

# NATURAL AREAS AND WILDLIFE IN YOUR COMMUNITY



Hudson River Estuary Program

## A Habitat Summary Prepared for the Town of Hunter

This summary was completed in July 2017 to provide information for land-use planning and decision-making as requested by the Town of Hunter. It identifies significant ecosystems in the town, including streams, forests, wetlands, and other natural areas with important biological values. This summary is based only on existing information available to the New York State Department of Environmental Conservation (DEC) and its partners, and, therefore should not be considered a complete inventory. Additional information about habitats in our region can be found in the *Wildlife and Habitat Conservation Framework* developed by the Hudson River Estuary Program (Penhollow et al. 2006) and in the *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* developed by Hudsonia and published by DEC (Kiviat and Stevens 2001).

Ecosystems of the estuary watershed—wetlands, forests, stream corridors, grasslands, and shrublands—are not only habitat for abundant fish and wildlife, but also support the estuary and provide many vital benefits to human communities. These ecosystems help to keep drinking water and air clean, moderate temperature, filter pollutants, and absorb floodwaters. They also provide opportunity for outdoor recreation and education, and create the scenery and sense of place that is unique to the Hudson Valley. Local land-use planning efforts are instrumental in balancing future development with protection of these resources. By conserving sufficient habitat to support the region’s astonishing diversity of plants and animals, communities can ensure that healthy, resilient ecosystems—and the benefits they provide—are available to future generations. For more information on local conservation approaches, see *Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York’s Hudson River Valley* (Strong 2008).

### The Estuary Program works to ensure the following benefits:

- Vital estuary ecosystem
- Resilient communities
- Clean water
- Fish, wildlife & habitats
- Scenic river landscape
- Education, access and recreation

This document was created by the New York State Department of Environmental Conservation’s Hudson River Estuary Program and Cornell University’s Department of Natural Resources. The Estuary Program (<http://www.dec.ny.gov/lands/4920.html>) protects and improves the natural and scenic Hudson River watershed for all its residents. The program was created in 1987 and extends from the Troy dam to upper New York Harbor.

The Estuary Program is funded by the NYS Environmental Protection Fund. The Biodiversity Outreach Program was created in partnership with Cornell University to help Hudson Valley communities learn what plants, animals, and habitats are found locally; understand the value of these resources; and increase their capacity to identify, prioritize, and

conserve important natural areas through informed decision-making. Additional information about habitats in the Hudson Valley can be found on DEC’s webpages, starting with [www.dec.ny.gov/lands/5094.html](http://www.dec.ny.gov/lands/5094.html).

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## Table of Contents

■ Introduction.....	3
Summary Content.....	3
How to use this summary .....	4
Limitations of Maps in this Summary .....	4
How to find more information.....	4
Conservation.....	5
■ Important Habitats in the Town of Hunter .....	6
Regional Context (Figure 1).....	6
Significant Ecological Features (Figure 2).....	6
Significant Natural Communities.....	6
Areas of Known Importance for Rare Plants, Rare Animals, and Significant Natural Communities. ....	7
Catskill Peaks Important Bird Area (IBA).....	8
Streams (Figure 3) .....	8
Wetlands (Figure 4) .....	10
Forests (Figure 5 and Figure 6).....	11
Grasslands, Shrublands, and Young Forests (not mapped).....	14
■ Species and Ecosystems of Conservation Concern in the Town of Hunter .....	21
Table 1. Species and Ecosystems of Conservation Concern in Hunter, NY .....	21
■ References .....	26

## Introduction

The Hudson River Estuary and its watershed is a region of remarkable beauty, historical and economic significance, and high biological diversity. The region, comprising only 13.5% of the land area in New York, contains nearly 85% of the bird, mammal, reptile, and amphibian species found in the state (Penhollow et al. 2006). Local municipalities can play a key role in conserving this natural heritage and the ecological processes that sustain it. By identifying important areas for habitat and wildlife, municipalities are better equipped to pursue conservation opportunities and make informed land-use decisions. This proactive approach to planning can help municipalities avoid the costs of urban and suburban sprawl, maintain community character and quality of life, and preserve the many benefits, or ecosystem services, that healthy, natural systems provide to present and future generations.

*An **ecosystem** is a community of animals and plants interacting with one another and with their physical environment.*

***Ecosystem services** are life-sustaining benefits we receive from nature, such as food, medicine, water purification, flood control, and pollination. Many of these services are provided for “free,” yet are worth many trillions of dollars.*

*- Ecological Society of America*

## Summary Content

This summary includes complementary text, maps, and tables. The [Habitat Summary text](#) describes what is known about the town's important natural areas and habitats based on information in DEC's databases and a review of local studies available at the time of writing. The text details the information in the maps, including the ecological importance of the data and its sources. There are six habitat maps for the Town of Hunter, which follow the text headings:

[Figure 1: Regional Context](#) of Hunter, NY

[Figure 2: Major Ecological Features](#) in Hunter, NY

[Figure 3: Streams](#) in Hunter, NY

[Figure 4: Wetlands](#) in Hunter, NY

[Figure 5: Forests](#) in Hunter, NY

[Figure 6: Forest History](#) in Hunter, NY

Descriptions of shrubland and young forest habitats and grasslands are included in the text but not mapped. Following the maps, Table 1 lists known species and habitats of conservation concern that have been recorded for Hunter, including species listed in New York (NY) or federally (US) as [endangered](#), [threatened](#), [special concern](#), [rare](#), a [Species of Greatest Conservation Need](#) (SGCN), or a [Hudson River Valley Priority Bird](#) species. SGCN are species that are experiencing some level of population decline, have identified threats that may put them in jeopardy, and need conservation actions to maintain stable population levels or sustain recovery (NYSDEC 2015). Audubon New York identified the Hudson River Valley priority birds by assessing continental, national, and regional bird planning initiatives in addition to state and federal priority designations.

[Table 1: Species and Ecosystems of Conservation Concern](#) in Hunter, NY

At the end of the summary, [References](#) identify the sources of information in this document and places to find more information. [General conservation measures](#) for protecting natural areas and wildlife are also provided.

Links in the summary will direct you to websites, publications, and fact sheets for supplemental information. In addition, viewing the maps in Adobe Reader will enable you to zoom in and turn off data layers to customize your view. Most of the GIS layers shown in the habitat summary maps are available for free from the [New York GIS Clearinghouse](#); others are available upon request from the Estuary Program. A complementary online map application, the [Hudson Valley Natural Resource Mapper](#), can be used for more interactive

viewing of mapped features in the habitat summary. Attribute information for many of the individual features is available in the mapper, along with links to more information, including GIS data sources.

Please note that some habitats and species identified in this document may be protected by state or federal programs. The [Environmental Resource Mapper](#) on DEC's website can help identify those resources. Please work with DEC's Region 4 Office in Schenectady and other appropriate entities as necessary.

## How to use this summary

This summary provides a starting point for recognizing important natural areas in the town and surrounding areas, but is limited to existing information and is not a substitute for on-site survey and assessment. Information provided should be verified for legal purposes, including environmental review. Effective conservation occurs across property and political boundaries and, therefore, necessitates a broader view of natural landscapes. By identifying areas with high-quality resources, this summary will be especially useful for setting priorities to inform municipal planning. Habitat summaries like this have been used by communities for open space plans, comprehensive plans, natural resource inventories, and other conservation and planning actions. One Hudson Valley town used the species lists in its comprehensive plan's generic environmental impact statement, another to designate critical environmental areas. Some communities have incorporated their summaries directly into plans, while others refer to the information when writing their own documents.

Though this summary does not contain adequate detail for site planning purposes, it can be useful for environmental review. First, by identifying high quality habitats on a municipal-wide scale, it helps land-use decision-makers and applicants understand how a proposed site plan might relate to important natural areas

### Limitations of Maps in this Summary

Maps included here were created in a geographic information system or GIS. Information on the maps comes from different sources, produced at different times, at different scales, and for different purposes. It is often collected or developed from remote sensing data (i.e., aerial photographs, satellite imagery) or derived from paper maps. For these reasons, GIS data often contain inaccuracies from the original data, plus any errors from converting it. Therefore, maps created in GIS are approximate and best used for planning purposes. They should not be substituted for site surveys. Any resource shown on a map should be verified for legal purposes, including environmental review.

on- and off-site. Second, the summary highlights areas that may require more detailed assessment to evaluate potential impacts. Third, the tables identify species of conservation concern that may warrant special attention during reviews. If it's not already a routine step, the planning board should consider requiring applicants to produce a current letter from the [New York Natural Heritage Program](#) that identifies rare plants, rare animals, and significant ecosystems that are known to be on or near a proposed development site. The planning board and applicants should also work closely with DEC Region 4 Permits staff to ensure regulatory requirements are met.

## How to find more information

Most of the GIS data presented in the Habitat Summary maps may be obtained for free from the [New York State GIS Clearinghouse](#) or from other public websites. The summary can be enhanced by local knowledge. Local studies, maps, plans, and knowledgeable residents can provide details and may reveal previously unknown, high-quality ecosystems. The summary draws upon *The Catskill Forest: A History* (2000) and additional field notes from studies in Hunter provided by the author, Dr. Michael Kudish. Biological information in environmental impact statements may also be useful, especially when a municipality has habitat standards for environmental review. For help with incorporating additional information into the summary or questions



about obtaining GIS data used in the maps, please contact Ingrid Haeckel, Hudson River Estuary Conservation and Land Use Specialist.

Guidance and suggestions for developing a more comprehensive natural resources inventory is available in [Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed](#) (Haeckel and Heady 2014). This handbook outlines how to inventory valuable natural and cultural assets and strategies for using natural resource information in local land-use and conservation planning. Limited hard copies are available upon request for municipalities.

## Conservation

Once important habitats and natural areas are identified, municipalities have numerous options to strengthen their protection, such as incorporating maps and data into comprehensive plans and zoning, developing critical environmental areas or conservation overlay districts, adopting resource protection regulations, and acquiring conservation easements for sensitive habitats, such as floodplains or wetlands and their buffers.

