Natural Areas and Wildlife in Your Community

A Habitat Summary Prepared for the Town of Philipstown
January 2021

This summary was completed to provide information for land-use planning and decision-making as requested by the Town of Philipstown. 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 NYSDEC (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).

To further support land-use and conservation planning efforts in the Town of Philipstown, this Natural Areas and Habitat Summary can be supplemented by complementary Water Resource and Climate Resilience Summaries, also available from the Hudson River Estuary Program by request.

Hudson River Estuary

Cornell University

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 and the state of habitats in the Hudson Valley can be found on DEC's webpages, starting with http://www.dec.ny.gov/lands/5094.html.

For more information about this summary or the Estuary Program, please contact:

Ingrid Haeckel, Conservation and Land Use Specialist

ingrid.haeckel@dec.ny.gov

New York State Department of Environmental Conservation

Hudson River Estuary Program

625 Broadway

Albany, NY 12233-4750

Phone: 518-402-8954 • Fax: 518-402-8925

Website: http://www.dec.ny.gov/lands/4920.html

The core mission of the Hudson River Estuary Program is to:

- *Ensure clean water*
- *Protect and restore fish, wildlife and their habitats*
- *Provide water recreation and river access*
- *Adapt to climate change*
- *Conserve world-famous scenery*

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 and has the same headings as the maps. It details the information in the maps, including the ecological importance of the data and its sources. There are five habitat maps for the Town of Philipstown, which follow the text:

Figure 1: **Regional Context** of Philipstown, NY
Figure 2: **Areas of Known Importance for Biodiversity** in Philipstown, NY
Figure 3: **Hudson River Coastal and Shoreline Habitat** in Philipstown, NY
Figure 4: **Streams and Watersheds** in Philipstown, NY
Figure 5: **Wetlands** in Philipstown, NY
Figure 6: **Large Forests (≥ 200 acres)** in Philipstown, NY

Descriptions of grassland, shrubland, and young forest habitats are included in the text but not mapped. Following the maps, Tables 1-2 list known species and habitats of conservation concern that have been recorded for Philipstown.

Table 1: **State Rare Plants, Animals, and Ecosystems** in Philipstown
Table 2: **Significant Birds** in Philipstown

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, Adobe Reader will enable you to zoom in and turn off data layers to customize

your view of the maps.

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 3 Office in New Paltz and other appropriate entities as necessary.

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.

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. 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 town 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 town-wide scale, it helps land-use decision-makers and applicants understand how a proposed site plan might relate to important natural areas 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 3 Permits staff to ensure regulatory requirements are met.

How to Find More Information

Information in this 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. Biological information in environmental impact statements may also be useful, especially when a town has habitat standards for environmental review. Additional information may be available from Hudsonia Ltd.; their biologists have conducted biological assessments in several parts of Putnam County. In 2014, an intermunicipal group with members from various Philipstown and Putnam Valley municipal boards and commissions and other volunteers are participating in a biodiversity assessment training program offered by Hudsonia and the Hudson River Estuary Program and mapped approximately 1,300 acres of habitats near Indian Lake and Canopus Hollow along the towns' shared boundary (Corbett et al. 2014). A prior biodiversity assessment team completed mapping of 5,000 acres in the North Highlands area of Philipstown (Anderson et al. 2003). For help with incorporating additional information into the summary, please contact Ingrid Haeckel, Hudson River Estuary Conservation and Land Use Specialist.

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 Philipstown's plans and land-use decisions. The Philipstown Natural Resources and Open Space Protection Plan outlines tools and techniques to achieve a sustainable balance between development and conservation, and many have been incorporated into the town's comprehensive plan. More detailed 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. 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 Philipstown

Regional Context (Figure 1)

> *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*

The first step to understanding the natural areas and habitats of Philipstown is to consider how the town relates to the ecological features that extend beyond its borders. Philipstown is bordered to the west by the tidal Hudson River Estuary and most of the town drains directly to the estuary via small tributaries, including the Philipse Brook, Indian Brook, and Foundry Brook. The northern portion of the town drains to Clove Creek and Trout Creek, subwatersheds of the greater Fishkill Creek watershed that drains approximately 193 square miles of land in Dutchess and Putnam counties, flowing into the Hudson River estuary in the City of Beacon. The southeast portion of the town is in the Canopus Creek and Annesville Creek subwatersheds of the Peekskill Hollow Creek (or Hollowbrook) watershed, which drains approximately 48 square miles of land within Putnam and Westchester counties, flowing into the Hudson River in the City of Peekskill. All of Philipstown is in the Highlands significant biodiversity area (SBA), a regionally significant landscape recognized by DEC's Hudson River Estuary Program for its extensive forest and high diversity of species and communities within close proximity of the New York City metropolitan area (Penhollow et al. 2006):

> "[The Highlands] represents one of the largest unfragmented landscape blocks in New York State that creates an important landscape corridor that links the mid-Atlantic states (New Jersey and Pennsylvania) with New England. Along with the continuous and relatively unfragmented forests, the area contains higher elevation ridges and several networks of relatively undisturbed wetlands in the valleys. The ecological significance of this area relates to its large, contiguous forest and wetland habitats and the disturbance-sensitive species dependent on these habitats, as well as the diversity of plants, communities, and animals unique to this region."

> ***Significant Biodiversity Areas (SBA)** are locations of high concentration of biological diversity or value for regional biodiversity, described in The Hudson River Estuary Wildlife and Habitat Conservation Framework (Penhollow et al. 2006).*

The Highlands extend from the Connecticut border west to New Jersey, with ridgelines, stream courses, and wetlands generally in a northeast to southwest alignment. Elevation in Philipstown ranges from sea-level along the Hudson River Estuary to a maximum of 1,540 feet above sea-level along the border with Fishkill on Scofield Ridge. Diverse geological conditions and strong elevation gradients in the Highlands region underpin the wide variety of distinctive habitats, in turn supporting high species diversity. All of these factors contribute to the Highlands' designation as a matrix forest and globally significant forest block, discussed further in the forests section.

The productive and regionally significant Mid-Hudson River Estuary is also a recognized SBA supporting globally rare ecosystems, many rare species, and regionally important fisheries. All of Philipstown's

Hudson River shoreline and tidal habitats are designated as Significant Coastal Fish and Wildlife Habitats by the New York State Department of State. These attributes are discussed further in the Hudson River Coastal and Shoreline Habitat section.

Areas of Known Importance for Biodiversity (Figure 2)

Figure 2 shows the major ecological and natural features known to occur in Philipstown, including a statewide important bird area, documented significant natural communities, important areas for rare plants and animals, and stream habitat for migratory fishes. Figure 2 and the corresponding descriptions below are based on limited information and more study of the town is needed to better describe Philipstown's natural assets.

Important Bird Areas. Audubon New York has identified three areas of statewide importance for birds in Philipstown; summaries of the sites are available on the National Audubon Society webpage. The Lower Hudson River site, extending from Croton Point Park to the Newburgh-Beacon Bridge, is one of the most critical wintering bald eagle sites in the state, and becoming an important breeding area for bald eagles. Constitution Marsh hosts over 200 species of birds and large numbers of waterfowl use the area during winter and migration. The large unfragmented forest tract spanning Fahnestock and Hudson Highlands State Parks supports an assemblage of bird species representative of deciduous and mixed forests, including a large number of regional conservation priorities. Birds of conservation concern documented in Philipstown during the *2000-2005 NYS Breeding Bird Atlas* are shown in Table 2 with links to guidance for conservation.

Significant Natural Communities. Not counting the Hudson River, eight exemplary natural community types spanning 10,343 acres have been mapped in Philipstown by the New York Natural Heritage Program (NYNHP). Chestnut oak forest, Appalachian oak-hickory forest, and oak-tulip tree forest are dominant in the Philipstown Highlands, with pitch-pine oak heath and red cedar communities occurring on rocky summits. A large example of acidic talus slope woodland occurs on the southeastern slopes of the Scofield-Fishkill ridge. The forests have good habitat diversity and are surrounded by other forest types in a large, fairly intact landscape. Some areas are mature and others are recovering from past selective logging. A complex of over 80 high quality highbush blueberry bog thicket wetlands in Fahnestock State Park spans the boundaries with Putnam Valley and Kent. A granite/gneiss cliff community abuts the Hudson River on Constitution Island, with 50-100 feet nearly vertical cliffs, and dwarf trees and shrubs in crevices and ledges. Constitution Marsh supports relatively large brackish tidal marshes and brackish intertidal mudflats that are good quality, with some exotic species. No Hudson River marsh is entirely unaffected or unaltered by human activity, historical or current. Table 1 provides links to NYNHP guides with detailed descriptions of the habitats and conservation recommendations. The large extent of these significant communities underscores the high quality of forests, rocky summits, and coastal habitats in Philipstown.

Areas of Known Importance for Rare Animals and Rare Plants. The New York Natural Heritage Program (NYNHP) has identified areas of importance for sustaining populations of rare animals and plants based on existing records and the species' habitat requirements. Important Areas include the specific locations

where species have been observed, as well as additional habitat areas which may be used at different times of the year and areas critical to maintaining the habitats of these rare animal and plant populations. 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 of rare animals and to the persistence and dispersal of rare plants. A complete list of state rare plants and animals known from Philipstown is shown in Table 1. Rare plants and their areas of importance are described throughout this report according to the primary habitat of documented occurrences. Areas of importance in Philipstown are delineated in Figure 2 for the following rare animals:

NY-Threatened **New England cottontail** is the only native cottontail east of the Hudson River in New York and its range has been greatly reduced in the state due to forest maturation, habitat loss, and competition with the more abundant eastern cottontail. It prefers open woods, disturbed areas, shrubby areas, thickets, and marshes. It occurs in several locations in Fahnestock State Park and is a candidate for federal listing under the Endangered Species Act.

Bat foraging areas are hunting grounds and the habitats bats traverse to reach them from their daytime roosts, which include caves, hollow trees, and buildings. For several weeks in summer, female bats gather in a **maternity roost** to have their babies. Constitution Island has a maternity roost for NY-Special Concern eastern small-footed bat, which has been documented to forage in the surrounding area and near Manitou.

NY-Threatened **bald eagle** nesting occurs in several locations along the Hudson River in Philipstown, and an important winter roosting site is located on the Breakneck-Scofield ridge. Winter roosting may occur elsewhere along the Hudson River shoreline. While bald eagle breeding and non-breeding populations are increasing in New York, development pressure and its impacts on habitat remain significant threats. Nesting sites are particularly sensitive to disturbance.

