadensis* var. *scabra*)
Solidago arguta	Forest or Cut-leaf goldenrod	
Solidago bicolor	Silverrod, White goldenrod	
Solidago caesia	Blue-stemmed goldenrod	
Solidago canadensis	Canada goldenrod	
Solidago flexicaulis	Zig-zag goldenrod	(*Solidago latifolia*)
Solidago gigantea	Smooth goldenrod	
Solidago juncea	Early goldenrod	
Solidago nemoralis	Gray goldenrod	
Solidago odora	Anise-scented or Sweet goldenrod	
Solidago patula	Rough-leaved or Swamp goldenrod	
Solidago puberula	Downy goldenrod	
Solidago rugosa	Wrinkle-leaved goldenrod	
Solidago uliginosa	Bog goldenrod	H
Sonchus arvensis	Field sow-thistle	non-native
Sonchus oleraceus	Common sow-thistle	non-native

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Sparganium americanum	American bur-reed	
Sparganium fluctuans	Floating bur-reed	E
Spergula arvensis	Corn spurry	H, non-native
Spiranthes cernua	Nodding ladies'-tresses	
Spiranthes lacera	Slender ladies'-tresses	(*Spiranthes gracilis*)
Spiranthes ochroleuca	Yellow ladies'-tresses	(*Spiranthes cernua* var. *ochroleuca*)
Spiranthes romanzoffiana	Hooded ladies'-tresses	H ^
Stellaria borealis	Northern stitchwort	SC H (*Stellaria calycantha*)
Stellaria graminea	Lesser or Grass-leaved stitchwort	non-native
Stellaria media	Common chickweed	non-native
Streptopus lanceolatus	Rose mandarin or twisted-stalk	(*Streptopus roseus*)
Succisella inflexa	Southern succisella	non-native
Symphyotrichum cordifolium	Heart-leaved American-aster	(*Aster cordifolius*)
Symphyotrichum dumosum	Bushy American-aster	H (*Aster dumosus*)
Symphyotrichum ericoides	White heath American-aster	(*Aster ericoides*)
Symphyotrichum lanceolatum	Panicled American-aster	(*Aster lanceolatus, Aster simplex*)
Symphyotrichum lateriflorum	Calico American-aster	(*Aster lateriflorus*)
Symphyotrichum lowrieanum	Lowrie's American-aster	H (possibly a hybrid) (*Aster lowrieanus*)
Symphyotrichum novae-angliae	New England American-aster	(*Aster novae-angliae*)
Symphyotrichum novi-belgii	New York American-aster	(*Aster novi-belgii*)
Symphyotrichum patens	Late purple American-aster	(*Aster patens*)
Symphyotrichum puniceum	Swamp or Purple-stemmed American-aster	(*Aster puniceus*)
Symphyotrichum undulatum	Wavy-leaved American-aster	(*Aster undulatus*)
Taraxacum officinale	Common dandelion	non-native
Thalictrum dioicum	Early meadow-rue	
Thalictrum pubescens	Tall meadow-rue	(*Thalictrum polygonum*)
Thalictrum thalictroides	Anemone meadow-rue, Rue-anemone	(*Anemonella thalictroides*)
Tiarella cordifolia	Foamflower	
Tragopogon pratensis	Yellow goat's-beard, Meadow salsify	non-native
Triadenum virginicum	Virginia marsh-St. John's-wort	*Hypericum virginicum*
Trifolium arvense	Rabbit-foot clover	non-native
Trifolium aureum	Yellow clover, Palmate hop clover	non-native (*Trifolium agrarium*)
Trifolium hybridum	Alsike clover	non-native
Trifolium pratense	Red clover	non-native
Trifolium repens	White clover	non-native
Trillium erectum	Red trillium	
Trillium undulatum	Painted trillium	
Turritis glabra	Tower-mustard	(*Arabis glabra*)
Tussilago farfara	Coltsfoot	non-native, invasive
Typha angustifolia	Narrow-leaved cattail	non-native, invasive
Typha latifolia	Common or Broad-leaved cattail	
Urtica dioica	Stinging nettle	native and non-native subspecies
Utricularia cornuta	Horned bladderwort	(*Stomoisia cornuta*)
Utricularia geminiscapa	Mixed or Hidden-fruit bladderwort	(*Utricularia clandestina*)
Utricularia gibba	Humped bladderwort	(*Utricularia biflora*)
Utricularia purpurea	Eastern purple bladderwort	
Utricularia radiata	Floating bladderwort	(*Utricularia inflata* var. *radiata*)
Utricularia vulgaris	Common or Greater bladderwort	
Uvularia perfoliata	Perfoliate bellwort	H
Uvularia sessilifolia	Wild oats, Sessile-leaved bellwort	
Valeriana officinalis	Garden heliotrope, Common valerian	non-native, invasive

* Latin name in ( ) indicates older, synonymous name; name without ( ) indicates a new name, not yet familiar to most; non-native indicates that the plant is not native to the Northeastern habitats found in Norfolk.

Species	Common Name	Comments*
Veratrum viride	False hellebore	
Verbascum thapsus	Common mullein	non-native
Verbena hastata	Blue vervain, Swamp verbena	
Veronica americana	American speedwell	
Veronica anagallis-aquatica	Blue water speedwell	non-native
Veronica arvensis	Corn speedwell	non-native
Veronica chamaedrys	Germander speedwell	H, non-native
Veronica officinalis	Common speedwell	non-native
Veronica serpyllifolia	Thyme-leaved speedwell	non-native
Vicia cracca	Tufted or Cow vetch	non-native
Vinca minor	Periwinkle	non-native
Viola blanda	Sweet white violet	(*Viola incognita*)
Viola canadensis	Canada white violet	SC
Viola cucullata	Marsh blue violet	
Viola labradorica	American dog violet	(*Viola conspersa*)
Viola pallens	Northern or Small white violet	*Viola macloskey, V. minuscula*
Viola pubescens	Downy yellow violet	(*Viola eriocarpa*)
Viola renifolia	Kidney-leaved white violet	SC H
Viola rostrata	Long-spurred violet	H
Viola rotundifolia	Round-leaved yellow violet	
Viola sagittata var. *sagittata*	Arrowleaf violet	*Viola sagittata*
Viola sagittata var. *ovata*	Downy blue violet	*Viola fimbriatula*
Viola sororia	Woolly or Common blue violet	(*Viola septentrionalis*)
Xyris difformis	Bog yellow-eyed-grass	
Xyris montana	Northern yellow-eyed-grass	T
Zizia aurea	Golden Alexanders	

Scientific Latin names without ( ) indicates a presently accepted name or one in transition of being changed; a Latin name in ( ) indicates an older, synonymous name; a native plant is one whose occurrence in the Northeast predates European settlement in North American and recorded growing wild in the Northeastern habitats found in Norfolk; native nearby – a plant that is non-native to Norfolk but is native to Southern New England or Eastern New York; non-native – a plant not native to the Northeastern habitats found in Norfolk; invasive – a naturalized non-native plant that has spread widely and causes, or potentially causes, harm

Key to comments:
E – plants listed as endangered by the CT Department of Energy and Environmental Protection, 2015
T – plants listed as threatened by the CT DEEP
SC – plants listed as species of special concern by the CT DEEP
US E - Federal endangered species
US T - Federal threatened species
H – plants known from historical records in Norfolk
^ – considered to be extirpated from the state
W – CT draft watch list - plants being considered as rare species

Contributions
Herbarium specimen data provided by: Yale Peabody Museum of Natural History, University of Connecticut, Harvard University, University of New Hampshire, University of Vermont, Central Connecticut State University, Western Connecticut State University, New York Botanical Garden, Boston University, Université de Montréal Biodiversity Centre, Connecticut College, Westfield State University (Accessed through the Consortium of Northeastern Herbaria web site, www.neherbaria.org, 2022-01-22 through 2022-09-12)
John Anderson, naturalist & consulting vegetation scientist
William Moorhead, consulting botanist & CT State Botanist
King's Mark Environmental Review Reports, CT DEP
iNaturalist Observations (Accessed through the iNaturalist website, www.inaturalist.org, 2022-01-22 through 2022-09-12)
Connecticut Botanical Society Native and Naturalized Plants of Connecticut Checklist, 2014
Native Plant Trust (Accessed through the Go Botany website, www.gobotany.nativeplanttrust.org, 2022-01-22 through 2022-09-12)
Flora of North America (Accessed through the Flora of North America website, www.efloras.org, 2022-01-22 through 2022-09-12)
Connecticut Department of Energy and Environmental Protection Endangered, Threatened, and Species of Special Concern (Accessed through the Connecticut State website, www.ct.gov/DEEP/Endangered-Species, 2022-01-22 through 2022-09-12)
Connecticut Invasive Plant Working Group Invasive Plant List & Early Detection and Research Lists (Accessed through the University of Connecticut website, www.cipwg.uconn.edu, 2022-01-22 through 2022-09-12)

Ferns

Species	Common Name	Comments*
Adiantum pedatum	Northern maidenhair fern	
Asplenium rhizophyllum	Walking fern or spleenwort	H
Asplenium trichomanes	Maidenhair spleenwort	H
Athyrium angustum	Northern or Narrow lady fern	(*Athyrium filix-femina*)
Botrychium angustisegmentum	Narrow triangle moonwort	(*Botrychium lanceolatum* ssp. *a.*)
Botrychium dissectum	Cut-leaved or Evergreen grapefern	*Sceptridium dissectum*
Botrychium matricariifolium	Daisyleaf grapefern	
Botrychium virginianum	Deciduous grapefern, Rattlesnake fern	
Cystopteris bulbifera	Bulblet fragile fern	
Cystopteris tenuis	Mackay's fragile fern	(*Cystopteris fragilis*)
Dennstaedtia punctilobula	Hay-scented fern	
Deparia acrostichoides	Silvery false spleenwort or glade fern	(*Diplazium a.*, *Asplenium a.*, *Athyrium thelypteroides*)
Diplazium pycnocarpon	Narrow-leaved glade fern	CT E *Homalosorus pycnocarpos*
Dryopteris x bootii	Hybrid wood or shield fern	*D. cristata* x *D. intermedia*
Dryopteris campyloptera	Mountain wood or shield fern	CT E (*D. austriaca*, *D. spinulosa* var. *americana*)
Dryopteris carthusiana	Spinulose wood fern or shield fern	(*Dryopteris spinulosa*, *Dryopteris austriaca* var. *s.*)
Dryopteris clintoniana	Clinton's wood or shield fern	(*Dryopteris cristata* var. *clintoniana*)
Dryopteris cristata	Crested wood fern	(*Aspidium cristata*)
Dryopteris goldiana	Goldie's wood fern	CT SC *Dryopteris goldieana*
Dryopteris intermedia	Evergreen wood or shield fern	
Dryopteris marginalis	Marginal wood or shield fern	
Dryopteris x triploidea	Hybrid wood or shield fern	*D. carthusiana* x *D. intermedia*
Gymnocarpium dryopteris	Northern oak fern	
Matteuccia struthiopteris	Ostrich fern	
Onoclea sensibilis	Sensitive fern	
Osmunda claytoniana	Interrupted fern	
Osmunda regalis	Royal fern	*Osmunda spectabilis*
Osmundastrum cinnamomeum	Cinnamon fern	(*Osmunda cinnamomea*)
Parathelypteris noveboracensis	New York or Tapering fern	*Amauropelta n.* (*Thelypteris n.*, *Dryopteris n.*
Parathelypteris simulata	Massachusetts fern (Thelypteris *s.*, Dryopteris *s.*)	*Coryphopteris simulata*
Phegopteris connectilis	Narrow or Long beech fern	(*Thelypteris phegopteris*, *Dryopteris phegopteris*)
Phegopteris hexagonoptera	Broad beech fern	(*Thelypteris h.*, *Dryopteris h.*)
Polypodium appalachianum	Appalachian polypody	(*Polypodium virginianum forma acuminatum*)
Polypodium virginianum	Common polypody	(*Polypodium vulgare*)
Polystichum acrostichoides	Christmas fern	
Pteridium aquilinum	Bracken	
Thelypteris palustris	Marsh fern	(*Dyropteris thelypteris*)
Trichomanes intricatum	Appalachian bristle fern, Weft fern	CT SC *Crepidomanes intricatum*

Clubmosses

Species	Common Name	Comments*
Dendrolycopodium dendroideum	Ground-pine, Prickley tree-clubmoss	(*Lycopodium obscurum* var. *dendroideum*)
Dendrolycopodium hickeyi	Ground-pine, Hickey's tree-clubmoss	(*Lycopodium obscurum* var. *isophyllum*)
Dendrolycopodium obscurum	Princess-pine, Flat-branched tree-clubmoss	(*Lycopodium obscurum*)
Diphasiastrum digitatum	Ground-cedar, Southern running-pine	(*Lycopodium complanatum* var. *flabelliforme*)
Huperzia lucidula	Shining fir-moss or clubmoss	(*Lycopodium lucidulum*)
Lycopodiella alopecuroides	Foxtail bog-clubmoss	E H
Lycopodiella inundata	Northern bog club-moss	(*Lycopodium inundatum*)
Lycopodium clavatum	Common clubmoss, Running-pine	
Lycopodium lagopus	One-cone clubmoss	H (*Lycopodium clavatum* var. *lagopus*)
Spinulum annotinum	Bristly clubmoss	(*Lycopodium annotinum*)

* Latin name in ( ) indicates older, synonymous name; name without ( ) indicates a new name, not yet familiar to most; non-native indicates that the plant is not native to the Northeastern habitats found in Norfolk.

Tree Fungi Identified in Norfolk

This list of saprophytic and parasitic fungi identified in Norfolk between 2003 and 2008 is a first, partial survey of fungi that consume trees and affect their structural health. It does not include fungi that affect shoots and leaves, nor does it include lichens or fungi that live in the soil.