Included with this summary are [General Conservation Measures for Protecting Natural Areas and Wildlife](#) that can help guide Hunter's plans and land-use decisions. Additional information on the how and why of local habitat conservation is available in [Conserving Natural Areas in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York's Hudson River Valley](#) (Strong 2008). This handbook was published by DEC and details why towns should conserve their biological resources, as well as the tools and techniques local governments can use to conserve natural areas and wildlife. Chapter 5 covers habitat conservation and Chapter 8 covers comprehensive planning. The document is available on a CD or in hard copy upon request.

Technical assistance is available through the Estuary Program, including help with incorporating natural resource conservation principles and information into municipal land-use planning procedures, plans, and policies. The Estuary Program and its partners also provide training to local leaders to recognize and map ecologically significant habitats and communicate their importance to the community. The [Hudson River Estuary Grants](#) program supports projects that continue to raise the capacity of municipalities, land trusts, and non-profits to identify and assess watershed biodiversity, promote stewardship and conservation of vital habitats, and create local conservation programs. For more information on technical assistance opportunities, please contact Ingrid Haeckel.

# Important Habitats in the Town of Hunter

## Regional Context (Figure 1)

The first step to understanding the natural areas and habitats of Hunter is to consider how the town relates to its surrounding area. The town and village of Hunter and village of Tannersville span 90 square miles in the Catskill Mountains of eastern New York. The entire town lies within the Hudson River watershed, a little over half of the area draining via Esopus and Catskill Creek systems to the Hudson River estuary, and the remainder flowing via Schoharie Creek and the Mohawk River into the Hudson River above the Troy dam.

*A **watershed** is the area of land where all of the water that is under it, or drains off of it, goes into the same stream, river, lake, or other waterbody.*

– U.S. Environmental Protection Agency

Hunter lies in the heart of the Catskill high peaks, an area widely recognized for its large, high quality forests. The DEC Hudson River Estuary Program recognizes the Catskill Mountains as a Significant Biodiversity Area (SBA), which is described in [The Hudson River Estuary Wildlife and Habitat Conservation Framework](#) (Penhollow et al., 2006):

“The Catskill Mountains contain major unfragmented forests, including first growth forest, as well as alpine communities, gorges, pristine headwater streams, and reservoirs; the area supports regionally significant populations of forest interior nesting birds, bald eagle, large mammals, coldwater fish, reptiles, and rare communities and plants.... The ecological significance of the Catskill Mountains relates to its large, continuous forest and pristine headwater stream habitats, and the species dependent on these habitats.... The Catskills are home to more than 120 species of breeding birds including the rare Bicknell’s thrush and several regionally rare raptors such as bald eagle (also a large wintering population), red-shouldered hawk, broad-winged hawk, sharp-shinned hawk, and barred owl.”

***Significant Biodiversity Areas (SBAs)** are locations of high concentration of biological diversity or value for regional biodiversity.*

Forests spanning the Indian Head range and High Peak measure over 63,000 acres; the Hunter Mountain range and the range from South Mountain to Blackhead each extend approximately 50,000 acres. These are some of the largest intact areas of forest in New York and are considered globally significant. The Nature Conservancy and New York Natural Heritage Program have also identified these areas as “matrix forests,” large enough to withstand major natural disturbances, maintain important ecological processes, and support populations of forest-interior wildlife and plants (Anderson and Bernstein, 2003). These attributes are discussed further in the [Forest](#) section.

## Significant Ecological Features (Figure 2)

[Figure 2](#) shows the significant ecological features known to occur in Hunter, including significant natural communities, areas of known importance for rare animals and rare plants, and an Important Bird Area. Figure 2 and the corresponding descriptions below are based on limited information and further study of the town would help to better describe Hunter’s natural features.

**Significant Natural Communities.** The New York Natural Heritage Program (NYNHP) has mapped several occurrences of rare and/or high quality natural communities in Hunter, including extensive high quality forest communities of the Catskill Mountains and cliff communities associated with the Catskill escarpment. A

complete list of the natural communities, along with links to online guides with illustrated descriptions and conservation and management guidance is provided in [Table 1](#).

### **Areas of Known Importance for Rare Plants, Rare Animals, and Significant Natural**

**Communities.** NYNHP has identified areas of importance for sustaining populations of rare plants and rare animals based on existing records and the species' habitat requirements. These areas include the specific locations where species have been observed, as well as areas critical to maintaining the species' habitat. Proactive planning that considers how species move across the landscape, with careful attention to maintaining connected habitat complexes, will contribute to the long-term survival and persistence of rare species. NYNHP has identified areas of importance in Hunter for Bicknell's Thrush, Eastern Box Turtle, Peregrine Falcon, Timber Rattlesnake, West Virginia White, and Wood Turtle, in addition to areas of importance for rare plants. A complete list of rare plants and animals known from Hunter is shown in [Table 1](#).

[Bicknell's Thrush](#) is a NY High Priority Species of Greatest Conservation Need and considered one of the most at-risk passerines in eastern North America. The species migrates between overwintering areas in the Antilles and summer breeding habitat in high elevation spruce-fir forests of eastern New York and New England. In the Catskills, breeding is restricted to peaks generally above 3500 ft. Habitat loss on wintering grounds in Hispaniola is considered the greatest threat to Bicknell's Thrush. However, breeding grounds in New York are also threatened by warming climate conditions, ski resort and wind tower development, acid precipitation and other toxic deposition (especially mercury), recreational hiking, and predation by red squirrels.

**Eastern Box Turtle** is a NY species of Special Concern that occurs in a variety of habitats. They primarily use well-drained forests and open deciduous forests, but are also found in field edges, shrublands, marshes, bogs, and stream banks. Box turtle has been documented in Hunter and is at the northern limit of its natural range in the Lower Hudson Valley. Stewardship of species at northern range edges is particularly important as climate changes and suitable habitat shifts north. Box turtle is threatened by habitat loss and fragmentation, vehicle strikes, and the pet trade.

NY-Endangered [Peregrine Falcon](#) was extirpated from the state in the 1960s by DDT and PCB poisoning, but has been steadily recovering in New York since 1983. Nesting is documented on cliffs in Hunter. Threats include habitat disturbance and loss, human recreation disturbance near nests, nest poaching, shooting by hunters, and effects of contamination.

[Timber Rattlesnake](#) inhabits mountainous or hilly forests, often with rock outcroppings, steep ledges, and rock slides. They migrate widely from their dens in summer to forage in the forest surrounding den sites. Extensive forest, ledges, and rocky barrens of the Catskill Mountains provide habitat for timber rattlesnakes, which occur in several areas of the town. Timber rattlesnakes are threatened due to habitat loss and fragmentation, illegal collecting, and malicious killing.

[West Virginia White](#) is a rare butterfly that occurs across southern New York State, typically in moist, rich, deciduous or mixed woods supporting its larval host plant, toothwort. It is considered vulnerable and is experiencing declines due to the spread of exotic garlic mustard, which is toxic to caterpillars, and the loss of food plant populations in some areas due to overbrowsing by deer.

**Wood turtle** is a NY-Special Concern species occurring along low gradient perennial streams that also spends time in adjacent forests and grasslands. Wood turtle has been documented in riparian settings in Hunter and is threatened by habitat loss, stream degradation, nest predation, and the pet trade.

**Note:** Rare animals may occur in more locations than are currently known by NYNHP or DEC. The DEC Region 4 Office in Schenectady should be contacted at (518) 357-2355 with any concerns or questions about the presence of protected species in the Town of Hunter.

**Catskill Peaks Important Bird Area (IBA).** The National Audubon Society has identified the Catskill Peaks area in Hunter as an area of global importance for forest birds. An [ornithological summary](#) of the area from Audubon states: “The Catskill peaks over 3,000 feet support a distinctive sub-alpine bird community including breeding Yellow-bellied Flycatchers, Swainson’s Thrushes, Hermit Thrushes, Magnolia Warblers, Yellow-rumped Warblers, White-throated Sparrows, and Dark-eyed Juncos. Peaks over 3,500 feet support breeding Bicknell’s Thrushes and Blackpoll Warblers. This is the southernmost extension of the breeding range of these two species. . . . Other at-risk species found at the site include the American Black Duck (breeds), Osprey (breeds), Bald Eagle (observed in breeding season), Sharp-shinned Hawk (breeds), Cooper’s Hawk (breeds), Northern Goshawk (breeds), Red-shouldered Hawk (breeds), Peregrine Falcon (breeds), American Woodcock (breeds), Olive-sided Flycatcher (breeds), Wood Thrush (breeds), Cerulean Warbler (breeds), and Canada Warbler (breeds).”

## Streams (Figure 3)

[Streams](#), their floodplains, adjacent wetlands, and other “riparian” or streamside habitats occurring along the stream channel provide important ecosystem services to communities, including clean water, flood management, and recreational opportunities like fishing and kayaking. In addition, Hudson River tributary streams and their associated shoreline and floodplain areas provide some of the most productive wildlife habitat in the region. The health of the Hudson River Estuary is closely linked to the health of its tributaries and their watersheds (Penhollow et al. 2006).

All of the land in Hunter ultimately drains to the Hudson River ([Figure 3](#)). Almost 47 square miles of the town drain to the Hudson River estuary via tributaries of Esopus and Catskill creeks. Stony Clove, Warner Creek, and the Beaver Kill drain to upper Esopus Creek above the Ashokan Reservoir; the Saw Kill and Plattekill Creek drain to lower Esopus Creek. The northeast section of town drains to Kaaterskill Creek, a major tributary of Catskill Creek. The nearly 41 square mile remaining area of Hunter as well as land in the villages of Hunter and Tannersville drain to Schoharie Creek, supplying the Schoharie Reservoir. Schoharie Creek is a major tributary of the Mohawk River, which enters the Hudson River above the federal dam in Troy. The Ashokan and Schoharie reservoirs are critical components of New York City’s drinking water supply, the largest unfiltered public water supply system in the United States.