The 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 Philipstown. Threats include habitat disturbance and loss, human recreation disturbance near nests, nest poaching, shooting by hunters, and effects of contamination.

Least bittern is a NY-Threatened marsh bird with a preference for large emergent wetlands with cattails, bulrushes, and sedges, and large open water areas, with an average home range of almost 25 acres (Poole et al. 2009). Least bittern nesting occurs in Constitution Marsh, an area of importance more generally for wetland birds. Least bittern is threatened by continued wetland loss in the Hudson Valley and by habitat degradation due to fragmentation, exotic plant invasions, and nutrient enrichment in wetlands.

Naturally occurring NY-Threatened **fence lizard** populations are restricted to the Highlands region of New York, with several known locations in Philipstown. Fence lizard occurs on steep

slopes with extensive open rocky areas that are surrounded by mixed-deciduous, oak-dominated forests. Like many uncommon reptiles, it is threatened to some degree by illegal collecting.

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 on Philipstown's ridges 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.

Wood turtle is a NY species of Special Concern occurring along low gradient perennial streams that also spends time in adjacent forests and grasslands. In Philipstown, it has been documented along sections of Clove Creek and Canopus Creek. Wood turtle is threatened by habitat loss and fragmentation, stream degradation, nest predation, vehicle strikes, and the pet trade.

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 Philipstown in western sections of Fahnestock State Park, along the Breakneck-Scofield ridge, and on Constitution Island, 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.

Diadromous fish refer to species that migrate between the sea and freshwater. US-Endangered Atlantic sturgeon, NY-Endangered shortnose sturgeon, Atlantic needlefish, blueback herring, alewives, and American eel are diadromous fishes of Philipstown's Hudson River coastal habitats and are discussed further in the following sections. Those that return to freshwater habitats to spawn are also referred to as **anadromous** and include shortnose sturgeon and herring. NYNHP recognizes the Highlands area of the Hudson River and Constitution Marsh as anadromous fish concentration areas. Stream reaches used by American eel are shown in Stream Habitat for Migratory Fishes.

Tidal wetland fishes: Atlantic silverside and inland silverside are small, short-lived fishes of tidal marshes and occur in Constitution Marsh and Manitou Marsh. These very rare species use similar estuarine habitats, but inland silverside has a lower tolerance for salinity and spends it entire life in the estuary. Atlantic silversides migrate to deeper marine waters in winter to hibernate.

Brook trout inhabit clear, cool, well-oxygenated waters (e.g., creeks and small-medium

rivers), and lakes with flowing water and gravel substrate. They prefer water temperatures that range from 57-61°F, and they rarely thrive in water over 68°F for extended periods of time (NatureServe 2010). Brook trout are threatened by streamside forest loss, development-related water quality impacts, and aquatic habitat barriers such as dams and culverts. The presence of self-sustaining wild trout populations in Clove Creek and Spring Brook in Philipstown is an indicator of high quality stream habitat. Upper reaches of the Philipse Brook are also documented to support a high quality riverine community, including the arrowhead spiketail, a rare dragonfly.

Note: Rare animals may occur in more locations than are currently known by NYNHP or DEC. The DEC Region 3 Office in New Paltz should be contacted at 845-256-3098 with any concerns or questions about the presence of protected species in Philipstown.

Stream Habitat for Migratory Fishes. DEC Bureau of Fisheries data and an aquatic habitat connectivity study by NYNHP indicate that sections of Foundry Brook and Indian Brook highlighted in Figure 2 comprise migratory routes for American eel, a fish species that begins life in the Atlantic Ocean and migrates to the headwaters of North American tributary streams as tiny "glass eels" (White et al. 2011). American eel is in decline throughout much of its range, and though eels are able to bypass certain dams, culverts, and other aquatic barriers, they rely on aquatic connectivity along streams to complete their life cycle and return to the sea to spawn. For example, eels are able to bypass barriers on the lower reaches of Foundry Brook and Indian Brook which are obstacles to other migratory fishes. An assessment of the tidally-influenced portions of Foundry Brook, Indian Brook, and Philipse Brook was carried out by the Putnam County Soil and Water Conservation District and Hudson Highlands Land Trust in 2005 and is documented in the report, State of the Tributaries, available from the Hudson Highlands Land Trust. The report states that the head of tide on the Indian Brook typically extends upstream approximately 300 meters (m), but can vary greatly due to the relatively level terrain of the stream corridor. The first barrier to migratory fish is about 850 m upstream of the head of tide. The mouth of Foundry Brook is bound to the east by ruins of the West Point Iron Foundry and was contaminated and altered significantly during the 19th century by foundry-related activities. The head of tide is approximately 150 m upstream, and the first barrier to migratory fish is 50 m further upstream. Today, the tidal wetlands adjacent to Foundry Brook in Constitution Marsh are recovering from remediation efforts and reverting to a functional natural state. Philipse Brook, the third tributary entering Constitution Marsh, is bound to the east by a significant (30 m) waterfall that is a barrier to both eel and other migratory fishes. In addition to stream habitats, Constitution Marsh and Manitou Marsh also provide important spawning, nursery, and feeding habitat for numerous migratory fishes.

Hudson River Coastal and Shoreline Habitat (Figure 3)

Philipstown is bordered to the west by the Hudson River Estuary. The connection to the Atlantic Ocean, upper watershed, and the changing tides make the shore zone a dynamic area. Water salinity throughout this reach of the Hudson River can range from brackish (low salinity) to freshwater according to tidal conditions and the amount of freshwater inflows up-river, which are dependent on seasonal

weather patterns and extreme events. The following description of Hudson River coastal habitat in Philipstown relies on reports and existing data from several sources; some of the information is publicly available. Figure 3 shows Philipstown's coastal and shoreline habitats along the tidal Hudson, including an inset map for Constitution Marsh.

This regional landscape is recognized as the "Mid-Hudson River Estuary" significant biodiversity area by the Hudson River Estuary Program because it is a globally rare ecosystem that supports many rare species as well as regionally important fisheries (Penhollow et al. 2006):

> "The Hudson River Estuary contains significant freshwater and brackish tidal wetlands, as well as other riverine and estuarine habitats, islands, riparian zones, and important tributaries. These habitats support a high diversity of fish, birds, and mammals….The productive and regionally significant Mid-Hudson River estuary is generally fresh water in winter and has low salinity in summer. This section encompasses regionally significant spawning migratory and nursery habitat for anadromous, estuarine, and freshwater fish, important winter feeding and roosting areas for the federally listed threatened bald eagle, and globally and regionally rare brackish and freshwater tidal communities and plants. The open water and tidal wetlands in this reach are spawning and nursery habitats and a migratory pathway between the upper and lower estuary for anadromous and resident fish."

Philipstown's Hudson River coastal area encompasses some of the most biologically rich habitats in the town. Significant plants, animals, and habitats on the Hudson shoreline and in Constitution and Manitou marshes in Philipstown include brackish tidal marshes and brackish intertidal mudflats; several species of rare plants that are associated with tidal habitats; and important concentration areas for migratory fish and waterfowl. See Table 1 for more information on the rare plants, rare animals, and significant ecosystems associated with Philipstown's coastal habitats.

Significant Coastal Fish and Wildlife Habitats

There are many different kinds of coastal habitats in New York, including marshes, wetlands, mud and sandflats, beaches, rocky shores, riverine wetlands and riparian corridors, stream, bay and harbor bottoms, submerged aquatic vegetation beds, dunes, old fields, grasslands and woodlands, and forests that provide habitat and feeding areas for animals and are also economically important. The DEC has identified and evaluated coastal habitats throughout the state's coastal regions, providing recommendations to the NYS Department of State so that the most important or "significant" habitats may be designated for protection in accordance with the Waterfront Revitalization and Coastal Resources Act. The Significant Coastal Fish and Wildlife Habitats are useful for planning at the local level because they describe the highest quality habitats on the Hudson, outlining fish and wildlife values and activities that may have large impacts on the habitats.

There are three designated Significant Coastal Fish and Wildlife Habitat areas in Philipstown encompassing all of the town's coastal and shoreline habitats (Figures 1 and 3). Detailed descriptions of the Hudson Highlands, Constitution Marsh, and Manitou Marsh sites are available from the NYS

Department of State webpage, including discussions of their value to fish and wildlife, and information on potential impacts to their habitat values.

The assessment for the Hudson Highlands site along the town's entire Hudson River shoreline states:

> "[It] is the Hudson's deepest and narrowest segment, with strong currents and rocky substrates… The combination of swift currents, rocky substrates, and freshwater inflow (during spring runoff) over this large area provides highly favorable conditions for reproduction by coastal migratory fishes, especially striped bass… Deep areas are used as migrational routes by Atlantic sturgeon (*Acipenser oxyrhynchus*) (US-Endangered) and shortnose sturgeon (*Acipenser brevirostrum*) (NY-Endangered) and are important nursery areas and summering areas for juvenile Atlantic sturgeon and summering areas for post-spawn adults… Associated with the fisheries resources in Hudson Highlands is a significant concentration of wintering bald eagles (*Haliaeetus leucocephalus*) (NY-Threatened). Because this area rarely freezes in winter it provides a dependable forage habitat for these birds."

NYNHP identifies the Highlands area of the Hudson River as an anadromous fish concentration area.

Adjacent to the Village of Cold Spring, Constitution Marsh is an approximately 430-acre wetland with tidal marshes and flats ranging in salinity from freshwater to brackish. It receives freshwater inflows from several coldwater streams, including Foundry Brook, Indian Brook, and Philipse Brook, and is hydrologically connected to the Hudson River through openings in the railroad causeway at each end of Constitution Island. There are a series of human-made dikes and channels that were constructed in the 1830s for wild rice farming within the marsh. Most of the wetland is owned by New York State and managed by the National Audubon Society as a wildlife sanctuary. Constitution Marsh's extensive shallow water areas and stream mouths provide spawning and nursery habitat for a variety of coastal migratory and resident freshwater fishes, including alewife, blueback herring, white perch, striped bass, and American eel. The marsh is especially important for marsh-nesting birds, including NY-Threatened least bittern, and concentrations of herons, waterfowl, and shorebirds also occur during spring and fall migrations. A number of reptiles and amphibians also use this habitat. Invertebrates include Needham's Skimmer, a state-rare dragonfly of coastal habitats. The diversity and abundance of wildlife species in Constitution Marsh is unusual in the lower Hudson River. In addition, numerous threatened and endangered plant species occur in the marsh and tidal habitats surrounding Constitution Island, including Delmarva beggar-ticks, Long's bittercress, saltmarsh aster, smooth bur-marigold, spongy arrowhead, and water pigmyweed. Constitution Island, west of the marsh, is primarily forested and in the past has supported nesting bald eagles. NYNHP considers Constitution Marsh both an anadromous fish concentration area and a waterfowl winter concentration area. Common reed was first documented at Constitution marsh in the 1980s and is currently being managed with control methods by Audubon NY to maintain high quality habitat for marsh birds and other wildlife.

