TOWN OF CHAMPLAIN & VILLAGE OF CHAMPLAIN
SMART GROWTH COMPREHENSIVE PLAN
Community Profile (Task 9)
Chapter 2 Natural Systems and Landscape Features
JUNE 2025

This document was prepared with funding provided by the New York State Department of State under Title 3 of the Environmental Protection Fund

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Chapter 2: Natural Systems and Landscape Features

The physical environments of Champlain Town and Village are composed of a rich variety of natural systems and features that contribute to the town's attraction for residents and recreational visitors. Champlain Town and Village's natural resources and physical landscape determine the land's suitability of, and appropriateness for, development. This chapter of the profile supplies the data and analysis of hydrology, geology, topography, soils, scenic resources, atmospheric conditions, ecological communities, and forest cover.

FIGURE 1 - GENERAL LOCATION MAP

2.1 Geography[1]

Champlain is approximately 43 miles south of Montreal. According to the United States census, the town has a total area of 58.8 square miles, of which 51.2 square miles is land and 7.6 square miles, or 12.90%, is water. Lake Champlain and the Richelieu River are on the eastern edge of the town, which shares a border with Grand Isle County, Vermont. The town line to the north is the international border with Saint-Bernard-de-Lacolle, Quebec, Canada.

Champlain is located in the "Lake Plain" section of the St. Lawrence-Champlain Lowland physiographic region (Cressey 1977). This area is characterized by till plains and drumlins, in a region of otherwise low fossil lake plains lying south of the St. Lawrence River and west of Lake Champlain. The landscape includes gently rolling terrain (till plains, marine plains, drumlins, and ridges) that were formed by the glacial outwash and wave action within the Champlain Sea. Land elevations range from150-260 ft. and slopes range from 0-25% but predominate in the 0-8% range. The Town and Village's many tributaries and micro-watersheds primarily drain east and in turn drain north or south into the Great Chazy River. The Chazy is a deeply cut river that originates in the extreme northern Adirondacks and flows easterly into Lake Champlain near Coopersville, NY.

[1] PHASE 1 ARCHAEOLOGICAL SURVEY WATER DISTRICT 6 TOWN OF CHAMPLAIN CLINTON COUNTY 13PR04826 Timothy J. Abel, PhD 33512 SR 26 Carthage, NY 13619 for WBE Architects, Engineers and Land Surveyors, LLC Watertown, NY 13601 December 23, 2014

The 176-mile Adirondack Northway (I-87) is a major north-south highway that begins at the Canadian border at Champlain and travels south to Albany, connecting to the New York State Thruway. US 9 parallels I-87, and U.S. Route 11 runs north-south across the town. US 2 intersects US-11 by Rouses Point. New York State Route 9B intersects US-11 in the northeast and US-9 in the southern part of Champlain, providing a highway closer to Lake Champlain. New York State Route 276 partly runs along the international border. Commercial development extends from I-87 east along US 11 to Rouse's Point. The Town and Village are a major corridor for auto and truck traffic due to the bridge crossing Lake Champlain to Vermont. The nearby border crossings on I-87 and nearby have also spurred federal and private development along the route. In addition to transportation-based commerce, a rural agricultural setting extends beyond and outward from the US 11 and I-87 corridors. Residential and farm development represent the historical landscape prior to more recent commercial development. The Villages of Champlain and Rouses Point represent more urban settings situated within the Town.

2.2 Climate and Weather[2]

Many people confuse weather and climate, but they are different. Weather is the conditions of the atmosphere over a short period of time, and climate is how the atmosphere is over long periods of time. Weather is how the atmosphere behaves and its effects upon life and human activities. Weather can change from minute-to-minute. Most people think of weather in terms of temperature, humidity, precipitation, cloudiness, brightness, visibility, wind, and atmospheric pressure. Climate is the description of the long-term pattern of weather in a place. Climate can mean the average weather for a particular region and time period taken over 30 years. Climate is the average of weather over time.

The most pleasant months of the year for Champlain are August, July and June. In Champlain, there are 4 comfortable months with high temperatures in the range of 70-85°. July is the hottest month for Champlain with an average high temperature of 79.8°, which ranks it as cooler than most places in New York. January is the snowiest month in Champlain with 15.6 inches of snow, and 6 months of the year have significant snowfall. There are few days during the summer when the humidity becomes unpleasant.

FIGURE 2 - BESTPLACES COMFORT INDEX

[2] https://www.bestplaces.net/weather/city/new_york/champlain

The Town and Village of Champlain are experiencing notable climate impacts that affect the local environment, economy, and community well-being that are mentioned below. Addressing these climate impacts requires a comprehensive approach, including community engagement, policy development, and investment in sustainable practices to enhance resilience and protect the region's natural and economic resources.

Average Monthly High and Low (°F)

	High	Low
January	27°	8°
February	30°	11°
March	40°	21°
April	54°	34°
May	67°	45°
June	76°	55°
July	80°	60°
August	78°	58°
September	70°	50°
October	57°	39°
November	45°	29°
December	33°	17°

FIGURE 3 - AVERAGE MONTHLY HIGH & LOW (FARENHEIT)

Rising Temperatures. The region has observed an increase in average temperatures over recent decades, leading to warmer winters and hotter summers. This trend affects local agriculture, wildlife habitats, and energy consumption patterns.

Increased Precipitation. There has been a rise in annual precipitation, with more frequent heavy rainfall events. This contributes to soil erosion, challenges in stormwater management, and potential flooding risks.

Lake Champlain Impacts[3]. Climate change has led to unseasonably high-water levels in Lake Champlain, as observed during the storms of 2023. These fluctuations can result in shoreline erosion and impact aquatic ecosystems. Warmer temperatures and increased runoff can exacerbate Lake water quality issues like algal blooms, affecting water quality and recreational activities.

Agricultural Effects. Longer growing seasons may benefit certain crops but can also introduce challenges such as increased pest populations and the need for more irrigation. Changes in temperature and precipitation patterns may affect the viability of traditional crops, necessitating adjustments in farming practices.

[3] WAMC Northeast Public Radio | By Pat Bradley Published June 10, 2024, at 12:30 PM EDT.

Flooding Risks. The Federal Reserve Bank of New York's report [4] highlights significant flood risks in the region, with one in ten properties facing serious threats. Inland areas like Champlain are susceptible to heavy rainfall and river overflow, not just coastal areas. Implementing climate-resilient infrastructure and community planning is essential to mitigate these risks and protect residents and property.

2.3 Bedrock and Surficial Geology[5]

Geology can be seen as the foundation of an area's landscape. This foundation is comprised of many layers of bedrock and surficial rock. A summary of Champlain Town and Village's geological history, the fundamentals of geology that apply to Champlain Town and Village, and present maps illustrating the bedrock, and the surficial geology are provided.

Beneath the earth's surface rock forming minerals alter throughout cycles and geological processes. Geological processes may be weathering, mass movements, soil creep, earth flows, landslides, wind, water and more. Molten rock or magma, when it crystallizes, forms igneous rock. Lava is magma that has been forced onto the surface. Material that cools above the surface becomes rocks of fine textures, while material formed from slow cooling below the surface is made up of large crystals. Igneous rock can change by exposure to intense heat, erosion, and weathering. When broken down by the latter and/or being deposited by forces such as water, igneous rocks create sediment that are the beginnings of sedimentary rock. When sediments gather and are compacted and cemented by conditions they become sedimentary rock. Sedimentary rock can change with earth's conditions, forming fragments or sediments when weathered or moved (deposited) or metamorphic rock under intense heat that causes melting and then cooling.

The geology of Champlain Town and Village is a result of two major geological events: the formation of the Adirondack Mountains and the formation of the Lake Champlain Basin during the Great Ice Age. Roughly 250,000 years ago, when temperatures on earth were a few degrees cooler, snow falling in the winter did not entirely melt during the cool summers. As the snow accumulated thousands of feet high over millennia, lower layers of the snow were compacted into ice. During this time, a glacier that covered most of New York and New England was formed. As the glacier advanced southward through the Adirondack region, the land was eroded and smoothed. The glacier pulverized boulders into pebbles and smoothed high mountain peaks. When the ice sheet began to melt, about 12,500 years ago, it deposited debris throughout the region. Many of the large rocks and boulders (erratic) that

[4] https://www.newyorkfed.org/newsevents/news/regional_outreach/2024/20241002

[5] https://www.dot.ny.gov/divisions/engineering/technical-services/geotechnical-engineering-bureau/geotech-eng-repository/GDM_Ch-3_Geology_of_NY.pdf

were deposited at that time can still be seen today along roads, trails and in fields. It was also at this time that the Lake Champlain Basin began to fill with water melting from the Glacier. The first body of water was known as Lake Vermont. It was a large body of fresh water that covered most of the land area in the basin. As the glacier continued to retreat and melt, marine waters from the St. Lawrence estuary flooded the Lake Champlain Basin. What was Lake Vermont becoming the Champlain Sea, an arm of the Atlantic Ocean.

Once the extremely heavy glacial ice was completely removed from the area the earth began to rebound. This rebound caused the source of ocean water to be cut off. Over time, sea water was replaced with fresh rainwater creating present day freshwater Lake Champlain, which has existed for about 9,000 years. The Basin is rimmed with sand and gravel deposits which record the shorelines and deltas of both Lake Vermont and the Champlain Sea.

Geology is the base of all landscape features and is divided into bedrock and surficial geology. Bedrock consists of the material beneath the surface while surficial geology consists of the material above the deep rock, including soil. Geology establishes the topography of a region. It is a strong factor in the creation and location of water systems (wetlands, ponds, lakes, streams, rivers, and waterfalls), vegetation, ecosystems, and even influences regional and local weather.

FIGURE 4 - ST. LAWRENCE/CHAMPLAIN LOWLAND

St. Lawrence – Champlain Lowland[6]

The St. Lawrence Lowland is a smooth plain that borders the Adirondack Mountains and extends northerly beyond the Canadian border. On the south, the border is defined as the line where the crystalline rocks of the mountains are overlapped by the younger sedimentary rocks. The eastern boundary is the drainage divide where water begins to flow to Lake Champlain. The

[6] https://www.dot.ny.gov/divisions/engineering/technical-services/geotechnical-engineering-bureau/geotech-eng-repository/GDM_Ch-3_Geology_of_NY.pdf

western edge may be arbitrarily taken as where the geologic age of the surface sedimentary rocks changes from Cambrian to Ordovician north of Watertown. The entire area is a low plain. Numerous drumlins or drumlin-like hills furnish much of the local relief.

Champlain Lake Plain Lowland is a relatively flat area underlain with marine clays and limestone which outcrops occasionally along the lake shore. Drift deposits and peat bogs are common in the northeastern part. The entire area is underlain by sedimentary rock. These are dolostone, limestone and sandstone. They are layered and dip northward away from the Adirondacks.

Landforms and Soil Deposits

Champlain is composed of a complex pattern of glacial till drumlins and drumlin-like hills surrounded by lacustrine silts and clays or related sands and gravels of beaches, bars, and deltas. Toward the Adirondack Mountains, outwash and ice-contact deposits are found. The ice-laid glacial tills are often extremely stony or bouldery and in places are very compact. The fine sand soil found on some of the large deltas has been moved by wind to form the so-called "blow sand" areas. It is likely that some of the silt and clay deposits in the eastern portion are marine in origin, resulting from a Pleistocene Atlantic invasion up the St. Lawrence Valley.

Surficial Geology is a significant factor to be considered in regard to development. Land slope, land stability, water percolation rates, water filtration related to water quality, on-site wastewater treatment (septic systems) suitability, and agricultural suitability are all affected by bedrock and/or surficial geology. Some issues associated with geology in relation to development can be overcome by engineering, but usually at significant cost. When planning the construction of an on-site wastewater treatment system (septic system), it is important to be aware of the depth of bedrock. If the bedrock is too close to the surface, site-specific engineering may be necessary to overcome the geological problems of the site. An example of an applicable engineering process might be a mound system, where the septic system is placed inside a mound of soil above the natural ground level.

While some geological factors are easily identified by the eye such as extremely high slopes or bedrock at the surface, others may be less obvious and more difficult to identify. Less obvious factors could include limiting substratum (layers beneath the topmost materials) such as clay, the depth to the bedrock, and other subsurface issues that do lend themselves to unstable building conditions and would require field work for identification and professional engineering.

Champlain Town and Village's surficial geology are presented on the following maps.

Bedrock Geology. The depth to bedrock in the Town of Champlain, New York, varies depending on local geological conditions. The area is primarily underlain by Cambrian and Ordovician sedimentary rocks, such as sandstone, limestone, and shale, which are part of the Champlain Valley's geological composition. Overlying these bedrock formations are unconsolidated glacial deposits from the last Ice Age, including till, sand, silt, and clay. The thickness of these surficial deposits can range from a few feet to over 90 feet, depending on specific locations within the valley. Consequently, the depth to bedrock in the Town of Champlain is not uniform and can vary significantly across different sites. For precise, site-specific information on depth to bedrock in the Town of Champlain, consulting detailed geological surveys or conducting on-site investigations, such as drilling or geophysical studies, is recommended. Agencies, such as the New York State Geological Survey or the New York State Department of Environmental Conservation, may provide more detailed maps and data pertinent to specific locations within the town. Champlain Town and Village's bedrock geology are presented on the following maps.