*Intermittent streams only flow seasonally or after rain. They can easily be overlooked when dry, but have great impact on larger downstream waters and warrant attention. Many flow directly into the Hudson and its tributaries, wetlands, and other water bodies, influencing water quantity and quality.*

In addition to watershed boundaries, [Figure 3](#) shows streams, waterbodies, trout status, active river areas, and flood hazard areas. Streams and waterbodies in Figure 3 and other maps in this summary are from the USGS National Hydrography Dataset (NHD). Note that existing stream maps have inherent inaccuracies and will not capture most intermittent streams. Visiting sites and conducting local stream surveys to create more accurate maps are methods to pursue to ensure these important resources are identified and considered during planning processes.

Trout status information in Figure 3 is provided from [DEC’s Water Quality Standards and Classifications](#), which identifies trout or trout-spawning presence based on fish survey records. The classifications suggest there is coldwater habitat suitable for trout in all of the major streams in Hunter, as well as smaller tributaries of each. Fish survey data compiled in the New York State Atlas of Inland Fishes (2016) furthermore indicates

that many of the streams in Hunter support wild populations of native brook trout, a NY Species of Greatest Conservation Need that has been declining throughout its range. Trout require well-shaded, cool to cold, flowing water and depend on clean gravel areas for spawning. They are sensitive to impacts of surrounding land use on streams and are often the first species to disappear from polluted waters. Trout are also threatened by dams and other stream barriers resulting in warmer water temperatures, sedimentation, and decreased oxygen levels. Forested stream buffers benefit all streams, but are especially important for maintaining clean, coldwater habitats that support native species like brook trout. Note that some headwater streams in Hunter have not been surveyed and are likely to support wild trout even if not indicated in Figure 3.

The DEC Waterbody Inventory/Priority Waterbodies List (WI/PWL) tracks the degree to which waterbodies are meeting their “best uses” based on their DEC classification. Waterbody impairment is determined for stream or waterbody segments based on DEC’s monitoring and other available information. WI/PWL data for tributaries in Hunter are available on the DEC website under the [Lower Hudson River Basin WI/PWL](#) and [Mohawk River Basin WI/PWL](#). Many of the streams in Hunter’s portion of the Hudson River estuary watershed are currently unassessed by DEC, including upper Plattekill Creek, upper Saw Kill, and Mink Hollow Brook. The Beaver Kill downstream of its confluence with Stony Clove brook was last sampled in 2002 and found to have no known impacts. However, the New York City Department of Environmental Protection (NYCDEP) has monitoring data showing Stony Clove to be a major source of turbidity in the Esopus Creek Watershed, and ultimately affecting water supply uses in the Ashokan Reservoir. It is a high priority for streambank restoration work. Upper Kaaterskill Creek is unassessed, but North and South Lakes are listed as impaired by mercury contamination attributed to atmospheric deposition and are under a health advisory for fish consumption.

The main stem of Schoharie Creek in Hunter has had minor impacts documented in the WI/PWL, the most recent sampling completed in 2002. The trout fishery habitat from Hunter to near Tannersville is affected by silt and sediment loadings and modification and erosion of streambanks. The source assessment states: “Riparian cover is inadequate to provide streambank stabilization and shading. The resulting sediment loads and higher summer temperatures in the stream affect this cold water fishery. Clay soils and exposed banks which contribute significantly to stream turbidity during rainfall runoff events have been documented. Populations of Japanese knotweed which crowd out native plants but provide poor riparian cover are also a concern. The local [Soil and Water Conservation District] is working with NYCDEP to implement streambank stabilization projects in the watershed.” Nevertheless, NYSDEC water quality monitoring conducted in 2005 and 2006 slightly downstream on Schoharie Creek in Jewett (at Deming Road) found overall water quality to fully support aquatic life and recreational uses in the stream. No known impacts are reported for Schoharie Creek and tributaries upstream of the Tannersville auxiliary water supply.

Effective stream conservation and restoration occurs beyond stream channels and banks. [Figure 3](#) shows Active River Areas (ARAs), which were developed by the Nature Conservancy to identify areas where physical and ecological processes occur that drive and sustain streams. ARAs highlight important near-stream areas influencing stream dynamics and health, including: meander belts—the adjacent areas within which the stream channel migrates over time; floodplains; terraces—former floodplains that may still flood in the largest flood events; riparian wetlands; and material contribution zones, which regularly contribute organic and inorganic (e.g., sediments, water) material to streams. These five components encompass the major processes influencing the stream—hydrology, sediment transport, processing and transport of organic materials, and key biotic interactions (Smith et al. 2008). Note that ARAs were developed through modeling based on coarse elevation data and have not been field verified. Nevertheless, ARAs can provide a starting point to inform land use strategies and stream protection efforts.



Floodplains are a particularly important component of active river areas, especially where forested or undeveloped. Forested floodplains and other forested riparian zones provide organic matter that supports the in-stream food web, shade that controls water temperature, and offer travel corridors for some wildlife (Knab-Vispo and Vispo 2010). In addition to their high ecological value, forested floodplains provide many important functions including preventing erosion and recharging groundwater. They also act as a safety zone between human settlement and the damaging impacts of flood events. The Hudson River Estuary Program's "[Trees for Tribes](#)" initiative offers free consultation and native trees and shrubs for qualifying streamside buffer planting projects in the estuary watershed. Similarly, the [Catskill Stream Buffer Initiative](#) provides assistance to streamside landowners in the New York City watershed with protection, enhancement, management, or restoration.

*Floodplains are low-lying areas with deep sediment deposits adjacent to streams and rivers that can become inundated during heavy precipitation or snow melt.*

Flood hazard area information included in [Figure 3](#) comes from the [Federal Emergency Management Agency \(FEMA\) Digital Flood Insurance Rate Map \(DFIRM\) Database](#). Areas estimated to have a 1% chance or greater probability of being inundated in any given year are often referred to as the 100-year flood zone. Some narrow additional areas with a 0.2% chance or greater probability of flooding in any given year are referred to as the 500-year flood zone. It is important to note that the FEMA-mapped flood zones and their statistical flooding intervals are estimations based on the data and technology available at the time of mapping. Actual floodplains may extend beyond FEMA-mapped flood zones. Due to many variables including the unpredictable nature of some floods, local drainage problems, and the variable intensity of land development in watersheds, some flood-prone areas may not appear on the maps. FEMA flood zones are included in the Habitat Summary to highlight areas where floodplain habitats may occur, which can provide a starting point for proactive conservation planning and restoration.

## **Wetlands ([Figure 4](#))**

There are many types of wetlands in the Hudson River estuary watershed, including wet meadows, emergent marsh, forested and shrub swamps, vernal pools, fens and bogs, floating and submerged vegetation, and open water, as well as the variety of tidal wetlands in the estuary. Each wetland type provides habitats for different groups of plants and animals. Many wildlife species depend upon wetlands for part of their life cycle, including many species of conservation concern in New York State. In addition to providing critical habitat for many plants and animals, wetlands help to control flooding and reduce damage from storm surge, recharge groundwater, filter and purify surface water, and provide recreation opportunities. The upland area surrounding a wetland is essential to its survival and function; both may diminish when a wetland is surrounded by pavement, buildings, and pollution-generating or other incompatible land uses ([Environmental Law Institute 2008](#)).

*Wetlands are areas saturated by surface or groundwater sufficient to support distinctive vegetation adapted for life in saturated soil conditions.*

Knowing about local wetlands enables municipalities to proactively plan to conserve this critical part of our life support system. Although several existing maps provide approximate locations and extent of wetlands, they often leave out wetlands and are not a substitute for site visits and on-the-ground delineation. Nonetheless, towns can use these maps as a starting point for a local wetlands inventory and supplement them with more refined data as they become available.

In [Figure 4](#), "known wetlands" are shown from the U.S. Fish and Wildlife Service's (USFWS) [National Wetlands Inventory \(NWI\)](#) and DEC's [Freshwater Wetlands Program](#) maps (which only include wetlands larger than 12.4 acres, unless designated "of unusual local importance"). Open water habitats are symbolized in blue as "waterbodies." NWI data are also available for viewing on the NWI [Wetlands Mapper](#) and NYS



freshwater wetland maps can be viewed using the [Environmental Resource Mapper](#). County soil maps are another good source for predicting the location of potential wetlands. In Figure 4, “probable wetland areas” are soil survey units classified as very poorly drained or poorly drained, and “possible wetland areas” are units classified as somewhat poorly drained (after Kiviat and Stevens 2001). Note that the probable and possible wetland areas cover a greater area than NWI and DEC wetland layers. NWI maps offer some general information on wetland habitat (e.g., forested, emergent), but in general, existing map resources are not very informative as far as habitat type or importance for biodiversity. In addition, NWI maps often underestimate wetland area and omit smaller and drier wetlands (Zucker and Lau unpublished report). In particular, vernal pools, wet meadows, and swamps are often under-represented on maps. Many of DEC’s regulatory maps are outdated and have similar inaccuracies (Huffman and Associates 2000). Likewise, note that soil units are only mapped to an approximate area of about two acres, and that soils within the unit may not be homogeneous. Areas shown as supporting probable or possible wetlands should always be verified in the field for the purposes of environmental review. Communities can learn more about habitat values through local surveys and studies.

Wetlands in Hunter appear relatively restricted to the town’s valleys, often adjacent to streams in riparian settings. Possible wetland areas are also mapped on lower valley slopes throughout the town, predominantly on Onteora silt loam soils. It is likely that many additional small wetlands and seepage areas occur on the town’s mountain slopes in places where topography and geology result in a discharge of groundwater to the land surface, or in small topographic basins found on slope terraces or saddles. A detailed habitat mapping study in the Town of Woodstock identified many previously unmapped wetlands and groundwater seepages in mountainous terrain similar to that of Hunter, both on slopes and terraces of the Catskill peaks (Haeckel et al., 2012).

