

NATURAL AREAS AND WILDLIFE IN YOUR COMMUNITY



Hudson River
Estuary Program

A Habitat Summary Prepared for the Town of East Greenbush

This summary was completed in September 2018, providing information for land-use planning and decision-making as requested by the Town of East Greenbush. It identifies significant ecosystems in the Town, including coastal habitats, 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 toward achieving key benefits:

- Clean water
- Resilient communities
- Vital estuary ecosystem
- Fish, wildlife & habitats
- Natural scenery
- Education, access, recreation, and inspiration

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.

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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 databases of the New York State Department of Environmental Conservation (DEC) and the New York Natural Heritage Program (NYNHP) 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. Maps referenced in this report are a subset of a larger series produced for the Town of East Greenbush Natural Resources Inventory (NRI) project by student intern Andrew Varuzzo. The Habitat Summary is organized around eight habitat-related NRI maps for the Town of East Greenbush, which follow the text headings:

- **General Land Cover and Land Use**
- **Significant Ecological Features**
- **Coastal Habitats**
- **Streams and Watersheds**
- **Floodplains and Riparian Areas**
- **Stream Habitats**
- **Wetlands**
- **Large Forests**

The final section about **Grasslands, Shrublands, and Young Forests** refers back to the General Land Cover map. Following the maps, [Table 1](#) lists known **Species and Ecosystems of Conservation Concern** that have been recorded for East Greenbush, 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 identified in the State Wildlife Action Plan 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). High priority SGCN are species in need of timely management intervention or they are likely to reach critical population levels in New York within 10 years. 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 2](#) lists county-rare plant species documented in the town by Dr. David Hunt for the Rensselaer County Biodiversity Greenprint Project.

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. 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.

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.

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 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 maps and descriptions in this summary incorporate information from Rensselaer Land Trust's draft *Land Conservation Plan* (completion expected 2018). It draws on extensive studies in the county by local ecologist Dr. David Hunt, who helped interpret information from the *Conservation Plan* for this report. 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 East Greenbush'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. 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 East Greenbush

General Land Cover and Land Use

The [General Land Cover and Land Use Map](#) provides a bird's-eye view of general habitat types, development, and land use patterns in the Town of East Greenbush based on remote sensing analysis of Landsat satellite imagery. It displays information at a 30-meter spatial resolution from the 2011 National Land Cover Dataset (NLCD, <http://www.mrlc.gov/>). Each 30X30m square displays a land cover or land use class. Overall accuracy for the 2011 assessments was 88%, with variations by geography and by identified class (Wickham et al. 2017). **Note that NLCD data are most reliable at regional scales and have important limitations at the municipal scale. The data are not necessarily accurate for all locations and do not distinguish many important habitat types.** Read more about the applications and limitations on the NLCD factsheet (<http://pubs.usgs.gov/fs/2012/3020/>). Used in an appropriate manner, the land cover/land use data can be a helpful tool to understand general patterns of land cover and land use, to identify large connected habitat areas, and to identify potential areas of concern where land uses may impact habitats or water resources. Definitions for land cover and land use classes shown on the map are as follows (https://www.mrlc.gov/nlcd11_leg.php):

Open Water- areas of open water, generally with less than 25% cover of vegetation or soil.

Developed, Open Space- areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.

Developed, Low Intensity- areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

Developed, Medium Intensity -areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

Developed High Intensity-highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.

Barren Land (Rock/Sand/Clay) - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.

Deciduous Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.

Evergreen Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.

Mixed Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.

Shrub/Scrub- areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional

stage or trees stunted from environmental conditions.

Grassland/Herbaceous- areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.

Pasture/Hay- areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.

Cultivated Crops - areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.

Woody Wetlands- areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Emergent Herbaceous Wetlands- Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

The following table summarizes the area and percent of East Greenbush represented by each land cover or land use class:

Land Cover/Use Class	Acres	Percent of Town
Open Water	143	0.9%
Developed, Open Space	1693	10.8%
Developed, Low Intensity	1414	9.0%
Developed, Medium Intensity	1494	9.5%
Developed, High Intensity	358	2.3%
Barren Land	19	0.1%
Deciduous Forest	4952	31.6%
Evergreen Forest	823	5.3%
Mixed Forest	210	1.3%
Shrub/Scrub	1074	6.9%
Herbaceous	41	0.3%
Hay/Pasture	2141	13.7%
Cultivated Crops	228	1.5%
Woody Wetlands	853	5.4%
Emergent Herbaceous Wetlands	238	1.5%

Much of the town is developed: 10.8% open space (e.g., lawns), 9% low intensity, 9.5% moderate intensity and 2.3% high intensity development. The most intensely developed areas follow the Route 9&20 and Route 4 corridors. The town still retains substantial forest and shrubland areas, hayfields, and meadows, especially east of I-90. In addition, large wetlands occur along riparian corridors and on Papscanee Island. Coastal habitats, floodplains, wetlands, large forests, and grassland and shrubland habitats are further described in subsequent sections of this report.

Significant Ecological Features

The [Significant Ecological Features Map](#) highlights the most significant *known* ecological features in East Greenbush based on state and county-level assessments. Some of the overlapping layers in the map may be viewed in greater detail using the [Hudson Valley Natural Resource Mapper](#).

The Town of East Greenbush spans approximately 24.5 square miles including underwater lands in the Hudson River along a portion of its western boundary. All land in the town ultimately drains to the Hudson River Estuary, a globally rare ecosystem that supports many rare species as well as regionally important fisheries. Tidal wetlands and shallow water habitats in the estuary and Papscanee Creek encompass some of the town's most biologically significant habitats. The Upper Hudson River Estuary is identified as a Significant Biodiversity Area (SBA) by the DEC Hudson River Estuary Program, including the town's Hudson River shoreline and Papscanee Marsh and Creek. SBAs are locations of high concentration of biological diversity or value for regional biodiversity, and are described in the Hudson River Estuary Wildlife and Habitat Conservation Framework (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 open water, tidal wetlands, and tributaries in the upper reach of the Hudson are regionally important fish spawning habitats for anadromous fish, especially American shad, striped bass, Atlantic sturgeon and shortnose sturgeon, and provide habitat for all life stages of resident freshwater species. The numerous creeks and tidal freshwater marshes in this stretch serve as breeding, nursery, and migration corridors supporting waterfowl, shorebirds, herons, raptors, and passerine birds. Regionally and globally rare tidal communities include freshwater tidal swamp, freshwater tidal marsh, freshwater intertidal mudflats, and freshwater intertidal shore."

From a county-wide perspective, Rensselaer Land Trust's draft *Land Conservation Plan* (2018) also highlights the town's coastal resources and a few other resource targets and conservation priority areas in Appendix D. It states:

"The tidal wetlands and floodplains along the Hudson River and Papscanee Creek are a high priority for water resources, agricultural areas, ecological resources (uncommon habitats, plants, and animals), and climate resiliency (this area will allow the migration of tidal wetlands as river level rises). The corridor of the Moordener Kill North Branch has high priority water resources, and flows through East Greenbush Town Park, the largest public land and the center of high priority scenic areas. Other high priority water resources are along Mill Creek and west of Miller Road, and other high priority agricultural resources are in the eastern part of the town. Of lower priority on a county-wide scale but significant for East Greenbush are the large areas of forested lands in the area of Best Road and Best-Luther Road (particularly north of Best Road) and the wetlands near Best Road which help protect water quality of streams and provide wildlife habitat. Areas of uncommon plants are found near Mannix Road and along Mill Creek."

Several map layers from the *Conservation Plan* are described further below.

Significant Coastal Fish and Wildlife Habitats. 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. Papscanee Marsh and Creek is a designated significant coastal fish and wildlife habitat in East Greenbush and is described under [Coastal Habitat](#).

Known Important Areas for Rare Animals. The New York Natural Heritage Program (NYNHP) has

identified areas of importance for sustaining populations of rare plants and rare animals based on existing records and the species' habitat requirements. Known important 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 or disperse 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 known important areas in East Greenbush for freshwater mussels, Bald Eagle, and migratory fish, as well as important areas for the tidal river natural community. A complete list of state rare species documented in East Greenbush is shown in [Table 1](#).

[Alewife floater](#) is a state-rare mussel documented near East Greenbush in the Hudson River and mouth of the Normans Kill. Populations of these mussels have declined dramatically since exotic zebra mussels were introduced to the Hudson River Estuary in the 1990s. These and other freshwater mussels are furthermore threatened by habitat loss and fragmentation, especially from dams; siltation and sedimentation from dams, altered river flows, and surface run-off.

[Bald Eagle](#) (NY-Threatened, SGCN) nesting is known in East Greenbush along the Hudson River. 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 sensitive to human disturbance.

Migratory fish species including NY-Endangered Atlantic sturgeon and [Shortnose Sturgeon](#) and SGCN such as Blueback Herring, Alewives, and American Eel utilize the Town's Hudson River coastal habitats. **Diadromous fish** refer to species that migrate between the sea and freshwater. Those that return to freshwater habitats to spawn are also referred to as **anadromous** and include sturgeon and herring species. Stream reaches used by American eel are shown in [Stream Habitat for Migratory Fishes](#).

The Hudson is an important **tidal river community** in a relatively intact landscape that benefits from natural shorelines and vegetated riparian buffers. Protecting diverse and high quality examples of habitats and avoiding habitat alterations are conservation priorities.