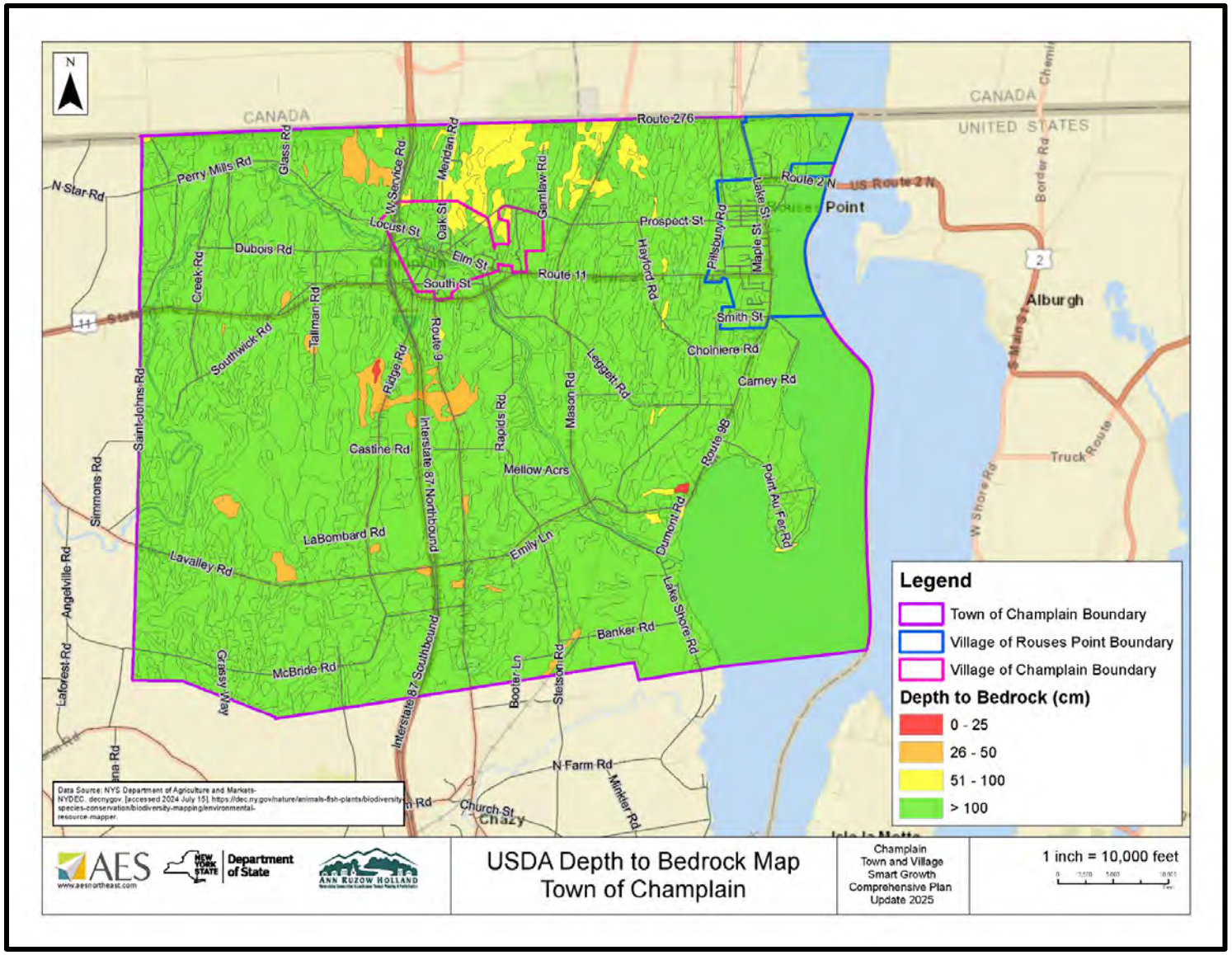

FIGURE 5 - USDA DEPTH TO BEDROCK MAP, TOWN OF CHAMPLAIN

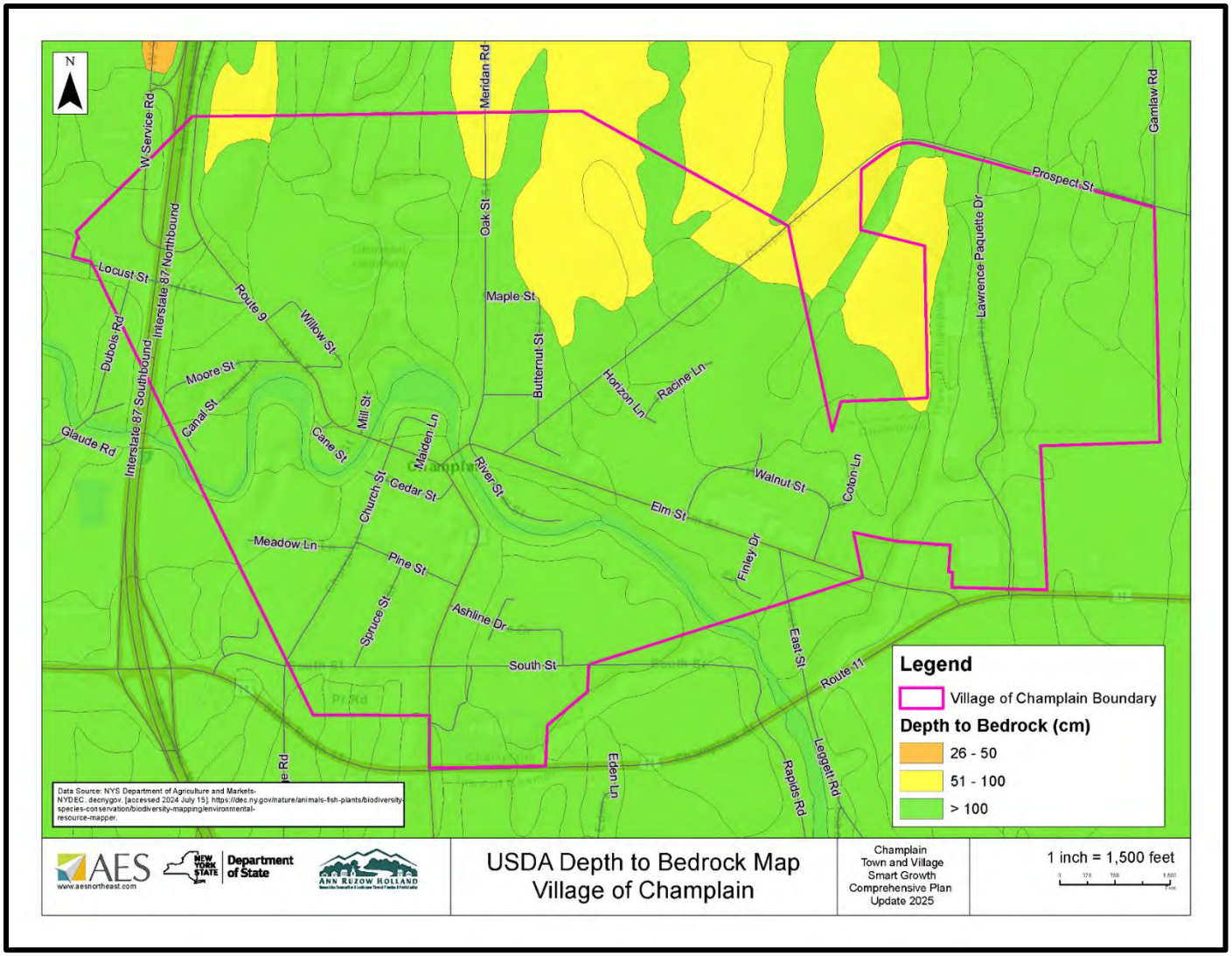

FIGURE 6 - USDA DEPTH TO BEDROCK MAP, VILLAGE OF CHAMPLAIN

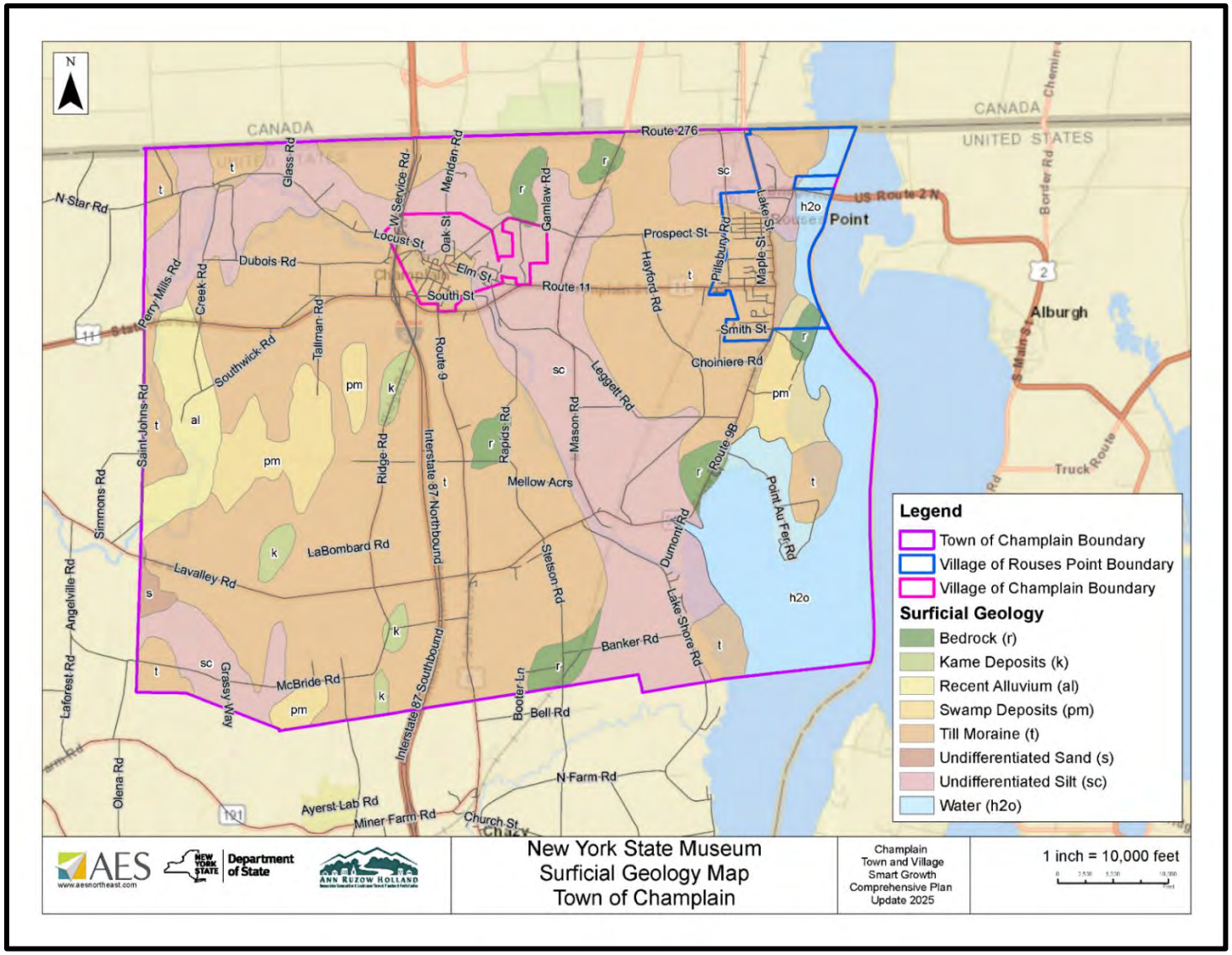

FIGURE 7 - NYS MUSEUM SURFICIAL GEOLOGY MAP, TOWN OF CHAMPLAIN

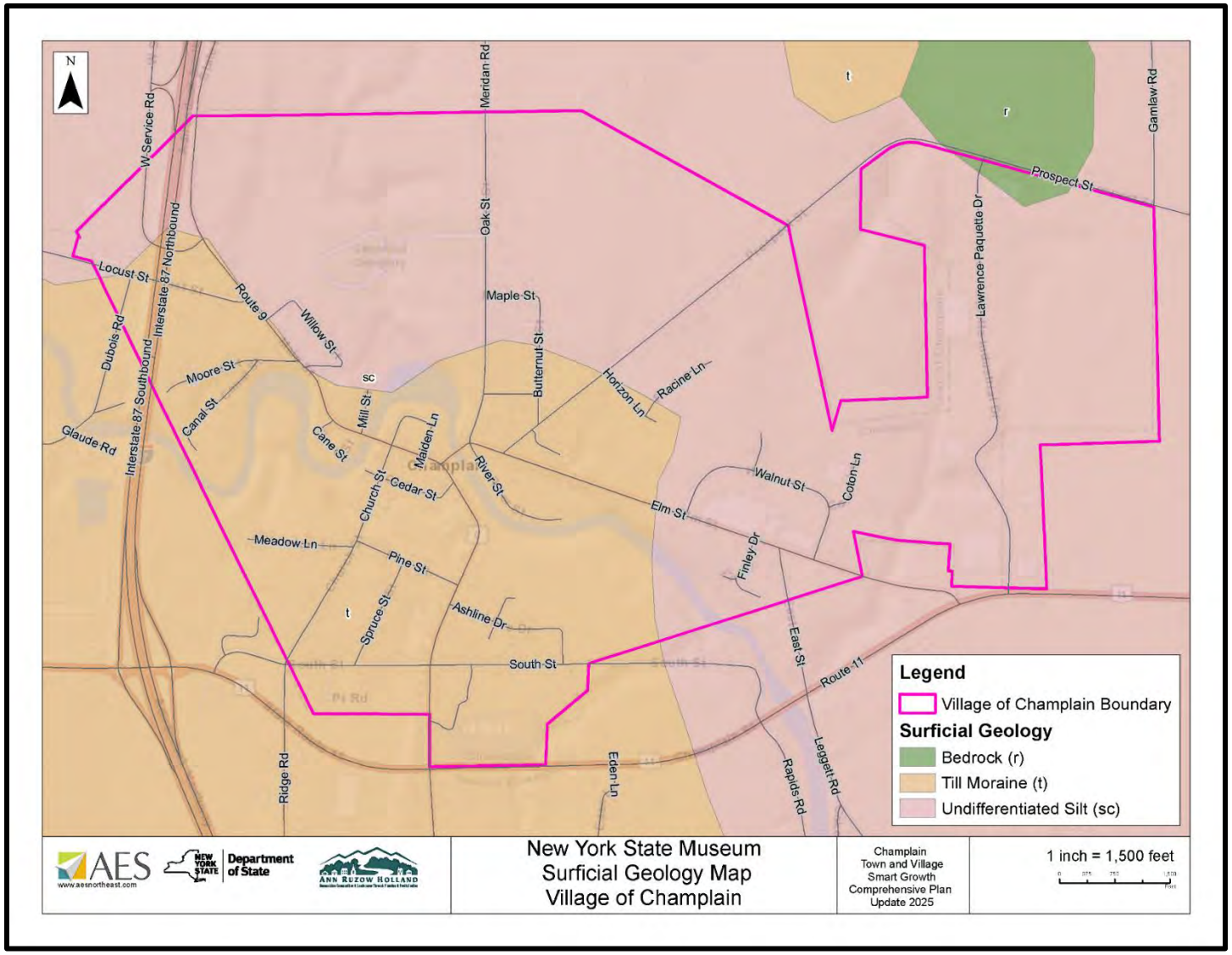

FIGURE 8 - NYS MUSEUM SURFICIAL GEOLOGY MAP, VILLAGE OF CHAMPLAIN

2.4 Topography and Slope

The Town of Champlain & Village of Champlain are characterized by lowlands and the surrounding lake plain. At higher elevations, the ground is covered with glacial till, creating more rolling topography. Topographic and slope maps for the Town and Village are presented in this section.

A topographic map serves two purposes: it shows the elevation of any given point on a land surface, and it illustrates the difference in elevation between two points in relation to their distance (i.e., slope). When there is a great difference in elevation in a short distance, the slope is high. When a large area has a small range of elevation the slope of that area is low. Contour lines define changes in elevation. The closer the lines appear, the greater the increase in elevation is occurring. Areas of slope are categorized by percent of slope (0-3%, 3-8%, 8-15%, 15-25%, and 25-43%). The percentage slope of an area is calculated by dividing the rise (difference in elevation between two points) by the run (distance between the two points). This is demonstrated in Figure 9:

If the land rises 10 feet in elevation over a horizontal distance of 100 feet, the slope of the land is 1/100, or 10%. A typical stairway with a 7-foot rise over 10 feet, is 70%; roads are generally 1-2%. The best slopes for development, taking into consideration drainage, soil depth and texture, and distance from water, are about 3-12%. However, to analyze slope conditions on an individual site, one would use a more specifically scaled map—i.e., 1-50.

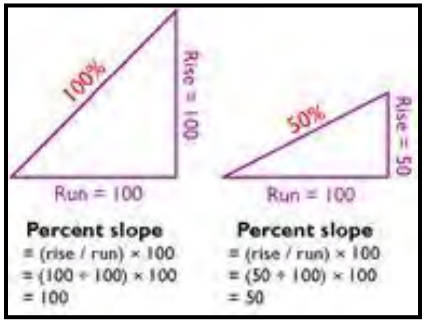

FIGURE 9 - DETERMINING SLOPE, TOPOGRAPHIC MAPS

All human-built structures are influenced by the slope of the land on which they are constructed. When combined with other factors, particularly drainage, slope can pose development difficulties. Drainage is particularly influenced by the combination of slope, elevation, and soil. Even a house built on a flat area (0% slope) can be influenced by ground conditions. For example, the ground may be dry or wet and, as a result, confound gravity-flow water or wastewater systems. Low elevation land with a slight slope, such as 0-1% slope can be composed of poorly drained soil and be prone to flooding. An area of land with an 8-15% slope requires buildings to overcome significant slope limitations in order to achieve a level structure. The following are general ratings of the limitations of slope for major types of development.

- Site with slopes averaging less than 1%: Usually results in areas of poor drainage and larger than normal gravity flow wastewater systems. Otherwise, they offer few development constraints.

- Sites with slopes averaging 1 -3%: Generally, offer the least topographic constraints. Positive drainage can normally be attained without excessive site re-grading. These sites are suitable for a wide range of development types; unfortunately, these are often our best farmlands as well.

- Sites with slopes averaging 3 -5%: These sites impose only slight constraints, except for developments that require large, fairly flat surfaces, e.g., play fields, parking areas, and major structures such as manufacturing plants and warehouses.

- Sites with slopes averaging 5 -8%: Impose slight constraints to developments with small structures and minimal site coverage and support systems. Constraints increase with the size of structures and with the percentage of site covered. These slopes have a formative impact on site organization as well as on the orientation of buildings and roads.

- Sites with slopes averaging more than 8%: Generally, they impose severe constraints to development. These slopes normally exclude structures with large footprints and severely increase the cost of even small structures. On the other hand, unique visual amenities often make these sites desirable places on which to build.