Figure 4 also shows the approximate location of 21 high elevation peat bogs identified in Hunter by Dr. Michael Kudish, which provide a unique window on the region’s past. The bogs are small wetlands that typically occur in cols or saddles between peaks along the ridges and occasionally on terraces of upper slopes. *Sphagnum* mosses are dominant, in addition to a variety of dense wetland vegetation. Dr. Kudish has studied pollen and macrofossils from these and other bogs in the Catskills to reconstruct the post-glacial vegetation history of the Catskills, described in his book *The Catskill Forest: A History* (2000). Emerald Bog at the Mountaintop Arboretum in Hunter reaches depths of 11 feet and is the oldest bog found to date in the Catskills, having formed shortly after retreat of the last glaciers about 14,900 years ago. The small extent, shallow bedrock basins, and high elevation setting of these high elevation bogs is distinct from bogs found in most surrounding regions.

## **Forests ([Figure 5](#) and [Figure 6](#))**

Large forests provide numerous benefits including wildlife habitat, clean water, climate moderation, and forest products. In general, larger forests provide higher quality habitat and greater benefits than smaller ones. However, the value of each forest is relative to the values of surrounding habitats. For example, a series of forest patches along a stream helps maintain water quality while creating a wildlife travel corridor. Conserving Hunter’s large forest areas and connections between them will help sustain the town’s rich diversity of forest plants and animals and the numerous other benefits that forests provide residents.

Hunter lies in one of the most intact forested regions of New York State and the eastern United States. Much of the Catskill peaks forest land in the town - over 47 square miles - is owned and administered by New York State as part of the Catskill Forest Preserve. An additional 5 square miles are owned and managed by New York City to protect drinking water supplies. Significant forest acreage also extends onto private land. There are opportunities to support and promote forest stewardship throughout the town, and to guide future land use in ways that maintain large forest tracts and minimize impacts to interior forest habitat.

[Figure 5](#) shows large forest patches in Hunter. The map was created from land cover data developed for the Coastal Change Analysis Program (National Oceanic and Atmospheric Administration 2010). Land cover categories considered ‘forest’ for this analysis included deciduous forest, evergreen forest, mixed forest, and palustrine forested wetland. Roads were buffered and removed from forest patches to show results of development-related fragmentation. Interstate roads were buffered by a total of 300 feet and state and county roads by 66 feet (Dunn 2008). Forest patch size classifications follow the Orange County Open Space Plan (Orange County Planning Department 2004) as cited in Strong (2008).

*Forest fragmentation is the process of breaking large patches of forest into smaller areas, often by clearing it for new roads or development. Fragmentation decreases forest habitat quality and health, disrupts wildlife movement, and facilitates the spread of invasive species. These impacts are greatest at forest edges but can extend for hundreds of feet into forest patches, often displacing sensitive species that depend on interior forest.*

There are three major forest tracts in Hunter mapped as “globally significant,” corresponding to the “matrix forests” identified by the Nature Conservancy, shown in Figure 1. The Sugarloaf forest block spans over 63,000 acres from the Indian Head range through Platte Clove to High Peak. The Westkill Wilderness block measures over 51,000 acres and includes Hunter Mountain. The Catskill Escarpment block extends from South Mountain to Blackhead and covers approximately 50,000 acres when including Cairo Roundtop. Matrix forests are among the largest, most intact forest systems in the eastern United States. They are considered large enough to withstand catastrophic natural disturbances, such as hurricanes or wildfires, and to maintain important ecological processes, such as nutrient and water cycling. Matrix forests are also big enough to support breeding populations of forest-interior species, including numerous forest songbirds, raptors, and far-ranging mammals like black bear, fisher, and bobcat. These characteristics will likely contribute to resiliency in a changing climate. Conserving large, high quality forest areas such as these and natural connections between them will also allow plants and animals to move northward and higher in elevation as the climate warms.

In addition to the town’s matrix forests, a “regionally significant” forest block measuring over 9,600 acres extends from along the northern edge of Hunter along the slopes of Onteora Mountain and the East Jewett range. Forest patches greater than 6,000 acres provide habitat to many area-sensitive species and can accommodate large-scale disturbances that maintain forest health over time. Forests in this size range are able to maintain the wider range of habitats and conditions often required by forest-dependent species. Two additional “stepping stone” forest patches are mapped along Schoharie Creek and north of the Village of Tannersville, measuring 310 and 1370 acres, respectively. Forests as small as 200 acres will support some forest-interior bird species, but several may be missing, and species that prefer “edge” habitats with higher disturbance levels will dominate. Smaller forests are more vulnerable to the spread of invasive species and less viable for timber management, among other values. Nevertheless, they may provide valuable corridors for wildlife movement and plant dispersal, allowing a large array of species to move safely from one habitat to another.

Wildlife and plant records reflect the abundance of high-quality forest interior habitat in Hunter. The [2000-2005 NYS Breeding Bird Atlas](#) documented 26 forest bird species of conservation concern in the town, including NY-Special Concern Bicknell’s Thrush and Cerulean Warbler and many NY-Species of Greatest Conservation Need, such as Black-throated Blue Warbler and Louisiana Waterthrush ([Table 1](#)). Three NY-Special Concern raptors were also documented in Hunter: Cooper’s Hawk, Red-shouldered Hawk, and Sharp-shinned Hawk. The National Audubon Society has delineated the highest priority forest bird habitat in the Catskill Peaks Important Bird Area, shown in [Figure 2](#). Audubon New York’s website offers information on [managing habitat for forest birds](#). In addition to birds, forests in Hunter support rare reptiles such as NY-Threatened [Timber Rattlesnake](#), which travel long distances surrounding den sites to forage during the summer. NY-Special Concern Eastern Box Turtles hibernate in forests, digging in leaf litter and soil to protect themselves from the cold and snow. The [West Virginia White](#) butterfly inhabits deciduous or mixed woods in Hunter with its larval hostplant, toothwort. In addition to wildlife records, several rare and endangered plants

are known from Hunter's forests in association with rocky summit, cliff, ledge, and talus slope habitats typical of the Catskill peaks. A complete list of rare plants and animals known from Hunter is available in [Table 1](#).

Catskill Forest Preserve lands in Hunter have been well studied, though less is known about habitat conditions of forests in other parts of the town. High quality examples of forest communities have been mapped throughout the preserve by the New York Natural Heritage Program, shown in [Figure 2](#). Beech-maple mesic forest is the dominant forest type on moist, well-drained soils in Hunter. Hemlock-northern hardwood forest is widespread on north-facing slopes and in the steep, shady gorges of Kaaterskill and Platte Cloves. Mountain spruce-fir forest and spruce northern-hardwood forest are found at high elevations above 3,000 feet. Chestnut oak forest and Appalachian oak-pine forest are found on dryer, warmer, south-facing slopes and along the escarpment, which has experienced repeated burns. Small occurrences of pitch pine-oak-heath rocky summit and cliff communities are also present on exposed ledges and ridgetops. Some exposed summit areas of the Catskill peaks in Hunter have probably never been forested since the ice age and support alpine plants that are rare in the Catskills, such as three-toothed cinquefoil. Botanist and forest historian Dr. Michael Kudish has studied forests throughout Hunter and is a source of detailed information on forest composition and history. In addition to driving physical geography factors, Dr. Kudish has shown that the distribution of forest types in the Catskills is closely related to past land use (Kudish 2000).

[Figure 6](#) displays forest history information from *The Catskill Forest: A History* (Kudish 2000) with permission of the author. Mapped areas are approximate, based on extensive field work throughout the Catskills. Historical land use continues to influence the composition and habitat values of modern-day forests. Most forests in Hunter are second or third-growth, having regenerated on lands following human disturbance such as logging, agriculture, quarrying, or burning. First growth forests – areas that were never subjected to those activities – have been mapped on most of the highest elevations in Hunter, as well as in the steep, nearly inaccessible portions of Plattekill and Kaaterskill cloves. High elevation first growth forests tend to be stunted due to chronic severe damage by wind, ice rime, and snow, a short growing season, and limitations of shallow, nutrient-poor soils. Within the cloves, first growth stands can reach 100 feet tall. Much, but not all of these first growth stands occur on Catskill Forest Preserve lands.

Fire has played a significant role in shaping Hunter's forests. Figure 6 shows areas in Hunter that have burned at least once. Repeated burning of the Catskill escarpment over millennia influenced establishment of southern hardwood forests, dominated by oak and hickory species adapted to fire. Most areas west of the escarpment were never burned prior to European settlement and support northern hardwood species not adapted to fire. Kudish (2000) refers to the area around Hunter Mountain as the "interior fire capital of the Catskills" due to the large number of human-caused forest fires that have occurred in the area since the early 19<sup>th</sup> century. Most recently, a fire in May 2015 on the south slope of Hunter Mountain reportedly consumed over 130 acres of forest. Forest fires are not necessarily bad – fires can create openings for young forest habitat, and some species require fire to reproduce. However, forest fires can pose a serious threat to life and property. NYSDEC recommends that communities at risk to wildfire should develop a community wildfire protection plan as a comprehensive means of addressing risk issues and mitigation strategies.

Figure 6 also shows approximate areas with existing or historical agricultural land use. Historically, most farms were located on floodplains and lower slopes of the major streams where the best tillable soils can be found. Lower slopes and some middle slopes were pastured, primarily for sheep. Many former agricultural lands are now in various stages of forest regrowth. These forests provide important wildlife habitat, but are missing many of the native plants typical of forests that were never completely cleared for agriculture (Bellemare et al., 2002). They are also more likely to be colonized by invasive species. First growth forests and those that were never fully cleared for farming are valuable refuges for native plant diversity.