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 East Greenbush.

[Streams with Migratory Fish](#). East Greenbush's Hudson River tributaries provide important stream habitat for migratory fish species according to DEC Bureau of Fisheries data and an aquatic habitat connectivity study by NYNHP (White, et al., 2011). American Eel occur along the full length of Mill Creek, the Moordener Kill, and the main tributary to Papscanee Creek in the town. River herring (Alewife and Blueback Herring) spawn in Papscanee Creek and the lower reaches of the Moordener Kill in neighboring Schodack. 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. River herring spend most of their time in coastal waters and return to the fresh water of the Hudson River each spring to spawn before returning back to ocean waters. See the [Streams and Watersheds](#) and [Stream Habitats](#) section, below, for additional information on stream habitat in East Greenbush.

[Trout and Trout Spawning Waters](#). [DEC's Water Quality Standards and Classifications](#) identify trout or trout-spawning presence along classified stream segments and suggest there is coldwater habitat suitable for trout in the North Branch Moordener Kill and for trout-spawning in Mill Creek starting just downstream of Route 151. DEC Bureau of Fisheries records in the Atlas of Inland Fishes of New York (Carlson et al. 2016)

confirm recent records of native brook trout in Mill Creek. 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.

Important Ecosystem Complexes. The Rensselaer Land Trust's draft *Land Conservation Plan* (2018) identifies several important ecosystem complexes in East Greenbush, representing uncommon or restricted habitat types likely to support rare or uncommon native species. Ecosystem complexes are groupings of habitat types that often co-occur across a landscape in relation to underlying physical features. **Papscanee Island and Creek** includes tidal and wetland aquatic habitat complexes that rank the highest in the town in terms of county-level importance. **Rensselaer Bay** is mapped at a lower level of significance. Despite disturbed conditions, **Hampton Manor Lake** is noted as one of only two known examples of natural calcareous (calcium-rich) lakes in the county. The **Best Road Wetlands** complex is ranked among the top 5 of such examples in the county. The **Moordener Kill Riparian Wetlands** complex is also identified as important.

Important Aquatic Networks. The *Conservation Plan* also identifies broader important aquatic networks encompassing the freshwater tidal Hudson River and the riparian and headwater areas of the North Branch Moordener Kill. These areas highlight the relatively intact natural condition of these riparian corridors and their adjacent uplands, as well as the relatively clean, connected status of the estuary or in-stream habitats. Maintaining aquatic network areas will benefit the long-term conservation of native aquatic plants and animals (and especially native fish) that rely on intact, connected river landscapes. Note that while Mill Creek supports a wild brook trout population, its riparian corridor and watershed forest cover are in poorer condition than that of the Moordener Kill.

Important Interior Forest Habitat. The *Conservation Plan* identifies mostly or relatively undisturbed interior forest habitat areas, representing the largest areas in the county of contiguous, primarily forest habitats. Interior forest habitats support a broad range of native species including many that are sensitive to human disturbance. These values are discussed further in the [Large Forest](#) section.

County Rare Plant Concentration Areas. The *Conservation Plan* identifies three county-rare plant concentration areas in East Greenbush: Papscanee Island and vicinity, Mannix Road woods, and Mill Creek woods and swamp. A list of rare plants identified in these areas is provided in [Table 2](#).

Coastal Habitats

Coastal habitats of the Upper Hudson River Estuary are dynamic, influenced by connections to upper watersheds, the Atlantic Ocean, and the changing tides. This reach of the estuary is entirely freshwater, supporting globally rare natural communities such as freshwater tidal marsh and swamp. The [Coastal Habitat Map](#) displays the distribution of natural shorelines, tidal wetlands, submerged aquatic vegetation beds, and documented significant coastal fish and wildlife habitats in East Greenbush's coastal zone. Streams with migratory fish are described under [Significant Ecological Features](#).

Significant Coastal Fish and Wildlife Habitats. Diverse coastal habitats occur in New York that provide critical habitat and feeding areas for animals as well as economic values. As previously mentioned, 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. 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.

Papscanee Marsh and Creek is a designated significant coastal fish and wildlife habitat spanning approximately 700 acres along the west side of Route 9J in the Towns of East Greenbush and Schodack. According to the [DOS habitat rating form](#) (2012),

“Papscanee Marsh ... is primarily a floodplain wetland area, encompassing a large tidal creek, emergent marshes, freshwater tributaries, old fields, submerged aquatic vegetation, mainly water celery, and young woodlands. The habitat also includes a one-mile segment of the Moordener Kill, which is a medium gradient, warm water stream, with a gravelly substrate and a drainage area of approximately 33 square miles.

Papscanee Marsh and Creek have been subject to considerable human disturbance as a result of navigation channel construction, agricultural use, nearby commercial and industrial developments, stream channel alterations, and the intrusion of invasive species including common reed, purple loosestrife and water chestnut.

Papscanee Creek and its tributaries, especially the Moordener Kill, are important spawning and nursery areas for a variety of coastal migratory fish species such as blueback herring, alewife, American eel, and American shad. In addition, the habitat is an important producer of forage fish (killifish, shiners) that are consumed by larger predatory fish species. Many resident estuarine and freshwater fish species are also found here, including white perch, white catfish, largemouth bass, and smallmouth bass. The submerged aquatic vegetation located within the habitat provides food for fish, invertebrates and waterfowl as well as refuge for fish and invertebrates.”

Papscanee Marsh is also an important resting and feeding area for migratory waterfowl such as American black duck and a confirmed or probable breeding site for numerous bird species. See [Table 1](#) for more information on the documented rare species associated with East Greenbush’s coastal habitats.

Underwater (Subtidal) Habitats. Beds of submerged aquatic vegetation (SAV), primarily water celery, occur along the Papscanee Island Hudson River shoreline. SAV improves water quality by trapping fine sediment and organic matter and adding oxygen to the water. It also provides essential habitat for organisms like insects, worms, and snails that feed fish and birds in the estuary, and serves as nursery habitat for young fish. Native species of SAV in the Hudson such as water celery currently compete for habitat with invasive, non-native water chestnut. Water chestnut does not provide the same water quality benefit as native SAV because its floating leaves release oxygen into the air rather than into the water.

The [Coastal Habitat Map](#) shows areas where SAV has been found since 1997. DEC’s most recent survey in 2014 found less than 0.1 acre of SAV along the Hudson River in East Greenbush, about 0.3% of the area documented with SAV in 2007. Extensive water chestnut has been documented in Papscanee Creek. A dramatic decline in SAV (90% loss) was seen throughout the Hudson River Estuary following Hurricanes Irene and Lee in 2011. The habitat loss was believed to be due to the large amount of sediment entering the estuary from the storms, which blocked light and prevented plant growth. Since 2016, signs of SAV recovery have been seen throughout the estuary. Even if SAV is not present today, the areas shown on the Coastal Habitat Map could support it in the future.

Tidal Wetlands. The wetlands in Papscanee Creek are both freshwater and tidal, a globally rare ecosystem type. Tidal wetlands serve a very important purpose in the river, providing habitat for rare plants and young fish and other benefits for people like wastewater dilution/purification and protecting shorelines from waves and strong storms. The Coastal Habitat Map shows tidal wetlands mapping from a 2007 inventory by DEC, which identified about 28 acres of tidal wetlands in East Greenbush in Papscanee Marsh and Creek.

Dominant wetland vegetation types were water chestnut (8.5 acres), cattail marsh (6.9 acres), and common reed (4 acres).

Tidal Shoreline Status. Natural shorelines are an important transition zone between water and land and provide habitat for diverse plants, fish and wildlife. Tidal shorelines comprise lands directly on the Hudson River as well as the shorelines of tidal wetlands, tidal tributaries, and coves, including both naturally vegetated and hard engineered shoreline. East Greenbush has approximately 3.2 miles of tidal shoreline directly along the Hudson River, in addition to unmapped shoreline along Papscanee Creek. The Coastal Habitat Map shows general shoreline type according to a 2005 inventory of Hudson River shoreline status by NYSDEC and the Hudson River National Estuarine Research Reserve. The study identified 0.6 miles of hard engineered shoreline in East Greenbush, primarily consisting of a bulkhead along the shoreline of Papscanee Island Park. The remaining 2.7 miles of natural shoreline support primarily woody vegetation or unvegetated rock, sand, and gravel.

Towns can evaluate tidal shoreline status to identify places where natural shorelines can be conserved or where the ecology of engineered shorelines could be enhanced. There are opportunities to conserve, restore, and manage shoreline habitats throughout the East Greenbush waterfront area. Parks, preserves, and regulated wetlands may offer a starting point to conserve or restore natural shorelines that will allow tidal wetlands to move with sea level rise. See the Sea Level Rise map in the Natural Resources Inventory to view areas where tidal wetlands are predicted to move inland in the coming decades. Even along working waterfronts there are ways to improve the habitat value of bulkheads and rip-rap revetments. The [Hudson River Sustainable Shorelines Project](#) provides information and tools on enhancing the ecology of built shorelines as well as how to conserve natural shorelines.

Streams and Watersheds

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

*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

Watersheds. 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. All of the land in East Greenbush ultimately drains to the Hudson River Estuary via tributary streams; these drainages are shown on the [Streams and Watersheds Map](#). The Mill Creek watershed drains 11.7 square miles of land in the center of the town. To the west, 6.9 square miles of land drain via Papscanee Creek. An additional 5 square miles of land in eastern East Greenbush drain to the Moordener Kill, and a narrow corner near the City of Rensselaer drains to the small Quackenderry Creek.