FIGURE 10 - PHOTO COURTESY OF THE TOWN/VILLAGE OF CHAMPLAIN

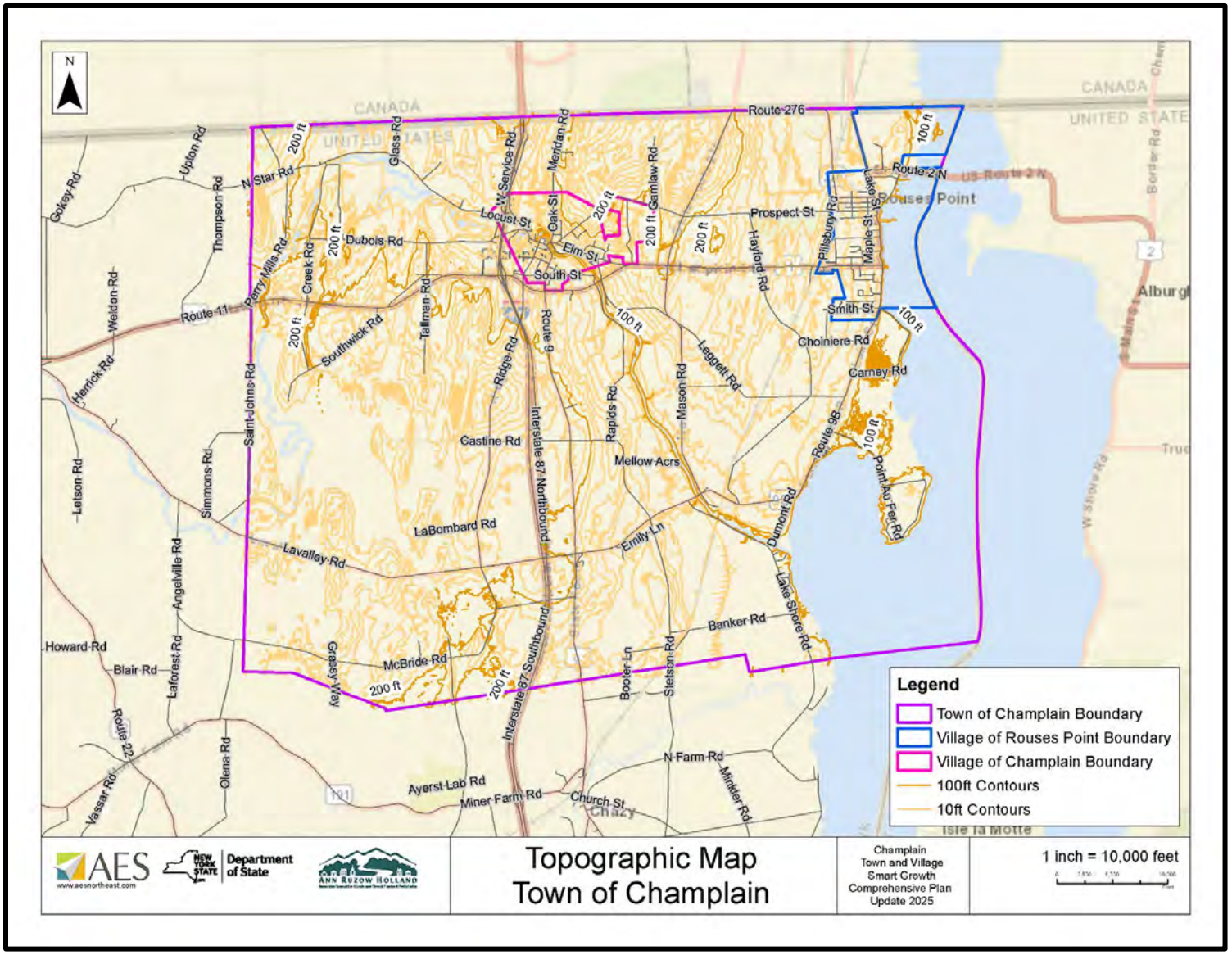

FIGURE 11 - TOPOGRAPHIC MAP, TOWN OF CHAMPLAIN

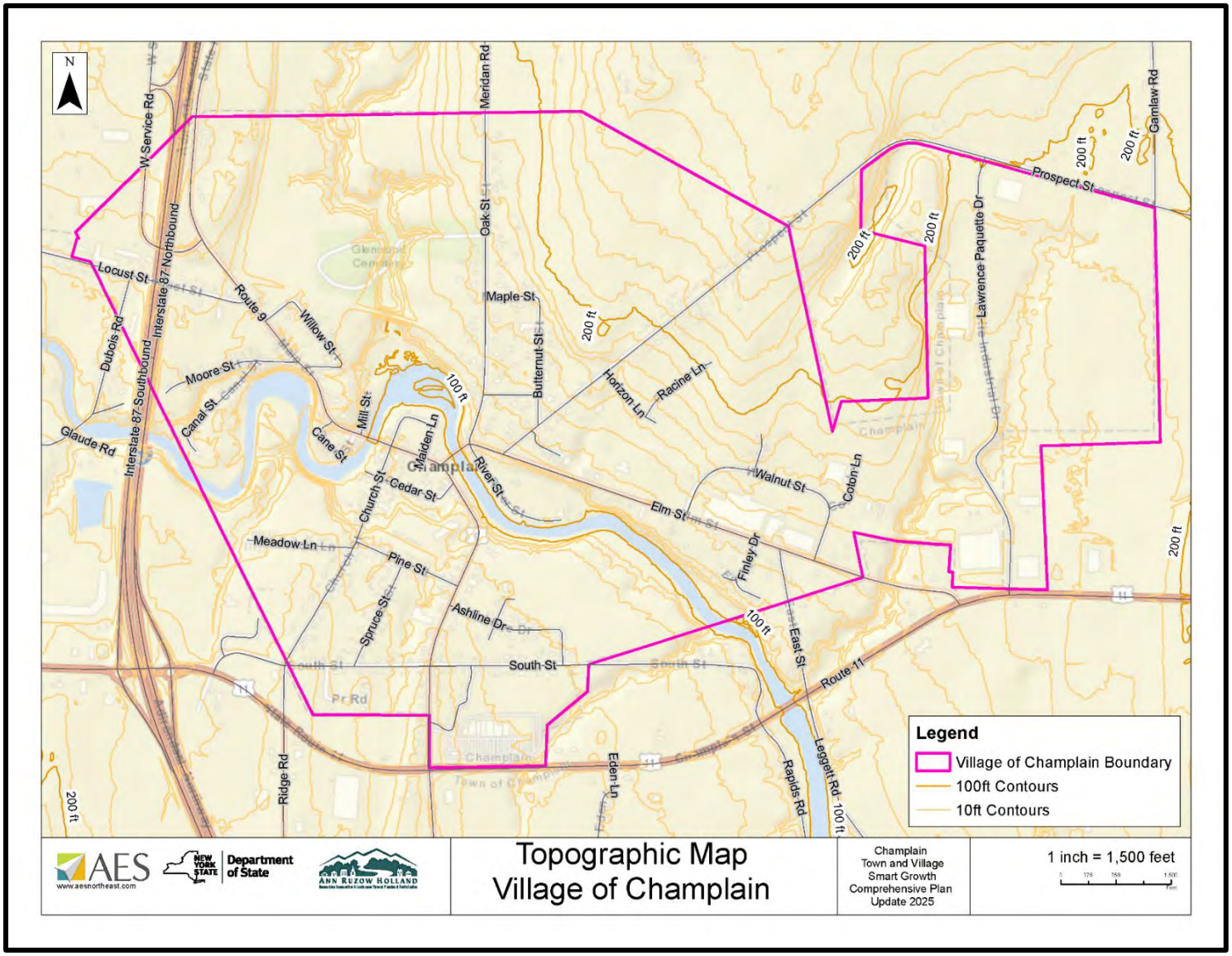

FIGURE 12 - TOPOGRAPHIC MAP, VILLAGE OF CHAMPLAIN

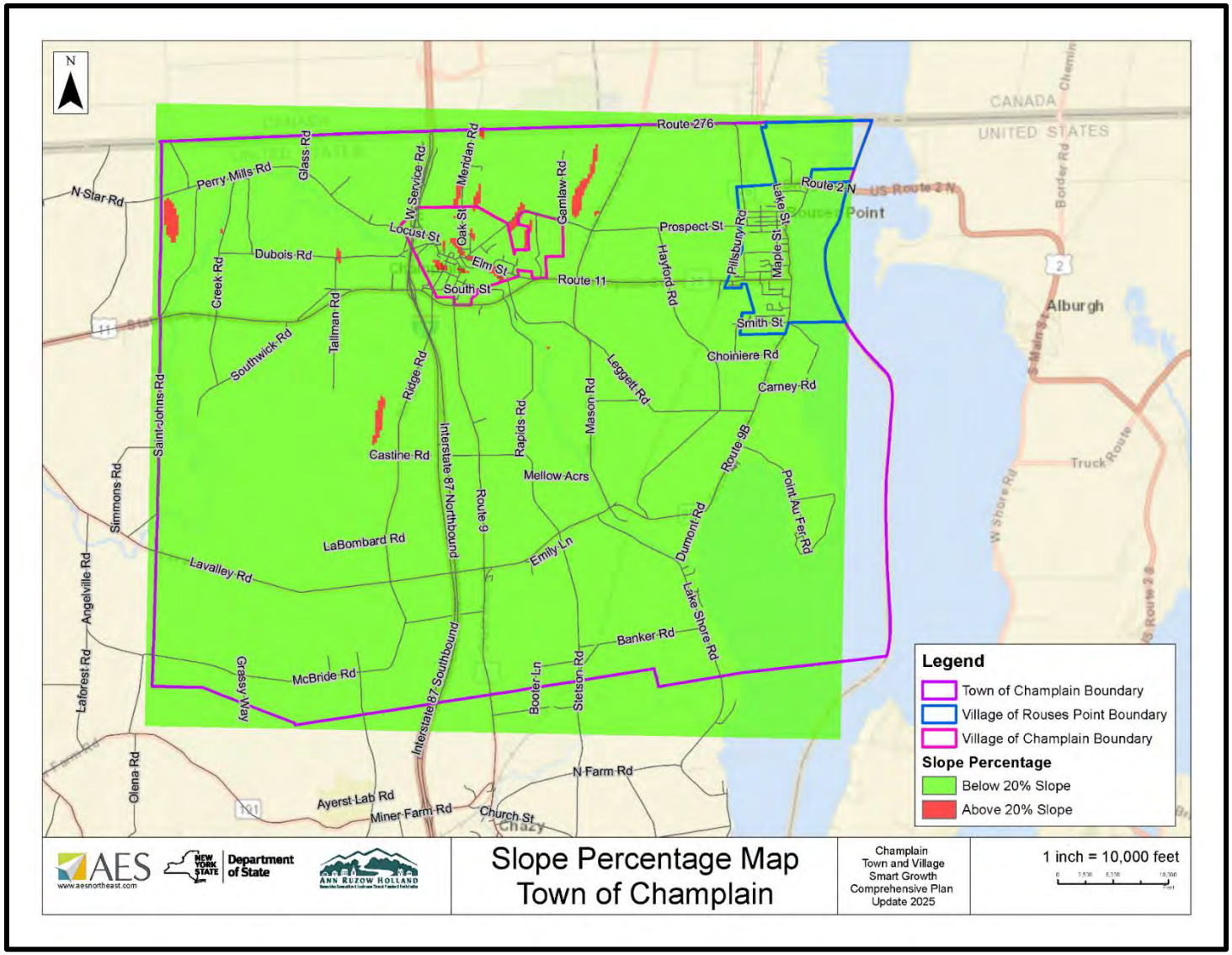

FIGURE 13 - SLOPE PERCENTAGE MAP, TOWN OF CHAMPLAIN

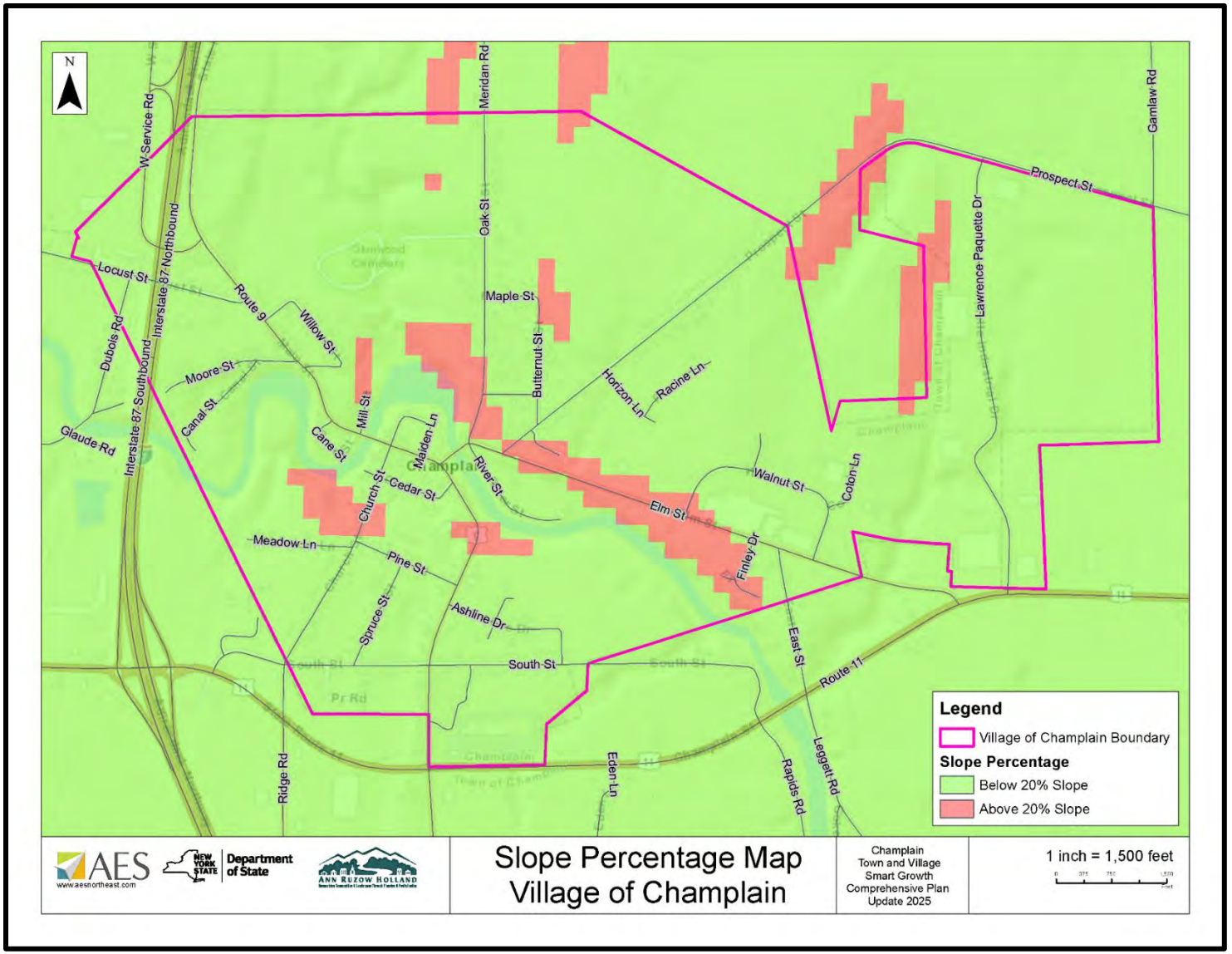

FIGURE 14 - SLOPE PERCENTAGE MAP, VILLAGE OF CHAMPLAIN

2.5 Soils

Soil is a highly influential factor for land use planning. In general, soils range greatly in their impact on development. Some soils are highly limited to structural and agricultural development while others pose few to no restrictions on development and therefore are ideal for certain uses. A key attribute of each soil type is its drainage/percolation rate. This affects water quality, on-site wastewater treatment suitability, and agricultural capability. Other properties of soil, such as texture and depth to bedrock, also affect land stability and development feasibility. Overall, soil plays a vital role in the suitability of any and all development.

Because Champlain's soils include important agricultural soils, the following maps present both general soils maps for the Town and Village, and USDA Prime Farmland and Farmland of Statewide Importance. There are some who might argue that prime agricultural soils are also very suitable for on-site wastewater treatment systems and are therefore vulnerable to development.