The greatest threat to forests in Hunter today is the introduction of tree diseases, forest pests, and other invasive species inadvertently brought in by people through landscaping and international commerce. Eastern Catskill forests have been significantly impacted in the past decade by the spread of hemlock woolly adelgid

and emerald ash borer, which are expected to eventually kill most large trees of these common species in the region. The [Catskill Regional Invasive Species Partnership](#) (CRISP) works to promote education, prevention, early detection and control of invasive species in the Catskills and is helping communities to prepare for and respond to this threat. Landowner education is also available through the Cornell Cooperative Extension's [Agroforestry Resource Center](#). Guiding future development to minimize forest fragmentation will help avoid the spread of invasive species into interior forests and conserve important habitats in the town.

The ability of private forest landowners to periodically harvest timber provides an important source of income that can help landowners avoid land parcelization or conversion to non-forest uses. Working forests also contribute to the local economy and demand very little in the way of community services in return for the property taxes their owners pay. DEC's [Municipal Guide to Forestry in New York State](#) (Daniels 2005) offers guidance to encourage local governments to actively support and promote multiple forest uses and stewardship of the land.

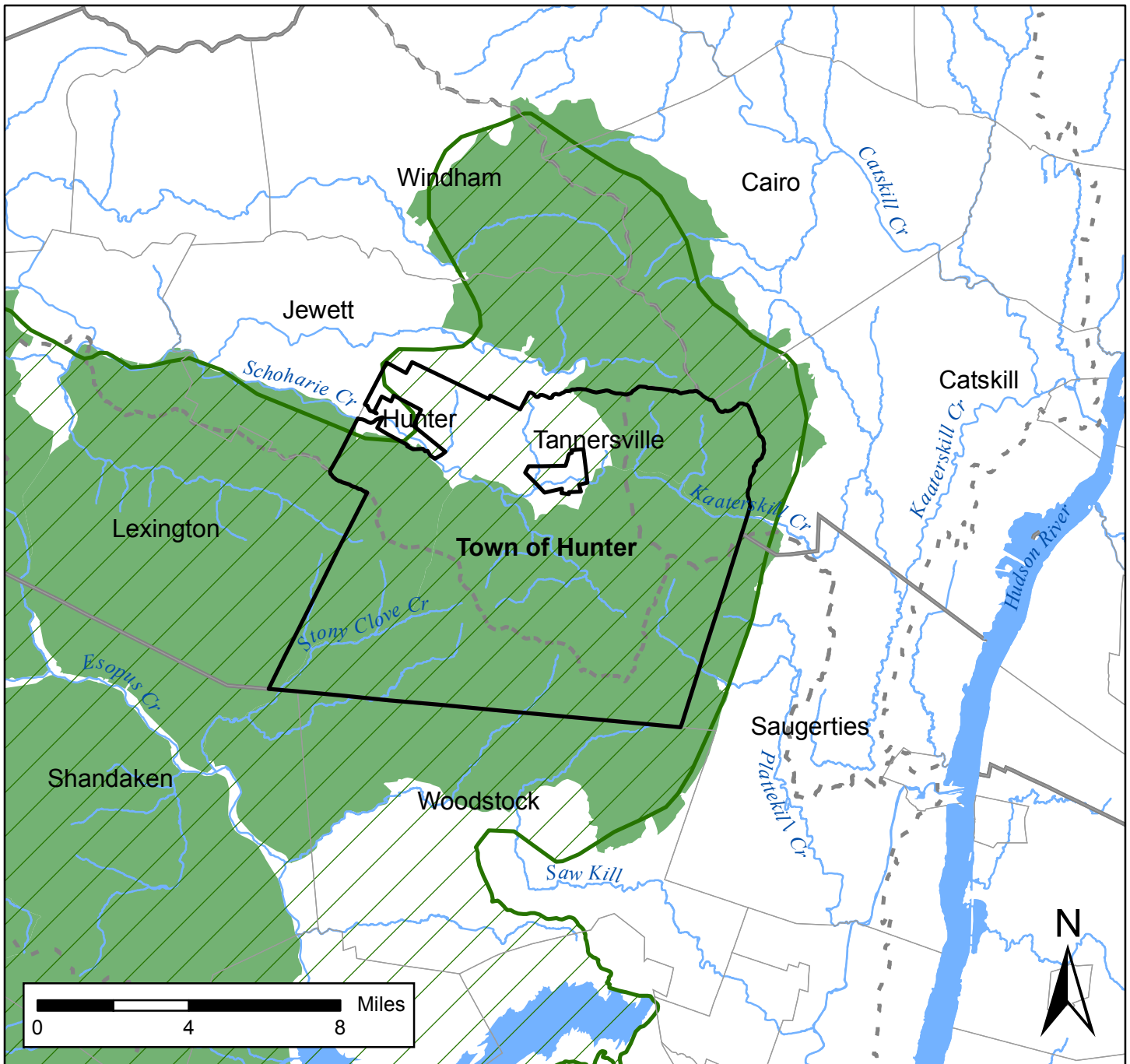
## Grasslands, Shrublands, and Young Forests (not mapped)

Recently disturbed sites, such as hayfields, abandoned farm fields, or forest clearings, can provide important habitat for species that require grasslands, shrublands, and young forests. These successional habitat types are transitional and relatively short-lived, and typically require periodic maintenance to avoid becoming more densely vegetated, eventually developing a canopy and becoming forest. We can infer from aerial photography and breeding bird records that valuable grasslands, shrublands, and young forests occur in Hunter (see [Table 1](#)).

Grassland or [meadow](#) habitat can support a variety of life, including rare plants, butterflies, reptiles, and birds, in addition to providing agricultural uses and scenic values. The quantity and quality of grasslands for wildlife have rapidly decreased in the Northeast during the last century due to increased human population, changes in agricultural technology, and abandonment of family farms. This continuing trend threatens populations of grassland birds that have adapted to the agricultural landscape. Grassland habitat is limited in Hunter; however, the [2000-2005 NYS Breeding Bird Atlas](#) documented breeding by three grassland bird Species of Greatest Conservation Need: American Kestrel, Bobolink, and Eastern Meadowlark (see [Table 1](#)). Audubon New York offers guidance on [managing habitat for grassland birds](#).

Shrublands and young forests are transitional habitats characterized by few or no mature trees, with a diverse mix of shrubs and/or tree saplings, along with openings where grasses and wildflowers grow. They can occur in recently cleared areas and abandoned farmland and are sometimes maintained along utility corridors by cutting or herbicides. These habitats are important for many wildlife species declining throughout the region because former agricultural areas have grown into forests, and natural forest disturbances that trigger young forest growth, such as fires, have been suppressed. Records from the *NYS Breeding Bird Atlas* support the presence of 12 species of conservation concern in Hunter that prefer young forest and shrubland habitat, including American Woodcock, Brown Thrasher, and Ruffed Grouse (see [Table 1](#)). Eastern box turtle also relies on young forest habitat with sunny openings for basking and thick, low vegetation that provides cover and plant and animal foods. [Figure 6](#) shows approximate locations of current and historical agricultural areas in the town, some of which may support shrubland or young forest habitat. For more information, see the [NYSDEC Young Forest Initiative](#) and Audubon's guidance on [managing habitat for shrubland birds](#).

Figure 1: Regional Context of Hunter, NY



**Legend**

- Municipal Boundary
- County Boundary
- Watershed Boundary
- Waterbody
- Stream
- Catskill Mountains Significant Biodiversity Area
- Matrix forest

This map shows the location of the Town of Hunter, Greene County in relation to its major watersheds, matrix forests, and significant biodiversity areas. This map was produced as part of a Habitat Summary for the Town. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at (845)256-3829 or [ingrid.haeckel@dec.ny.gov](mailto:ingrid.haeckel@dec.ny.gov). <http://www.dec.ny.gov/lands/5094.html>

**Data Sources:**

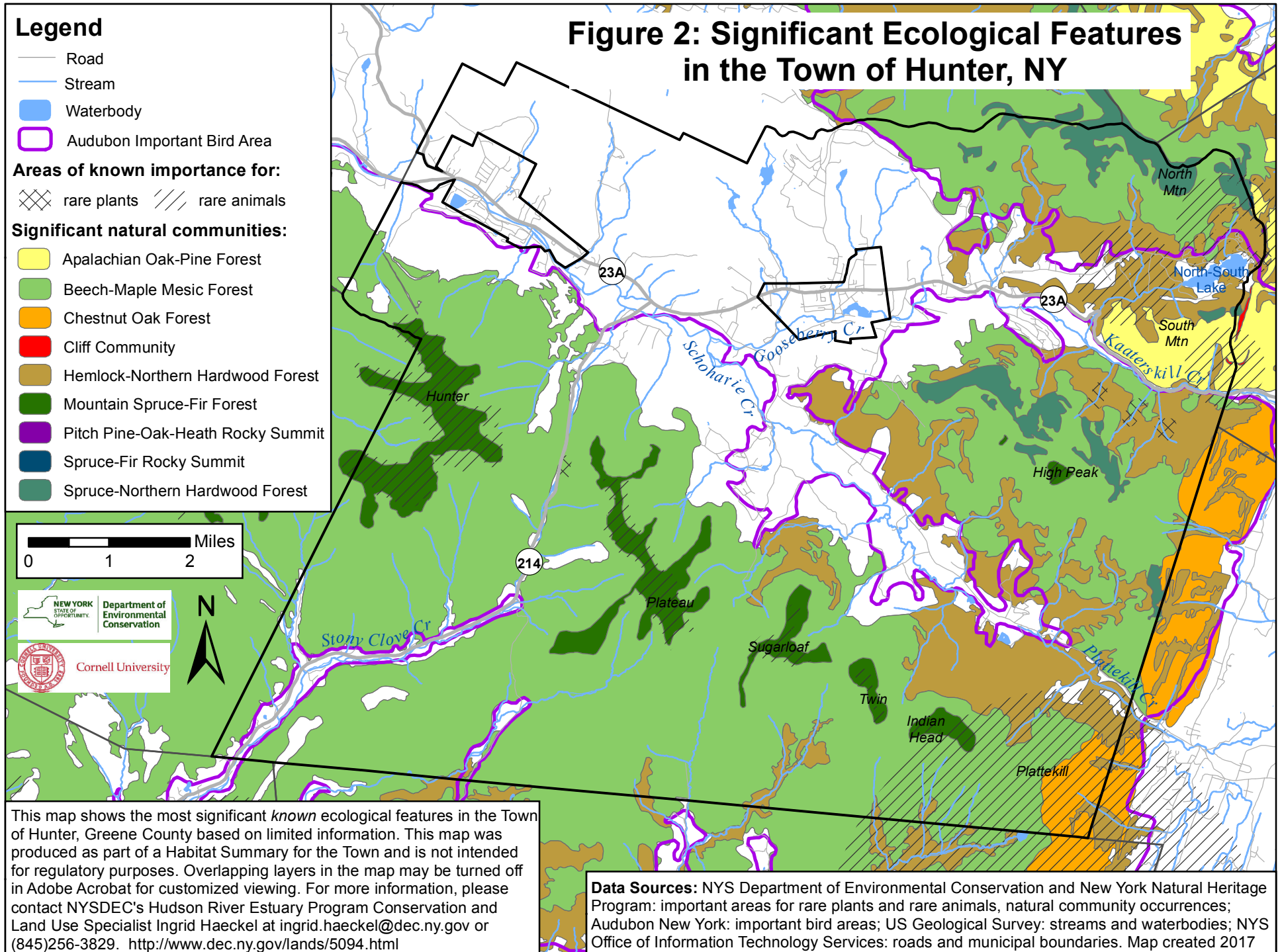
- US Geological Survey: watersheds, major streams, and waterbodies
- NYS Department of Environmental Conservation: significant biodiversity areas
- The Nature Conservancy: matrix forests
- NYS Office of Information Technology Services: municipal boundaries