Streams and waterbodies on this and other maps in the summary are from the USGS National Hydrography Dataset (NHD) and were digitized from air photos. Note the resulting maps have inherent inaccuracies and do not capture most intermittent streams, which only flow seasonally or after rain. Intermittent streams are in fact widespread, accounting for an estimated 59% of total stream length in the United States. The US Environmental Protection Agency and has

***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.*

compiled extensive scientific reviews highlighting their essential role in maintaining water quantity, quality, and overall watershed function or health (Levick et al. 2008). Intermittent streams also play a vital role in dissipating stream energy during storms and reducing erosion and downstream flood impacts. Visiting sites and creating more accurate maps are methods to pursue to ensure that intermittent streams are identified and considered during planning processes.

Floodplains and Riparian Areas

Effective stream conservation and restoration occurs beyond stream channels and banks. The [Floodplains and Riparian Areas Map](#) highlights streamside areas most closely linked to stream physical processes, habitat, and water quality.

Riparian Areas. NYNHP's Riparian Opportunity Assessment (Conley et. al. 2018) mapped riparian areas across New York using the Riparian Buffer Delineation Model (Abood et al. 2012). The riparian areas highlight important streamside areas that influence stream dynamics and health. Riparian areas intercept stormwater runoff, filter sediment and nutrients, and help attenuate flooding. Forested riparian buffers provide organic matter that supports the in-stream food web and shade that helps maintain cool water temperatures. They also support unique and diverse habitats, and serve as wildlife travel corridors (Knab-Vispo and Vispo 2010). The riparian areas were mapped around streams based on digital elevation data, known wetlands, and modeling for the 50-year flood zone. The riparian areas overlap with FEMA floodplain data in the map and are available for viewing in greater detail using the [Hudson Valley Natural Resource Mapper](#). Note that the riparian areas were developed through modeling and have not been field verified. Nevertheless, they can provide a starting point to inform land use strategies and stream protection efforts. 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.

Floodplains. Floodplains are a particularly important component of riparian areas, especially where forested or undeveloped. Natural floodplains provide space streams need to expand, contract, and sometimes change course, and they promote groundwater recharge. Furthermore, they safeguard human settlement from the damaging impacts of flood events. Floodplains are provided from [Federal Emergency Management Agency](#) (FEMA) Digital Q3 Flood Data, which were developed by scanning existing hardcopy Flood Insurance Rate Maps developed in the 1980s. FEMA has recently updated many flood hazard maps across the country to reflect physical changes in floodplains, new data, and improved modeling capabilities. However, as of 2018, FEMA has not yet completed digital remapping for Rensselaer County.

*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.*

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"), include Papscanee Island and riparian areas along Mill Creek and the North Branch Moordener Kill. It is important to note that the 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.

Stream Habitats

From cold, medium gradient, headwater streams like Mill Creek to the large, warm Hudson River Estuary, East Greenbush supports a variety of streams and rivers illustrated in the [Stream Habitats Map](#). The Town's streams store freshwater and support diverse aquatic life, as well as recreational activities like fishing and

boating.

Stream Habitats. The Nature Conservancy (Olivero and Anderson 2008) has mapped and classified stream habitats across the Northeast region based on four attributes: size (the area drained by the stream; the primary classification variable), gradient (the steepness of the stream channel), geology (influence on water pH), and temperature (the mean summer water temperature). The following stream habitat descriptions are based on TNC's accompanying aquatic habitat guides (Anderson et al. 2013). **Note:** the stream habitat classification system was developed based on remote assessment at a regional scale, and has not been field verified. Nevertheless, it can provide a starting point for understanding the diversity of stream habitat conditions and associated wildlife and plants.

Medium gradient, cold, headwaters and creeks (Examples: Mill Creek)

Cold, moderately fast-moving, headwaters and creeks of hills and gentle slopes. These small streams of northern regions or high elevations, occur on hills and slopes at moderate to high elevations in small watersheds (< 39 sq.mi). They have cold moderately fast-moving waters with good oxygenation. Instream habitats are dominated by riffle-pool development. Permanent cold water temperatures in these streams means coldwater fish species, such as brook trout and slimy sculpin likely represent over half of the fish community.

Medium gradient, cool, headwaters and creeks (Example: Papscanee Creek tributary)

Similar to medium gradient, cold, headwaters and creeks, but with a higher proportion of cool and warm water species such as smallmouth bass and white sucker relative to coldwater species.

Low gradient, cool, headwaters and creeks (Example: Moordener Kill)

Cool, slow-moving, headwaters and creeks of low-moderate elevation flat, marshy settings. These small streams of moderate to low elevations occur on flats or very gentle slopes in small watersheds. The cool slow-moving waters may have high turbidity and be somewhat poorly oxygenated. Instream habitats are dominated by glide-pool and ripple-dune systems with runs interspersed by pools and a few short or no distinct riffles. Bed materials are predominantly sands, silt, and only isolated amounts of gravel. Cool and warm water species predominate.

Tidal, low gradient, cool, headwaters and creeks (Example: Papscanee Creek)

Slow-moving, shallow, tidally influenced creeks and headwater streams. These tidal creeks and streams connect directly to the ocean or to large tidal rivers estuaries and have small watersheds. The water flow and level in these streams is tidally influenced. Most tidal streams have moderately firm, sandy channel bottoms and vertical banks that are regularly eroded and slump into the creek bottom. These streams and their associated estuaries support a rich diversity of plant and animals and serve as the primary nursery area for many marine fishes. The ecological importance of small tidal streams has historically been undervalued, but recent research is showing their collective influence on estuarine ecosystem function may equal or exceed that of larger tidal rivers.

Tidal, low gradient, warm, large river (Example: Hudson River).

Slow moving, large, deep, tidally influenced rivers. These very large rivers connect directly to the ocean or to large estuaries and their water flow and level fluctuates with the tides. They have large upstream watersheds (>1000 sq.mi) and are often over 300 feet wide. In the river there is a vertical salinity gradient (but note that the Upper Hudson River Estuary is entirely freshwater). Plant and wildlife communities found in and along the river are determined by both depth and salinity. These rivers and their associated estuaries support a rich diversity of plant and animals and serve as the primary nursery area for many marine, estuarine, and anadromous fishes.

Important Aquatic Networks. The Hudson River shoreline and the largely intact forested riparian corridor and headwaters of the North Branch Moordener Kill are highlighted as Important Aquatic Networks and described under [Significant Ecological Features](#).

Riparian Areas. Riparian areas including streamside buffers, adjacent wetlands, and the 50-year flood zone are described under [Floodplains and Riparian Areas](#).

Trout and Trout Spawning Waters. [DEC's Water Quality Standards and Classifications](#) identify trout or trout-spawning presence along classified stream segments and suggest there is coldwater habitat suitable for trout in the North Branch Moordener Kill and for trout-spawning in Mill Creek starting just downstream of Route 151.

Dams and Culverts. Infrastructure in streams, such as dams and culverts, can isolate and severely limit the range of fish and other aquatic organisms that use stream corridors. Dams and culverts can present physical barriers to passage, and these structures can also become impassable by changing water quality (e.g. temperature) and quantity (e.g. high velocity). Dams can also lead to flow barriers, when the water in the impoundment behind the dam is used, consumed, or diverted for other purposes (e.g., drinking water supply), leading to lack of water downstream. In some cases, pollution and channel modifications can create the same kinds of barriers. Just as many forest-dwelling species are negatively impacted by forest fragmentation from roads and structures, stream barriers disconnect streams and decrease available habitat. Historically, as mills and road crossings were added to the streams of the Hudson Valley, dams and culverts blocked off and cut up the habitat for organisms like brook trout and American eel. Stream barriers can also have serious effects on local flooding and water quality. Streams flowing into undersized culverts can flood upstream and, in some cases, overtake and wash out a road during heavy precipitation or snowmelt. Bridges, open-bottom culverts and similar structures that completely span the waterway and associated floodplain/riparian area generally have the least potential impacts on hydrology, floodplains, and habitat.

The Stream Habitats map displays the **New York State Inventory of Dams**. While the DEC tries to maintain an accurate inventory, this data should not be relied upon for emergency response decision-making. DEC recommends that critical data, including dam location and hazard classification, be verified in the field. The presence or absence of a dam in this inventory does not indicate its regulatory status. Note that assessments by the DEC Hudson River Estuary Program in trial watersheds indicate that perhaps twice as many barriers exist than are recorded in the NYS Inventory of Dams.

Culvert data are provided from the [North Atlantic Aquatic Connectivity Collaborative](#) (NAACC), a network focused on improving aquatic habitat connectivity across the Northeast region. Only one culvert in East Greenbush has been formally assessed and identified as a significant aquatic barrier (on Phillips Rd). The DEC Hudson River Estuary Program is leading efforts in the Hudson Valley to assess road-stream crossings for aquatic passability and to mitigate significant barriers to increase aquatic habitat available for SGCN species such as Brook Trout and American Eel. Technical assistance is available to conduct assessments and prioritize known aquatic barriers for removal or mitigation.