At the southern end of Philipstown, Manitou Marsh is an approximately 75-acre enclosed freshwater to low salinity tidal marsh almost completely hydrologically isolated from the Hudson River by a railroad

causeway and natural ledge, with the exception of two culverts that allow interchange. The marsh is part of Manitou Point Preserve, owned and managed by Scenic Hudson. Narrow-leaf cattail is dominant, but common reed has established in northern portions and is expanding. Manitou Marsh provides important nursery habitat for resident freshwater, migratory and estuarine/marine species, including alewife, blueback herring, striped bass, American eel, Atlantic silverside, inland silverside, and Atlantic needlefish. The marsh also supports a variety of wetland birds, and invertebrates such as Needham's Skimmer, a rare dragonfly.

State and federal law requires that some projects may be reviewed for consistency with coastal policies on significant fish and wildlife habitat. Contact the NYS Department of State Office of Planning & Development for more information on the protection and regulation of these habitats. Cold Spring has a Local Waterfront Revitalization Strategy, adopted and accepted by New York State in 2011, and a draft Local Waterfront Revitalization Program is currently under review.

Underwater (Subtidal) Habitats

Beds of submerged aquatic vegetation (SAV), primarily water celery, occur along most of Philipstown's Hudson River shoreline and in Consitution and Manitou marshes (Figure 3). SAV improves water quality by trapping fine sediment and organic matter and maintaining dissolved oxygen levels. It also provides essential habitat for invertebrates supporting the rich diversity of fish and waterfowl that use the estuary. The areas mapped indicate locations where SAV growth has been documented and needs protection, even though in any given year the SAV may not be present. The town can obtain SAV data for free from the NYS GIS Clearinghouse.

Tidal Hudson River Estuary Wetlands

The wetlands in Constitution and Manitou marshes range from brackish to freshwater and are tidal. Tidal wetlands serve a very important purpose in the river, not only providing habitat for rare plants and young fish, but other benefits for people like flood attenuation and wastewater dilution/purification. There are two sources of information on tidal wetlands in the Hudson River: DEC and NYNHP. Each are discussed separately below but are combined on Figure 3 to facilitate viewing of the complex shoreline habitats.

A 2007 inventory by the DEC identified about 375 acres of tidal wetlands in Constitution Marsh. About 40 percent is cattail marsh (155 acres), with interspersed areas of invasive water chestnut (94 acres), unvegetated flats (48 acres), intertidal mix (27 acres), wooded swamp (9 acres), submerged aquatic vegetation (7 acres), and common reed (3 acres). About 59 acres of tidal wetlands were identified in Manitou Marsh, dominated by cattail (44.5 acres) and interspersed with smaller areas of other tidal wetland types. The green areas on Figure 3 are an aggregate of these different tidal wetland habitat types. The town can obtain the finer-scale tidal wetlands data for free from the NYS GIS Clearinghouse.

NYNHP has mapped areas of state-rare brackish tidal marshes and brackish intertidal mudflats in Constitution Marsh. Salinities in brackish tidal marshes can vary widely according to the tides, seasonal patterns, and extreme weather events. The species composition of brackish tidal marshes is thus a

combination of species characteristic of salt and freshwater tidal marshes. Brackish intertidal mudfalts are rich in invertebrates and provide important feeding areas for a wide range of fish during high tide. These ecological communities are displayed in more detail on the inset map in Figure 3. See Table 1 for more information on the rare species and significant ecosystems associated with Philipstown's coastal habitats.

Tidal Shoreline Status

Natural shorelines provide a vital transition zone between water and land and important habitat for diverse plants, fish, and wildlife. Knowing the status of tidal shoreline habitat can help the town guide restoration and management of a more natural shoreline and identify natural shorelines that might be priorities for conservation. Furthermore, global sea level rise will fundamentally affect the shoreline of the Hudson River Estuary in the coming decades. Natural shorelines will potentially allow for the migration of tidal and shoreline habitats as sea level rises.

Tidal shoreline comprises lands directly on the Hudson River and the shorelines of tidal wetlands, tidal tributaries, and coves, including both naturally vegetated and engineered shoreline. Including the Village of Cold Spring, Philipstown has approximately 10.3 miles of shoreline directly along the Hudson River, most of which is closely followed by the Amtrak and Metro North railroad tracks. The majority of the shoreline area was documented as unvegetated or unconsolidated rock revetment in a 2005 inventory (Figure 3). In addition, small areas of woody vegetation, graminoid/broadleaf vegetation, and engineered bulkhead were observed. The shorelines of Constitution and Manitou marshes are also considered shoreline habitat; however, they were not mapped by the 2005 inventory.

In protected areas, including parks, preserves and regulated wetlands, it is important that shorelines remain natural to maintain connectivity between the water and land and to allow for inundation by sea level rise. The Hudson River Sustainable Shorelines Project provides information and tools on how to enhance the ecology of engineered shoreline protection, including bulkheads and rip-rap revetments, as well as how to conserve natural shorelines.

Opportunities for managing coastal habitats and restoring coastal habitat value exist in virtually the entire waterfront area, from submerged aquatic vegetation, wetlands to the shoreline. Understanding the resource is the first step.

Streams and Watersheds (Figure 4)

Streams, their floodplains, adjacent wetlands, and other "riparian" or streamside habitats that occur along their 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

***Riparian zones** are transitional areas along waterbodies that link land and water. They include streambanks, lakeshores, wetlands, and floodplains and are closely tied to stream health. They often have very high biological diversity.*

River estuary is closely linked to the health of its tributaries and their watersheds (Penhollow et al. 2006).

There are over 200 miles of streams in Philipstown, all draining to the Hudson River estuary (Figures 1 and 4). Most of the town drains directly to the estuary via small tributaries, including Foundry Brook, Indian Brook, and Philipse Brook. The southeast portion of the town drains to Annesville Creek and Canopus Creek in the Peekskill Hollow Creek watershed, which drains to the Hudson River at the City of Peekskill. The northeast portion of the town drains to Fishkill Creek via Clove Creek and Trout Creek. The 2005 Natural Resources Management Plan for the Fishkill Creek Watershed contains a comprehensive review of existing Fishkill watershed characteristics, data, and maps, and lays out a conservation strategy to help municipalities plan for the future of water and biological resources. For more information on the Fishkill Creek watershed, visit Fishkill Creek Watershed Association online or at fishkillcreek@gmail.com. For more information on the Peekskill Hollow Creek watershed, visit the Hollowbrook Watershed Watch online or at hollowbrookww1@aol.com or 914-227-4981.

Philipstown's streams and waterbodies serve several important water supply systems either directly or indirectly, and are described in the Philipstown Natural Resources and Open Space Protection Plan. Foundry Brook is the primary source for municipal water services to the Villages of Nelsonville and Cold Spring and carries water from the Scofield Ridge to the Cold Spring Reservoir, located in the Town of Philipstown. Nearby, Cargill (or Beacon) Reservoir on a tributary of Clove Creek is the second largest of the City of Beacon's three municipal water sources. Clove Creek flows above and feeds the Fishkill Creek/ Sprout Brook Aquifer, a Primary-Water Supply Aquifer that serves thousands of people in the Towns of Fishkill and Wappinger, the City of Beacon, and the Village of Fishkill.

In addition to watershed boundaries, Figure 4 shows streams, floodplains, waterbodies, and general stream habitat information. Streams shown on maps in this summary are from the 1:24,000 USGS Quadrangle Maps and were digitized from air photos. Note the resulting maps have inherent inaccuracies and will not capture many of the intermittent streams in Philipstown. Visiting sites and creating more accurate maps are methods to pursue to ensure these important resources are identified and considered during planning processes. Detailed stream locations were mapped by the 2014 Biodiversity Assessment Training team for the Canopus Valley study area and are described in the group's report (Corbett et al. 2014).

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.*

Stream habitat information on Figure 4 is based on DEC's water quality classifications. Streams deemed to have conditions suitable for trout (T) or trout spawning (TS) are identified as coldwater habitat; streams without that designation are identified as warmwater habitat. These are generalized stream habitat types based on limited information and do not reflect site-specific habitat quality. The data suggest there is coldwater habitat in all of the major streams in Philipstown and many of the smaller tributaries. Trout require well-shaded, cool to cold, flowing water and are sensitive to warmer

temperatures. While all streams benefit from adequate streamside vegetation, it is especially important for maintaining clean, coldwater habitats that support native species like brook trout. NYNHP documented three occurrences in Philipstown of the arrowhead spiketail, a rare dragonfly inhabiting small spring-fed streams and seeps in forested areas: in a wetland off Fishkill Road, along the Philipse Brook, and along an Indian Brook tributary. Tiger spiketail, a rare dragonfly of coldwater streams, springs, and seeps, was also documented near the mouth of Philipse Brook. The *NY Amphibian and Reptile Atlas* (NYRA) documented the presence of wood turtle and eastern box turtle in Philipstown, species of Special Concern in New York that occurring in riparian habitats. In addition to stream habitat, lakes, ponds, and other waterbodies can provide important wildlife habitat. Comet darner, a very rare dragonfly, was documented by NYNHP in a freshwater pond by Route 9D, east of Constitution Marsh. See Figure 2 for the location of streams supporting migratory fish runs and Areas of Known Importance for Rare Animals.

An assessment of the headwaters of Foundry Brook was carried out by the Putnam County Soil and Water Conservation District and Hudson Highlands Land Trust in 2005 and is documented in a report, State of the Tributaries: Foundry Brook & Upper Peekskill Hollow Brook in Kent, Philipstown, and Putnam Valley, NY. The report includes a detailed habitat map for the entire Foundry Brook corridor and habitat descriptions, as well as results from physical surveys, chemical indicator data collection, and macroinvertebrate assessment. In addition, the Hudson Highland Land Trust carried out habitat assessments along segments of Foundry Brook, Philipse Brook, and Clove Creek with community volunteers in 2004. More than half of the 14 stream segments studied were good to excellent quality; five survey sites had fair to poor habitat or were moderately impacted. The Streamwalk report documenting the assessment is available from the Hudson Highlands Land Trust.