Species	Common Name	Trees Affected
Apiognomonia venta	Sycamore anthracnose	Sycamore
Apioperdon pyriforme	Stump puffball	Dead hardwoods & conifers
Apiosporina morbosa	Black knot	Cherries, peaches, plums
Armillaria mellea	Shoestring root rot, Honey fungus	Hardwoods & conifers
Ceratocystis ulmi ^	Dutch elm disease ^	American elms
Cerioporus squamosus	Dryad's-saddle	Dead hardwoods
Cerrena unicolor	Canker rot, Mossy maze polypore	Paper birches, Sugar maples
Climacodon septentrionalis	Northern tooth fungus	Beeches, Maples
Cryphonectria parasitica ^	Chestnut blight ^	American chestnuts & other hardwoods
Eutypella parasitica	Eutypella canker	Maples
Fomes fomentarius	Tinder fungus	Birches & other hardwoods
Ganoderma applanatum	Artist's conk	Dead hardwoods
Ganoderma tsugae	Hemlock varnish shelf	Hemlocks

^ non-native invasive species

Tree Fungi Identified in Norfolk

Species	Common Name	Trees Affected
Grifola frondosus	Hen-of-the-woods	Mature Oaks, Maples & other hardwoods
Gymnosporangium juniperi-virginianae	Cedar-apple rust	Eastern red-cedars, junipers, apples
Hericium coralloides	Coral tooth fungus	Dead hardwoods
Hydnochaete olivacea	Brown-toothed crust	Dead hardwoods
Inonotus dryadeus	Oak bracket	Oaks & other hardwoods
Inonotus obliquus	Clinker polypore, Chaga	Birches
Kretzschmaria deusta	Butt rot, Brittle cinder	Hardwoods *(Hypoxylon deustum)*
Laetiporus sulphureus	Chicken-of-the-woods, Sulfur mushroom	Mature & dead hardwoods
Lentinellus ursinus	Bear lentinus	Hardwoods
Nectria coccinea var. *faginata*	Beech bark disease	Beech
Nectria ditissima	Nectria canker	Apples, Beech & other hardwoods
Omphalotus illudens	Jack-o'lantern mushroom	Dead hardwoods
Perenniporia fraxinophila	Ash heart rot	Ashes
Phaeolus schweinitzii	Velvet-top fungus	Conifers
Phellinus pini	Red-heart-of-pine	Pines & other conifers
Phellinus punctatus	Elbow-patch crust	Dead hardwoods
Phellinus robineae	Cracked cap polypore	Black locusts & other hardwoods
Phellinus tremulae	White heartwood rot	Trembling aspens
Piptoporus betulinus	Birch polypore	Birches
Schizophyllum commune	Wood decay, Split gill	Dead hardwoods
Stereum rameale	Crowded parchment	Peaches & other hardwoods
Trametes versicolor	Turkey tail	Dead hardwoods
Xylobolus frustulatus	Ceramic parchment fungus	Dead Oaks

^ non-native invasive species

Invasive Non-native Plant Species

Of particular concern in Norfolk

Species	Common Name
Acer platanoides	Norway maple
Aegopogium podagraria	Goutweed
Alliaria petiolata	Garlic mustard
Ampelopsis brevipedunculata	Porcelainberry
Artemisia vulgaris	Mugwort
Berberis thunbergii	Japanese barberry
Celastrus orbiculatus	Oriental bittersweet
Euonymus alatus	Winged euonymus
Fallopia japonica	Japanese knotweed
Frangula alnus	Glossy buckthorn
Lonicera morrowii, L. tatarica, L. x bella	Honeysuckles
Lythrum salicaria	Purple loosestrife
Microstegium vimineum	Japanese stiltgrass
Phragmites australis	Common reed
Robinia pseudoacacia	Black locust
Rosa multiflora	Multiflora rose
Valeriana officinalis	Garden heliotrope

Also found invasive or escaped in Norfolk

Species	Common Name	Species	Common Name
Acer pseudoplatanus	Sycamore maple	*Ligustrum ovalifolium*	California privet
Akebia quinata	Five-leaved akebia	*Ligustrum vulgare*	European privet
Aralia elata	Japanese angelica-tree	*Lychnis flos-cuculi*	Ragged robin
Berberis vulgaris	European barberry	*Lysimachia nummularia*	Moneywort
Cardamine impatiens	Narrowleaf bittercress	*Lysimachia vulgaris*	Garden loosestrife
Centaurea stroebe	Spotted knapweed	*Lupinus polyphyllus*	Large-leaved or Blue lupine
Cercidiphyllum japonicum	Katsura-tree		
Cirsium arvense	Canada thistle	*Mentha x rotundifolia*	Apple or Horse mint
Cynanchum louiseae	Black swallow-wort	*Myosotis scorpiodes*	Forget-me-not
Datura stramonium	Jimsonweed	*Nasturtium officinale*	Watercress
Elaeagnus umbellatus	Autumn-olive	*Onopordum acanthium*	Scotch thistle
Elsholtzia ciliate	Crested late-summer mint	*Ornithogalum umbellatum*	Star-of-Bethlehem
Euphorbia esula	Leafy spurge	*Phalaris arundinacea*	Reed canary grass
Geum urbanum	Herb-Bennet	*Poa compressa*	Canada bluegrass
Glechoma hederacea	Ground-ivy	*Polygonum caespitosum*	Oriental lady's-thumb
Hesperis matronalis	Dame's rocket	*Ranunculus bulbosus*	Bulbous crowfoot
Iris pseudacorus	Yellow iris	*Ranunculus ficaria*	Lesser celandine

See page 95, Appendix 3, for aquatic invasive plants.

Rare Plants

State-listed rare plants occurring or potentially occurring in Norfolk (a modified adaption of the King's Mark ERT Review Of Yale Farm Golf Club Northwest Conservation District Botany Team Report, 2003)
* Known to occur or have occurred in Norfolk

Species	Common Name	Comments*
Abies balsamea	Balsam fir (native populations only)	E
*Actaea racemosa**	Black bugbane	W
Agastache nepetoides	Catnip giant-hyssop	E
Agrimonia parviflora	Southern agrimony	W
Alopecurus aequalis	Short-awned meadow-foxtail	T
Andromeda polifolia var. *glaucophylla* *	Bog-rosemary	CT T
Anemone acutiloba *	Sharp-lobed hepatica	SC
Anemone canadensis *	Canada windflower or anemone	T
Antennaria howellii ssp. *petaloidea*	Field pussytoes	SC H
Arceuthobium pusillum *	Dwarf mistletoe	E
*Arethusa bulbosa**	Dragon's-mouth	SC H
Asclepias purpurascens	Purple milkweed	SC
Asplenium montanum	Mountain spleenwort	SC
Asplenium ruta-maria	Wall-rue spleenwort	T
Betula pumila	Swamp birch	T
Blephilia ciliata	Downy wood-mint	SC H
*Blephilia hirsuta**	Hairy wood-mint	SC H
Botrychium simplex	Little grapefern	SC H
Calamagrositis stricta ssp. *inexpansa*	Reed bentgrass	T
Cardamine douglassii	Purple cress	T
*Carex aestivalis**	Summer sedge	SC
Carex alopecoidea	Foxtail sedge	T
Carex aquatilis var. *altior*	Water sedge	SC
Carex bushii	Bush's sedge	SC
Carex castanea	Chestnut-colored sedge	E
Carex crawei	Crawe's sedge	T
Carex crawfordii	Crawford's sedge	SC H
Carex cumulata	Clustered sedge	T
Carex foenea	Bronze sedge	SC
Carex formosa	Handsome sedge	SC
Carex magellanica *	Boreal bog sedge	E
Carex molesta	Troublesome sedge	SC
Carex novae-angliae *	New England sedge	SC
Carex pauciflora *	Few-flowered sedge	SC H
Carex prairea	Prairie sedge	SC
Carex pseudocyperus	Cyperus-like sedge	E
Carex schweinitzii	Schweintz's sedge	E
Carex sterilis	Dioecious sedge	SC
Carex squarrosa	Ragged-bract sedge	W
Castilleja coccinea	Indian paintbrush	E
Chamaelirium luteum	Devil's-bit	E
Coeloglossum viride var. *virescens*	Long-bracted green orchid	SC
*Corallorhiza trifida**	Early coralroot	SC
Cypripedium parviflorum	Yellow lady's-slipper	SC
Cypripedium parviflorum var. *p.**	Yellow lady's-slipper	SC
Cypripedium parviflorum var. *pubescens**	Yellow lady's-slipper	SC

Rare Plants

Species	Common Name	Comments*
*Cypripedium reginae**	Showy lady's-slipper	E
Dicentra canadensis *	Squirrel corn	SC
*Diplazium pycnocarpon**	Narrow-leaved glade fern	E
*Dryopteris campyloptera**	Mountain wood fern	E
*Dryopteris goldiana**	Goldie's fern	SC
Equisetum pratense	Meadow horsetail	E
*Equisetum scirpoides**	Dwarf souring rush	E
Galium labradoricum	Bog bedstraw	E
Gaultheria hispidula *	Creeping snowberry	SC
Gaylussacia bigeloviana *	Northern dwarf huckleberry	CT T
Gentiana andrewsii	Andrew's bottle gentian	W
Gentianella quinquefolia	Stiff gentian	E
Geranium bicknellii *	Bicknell's northern crane's-bill	SC H
Geum fragarioides (*Waldsteinia f.*)	Appalachian barren-strawberry	E
Goodyera repens var. *ophioides*	Dwarf rattlesnake-plantain	SC H
Houstonia longifolia *	Longleaf bluet	T
Huperzia appressa	Fir clubmoss	SC H
Ilex montana	Big-leaved winterberry	W
Isotria medeoloides	Small whorled pogonia	CT E, US T
Juglans cinera *	Butternut	W
Linnaea borealis ssp. *americana* *	Twinflower	E
Liparis liliifolia	Lily-leaved twayblade	E
*Lythrum alatum**	Winged loosestrife	E
Maianthemum trifolium *	Three-leaved false Solomon's-seal	T
Malaxis monophyllo ssp. *brachypoda*	White adder's-mouth	E
Malaxis unifolia *	Green adder's-mouth	E
Milium effusum	Tall millet-grass	E
Mitella nuda *	Naked miterwort	SC
*Moneses uniflora**	One-flowered wintergreen	E
Morus rubra	Red mulberry	W
Myriophyllum alterniflorum *	Slender or Alternate-flowered water-milfoil	E
Oenothera fruticosa	Sundrops, Narrow-leaved evening primrose	SC H
Ophioglossum pusillum	Northern adder's-tongue	E
Packera paupercula *	Balsam groundsel or ragwort	E
Panax quinquefolius	American ginseng	SC
Pellea glabella	Smooth cliff-brake	E
Petasites frigidus var. *palmatus*	Sweet coltsfoot	T
Phragmites americanus	American reed	SC
Pinus resinosa	Red pine (native populations only)	E
Platanthera blegphariglottis *	White-fringed orchid	E
Platanthera dilatata *	Tall white bog orchid	SC H
Platanthera flava ssp. *herbiola*	Pale green orchid	SC
Platanthera hookeri	Hooker's orchid	SC H
Platanthera orbiculata *	Large round-leaved orchid	SC H
Populus balsamifera *	Balsam poplar	W

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W - watch list - plants being considered as rare species
* Known to occur or have occurred in Norfolk

Rare Plants

Species	Common Name	Comments*
Pyrola chlorantha *	Green-flowered shinleaf	W
Ranunculus pensylvanicus	Bristly buttercup	SC
Rhododendron groenlandicum *	Labrador-tea	T
Rhynchospora capillacea	Needle beaksedge	E
Ribes glandulosum *	Skunk currant	SC
Ribes lacustre	Swamp black currant	SC H
Ribes rotundifolia	Appalachian gooseberry	SC
*Ribes triste**	Swamp red currant	E
Rubus dalibarda	Dewdrop	E
Salix candida *	Sage or Hoary willow	W
*Salix pedicellaris**	Bog willow	E
Salix petiolaris	Slender willow	SC
Salix serissima *	Autumn willow	W
Schizachne purpurascens *	Purple oat, False melic grass	SC
Schoenoplectus acutus	Hard-stemmed club-bulrush	T
Senna hebecarpa	Wild senna	T
Sibbaldiopsis tridentata *	Three-toothed-cinquefoil	T
Solidago squarrosa	Stout or Rough-stemmed goldenrod	W
Sparganium fluctuans *	Floating bur-reed	E
Spiranthes romanzoffiana *	Hooded ladies'-tresses	H
*Stellaria borealis**	Northern stitchwort	SC
Thuja occidentalis	Northern white cedar (native pop. only)	T
Trichomanes intricatum	Appalachian bristle fern, Weft fern	SC
Triphora trianthophora	Nodding pagonia	E
Trollius laxu	Narrow false oats	T
*Viola canadensis**	Canada violet	SC
Viola nephrophylla	Northern bog violet	SC
Viola renifolia *	Kidney-leaf white	SC
Viola selkirkii	Great-spurred violet	SC
Xyris montana *	Northern yellow-eyed-grass	T

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Pitcher plant (Sarracenia purpurea).

Appendix 5: Wildlife

Norfolk Mammals

Species	Common Name	Status		
		Norfolk	State	Federal
MARSUPIALS				
Didelphis virginia	Opossum	*		
INSECTIVORES				
Blarina brevicauda talpoides	Northern short-tailed shrew	*		
Condylura cristata cristata	Star-nosed mole	*		
Parascalops breweri	Hairy-tailed mole	r/n		
Scalopus aquaticus aquaticus	Eastern mole	r/n		
Sorex cinereus cinereus	Masked shrew	r/n		
Sorex dispar dispar	Long-tailed shrew	r/n		
Sorex fumeus fumeus	Smoky shrew	r/n		
Sorex albibarbis	Eastern water shrew	r/n		
BATS				
Eptesicus fuscus	Big brown bat	*		
Lasiurus borealis	Red bat	*	SC	
Lasiurus cinereus	Hoary bat	*	SC	
Lasionycteris noctivagans	Silver-haired bat	*	SC	
Myotis septentrionalis	Northern long-eared bat	r/n	E	T
Myotis lucifugus	Little brown bat	*	E	
Perimyotis transitionalis	Tri-colored bat	*	E	
RABBITS				
Lepus americanus	Snowshoe hare	*		
Sylvilagus floridanus	Eastern cottontail	*		
Sylvilagus transitionalis	New England cottontail	*		
RODENTS				
Castor canadensis	Beaver	*		
Clethrionomys gapperi	Boreal red-backed vole	*		
Erethizon dorsatum	North American porcupine	*		
Glaucomys sabrinus	Northern flying squirrel	r/n		
Glaucomys volans	Southern flying squirrel	*		
Marmota monax	Woodchuck	*		
Microtus pennsylvanicus	Meadow vole	*		
Napaeozapus insignis	Woodland jumping mouse	*		
Ondatra zibethicus	Muskrat	*		
Peromyscus leucopus	White-footed mouse	*		
Peromyscus maniculatus	Deer mouse	*		
Rattus norvegicus	Norway rat	r/n		
Sciurus carolinensis	Gray squirrel	*		
Tamias striatus	Eastern chipmunk	*		
Tamiasciurus hudsonicus	Red squirrel	*		
Zapus hudsonius	Meadow jumping mouse	r/n		

Norfolk Mammals

Species	Common Name	Status		
		Norfolk	State	Federal
CARNIVORES				
Canis latrans	Eastern coyote	*		
Lontra canadensis	River otter	*		
Lynx rufus rufus	Bobcat	*		
Pekania pennanti pennanti	Fisher	*		
Mephitis mephitis	Striped skunk	*		
Mustela erminea	Short-tailed weasel	*		
Mustela frenata	Long-tailed weasel	*		
Mustela vison	Mink	*		
Procyon lotor	Raccoon	*		
Urocyon cinereoargenteus	Gray fox	r/n		
Ursus americanus	Black bear	*		
Vulpes vulpes	Eastern American red fox	*		
DEER				
Alces alces	Moose	*		
Odocoileus virginianus	White-tail deer	*		

Other species that are listed due their historical occurrence or regional status:

Species	Common Name	Status	
		State	Federal
Canis lupus	Gray or Eastern timber wolf	SC ^	E
Lynx canadensis	Lynx		T
Martes americana	American marten		
Microtus pinetorum	Wood or Pine vole		
Myotis leibii leibii	Eastern small-footed bat	SC	
Myotis sodalis	Indiana bat	E	E
Neotoma magister	Alleghany woodrat	SC ^	
Perimyotis subflavus	Eastern pipistrelle	E	
Puma concolor couguar	Eastern mountain lion or Cougar	SC ^	^
Synaptomys cooperi	Southern bog lemming	SC	

* Documented occurrence in Norfolk
r/n - Reported nearby
E - Endangered species
T - Threatened species
SC - Species of special concern
^ – Considered to be extirpated from the state or country

Contributions
CT Department of Energy & Environmental Protection, https://portal.ct.gov/DEEP/Endangered-Species/Connecticuts-Endangered-Threatened-and-Special-Concern-Species (accessed January 2023)
Yale Peabody Museum, Collections, https://peabody.yale.edu/explore/collections (accessed January 2023)
Integrated Taxonomic Information System, https://www.itis.gov/ (accessed January 2023)
Environmental Conservation Online System, US Fish & Wildlife Service, https://ecos.fws.gov/ecp/ (accessed January 2023)
iNaturalist, https://www.inaturalist.org (accessed January 2023)
Wikipedia, https://en.wikipedia.org/wiki/Wikipedia (accessed January 2023)
James Fischer, Research Director, White Memorial Foundation
Karen Zyko, Wildlife Division, CT Department of Energy & Environmental Protection

Norfolk Amphibians and Reptiles

Species	Common Name	Status
AMPHIBIANS		
Ambystoma jeffersonianum	Jefferson salamander	
Ambystoma jeffersonianum complex	Jefferson complex	***
Ambystoma laterale	Blue-spotted salamander	
Ambystoma laterale complex	Blue-spotted complex	***
Ambystoma maculatum	Spotted salamander	
Anaxyrus (Bufo) americanus	American toad	
Desmognathus fuscus	Northern dusky salamander	
Eurycea bislineata	Northern two-lined salamander	
Gyrinophilus porphyriticus	Northern spring salamander	**
Hemidactylium scutatum	Four-toed salamander	
Hyla versicolor	Gray tree frog	
Notophthalmus viridescens	Red-spotted newt, Red eft	
Plethodon cinereus	Red-backed salamander	
Plethodon cinereus ethryistic	Ethryistic red-backed salamander	
Pseudacris crucifer	Spring peeper	
Lithobates (Rana) catesbeiana	Bullfrog	
Lithobates (Rana) clamitans	Green frog	
Lithobates (Rana) palustris	Pickerel frog	
Lithobates (Rana) pipiens	Northern leopard frog	***
Lithobates sylvaticus (Rana sylvatica)	Wood frog	
REPTILES		
Agkistrondon contortrix	Northern copperhead	
Chelydra serpentina	Common snapping turtle	
Chrysemys picta	Painted turtle	
Clemmys guttata	Spotted turtle	***
Glyptemys (Clemmys) insculpta	Wood turtle	***
Coluber constrictor	Northern black racer	
Crotalus horridus	Timber rattlesnake	*
Diadolphis punctatus ssp. edwardsii	Northern ringneck snake	
Heterodon platirhinos	Eastern hognose snake	***
Lampropeltis triangulum	Eastern milk snake	
Nerodia sipedon	Northern water snake	
Opheodrys vernalis	Smooth green snake	***
Sternotherus odoratus	Common musk turtle, Stinkpot	
Storeria dekayi	DeKay's or Northern brown snake	
Storeria occipitomaculata	Northern redbelly snake	
Terrapene carolina	Eastern box turtle	***
Thamnophis saurita	Eastern ribbon snake	***
Thamnophis sirtalis	Eastern garter snake	

*State-listed endangered species
**State-listed threatened species
***State-listed species of special concern
+Federal endangered or threatened species
^ Extirpated from Connecticut

Birds of Norfolk

Species	Common Name	Season observed: Spring	Summer	Fall	Winter
WATERFOWL					
Branta bernicla	Brant #			x	
Branta canadensis	Canada goose *	x	x	x	
Aix sponsa	Wood duck *	x	x	x	
Spatula discors	Blue-winged teal # **	x	x		
Anas rubripes	American black duck *		x		
Anas platyrhynchos	Mallard duck *	x	x	x	
Aythya collaris	Ring-necked duck	x			
Lophodytes cucullatus	Hooded merganser *	x	x		
Mergus merganser	Common merganser *	x	x		
Oxyura jamaicensis	Ruddy duck	x			
LANDFOWL					
Meleagris gallopavo	Wild turkey *	x	x	x	x
Bonasa umbellus	Ruffed grouse *	x	x	x	x
Phasianus colchicus	Ring-necked pheasant	x	x	x	x
PIGEONS & DOVES					
Columba livia	Rock pigeon *	x	x	x	x
Zenaida macroura	Mourning dove *	x	x	x	x
CUCKOOS					
Coccyzus americanus	Yellow-billed cuckoo **	x	x		
Coccyzus erythropthalmus	Black-billed cuckoo *	x		x	
NIGHTHAWKS					
Chordeiles minor	Common nighthawk		x		
Antrostomus vociferus	Eastern Whip-poor-will #	x			
SWIFTS & HUMMINGBIRDS					
Chaetura pelagica	Chimney swift *	x	x		
Archilochus colubris	Ruby-throated hummingbird *	x	x	x	
CRANES & RAILS					
Rallus limicola	Virginia rail **		x		
Antigone canadensis	Sandhill crane ** #	x	x	x	
SHOREBIRDS					
Charadrius vociferus	Killdeer *	x	x		
Calidris minutilla	Least sandpiper			x	
Scolopax minor	American woodcock *	x	x		x
Gallinago gallinago	Common snipe	x			
Actitis macularius	Spotted sandpiper *	x	x		
Larus argentatus	Herring gull				x

*confirmed breeder; ** probable breeder; # uncommon/rare
Spring = March to May, Summer = June to August, Fall = September to November, Winter = December to February

Species	Common Name	Season observed: Spring	Summer	Fall	Winter
WATERBIRDS					
Gavia immer	Common loon *	x	x	x	
Podilymbus podiceps	Pied-billed grebe #			x	
Phalacrocorax auritus	Double-crested cormorant		x		
Botaurus lentiginosus	American bittern **	x	x		
Ardea herodias	Great blue heron *	x	x		
Ardea alba	Great egret #		x		
Egretta caerulea	Little blue heron #		x		
Butorides virescens	Green heron *		x		
VULTURES, HAWKS & EAGLES					
Coragyps atratus	Black vulture #		x		
Cathartes aura	Turkey vulture *	x	x	x	
Pandion haliaetus	Osprey **	x	x		
Aquila chrysaetos	Golden eagle #				x
Circus hudsonius	Northern harrier	x		x	x
Accipiter striatus	Sharp-shinned hawk **	x	x	x	
Accipiter cooperii	Cooper's hawk *	x	x	x	
Accipiter gentilis	Northern goshawk * #		x	x	x
Haliaeetus leucocephalus	Bald eagle	x	x	x	x
Buteo lineatus	Red-shouldered hawk *	x	x		
Buteo platypterus	Broad-winged hawk *	x	x	x	
Buteo jamaicensis	Red-tailed hawk *	x	x	x	x
Buteo lagopus	Rough-legged hawk #		x		
OWLS					
Tyto alba	Barn owl #	x	x		
Megascops asio	Eastern Screech owl	x			
Bubo virginianus	Great horned owl *	x	x	x	x
Bubo scandiacus	Snowy owl #				x
Strix varia	Barred owl *	x	x	x	x
Asio otus	Long-eared owl #				x
Aegolius acadicus	Northern saw-whet owl **	x	x	x	x
KINGFISHERS					
Megaceryle alcyon	Belted kingfisher *	x	x		
WOODPECKERS					
Melanerpes carolinus	Red-bellied woodpecker **	x	x	x	x
Sphyrapicus varius	Yellow-bellied sapsucker *	x	x	x	x
Dryobates pubescens	Downy woodpecker *	x	x	x	x
Dryobates villosus	Hairy woodpecker *	x	x	x	x
Colaptes auratus	Northern flicker *	x	x	x	
Dryocopus pileatus	Pileated woodpecker *	x	x	x	x

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Birds of Norfolk

Species	Common Name	Season observed: Spring	Summer	Fall	Winter
FALCONS					
Falco sparverius	American kestrel *	x	x	x	
Falco columbarius	Merlin	x		x	
PERCHING BIRDS					
Flycatchers					
Myiarchus crinitus	Great crested flycatcher *	x	x	x	
Tyrannus tyrannus	Eastern kingbird *	x	x		
Contopus cooperi	Olive-sided flycatcher # *		x		
Contopus virens	Eastern wood-pewee *	x	x	x	
Empidonax flaviventris	Yellow-bellied flycatcher		x		
Empidonax virescens	Acadian flycatcher # *		x		
Empidonax alnorum	Alder flycatcher # **		x		
Empidonax traillii	Willow flycatcher # **	x	x		
Empidonax minimus	Least flycatcher *	x	x		
Sayornis phoebe	Eastern phoebe *	x	x	x	
Vireos					
Vireo griseus	White-eyed vireo		x		
Vireo flavifrons	Yellow-throated vireo *		x	x	
Vireo solitarius	Blue-headed or Solitary vireo *	x	x	x	
Vireo gilvus	Warbling vireo *	x	x	x	
Vireo olivaceus	Red-eyed vireo *	x	x	x	
Shrikes					
Lanius borealis	Northern shrike #				x
Jays & Crows					
Cyanocitta cristata	Blue jay *	x	x	x	x
Corvus brachyrhynchos	American crow *	x	x	x	x
Corvus corax	Common raven *	x	x	x	x
Chickadees & Titmice					
Poecile atricapillus	Black-capped chickadee *	x	x	x	x
Baeolophus bicolor	Tufted titmouse *	x	x	x	x
Swallows					
Riparia riparia	Bank swallow *		x		
Tachycineta bicolor	Tree swallow *	x	x	x	
Stelgidopteryx serripennis	Northern rough-winged swallow **		x		
Progne subis	Purple martin #	x			
Hirundo rustica	Barn swallow *	x	x	x	
Petrochelidon pyrrhonota	Cliff swallow		x		

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Birds of Norfolk

Species	Common Name	Season observed: Spring	Summer	Fall	Winter
Kinglets					
Corthylio calendula	Ruby-crowned kinglet	x		x	x
Regulus satrapa	Golden-crowned kinglet				x
Waxwings					
Bombycilla cedrorum	Cedar waxwing *	x	x	x	x
Nuthatches					
Sitta canadensis	Red-breasted nuthatch *		x	x	x
Sitta carolinensis	White-breasted nuthatch *	x	x	x	x
Creepers					
Certhia americana	Brown creeper *	x	x	x	
Gnatcatchers					
Polioptila caerulea	Blue-gray gnatcatcher *	x	x		
Wrens					
Troglodytes aedon	House wren *	x	x		
Troglodytes hiemalis	Winter wren *	x	x		
Thryothorus ludovicianus	Carolina wren **	x	x	x	x
Mockingbirds & Thrashers					
Dumetella carolinensis	Gray catbird *	x	x	x	
Toxostoma rufum	Brown thrasher # **		x		
Mimus polyglottos	Northern mockingbird # *	x	x	x	x
Starlings					
Sturnus vulgaris	European starling *	x	x	x	x
Bluebirds					
Sialia sialis	Eastern bluebird *	x	x	x	x
Thrushes					
Catharus fuscescens	Veery *	x	x	x	
Catharus ustulatus	Swainson's thrush #			x	
Catharus guttatus	Hermit thrush *	x	x	x	x
Hylocichla mustelina	Wood thrush *	x	x	x	
Turdus migratorius	American robin *	x	x	x	x
Old World Sparrows					
Passer domesticus	House sparrow *	x	x	x	x

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Birds of Norfolk

Species	Common Name	Season observed: Spring	Summer	Fall	Winter
Finches					
Coccothraustes vespertinus	Evening grosbeak #		x		x
Pinicola enucleator	Pine grosbeak #				x
Haemorhous mexicanus	House finch *	x	x	x	x
Haemorhous purpureus	Purple finch *	x	x	x	x
Acanthis flammea	Common redpoll #				x
Acanthis hornemanni	Hoary redpoll #				x
Loxia curvirostra	Red crossbill ** #		x		x
Loxia leucoptera	White-winged crossbill #				x
Spinus pinus	Pine siskin *	x	x	x	x
Spinus tristis	American goldfinch *	x	x	x	x
Longspurs & Snow Buntings					
Plectrophenax nivalis	Snow bunting #				x
Towhees & Sparrows					
Spizella passerina	Chipping sparrow *	x	x	x	x
Spizella pusilla	Field sparrow	x	x	x	
Passerella iliaca	Fox sparrow	x		x	x
Spizelloides arborea	American tree sparrow	x		x	x
Junco hyemalis	Dark-eyed junco *	x	x	x	x
Zonotrichia leucophrys	White-crowned sparrow	x		x	
Zonotrichia albicollis	White-throated sparrow *	x	x	x	
Passerculus sandwichensis	Savannah sparrow **		x		x
Melospiza melodia	Song sparrow *	x	x	x	
Melospiza georgiana	Swamp sparrow *	x	x	x	x
Pipilo erythrophthalmus	Eastern towhee *	x	x		
Blackbirds & Orioles					
Dolichonyx oryzivorus	Bobolink *	x	x		
Sturnella magna	Eastern meadowlark * #	x	x		
Icterus galbula	Baltimore oriole *	x	x	x	
Agelaius phoeniceus	Red-winged blackbird *	x	x	x	x
Molothrus ater	Brown-headed cowbird *	x	x	x	
Euphagus carolinus	Rusty blackbird	x			
Quiscalus quiscula	Common grackle *	x	x	x	x
Wood-Warblers					
Seiurus aurocapilla	Ovenbird *	x	x		
Helmitheros vermivorum	Worm-eating warbler **	x	x		
Parkesia motacilla	Louisiana waterthrush *	x	x		
Parkesia noveboracensis	Northern waterthrush *	x	x		

*confirmed breeder; ** probable breeder; # uncommon/rare
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Birds of Norfolk

Species	Common Name	Season observed: Spring	Summer	Fall	Winter
Vermivora chrysoptera	Golden-winged warbler	x	x		
Vermivora cyanoptera	Blue-winged warbler *	x	x		
Vermivora chrysoptera x cyanoptera	Brewster's warbler (hybrid) *	x	x		
Mniotilta varia	Black-and-white warbler *	x	x		
Leiothlypis ruficapilla	Nashville warbler *	x	x		
Geothlypis formosa	Kentucky warbler #		x		
Geothlypis trichas	Common yellowthroat *	x	x		
Setophaga citrina	Hooded warbler #		x		
Setophaga ruticilla	American redstart *	x	x		
Setophaga tigrina	Cape May warbler	x	x		
Setophaga cerulea	Cerulean warbler #	x	x		
Setophaga americana	Northern parula **	x	x		
Setophaga magnolia	Magnolia warbler *	x	x		
Setophaga castanea	Bay-breasted warbler		x		
Setophaga fusca	Blackburnian warbler *	x	x		
Setophaga petechia	Yellow warbler *	x	x		
Setophaga pensylvanica	Chestnut-sided warbler *	x	x		
Setophaga striata	Blackpoll warbler #	x		x	
Setophaga caerulescens	Black-throated blue warbler *	x	x		
Setophaga palmarum	Palm warbler	x			
Setophaga pinus	Pine warbler *	x	x	x	
Setophaga coronata	Yellow-rumped warbler *	x	x		
Setophaga discolor	Prairie warbler	x	x		
Setophaga virens	Black-throated green warbler *	x	x		
Cardellina canadensis	Canada warbler *	x	x		
Cardinals & Grosbeaks					
Piranga olivacea	Scarlet tanager *	x	x	x	
Cardinalis cardinalis	Northern cardinal *	x	x	x	x
Pheucticus ludovicianus	Rose-breasted grosbeak *	x	x		
Passerina cyanea	Indigo bunting *	x	x		

*confirmed breeder; ** probable breeder; # uncommon/rare
Spring = March to May, Summer = June to August, Fall = September to November, Winter = December to February

Contributions: Connecticut Ornithological Association, Checklist of the Birds of Connecticut, 2022. American Ornithological Society, Checklist of North and Middle American Birds, 1998, 2022. CT Department of Energy & Environmental Protection, https://portal.ct.gov/DEEP/Endangered-Species/Connecticuts-Endangered-Threatened-and-Special-Concern-Species (accessed January 2023). Aton Forest, bird research programs. Shelley Harms.