Wetlands

There are many types of wetlands in East Greenbush, including wet meadows, emergent marsh, forested and shrub swamps, vernal pools, floating and submerged vegetation, and open water, as well as the variety of tidal wetland types in the estuary discussed in the [Coastal Habitat](#) section. 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

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

is surrounded by pavement, buildings, and pollution-generating or other incompatible land uses ([Environmental Law Institute 2008](#)).

Knowing about local wetlands can enable the town to proactively plan to conserve this critical part of our life support system. The [Wetlands Map](#) shows information from several existing sources that provide approximate locations and extent of wetlands. They are inherently inaccurate and not a substitute for site visits and on-the-ground delineation. Nonetheless, the town can use these maps as a starting point for inventorying local wetlands and supplement them with more refined data as they become available.

National Wetlands Inventory and NYS Freshwater Wetlands. Mapped wetlands are shown from the U.S. Fish and Wildlife Service's (USFWS) [National Wetlands Inventory \(NWI\)](#) as well as DEC's [Regulatory Freshwater Wetlands](#) (which only include wetlands larger than 12.4 acres, unless designated "of unusual local importance"). Open water habitats including the Hudson River are symbolized in blue as "waterbodies." NWI maps offer general information on wetland habitat, distinguishing forested wetlands (e.g., shrub or forest swamp) from emergent wetlands (e.g. marsh or wet meadow). Wildlife records indicate that four-toed salamander, a High Priority SGCN, inhabits wetlands in East Greenbush. Communities can learn more about wetland habitat values by conducting local surveys and studies. Note that 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 wetland maps are outdated and have similar inaccuracies (Huffman and Associates 2000). NWI and NYS freshwater wetlands can be viewed using the [Environmental Resource Mapper](#).

Tidal Wetlands. Wetlands at Papscanee Island and Creek are both freshwater and tidal, considered to be globally rare. They are described under the Coastal Habitats section.

Wetland Soils. County soil maps are also a good source for predicting the location of potential wetlands. Soils classified as very poorly drained or poorly drained are good indicators of probable wetland areas, and soils classified as somewhat poorly drained may indicate possible wetland areas (Kiviat and Stevens 2001). Note that the probable and possible wetland areas cover a greater area than NWI and DEC wetland layers. 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.

Important Wetland Complexes. Rensselaer Land Trust's draft *Land Conservation Plan* (2018) identifies several important wetland ecosystem complexes in East Greenbush, described under the Significant Ecological Features map. They include **Papscanee Island and Creek**, **Hampton Manor Lake**, the **Best Road Wetlands** complex, and the **Moordener Kill Riparian Wetlands**.

Although no [vernal pools](#) have been mapped in East Greenbush, local wood frog and spotted salamander records in the *NY Amphibian and Reptile Atlas* indicate that vernal pools likely occur in the town. Vernal pools are small, isolated wetlands that are often dry in summer. They provide habitat for many animals, including a group of forest amphibians which use the pools for breeding. Vernal pools often go undetected in the forest due to their small size and seasonal drawdown. Vernal pools and other small, isolated wetlands are also vulnerable due to limited regulatory protection (see [Conserving Small Wetlands in the Hudson Valley](#) for more information). 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).

Large Forests

The [Large Forest Map](#) shows forests greater than 200 acres in size, which 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 East Greenbush'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.

Large Forests. Large forest patches were identified from 2010 land cover data developed for the National Oceanic and Atmospheric Administration's Coastal Change Analysis Program. 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. Forest patch size classifications follow the Orange County Open Space Plan (Orange County Planning Department 2004) as cited in Strong (2008).

East Greenbush's forests are small compared to rural parts of Rensselaer County; however, sizeable patches of forest habitat persist in the more undeveloped parts of the town, as well as small patches and street trees that contribute to a better quality of life in suburban areas. Intact forest patches ranging from 200-1,000 acres remain throughout East Greenbush, primarily along Route 9J and east of the I-90 corridor. "Stepping stone" forest patches such as these may provide habitat for some forest interior species as well as relatively broad corridors for wildlife movement and plant dispersal. They enable a large array of species, including wide-ranging and area-sensitive species, to move from one habitat to another across a landscape fragmented by roads and developed areas. Forested stream corridors are particularly favored travel routes for many species of wildlife and help protect water quality and habitat. The North Branch Moordener Kill retains a relatively intact forest corridor highlighted as an **Important Aquatic Network** in the [Stream Habitat Map](#). The East Greenbush Town Park is a protected portion of a stepping stone forest along this corridor, and supports many woodland plant species and mixed-age forest stands which include large, older trees (Schmitt and Miller 1994). Although rare species and significant habitats have not been documented in the park, it was identified through as having biodiversity value through the Rensselaer Land Trust's community values meetings (RLT 2018).

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.

The 200-acre threshold is often considered a minimum size for intact forest ecosystems. Smaller forests have limited habitat value for forest interior bird species and suffer greater impacts from development. Forest edge disturbances dominate small forests, such as invasive species, increased predation levels, and micro-climatic differences. Many of the larger forest patches mapped in East Greenbush appear to have considerable edge habitat, and are in fact divided by local roads, driveways, or small-scale development. These forests nevertheless serve a critical ecological function as buffers to the town's streams and help to protect steep slopes, promote groundwater infiltration, and reduce flood damage. Regardless of size or habitat values, all forests and trees in the town help to manage stormwater, moderate temperature, and improve air quality, among other ecosystem benefits. The [General Land Cover Map](#) shows approximate location of forests of all sizes in the Town.

Wildlife records confirm the availability of high-quality forest habitat in East Greenbush. The [2000-2005 NYS](#)

[Breeding Bird Atlas](#) documented several forest-interior bird species of conservation concern in the town, including NY-Species of Greatest Conservation Need such as scarlet tanager, sharp-shinned hawk, and wood thrush ([Table 1](#)). Audubon New York's website has specific information on [managing habitat for forest birds](#).

Important Interior Forest Habitat. Rensselaer Land Trust's draft *Land Conservation Plan* (2018) identifies a few mostly or relatively undisturbed interior forest habitat areas in East Greenbush, which occur east of Route 9J, along the Mill Creek corridor, and north of Best Road. These large forest areas far from roads and development are the most likely places in the town to support populations of forest-interior nesting birds and other sensitive wildlife species.

One of the greatest threats to forests in East Greenbush today is the introduction of tree diseases, forest pests, and other invasive species inadvertently brought in by people through landscaping and international commerce. Hemlock woolly adelgid and emerald ash borer have already done much damage in nearby towns, and are expected to eventually kill most large trees of these common species in the region. Also, oak wilt, a fungal disease which can quickly kill oak trees, is in nearby Schenectady County. The DEC Division of Lands and Forests has further information about [Forest Health Issues](#) and preventative measures to reduce the spread of pests, such as using locally-sourced firewood. The [Capital/Mohawk Partnership for Regional Invasive Species Management](#) (PRISM) works to promote education, prevention, early detection and control of invasive species and is helping communities to prepare for and respond to this threat. Guiding future development to minimize forest fragmentation and loss will help minimize the spread of invasive species into interior forests and conserve important habitats in the town.

Grasslands, Shrublands, and Young Forests (see General Land Cover and Land Use Map)

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 the [General Land Cover and Land Use Map](#), aerial photography, and breeding bird records that valuable grasslands, shrublands, and young forests occur in East Greenbush (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. East Greenbush is largely forested or developed today, but the General Land Cover and Land Use map indicates that approximately 15% of the town is in herbaceous land cover (hay, pasture, or cropland). The [2000-2005 NYS Breeding Bird Atlas](#) documented breeding by three grassland bird Species of Greatest Conservation Need in the East Greenbush area, including eastern meadowlark, bobolink, and American kestrel (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 10 species of conservation concern in East Greenbush that prefer young forest and shrubland habitat, including American woodcock, ruffed grouse, and blue-winged warbler (see [Table 1](#)). For more information, see Audubon's guidance on [managing habitat for shrubland birds](#).

Town of East Greenbush Natural Resources Inventory

General Land Cover and Land Use

Map Legend

Land Cover

- Developed - High Intensity
- Developed - Medium Intensity
- Developed - Low Intensity
- Developed - Open Space
- Emergent Herbaceous Wetlands
- Woody Wetlands
- Open Water
- Cultivated Crops
- Hay/Pasture
- Barren Land
- Shrub/Scrub
- Herbaceous
- Deciduous Forest
- Mixed Forest
- Evergreen Forest

Roads

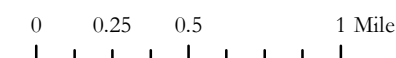
- Interstate
- State/US Highway
- Local Street
- Railroad

Hydrology

- Open Water
- River/Stream

- Municipality

Scale: 1:40,000



Data Sources: *Land Cover:* National Land Cover Dataset: U.S. Geological Survey (2011). | *Roadways:* ESRI North American Detailed Streets (2010). | *Railroads:* NYS DOT (May 2013). | *Towns:* NYS GIS Program Office (January 2017). | *Elevation:* NYS DEC and U.S. Geological Survey (date unknown). | *Rivers/Streams:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). **Note:** This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of Coeymans Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu>