Floodplain information included in Figure 4 comes from the Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Map (DFIRM) Database. This information was included in the Habitat Summary to highlight the riparian corridors where stream and floodplain habitats occur, and where land-use change will likely influence stream quality. In addition to their high ecological value, 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. When left in their natural state, they provide space for the fluctuations in flow that cause streams to expand, contract, and sometimes change course. Figure 4 shows the areas estimated by FEMA to have a 1% chance or greater probability of being inundated in any given year (often referred to as the "100-year flood"), including areas along the Hudson River shoreline, Clove Creek, Foundry Brook, Indian Brook, Philipse Brook, and Canopus Creek. Areas with 0.2% chance of flooding in a given year ("500-year flood") are also included on the map.

> ***Floodplains** are low-lying areas adjacent to streams and rivers that can become inundated during heavy precipitation or snow melt. The **floodway** is the channel of a stream or river that carries the deepest, fastest water downstream.*

It is important to note that FEMA-mapped floodplains and their statistical flooding intervals are estimations based on the data and technology available at the time of mapping. Due to many variables,

such as the unpredictable nature of some kinds of floods, local drainage problems, and the variable intensity of land development in watersheds, some flood-prone areas may not appear on the maps. Nonetheless, the mapped floodplains provide a starting point for proactive conservation planning and may contain a variety of habitats, including but not limited to upland meadows, wet meadows, swamps, marshes, and forests (Kiviat and Stevens 2001).

Forested floodplains support the in-stream food web and serve as a travel corridor for some wildlife (Knab-Vispo and Vispo 2010). In addition to their biological values, floodplain forests play a vital role in minimizing soil erosion and surface runoff, control water temperatures, and help reduce downstream flood intensity. Floodplain forests have not been mapped in Philipstown, but an overlay of forest habitat on mapped floodplains suggests they are present in certain areas; in particular, along portions of Foundry Brook. Where appropriate, there may be potential for reforestation of floodplains in Philipstown. The Hudson River Estuary Program's "Trees for Tribs" initiative offers free consultation and native trees and shrubs for qualifying streamside buffer planting projects in the estuary watershed.

For more information on streams, water quality, drinking water, and watershed issues in Philipstown, a complementary Water Resources Summary is available from the Estuary Program by request.

Wetlands (Figure 5)

In addition to providing critical habitat for many plants and animals, wetlands provide important services for human communities. They help to control flooding and reduce damage from storm surge, recharge groundwater, act as filters to cleanse water of impurities, 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 are inherently inaccurate and not a substitute for site visits and on-the-ground delineation. Nonetheless, towns can use these maps as a starting point for inventorying local wetlands and supplement them with more refined data as they become available.

In Figure 5, "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"). NWI data are available for viewing on the NWI Wetlands Mapper or as a download for use in geographic information systems (GIS). NYS freshwater wetland maps are available for viewing using the Environmental Resource Mapper or to

download as GIS files at the NYS GIS Clearinghouse. In Figure 4, information also comes from county soil maps, which are a good source for predicting the location of potential wetlands. "Probable wetlands" are those areas classified in the soil survey as very poorly drained or poorly drained soils, and "possible wetlands" are those classified as somewhat poorly drained (after Kiviat and Stevens 2001). Note that in Figure 4, probable and possible wetlands cover a greater area than NWI and DEC wetland layers. 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). Detailed wetland locations were mapped by the 2014 Biodiversity Assessment Training team for the Canopus Valley study area and are described in the group's report (Corbett et al. 2014), including hardwood swamp and emergent marsh.

While NWI maps offer some limited, general information on wetland habitat (e.g., forested, emergent), most existing map resources focus on wetland locations and do not yield information about habitat or importance for biodiversity. Towns can learn more about habitat values from other sources and by conducting local surveys and studies. NYNHP mapped a very large complex of highbush blueberry bog thickets on Round Hill in Philipstown comprising over 80 individual wetlands within the 14,000-acre forested landscape in Fahnestock State Park, spanning the boundaries with Putnam Valley and Kent. This is a high quality occurrence at the statewide level of an uncommon habitat. The wetlands occur within a matrix of predominantly chestnut oak forest, but including Appalachian oak-hickory forest, oak-tulip tree forest, and hemlock-northern hardwood forest. NYRA documented the presence of NY-special concern spotted turtle in Philipstown, a mobile wetland species that also uses upland forest and grassland habitats. Spotted turtle is sensitive to water pollution and further threatened by wetland loss, invasive species, road mortality, and the pet trade.

A study carried out by Teatown Lake Reservation mapped 253 potential vernal pools in Philipstown and more in neighboring towns, but they have yet to be confirmed in Philipstown through field visits (Rubbo 2013). (Data for potential vernal pool locations are available upon request.) Volunteers in the 2014 Biodiversity Assessment Training team mapped four potential vernal pools in the Philipstown portion of the study area near Indian Lake, but likewise, they have yet to be confirmed. Records of marbled salamander, spotted salamander, four-toed salamander, and wood frog in the *NY Amphibian and Reptile Atlas* further attest to the presence of vernal pools in Philipstown. Vernal pools are small, isolated wetlands that are often dry in summer. They provide habitat for many animals, including forest amphibians which use the pools for breeding. Vernal pools often go undetected in the forest due to their small size and seasonal drawdown, and are vulnerable due to reduced regulatory protection of isolated wetlands (see Conserving Small Wetlands in the Hudson Valley for more information.) Biodiversity assessment in the town may help to verify vernal pool locations, reveal additional wetland habitat types, and provide detail on quality and habitat use. Outreach to landowners and planners may help promote stewardship and land-use decisions that protect the pools, surrounding forest habitat, and associated wildlife. Specific management recommendations can be found in *Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Development in the*

Northeastern United States (Calhoun and Klemens 2002) and *Maine Municipal Guide to Mapping and Conserving Vernal Pool Resources* (Morgan and Calhoun 2012).

Hudson River tidal wetlands are covered in the Hudson River Coastal and Shoreline Habitat section.

Forests (Figure 6)

The ability of forests to provide wildlife habitat, clean water, climate moderation, and economically viable forest products depends in part on our ability to maintain sizeable tracts of forest. In general, larger forests provide more ecosystem services and higher quality forest habitat than smaller ones. However, the value of each forest is relative to the values of other forests in the community, watershed, or natural landscape. Even small patches of forest can be extremely valuable depending on different factors, such as their relationship to the surrounding landscape. For example, a network of forest patches along a stream can create a riparian corridor that helps maintain water quality and wildlife habitat, and that serves as a travel route for forest animals. Similarly, wooded hedgerows in an agricultural landscape often provide a refuge for animals that do not typically use agricultural fields.

We know little about the on-the-ground habitat quality of forests in Philipstown (e.g., presence of invasive species, lack of understory vegetation, etc.). However, the "birds-eye view" shows that most of Philipstown is covered in forests of varying sizes. Figure 6 shows forest patches 200 acres and larger in Philipstown. The map was created from land cover data developed for the Coastal Change Analysis Program (National Oceanic and Atmospheric Administration 2006). 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 pieces, 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.*

Two "globally significant" forest blocks stand out in Figure 6, extending from north to south along the eastern half of Philipstown, divided by NY 301. The northern block extends into the towns of Kent, Fishkill, and East Fishkill, and measures over 16,200 acres. The southern block includes much of the Town of Putnam Valley and a small area of Cortlandt and measures nearly 23,000 acres. When combined with the nearly 10,000-acre "regionally significant" forest block of the Fishkill-Scofield Ridge, this area corresponds with the eastern Hudson Highlands "matrix forest block," identified in a regional analysis of the northeastern United States by the Nature Conservancy (see Figure 1). Matrix forests represent the largest, most intact forests, whose size and natural condition allow for the maintenance of

ecological processes, natural forest communities, and populations of forest-interior species (Anderson and Bernstein 2003). These characteristics facilitate species movement and will likely contribute to resiliency in a changing climate. The goal of the matrix forest analysis is to identify viable examples of forest types that, if protected and allowed to maintain or regain their natural condition, will serve as critical source areas for species associated with the forest types or for species generally requiring forest-interior conditions. Conserving large, high quality natural areas such as these and natural connections between them will also allow plants and animals to move northward and higher in elevation as temperatures increase with climate change. The Philipstown portion of the matrix forest block includes Fahnestock and Hudson Highlands state parks, which protect over 11,250 acres of forest land in Philipstown. Over 10,000 acres of high quality forest communities with low disturbance and many rare plant and animal species have been documented by NYNHP in Philipstown, primarily within these state parks, including acidic talus slope woodland, Appalachian oak-hickory forest, chestnut oak forest, and oak-tulip tree forest, and pitch-pine oak heath and red cedar rocky summit communities. See the Areas of Known Importance for Biodiversity section for more information. Descriptions of forest structure and composition in Canopus Valley and on the ridge near Indian Lake from the 2014 Biodiversity Assessment Training team are provided in the project report (Corbett et al. 2014).

Two smaller but "locally significant" forested areas are present in Philipstown. South of NY 403/ Cat Rock Rd, the Canada Hill forest block measures over 4,800 acres, extending into Cortlandt. It includes significant forest communities mapped by NYNHP and provides habitat for several threatened and endangered animals. To the north, a smaller forest block south of NY 301 between US 9 and US 9D measures over 2,100 acres. Smaller forests such as these that are more fragmented by development and roads are at the lower limit of viable habitat patch size for forest-dependent birds. Even smaller "stepping stone" forest patches (less than 2,000 acres) may provide valuable habitat, especially when forming relatively broad corridors between the larger forest blocks in the town.

The Croton-to-Highlands Biodiversity Plan (Miller and Klemens 2004) identified the southeastern portion of Philipstown as an important area for habitat connectivity between the Highlands and Westchester towns to the south. This corridor includes the 2014 Biodiversity Assessment Team's study area and presents an opportunity for intermunicipal collaboration on land use planning and management between Philipstown, Putnam Valley, and Cortlandt.