Norfolk Butterflies

Species	Common Name
SWALLOWTAILS	
Battus philenor	Pipevine swallowtail
Papillo cresphontes	Giant swallowtail
Papilio polyxenes	Black swallowtail
Papillo glaucus	Eastern tiger swallowtail
Papillo troilus	Spicebush swallowtail
WHITES	
Pieris virginiensis	West Virginia white
Pieris rapae	Cabbage white
SULPHURS	
Colias eurytheme	Orange sulphur
Colias philodice	Clouded sulphur
HARVESTER	
Feniseca tarquinius	Harvester (insectivorous)
COPPERS	
Lycaena phlaeas	American copper
HAIRSTREAKS	
Satyrium titus	Coral hairstreak
Satyrium liparops	Striped hairstreak
Callophrys niphon	Eastern pine elfin
BLUES	
Cupido comyntas	Eastern tailed-blue
Celastrina ladon	Spring azure
FRITILLARIES	
Argynnis (Speyeria) cybele	Great spangled fritillary
Argynnis (Speyeria) aphrodite	Aphrodite fritillary
Argynnis (Speyeria) atlantis	Atlantis fritillary
Boloria selene	Silver-bordered fritillary
Boloria bellona	Meadow fritillary
CHECKERSPOTS	
Phyciodes tharos	Pearl crescent
Euphydryas phaeton	Baltimore checkerspot
ANGLEWINGS	
Polygonia interrogationis	Question mark
Nymphalis l-album	Compton tortoiseshell
Nymphalis antiopa	Mourning cloak
Aglais milberti	Milbert's tortoiseshell
Vanessa virginiensis	American lady
Vanessa atalanta	Red admiral (migratory)
ADMIRALS	
Limenitis arthemis	Red-Spotted purple/ White admiral
Limenitis archippus	Viceroy
SATYRS	
Lethe antheodon	Northern pearly-eye
Lethe eurydice	Eyed brown*
Lethe appalachia	Appalachian brown
Megisto cymela	Little wood satyr
Coenonympha tullia	Common ringlet
Cercyonis pegala	Common wood nymph
MONARCHS	
Danaus plexippus	Monarch (migratory)
SPREAD-WING SKIPPERS	
Epargyreus clarus	Silver-spotted skipper
GRASS SKIPPERS	
Carterocephalus palaemon	Arctic skipper***
Ancyloxypha numitor	Common least skipper
Thymelicus lineola	European skipper
Polites peckius	Peck's skipper
Polites themistocles	Tawny-edged skipper
Polites origenes	Crossline skipper
Polites mystic	Long dash
Polites egeremet	Northern broken-dash
Vernia verna	Little glassywing
Anatrytone logan	Delaware skipper
Poanes massasoit	Mulberry wing
Lon hobomok	Hobomok skipper
Poanes viator	Broad-winged skipper
Euphyes bimacula	Two-spotted skipper
Euphyes vestris	Dun skipper
Amblyscirtes hegon	Pepper and salt skipper

*Connecticut species of special concern, ***previously unknown in Connecticut

Names and Status sources: Ron Harms, 2009; Thomas & Morehead, 2003; iNaturalist (research-grade observations in Norfolk, website: inaturalist.org, accessed 10-10-2022); NatureServe (website: explorer.natureserve.org, accessed 10-05-2022)
Arranged following the Checklist of the Butterflies of Connecticut, Connecticut Butterfly Association, 2020

Species	Common Name	Species	Common Name
Abagrotis alternata	Greater red dart moth	*Amphipyra pyramidoides*	American copper underwing moth
Abrostola urentis	Spectacled nettle moth	*Anageshna primordalis*	Yellow-spotted webworm moth
Acasis viridata	Olive-and-black carpet moth	*Anagrapha falcifera*	Celery looper moth
Achatia distincta	Distinct Quaker moth	*Anania (Phlyctaenia) coronata*	Elderberry pearl, Crowned phlyctaenia moth
Acleris albicomana	Red-edged acleris moth		
Acleris chalybeana	Lesser maple leafroller moth	*Anania funebris*	White-spotted sable moth
Acleris curvalana	Blueberry leaftier	*Anania (Eurrhypara) hortulata*	Small magpie moth
Acleris forskaleaena	Maple leaftier moth	*Anaplectoides prasina*	Green arches moth
Acleris nivisellana	Snowy-shouldered acleris moth	*Anathix ralla*	Dotted sallow moth
Acleris variana	Eastern black-headed budworm moth	*Anavitrinella pampinaria*	Common gray moth
Acrobasis angusella	Hickory leafstem borer moth	*Ancylis burgessiana*	Oak leaffolder moth
Acrobasis indigenella	Leaf crumpler moth	*Ancylis comptana* ssp. *fragariae*	Strawberry leafroller moth
Acrobasis ostryella	Ostrya snout moth	*Ancylis diminutana*	Small festooned roller
Acrobasis palliolella	Mantled acrobasis moth	*Ancylis mira*	
Acrobasis vaccinii	Cranberry fruitworm moth	*Ancylis nubeculana*	Little cloud ancylis moth
Acronicta americana	American dagger moth	*Anicla illapsa*	Snowy dart moth
Acronicta hasta (furcifera)	Cherry dagger	*Antaeotricha schlaegeri*	Schlaeger's fruitworm moth
Acronicta impressa	Impressed dagger moth	*Anterastria teratophora*	Gray marvel moth
Acronicta innotata	Birch or Unmarked dagger moth	*Antheraea polyphemus*	Polyphemus moth
Acronicta insita (dactylina)	Alder, Large gray or Fingered dagger moth	*Anticarsia gemmatalis*	Velvetbean caterpillar moth
		Anticlea vasiliata	Variable carpet moth
Acronicta lobeliae	Greater oak dagger moth	*Apamea amputatrix*	Yellow-headed cutworm moth
Acronicta longa	Long-winged dagger moth	*Apamea cariosa*	a noctuid moth
Acronicta modica (haesitata)	Hesitant dagger moth	*Apamea contradicta*	Northern banded Quaker moth
Acronicta morula	Ochre dagger moth	*Apamea devastator*	Glassy cutworm moth
Acronicta noctivaga	Night-wandering dagger moth	*Apamea helva*	Yellow three-spot moth
Acronicta oblinita	Smeared dagger moth, Smartweed caterpillar	*Apamea impulsa*	
		Apamea lignicolora	Wood-colored apamea moth
Acronicta ovata	Ovate dagger moth	*Apamea sordens ssp. finitima*	Bordered apamea moth
Actias luna	Luna moth	*Apamea vulgaris*	Common apamea moth
Aethalura intertexta	Four-barred gray moth	*Apamea vultuosa*	Airy apamea moth
Aethes angustana	Angular aethes moth	*Apantesis nais*	Nais tiger moth
Agnorisma badinodis	Pale-banded dart moth	*Apantesis phalerata*	Harnessed tiger moth
Agonopterix clemensella	Umbellifer agonopterix moth	*Apantesis (Grammia) virgo*	Virgin tiger moth
Agonopterix curvilineella	Curved-line agonopterix moth	*Apantesis (Grammia) virguncula*	Little virgin tiger moth
Agriopodes fallax	Green marvel moth	*Aphomia sociella*	Bee moth
Agrotis ipsilon	Ipsilon dart moth, Black cutworm	*Aplectoides condita*	
Agrotis venerabilis	Venerable dart moth, Dusky cutworm	*Apoda biguttata*	Shagreened slug moth
Allagrapha aerea	Unspotted looper moth	*Apotomis albeolana*	
Amolita fessa	Feeble grass moth	*Archips cerasivorana*	Ugly-nest caterpillar moth
Amorpha juglandis	Walnut sphinx moth	*Archips dissitana*	Boldly-marked archips moth
Amphion floridensis	Nessus sphinx moth	*Archips purpurana*	Omniverous leafroller moth
Amphipoea americana	American ear moth	*Arequipa turbatella*	

Latin name in ( ) indicates older, synonymous name.

Species	Common Name	Species	Common Name
Argyrotaenia alisellana	White-spotted leafroller moth	*Catocala palaeogama*	Oldwife underwing moth
Argyrotaenia mariana	Gray-banded leafroller moth	*Catocala praeclara*	Praeclara underwing moth
Argyrotaenia quercifoliana	Yellow-winged oak leafroller moth	*Catocala relicta*	White underwing moth
Argyrotaenia velutinana	Red-banded leafroller moth	*Catocala residua*	Residua underwing moth
Autographa ampla	Large looper moth	*Catocala semirelicta*	Semirelict underwing moth
Autographa mappa	Wavy chestnut Y moth	*Catocala ultronia*	Ultronia underwing moth
Autographa precationis	Common looper moth	*Catocola cerogama*	Yellow-banded underwing moth
Autographa rubidus		*Cepphis armataria*	Scallop moth
Baileya dormitans	Sleeping baileya moth	*Cepphis decoloraria*	Dark scallop moth
Balsa malana	Many-dotted appleworm moth	*Cerastis tenebrifera*	Reddish speckled dart moth
Balsa tristrigella	Three-lined balsa moth	*Ceratomia undulosa*	Waved sphinx moth
Bellua obliqua	Cattail borer moth	*Cerma cerintha*	Tufted bird-dropping moth
Besma endropiaria	Straw besma moth	*Chalcoela iphitalis*	Sooty-winged chalcoela moth
Besma quercivoraria	Oak besma moth	*Charadra deridens*	Laugher moth
Bibarrambla allenella	Bog bibarrambla moth	*Chlorochlamys chloroleucaria*	Blackberry looper moth
Biston betularia	Peppered moth	*Choristoneura fractivittana*	Broken-banded leafroller moth
Blastodacna atra	Apple pith moth	*Choristoneura fumiferana*	Spruce budworm moth
Bondia crescentella	Crescent-marked bondia	*Choristoneura pinus*	Jack pine budworm moth
Bucculatrix ainsliella	Oak skeletonizer moth	*Choristoneura rosaceana*	Oblique-banded leafoller moth
Caenurgina crassiuscula	Clover looper moth	*Chrysanympha formosa*	Formosa looper moth
Calledapteryx dryopterata	Brown scoopwing moth	*Chrysoclista linneella*	Linden bark-borer moth
Callopistria cordata	Silver-spotted fern moth	*Chytolita morbidalis*	Morbid owlet moth
Callopistria mollissima	Pink-shaded fern moth	*Chytonix palliatricula*	Cloaked marvel moth
Callosamia angulifera	Tulip-tree silkmoth	*Cisseps fulvicollis*	Yellow-collared scape moth
Calophasia lunula	Toadflax brocade moth	*Cladara atroliturata*	Scribbler moth
Caloptilia hypericella	St. John's-wort miner moth	*Cladara limitaria*	Mottled gray carpet moth
Calyptra canadensis	Canadian owlet moth	*Clepsis clemensiana*	Clemens' clepsis moth
Cameraria aceriella	Maple leaf blotch miner moth	*Clepsis peritana*	
Campaea perlata	Pale beauty moth	*Clepsis persicana*	White-triangle tortrix moth
Capis curvata	Curved halter moth, Bog capis moth	*Clepsis virescana*	
Caripeta angustiorata	Brown pine looper moth	*Clostera albosigma*	Sigmoid prominent moth
Caripeta divisata	Gray spruce looper moth	*Clostera apicalis*	Apical prominent moth
Caripeta piniata		*Clostera strigosa*	Striped chocolate-tip moth
Catastega aceriella	Maple trumpet skeletonizer moth	*Coleophora mayrella*	Metallic coleophora moth
Catocala andromedae	Andromeda underwing moth	*Coleotechnites quercivorella*	
Catocala cara	Darling underwing moth	*Colocasia propinquilinea*	Closebanded yellowhorn moth
Catocala concumbens	Pink underwing moth	*Condica vecors*	Dusky groundling moth
Catocala crataegi	Hawthorn underwing moth	*Condylolomia participalis*	Drab condylolomia moth
Catocala gracilis	Graceful underwing moth	*Conservula anodonta*	Sharp angle shades moth
Catocala grynea	Woody underwing moth	*Coryphista meadii*	Barberry geometer moth
Catocala ilia	Ilia underwing moth	*Cosmia calami*	American dun-bar moth
Catocala innubens	Betrothed underwing moth	*Cosmopterix clemensella*	Clemens' cosmopterix moth
Catocala neogama	Bride underwing moth	*Costaconvexa centrostrigaria*	Bent-line carpet moth