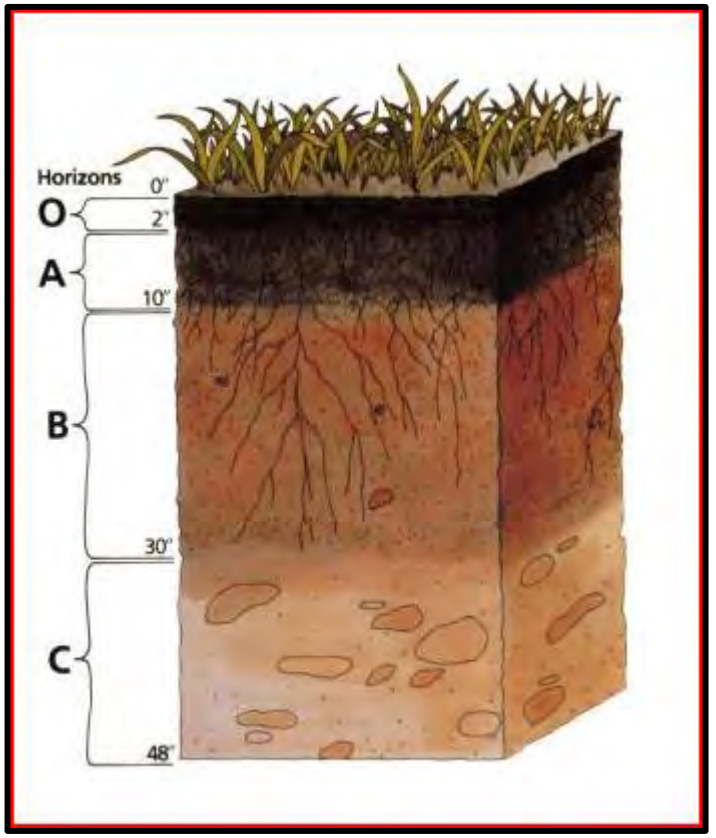

FIGURE 15 - SOIL DIAGRAM

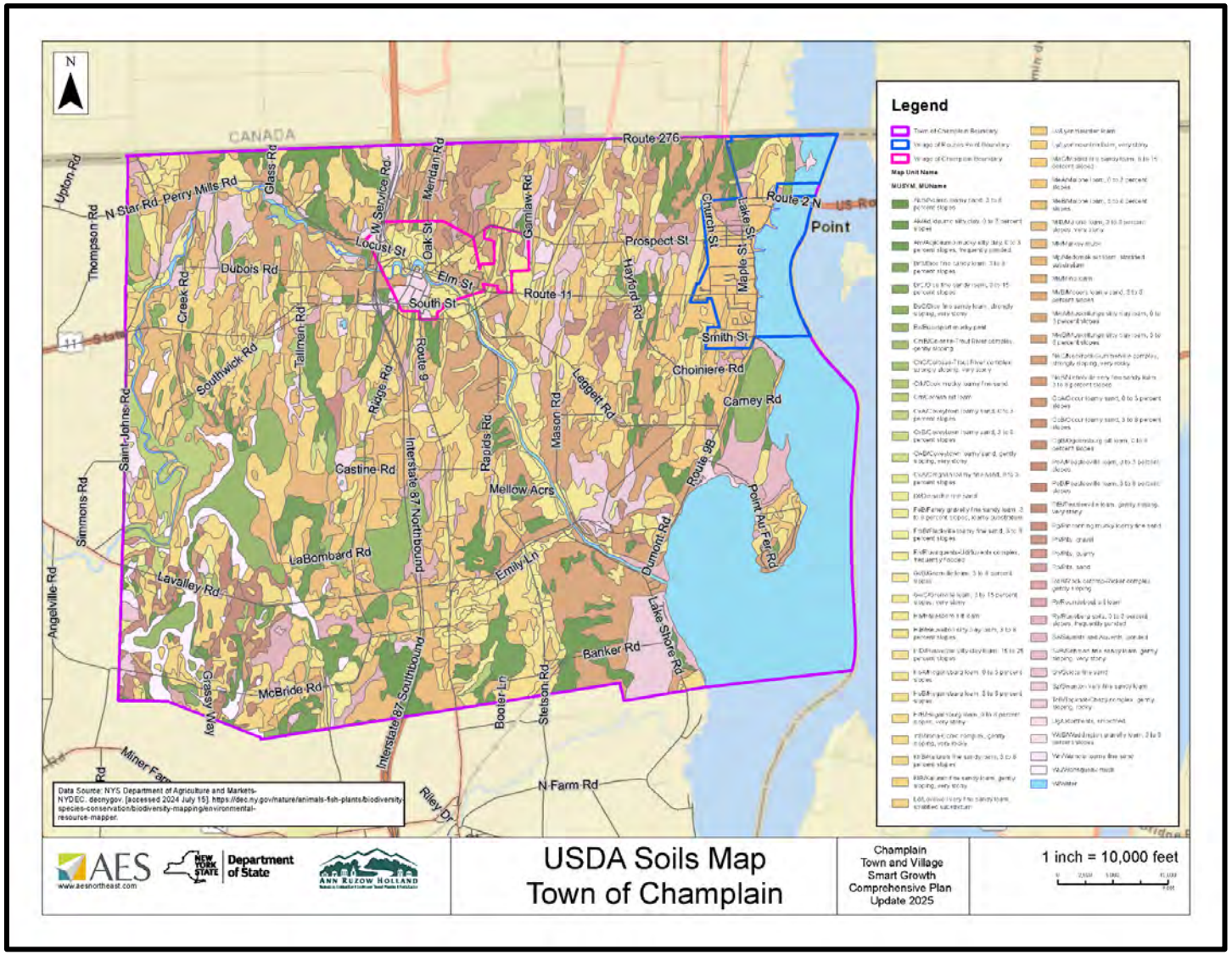

FIGURE 16 - USDA SOILS MAP, TOWN OF CHAMPLAIN

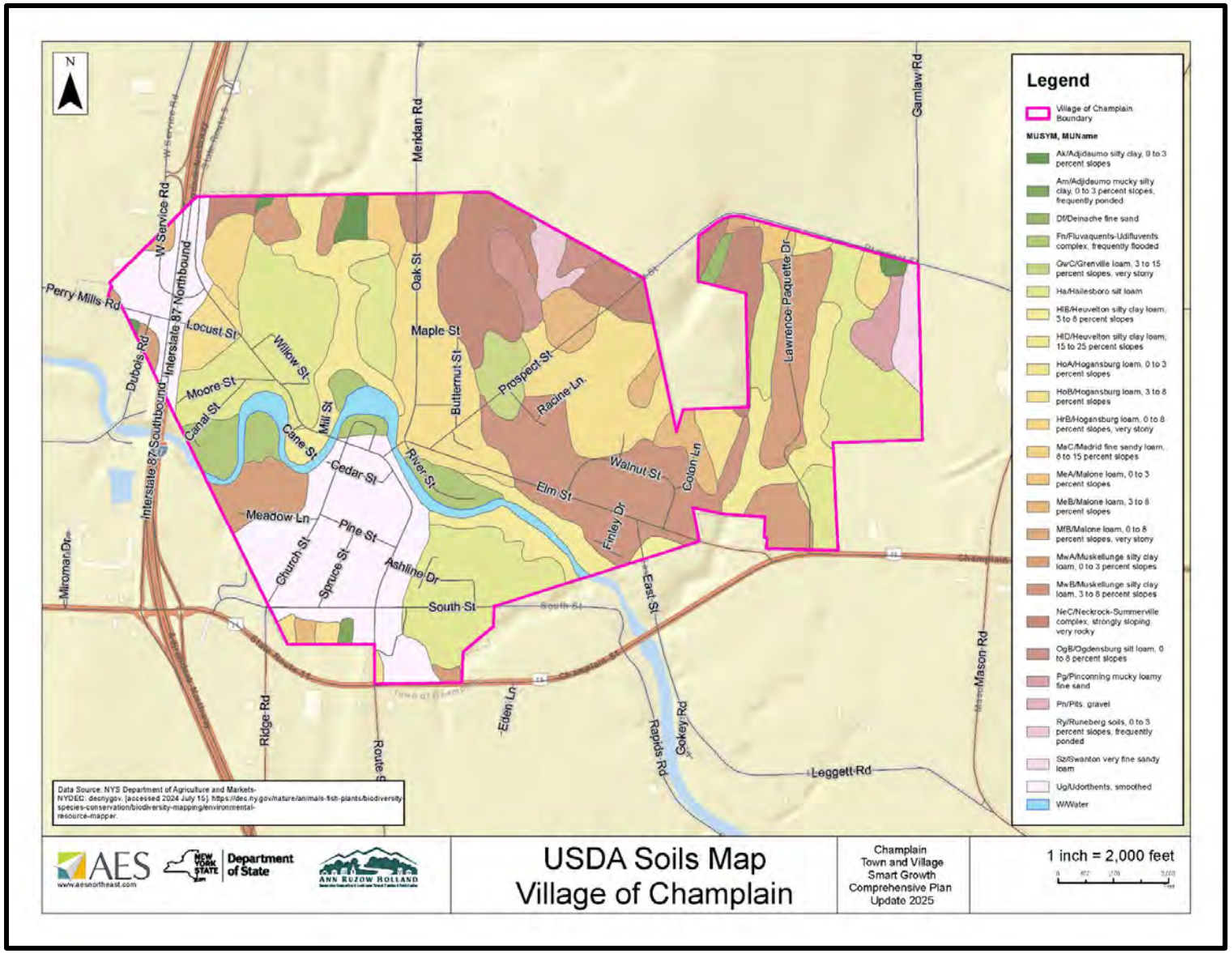

FIGURE 17 - USDA SOILS MAP, VILLAGE OF CHAMPLAIN

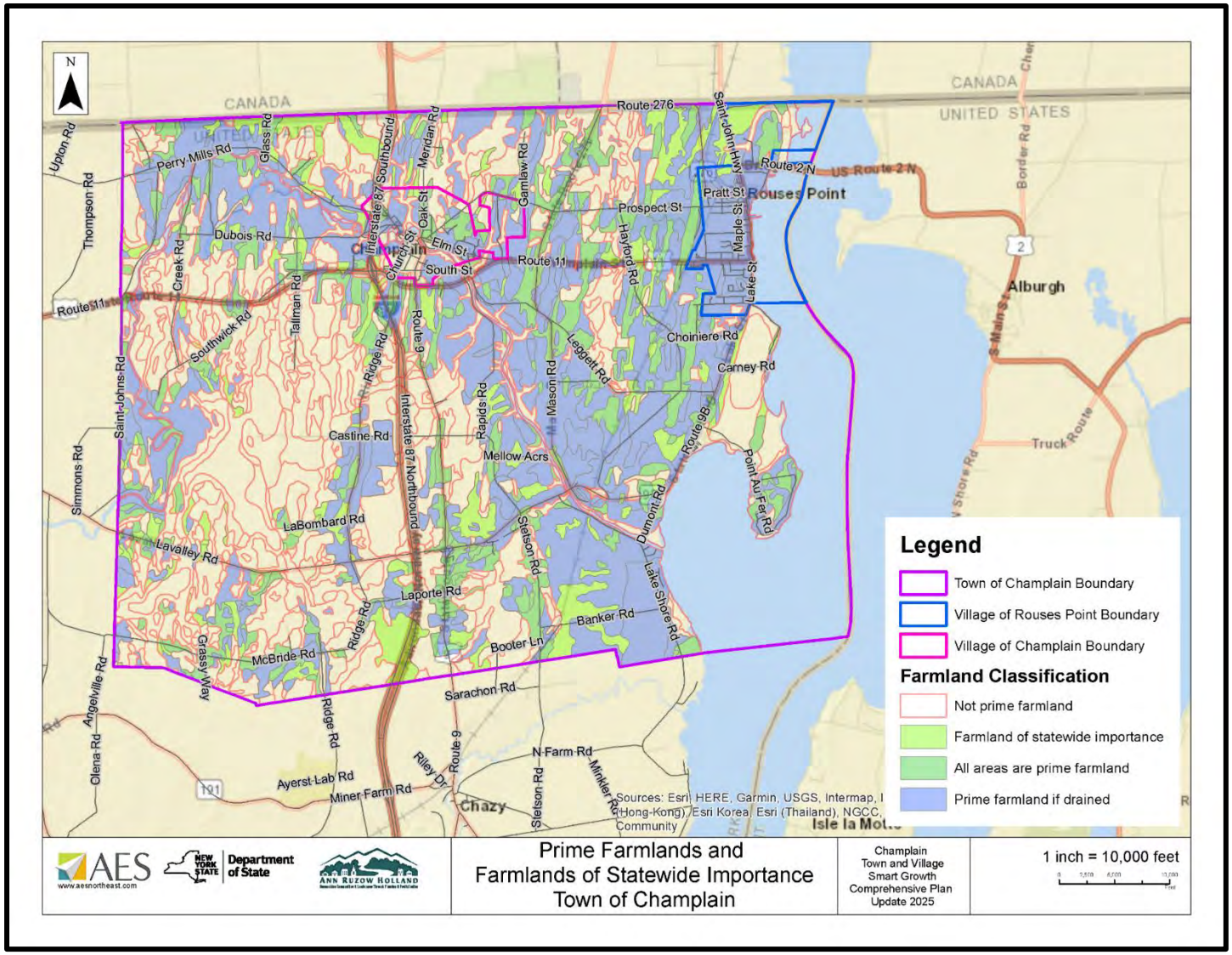

FIGURE 18 - PRIME FARMLANDS & FARMLANDS OF STATEWIDE IMPORTANCE, TOWN OF CHAMPLAIN

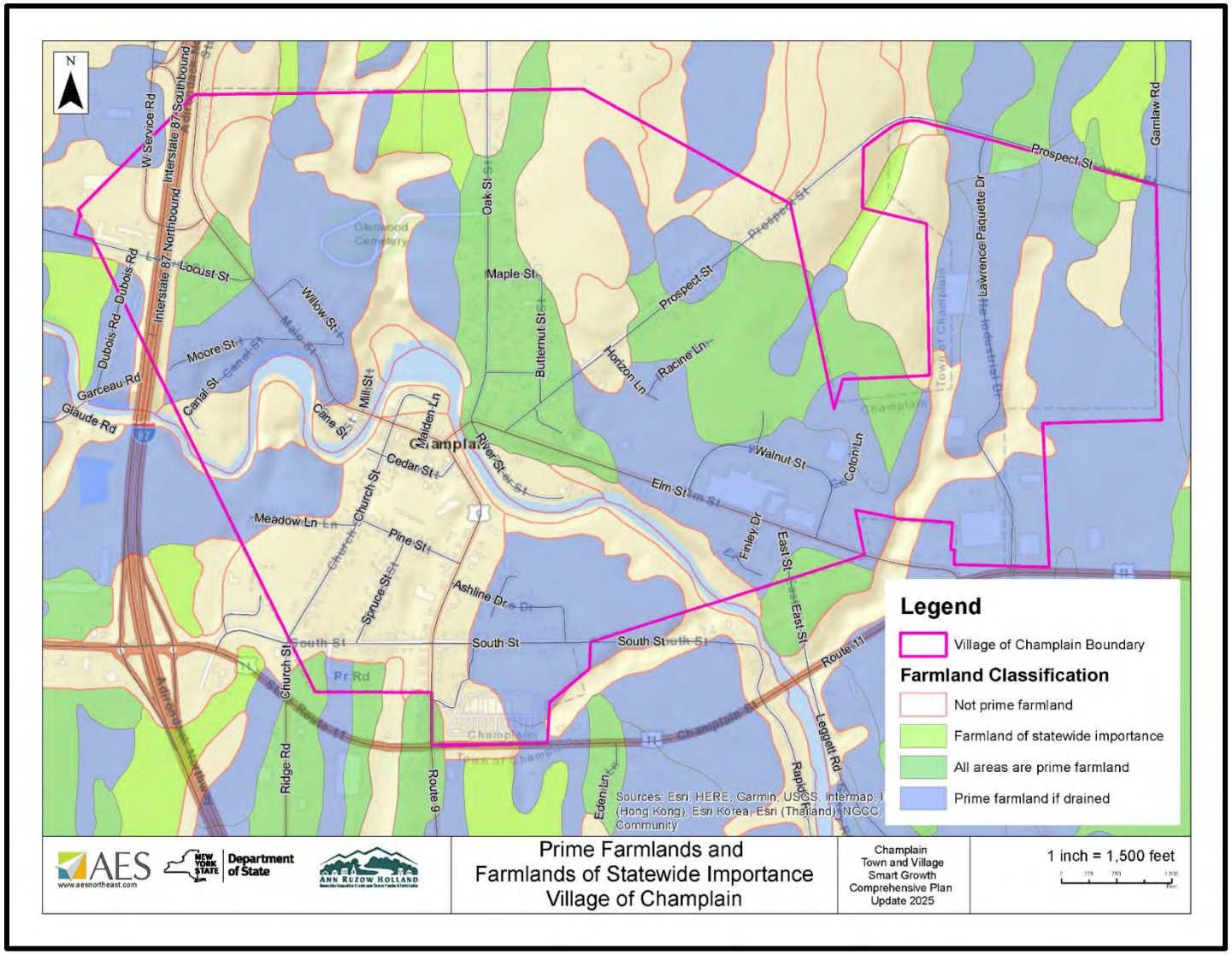

FIGURE 19 - PRIME FARMLANDS & FARMLANDS OF STATEWIDE IMPORTANCE, VILLAGE OF CHAMPLAIN

2.6 Water Resources-Hydrology and Hydrography

Hydrology is defined as: "the science dealing with the occurrence, circulation, distribution, and properties of the waters of the earth and its atmosphere." The study of hydrology examines watersheds, sub-basins or sections of watersheds, lakes, ponds, rivers, streams, and wetlands. This section identifies and analyzes the hydrology of Champlain Town and Village. Water resources are identified, trends in water quality analyzed, and flood zones and flood hazard areas are recorded.

Champlain Town and Village's unique variety of water resources shape and define the town physically, in character, ecologically and economically. The Champlain Valley has state, national, and international designations underscoring that planning for the protection of water quality, ecological integrity and biological diversity are of national and international importance.

Champlain Town and Village are within the Great Chazy watershed (sub-basin) of the Lake Champlain Basin. A basin is an area of land where all water flows to a common center. The Lake Champlain Basin is divided into eight major sub-basins which are drained by one or more of the lake's major tributaries. Lake Champlain Basin drains a total land area of 636,516 acres with its major rivers, the Boquet and Ausable Rivers.

Champlain Town and Village also include rivers, streams, ponds, and wetlands which are all part of the sub-basin. Wetlands are scattered throughout, mostly in low-lying, topographically depressed areas close to water bodies. All are very important water resources. Wetlands function as a water filtration source, aid in ecological and biological diversity, and moderate flood/water levels. Sediment and nutrients in surface runoff and stream water are filtered as the water passes through a wetland. This protects water bodies' down-flow from wetlands from becoming over burdened with sediment and exposed to damaging levels of nutrients. Wetlands also support many species of plants and animals that can only thrive in the particular conditions a wetland can provide. Finally, wetlands act as a buffering area during extreme precipitation events and floods. Wetlands act like sponges and are able to accommodate large amounts of water, while releasing that water into the environment at a moderate rate. These attributes combine to make wetlands a highly valuable water resource.

NYS Wild, Scenic, and Recreational Rivers Act

The state's Wild Scenic and Recreational Rivers Act protects those rivers of the state that possess outstanding scenic, ecological, recreational, historic, and scientific values. These attributes may include value derived from fish and wildlife and botanical resources, aesthetic quality, archaeological significance, and other cultural and historic features. State policy is to preserve designated rivers in a free-flowing condition, protecting them from improvident development and use. This policy is intended to preserve the enjoyment and benefits derived from these rivers for present and future generations. DEC's regulations implementing the Wild Scenic and Recreational Rivers Act affect management, protection, enhancement, and control, of land use and development on all designated river areas in New York State, excluding those on private lands within the Adirondack Park. They are subject to separate provisions pertaining only to land within the park (9 NYCRR Part 577). A review of the designated NYS rivers indicates that neither the Great or Little Chazy Rivers are listed under the NYS Wild, Scenic, and Recreational Rivers Law[7].

NYS Freshwater Wetlands Act

The Freshwater Wetlands Act (Article 24 of the Environmental Conservation Law) required DEC to map the freshwater wetlands that are subject to jurisdiction of the law. The law required the maps to show "the approximate location of the actual wetland boundary." DEC will refine that approximate boundary by doing a field delineation for landowners when they need more precise information, such as when they are planning to work near a wetland area. Starting on January 1, 2025, the current NYS Freshwater Wetlands Maps will no longer limit DEC regulatory jurisdiction to wetlands depicted on those maps. Instead, maps will become informational and any wetlands that meet the applicable definition and criteria will be regulated by DEC and subject to permitting, regardless of whether they appear on the informational maps.[8]

[7] https://dec.ny.gov/regulatory/permits-licenses/waterways-coastlines-wetlands-permits/wild-scenic-recreational-rivers-permit-program/wild-scenic-recreational-rivers

[8] https://dec.ny.gov/nature/waterbodies/wetlands/freshwater-mapping

THE FOLLOWING MAPS PROFILE WATER-RELATED RESOURCES OF THE TOWN AND VILLAGE OF CHAMPLAIN.