The *NYS Breeding Bird Atlas* has numerous records of birds that indicate the availability of high-quality forest habitat (e.g., northern goshawk, sharp-shinned Hawk, cerulean warbler) and high-quality riparian forest habitat (Louisiana waterthrush, yellow-throated vireo) in Philipstown (see Table 2). The remarkably intact forest communities and bird assemblages of the Highlands region were justifications for Audubon NY's designation of the Fahnestock and Hudson Highlands State Parks Important Bird Area (see Figure 2). Conserving the town's large, contiguous forested areas, particularly those that provide broad, connected corridors; smaller forest patches that act as stepping stones between larger forests; and forested floodplains will help ensure there is adequate habitat to sustain these species, as well as other forest plants and animals. This strategy will also help to preserve the ecosystem services that the town's forests are providing to its residents. Audubon New York's website has specific information on

managing habitat for forest birds.

Philipstown's forests are also home to several reptile species of conservation concern. Eastern worm snake is a secretive species that burrows in damp forest soils or under logs and rocks. Rocky forested ridges provide habitat for northern black racer and timber rattlesnake, which forage quite widely from den sites. They are particularly susceptible to fragmentation of forest habitats by roads and development, which can isolate populations and lead to increased road mortality. Spotted turtle and eastern box turtle also spend significant periods of the year traveling, foraging, and aestivating (in a state of dormancy) in forest habitat.

Forest and open woodland plants of conservation concern in Philipstown include woodland agrimony and violet wood-sorrel. Historically, fairy wand, large twayblade, and wild hydrangea were documented in forests in the town. The rare Appalachian azure butterfly occurs in Fahnestock State Park in rich deciduous forests with black cohosh, its larval food-plant.

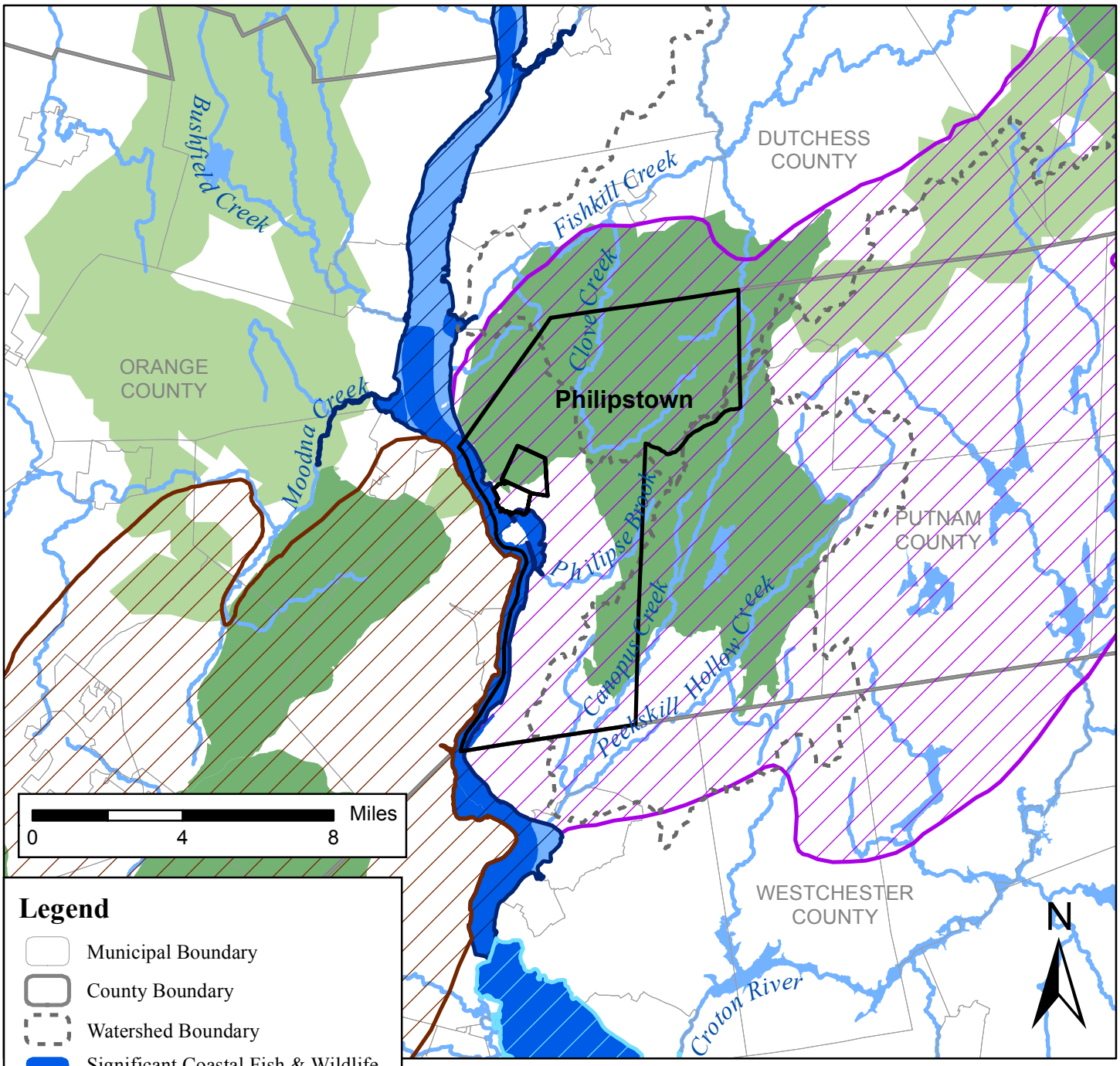
Grasslands, Shrublands, and Young Forests (not mapped)

Recently disturbed sites, such as 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 wildlife records that valuable grasslands, shrublands, and young forests occur in the town. For example, northern black racer, a species of conservation concern that prefers open fields and transitional habitat between forests and fields, was documented in Philipstown during the *NY Amphibian and Reptile Atlas* (see Table 1).

Upland 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. Breeding bird records from Philipstown indicate that grassland habitat is present in the town. Table 2 shows two grassland bird species of state conservation concern known to breed in Philipstown (*NYS Breeding Bird Atlas*): American kestrel and bobolink. Grassland breeding birds respond to habitat structure rather than species composition, so even hayfields dominated by non-native grasses can provide suitable habitat for species of conservation concern if they are managed appropriately. Audubon New York offers guidance on managing habitat for grassland birds. Even when limited to small habitat patches, grasslands in Philipstown may host a number of rare plants of conservation concern. Woodland openings and rocky summits on Constitution Island support threatened species including black-edge sedge, clustered sedge, Great Plains flatsedge, and troublesome sedge. Small forest openings and dry grassy crests and slopes of the Hudson Highlands historically supported the threatened plant species stiff-leaf goldenrod.

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. New England cottontail occurs in shrubby and open forest areas of Philipstown. The *NYS Breeding Bird Atlas* documented twelve species of conservation concern in Philipstown that prefer young forest and shrubland habitat, including American woodcock, ruffed grouse, and whip-poor-will. Extensive young forests and those that form large complexes with meadow habitats may be particularly important for nesting by these species, as well as for grassland nesting birds; for more information, see Audubon's guidance on managing habitat for shrubland birds.

Figure 1: Regional Context of Philipstown, NY



Legend

- Municipal Boundary
- County Boundary
- Watershed Boundary
- Significant Coastal Fish & Wildlife Habitat

Matrix Forest Blocks and Linkages

- Matrix forest block
- Regional forest linkage zone

Significant Biodiversity Areas

- Hudson Highland East
- Hudson Highlands West
- Mid Hudson River
- Lower Hudson River

This map shows the location of the Town of Philipstown, Putnam County in relation to its major watersheds, important forest blocks, 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 ingrid.haeckel@dec.ny.gov or (518)402-8954. http://www.dec.ny.gov/lands/5094.html

Data Sources:

New York State Department of Environmental Conservation
New York Natural Heritage Program
New York State Department of State
New York State Office of Cyber Security and Critical Infrastructure Coordination
US Geological Survey
The Nature Conservancy