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Species	Common Name	Species	Common Name
Crambidia pallida	Pale lichen moth	*Doryodes bistrialis*	Double-lined doryodes moth
Crambodes talidiformis	Verbena moth	*Drepana arcuata*	Arched hooktip moth
Crambus agitatellus	Double-banded grass-veneer moth	*Drepana bilineata*	Two-lined hooktip moth
Crambus albellus	Small white grass-veneer moth	*Dryocampa rubicunda*	Rosy maple moth
Crambus bidens	Biden's grass-veneer moth	*Dypterygia rozmani*	American bird's-wing moth
Crambus girardellus	Girard's grass-veneer moth	*Dyspteris abortivaria*	Badwing moth
Crambus praefectellus	Common grass-veneer moth	*Dysstroma hersiliata*	Orange-barred carpet moth
Crambus saltuellus	Pasture grass-veneer moth	*Dysstroma truncata*	Marbled carpet moth
Crocigrapha normani	Norman's Quaker moth	*Ecdytolopha insiticiana*	Locust twig borer moth
Cryptocala acadiensis	Catocaline dart moth	*Ectropis crepuscularia*	Small engrailed moth
Ctenucha virginica	Virginia ctenucha moth	*Elaphria festivoides*	Festive midget moth
Cucullia asteroides	Asteroid moth	*Elaphria versicolor*	Variegated midget moth
Cucullia convexipennis	Brown-hooded owlet moth	*Ellida caniplaga*	Linden prominent moth
Cucullia intermedia	Intermediate hooded owlet moth	*Elophila (Munroessa) gyralis*	Waterlily borer moth
Cyclophora pendulinaria	Sweetfern geometer moth	*Elophila (Munroessa) icciusalis*	Pondside pyralid moth
Cycnia tenera	Delicate cycnia moth	*Ennomos magnaria*	Maple spanworm moth
Cydia latiferreana	Filbertworm moth	*Ennomos subsignaria*	Elm spanworm moth
Cydia toreuta	Eastern pine seedworm moth	*Eosphoropteryx thyatyroides*	Pink-patched looper moth
Darapsa choerilus	Azalea sphinx	*Epelis truncataria*	Black-banded orange moth
Darapsa myron	Virginia creeper sphinx moth	*Epiblema obfuscana*	
Dargida diffusa	Wheat head armyworm moth	*Epiblema otiosana*	Bidens borer moth
Dasychira basiflava	Yellow-based tussock moth	*Epiblema scudderiana*	Goldenrod gall moth
Dasychira cinnamomea	Cinnamon tussock moth	*Epipaschia superatalis*	Dimorphic macalla moth
Dasychira obliquata	Streaked tussock moth	*Epirrhoe alternata*	White-banded toothed carpet moth
Dasychira plagiata	Northern pine tussock moth	*Eubaphe mendica*	Beggar moth
Dasylophia thyatiroides	Gray-patched prominent moth	*Euchlaena johnsonaria*	Johnson's euchlaena moth
Decantha boreasella	Reticulated decantha moth	*Euchlaena effecta*	Effective euchlaena moth
Deidamia inscripta	Lettered sphinx moth	*Euchlaena muzaria*	muzaria euchlaena moth
Dejongia lobidactylus		*Euchlaena serrata*	Saw-wing moth
Deltote bellicula	Bog lithacodia moth	*Euchlaena tigrinaria*	Mottled euchlaena moth
Desmia funeralis	Grape leaffolder moth	*Eucosma (Phaneta) essexana*	Essex phaneta moth
Diachrysia aereoides	Dark-spotted looper moth	*Eucosma (Phaneta) formosana*	Beautiful phaneta moth
Diachrysia balluca	Green-patched looper moth	*Eucosma monitorana*	Red pinecone borer moth
Diarsia jucunda	Smaller pinkish dart moth	*Eucosma (Phaneta) ochroterminana*	Buff-tipped phaneta moth
Dichomeris bilobella	Bilobed dichomeris moth	*Eucosma (Phaneta) parmatana*	
Dichomeris leuconotella		*Eucosma tocullionana*	White pinecone borer moth
Digrammia ocellinata	Faint-spotted angle moth	*Eudryas grata*	Beautiful wood-nymph moth
Dioryctria abietivorella	Evergreen coneworm moth	*Eudryas unio*	Pearly wood-nymph moth
Dioryctria auranticella	Ponderosa pineconeworm moth	*Eueretagrotis perattentus*	Two-spot dart moth
Dioryctria disclusa	Webbing coneworm moth	*Eueretagrotis sigmoides*	Sigmoid dart moth
Disclisioprocta stellata	Somber carpet moth	*Eufidonia discospilata*	Sharp-lined powder moth
Dolba hyloeus	Pawpaw sphinx moth	*Eufidonia notataria*	Powder moth
Donacaula melinellus			

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Species	Common Name	Species	Common Name
Eugonobapta nivosaria	Snowy geometer moth	*Helotropha reniformis*	Reniform celaena moth
Eulia ministrana	Ferruginous eulia moth	*Hemaris thysbe*	Hummingbird clearwing moth
Eulithis diversilineata	Lesser grapevine looper moth	*Hemipachnobia subporphyrea*	
Eulithis explanata	White eulithis moth	*Herpetogramma pertextalis*	Bold-feathered grass moth
Eulithis molliculata	Dimorphic eulithis moth	*Herpetogramma thestealis*	Zigzag herpetogramma moth
Eulithis testata	Chevron moth	*Heterocampa biundata*	Wavy-lined heterocampa moth
Eulogia ochrifrontella	Broad-banded eulogia moth	*Heterocampa guttivitta*	Saddled prominent moth
Euparthenos nubilis	Locust underwing moth	*Heterophleps triguttaria*	Three-spotted fillip moth
Euphyia intermediata	Sharp-angled carpet moth	*Hethemia pistasciaria*	Pistachio emerald moth
Eupithecia cretaceata		*Homochlodes fritillaria*	Pale homochlodes moth
Eupithecia indistincta		*Homorthodes furfurata*	Northern scurfy Quaker moth
Eupithecia miserulata	Common eupithecia moth	*Horisme intestinata*	Brown bark carpet moth
Euplexia benesimilis	American angle shades moth	*Hulda impudens*	
Eupsilia vinulenta	Straight-toothed sallow moth	*Hyalophora cecropia*	Cecropia moth
Eurois occulta	Great brocade moth	*Hydraecia micacea*	Rosy rustic moth
Eusarca confusaria	Confused eusarca moth	*Hydrelia inornata*	Unadorned carpet moth
Eutrapela clemataria	Curve-toothed geometer moth	*Hydriomena divisaria*	Black-dashed hydriomena moth (European)
Euxoa redimicula	Fillet dart moth		
Euzophera ostricolorella	Root collar borer moth	*Hydriomena ruberata*	Ruddy highflyer moth
Evergestis pallidata	Purple-backed cabbageworm moth	*Hyles gallii*	Gallium sphinx moth
Exyra fax	Epauletted pitcher-plant moth	*Hypagyrtis piniata*	Pine measuringworm moth
Feltia herilis	Master's dart moth	*Hypagyrtis unipunctata*	One-spotted variant moth
Feltia jaculifera	Dingy cutworm moth	*Hypena abalienalis*	White-lined bomolocha moth
Feltia subgothica	Subgothic dart moth	*Hypena baltimoralis*	Baltimore bomolocha moth
Feltia subterranea	Subterranean dart moth	*Hypena deceptalis*	Deceptive bomolocha moth
Feralia comstocki	Comstock's sallow moth	*Hypena edictalis*	Large bomolocha moth
Fishia illocata	Wandering brocade moth	*Hypena eductalis*	Red-footed snout or bomolocha moth
Furcula borealis	White furcula moth	*Hypena humuli*	Hop vine moth
Furcula cinerea	Gray furcula moth	*Hypena madefactalis*	Gray-edged bomolocha moth
Galasa nigrinoidis	Boxwood leaftier	*Hypena manalis*	Flowing-line bomolocha moth
Gluphisia septentrionis	Common gluphisia moth	*Hypena palparia*	Mottled bomolocha moth
Graphiphora augur	Double dart moth	*Hypena scabra*	Green cloverworm moth
Guenaria similaria	Ghostly fern moth	*Hypenodes caducus*	Large hypenodes moth
Gypsonoma substitutionis		*Hypenodes fractilinea*	Broken-line hypenodes moth
Habrosyne scripta	Lettered habrosyne moth	*Hypenodes sombrus*	
Halysidota tessellaris	Banded tussock moth	*Hyperaeschra georgica*	Georgian prominent moth
Haploa clymene	Clymene moth	*Hyperstrotia pervertens*	Dotted graylet moth
Haploa colona	Colona moth	*Hyperstrotia villificans*	White-lined graylet moth
Haploa confusa	Confused haploa moth	*Hyphantria cunea*	Fall webworm moth
Haploa lecontei	Leconte's haploa moth	*Hypoprepia fucosa*	Painted lichen moth
Harrisimemna trisignata	Harris's three-spot moth	*Hypoprepia miniata*	Scarlet-winged lichen moth
Harrisina americana	Grapeleaf skeletonizer moth	*Hyppa xylinoides*	Common hyppa moth
Heliomata cycladata	Common spring moth	*Idaea demissaria*	Red-bordered wave moth

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Species	Common Name	Species	Common Name
Idaea dimidiata	Single-dotted wave moth	*Loscopia velata*	Veiled ear moth
Idia aemula	Common idia moth	*Lycophotia phyllophora*	Lycophotia moth
Idia americalis	American idia moth	*Lymantria dispar*	Spongy or Gypsy moth
Idia diminuendis	Orange-spotted idia moth	*Lytrosis unitaria*	Common lytrosis moth
Idia lubricalis	Glossy black idia moth	*Macaria aemulataria*	Common angle moth
Idia rotundalis	Rotund idia moth	*Macaria bisignata*	Red-headed inchworm moth
Idia scobialis	Smoky idia moth	*Macaria fissinotata*	Hemlock angle moth
Immyrla nigrovittella		*Macaria minorata*	
Ipimorpha pleonectusa	Even-lined sallow moth	*Macaria pinistrobata*	White pine angle moth
Iridopsis ephyraria	Pale-winged gray moth	*Macaria promiscuata*	Promiscuous angle moth
Iridopsis larvaria	Bent-line gray moth	*Macaria sexmaculata*	Larch looper moth
Iridopsis vellivolata	Large purplish gray moth	*Macaria signaria*	Pale-marked angle moth
Lacanobia grandis	Grand arches moth	*Macaria transitaria*	Blurry chocolate angle
Lacinipolia implicata	Implicit arches moth	*Macrochilo absorptalis*	Slant-lined owlet moth
Lacinipolia lorea	Bridled arches moth	*Macrochilo louisiana*	Louisiana macrchilo moth
Lacinipolia olivacea	Olive arches moth	*Macrochilo orciferalis*	Bronzy macrochilo moth
Lacinipolia renigera	Bristly cutworm moth	*Macronoctua onusta*	Iris borer moth
Lacosoma chiridota	Scalloped sack-bearer moth	*Macrurocampa marthesia*	Mottled prominent moth
Lambdina fiscellaria	Hemlock looper moth	*Malacosoma americana*	Eastern tent caterpillar moth
Lapara bombycoides	Northern pine sphinx moth	*Malacosoma disstria*	Forest tent caterpillar moth
Lascoria ambigualis	Ambiguous moth	*Maliattha concinnimacula*	Red-spotted lithacodia moth
Lateroligia (Apamea)		*Maliattha synochitis*	Black-dotted lithacodia moth
ophiogramma	Double-lobed moth	*Manduca sexta*	Carolina sphinx moth
Ledaea perditalis	Lost owlet moth	*Marathyssa basalis*	Light marathyssa moth
Leucania commoides		*Megalographa biloba*	Bilobed looper moth
Leucania inermis	Unarmed wainscot moth	*Melanchra adjuncta*	Hitched arches moth
Leucania insueta		*Melanchra assimilis*	Black arches moth
Leucania linita		*Melanolophia canadaria*	Canadian arches moth
Leucania multilinea	Many-lined wainscot moth	*Melanolophia signataria*	Signate melanolophia moth
Leucania phragmitidicola		*Meroptera abditiva*	
Leucania pseudargyria	False wainscot moth	*Mesapamea fractilinea*	Broken-lined brocade moth
Leucania ursula	Ursula wainscot moth	*Mesoleuca ruficillata*	White-ribboned carpet moth
Leucoma salicis	Satin moth	*Mesothea incertata*	Day emerald moth
Leuconycta diphteroides	Green leuconycta moth	*Metanema inatomaria*	Pale metanema moth
Limnaecia phragmitella	Shy cosmet moth	*Metarranthis duaria*	Ruddy metarranthis moth
Lithacodes fasciola	Yellow-shouldered slug moth	*Metarranthis homuraria*	Purplish metarranthis moth
Lithomoia germana		*Metarranthis indeclinata*	Pale metarranthis moth
Lobophora nivigerata	Powdered bigwing moth	*Metarranthis refractaria*	Refracted metarranthis moth
Lochmaeus manteo	Variable oakleaf caterpillar moth	*Microcrambus elegans*	Elegant grass-veneer moth
Lomographa glomeraria	Gray spring moth	*Misogada unicolor*	Drab prominent moth
Lomographa semiclarata	Bluish spring moth	*Moodna ostrinella*	Darker moodna moth
Lomographa vestaliata	White spring moth	*Morrisonia confusa*	Confused woodgrain moth
Lophocampa caryae	Hickory tussock moth	*Morrisonia evicta*	Bicolored woodgrain moth

Latin name in ( ) indicates older, synonymous name.

Norfolk Moths

Species	Common Name	Species	Common Name
Morrisonia latex	Fluid arches moth	*Ortholepis pasadamia*	Striped birch pyralid moth
Mythimna oxygala	Lesser wainscot moth	*Orthonama obstipata*	Gem moth
Mythimna unipuncta	Armyworm moth	*Pachysphinx modesta*	Big poplar sphinx moth
Nadata gibbosa	White-dotted prominent moth	*Packardia geminata*	Jeweled tailed slug moth
Nedra ramosula	Gray half-spot moth	*Palpita magniferalis*	Splendid palpita moth
Nematocampa resistaria	Horned spanworm moth	*Palthis angulalis*	Dark-spotted palthis moth
Nemoria bistriaria	Red-fringed emerald moth	*Palthis asopialis*	Faint-spotted palthis moth
Nemoria mimosaria	White-fringed emerald moth	*Pandemis limitata*	Three-lined leafroller moth
Neocataclysta magnificalis	Scrollwork pyralid moth	*Pangrapta decoralis*	Decorated owlet moth
Neodactria luteolellus	Mottled grass-veneer moth	*Panopoda rufimargo*	Red-lined panopoda moth
Neoligia exhausta	Exhausted brocade moth	*Panthea furcilla*	Eastern panthea moth
Nephelodes minians	Bronzed cutworm moth	*Pantographa limata*	Basswood leafroller moth
Nepytia canosaria	False hemlock looper moth	*Paonias excaecatus*	Blind-eyed sphinx moth
Noctua pronuba	Large yellow underwing moth	*Paonias myops*	Small-eyed sphinx moth
Nola pustulata	Sharp-blotched nola moth	*Papaipema cataphracta*	Burdock borer moth
Nomophila nearctica	Lucerne moth	*Papaipema inquaesita*	Sensitive fern borer moth
Notodonta scitipennis	Finned-willow prominent moth	*Papaipema pterisii*	Bracken borer moth
Notodonta torva	Northern finned prominent moth	*Papaipema rigida*	Rigid sunflower borer moth
Ochropleura implecta	Flame-shouldered dart moth	*Parallelia bistriaris*	Maple looper moth
Odontosia elegans	Elegant prominent moth	*Paralobesia yaracana*	
Ogdoconta cinereola		*Paraponyx allionealis*	
Olethreutes bipartitana	Divided olethreutes moth	*Paraponyx badiusalis*	Chestnut-marked pondweed moth
Olethreutes coruscana		*Parornix spiraeifoliella*	
Olethreutes fasciatana		*Pasiphila rectangulata*	Green pug moth
Olethreutes nigranum	Variable nigranum moth	*Patalene olyzonaria*	Jupiter geometer moth
Olethreutes permundana	Raspberry leafroller moth	*Peridea angulosa*	Angulose prominent moth
Olethreutes quadrifidum		*Peridea basitriens*	Oval-based prominent moth
Olethreutes valdanum		*Peridea ferruginea*	Chocolate prominent moth
Oligia bridghami	Bridgham's brocade moth	*Pero ancetaria*	Hubner's pero
Oligia minuscula	Small brocade moth	*Pero honestaria*	Honest pero moth
Oligocentria lignicolor	White-streaked prominent moth	*Pero morrisonaria*	Morrison's pero moth
Oligocentria semirufescens	Red-washed prominent moth	*Petrophora subaequaria*	Northern petrophora moth
Oneida lunulalis	Orange-tufted oneida moth	*Phaeoura quernaria*	
Oreana unicolorella		*Phalaenophana pyramusalis*	Dark-banded owlet moth
Oreta rosea	Rose hooktip moth	*Phalaenostola eumelusalis*	Dark phalaenostola moth
Orgyia antiqua	Rusty tussock moth	*Phalaenostola metonalis*	Pale phalaenostola moth
Orgyia definita	Definite tussock moth	*Pheosia rimosa*	Black-rimmed prominent moth
Orgyia leucostigma	White-marked tussock moth	*Phigalia strigataria*	Small phigalia moth
Orthodes cynica	Cynical Quaker moth	*Phlogophora iris*	Olive angle shades moth
Orthodes detracta	Disparaged arches moth	*Phragmatobia assimilans*	Large ruby tiger moth
Orthodes majuscula	Rustic Quaker moth	*Phragmatobia fuliginosa*	Ruby tiger moth
Orthofidonia exornata		*Phragmatobia lineata*	Lined ruby tiger moth
Orthofidonia flavivenata	Yellow-veined geometer moth	*Phtheochroa hoffmanana*	