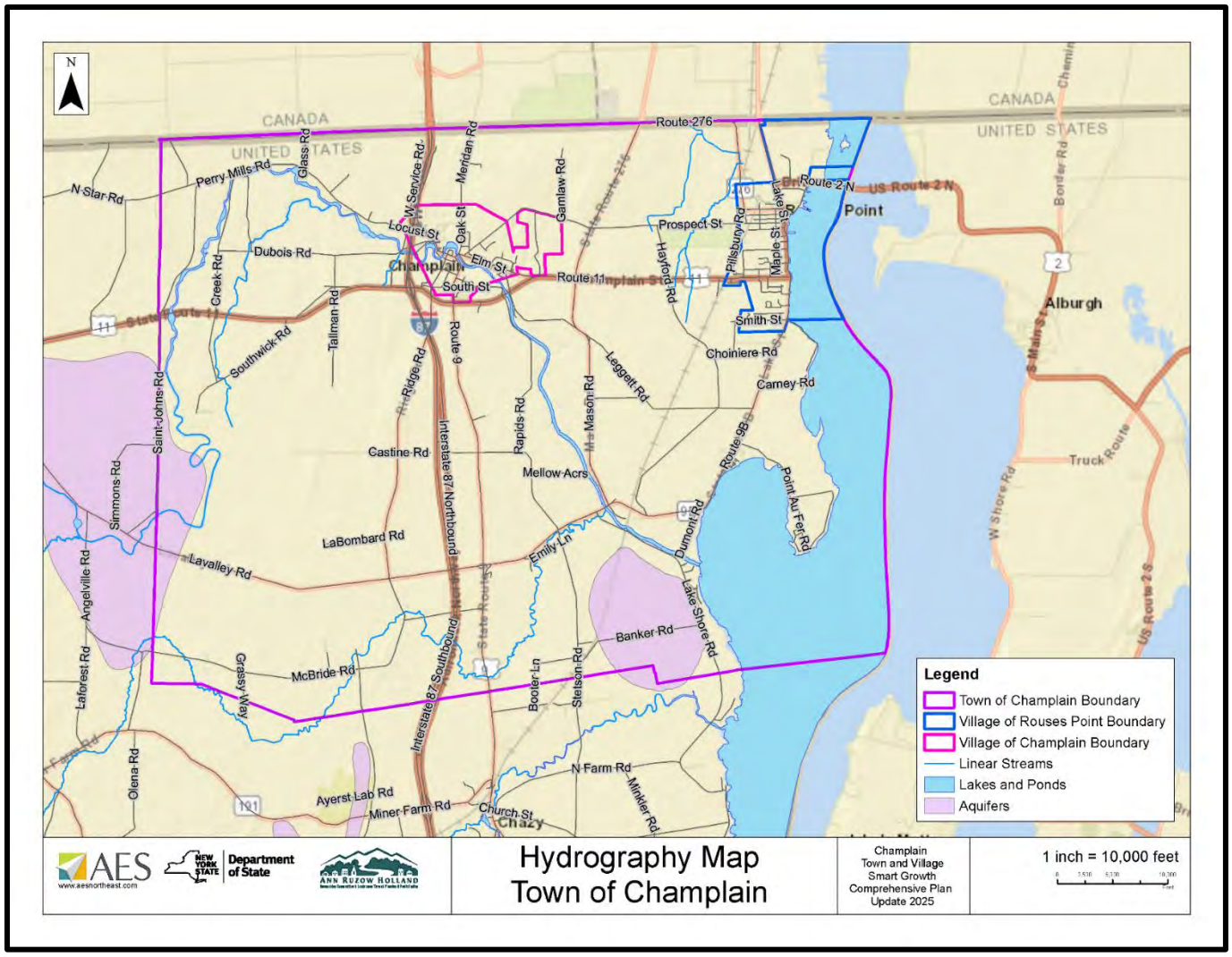

FIGURE 20 - HYDROGRAPHY MAP, TOWN OF CHAMPLAIN

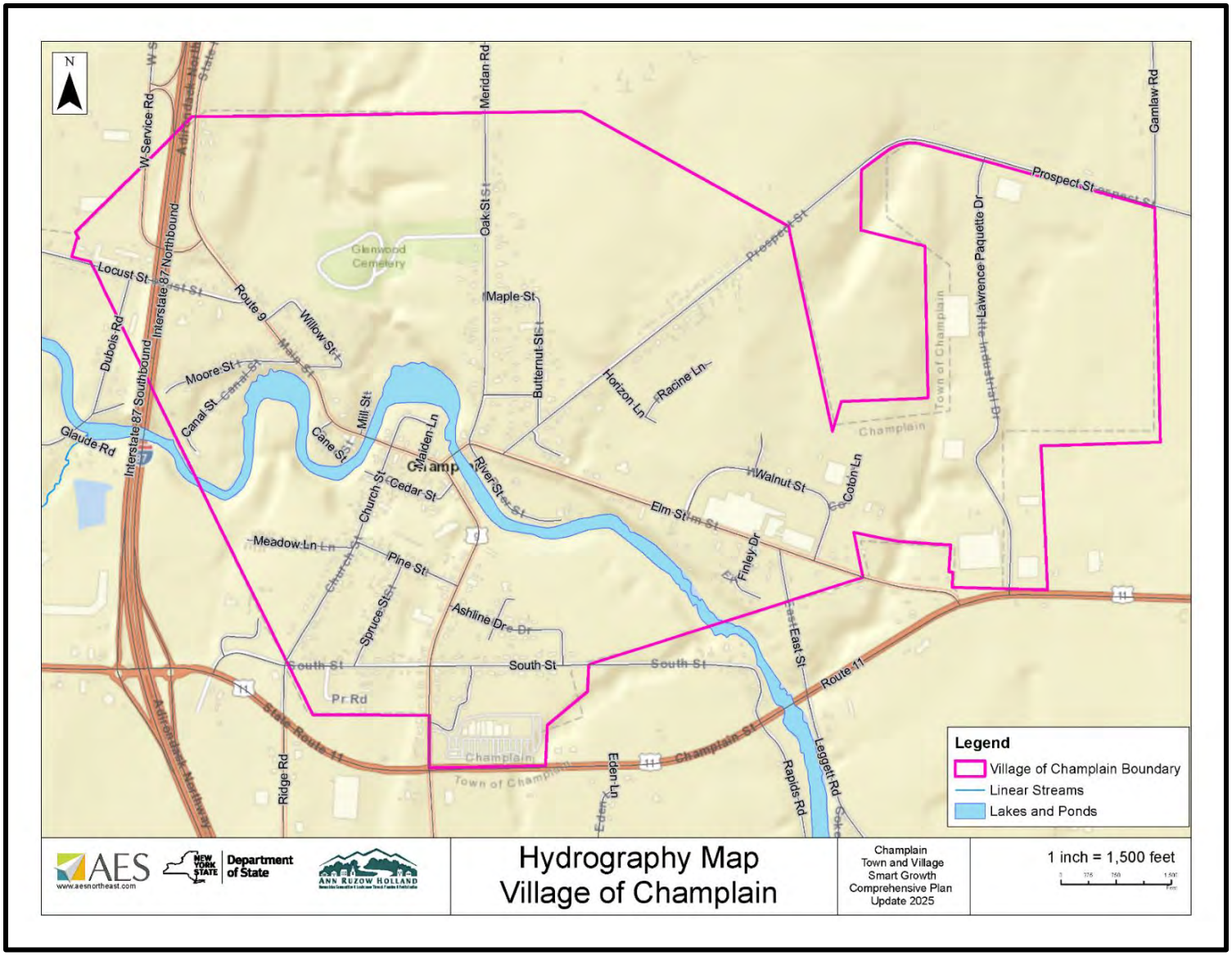

FIGURE 21- HYDROGRAPHY MAP, VILLAGE OF CHAMPLAIN

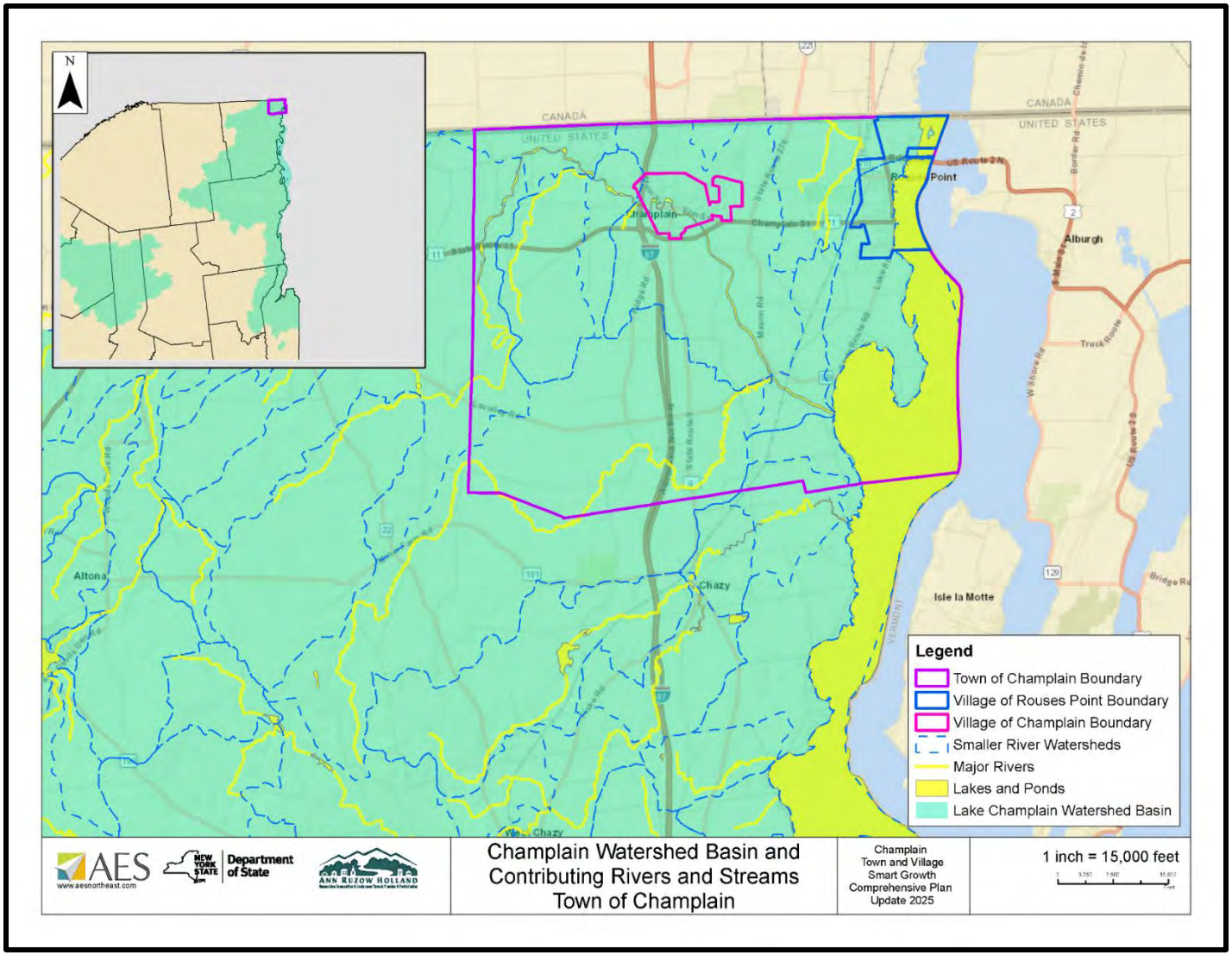

FIGURE 22 - CHAMPLAIN WATERSHED BASIN & CONTRIBUTING RIVERS AND STREAMS, TOWN OF CHAMPLAIN

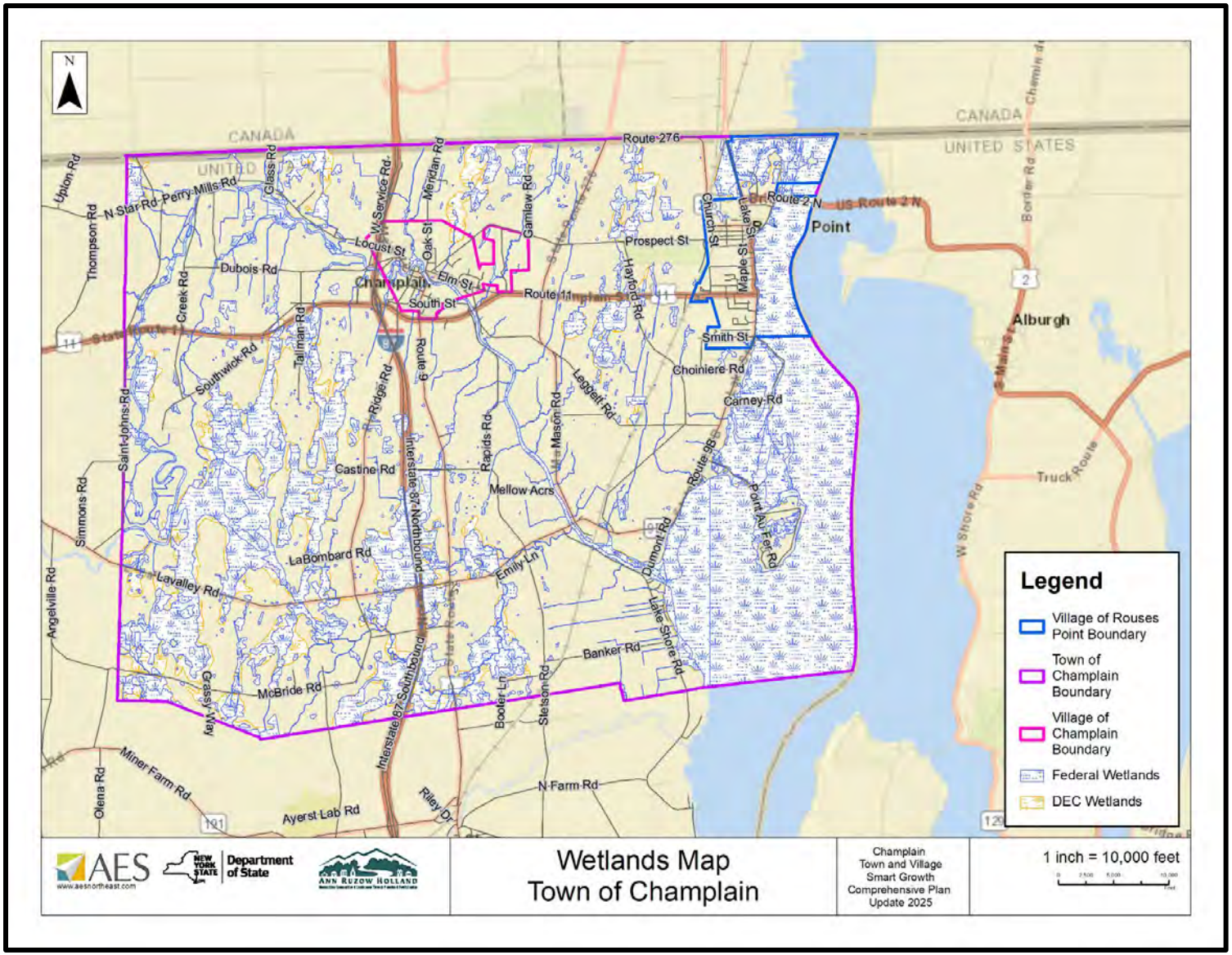

FIGURE 23 - WETLANDS MAP, TOWN OF CHAMPLAIN

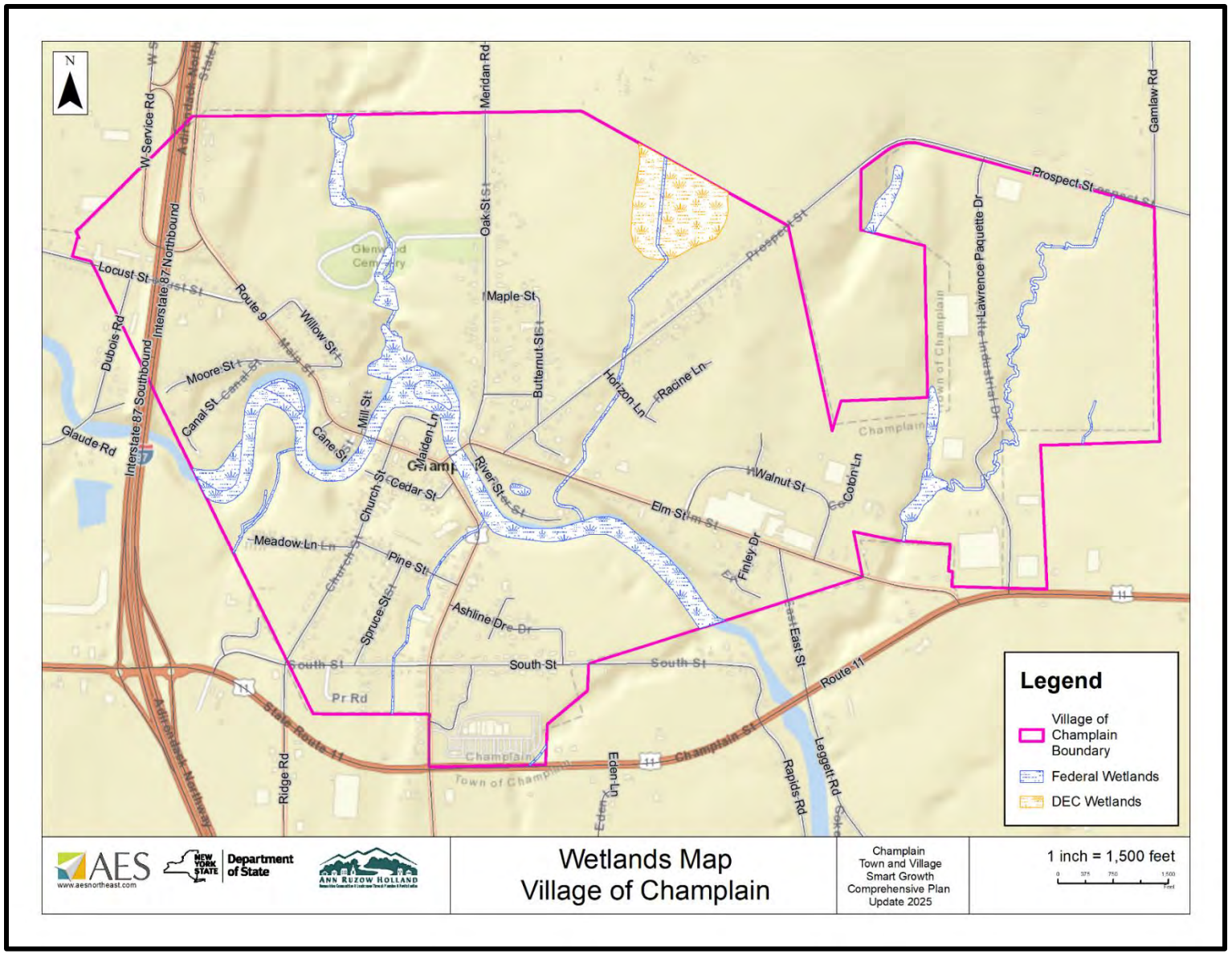

FIGURE 24 - WETLANDS MAP, VILLAGE OF CHAMPLAIN

2.7 Flood Designations and Flood Zones

Flood hazard areas are areas of land that usually adjoin a water body and are likely to be inundated with water in the event of a major flood. A floodplain is the area of land adjacent to a stream or river that will be inundated with water when the river or stream reaches flood levels. These areas are often visually noticeable when viewing a stream or river. Wetlands are often found in flood plains due to the high likelihood of soil saturation and play a vital role in flood control.

Both types of flooding, seasonal and 100-year flood events, can increase in extent with certain human development. This includes, for example, filling in wetlands, removing vegetation from land adjoining a water body, and altering a stream's natural bed and banks. The natural flow of a stream or river combined with the land's ability to absorb and moderate water flow rates are important in decreasing the ecological and environmental damage caused by flooding. The more natural vegetation within a floodplain, the less damage that land will experience during a flood event. Seasonal flooding due to snowmelt and precipitation events in the early spring is much less severe than 100 or 500-year flood events.

FIGURE 25 - VILLAGE OF CHAMPLAIN DURING BREAKUP ICE JAM EVENT IN 2007. IMAGE PROVIDED BY CLINTON COUNTY

The United States Federal Emergency Management Agency (FEMA) maintains a record of all national flood hazard areas and classifies them periodically as "Zones." They establish possible 100 and 500-year designated flood hazard areas based on the topography and hydrology. The maps below show the current FEMA classifications for Champlain Town and Village.

The NYS Department of Environmental Conservation (NYSDEC) also recently completed a flood study for the Great Chazy River[9]. An analysis was conducted for the Great Chazy River Watershed to identify High Risk Areas (HRA) and plan for mitigation of flood and ice jam events. A flood history that includes the Town and Village of Champlain over several decades is included.

[9] Flood Mitigation and Resilience Report – Great Chazy River SD119 – SLR Engineering, Landscape Architecture, and Land Surveying, P.C. - June 2022.

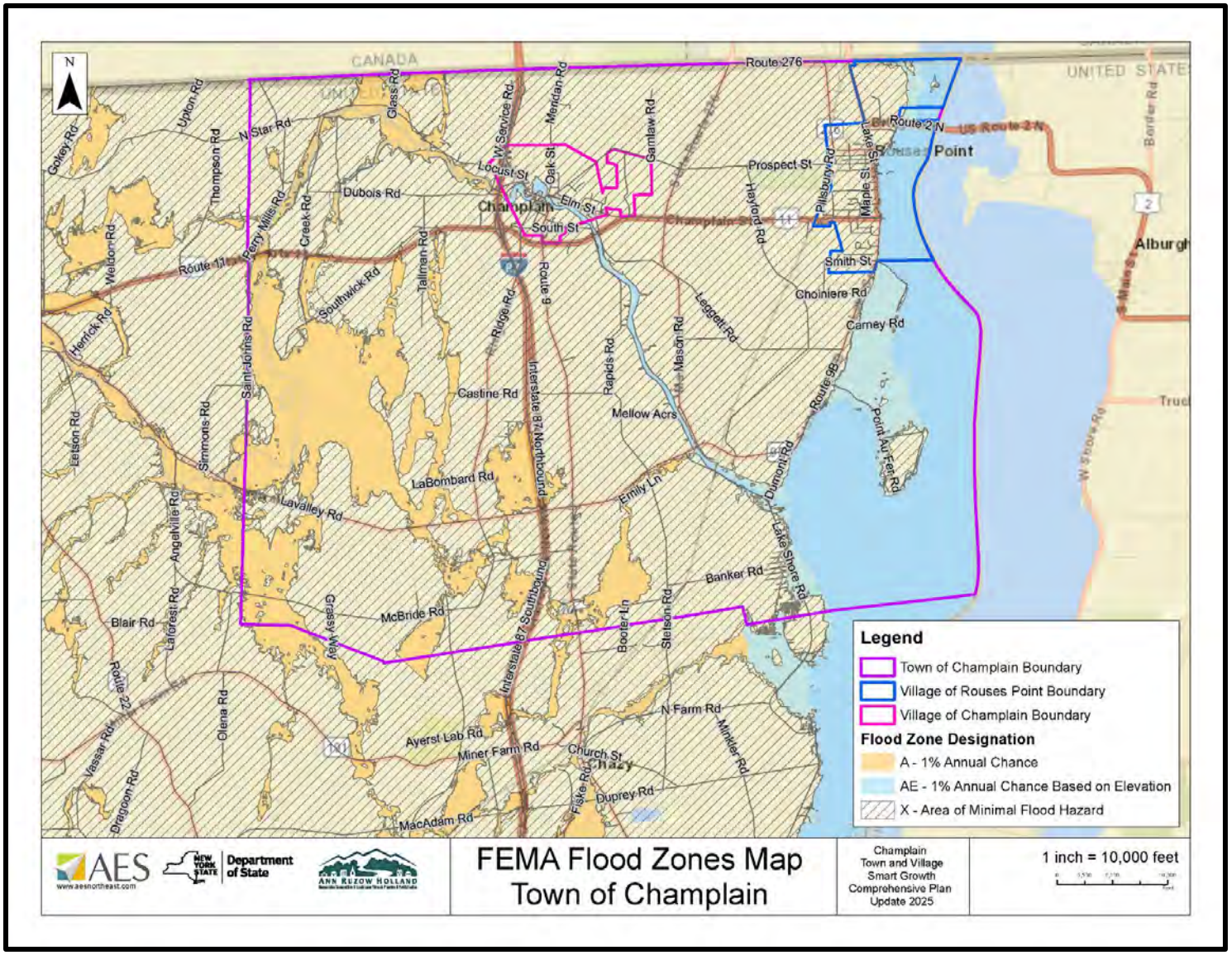

FIGURE 26 - FEMA FLOOD ZONES MAP, TOWN OF CHAMPLAIN

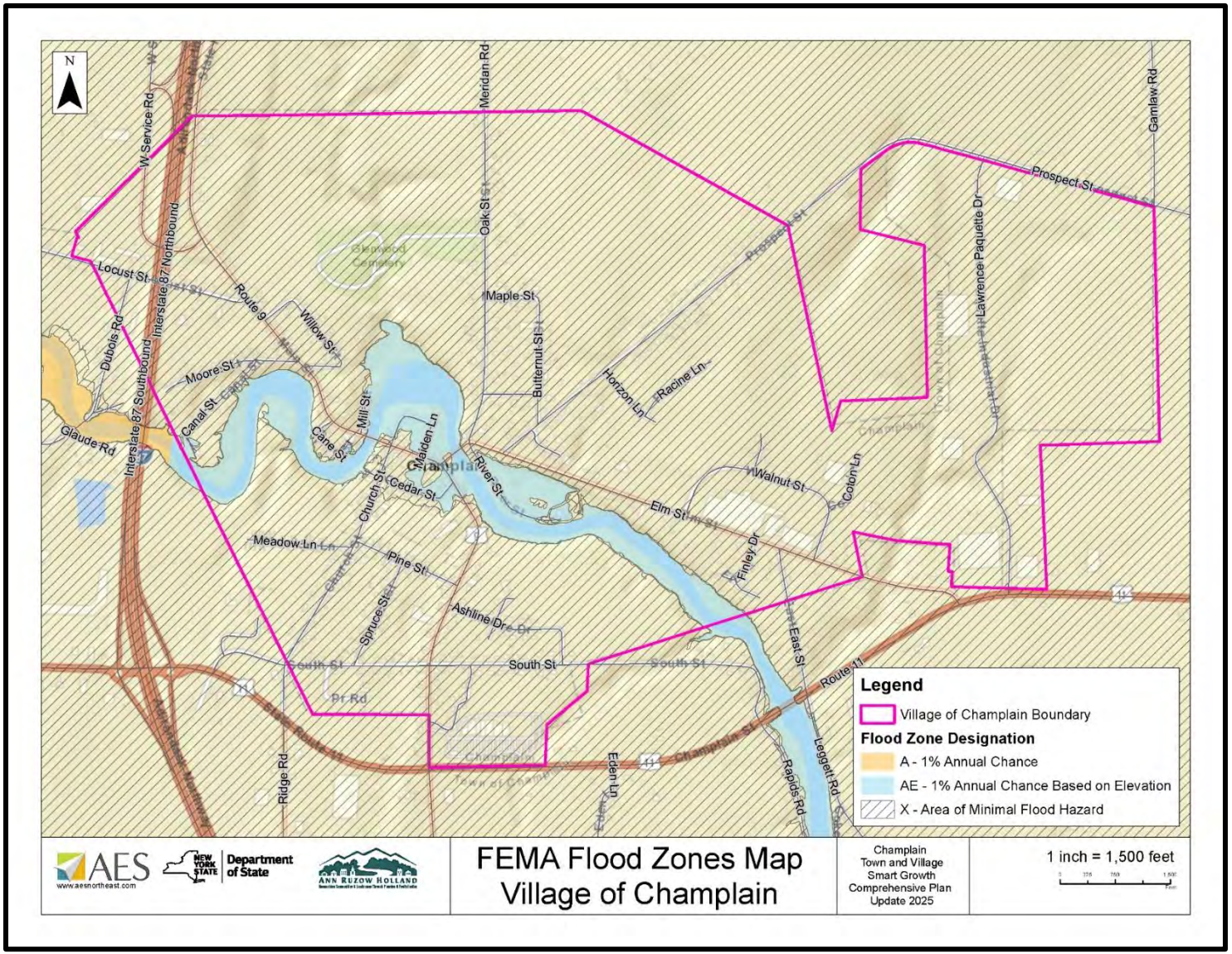

FIGURE 27 - FEMA FLOOD ZONES MAP, VILLAGE OF CHAMPLAIN

2.8 Scenic & Recreational Resources

Champlain Town and Village have a beautiful landscape, and this landscape attracts people to reside in and visit the town. Some defining characteristics of Champlain Town and Village include its waterfronts along the Great Chazy River and Lake Champlain, its countryside and expansive open spaces and its bustling villages and historic resources --all of which are conducive to tourism and add to the popularity of its cultural and outdoor recreational amenities within the town.

FIGURE 29 - PHOTO COURTESY OF THE TOWN/VILLAGE OF CHAMPLAIN

The Town and Village host several parks and trails that are suitable for four-season use, including snowshoeing, cross-country skiing, and ice fishing during the winter months. The Harry J. McManus Northern Tier Recreation Trail is a 5 mile – or so trail starts at the Village of Champlain at Bill Earl Park, follows Elm Street in the Village of Champlain where it turns left and becomes a trail through the fields crossing Paquette Boulevard and heading toward Northeastern Clinton Middle/High School. The trail crosses Route 276, continuing as a cinder path until it reaches Prospect Street and has a shared surface with the road. It ends at Rouses Point Elementary School. This Trail is for non-motorized use only. It allows residents and visitors to walk, run, bike, or roll safely from one village to the other. Partially paved and lined with benches, parking is available, and the train is both wheelchair accessible and stroller accessible. In warmer seasons, Lake Champlain and the Great Chazy River are popular for all forms of boating, including kayaking, canoeing, and sailing.