Map Created 2017



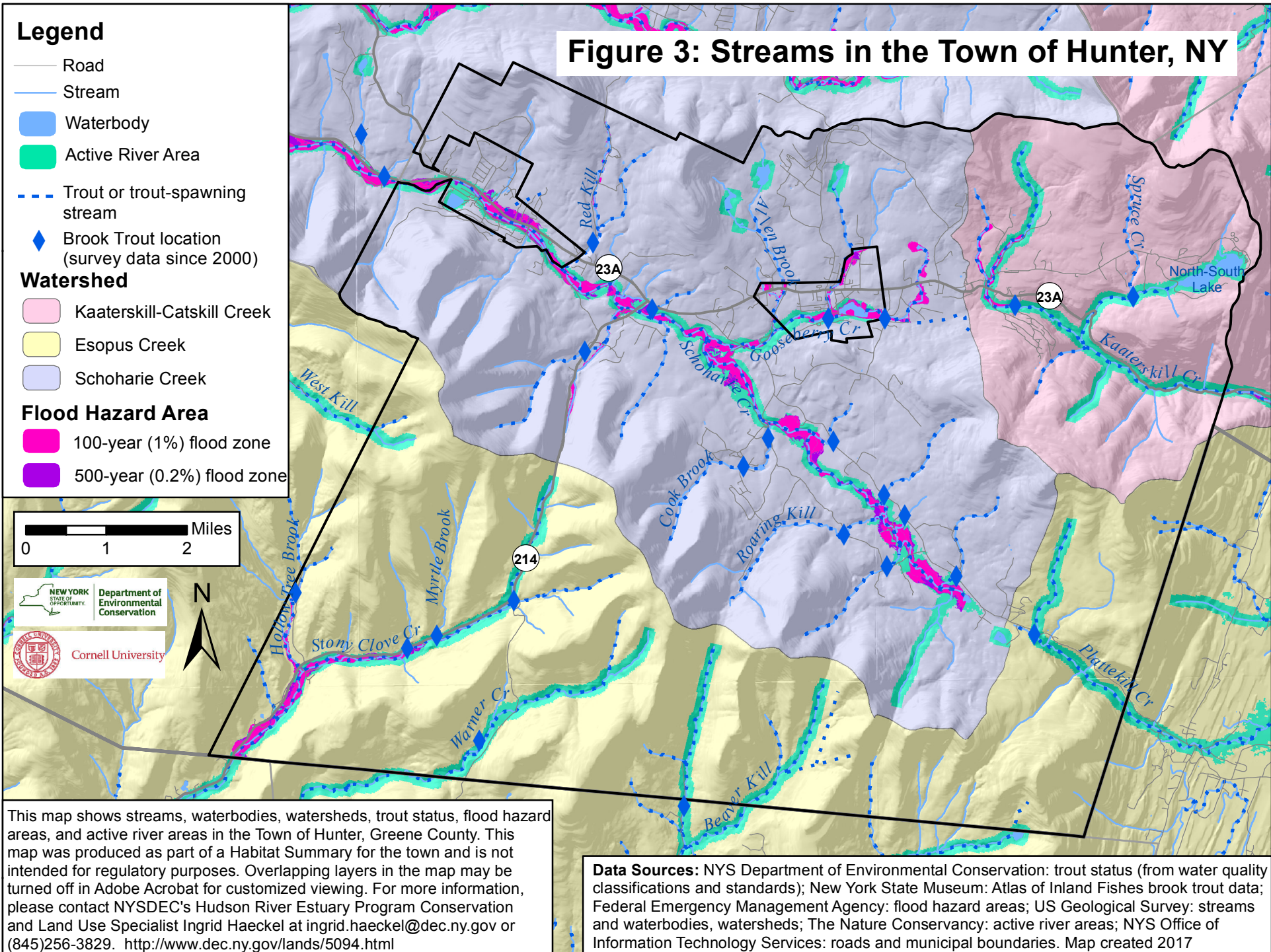


## Figure 2: Significant Ecological Features in the Town of Hunter, NY



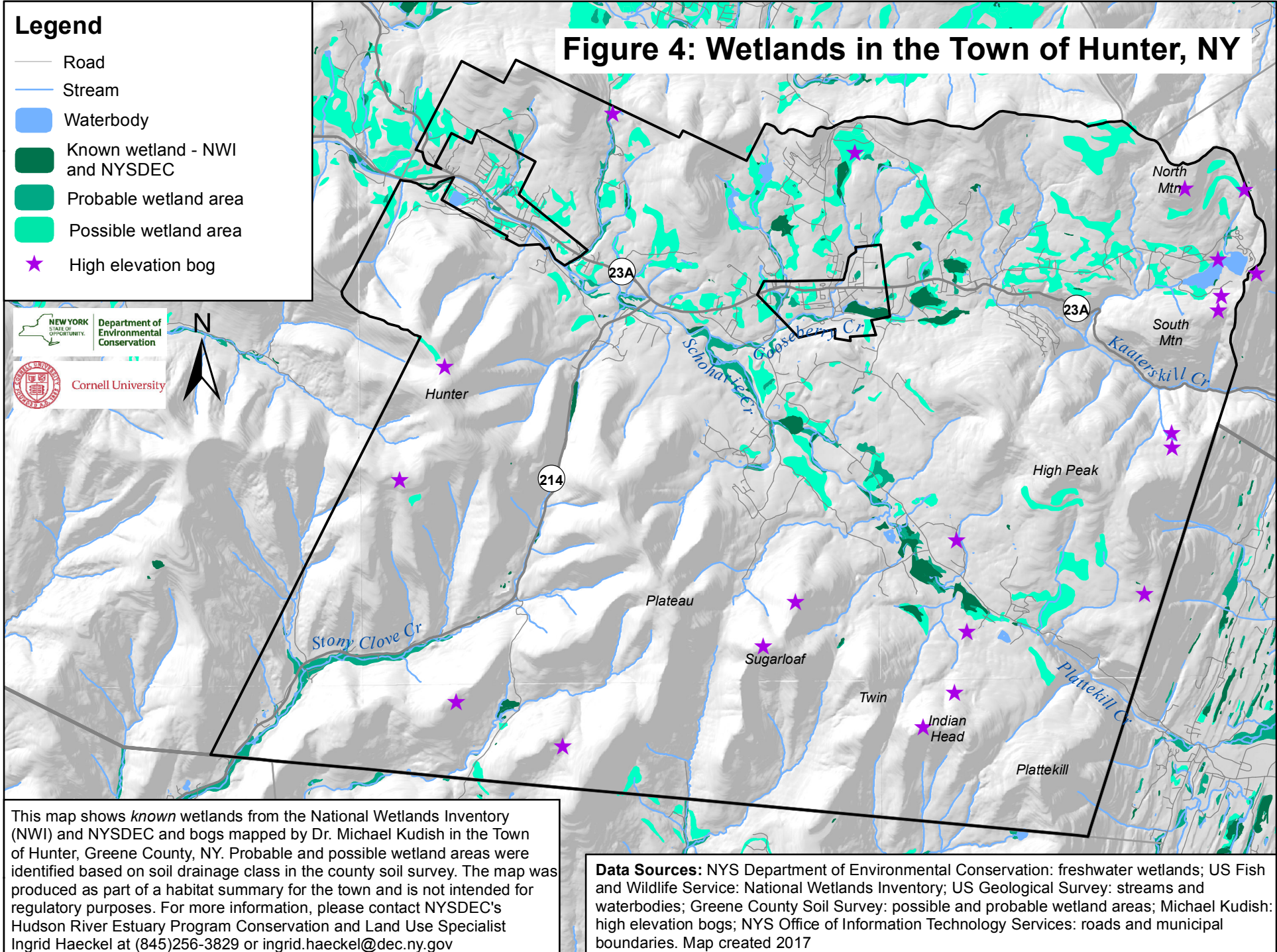
This map shows the most significant *known* ecological features in the Town of Hunter, Greene County based on limited information. This map was produced as part of a Habitat Summary for the Town and is not intended for regulatory purposes. Overlapping layers in the map may be turned off in Adobe Acrobat for customized viewing. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at [ingrid.haeckel@dec.ny.gov](mailto:ingrid.haeckel@dec.ny.gov) or (845)256-3829. <http://www.dec.ny.gov/lands/5094.html>