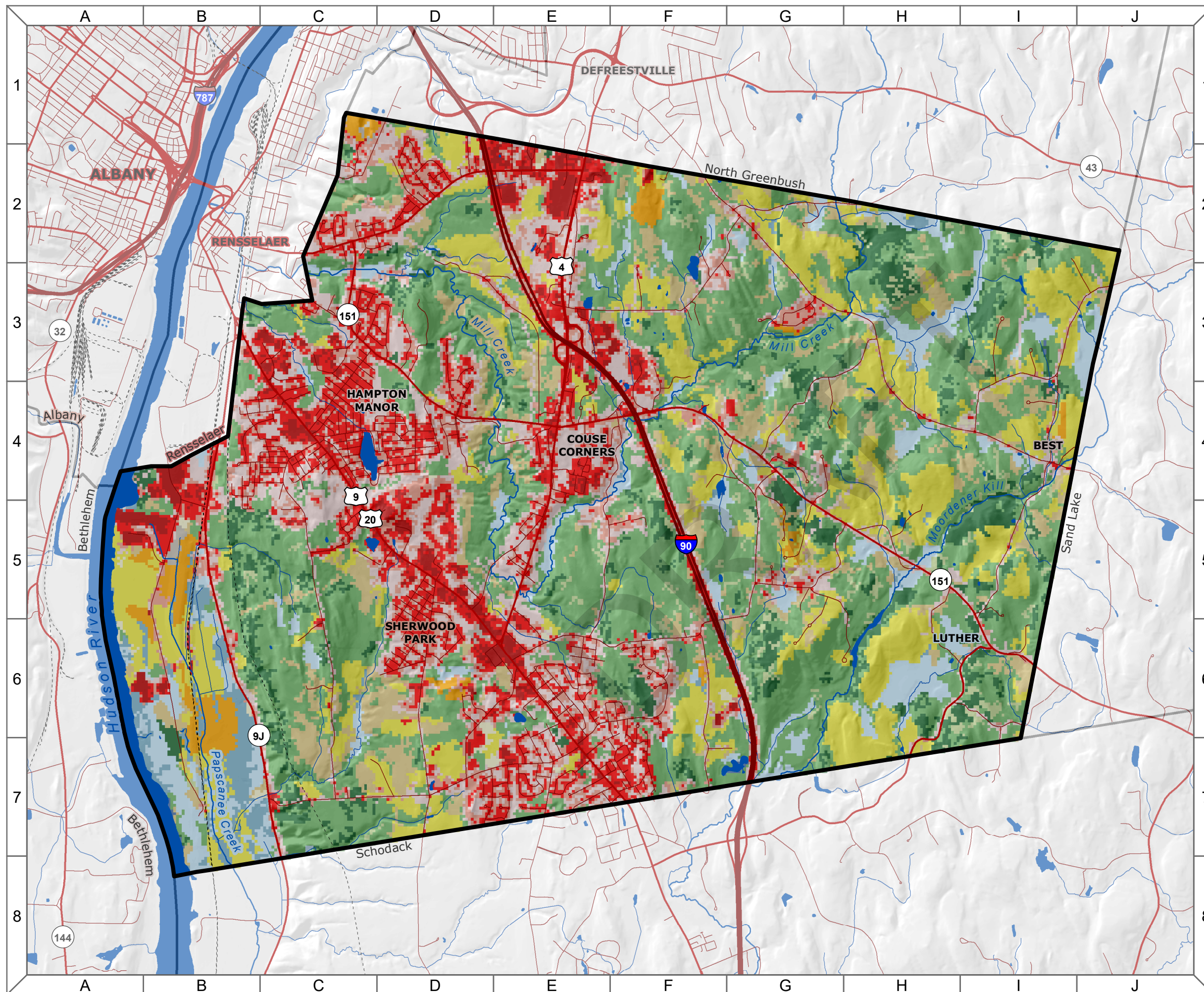


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Town of East Greenbush Natural Resources Inventory Significant Ecological Features

Map Legend

Ecological Features

- Important Aquatic Networks
- County Rare Plant Concentration Areas
- Known Important Areas: Animals
- Known Important Areas: Natural Communities
- Papscaene Marsh and Creek Significant Habitat
- Important Ecosystem Complexes
- Important Interior Forest Habitat

- Streams with Migratory Fish
- Trout Spawning Water
- Trout Water

Hydrology

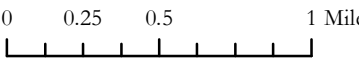
- Open Water
- Wetland
- River/ Stream

Roads

- Interstate
- State/US Highway
- Local Street
- Railroad

- Municipality

Scale: 1:40,000



Data Sources: *Important Aquatic Networks*, *County Rare Plant Concentration Areas*, *Important Ecosystem Complexes*, *Important Interior Forest Habitat*: Rensselaer Land Trust and Dr. David Hunt (2017). | *Known Important Areas - Animals/Natural Communities*: NYS Natural Heritage Program (March 2013). | *Papscaene Marsh and Creek Significant Habitat*: NYS DEC Hudson River Estuary Program (2006). | *Streams with Migratory Fish*: The Nature Conservancy Eastern Conservation Science (2008). | *Trout and Trout Spawning Waters*: NYS DEC Bureau of Water Assessment and Monitoring (May 2017). | *Roadways*: ESRI North American Detailed Streets (2010). | *Railroads*: NYS DOT (May 2013). | *Towns*: NYS GIS Program Office (January 2017). | *Topography*: U.S. Geological Survey (Unknown). | *Wetlands*: US Fish and Wildlife Service (2012) and NYS DEC (2013). **Note:** This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of East Greenbush Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu>
Map by Andrew Varuzzo, 2018.



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Town of East Greenbush Natural Resources Inventory Coastal Habitats

Map Legend

Coastal Habitats

- Submerged Aquatic Vegetation
- Tidal Wetlands
- Significant Coastal Fish & Wildlife Habitat
- Streams with Migratory Fish

Shoreline Status

- Natural¹
- Hard Engineered²

Hydrology

- Open Water
- Wetland
- River/ Stream

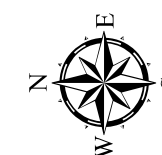
Roads

- State/US Highway
- Local Street
- Railroad

- Municipality

Scale: 1:20,000

0 0.125 0.25 0.5 Mile



1. Riverbank lined with sand, mud, natural rock or woody vegetation.
2. Riverbank lined with man-made timber, metal, concrete or rock.

Data Sources: *Submerged Aquatic Vegetation and Tidal Wetlands:* Cornell Institute for Resource Information Sciences, NYS DEC and Hudson River National Estuarine Research Reserve (2014/2007). | *Significant Coastal Wildlife Habitat:* NYS Department of State, Division of Coastal Resources (1998). | *Diadromous Fish:* The Nature Conservancy Eastern Conservation Science (2008). | *Shoreline Status:* Hudson River National Estuarine Research Reserve (2005). | *Roadways:* ESRI North American Detailed Streets (2010). | *Railroads:* NYS DOT (May 2013). | *Towns:* NYS GIS Program Office (January 2017). | *Elevation:* NYS DEC and U.S. Geological Survey (date unknown). | *Rivers/Streams:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). | *Wetlands:* US Fish and Wildlife Service (2012) and NYS DEC (2013). **Note:** This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of East Greenbush Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu>
Map by Andrew Varuzzo, 2018.