Map Created 2014

Hudson River Estuary

Cornell University

Figure 2: Areas of Known Importance for Biodiversity in Philipstown, NY

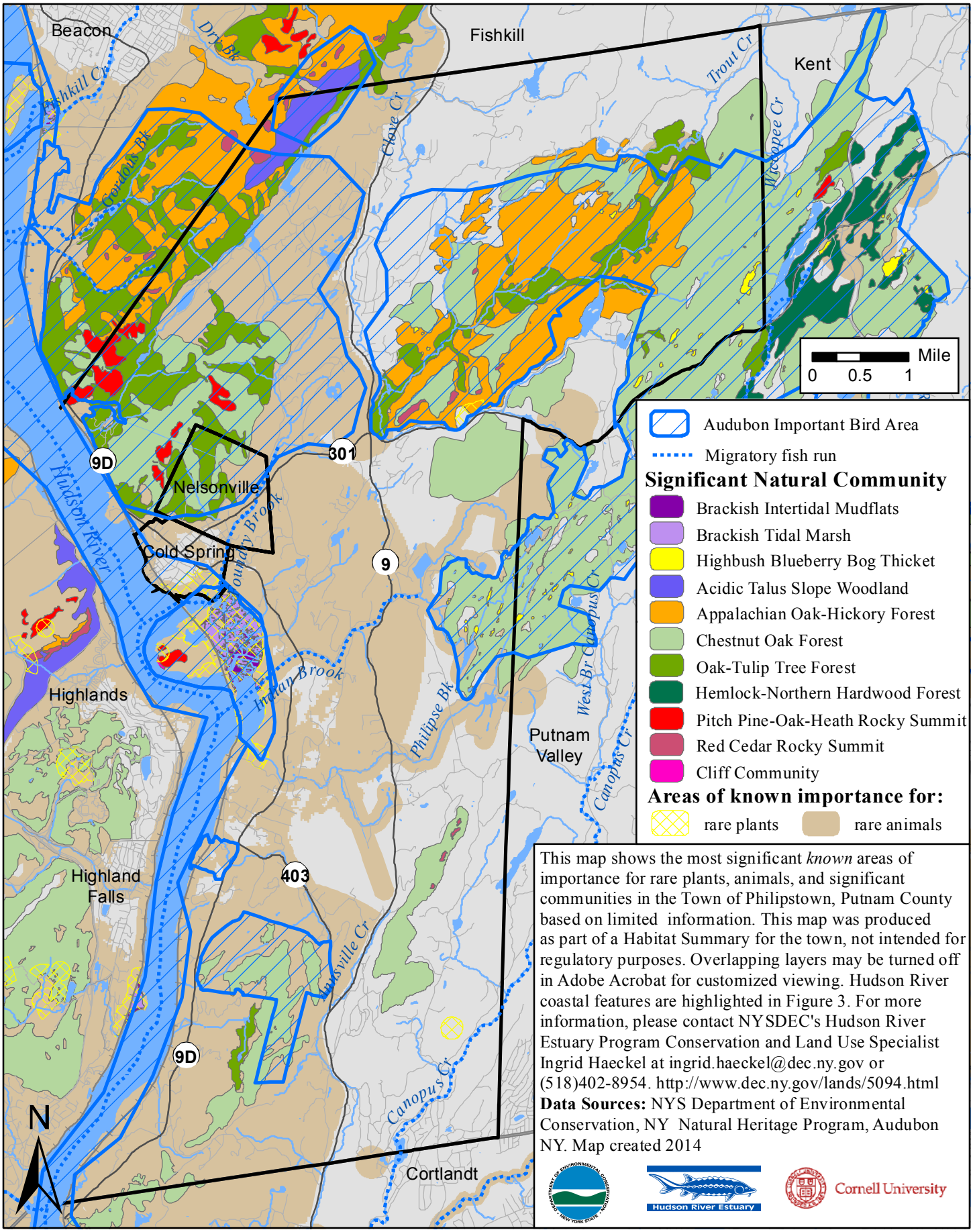
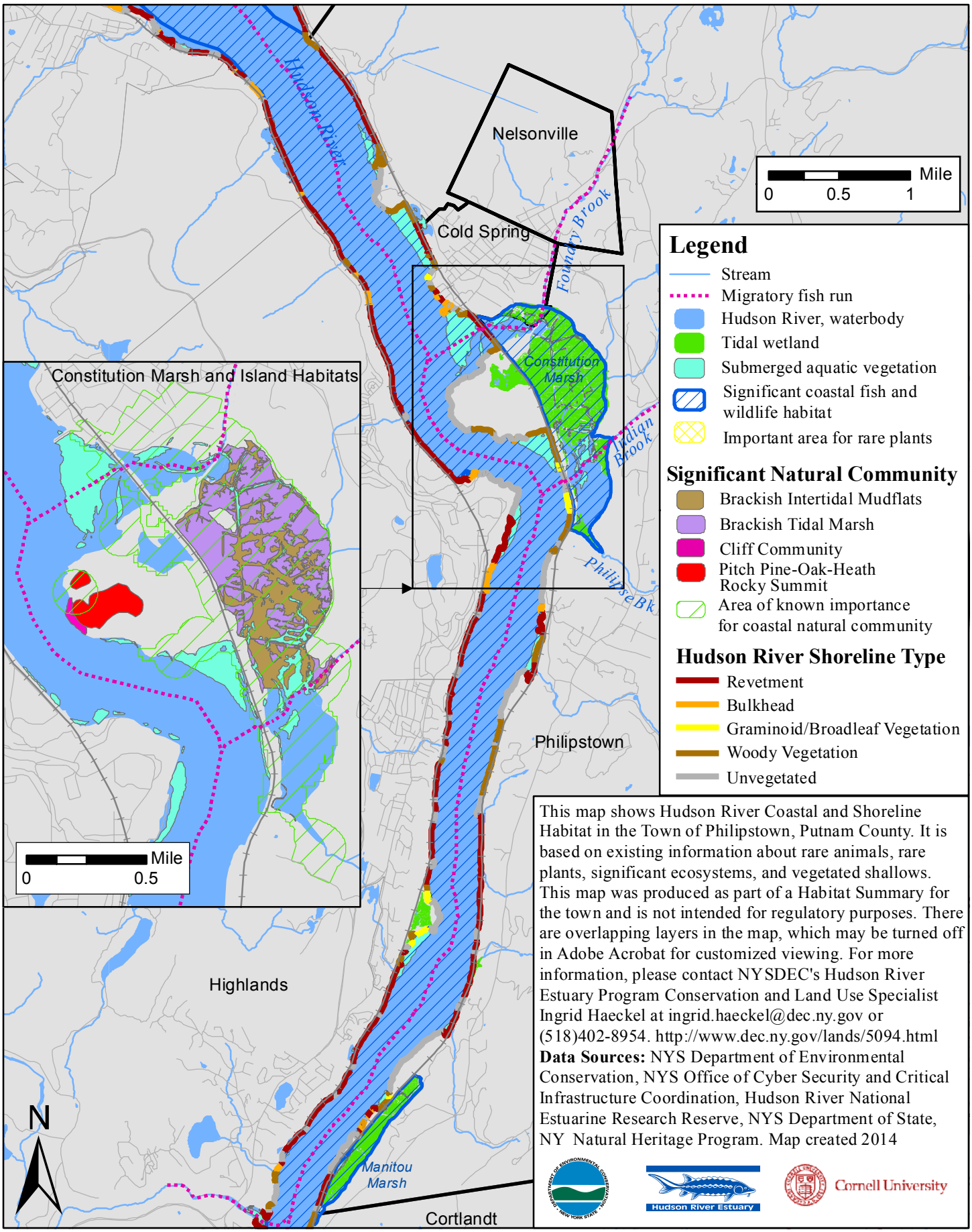


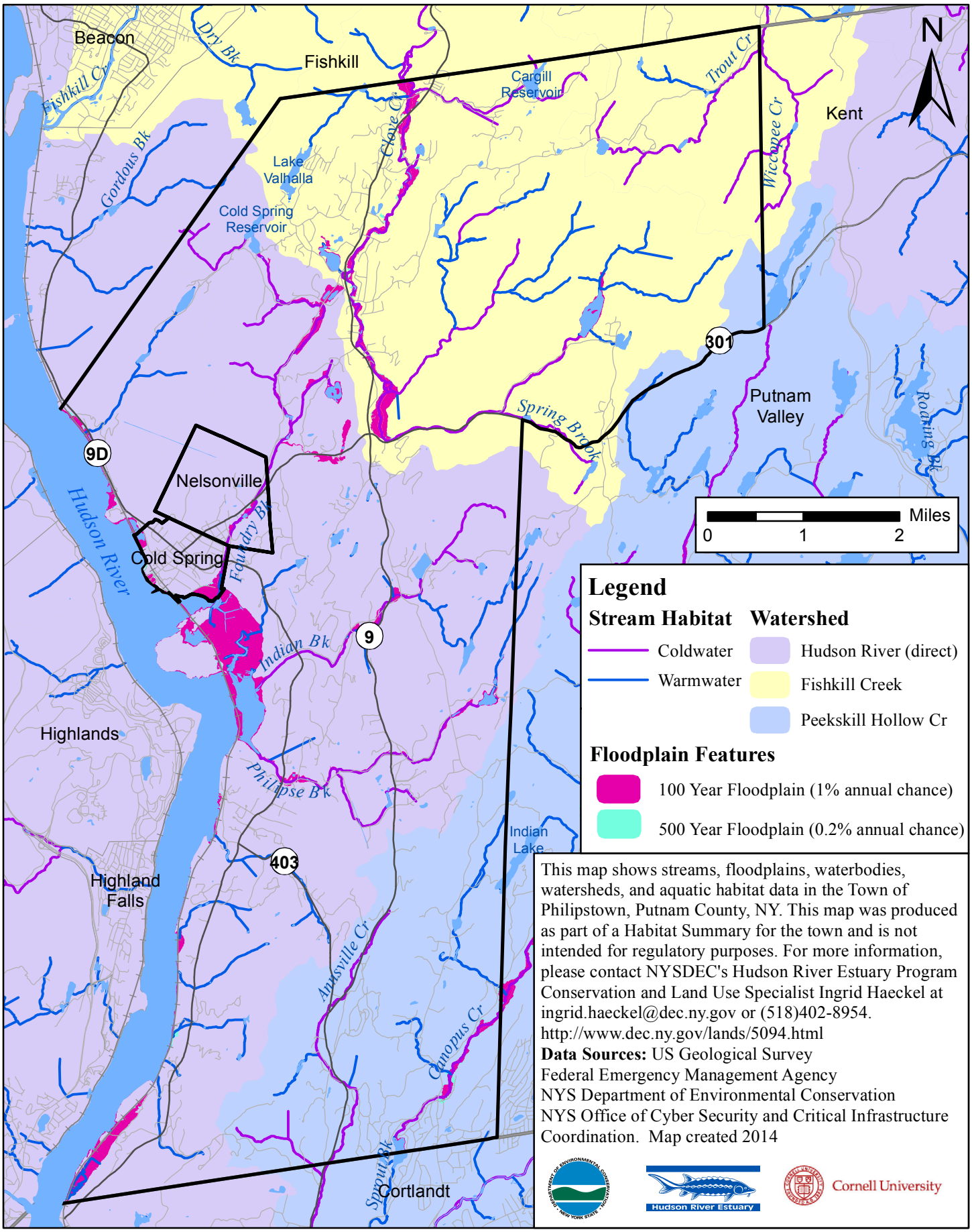
Figure 3: Hudson River Coastal and Shoreline Habitat in Philipstown, NY



This map shows Hudson River Coastal and Shoreline Habitat in the Town of Philipstown, Putnam County. It is based on existing information about rare animals, rare plants, significant ecosystems, and vegetated shallows. This map was produced as part of a Habitat Summary for the town and is not intended for regulatory purposes. There are overlapping layers in the map, which 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 or (518)402-8954. http://www.dec.ny.gov/lands/5094.html

Data Sources: NYS Department of Environmental Conservation, NYS Office of Cyber Security and Critical Infrastructure Coordination, Hudson River National Estuarine Research Reserve, NYS Department of State, NY Natural Heritage Program. Map created 2014