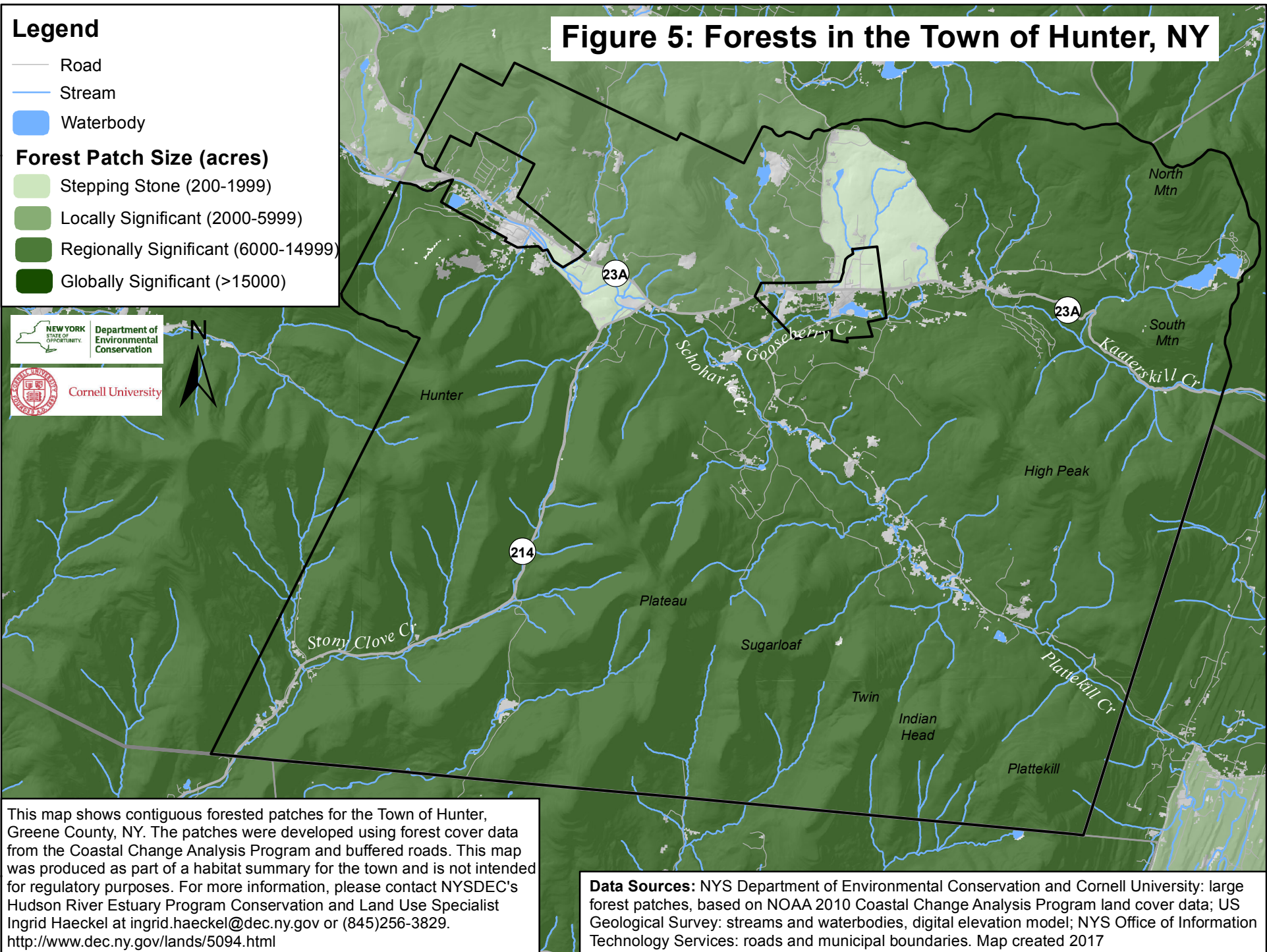




**Figure 4: Wetlands in the Town of Hunter, NY**



**Figure 5: Forests in the Town of Hunter, NY**

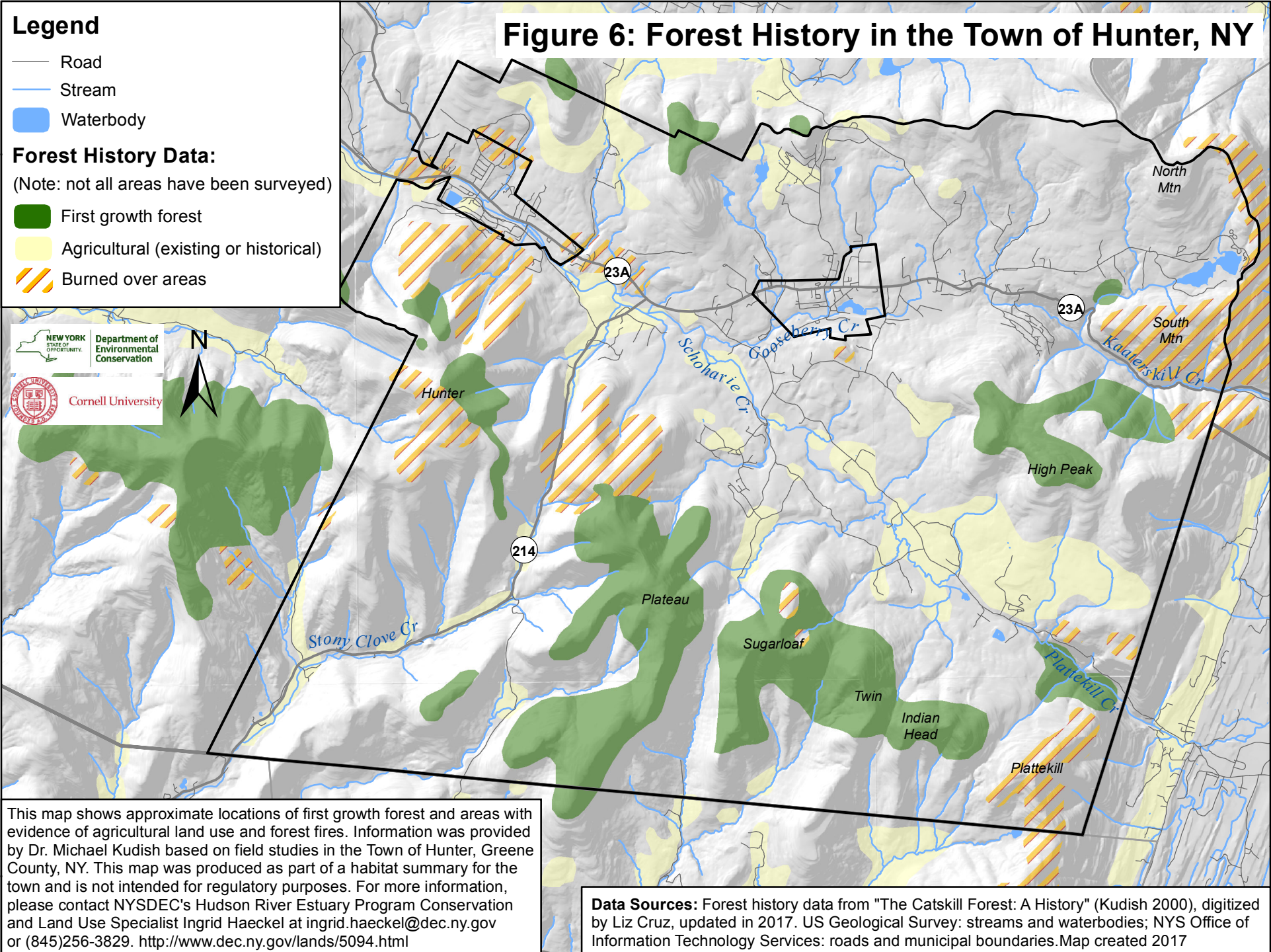


This map shows contiguous forested patches for the Town of Hunter, Greene County, NY. The patches were developed using forest cover data from the Coastal Change Analysis Program and buffered roads. This map was produced as part of a habitat summary for the town and is not intended for regulatory purposes. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at [ingrid.haeckel@dec.ny.gov](mailto:ingrid.haeckel@dec.ny.gov) or (845)256-3829. <http://www.dec.ny.gov/lands/5094.html>

**Data Sources:** NYS Department of Environmental Conservation and Cornell University: large forest patches, based on NOAA 2010 Coastal Change Analysis Program land cover data; US Geological Survey: streams and waterbodies, digital elevation model; NYS Office of Information Technology Services: roads and municipal boundaries. Map created 2017



**Figure 6: Forest History in the Town of Hunter, NY**



This map shows approximate locations of first growth forest and areas with evidence of agricultural land use and forest fires. Information was provided by Dr. Michael Kudish based on field studies in the Town of Hunter, Greene County, NY. This map was produced as part of a habitat summary for the town and is not intended for regulatory purposes. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at [ingrid.haeckel@dec.ny.gov](mailto:ingrid.haeckel@dec.ny.gov) or (845)256-3829. <http://www.dec.ny.gov/lands/5094.html>

**Data Sources:** Forest history data from "The Catskill Forest: A History" (Kudish 2000), digitized by Liz Cruz, updated in 2017. US Geological Survey: streams and waterbodies; NYS Office of Information Technology Services: roads and municipal boundaries. Map created 2017

# Species and Ecosystems of Conservation Concern in the Town of Hunter

**Table 1. Species and Ecosystems of Conservation Concern in Hunter, NY**

The following table lists species of conservation concern that have been recorded in Hunter, NY. The information comes from the [New York Natural Heritage Program](#) (NYNHP) biodiversity databases, the [Atlas of Inland Fishes of New York](#), the [1990-1999 New York Amphibian and Reptile Atlas](#) (NYARA), and the [2000-2005 New York State Breeding Bird Atlas](#) (NYBBA). Species from the NYBBA are included in the table if they were documented in Atlas blocks that are more than 50% in Hunter. The table only includes species listed in New York (NY) or federally (US) as [endangered](#), [threatened](#), [special concern](#), [rare](#), a [Species of Greatest Conservation Need](#) (SGCN), or a [Hudson River Valley Priority Bird](#) species recognized by Audubon New York. Historical records are provided from the NYNHP biodiversity databases. Generalized primary habitat types are provided for each species, but for conservation and planning purposes, it's important to recognize that many species utilize more than one kind of habitat. More information on rare animals, plants, and ecological communities can be found at <http://guides.nynhp.org>. **Note:** Additional rare species and habitats may occur in the Town of Hunter.

Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			<a href="#">Hudson River Valley Priority Bird</a>	<a href="#">Species of Greatest Conservation Need</a> xx = high priority	<a href="#">Special Concern</a>	<a href="#">Threatened</a>	<a href="#">Endangered</a>	
<b>Birds</b>								
Acadian Flycatcher	<i>Empidonax vireescens</i>	forest	x					NYBBA
American Black Duck	<i>Anas rubripes</i>	wetlands	x	xx				NYBBA
American Goldfinch	<i>Spinus tristis</i>	young forest, shrubland	x					NYBBA
American Kestrel	<i>Falco sparverius</i>	grassland	x	x				NYBBA
American Redstart	<i>Setophaga ruticilla</i>	forest	x					NYBBA
American Woodcock	<i>Scolopax minor</i>	young forest, shrubland	x	x				NYBBA
Baltimore Oriole	<i>Icterus galbula</i>	forest	x					NYBBA
Belted Kingfisher	<i>Megaceryle alcyon</i>	stream	x					NYBBA
Bicknell's Thrush	<i>Catharus bicknelli</i>	forest (high elevation)	x	xx	x			NYBBA
Black-and-white Warbler	<i>Mniotilta varia</i>	forest	x					NYBBA
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	young forest, shrubland	x	x				NYBBA
Blackburnian Warbler	<i>Dendroica fusca</i>	forest	x					NYBBA
Blackpoll Warbler	<i>Setophaga striata</i>	forest	x					NYBBA
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	forest	x	x				NYBBA

Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			<u>Hudson River Valley Priority Bird</u>	<u>Species of Greatest Conservation Need</u> xx = high priority	<u>Special Concern</u>	<u>Threatened</u>	<u>Endangered</u>	
Black-throated Green Warbler	<i>Dendroica virens</i>	forest	x					NYBBA
Blue-Winged Warbler	<i>Vermivora pinus</i>	young forest, shrubland	x	x				NYBBA
Bobolink	<i>Dolichonyx oryzivorus</i>	grassland	x	xx				NYBBA
Broad-winged Hawk	<i>Buteo platypterus</i>	forest	x					NYBBA
Brown Thrasher	<i>Toxostoma rufum</i>	young forest, shrubland	x	xx				NYBBA
Canada Warbler	<i>Wilsonia canadensis</i>	young forest, shrubland	x	xx				NYBBA
Cerulean Warbler	<i>Dendroica cerulea</i>	forest	x	x	x			NYBBA
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	young forest, shrubland	x					NYBBA
Chimney Swift	<i>Chaetura pelagica</i>	urban	x					NYBBA
Cooper's Hawk	<i>Accipiter cooperii</i>	forest	x		x			NYBBA
Downy Woodpecker	<i>Picoides pubescens</i>	forest	x					NYBBA
Eastern Kingbird	<i>Tyrannus tyrannus</i>	young forest, shrubland	x					NYBBA
Eastern Meadowlark	<i>Sturnella magna</i>	grassland	x	xx				NYBBA
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	young forest, shrubland	x					NYBBA
Eastern Wood-Pewee	<i>Contopus virens</i>	forest	x					NYBBA
Field Sparrow	<i>Spizella pusilla</i>	young forest, shrubland	x					NYBBA
Least Flycatcher	<i>Empidonax minimus</i>	forest	x					NYBBA
Louisiana Waterthrush	<i>Seiurus motacilla</i>	forest	x	x				NYBBA
Northern Flicker	<i>Colaptes auratus</i>	forest	x					NYBBA
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	forest	x					NYBBA
<a href="#">Peregrine Falcon</a>	<i>Falco peregrinus</i>	cliffs	x	x			x	NYBBA
Purple Finch	<i>Carpodacus purpureus</i>	forest	x					NYBBA



Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			<a href="#">Hudson River Valley Priority Bird</a>	<a href="#">Species of Greatest Conservation Need</a> xx = high priority	<a href="#">Special Concern</a>	<a href="#">Threatened</a>	<a href="#">Endangered</a>	
Red-shouldered Hawk	<i>Buteo lineatus</i>	forest	x	x	x			NYBBA
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	forest	x					NYBBA
Ruffed Grouse	<i>Bonasa umbellus</i>	young forest, shrubland	x	x				NYBBA
Scarlet Tanager	<i>Piranga olivacea</i>	forest	x	x				NYBBA
Sharp-shinned Hawk	<i>Accipiter striatus</i>	forest	x	x	x			NYBBA
Veery	<i>Catharus fuscescens</i>	forest	x					NYBBA
Wood Thrush	<i>Hylocichla mustelina</i>	forest	x	x				NYBBA
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	young forest, shrubland	x					NYBBA
Yellow-throated Vireo	<i>Vireo flavifrons</i>	forest	x					NYBBA

Reptiles								
Common Snapping Turtle	<i>Chelydra serpentina</i>	wetlands		x				NYARA
Eastern Box Turtle	<i>Terrapene carolina</i>	forest		xx	x			NYARA
<a href="#">Timber Rattlesnake</a>	<i>Crotalus horridus</i>	forest		xx		x		NYNHP
Wood Turtle	<i>Clemmys insculpta</i>	stream		xx	x			NYARA

Fish								
Brook Trout	<i>Salvelinus fontinalis</i>	stream		x				NYSDEC

Butterflies								
<a href="#">West Virginia White</a>	<i>Pieris virginiensis</i>	forest						NYNHP

Plants								
<a href="#">Appalachian Sandwort</a>	<i>Minuartia glabra</i>	rock, forest						NYNHP
Clubmoss lantern moss	<i>Mnium lycopodioides</i>	rock/cliff						NYNHP
Drooping Thread Moss	<i>Bryum algovicum</i>	rock/cliff						NYNHP
<a href="#">Fragrant Cliff Fern</a>	<i>Dryopteris fragrans</i>	rock/cliff, stream					x	NYNHP

Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			<u>Hudson River Valley Priority Bird</u>	<u>Species of Greatest Conservation Need</u> xx = high priority	<u>Special Concern</u>	<u>Threatened</u>	<u>Endangered</u>	
<a href="#">Musk Root</a>	<i>Adoxa moschatellina</i>	forest					x	NYNHP
<a href="#">Roseroot</a>	<i>Rhodiola rosea</i>	rock/cliff, stream					x	NYNHP

Natural Communities								
<a href="#">Appalachian Oak-Pine Forest</a>	n/a	forest						NYNHP
<a href="#">Beech-Maple Mesic Forest</a>	n/a	forest						NYNHP
<a href="#">Chestnut Oak Forest</a>	n/a	forest						NYNHP
<a href="#">Hemlock-Northern Hardwood Forest</a>	n/a	forest						NYNHP
<a href="#">Mountain Spruce-Fir Forest</a>	n/a	forest						NYNHP
<a href="#">Pitch Pine-Oak-Heath Rocky Summit</a>	n/a	forest						NYNHP
<a href="#">Spruce-Northern Hardwood Forest</a>	n/a	forest						NYNHP

Historical Records								
<a href="#">Climbing Fern</a>	<i>Lygodium palmatum</i>	wetlands					x	NYNHP
<a href="#">Glaucous Sedge</a>	<i>Carex glaucoidea</i>	forest				x		NYNHP
<a href="#">Northern Wild Comfrey</a>	<i>Cynoglossum virginianum var. boreale</i>	forest					x	NYNHP
<a href="#">Rough Avens</a>	<i>Geum virginianum</i>	forest, wetlands				x		NYNHP

## General Conservation Measures for Protecting Natural Areas and Wildlife



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- **Protect large, contiguous, unaltered tracts** wherever possible.
- **Preserve links** between natural habitats on adjacent properties.
- **Preserve natural disturbance processes**, such as fires, floods, tidal flushing, seasonal drawdowns, landslides, and wind exposures wherever possible. Discourage development that would interfere with these processes.
- **Restore and maintain broad buffer zones** of natural vegetation along streams, along shores of other water bodies and wetlands, and at the perimeter of other sensitive habitats.
- In general, **encourage development of altered land** instead of unaltered land wherever possible.
- **Promote redevelopment of brownfields**, other post-industrial sites, and other previously-altered sites (such as mined lands), “infill” development, and “adaptive re-use” of existing structures wherever possible, instead of breaking new ground in unaltered areas.
- **Encourage pedestrian-centered developments** that enhance existing neighborhoods, instead of isolated developments requiring new roads or expanded vehicle use.
- **Concentrate development along existing roads**; discourage construction of new roads in undeveloped areas. Promote clustered development wherever appropriate, to maximize extent of unaltered land.
- **Direct human uses toward the least sensitive areas**, and minimize alteration of natural features, including vegetation, soils, bedrock, and waterways.
- **Preserve farmland potential** wherever possible.
- **Minimize area of impervious surfaces** (roads, parking lots, sidewalks, driveways, roof surfaces) and maximize onsite runoff retention and infiltration to help protect groundwater recharge, and surface water quality and flows.
- **Restore degraded habitats wherever possible**, but do not use restoration projects as a “license” to destroy existing habitats.

*Source: Kiviat, E. & G. Stevens. 2001. Biodiversity Assessment Manual for the Hudson River Estuary Corridor. NYS Department of Environmental Conservation, Albany, NY.*

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