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Species	Common Name	Species	Common Name
Plagodis alcoolaria	Hollow-spotted plagodis moth	*Renia nemoralis*	Chocolate renia moth
Plagodis fervidaria	Fervid plagodis moth	*Rheumaptera prunivorata*	
Plagodis kuetzingi	Purple plagodis moth	*Rhyacionia buoliana*	European pine shoot moth
Plagodis phlogosaria	Straight-lined plagodis moth	*Rivula propinqualis*	Spotted grass moth
Plagodis pulveraria		*Saphenista* (new species)	
(Anagoga occiduaria)	American barred umber moth	*Schizura badia*	Chestnut schizura moth
Plagodis serinaria	Lemon plagodis moth	*Schizura ipomoeae*	Morning-glory prominent moth
Platypolia mactata	Adorable brocade moth	*Schizura leptinoides*	Black-blotched schizura moth
Platyptilia pallidactyla		*Schizura unicornis*	Unicorn caterpillar moth
Plusia contexta	Connected looper moth	*Sciota virgatella*	
Plusia putnami	Putnam's looper moth	*Scopula limboundata*	Large lace-border moth
Plutella porrectella	Dame's violet moth	*Selenia kentaria*	Kent's geometer moth
Pococera asperatella	Maple webworm moth	*Sicya macularia*	Sharp-lined yellow moth
Podosesia aureocincta	Banded ash clearwing moth	*Sideridis congermana*	German cousin moth
Podosesia syringae	Ash borer moth	*Sideridis maryx*	Maroonwing moth
Polia imbrifera	Cloudy arches moth	*Simyra insularia*	Henry's marsh moth
Polia nimbosa	Stormy arches moth	*Smerinthus cerisyi*	One-eyed sphinx moth
Polygrammate hebraeicum	Hebrew moth	*Smerinthus jamaicensis*	Twin-spotted sphinx moth
Ponometia erastrioides	Small bird-dropping moth	*Sparganothis acerivorana*	Maple leafroller moth
Prionoxystus macmurtrei	Little carpenterworm moth	*Sparganothis diluticostana*	Spring dead-leaf roller moth
Probole amicaria	Friendly probole moth	*Sparganothis pettitana*	Maple-basswood leafroller moth
Prochoerodes lineola	Large maple spanworm moth	*Sparganothis unifasciana*	One-lined sparganothis moth
Proteoteras aesculana	Maple twig borer moth	*Speranzia pustularia*	Lesser maple spanworm moth
Protitame virginalis	Virgin moth	*Sphecodina abbottii*	Abbott's sphinx moth
Protoboarmia porcelaria	Porcelain gray moth	*Sphinx gordius*	Apple sphinx moth
Protodeltote albidula	Pale glyph moth	*Sphinx kalmiae*	Laurel sphinx moth
Protodeltote muscosula	Large mossy lithacodia moth	*Spilosoma congrua*	Agreeable tiger moth
Protorthodes oviduca	Ruddy Quaker moth	*Spilosoma latipennis*	Pink-legged tiger moth
Proxenus miranda	Miranda moth	*Spilosoma virginica*	Virginian tiger moth
Pseudeustrotia carneola	Pink-barred lithacodia moth	*Sthenopis argenteomaculatus*	Silver-spotted ghost moth
Pseudexentera kalmiana		*Sthenopis auratus*	Gold-spotted ghost moth
Pseudohermonassa bicarnea	Pink-spotted dart moth	*Stretchia plusiaeformis*	
Pseudorthodes vecors	Small brown Quaker moth	*Sunira bicolorago*	Bicolored sallow moth
Pseudotelphusa basifasciella		*Symmerista albifrons*	White-headed prominent moth
Pseudothyatira cymatophoroides	Tufted thyatirid moth	*Synanthedon acerni*	Maple callus borer moth
Psilocorsis reflexella	Dotted leaftier moth	*Synanthedon exitiosa*	Peachtree borer moth
Pyralis farinalis	Meal moth	*Synanthedon rhododendri*	Rhododendron borer moth
Pyrausta acrionalis	Mint-loving pyrausta moth	*Synchlora aerata*	Wavy-lined emerald moth
Pyrausta bicoloralis	Bicolored pyrausta moth	*Syndemis afflictana*	Gray leafroller moth
Pyrrharctia isabella	Isabella tiger moth (woolly bear caterpillar)	*Tetracis cachexiata*	White slant-line moth
		Tetracis crocallata	Yellow slant-line moth
Raphia frater	Brother moth	*Tolype laricis*	Larch tolype moth
Renia factiosalis	Sociable renia moth	*Tolype velleda*	Large tolype moth

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Species	Common Name	Species	Common Name
Tortricidia flexuosa	Abbreviated button slug moth	*Xestia dolosa*	Greater black-letter dart moth
Tortricidia pallida	Red-crossed button slug moth	*Xestia normanianus*	Norman's dart moth
Trichodezia albovittata	White-striped black moth	*Xestia smithii*	Smith's dart moth
Tricholita signata	Signate Quaker moth	*Xylena curvimacula*	Dot-and-dash swordgrass moth
Trichoplusia ni	Cabbage looper moth	*Yponomeuta cagnagella*	Spindle ermine moth
Udea rubigalis	Celery leaftier moth	*Yponomeuta multipunctella*	American ermine moth
Ulolonche culea	Sheathed Quaker moth	*Ypsolopha dentiferella*	
Urola nivalis	Showy urola moth	*Zale duplicata*	Pine false looper moth
Vaxi auratella	Curve-lined vaxi moth	*Zale helata*	Brown-spotted zale moth
Virbia (Holomelina) aurantiaca	Orange holomelina moth	*Zale horrida*	Horrid zale moth
Virbia (Holomelina) opella	Tawny holomelina moth	*Zale lunata*	Lunate zale moth
Xanthorhoe ferrugata	Red twin-spot moth	*Zale minerea*	Colorful zale moth
Xanthorhoe labradorensis	Labrador carpet moth	*Zanclognatha cruralis*	Early zanclognatha moth
Xanthorhoe lacustrata	Toothed brown carpet moth	*Zanclognatha laevigata*	Variable zanclognatha moth
Xanthotype sospeta	Crocus geometer moth	*Zanclognatha lituralis*	Lettered zanclognatha moth
Xanthotype urticaria	False crocus geometer moth	*Zanclognatha pedipilalis*	Grayish zanclognatha moth
Xestia c-nigrum (adela)		*Zanclognatha protumnusalis*	
Xestia badicollis	Northern variable dart moth	*Zeuzera pyrina*	Leopard moth
Xestia dilucida	Dull reddish dart moth		

Latin name in ( ) indicates older, synonymous name.

These moths were collected by Ronald Harms, DDS, and David Wagner, PhD, in Norfolk, Connecticut.
Their lists were integrated and edited by Sue Frisch and John Anderson, who also added available common names. This list was reviewed and amended by David Wagner and Ray Simpson, entomologist (Yale Peabody Museum). Other reference used: Moth photographers group website (http://mothphotographerdgroup.msstate.edu), Mississippi Entomological Museum.

Norfolk Bees

There have been 15 genera of bees collected in Norfolk, with most records coming from the genus Andrena (11 species; mining bees, which are solitary) and Bombus (10 species; bumble bees, which live in colonies). Other genera in Norfolk can be grouped into the following categories: sweat bees, green bees, cellophane bees, jelly-belly bees and clepto-parasitic species. The total number of species that have been collected in Norfolk is 38, and the total number of records is 100.

Species	Common Name	Status
MINER BEES		
Andrena asteris	Aster miner bee	
Andrena bradleyi	Bradley's miner bee	
Andrena carlini	Carlinville miner bee	
Andrena clarkella	Clark's miner bee	
Andrena cressonii cressonii	Dotted or Cresson's miner bee	
Andrena hirticincta	Hairy-banded miner bee	
Andrena milwaukeensis	Milwaukee miner bee	
Andrena nivalis	Snowy miner bee	
Andrena nuda	Naked miner bee	
Andrena regularis	Regular miner bee	
Andrena rufosignata	Red-faced or Brown-fovea miner	
Andrena vicina	Neighborly miner bee	
APID BEES		
Anthophora terminalis	Orange-tipped wood-dagger	
Bombus flavidus	Yellowish cuckoo bumble bee	a northern species, rare, may be increasing in CT
Bombus griseocollis	Brown-belted bumble bee	C
Bombus affinis	Rusty-patched bumble bee	US E
Bombus bimaculatus	Two-spotted bumble bee	C
Bombus impatiens	Common eastern bumble bee	C, most abundant species
Bombus perplexus	Perplexing bumble bee	C
Bombus sandersoni	Sanderson's bumble bee	a northern species, localized
Bombus ternarius	Tricolored bumble bee	a northern species, may be declining in CT
Bombus terricola	Yellow-banded bumble bee	T
Bombus vagans	Half-black bumble bee	C
Melissodes denticulatus	Long-horned bee	
Nomada gracilis	Slender nomad bee	
Nomada maculata	Spotted nomad bee	
PLASTERER BEES		
Colletes simulans	Spine-shouldered cellophane bee	

US E – federally endangered, U.S. Fish & Wildlife Service, T – threatened, CT DEEP
SC – species of special concern, CT DEEP, C – common

Norfolk Bees

Species	Common Name	Status
SWEAT BEES		
Agapostemon virescens	Bicolored striped sweat bee	
Augochlora pura	Pure gold-green sweat bee	
Augochlorella aurata	Golden green sweat bee	
Augochloropsis metallica	Metallic epauletted sweat bee	
Halictus rubicundus	Orange-legged furrow bee	
Sphecodes aroniae	Chokeberry cuckoo sweat bee	
MEGACHILID BEES		
Coelioxys sayi	Say's cuckoo leafcutter bee	
Megachile brevis	Short leafcutter bee	
Megachile centuncularis	Patchwork leafcutter bee	
Megachile mendica	Flat-tailed leafcutter bee	
Megachile montivaga	Silver-tailed petalcutter bee	

Damselflies and Dragonflies [*Odonata*]

Species	Common Name	Status
Aeshna umbrosa	Shadow darner	S5, Common
Amphiagrion saucium	Eastern Red damsel	S3, Rare to Uncommon
Anax junius	Common Green darner	S5, Common, migratory
Argia fumipennis	Variable darner	S5, Common
Arigomphus villosipes	Unicorn clubtail	S5, Common to Uncommon
Calopteryx maculata	Ebony jewelwing	S5, Common
Celithemis elisa	Calico pennant	S5, Common
Celithemis eponina	Halloween pennant	S5, Common
Chromagrion conditum	Aurora damsel	S5, Common
Cordulegaster diastatops	Delta-spotted spiketail	S4, Uncommon
Epitheca cynosure	Common baskettail	S5, Common
Enallagma geminatum	Skimming bluet	S5, Common
Enallagma vesperum	Vesper bluet	S3, Rare to Uncommon
Gomphaeschna furcillata	Harlequin darner	S4, Uncommon
Hagenius brevistylus	Dragonhunter	S3-S4, Rare to Uncommon
Ischnura kellicotti	Lilypad forktail	S3-S4, Rare to Uncommon
Ischnura verticalis	Eastern forktail	S5, Common
Ladona julia	Chalk-fronted corporal	S5, Common
Leucorrhinia intacta	Dot-tailed whiteface	S5, Common
Leucorrhinia proxima	Belted whiteface	S2-S3, Very Rare to Uncommon
Libellula cyanea	Spangled skimmer	S5, Common
Libellula incesta	Slaty skimmer	S5, Common
Libellula luctuosa	Widow skimmer	S5, Common
Libellula pulchella	Twelve-spotted skimmer	S5, Common
Libellula quadrimaculata	Four-spotted skimmer	S4, Uncommon
Nehalennia irene	Sedge sprite	S5, Common
Perithemis tenera	Eastern amberwing	S5, Common
Plathemis lydia	Common whitetail	S5, Common
Rhionaeschna mutata	Spatterdock darner	S3, Rare to Uncommon
Sympetrum vicinum	Autumn meadowhawk	S5, Common

Key to State Conservation Rank: S1 – Critically imperiled, S2 – Imperiled, S3 – Vulnerable, S4 – Apparently secure, S5 – Secure
[Sources: Thomas & Morrhead, 2003; iNaturalist.org (research-grade observations in Norfolk; accessed website 10-10-2022); Natureserve.org (website: explorer.natureserve.org, accessed website 10-11-2022)]

Appendix 6: Areas of Ecological Importance

What is Biodiversity?

The word "biodiversity" is often used. You may hear people say, "We must preserve biodiversity" or "The biodiversity of this area is poor." But what does that mean?

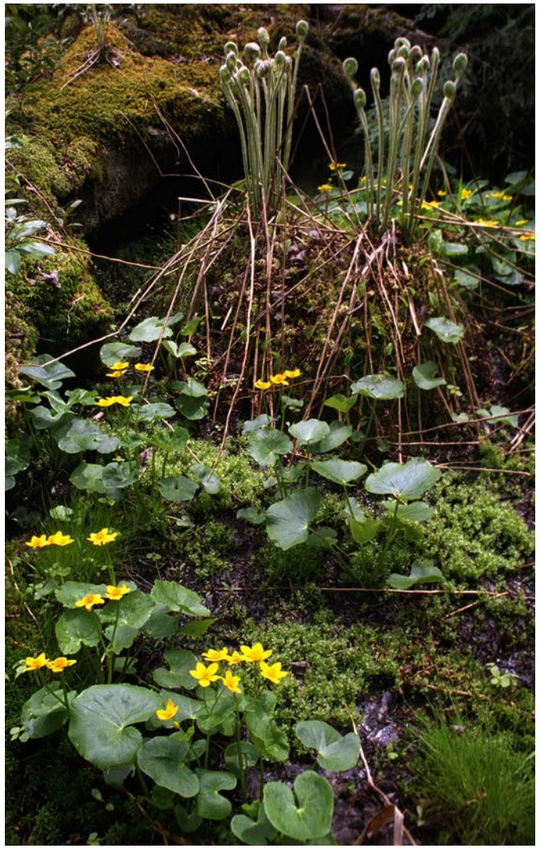
"Biodiversity" stems from "bio-" (life, living) and "diverse" (differing, distinct). It is used to refer to the overall spectrum of living things and to the diverse living organisms of a specific area. Although some important habitats are naturally sparse, its value is generally measured by the number of different species present within a given area.