Figure 4: Streams and Watersheds in Philipstown, NY



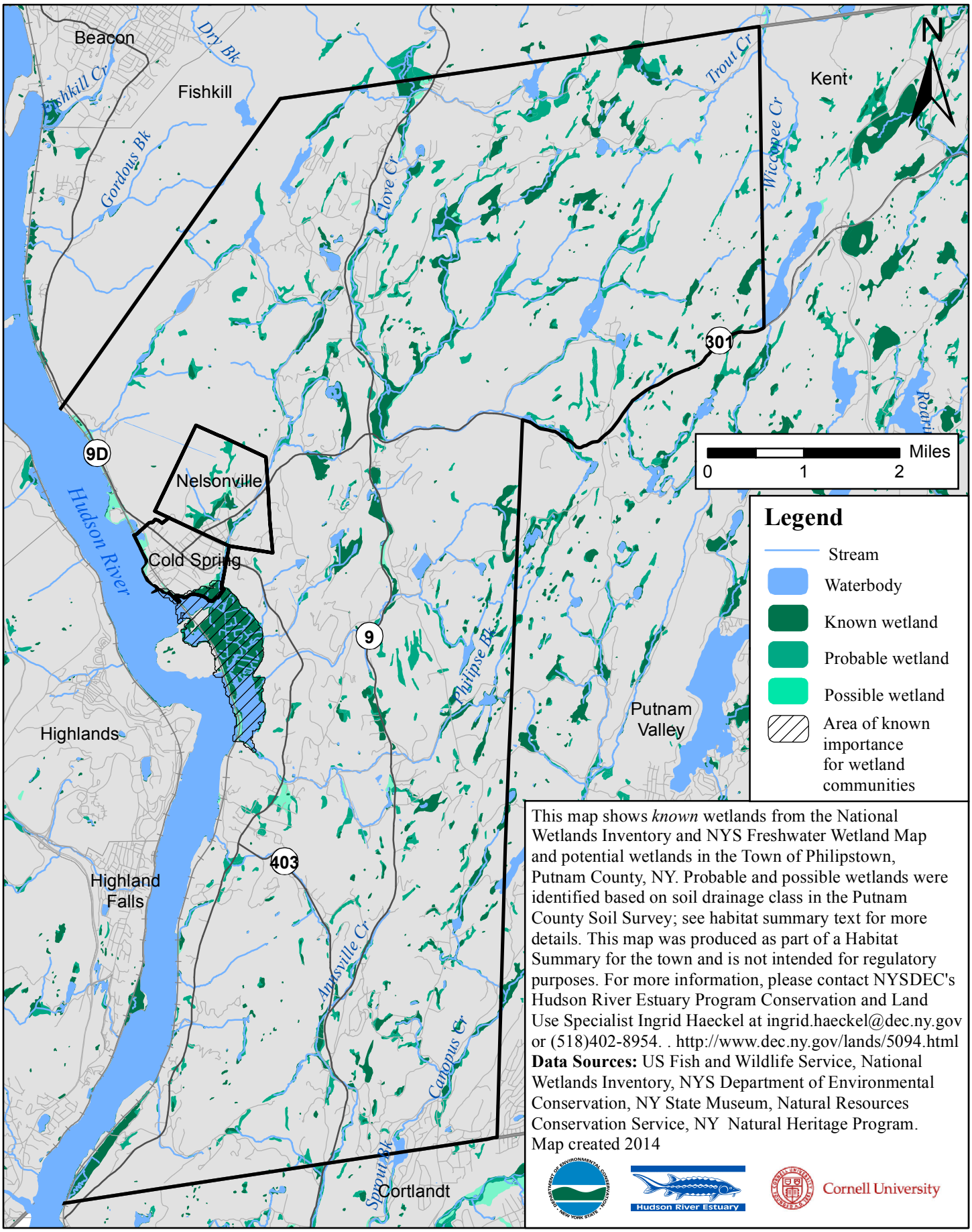
This map shows streams, floodplains, waterbodies, watersheds, and aquatic habitat data in the Town of Philipstown, Putnam County, NY. This map was produced as part of a Habitat Summary for the town and is not intended for regulatory purposes. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at ingrid.haeckel@dec.ny.gov or (518)402-8954. http://www.dec.ny.gov/lands/5094.html

Data Sources: US Geological Survey
Federal Emergency Management Agency
NYS Department of Environmental Conservation
NYS Office of Cyber Security and Critical Infrastructure Coordination. Map created 2014

Hudson River Estuary

Cornell University

Figure 5: Wetlands in Philipstown, NY



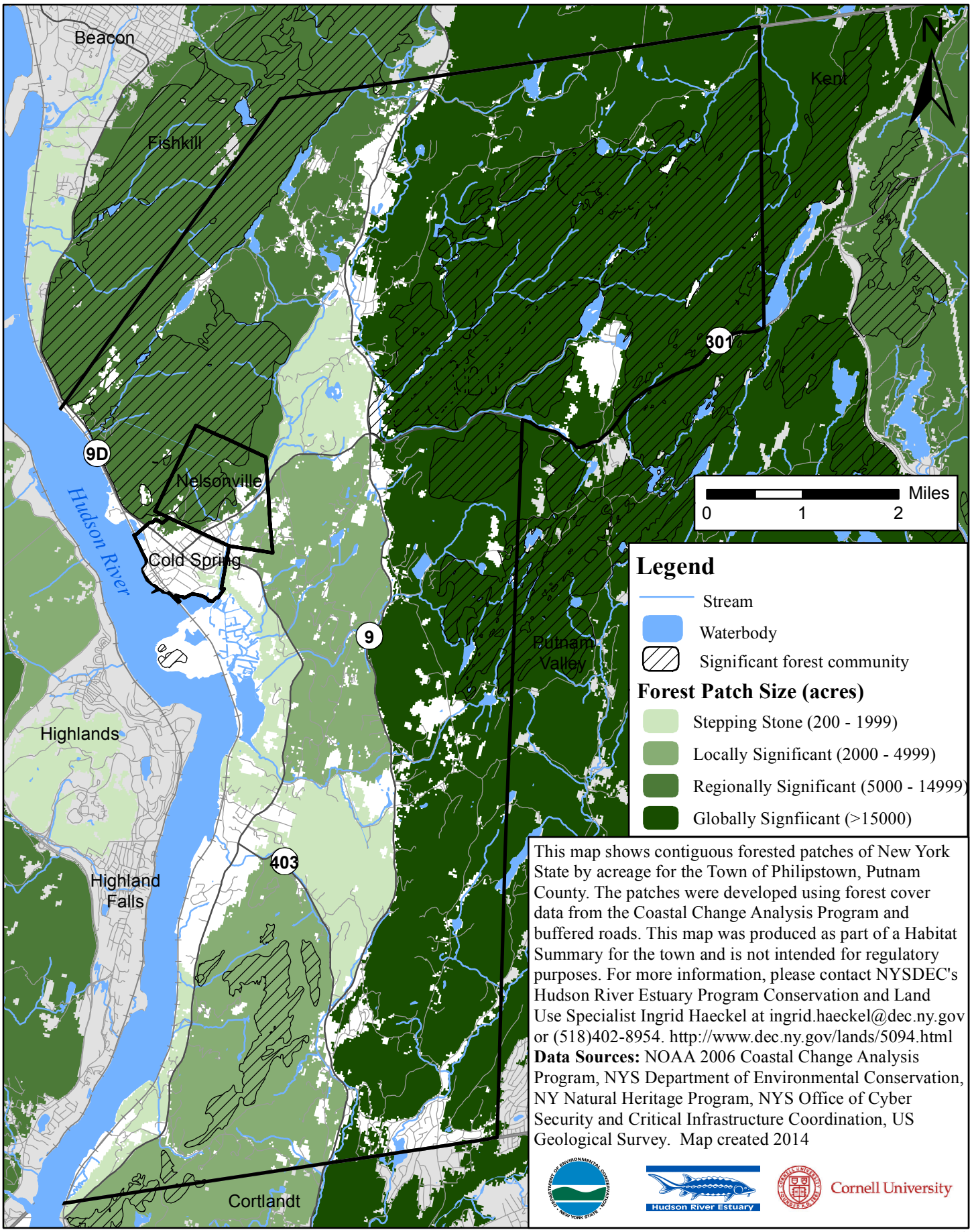
This map shows *known* wetlands from the National Wetlands Inventory and NYS Freshwater Wetland Map and potential wetlands in the Town of Philipstown, Putnam County, NY. Probable and possible wetlands were identified based on soil drainage class in the Putnam County Soil Survey; see habitat summary text for more details. 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 or (518)402-8954. . http://www.dec.ny.gov/lands/5094.html

Data Sources: US Fish and Wildlife Service, National Wetlands Inventory, NYS Department of Environmental Conservation, NY State Museum, Natural Resources Conservation Service, NY Natural Heritage Program. Map created 2014

Hudson River Estuary

Cornell University

Figure 6: Large Forests (200 acres and larger) in Philipstown, NY



This map shows contiguous forested patches of New York State by acreage for the Town of Philipstown, Putnam County. 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 or (518)402-8954. http://www.dec.ny.gov/lands/5094.html

Data Sources: NOAA 2006 Coastal Change Analysis Program, NYS Department of Environmental Conservation, NY Natural Heritage Program, NYS Office of Cyber Security and Critical Infrastructure Coordination, US Geological Survey. Map created 2014

Hudson River Estuary

Cornell University

Species and Ecosystems of Conservation Concern in Philipstown
(January 2021 Update)

The species and ecosystems of conservation concern that have been recorded in Philipstown are listed in Tables 1-2. Table 1 lists state rare species and ecosystems and Table 2 lists bird species of conservation concern; both are referenced throughout the Habitat Summary text. In Tables 1 and 2, species are included if they are: on state or federal endangered and threatened species lists; listed as a Species of Greatest Conservation Need in New York's Comprehensive Wildlife Conservation Strategy Plan; recognized as a Hudson River Valley Priority Bird by Audubon New York; or are otherwise indicators of high quality habitat. All species and ecosystems on the lists are linked to a habitat described in the summary.

Note: There may be additional rare species and habitats in Philipstown not yet documented.

Table 1. State Rare Animals, Plants, and Significant Ecosystems in Philipstown

The following information comes from the New York Natural Heritage Program (NYNHP) biodiversity databases (UPDATED - January 2021), the *NY Amphibian and Reptile Atlas* (NYARA), the *2000-2005 New York State Breeding Bird Atlas* (NYBBA), the New York State Department of Environmental Conservation (NYSDEC), and the Metropolitan Conservation Alliance (MCA) Croton-to-Highlands Biodiversity Plan (2004). Data from NYNHP are available online from the New York Nature Explorer and information on rare animals, plants, and ecological communities can be found at http://guides.nynhp.org. The NYARA documented more reptile and amphibian species in Philipstown than listed below; the table only includes those that are of conservation concern or are indicators of high quality habitat. For wildlife species, the "Description" column is largely based on the species groups in the NYS Comprehensive Wildlife Conservation Strategy (2005).