FIGURE 28 - PHOTO COURTESY OF THE TOWN/VILLAGE OF CHAMPLAIN

The Town has a lovely golf course, North Country Golf Club Inc. is an 18 Hole Semi-Private Course with Restaurant (North Country Grille) and Bar which is open to the Public.

Nearby the Adirondacks provide unlimited recreational opportunities.

FIGURE 30 - PHOTO COURTESY OF THE TOWN/VILLAGE OF CHAMPLAIN

FIGURE 31 - PHOTO COURTESY OF THE TOWN/VILLAGE OF CHAMPLAIN

FIGURE 32 - KINGS BAY WILDLIFE MANAGEMENT AREA

NYSDEC owns an important recreational resource along Lake Champlain. The Kings Bay Wildlife Management Area (WMA) provides for wildlife management, wildlife habitat management, and wildlife-dependent recreation. This WMA is 683 acres in size. The land was acquired by the state in the 1960s, primarily for waterfowl habitat enhancement. Formerly an agricultural area where hay, small grains, and firewood were harvested, the Kings Bay Wildlife Management Area is now comprised of hardwood swamp, cattail marsh, and reverted cattle pasture. Because of its agricultural history, the area provided an ideal base to practice wildlife management.

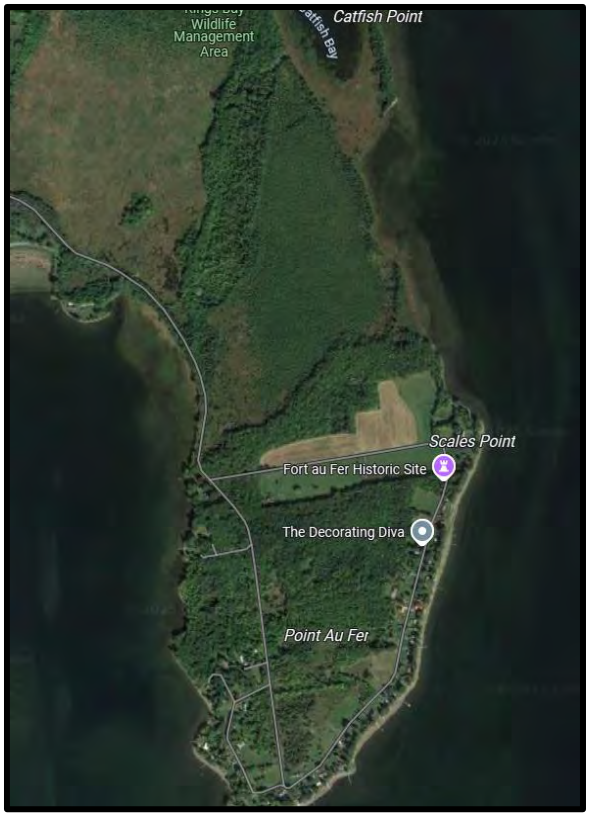

FIGURE 33 - KINGS BAY WILDLIFE MANAGEMENT AREA

Like most of the state's Wildlife Management Areas, Kings Bay WMA is managed by DEC's Division of Fish and Wildlife for wildlife conservation and wildlife-associated recreation (hunting, trapping, wildlife viewing, and photography). From the Great Chazy Boat Launch Site on Lake Champlain, on Laventure Drive, wheelchair accessible features include a viewing platform of Lake Champlain, approximately 500 feet from the parking area. Primary recreational activities at Kings Bay are hiking, watchable wildlife and fishing.

The following series of maps depict recreational resources and public lands in the town.

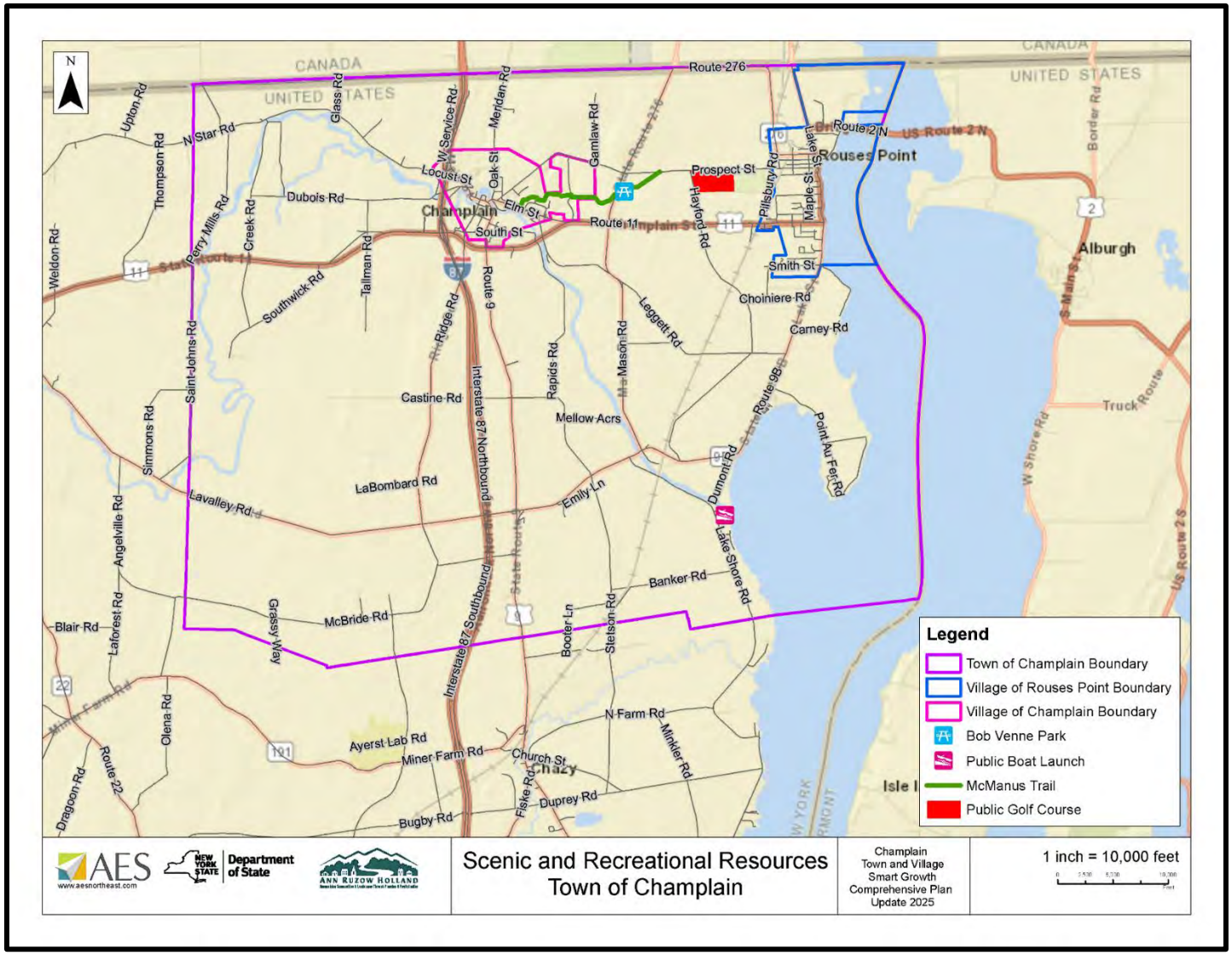

FIGURE 34 - SCENIC AND RECREATIONAL RESOURCES, TOWN OF CHAMPLAIN

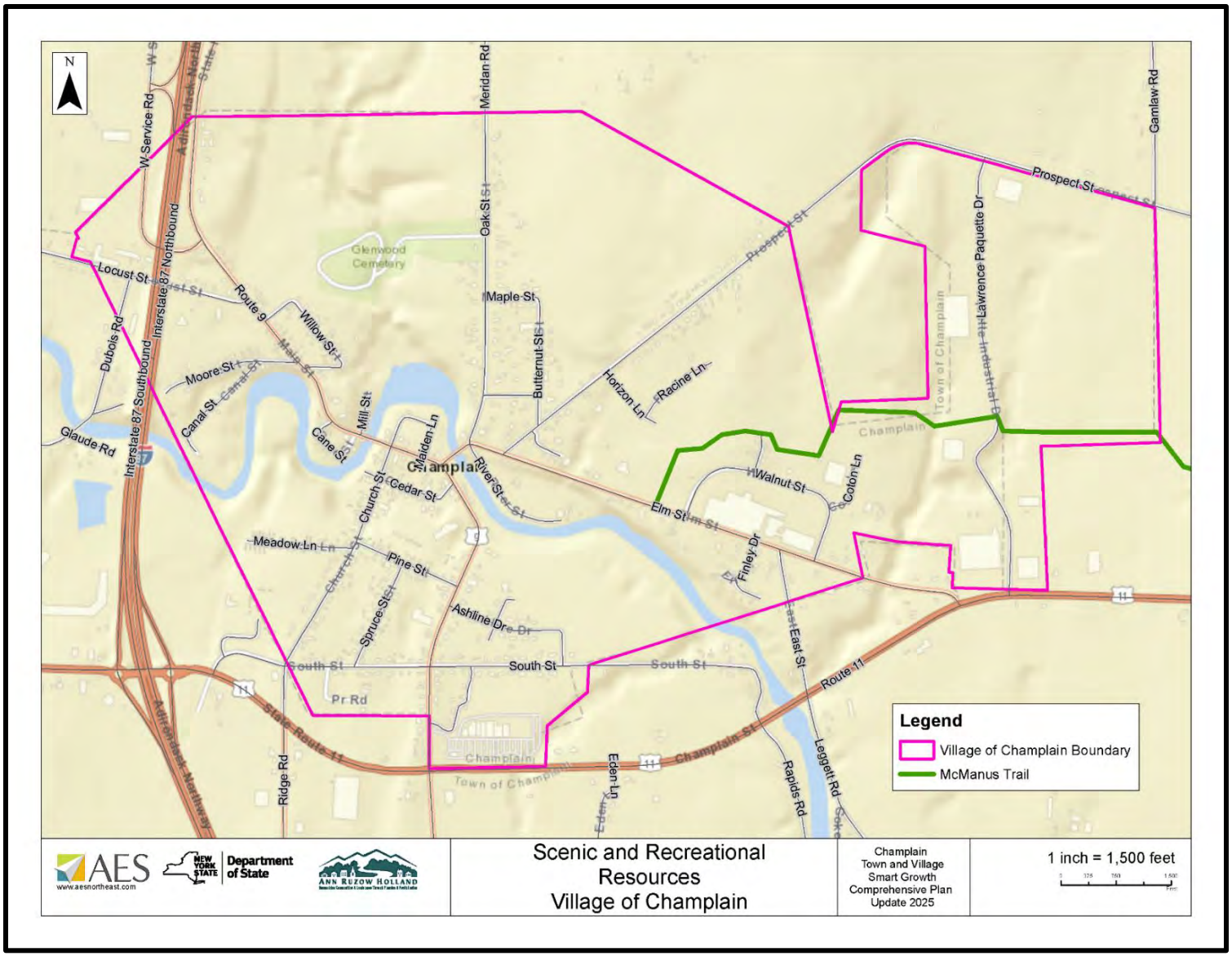

FIGURE 35 - SCENIC AND RECREATIONAL RESOURCES, VILLAGE OF CHAMPLAIN

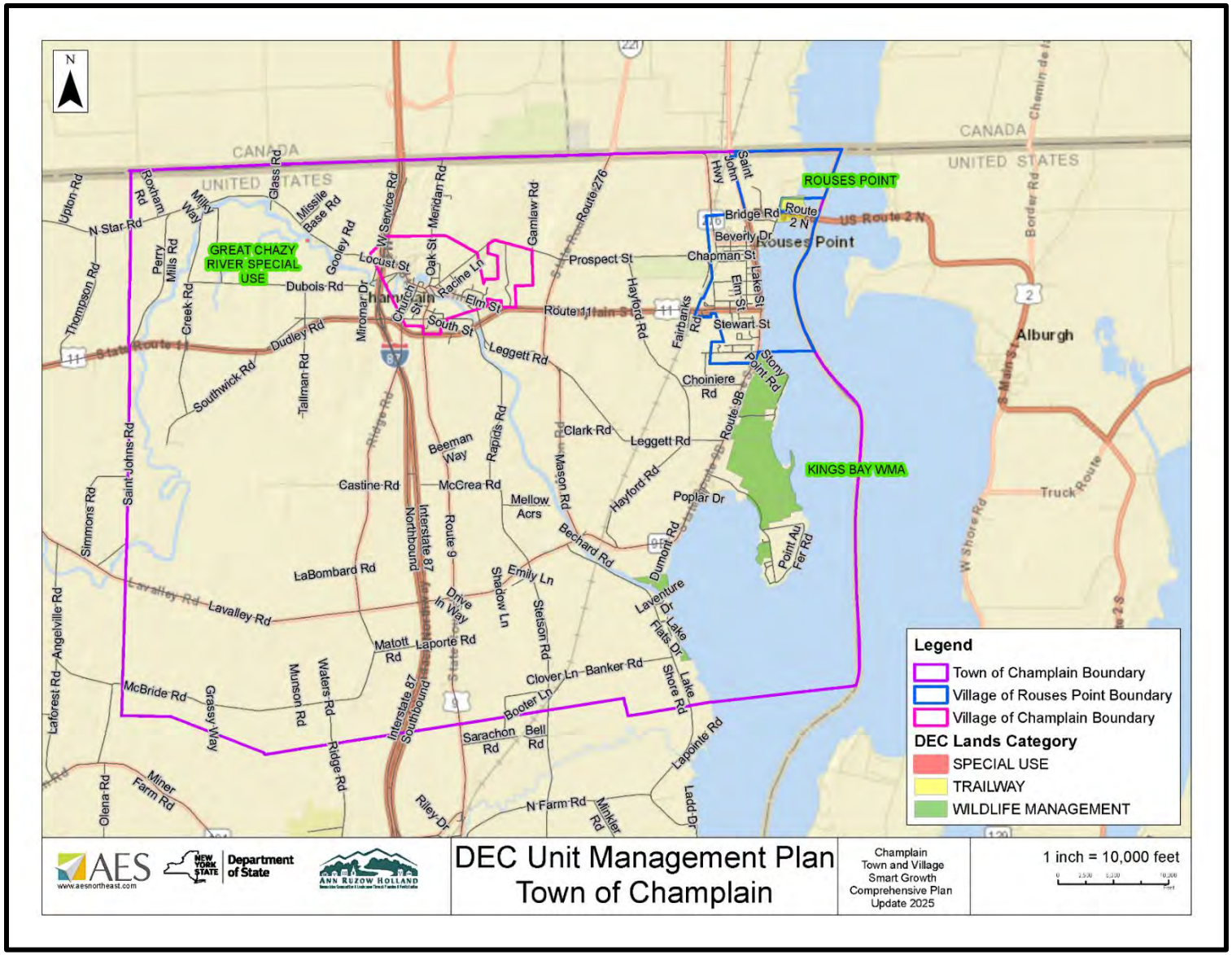

FIGURE 36 - DEC UNIT MANAGEMENT PLAN, TOWN OF CHAMPLAIN

2.9 Land and Forest Cover

The Town of Champlain, located in the Champlain Valley of New York, features a diverse landscape comprising forests, agricultural lands, wetlands, and developed areas. Champlain Town and Village and the Adirondacks are also part of the Northern Forest Region, a four-state area comprised of 30 million acres of forest lands traditionally known as the "Great North Woods."

The region is also part of the Northern Appalachian Acadian Ecoregion. As part of the Adirondacks, the Northern Forest, and the Ecoregion, Champlain Town and Village's natural landscapes play an integral role in the quality of the environment, habitats for natural communities, nature tourism, scenic vistas, outdoor education, agribusiness, protection of shorelines and more. And in today's world of climate insecurity, the natural countryside provides an important carbon "sink" that helps mitigate the effects of climate change.

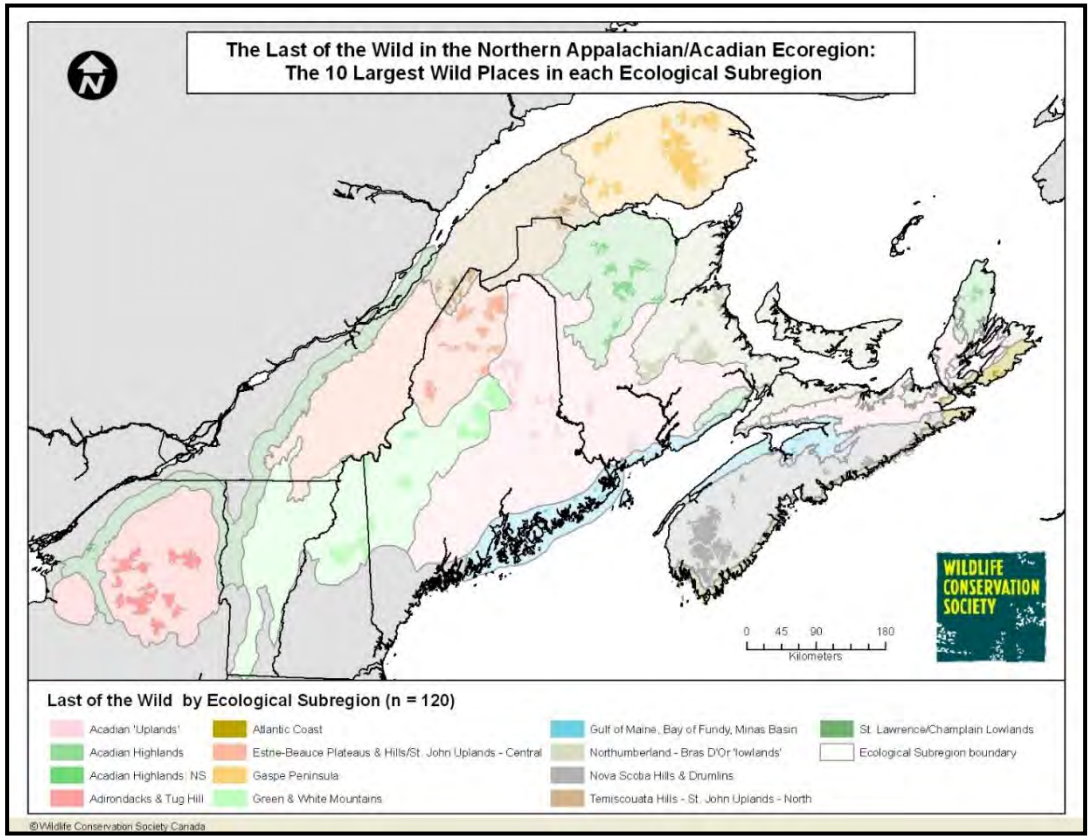

FIGURE 37 - LAST OF THE WILD BY ECOLOGICAL SUBREGION

Planning and land regulations should conserve undeveloped lands, reflect the expressed values of the citizens for the landscape, attract visitors, and assist the economy.