Biodiversity can include the entire range of all living things, from the largest to the smallest microscopic organism. It can refer to the genetic components of these species, or to larger units composed of many species, such as communities or ecosystems. Sometimes only native species are counted towards an area's biodiversity; sometimes all species are included. The full, world wide variation in a single group of organisms, such as birds, may be described and sometimes it is used for the known or estimated species-richness of an area. One could measure the biodiversity of an area as large as the whole earth or smaller than a clump of moss.

Healthy ecosystems—complex groups of living things interacting with their environments—depend on having a multitude of organisms. An ecosystem is more stable and more adaptable to change when it has widely diverse life forms. It can restore itself more easily after a disaster, such as external flood and drought, or internal plagues and diseases. At the genetic level, diversity means not only that there are greater varieties of organisms to fill the niches in the existing environment; it also means that new organisms will fill any niches added as the environment changes. More, more diverse niches will allow more species to survive.

Humans themselves are important parts of the global ecosystem. We are living creatures that depend on the other organisms for food, medicine, energy and shelter as well as for clean air, water and soil, and yet we can have serious impacts on them. As a result of some human activities, ecosystems, species and genetic diversity are being eroded at rates much greater than ever before; species extinction is thought to be many times faster today than it was before people became a factor. This accelerated decline in biodiversity threatens the many benefits we currently derive from the Earth's living resources.

For example, the energy cycle (photosynthesis, the conversion of sunlight into carbohydrates, and respiration, the use of energy), the water cycle (circulation by precipitation, flow and evaporation), the carbon and oxygen cycles (exchanges of carbon and oxygen through



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Swamp tussocks support marsh marigolds (Caltha palustris), moss, ferns and countless other living things.

living organisms, the earth, water and atmosphere) and the nitrogen cycle (from atmospheric nitrogen to plant nutrients and back), are all mediated by diverse animals and plants. We need all these living things to sustain our environment. Unfortunately, in many cases we do not understand, or only partly understand, the roles these species play. There also is much we do not even know about and will never know about before we destroy it. We do know this: we cannot survive without our co-inhabitants of this earth.

Norfolk is fortunate to have a rich biodiversity. Its forests, wetlands, fields and rocky hills support many different balanced ecosystems. There are some problems but, with care and attention, we can keep our land and ourselves healthy.

Appendix 7: Open Space

Land Open for Recreation

This list of land open to the public for recreation does not include very small or isolated parcels. The map of protected open space on page 52 shows the general location of the areas listed below, and a larger map showing all public land is on display at town hall.

State Parks

Campbell Falls State Park: Located in the northwest corner of the town off Route 272. Consists of 65 acres with a hiking trail to the falls.

Dennis Hill State Park: Located south of town on Route 272. Consists of 240 acres, trails, a shelter and views.

Haystack State Park: Located just north of town center on Route 272. Consists of 355 acres and has several hiking trails leading to a stone tower with a 360-degree view.

Connecticut DEP Lands

North Swamp Flood Control Area: Access is behind Botelle School. Consists of 28 acres and provides access to the North Swamp Trail (see below).

Spaulding Brook Flood Control Area: Access is on Westside Road. Consists of 11 acres and offers walking, views over wetlands.

Wood Creek Flood Control Area: Access by the state garage on Route 272 and opposite Haystack State Park on Route 272. Consists of 250 acres and offers hiking and (on one portion) hunting.

Wood Creek Pond: Access from Ashpohtag Road north of Route 272. Its boat ramp allows fishing, canoeing and kayaking.

Town of Norfolk

Public beach on Tobey Pond leased by town of Norfolk from Great Mountain Forest: Open to residents in summer; fee pays for lifeguards.

Baseball and soccer fields, tennis courts next to Botelle School: On Route 44 east of the Green.

Baseball and soccer field and ice skating area leased by town of Norfolk from the Battell-Stoeckel Estate: On Mountain Road.

Conservation Organizations

Aton Forest: Headquarters on State Line Hill Road. Consists of 1,247 acres that are open by appointment for scientific and educational purposes. For information, call e-mail to atonforest@gmail.com.

Barbour Woods (Norfolk Land Trust): Entrances on Lover's Lane, Shepard Road, behind the state garage on Route 272 and across the flood control dam off Route 272. Consists of 205 acres with extensive trail system.

Billings Trail (Norfolk Land Trust): Several sections of this hiking and ski trail follow an old railroad right of way.

The Stoney Lonesome Section goes 1.5 miles from a gate on Ashpohtag Road through several rock cuts to a parking area on Locust Hill Road.

The Mad River Section goes 1.6 miles from the trail head on Grantville Road just west of Smith Pond to Winchester Road just south of Route 272.

Pine Mountain (Norfolk Land Trust): Entrance on Grantville Road. 311 acres with extensive trails and two summits.

North Swamp Trail (Spaulding Pond Preserve, maintained by Norfolk Land Trust): Located behind Botelle School, beyond the flood control dam. Trail is about 1.5 miles long.

Great Mountain Forest (Forest Legacy easement held by USDA Forest Service): Headquarters on Windrow Road. Consists of 6,041acres with hiking and ski trails, and some ponds that are open for non-motorized boats. See the Forest's website at https://greatmountainforest.org for regulations or call 860-542-5422.

Camp Barbour (Connecticut Rivers Council, BSA): Boy Scout camp.

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A quiet day.

Appendix 8: Scenic Resources

Norfolk Scenic Town Road Characteristics

Town Roads	**Unpaved**	**Mature trees**	**Stone walls**	**20 feet or less wide**	**Scenic views**	**Blends into terrain**	**Water features**	Historic significance	Recreational uses	Near open space	Farm or forest	Attractive vegetation	Notable natural features
Ashpohtag Road	no	x	x	part	x	x	x	x	x	x	x	x	x
Bald Mountain Road	no	x	x	most	x	x	x	x	x	x	x	x	x
Barry Hill Road	x	x	x	x	x	x	no	x	x	x	x	x	x
Beckley Road	x	x	x	x	x	x	x	x	x	x	x	x	x
Bruey Road	no	x	x	x	x	x	x	x	x	x	x	x	x
Colebrook Road	no	x	x	no	x	x	x	no	x	x	x	x	no
Doolittle Drive	no	x	x	x	x	x	x	x	x	x	x	x	x
Elmore Road	no	x	x	x	x	x	x	no	x	x	x	x	x
Estey Road	part	x	x	x	x	x	x	x	x	x	x	x	x
Gamefield Road	x	x	x	x	x	x	x	no	x	x	x	x	x
Golf Drive	no	x	no	x	x	x	x	x	x	x	x	x	no
Goshen East Street	no	x	x	part	x	x	x	x	x	x	x	x	x
Grantville Road	no	x	x	part	x	x	x	x	x	x	x	x	x
Green Road	x	x	x	x	no	x	x	x	x	x	x	x	no
Loon Meadow Drive	no	x	x	x	x	x	x	x	x	x	x	x	no
Lovers Lane	no	x	x	x	x	x	x	no	x	x	x	x	x
Meekertown Road	x	x	x	x	x	x	x	x	x	x	x	x	x
Mountain Road	part	x	x	x	x	x	x	x	x	x	x	x	x
North Colebrook Road	no	x	x	x	x	x	x	x	x	x	x	x	no
Old Goshen Road	no	x	x	x	x	x	x	x	x	x	x	x	x
Old Spaulding Road	no	x	x	most	x	x	x	x	x	x	x	x	x
Parker Hill Road	no	x	x	most	x	x	x	no	x	x	x	x	x
Roughland Road	no	x	x	part	x	x	x	no	x	x	x	x	no
Schoolhouse Road	no	x	x	part	x	x	x	x	x	x	x	x	x
Shantry Road	no	x	x	x	x	x	x	x	x	x	x	x	no
Smith Road	no	x	x	no	x	x	x	no	x	x	x	x	x
South Sandisfield Road	x	x	x	x	x	x	x	x	x	x	x	x	x
State Line Hill Road	part	x	x	x	no	x	no	no	x	x	x	x	x
Westside Road	no	x	x	part	x	x	x	x	x	x	x	x	x
Wheeler Road	no	x	x	x	x	x	x	x	x	x	x	x	x
Winchester Road	no	x	x	part	x	x	x	x	x	x	x	x	x
Windrow Road	part	x	x	part	x	x	x	x	x	x	x	x	no

A road must have at least one of the boldface characteristics to qualify as a scenic road.
Other listed characteristics may be taken into account.

Norfolk Scenic State Road Characteristics

State Roads	Forests with mature trees	Stone walls	Marshes	Scenic views	Compatible development	Water features	Historic significance (state)	Agricultural land	Attractive vegetation	Notable natural features
Greenroads Road East (Route 44)	x	x	x	x	x	x	x	x	x	no
Greenroads Road West (Route 44)	x	x	x	x	x	x	x	x	x	no
Litchfield Road (Route 272)	x	x	x	x	x	x	x	x	x	no
North Street (Route 272)	x	x	x	x	x	x	x	x	x	x
Sandy Brook Road (Route 183)	x	x	x	x	x	x	x	x	x	x

The state considers all of the above characteristics in approving scenic highway status.

Notes on Norfolk's Roads

TOWN ROADS

Ashpohtag Road
History: Shepard & Adams tannery foundations and water supply dam, one-room schoolhouse, West Norfolk railroad station, North Norfolk green
Geology: Boulders, deep ravine with creek
Open space: Wood Creek Pond and state boat launch, entrance to Norfolk Land Trust trail through Stoney Lonesome
View: Fields, Haystack Mountain

Bald Mountain Road
History: Little Red Schoolhouse, land grant to Yale University (Yale Farm)
View: Forest, water and farm fields, Haystack Mountain

Barry Hill Road
History: Old farmhouse foundations, one (Mills) with hand built stone-lined well
View: Mostly forested, gravel road

Beckley Road
History: Plane crash site, exploration pits for possible iron mines
Geology: Boulders
Open space: Beckley Bog, the Nature Conservancy borders both sides
View: Mostly forested, brief view of Beckley Bog Pond, gravel road

Bruey Road
History: Bruey farmhouse
Open space: Aton Forest, Spaulding Pond Preserve
View: Open views, swamp and pond, winter views to Grant Hill and Dennis Hill, panoramic view south to Turkey Cobble and Riggs Hill

Doolittle Drive
History: Pond Town Cemetery, Great Pond (Doolittle Lake), original (1758) proposed site for iron works, historic farm foundations
Geology: Huge glacial erratic boulder near Wheeler Road
View: North-central ridge, farm fields, orchard, stone walls

Elmore Road
Geology: Large boulders
Open space: Holleran Swamp (The Nature Conservancy)
View: Woods, nice swamp view

Estey Road
History: One-room schoolhouse, historic farmhouse (Deacon Minor)
Geology: Leads to Tipping Rock (in Goshen), unpaved for .2 mile from south end

Gamefield Road
View: Brook, views of Tobey Pond, hemlocks, gravel road

Golf Drive
History: Norfolk Downs, one of the first golf courses in the state
Geology: Sheep Rock, kettle holes
Recreation: Norfolk Country Club, Norfolk Curling Club, Tobey Pond beach

Goshen East Street
History: One of the two oldest structures in Norfolk, many foundations of early nineteenth century community
View: Arcadia Farm and Hoover Pond

Grantville Road
History: Old farmhouses, Grantville railroad section
Open space: Norfolk Land Trust rail trail, Nature Conservancy land
View: Dennis Hill State Park, Smith Pond, Maple View Farm, Kelly Swamp, attractive houses

Green Road
History: Old foundations
View: Heavily wooded, no houses

Loon Meadow Drive
History: First known recorded road into Norfolk
Open space: Camp Barbour (Boy Scouts of America)
View: Open fields, Loon Brook wetlands

Lovers Lane
View: Swamp and field near town, otherwise wooded
Open space: Norfolk Land Trust trails

Meekertown Road
History: Old tannery foundation (Waterbury Leather), community foundations
Geology: Town House boulder visible from road, boulders and rock outcroppings
Open space: Adjoins Great Mountain Forest, road does not go all the way through

Mountain Road
History: 1897 public water supply system, historic farmhouse, shanty town, cheese box mill, Battell Stoeckel estate, old split-rail fence
Geology: Large boulders
Open space: Great Mountain Forest
View: Swamp, woods and fields; Haystack and Dutton Mountains, part gravel road
Recreation: Ball fields

North Colebrook Road
History: One-room schoolhouse foundation, old farm foundations, old houses
Open space: Aton Forest
View: Mostly forested, old houses

Old Goshen Road
History: Foundation and dam (Waterbury Leather), early farmhouses, Torrington House
View: Stone walls, fields, pine woods

Old Spaulding Road
History: Old farm foundations
Geology: Cliff and boulders
Open space: Campbell Falls State Park
View: Fields, woods

Parker Hill Road
View: Woods

Roughland Road
View: Woods, old houses

Schoolhouse Road
History: Grant homestead, Grantville railroad station, one-room schoolhouse location, foundation of railroad bridge
View: Mad River

Shantry Road
History: Old farmhouse
Open space: Aton Forest

Smith Road
View: Wooded hillside, fields, Hall Meadow Brook

South Sandisfield Road *Town-designated scenic road*
History: Old farm foundations
Open space: Aton Forest
View: forested, beaver pond, gravel road

State Line Hill Road
View: forested, partially gravel road (abandoned section)

Westside Road
History: Site of first grist and saw mills, old farm foundations, Pupin estate, one-room schoolhouse, saw mill foundation
Geology: esker
View: Outstanding wildflowers, stone walls and farm fields, Buttermilk Falls, waterfall over dam, views to Dutton and Haystack Mountains and Swift Hill

Wheeler Road
History: One-room schoolhouse location, historic site of steam saw mill
Open space: Holleran Swamp (the Nature Conservancy)
View: Winter view to north-central ridge

Winchester Road *Town-designated scenic road*
History: Grantville Cemetery, old farmhouses
Open space: Norfolk Land Trust rail trail; Spaulding Pond Preserve, Connecticut Audubon easement
View: Dennis Hill State Park, panorama south across Broadfield Farm field to Parker and Riggs Hills, Kelly Swamp

Windrow Road
History: One-room schoolhouse, Childs Pond (early curling), Tobey Pond (ice industry), old farmhouses
Open space: Great Mountain Forest

STATE HIGHWAYS

Colebrook Road (Route 182)
History: Registered historic house, one-room schoolhouse, Old Newgate Coon Club, historic foundations

Greenwoods Road East and West (Route 44)
History: Historic district, historic homes, ice industry site, town farm site, Greenwoods Turnpike, old industrial area along Blackberry River (11 dam sites), Iron Heritage Trail, tanner site, site of original settler for town of Norfolk, old farmhouses
Open space: Norfolk Land Trust, Spaulding Pond Preserve
View: Pond Hill Pond, Haystack Mountain, Buttermilk Falls

Litchfield Road (Route 272 south) *State-designated scenic highway*
History: Historic district, many grand old homes, Summit train station (highest in the state), old farmhouses, old school house, South Norfolk Cemetery
Open space: Land Trust rail trail, Dennis Hill state park, Spaulding Pond Preserve
View: Westside Road valley and forested hills, panoramic view northwest, Swift Hill, winter views southwest to Crissey Ridge

North Street (Route 272 north) *State-designated scenic highway*
History: Catholic church, Methodist church, historic registered homes, old farmhouses, stone quarry site, St. Mary's Cemetery
Open space: Haystack State Park, Campbell Falls State Park, Norfolk Land Trust rail trail, Connecticut Flood Control Area
View: Across dry dam to Beech Hill and Loon Meadow, north-central ridge, Haystack Mountain

Colebrook Road (Route 183)
History: Registered historic house, old farmhouses
Open space: Aton Forest
View: Sandy Brook

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Appendix 10: About This Inventory

This inventory of Norfolk's natural resources was conceived in 2005 by the Conservation Commission/Wetlands Agency, which was then a joint commission. A subcommittee—Elizabeth Borden, Stanley Civco, Sue Frisch, Shelley Harms, Edward Machowski, Adair Mali, Elizabeth Potter and Alnasir (Nash) Pradhan—was appointed and charged with researching and writing the inventory, and producing recommendations based upon the data. William Couch was appointed to the subcommittee as a representative of the Planning & Zoning Commission and John Anderson, invited to participate as an adviser, became a major contributor.