Common Name	Description	Scientific Name	Source
anadromous fish concentration area	animal assemblage	n/a	NYNHP
waterfowl winter concentration area	animal assemblage	n/a	NYNHP
acidic talus slope woodland	forest community	n/a	NYNHP
Appalachian oak-hickory forest	forest community	n/a	NYNHP
brackish intertidal mudflats	coastal community	n/a	NYNHP
brackish tidal marsh	coastal community	n/a	NYNHP
chestnut oak forest	forest/rocky summit community	n/a	NYNHP
cliff community	coastal/forest community	n/a	NYNHP
highbush blueberry bog thicket	wetland community	n/a	NYNHP
oak-tulip tree forest	forest community	n/a	NYNHP
pitch pine-oak-heath rocky summit	forest/rocky summit community	n/a	NYNHP
red cedar rocky summit	forest/rocky summit community	n/a	NYNHP

rocky summit grassland	grassland/rocky summit community	n/a	NYNHP
tidal river	coastal community	n/a	NYNHP
New England cottontail[2]	forest mammal	*Sylvilagus transitionalis*	NYNHP
Common Name	**Description**	**Scientific Name**	**Source**
eastern red bat[1]	forest mammal	*Lasiurus borealis*	NYSDEC
eastern small-footed bat[1]	forest mammal	*Myotis leibii*	NYNHP
little brown bat[1]	forest mammal	*Myotis lucifugus*	NYSDEC
northern long-eared bat[3]	forest mammal	*Myotis septentrionalis*	NYSDEC
tri-colored bat[1]	forest mammal	*Perimyotis subflavus*	NYSDEC
bald eagle[3]	coastal bird	*Haliaeetus leucocephalus*	NYNHP
peregrine falcon[4]	coastal bird	*Falco peregrinus*	NYNHP
northern goshawk[2]	forest bird	*Accipiter gentilis*	NYBBA
Cooper's hawk[2]	forest bird	*Accipiter cooperii*	NYBBA
red-shouldered hawk[2]	forest bird	*Buteo lineatus*	NYBBA
sharp-shinned hawk[2]	forest bird	*Accipter striatus*	NYBBA
least bittern[3]	wetland bird	*Ixobrychus exilis*	NYNHP
whip-poor-will[2]	young forest bird	*Caprimulgus vociferus*	NYBBA
cerulean warbler[2]	forest bird	*Dendroica cerulea*	NYBBA
yellow-breasted chat[2]	young forest bird	*Icteria virens*	NYBBA
fence lizard[3]	forest/rocky summit lizard	*Sceloporus undulatus*	NYNHP
common five-lined skink[1]	forest/rocky summit lizard	*Eumeces fasciatus*	NYARA
eastern wormsnake[1]	forest snake	*Carphophis amoenus*	NYNHP
northern black racer[1]	forest/rocky summit snake	*Coluber c. constrictor*	NYARA
timber rattlesnake[3]	forest/rocky summit snake	*Crotalus horridus*	NYNHP
eastern box turtle[2]	forest/stream/grassland turtle	*Terrapene carolina*	NYNHP
wood turtle[2]	stream/forest/grassland turtle	*Clemmys insculpta*	NYARA
spotted turtle[2]	wetland/forest/grassland turtle	*Clemmys guttata*	NYARA
marbled salamander[2]	vernal pool/forest amphibian	*Ambystoma opacum*	NYARA
spotted salamander	vernal pool/forest amphibian	*Ambystoma maculatum*	NYARA
four-toed salamander[1]	vernal pool/forest amphibian	*Hemidactylium scutatum*	NYNHP
wood frog	vernal pool/forest amphibian	*Rana sylvatica*	NYARA
Atlantic needlefish	coastal fish	*Strongylura marina*	NYNHP
Atlantic silverside[1]	coastal fish	*Menidia menidia*	NYNHP
inland silverside[1]	coastal fish	*Menidia beryllina*	NYNHP
Atlantic sturgeon[5]	coastal fish	*Acipenser oxyrinchus*	NYNHP
shortnose sturgeon[4,5]	coastal fish	*Acipenser brevirostrum*	NYNHP
Needham's skimmer[1]	coastal dragonfly	*Libellula needhami*	NYNHP
Appalachian azure	forest/rocky summit butterfly	*Celastrina neglectamajor*	NYNHP
Comet darner	waterbody dragonfly	*Anax longipes*	NYNHP

mocha emerald[1]	stream dragonfly	*Somatochlora linearis*	NYNHP
tiger spiketail[1]	stream dragonfly	*Cordulegaster erronea*	NYNHP
arrowhead spiketail[1]	stream dragonfly	*Cordulegaster obliqua*	NYNHP
black-edge sedge[3]	forest plant	*Carex nigromarginata*	NYNHP
clustered sedge[3]	forest / grassland plant	*Carex cumulata*	NYNHP
Delmarva beggar-ticks	coastal plant	*Bidens bidentoides*	NYNHP
fairy wand[4]*	forest plant	*Chamaelirium luteum*	NYNHP
Great Plains flatsedge[3]	grassland plant	*Cyperus lupulinus* ssp. *lupulinus*	NYNHP
Common Name	**Description**	**Scientific Name**	**Source**
gypsy-wort[4]	coastal/ wetland plant	*Lycopus rubellus*	NYNHP
large twayblade[4]*	young forest/ wetland plant	*Liparis liliifolia*	NYNHP
Long's bittercress[3]	coastal plant	*Cardamine longii*	NYNHP
narrow-leaved sedge[4]	forest plant	*Carex amphibola*	NYNHP
saltmarsh aster[3]	coastal plant	*Symphyotrichum subulatum* var. *subulatum*	NYNHP
slender marsh-pink[4]*	coastal plant	*Sabatia campanulata*	NYNHP
smooth bur-marigold[3]	coastal plant	*Bidens laevis*	NYNHP
spongy arrowhead[3]	coastal plant	*Sagittaria montevidensis* var. *spongiosa*	NYNHP
stiff-leaf goldenrod[3]*	grassland plant	*Oligoneuron rigidum* var. *rigidum*	NYNHP
tidal spikerush[4]*	coastal plant	*Eleocharis aestuum*	NYNHP
troublesome sedge[3]	forest / grassland plant	*Carex molesta*	NYNHP
violet wood-sorrel[3]	forest plant	*Oxalis violacea*	NYNHP
water pigmyweed[4]	coastal plant	*Crassula aquatica*	NYNHP
wild hydrangea[3]*	forest plant	*Hydrangea arborescens*	NYNHP
woodland agrimony[3]	forest plant	*Agrimonia rostellata*	NYNHP

[1] NYS Species of Greatest Conservation Need (SGCN)
[2] NYS Special Concern and SGCN
[3] NYS Threatened Species and SGCN
[4] NYS Endangered Species and SGCN
[5] US Endangered Species and SGCN
*historical record

Table 2. Significant Birds of Philipstown

The following table lists bird species of conservation concern that were observed in Philipstown during the 2000-2005 New York State Breeding Bird Atlas. Species are included in the table if 1) they were documented in Atlas blocks that are more than 50% in Philipstown, and 2) they have been identified as Hudson River Valley Priority Birds by Audubon NY (2009). Associated habitat information and links to species profiles, when available, are also from Audubon NY (2009); young forest and shrubland habitat designations are from DEC Biologist Paul Novak.

		NYS Conservation Status			
Common Name	**Scientific Name**	Species of Greatest Conservation Need	Special Concern	Threatened	Endangered
Forest Birds					
Acadian Flycatcher	*Empidonax virescens*				
American Redstart	*Setophaga ruticilla*				
Baltimore Oriole	*Icterus galbula*				
Black-and-white Warbler	*Mniotilta varia*				
Black-throated Green Warbler	*Dendroica virens*				
Black-throated Blue Warbler	*Dendroica caerulescens*	x			
Broad-winged Hawk	*Buteo platypterus*				
Cerulean Warbler	*Dendroica cerulea*	x	x		
Cooper's Hawk	*Accipiter cooperii*	x	x		
Downy Woodpecker	*Picoides pubescens*				
Eastern Wood-Pewee	*Contopus virens*				
Hooded Warbler	*Wilsonia citrina*				
Louisiana Waterthrush	*Seiurus motacilla*	x			
Magnolia Warbler	*Dendroica magnolia*				
Northern Flicker	*Colaptes auratus*				
Northern Goshawk	*Accipiter gentilis*	x	x		
Northern Parula	*Parula americana*				
Red-shouldered Hawk	*Buteo lineatus*	x	x		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*				
Scarlet Tanager	*Piranga olivacea*	x			
Sharp-shinned Hawk	*Accipter striatus*	x	x		
Veery	*Catharus fuscescens*				
Wood Thrush	*Hylocichla mustelina*	x			
Worm-eating Warbler	*Helmitheros vermivorum*	x			
Yellow-throated Vireo	*Vireo flavifrons*				
Grassland Birds					

		NYS Conservation Status			
Common Name	**Scientific Name**	Species of Greatest Conservation Need	Special Concern	Threatened	Endangered
American Kestrel	*Falco sparverius*				
Bobolink	*Dolichonyx oryzivorus*	x			
Young Forest and Shrubland Birds					
American Woodcock	*Scolopax minor*	x			
Black-Billed Cuckoo	*Coccyzus erythropthalmus*	x			
Blue-Winged Warbler	*Vermivora pinus*	x			
Brown Thrasher	*Toxostoma rufum*	x			
Canada Warbler	*Wilsonia canadensis*	x			
Eastern Kingbird	*Tyrannus tyrannus*				
Eastern Towhee	*Pipilo erythrophthalmus*				
Field Sparrow	*Spizella pusilla*				
Indigo Bunting	*Passerina cyanea*				
Prairie Warbler	*Dendroica discolor*	x			
Ruffed Grouse	*Bonasa umbellus*	x			
Whip-poor-will	*Caprimulgus vociferus*	x	x		
Willow Flycatcher	*Empidonax trailli*	x			
Yellow-breasted Chat	*Icteria virens*	x	x		
Wetland Birds					
Least Bittern	*Ixobrychus exilis*	x		x	
Marsh Wren	*Cistothorus palustris*				
Purple Martin	*Progne subis*				
Birds of Other Habitats					
Bald Eagle (open water/forest)	*Haliaeetus leucocephalus*	x		x	
Belted Kingfisher (open water)	*Megaceryle alcyon*				
Chimney Swift (urban)	*Chaetura pelagica*				
Osprey (open water/wetland)	*Pandion haliaetus*	x	x		
Peregrine Falcon (cliffs)	*Falco peregrinus*	x			x

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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