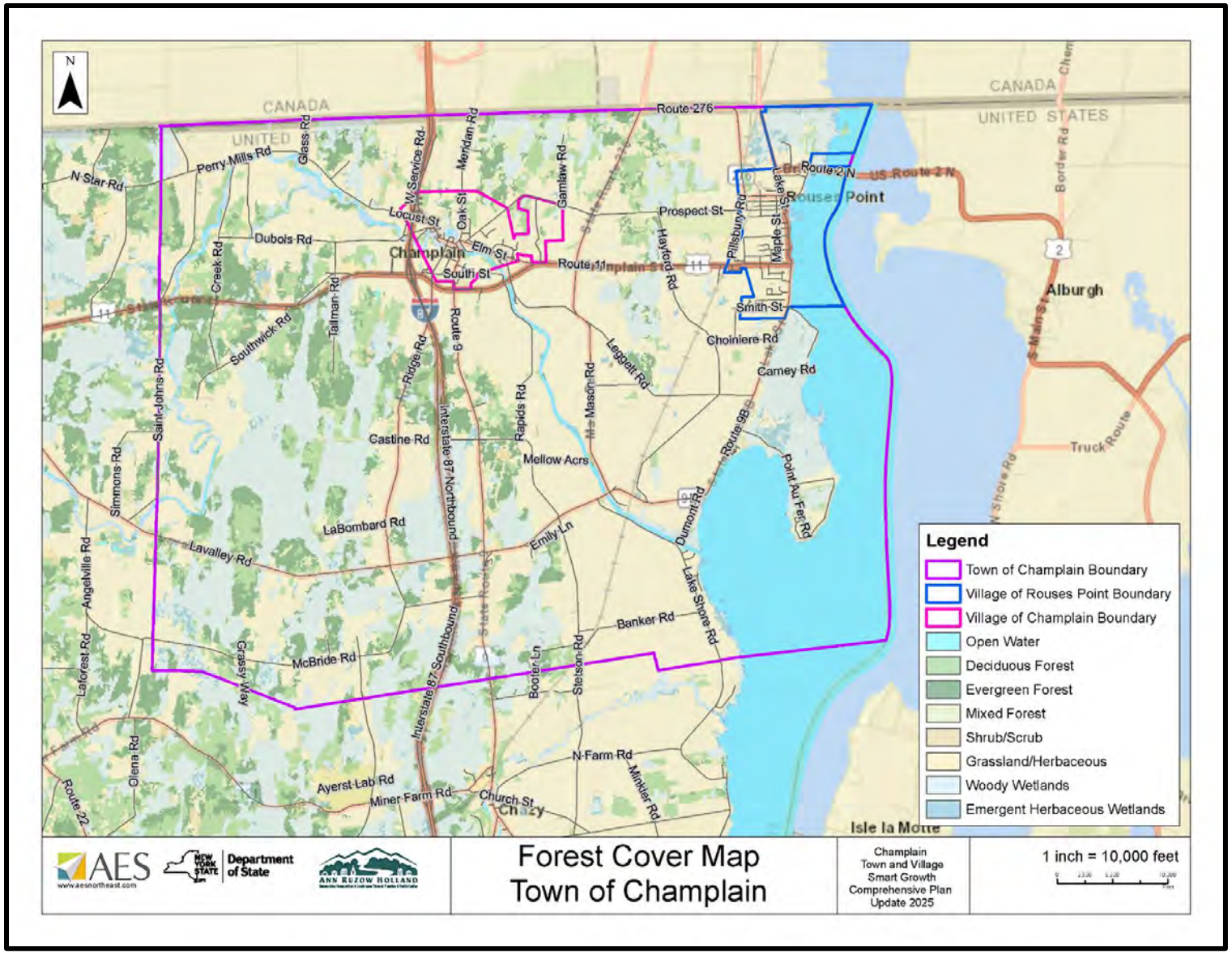

FIGURE 38 - FOREST COVER MAP, TOWN OF CHAMPLAIN

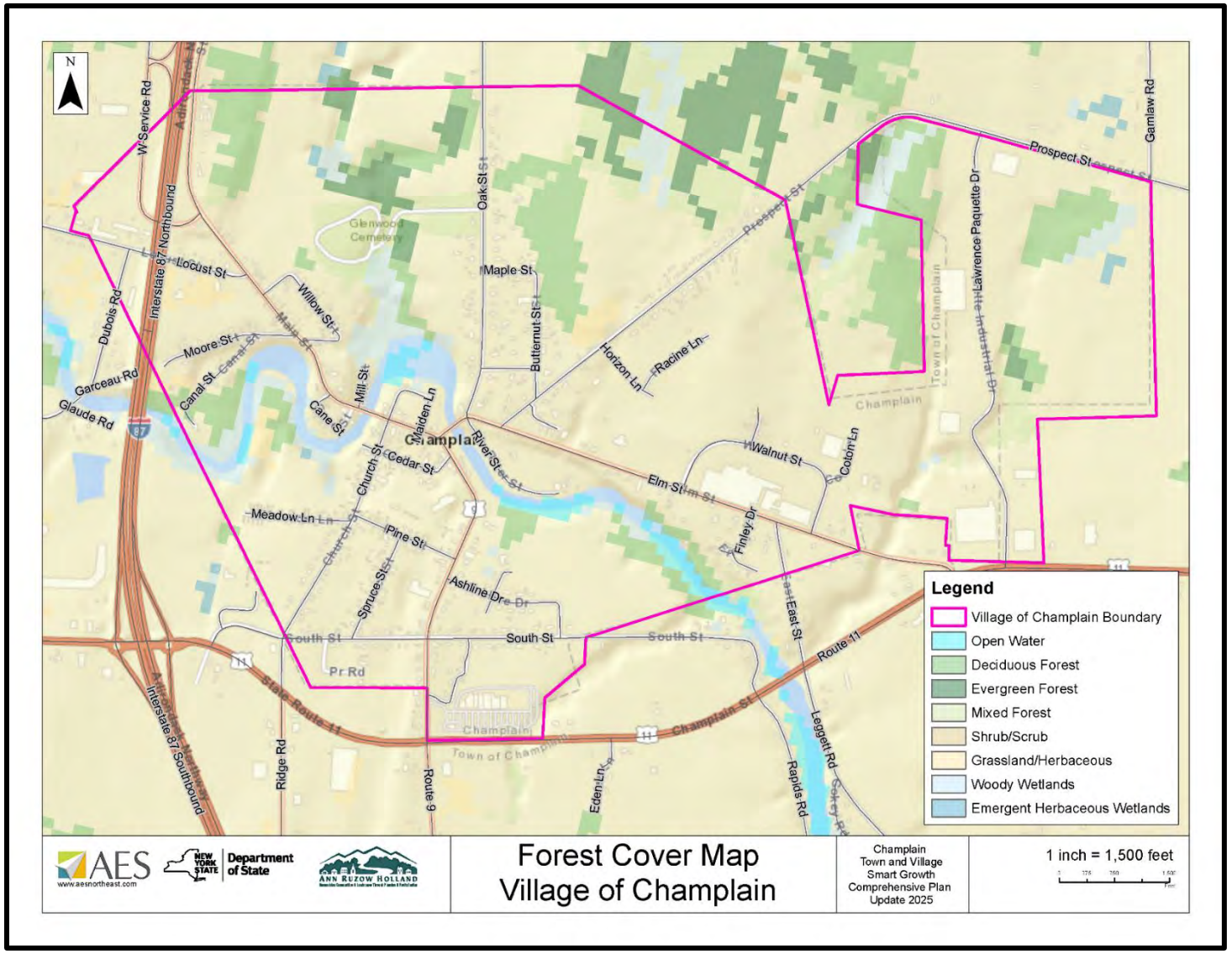

FIGURE 39 - FOREST COVER MAP, VILLAGE OF CHAMPLAIN

2.10 Biological Diversity and Ecological Communities

Biological Diversity is a shorter term for "Biodiversity". *Biology On Line* defines *Biodiversity* as, "*the measurement tool for all the variations (at all three levels namely genetic, species, and ecosystem) that exist in the different life forms inhabiting the Earth's surface. It includes all microscopic and macroscopic forms of life."*[10] The concept of Biodiversity recognizes the scientific, economic, and social importance of a broad and variable ecological community comprised of plants, animals, and habitats.

FIGURE 40 - IMAGE REPRESENTING BIODIVERSITY

Biodiversity is one of many *ecosystem services* provided by undeveloped places. The National Wildlife Federation notes, *"The value of nature to people has long been recognized, but in recent years, the concept of ecosystem services has been developed to describe these various benefits. An ecosystem service is any positive benefit that wildlife or ecosystems provide to people. The benefits can be direct or indirect—small or large."*[11] It is easy to forget that human health, water quality and quantity, and rural character—all of which are ecosystem services provided by plants, animals, and their habitats.

Biodiversity is also linked to the science of ecology through the concept of an *ecological community*. According to the NYS DEC, "An ecological community is a variable assemblage of interacting plant and animal populations that share a common environment."[12] Ecological communities serve as habitat for a wide range of plants and animals, both rare and common. Ecological communities in good condition provide ecological value and services. Unique ecological communities encompass natural features, such as geology, topography and climate combined with a history of low-intensity land use (limited development, forestry, and agriculture). The combination of these creates significant biodiversity throughout the Town.

[10] https://www.biologyonline.com/dictionary/biodiversity
[11] https://www.nwf.org/Educational-Resources/Wildlife-Guide/Understanding-Conservation/Ecosystem-Services
[12] https://www.nynhp.org/ecological-communities/

NYS DEC maintains an inventory of NYS's rare plants, animals, and places. The New York Natural Heritage Program inventory includes a classification and ranking system to help assess and protect the biological diversity of the state. The Program also as well as an up-to-date database of information on rare animals and plants, and significant natural communities. This inventory also provides a ranking system for determining priorities for conservation and management of New York State's significant natural areas. The importance of the ecological communities of New York is underscored by the State's use of scientific documentation, mapping, data compilation and designation of significant natural communities.

According to the Nature Conservancy,[13] "The Champlain Valley presents a rare opportunity to conserve a spectrum of large landscapes in the Northeast, from unbroken wetlands to thriving rare plant communities, to working family farms and wildlife corridors. This ecologically rich valley lies within an area known as the St. Lawrence-Champlain Valley ecoregion. Approximately 24 percent of this lowland ecoregion is in New York, 66 percent in Canada, and 10 percent in Vermont. The Nature Conservancy works to preserve the ecoregion's characteristic natural communities, including clay plain forests, lake-sand beaches, sandplains and numerous wetland and aquatic communities.

The Champlain Valley represents the northernmost reaches of many southern tree species, such as shagbark hickory, red and white oak, and hop hornbeam. Wildflowers include blue cohosh, bloodroot, Dutchman's breeches, wood anemone and more. The valley's sandstone pavement barrens, which are globally rare, provide habitat for jack pine and low-lying heath, such as huckleberry. The Champlain Valley provides habitat for bobcats, eastern timber rattlesnakes, coyotes, black bears, fishers, white-tailed deer and more. Of the 193 birds that breed in the Adirondacks, 155 of them are found in the Champlain Valley. On the lake itself, you might see common loons, snow geese, ring-necked ducks, buffleheads, mergansers, and a variety of gulls. Inland, you might see yellow-bellied sapsuckers, least flycatchers, American kestrels, great horned owls, bobolinks, eastern meadowlarks, peregrine falcons, and a variety of hawks."

Threats to ecological communities include land conversion and fragmentation that lead to habitat loss and altered hydrologic systems. External threats include invasive species and pollution from the byproducts of agricultural practices (chemicals, nutrients, and sediments). These threats can be minimized by direct actions to preserve the biological diversity of the valley and educating residents and visitors about the Town's natural environment. Conserving streams, lakeshores, and Lake Champlain to protect water

[13] https://www.nature.org/en-us/about-us/where-we-work/united-states/new-york/

quality and mitigate flooding will also help people-- as well as plants and animals—thrive in Champlain. Conserving land through easements and fee acquisition of scenic landscapes will enhance tourism and inspire pride and curiosity in visitors and residents. The Lake Champlain Basin Program and their partners can also help by working with local farmers and landowners to promote sustainable agricultural and forestry practices, while helping local communities to strengthen their economies and cultural heritage.