The subcommittee was disbanded in March 2009 and Anderson, Borden, Frisch, Harms, Machowski, Potter and Pradhan were appointed to the newly separate Conservation Commission.

It is the Conservation Commission's hope that the information in this inventory will help town officials, its agencies and individuals appreciate the wealth of resources Norfolk is fortunate enough to have. It is also our hope that the recommendations will influence decisions about land use on all levels, and introduce the town and individuals to conservation methods they can use.

This inventory is just the beginning of an ongoing effort to understand Norfolk's flora and fauna. The commission invites everyone to help it gather more information for what it intends will be yearly supplements to this printed document and frequent additions to the town website. It also invites public comment and suggestions for its future direction.

The update of this publication began in 2018, with the good intention of completing it in 2019, the year of the tenth anniversary of the first NRI. However, the project turned out to be a greater undertaking than the members of the commission had anticipated and, as with many volunteer efforts, proceeded slowly, but always forward. We had always intended that much of text and information would remain, as we determined most of it still relevant and accurate. We did want to incorporate new information and some new topics based on Conservation Commission activities over the past 12 years. This is a work in progress and this inventory will continue to be updated and improved in the future.

Methods

Subcommittee members and all other contributors were chosen for their expertise in the areas covered by the projected inventory. The chapters were written as context for the data in the appendices. In the appendices, whenever possible, we used information that already existed, such as the Checklist of Butterflies of Connecticut and Native and Naturalized Plants of Connecticut. These were reviewed and modified by outside experts. All lists were made to be as specific and relevant to Norfolk as possible, and not generic to Connecticut or the entire northwest corner. Other lists were prepared specially for the inventory and derive from many sources; they also were reviewed by outside experts.

Acknowlededgements

This work was planned, written and reviewed by John Anderson, Elizabeth Borden, Stanley Civco, William Couch, Sue Frisch, Shelley Harms, Edward Machowski, Adair Mali, Elizabeth Potter and Nash Pradhan. Sue Frisch organized and edited the original inventory and was the force behind this effort.

Elizabeth Corrigan, Marjorie Faber, Ronald Harms, Ann Havemeyer, Sean Hayden, Ted Hinman, Kathleen Johnson, Russell Russ, Randolph Steinen and Susannah Wood also wrote portions, and others helped by reviewing chapters and lists, contributing missing pieces of information and otherwise making this publication possible, as follows:

The 2023 Second Edition was modified and edited by past and present members of the Conservation Commission (CC) members John Anderson, Elizabeth Borden, Sue Frisch, Shelley Harms, Martha Klein, Nash Pradhan and Susannah Wood. This document was also reviewed by Mike Halloran (Norfolk WEO/ZEO), Bill Ticineto (CC) and Sam Williams (CC). Others reviewed and improved portions of both editions of this inventory.

Geography and Geology of Norfolk
Randolph Steinen helped write the Geography and Geology chapter.

Norfolk's Weather
Russell Russ wrote and updated the Norfolk Weather chapter and supplied weather data. He also supplied the lilac phenological data from Great Mountain Forest, with their permission. John Anderson supplied the phenological data comparison from Aton Forest based on his personal research. Josh and Ann DeCerbo helped with the first edition weather graphs in Appendix 1, modified by Russ for the second edition.

Soils of Norfolk
Sean Hayden wrote the Soils chapter, with help from Kathleen Johnson, Marjorie Faber and Donald Parizek. Kathleen Johnson wrote the soil descriptions in Appendix 2, assisted by Marjorie Faber, who updated the two soils tables.

Aquatic Resources
Randolph Steinen contributed information on groundwater to the Aquatic Resources chapter and Vince Long assembled groundwater contamination data from DEP files. Ed Machowski wrote the Aquatic Resources chapter. John Anderson wrote the section on vernal pools. Mike Beauchene, CT DEEP fisheries biologist, reviewed and updated the Freshwater Fishes list in Appendix 3.

The Norfolk Plantscape
John Anderson and Nash Pradhan wrote the Norfolk Plantscape chapter. The Norfolk-Colebrook Garden Club (now defunct) helped to publicize the notable trees project mentioned in the chapter on the Norfolk plantscape, and William Moorhead, Kenneth Metzler and Leslie Mehrhoff reviewed it and the various plant lists in Appendix 4 developed by Stan Civco, Nash Pradhan and John Anderson. Jody Bronson and Russell Russ helped with the list of native trees and Ted Hinman contributed the list of tree fungi. Glenn Dreyer and Frank Kaputa gave permission to use the notable Norfolk trees they had documented for the Notable Trees statewide list.

Wildlife
This chapter and recommendations were written by the wildlife subcommittee, which included Stan Civco, Shelley Harms and Nash Pradhan, with assistance from John Anderson. James Fischer contributed a list of Norfolk mammals in Appendix 5, as well as additional and valuable information on wildlife. He and Karen Zyko also reviewed and added to the status of bats in the town. Ronald Harms contributed information about butterflies and moths to the wildlife chapter and was the main contributor to the butterfly list in Appendix 5. Also in the appendix, David Wagner and Ray Simpson reviewed the butterfly and moth list, Ayerslea Denny contributed information about snakes and birds, and Ronald and Shelley Harms, Stan Civco, Susannah Wood and John Anderson also contributed their bird observations. Other sources for bird material include Great Mountain Forest and Aton Forest.

Areas of Ecological Importance
Elizabeth Corrigan wrote the chapter on Areas of Ecological Importance and reviewed the definition of biodiversity in Appendix 6. Alex Persons mapped the vernal pool field data gathered by many Norfolk volunteers.

Open Space
Susannah Wood wrote the chapter on open space and compiled the list of public recreational spaces in Appendix 7.

Scenic Resources
Bill Couch wrote this chapter. Shelley Harms and Susannah Wood wrote the dark night sky section and organized the scenic resources survey. Norfolk First Selectman Matt Riiska contributed information about the town roads. Daniel and Meredith Torrey and Stella and Anya Wareck helped with the Scenic Resources survey of Norfolk's rural roads in Appendix 8, and Richard Byrne contributed information about their historic features.

Historic Resources
Ann Havemeyer wrote the chapter on Historic Resources. Richard Byrne worked with her on the data for the maps.

Recommendations
The recommendations were a collaborative affair of the original Natural Resource Inventory subcommittee and many of the other contributors. Drafts of these and selected chapters were reviewed and commented upon by members of the Board of Selectmen, Planning & Zoning Commission and the Wetlands Agency. Some additions and changes to the recommendations were made by the Conservation Commission for 2023.

Maps, photographs, design

Stacy Deming, GIS manager for Housatonic Valley Association, created or modified many of the maps in this updated inventory. Unmodified maps retained from the original inventory were created by Kirk Sinclair. The Critical Habitat map from the 2009 inventory, created by Elizabeth Corrigan, has been updated and replaced.

Many of the photographs were entries in a year-long contest won by Alexandra Childs, Eileen Fitzgibbons, Katherine Griswold (best in show), Adela Hubers and Leila Javitch. The rest came from other Norfolk photographers, including John Anderson, Tammy Andrews, Peter Coffeen, Bruce Frisch, Jean Grasmere, Pat Harms, Shelley Harms, Jim Jackson, Christopher Little, Joel Pensley, Julie Scharnberg and Rebecca Ward. The USDA Natural Resources Conservation Service contributed the aerial view of Norfolk and two photographs in the soils chapter.

Bruce Hanke designed the previous inventory, much of which has been retained in this 2023 update. Aaron Frisch updated the inventory, organizing it into a new program and preparing it for printing and publishing on the Town of Norfolk website.

About the contributors

John Anderson is a local naturalist and scientist. He is the co-founder and former executive director of Aton Forest, Inc. in Norfolk. He holds degrees in natural resource conservation and geography and a certificate in geographic information systems. He is a member of the Conservation Commission and also serves on the board of the Connecticut Botanical Society.

Mike Beauchene is a fisheries biologist with the CT DEEP.

Elizabeth Borden is a retired teacher and publisher, and holds a degree in environmental management. She is a member of the Conservation Commission, the Norfolk Land Trust and other local commissions.

Jody Bronson is Forester Emeritus at Great Mount Forest in Norfolk.

Richard Byrne is vice president of the Norfolk Historical Society and assistant municipal historian.

Stanley Civco is a retired Connecticut conservation officer; he holds a degree in wildlife ecology.

Elizabeth Corrigan is a consulting biologist, who has worked independently and for various organizations and agencies. She was co-chair of the Connecticut Invasive Plant Working Group and is a former member of the Conservation Commission.

William Couch is an alternate member of Norfolk's Planning and Zoning Commission. He holds a degree in geography.

Stacy Deming is the GIS manager for the Housatonic Valley Association, Cornwall Bridge, and created the new maps for the 2023 NRI update.

Ayerslea Denny is a local naturalist.

Ann and Joshua DeCerbo are design and computer consultants as DeCerbo Designs.

Glenn Dreyer is director of the Connecticut College Arboretum and author of Connecticut's Notable Trees.

Marjorie Faber is Assistant State Soil Scientist (Connecticut) for the USDA Natural Resources Conservation Service, based in Tolland.

James Fischer is a mammologist and research director at the White Memorial Conservation Center in Litchfield.

Bruce Frisch (deceased) was a noted photographer and contributed many of the photographs in this NRI. He was the husband of Sue Frisch. This edition is dedicated to his memory.

Sue Frisch is a retired editor and publisher. She was a member of the Conservation Commission, initiated and was the editor of the first edition of the NRI in 2009 and contributed to the 2023 updated edition as well.

Ronald Harms (deceased) was a federally licensed bird-bander and amateur lepidopterist active and resident in Norfolk.

Shelley Harms is an avid birder and conservationist. A retired lawyer, she helps land trusts with governance, acquisitions and conservation work. She is a member of the Conservation Commission and the Norfolk Land Trust.

Ann Havemeyer is collections curator for the Norfolk Historical Museum and director of the Norfolk Library.

Sean Hayden is a soil scientist and worked for the Northwest Conservation District in Torrington. He is now the executive director of the Lake Waramaug Task Force in Warren.

Ted Hinman is a local arborist.

Kathy Johnson, now retired, was the District Conservationist at the USDA Natural Resources Conservation Service Center in Torrington.

Martha Klein is an environmental advocate and works with the Sierra Club. She is a former member of the Conservation Commission.

Edward Machowski is a fisheries biologist who works for the Connecticut DEEP.

Adair Mali is a trained ecologist. She owns and runs Lost Ruby Farm with her husband Antonio in Norfolk and is a former member of the Conservation Commission. She was formerly the Highlands Program Director for the Nature Conservancy.

Les Mehrhoff (deceased) was the scientific collections manager, research associate and director of the Invasive Plant Atlas of New England (IPANE) at the University of Connecticut, Storrs.

Kenneth Metzler, now retired, was an ecologist with the Natural Diversity Database, Conn. DEEP.

William Moorhead is a botanist/plant community ecologist with the Natural Diversity Database, Conn. DEEP, and former independent consulting field botanist with a special interest in rare plants.

Sarah Pellegrino is the land protection and strategies manager for the Nature Conservancy in Connecticut.

Alex Persons is a geographic information systems (GIS) specialist who has done work for the Farmington River Watershed Association.

Elizabeth (Pebble) Potter (deceased) taught science for 30 years at Chapin School in New York City. She was a member of the Conservation Commission.

Donald Parizek is a USDA Natural Resources Conservation Service soil scientist, based in Windsor.

Alnasir (Nash) Pradhan is a biologist and horticulturalist, specializing in organic land care. He runs Ginger Creek Nursery and is a member of the Conservation Commission.

Matt Riiska is First Selectman of Norfolk and an ex officio member of many local committees.

Russell Russ is a forester at Great Mountain Forest and a cooperative weather observer for the National Weather Service.

Ray Simpson is an entomologist and has worked for the Yale Peabody Museum. He is president of the Connecticut Entomological Society.

Kirk Sinclair was the GIS manager for the Housatonic Valley Association. He holds a Ph.D. in Natural Resource Planning and Management.

Randolph Steinen is Professor Emeritus of Geology at the University of Connecticut and a volunteer with the Connecticut Geological and Natural History Survey.

Kim Stoner is an entomologist and worked for the Connecticut Agricultural Experiment Station developing alternatives to insecticides. She is now with the Northeast Organic Gardeners Association.

Mike Thomas (deceased) was an entomologist with the Connecticut Agricultural Experiment Station.

Daniel and Meredith Torrey are the children of Shelley Harms.

David Wagner is Professor of Ecology and Evolutionary Biology at the University of Connecticut; he has a special interest in lepidoptera.

Anya and Stella Wareck are the grandchildren of Elizabeth Borden.

Susannah Wood is a member of the Conservation Commission and has written many articles on the environment. She served for many years on the board of the Norfolk Land Trust. Writing under her maiden name, Susannah Lawrence, she also co-authored a two-volume guide on natural history for the Audubon Society.

Tracy Zarrillo is an entomologist and native bee expert with the Connecticut Agricultural Experiment Station.

Karen Zyko is the database manager for the Natural Diversity Database, Conn. DEEP.