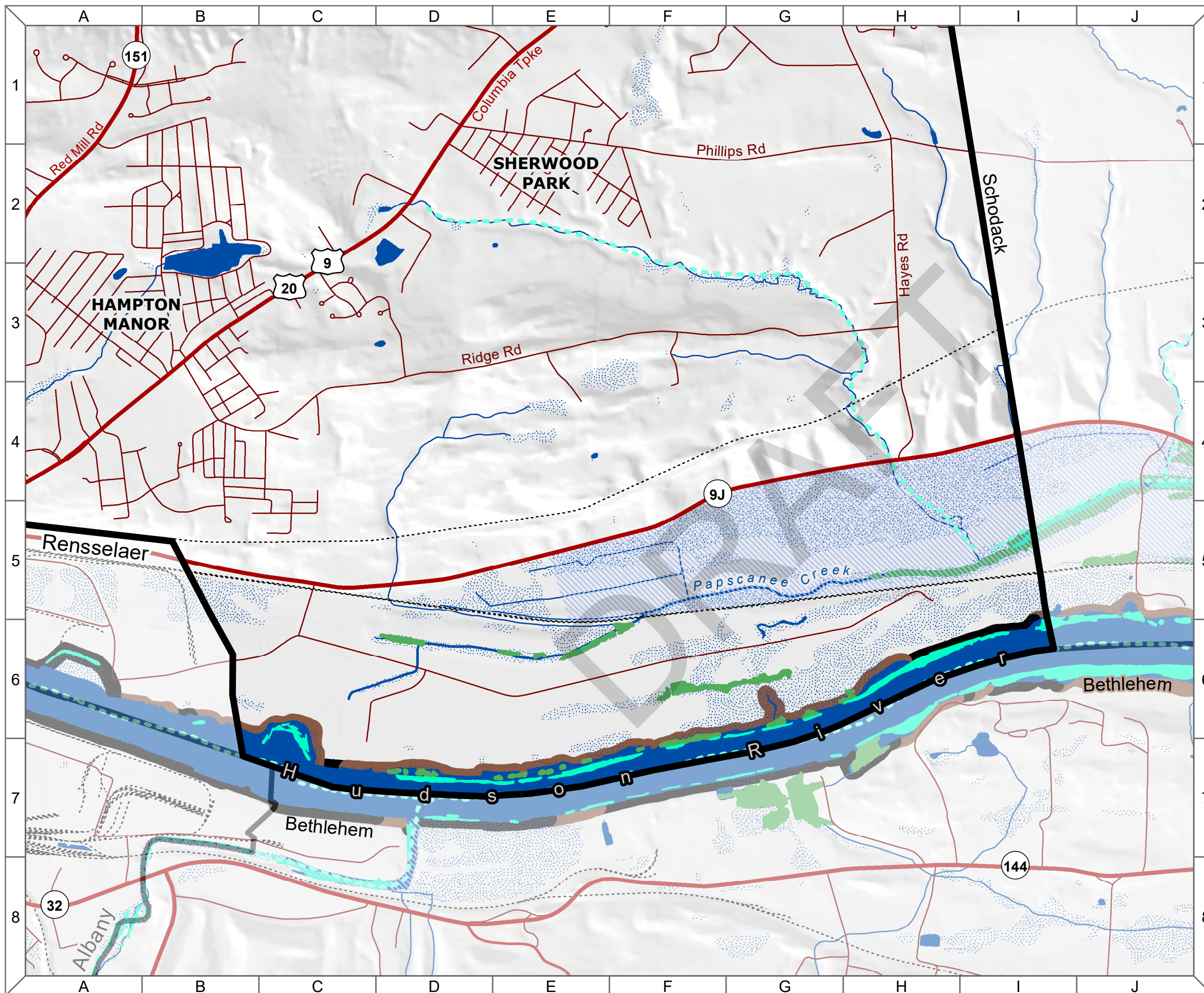


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Town of East Greenbush Natural Resources Inventory

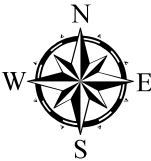
Streams and Watersheds

Map Legend

- Watersheds**
 - Mill Creek Watershed
 - Moordener Kill Watershed
 - Papscanee Creek/Hudson River Watershed
 - Rensselaer Creek/Hudson River Watershed
- Hydrology**
 - Open Water
 - Wetland
 - River/Stream
- Roads**
 - Interstate
 - State/US Highway
 - Local Street
 - Railroad
- Municipality**

Scale: 1:40,000

0 0.25 0.5 1 Mile



Data Sources: *Watersheds:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). | *Roadways:* ESRI North American Detailed Streets (2010). | *Railroads:* NYS DOT (May 2013). | *Towns:* NYS GIS Program Office (January 2017). | *Elevation:* NYS DEC and U.S. Geological Survey (date unknown). | *Rivers/Streams:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). | *Wetlands:* US Fish and Wildlife Service (2012) and NYS DEC (2013). **Note:** This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of East Greenbush Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu> Map by Andrew Varuzzo, 2018.

Town of East Greenbush Natural Resources Inventory Floodplains and Riparian Areas

Map Legend

FEMA Flood Hazard Areas
1% (100-Year) Flood Zone

Hydrology
Riparian Areas
Open Water
Wetland
River/Stream

Roads
Interstate
State/US Highway
Local Street
Railroad

Municipality

Scale: 1:40,000

0 0.25 0.5 1 Mile



Data Sources: *Flood Zones:* Federal Emergency Management Agency (June, 2015). | *Riparian Areas:* NY Natural Heritage Program (2018). | *Roadways:* ESRI North American Detailed Streets (2010). | *Railroads:* NYS DOT (May 2013). | *Towns:* NYS GIS Program Office (January 2017). | *Elevation:* NYS DEC and U.S. Geological Survey (date unknown). | *Rivers/Streams:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). | *Wetlands:* US Fish and Wildlife Service(2012) and NYS DEC (2013). **Note:** This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of East Greenbush Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu>. Map by Andrew Varuzzo, 2018.

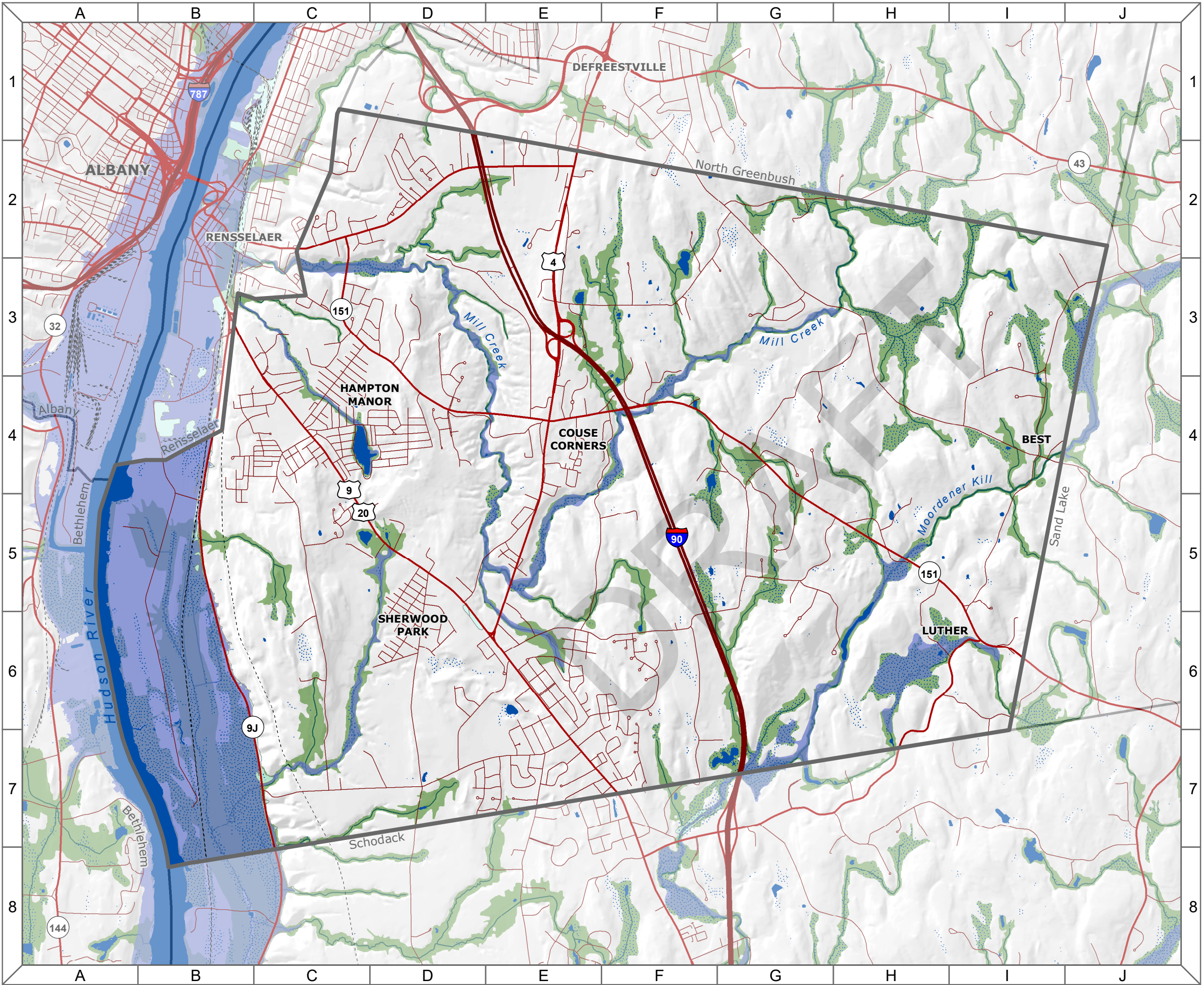


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Town of East Greenbush Natural Resources Inventory Stream Habitats

Map Legend

Stream Habitats¹

- (Tidal) Low Gradient, Cool, Headwaters & Creeks
- (Tidal) Low Gradient, Warm, Large River
- High Gradient, Cold, Headwaters and Creeks
- Med. Gradient, Cold, Headwaters and Creeks
- Med. Gradient, Cool, Headwaters and Creeks
- Med. Gradient, Cool, Small River
- Low Gradient, Cold, Headwaters & Creeks
- Low Gradient, Cool, Headwaters & Creeks
- Trout/Trout Spawning Stream Segments
- Other Streams

- Dams
- Culvert: No Barrier
- Culvert: Barrier
- Culvert: No Data

Other Hydrology

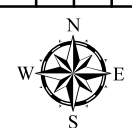
- Open Water
- Wetland
- Important Aquatic Networks
- Watershed Boundary
- Riparian Buffers

Roads

- Interstate
- State/US Highway
- Local Street
- Railroad
- Municipality

Scale: 1:40,000

0 0.25 0.5 1 Mile



1. Tidal classifications revised based on local knowledge.
2. Moordener Kill, Mill Creek and a tributary of Papsancee Creek are documented habitat for American Eel.

Data Sources: *Stream Habitat:* The Nature Conservancy- Northeast Aquatic Habitat Classification (May 2013) | *Trout Waters:* NYS DEC Bureau of Water Assessment and Monitoring (April 2010). | *Dams:* NYS DEC (2009). | *Culverts:* North Atlantic Aquatic Connectivity Collaborative (2017). | *Aquatic Networks:* Rensselaer Land Trust and Dr. David Hunt (2018). | *Watersheds:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). | *Riparian Areas:* NY Natural Heritage Program (2018). | *Roadways:* ESRI North American Detailed Streets (2010). | *Railroads:* NYS DOT (May 2013). | *Towns:* NYS GIS Program Office (January 2017). | *Elevation:* NYS DEC and U.S. Geological Survey (date unknown). | *Rivers/Streams:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). | *Wetlands:* US Fish and Wildlife Service (2012) and NYS DEC (2013). **Note:** This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of East Greenbush Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu>. Map by Andrew Varuzzo, 2018.