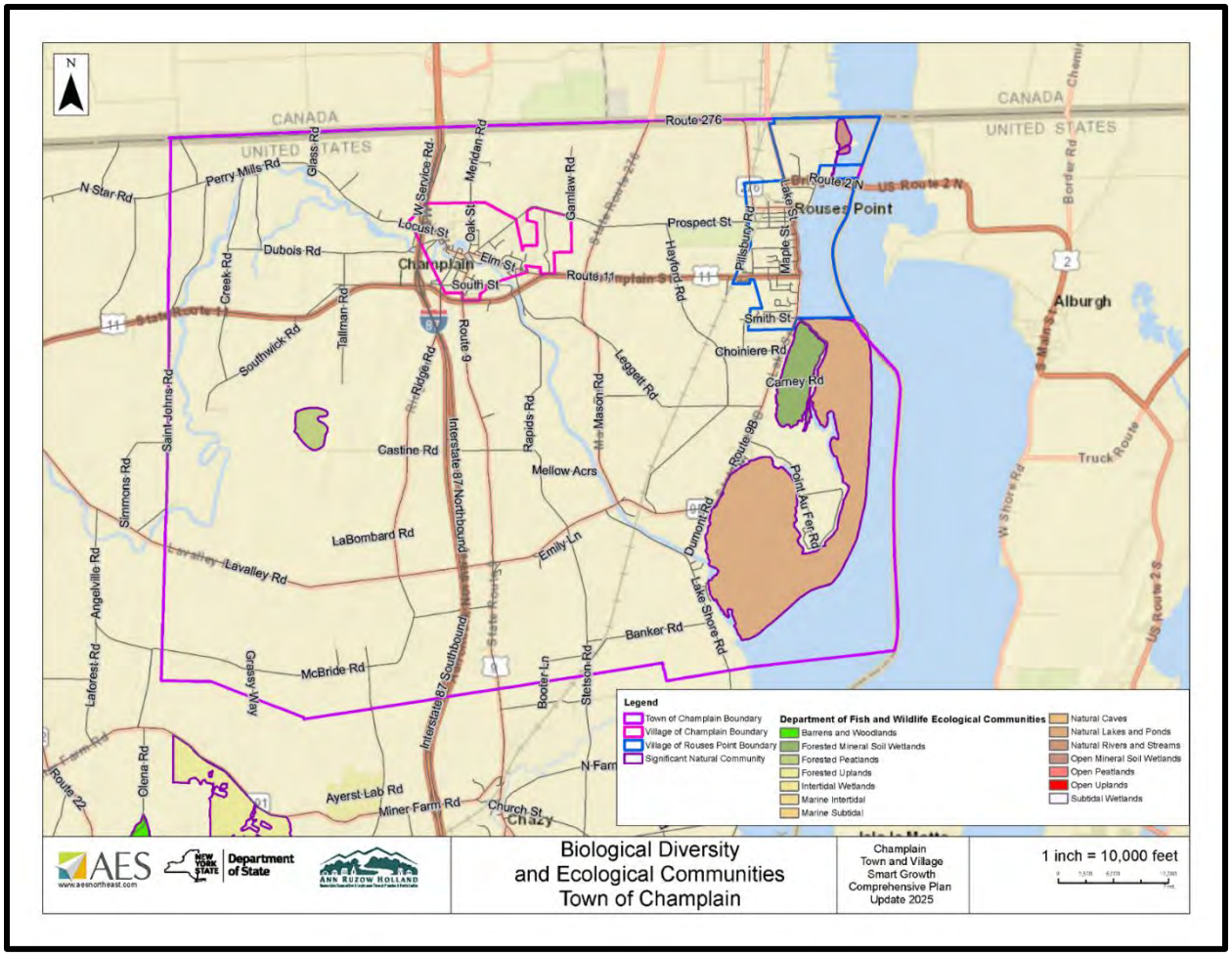

FIGURE 41 - BIOLOGICAL DIVERSITY AND ECOLOGICAL COMMUNITIES, TOWN OF CHAMPLAIN

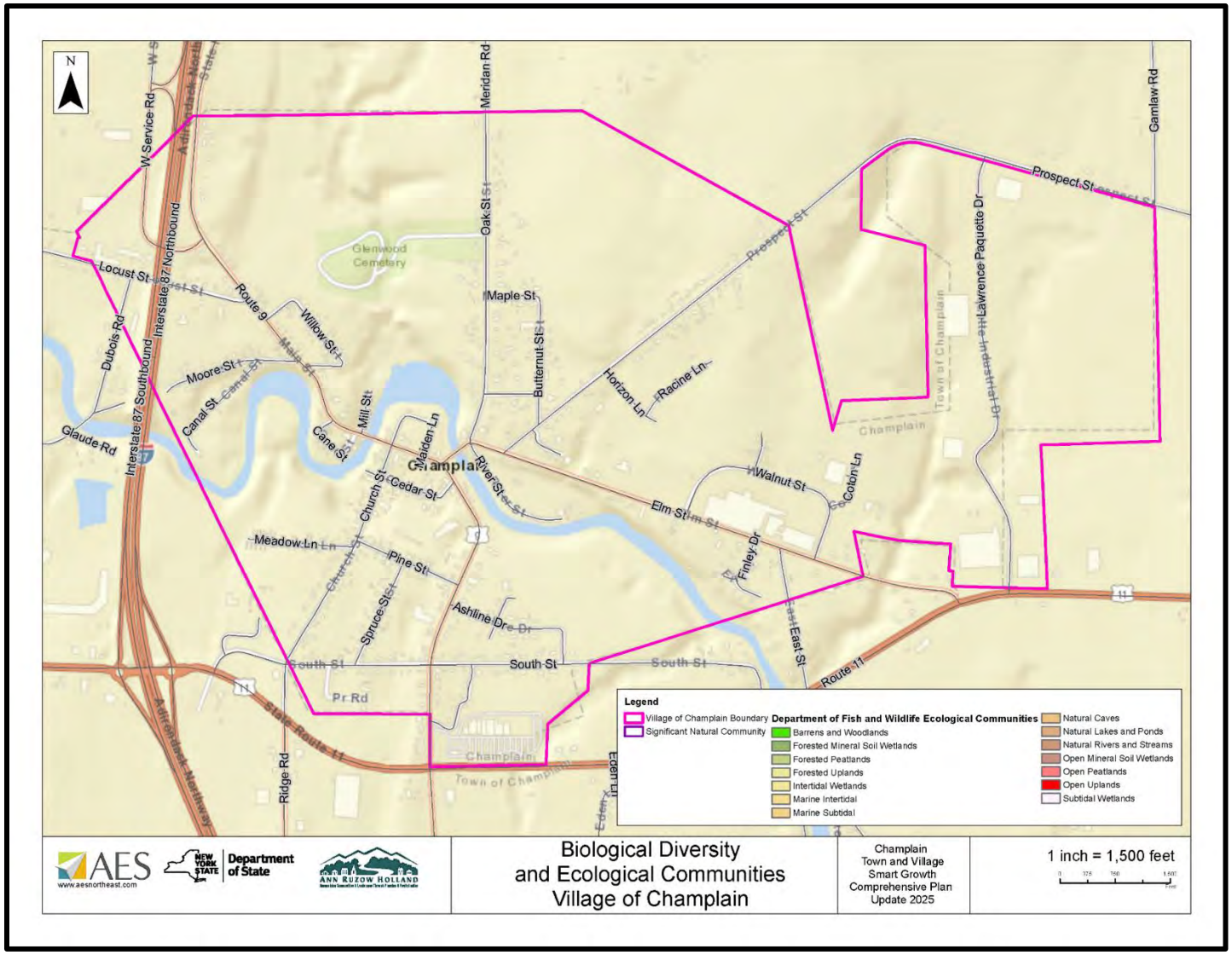

FIGURE 42 - BIOLOGICAL DIVERSITY AND ECOLOGICAL COMMUNITIES, VILLAGE OF CHAMPLAIN

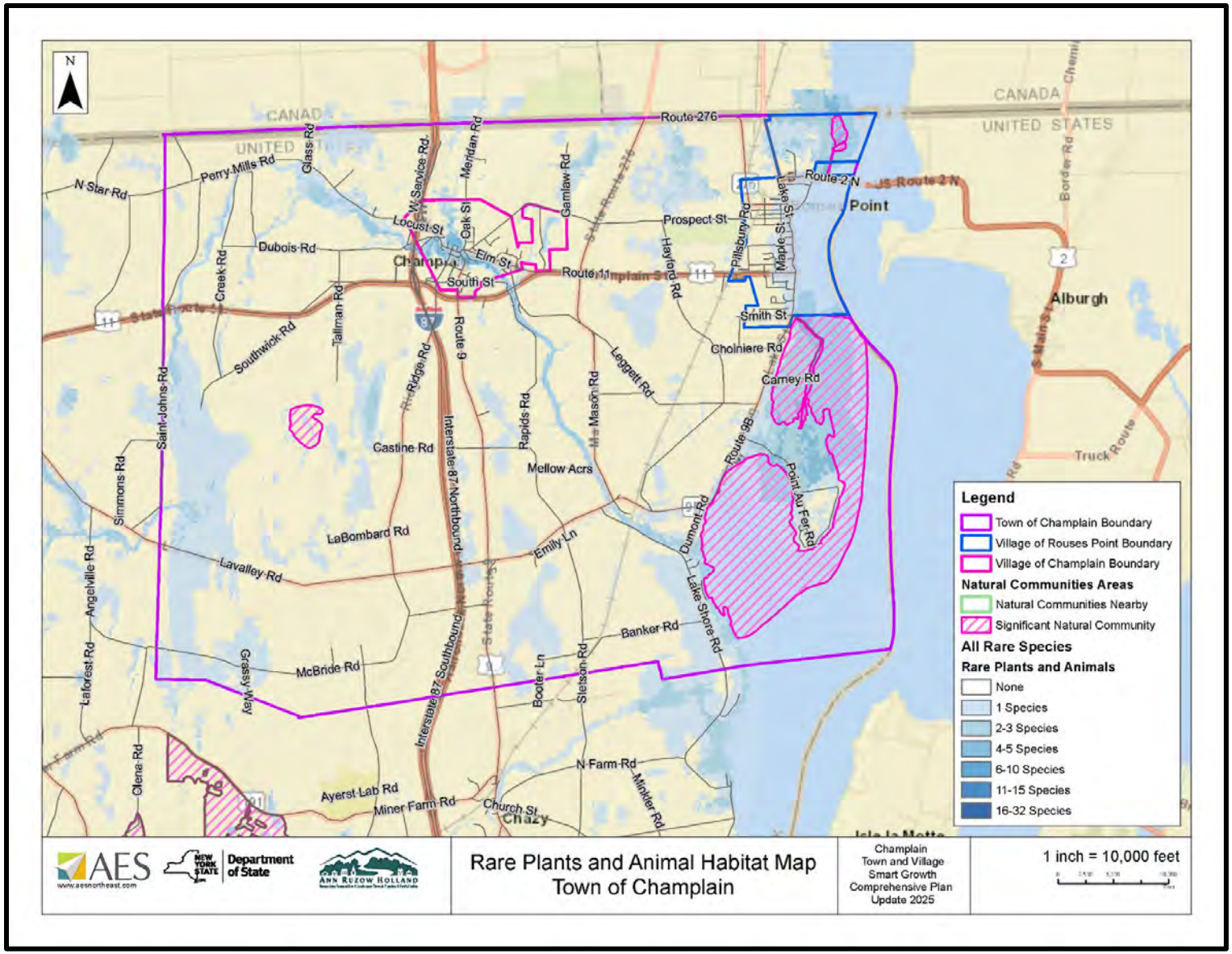

FIGURE 43 - RARE PLANTS AND ANIMAL HABITAT MAP, TOWN OF CHAMPLAIN

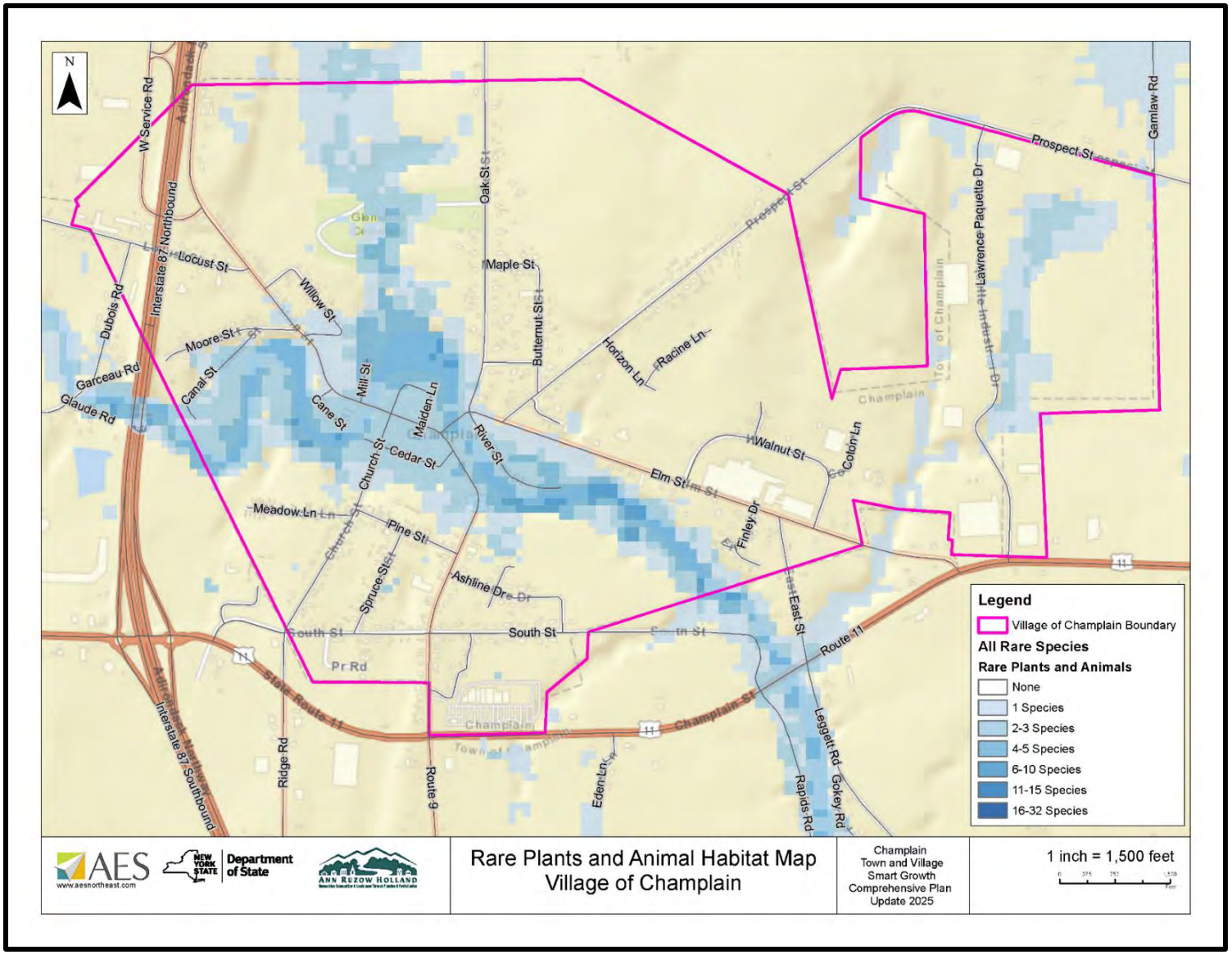

FIGURE 44 - RARE PLANTS AND ANIMAL HABITAT MAP, VILLAGE OF CHAMPLAIN

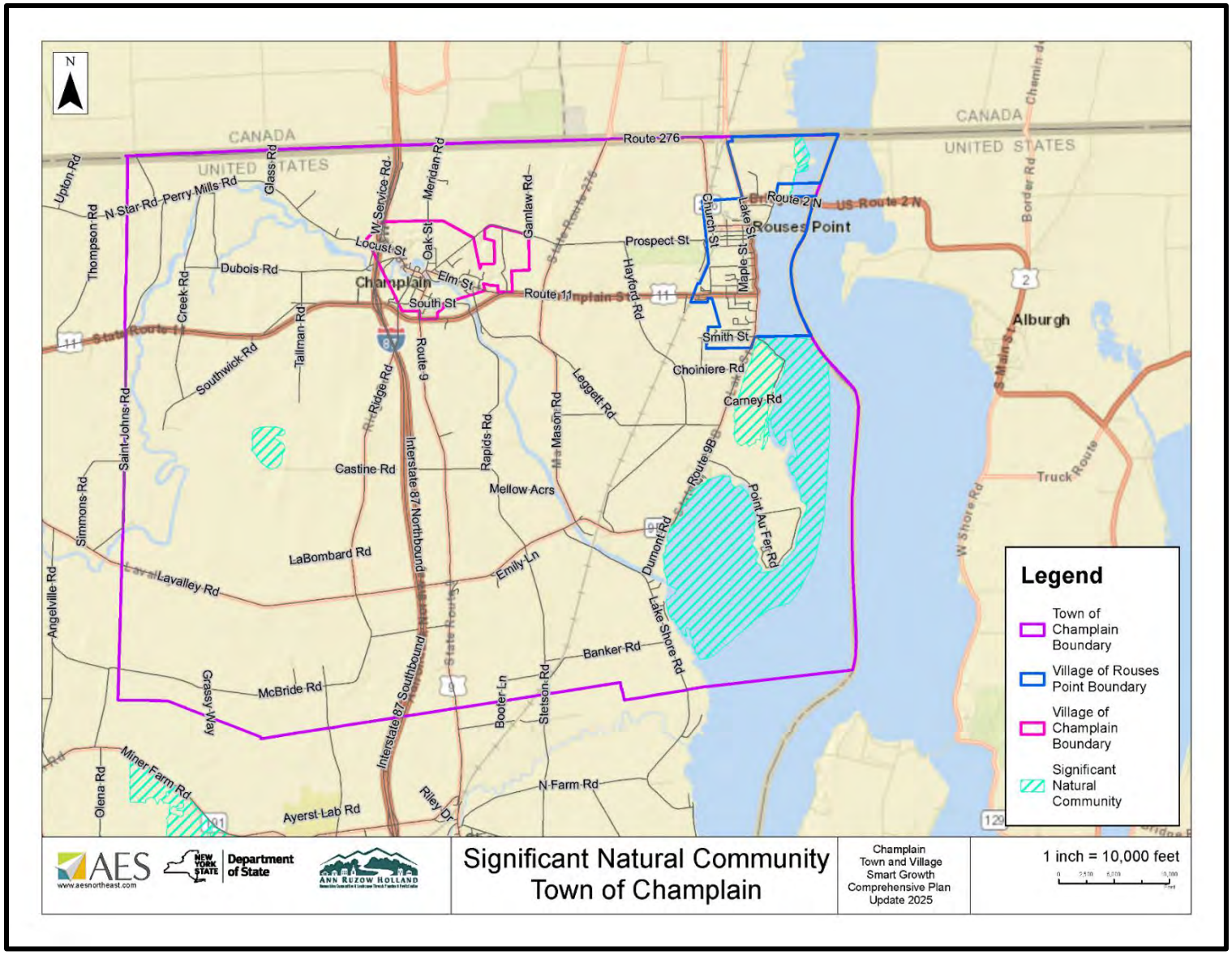

FIGURE 45 - SIGNIFICANT NATURAL COMMUNITY, TOWN OF CHAMPLAIN

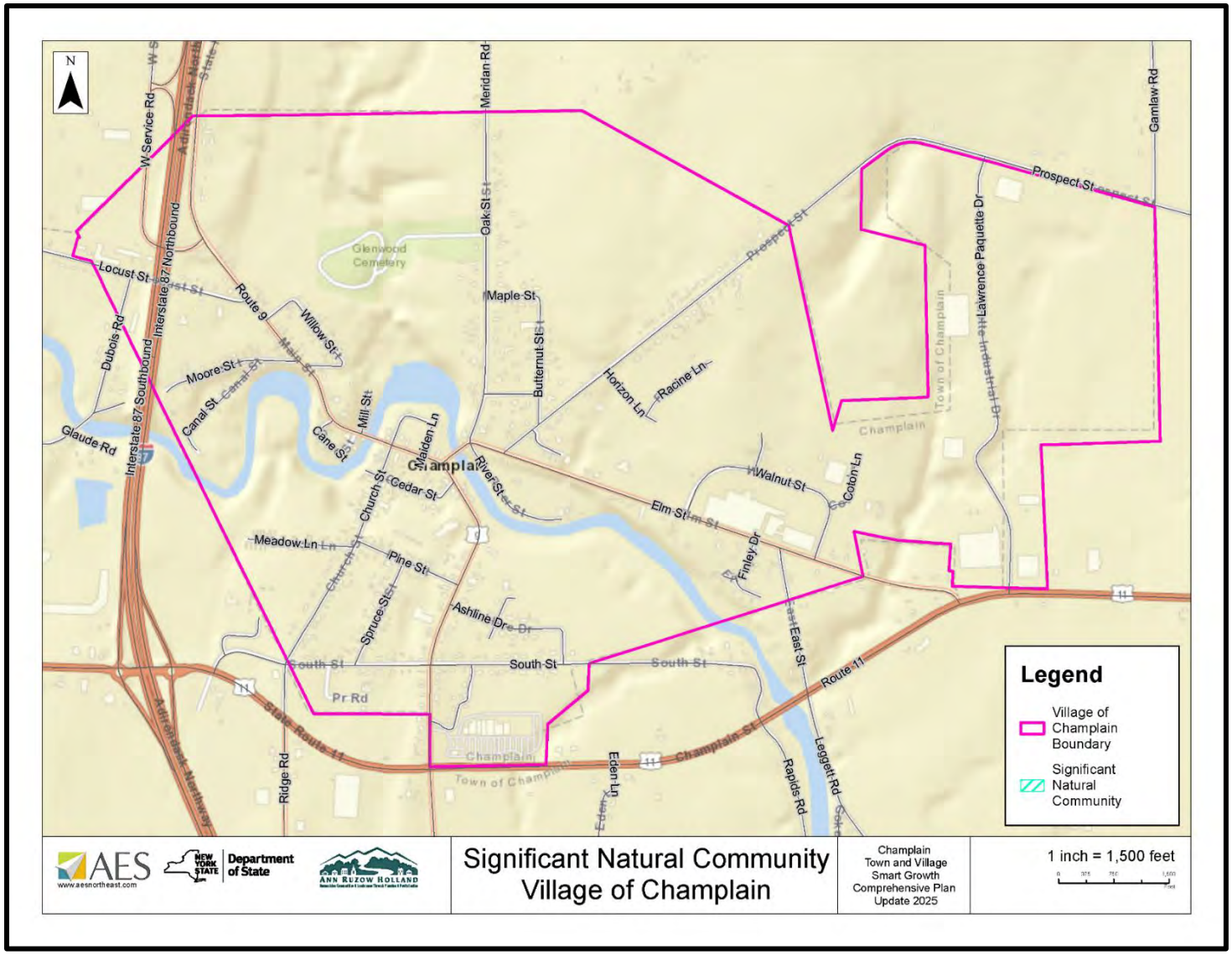

FIGURE 46 - SIGNIFICANT NATURAL COMMUNITY, VILLAGE OF CHAMPLAIN

The U.S. Department of Fish and Wildlife identify imperiled plant and animal species. They are listed as Endangered, Threatened, or Species of Special Concern. Rare plants or animals are defined as having uncommon or rapid declines in population and meet the State of New York Designation criteria as rare or potentially rare. The designations are not static but continually adjusted as the data informs the situation. Low population numbers make these identified plants and animals vulnerable to extinction. The specific locations of rare and endangered species are not disclosed to the public to protect them from poachers, exploitation, and harm. Even though specific species are listed, instead of protecting single species, scientists use a habitat, communities, or landscape conservation approach to protect Biodiversity. The table below presents the current listings for the Northeast Region of the US FWS.

Northeast Region (Region 5) Federal USFWS Listing Source: https://www.fws.gov/program/listing-and-classification			
Scientific Name	**Common Name**	**Federal Listing Status**	**Where Listed**
Aeschynomene virginica	Sensitive joint-vetch	Threatened	Wherever found
Agalinis acuta	Sandplain gerardia	Endangered	Wherever found
Alasmidonta heterodon	Dwarf wedgemussel	Endangered	Wherever found
Antrolana lira	Madison Cave isopod	Threatened	Wherever found
Asplenium scolopendrium var. americanum	American hart's-tongue fern	Threatened	Wherever found
Astragalus robbinsii var. jesupii	Jesup's milk-vetch	Endangered	Wherever found
Betula uber	Virginia round-leaf birch	Threatened	Wherever found
Boechera serotina	Shale barren rock cress	Endangered	Wherever found
Calidris canutus rufa	rufa red knot	Threatened	Wherever found
Cambarus callainus	Big Sandy crayfish	Threatened	Wherever found
Cambarus veteranus	Guyandotte River crayfish	Endangered	Wherever found
Corynorhinus (=Plecotus) townsendii virginianus	Virginia big-eared bat	Endangered	Wherever found
Crystallaria cincotta	diamond Darter	Endangered	Wherever found

Northeast Region (Region 5) Federal USFWS Listing Source: https://www.fws.gov/program/listing-and-classification			
Scientific Name	**Common Name**	**Federal Listing Status**	**Where Listed**
Ellipsoptera puritana	Puritan tiger beetle	Threatened	Wherever found
Epioblasma rangiana	Northern riffleshell	Endangered	Wherever found
Etheostoma osburni	Candy darter	Endangered	Wherever found
Etheostoma sellare	Maryland darter	Endangered	Wherever found
Glyptemys muhlenbergii	Bog turtle	Threatened	Wherever found, except GA, NC, SC, TN, VA
Habroscelimorpha dorsalis dorsalis	Northeastern beach tiger beetle	Threatened	Wherever found
Helenium virginicum	Virginia sneezeweed	Threatened	Wherever found
Helonias bullata	Swamp pink	Threatened	Entire
Hemileuca maia menyanthevora (=H. iroquois)	bog buck moth	Endangered	Wherever found
Iliamna corei	Peter's Mountain mallow	Endangered	Wherever found
Isotria medeoloides	Small whorled pogonia	Threatened	Entire
Lirceus usdagalun	Lee County cave isopod	Endangered	Wherever found
Novisuccinea chittenangoensis	Chittenango ovate amber snail	Threatened	Wherever found
Parvaspina collina	James spinymussel	Endangered	Wherever found
Pedicularis furbishiae	Furbish lousewort	Threatened	Entire
Percina rex	Roanoke logperch	Endangered	Wherever found
Plethodon nettingi	Cheat Mountain salamander	Threatened	Wherever found
Plethodon shenandoah	Shenandoah salamander	Endangered	Wherever found
Pleurobema clava	Clubshell	Endangered	Wherever found; Except where listed as Experimental Populations
Polygyriscus virginianus	Virginia fringed mountain snail	Endangered	Wherever found
Pseudemys rubriventris bangsi	Plymouth Redbelly Turtle = Plymouth Redbelly Cooter	Endangered	Wherever found

Northeast Region (Region 5) Federal USFWS Listing Source: https://www.fws.gov/program/listing-and-classification			
Scientific Name	**Common Name**	**Federal Listing Status**	**Where Listed**
Ptilimnium nodosum	Harperella	Endangered	Wherever found
Quadrula cylindrica strigillata	Rough rabbitsfoot	Endangered	Wherever found
Rhynchospora knieskernii	Knieskern's Beaked rush	Threatened	Wherever found
Scirpus ancistrochaetus	Northeastern bulrush	Endangered	Entire
Spiraea virginiana	Virginia spiraea	Threatened	Wherever found
Stygobromus hayi	Hay's Spring amphipod	Endangered	Wherever found
Theliderma sparsa	Appalachian monkeyface (pearlymussel)	Endangered	Wherever found
Triodopsis platysayoides	Flat-spired three-toothed Snail	Threatened	Wherever found
Villosa perpurpurea	Purple bean	Endangered	Wherever found

TABLE 1 - NORTHEAST REGION FEDERAL USFWS LISTING

Smart Growth and Land Planning Issues for Ecological Communities and Biodiversity

All kinds of land can provide habitat and may host ecological communities. In general, development and buildings should be directed away from known significant ecological communities and wildlife corridors. Parcel characteristics that promote wildlife success are increasing the distance from and between buildings, less bare ground, and including protected riparian areas within the parcel.

FIGURE 47 - ECOLOGICAL COMMUNITIES

Since we do not know with certainty the ecological and human consequences of species loss (medicines to fight disease, vector control, pollination, climate change etc.), it is essential to protect critical habitats upon which plants and animals depend. It is especially important to preserve sufficient habitat to ensure listed plants and animals are protected. We know through an extensive body of research that insufficient habitat due to poorly planned development is a primary cause of low or decreasing biodiversity.