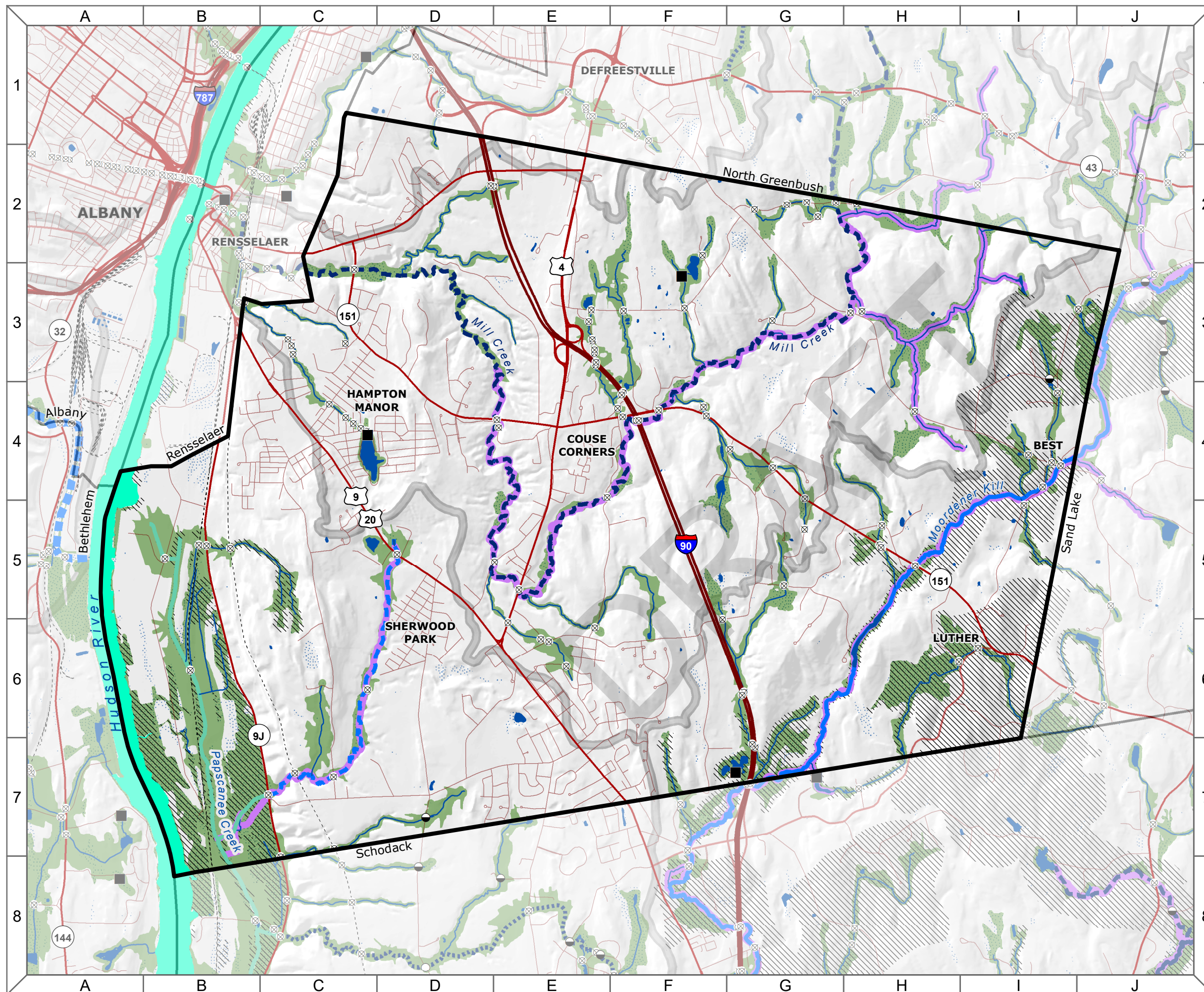


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Town of East Greenbush Natural Resources Inventory Wetlands

Map Legend

Wetlands

- NYS Freshwater Wetlands
- Emergent Wetlands (NWI)
- Forested/Shrub Wetlands (NWI)
- Tidal Wetlands
- Poorly and Very Poorly Drained Soils¹
- Somewhat Poorly Drained Soils²
- Important Wetland Complexes

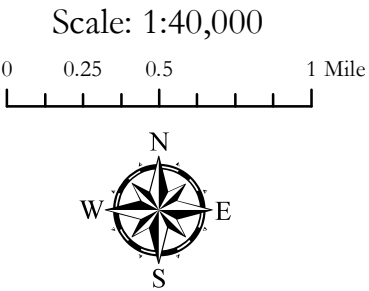
Hydrology

- Open Water
- River/Stream

Roads

- Interstate
- State/US Highway
- Local Street
- Railroad

Municipality



1. These soils suggest probable wetland areas.
2. These soils suggest possible wetland areas

Data Sources: *Probable/Possible Wetlands:* USDA Natural Resources Conservation Service (December 2006). | *Emergent and Forested/Shrub NWI Wetlands:* National Wetlands Inventory - US Fish and Wildlife Service and NYS DEC (September 2012). | *NYS Freshwater Wetlands:* NYS DEC (2002). | *Tidal Wetlands:* NYS DEC, Cornell Institute for Resource Information Sciences, and Hudson River National Estuarine Research Reserve (2007). | *Important Wetland Complexes:* Rensselaer Land Trust and Dr. David Hunt (2017). | *Roadways:* ESRI North American Detailed Streets (2010). | *Railroads:* NYS DOT (May 2013). | *Towns:* NYS GIS Program Office (January 2017). | *Elevation:* NYS DEC and U.S. Geological Survey (date unknown). | *Rivers/Streams:* National Hydrography Dataset: NYS DEC and US Geological Survey (March 2017). | *Wetlands:* US Fish and Wildlife Service and NYS DEC (September 2012). **Note:** This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of East Greenbush Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu> Map by Andrew Varuzzo, 2018.

Town of East Greenbush
Natural Resources Inventory

Large Forests

Map Legend

Forest Resources

- 200 - 1,999 acres - Stepping Stone Forest
- 2,000 - 5,999 acres - Locally Significant Forest
- Important Forest Interiors

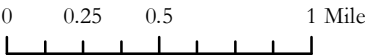
Hydrology

- Open Water
- Wetland
- River/ Stream
- Municipality

Roads

- Interstate
- State/US Highway
- Local Street
- Railroad

Scale: 1:40,000



Data Sources: *Forest Patches:* Cornell University Dept. Natural Resoruces and NYS DEC Hudson River Estuary Program (2010). | *Important Forest Interiors:* Rensselaer Land Trust and Dr. David Hunt (2018). | *Roadways:* ESRI North American Detailed Streets (2010). | *Railroads:* NYS DOT (May 2013). | *Towns:* NYS GIS Program Office (January 2017). | *Topography:* U.S. Geological Survey (Unknown). | *Wetlands:* US Fish and Wildlife Service (2012) and NYS DEC (2013).
Note: This map is intended for general planning and education purposes and is not a substitute for site-level surveys. It relies upon public data sources that may contain errors or omissions. Town of Coeymans Natural Resources Inventory maps were completed with technical assistance from Cornell University, with funding from the NYS Environmental Protection Fund through the NYS DEC Hudson River Estuary Program. <http://hudson.dnr.cals.cornell.edu> Map by Andrew Varuzzo, 2018.



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Species and Ecosystems of Conservation Concern in the Town of East Greenbush

Table 1. Species and Ecosystems of Conservation Concern in East Greenbush, NY

The following table lists species of conservation concern that have been recorded in East Greenbush, NY. The information comes from the [New York Natural Heritage Program](#) (NYNHP) biodiversity databases, 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 East Greenbush. The table only includes species listed in New York as [endangered](#) (at the state (NY) and/or federal (US) level), [threatened](#), [special concern](#), [rare](#), [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 East Greenbush.

			NYS Conservation Status					
Common Name	Scientific Name	General Habitat	Hudson River Valley Priority Bird	Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered	Data Source
Birds								
Bald Eagle	<i>Haliaeetus leucocephalus</i>	coastal	x	x		NY		NYNHP
American Redstart	<i>Setophaga ruticilla</i>	forest	x					NYBBA
Baltimore Oriole	<i>Icterus galbula</i>	forest	x					NYBBA
Black-and-white Warbler	<i>Mniotilta varia</i>	forest	x					NYBBA
Downy Woodpecker	<i>Picoides pubescens</i>	forest	x					NYBBA
Eastern Wood-Pewee	<i>Contopus virens</i>	forest	x					NYBBA
Least Flycatcher	<i>Empidonax minimus</i>	forest	x					NYBBA
Northern Flicker	<i>Colaptes auratus</i>	forest	x					NYBBA
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	forest	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

			NYS Conservation Status					Data Source
Common Name	Scientific Name	General Habitat	<u>Hudson River Valley</u> Priority Bird	<u>Species of Greatest</u> <u>Conservation Need</u> xx = high priority	<u>Special Concern</u>	<u>Threatened</u>	<u>Endangered</u>	
Yellow-throated Vireo	<i>Vireo flavifrons</i>	forest	x					NYBBA
American Kestrel	<i>Falco sparverius</i>	grassland	x	x				NYBBA
Bobolink	<i>Dolichonyx oryzivorus</i>	grassland	x	xx				NYBBA
Eastern Meadowlark	<i>Sturnella magna</i>	grassland	x	xx				NYBBA
Belted Kingfisher	<i>Megaceryle alcyon</i>	stream	x					NYBBA
Chimney Swift	<i>Chaetura pelagica</i>	urban	x					NYBBA
American Goldfinch	<i>Spinus tristis</i>	young forest, shrubland	x					NYBBA
American Woodcock	<i>Scolopax minor</i>	young forest, shrubland	x	x				NYBBA
Blue-Winged Warbler	<i>Vermivora pinus</i>	young forest, shrubland	x	x				NYBBA
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	young forest, shrubland	x					NYBBA
Eastern Kingbird	<i>Tyrannus tyrannus</i>	young forest, shrubland	x					NYBBA
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	young forest, shrubland	x					NYBBA
Field Sparrow	<i>Spizella pusilla</i>	young forest, shrubland	x					NYBBA
Prairie Warbler	<i>Dendroica discolor</i>	young forest, shrubland	x	x				NYBBA
Ruffed Grouse	<i>Bonasa umbellus</i>	young forest, shrubland	x	x				NYBBA
Willow Flycatcher	<i>Empidonax traillii</i>	young forest, shrubland	x					NYBBA

Reptiles								
Common Snapping Turtle	<i>Chelydra s. serpentina</i>	wetlands, coastal		x				NYARA

Amphibians								
Four-toed Salamander	<i>Hemidactylium scutatum</i>	wetlands		xx				NYARA

Fish								
Alewife	<i>Alosa pseudoharengus</i>	coastal		x				NYSDE C
American Eel	<i>Anguilla rostrata</i>	stream		xx				NYSDE C
American Shad	<i>Alosa sapidissima</i>	coastal		xx				NYSDE C

			NYS Conservation Status					Data Source
Common Name	Scientific Name	General Habitat	<u>Hudson River Valley</u> Priority Bird	<u>Species of Greatest</u> <u>Conservation Need</u> xx = high priority	<u>Special Concern</u>	<u>Threatened</u>	<u>Endangered</u>	
Blueback Herring	<i>Alosa aestivalis</i>	coastal		x				NYSDEC
Brook Trout	<i>Salvelinus fontinalis</i>	stream		x				NYSDEC
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	coastal		x			US NY	NYNHP

Historical Records								
Alewife Floater	<i>Anodonta implicata</i>	coastal		xx			US NY	NYNHP
Bog Turtle	<i>Glyptemys muhlenbergii</i>	wetlands		xx		US	NY	NYNHP
Least Bittern	<i>Ixobrychus exilis</i>	wetlands	x	x		NY		NYNHP
Ostrich Fern Borer Moth	<i>Papaipema sp. 2 nr. pterisii</i>	stream						NYNHP
Yellow Lampmussel	<i>Lampsilis cariosa</i>	coastal		x				NYNHP

Table 2. County-Rare Plants in East Greenbush, NY

The following table is comprised of rare plant species observed within the Town of East Greenbush. The observations were made by various surveyors between 2003 and 2016 and were compiled into a report by Dr. David Hunt for the Rensselaer County Biodiversity Greenprint Project. Dr. Hunt prepared this list in a July 3, 2018 memo for the Town of East Greenbush Natural Resources Inventory. 'General Habitats' are based on the habitat where each species was observed, as noted in Dr. Hunt's memo. "Rarity Ranking" categorizes each species by its observed abundance at county, state and global scales. State and global ranking terminology is defined by the New York Natural Heritage Program and county terminology follows the same format. 'Survey Location(s)' identify sites where each species was observed.

Common Name	Scientific Name	General Habitat	Rarity Ranking			Survey Location(s)
			County	State	Global	
bergamont	<i>Monarda sp.</i>	Island	C1C2-	-	-	Papscanee Island & Vicinity
narrowleaf willow	<i>Salix exigua</i>	Island	C1C2-	S4	G4	Papscanee Island & Vicinity
red mulberry	<i>Morus rubra</i>	Island	C1C2N?	S5	G5	Papscanee Island & Vicinity
erect knotweed	<i>Polygonum erectum</i>	Island	C1C2	S2S3	G5	Papscanee Island & Vicinity
sleepy catchfly	<i>Silene antirrhina</i>	Island	C2C3	S5	G5	Papscanee Island & Vicinity
switch grass	<i>Panicum virgatum</i>	Island	C2C3-	S5	G5T5	Papscanee Island & Vicinity
three-square bulrush	<i>Schoenoplectus pungens</i> var. <i>pungens</i>	Island, Wetlands	C2	S5	G5	Papscanee Island & Vicinity; Red Mill Creek
ambiguous sedge	<i>Carex amphibola</i>	Island	C2C3-	S3	G5T4Q	Papscanee Island & Vicinity
naiad	<i>Najas sp.</i>	Island	C2C3	-	-	Papscanee Island & Vicinity
water celery	<i>Vallisneria americana</i>	Island	C2C#	S5	G5	Papscanee Island & Vicinity
large Solomon's seal	<i>Polygonatum commutatum</i>	Island	C2C3	-	-	Papscanee Island & Vicinity
wild black currant	<i>Ribes americanum</i>	Island	C2C3	S5	S5	Papscanee Island & Vicinity
Virginia stickseed	<i>Hackelia virginiana</i>	Island	C2C3/C3	S5	-	Papscanee Island & Vicinity
giant ragweed	<i>Ambrosia trifida</i>	Island	C3d	S4	-	Papscanee Island & Vicinity
estuary beggar ticks	<i>Bidens bidentoides</i>	Creek	C1C2	S3	G3G4	Papscanee Island & Vicinity
southern wild rice	<i>Zizania aquatica</i>	Creek	C2	S5	G5	Papscanee Island & Vicinity
spreading-beaked sedge	<i>Carex squarrosa</i>	Forest	C1C2	S5	G4G5	Mannix Road Woods
wild bergamont	<i>Monarda fistulosa</i>	Forest	C1C2	S5	G5	Mannix Road Woods
black walnut	<i>Juglans nigra</i>	Forest	C2NC3E	S5	G5	Mannix Road Woods
flowering dogwood	<i>Cornus florida</i>	Forest	C2C3	S3S5	-	Mannix Road Woods
pitch pine	<i>Pinus rigida</i>	Forest	C2C3	S5	-	Mannix Road Woods

Common Name	Scientific Name	General Habitat	Rarity Ranking			Survey Location(s)
			County	State	Global	
horse nettle	<i>Solanum carolinense</i>	Forest	C2C3	S5	-	Mannix Road Woods
New Jersey tea	<i>Ceanothus americanus</i>	Forest	C1C2	S5	G5	Mannix Road Woods
white trillium	<i>Trillium grandiflorum</i>	Forest	C1C2>C2	S5	G5	Mannix Road Woods
yellow star grass	<i>Hypoxis hirsuta</i>	Forest	C2C3/C2	S5	G5	Mannix Road Woods
mountain laurel	<i>Kalmia latifolia</i>	Forest	C2C3/C2	S5	-	Mannix Road Woods
Canada lily	<i>Lilium canadense</i>	Forest	C2C3-	S5	G5T4?	Mannix Road Woods
Dutchman's breeches	<i>Dicentra cucullaria</i>	Forest	C2C3	S5	G5	Mannix Road Woods
scarlet oak	<i>Quercus coccinea</i>	Forest	C2C3	S5	G5	Mannix Road Woods
rue anemone	<i>Thalictrum thalictroides</i>	Forest	C2C3	S5	G5	Mannix Road Woods
-	<i>Heteranthera sp.</i>	Forest	C2-	-	-	Mannix Road Woods
deerberry	<i>Vaccinium stamineum</i>	Forest	C3d	S5	-	Mannix Road Woods
great water dock	<i>Rumex orbiculatus</i>	Uplands	C1C2	S5	G5	Red Mill Creek
great blue lobelia	<i>Lobelia siphilitica</i>	Uplands	C2C3	S5	G5	Red Mill Creek
bitternut hickory	<i>Carya cordiformis</i>	Uplands	C3d	S5	G5	Red Mill Creek
agrimony	<i>Agrimonia parviflora</i>	Wetlands	C1	S3	G5	Red Mill Creek
red-rooted flat sedge	<i>Cyperus erythrorhizos</i>	Wetlands	C1	S3	G5	Red Mill Creek
ditch stonecrop	<i>Penthorum sedoides</i>	Wetlands	2/C2C3	S5	G5	Red Mill Creek
green-headed coneflower	<i>Rudbeckia laciniata</i>	Wetlands	C2C3	S5	G5	Red Mill Creek

Explanation of Species Ranks and Codes: Each species has a global and state rank as determined by the NY Natural Heritage Program. These ranks carry no legal weight. The global rank (G) reflects the rarity of the element throughout the world and the state rank (S) reflects the rarity within New York State. County ranks (C) as determined by Dr. David Hunt.

Rank	Criteria
1	Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable at [global/state/county]-level.
2	Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable at [global/state/county]-level.
3	Typically 21 to 100 occurrences, limited acreage, or miles of stream at [global/state/county]-level.
4	Apparently secure at [global/state/county]-level.
5	Demonstrably secure at [global/state/county]-level.

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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