

NATURAL AREAS AND WILDLIFE IN YOUR COMMUNITY



Hudson River Estuary Program

A Habitat Summary Prepared for the Town of Knox

This summary was completed in September 2015 to provide information for land-use planning and decision-making as requested by the Town of Knox. It identifies significant ecosystems in the town, including streams, forests, wetlands, and other natural areas with important biological values. This summary is based only on existing information available to the New York State Department of Environmental Conservation (DEC) and its partners, and, therefore should not be considered a complete inventory. Additional information about habitats in our region can be found in the *Wildlife and Habitat Conservation Framework* developed by the Hudson River Estuary Program (Penhollow et al. 2006) and in the *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* developed by Hudsonia and published by DEC (Kiviat and Stevens 2001).

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

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

The Estuary Program's core mission is to ensure the following six benefits:

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

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

The Estuary Program is funded by the NYS Environmental Protection Fund. The Biodiversity Outreach Program was created in partnership with Cornell University to help Hudson Valley communities learn what plants, animals, and habitats are found locally; understand the value of these resources; and increase their capacity to identify, prioritize, and conserve important natural areas through informed decision-making. Additional information about habitats in the Hudson Valley can be found on DEC's webpages, starting with www.dec.ny.gov/lands/5094.html.

CONTACT INFORMATION

Ingrid Haeckel

Conservation and Land Use Specialist
New York State Department of Environmental Conservation

21 S. Putt Corners Rd, New Paltz, NY 12561
845-256-3829 | ingrid.haeckel@dec.ny.gov



Department of Environmental Conservation



Cornell University

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

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

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

[Figure 3: Streams and Watersheds](#) in Knox, NY

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

[Figure 5: Large Forests \(≥ 200 acres\)](#) in Knox, NY

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

[Table 1: State Rare Plants, Animals, and Ecosystems](#) in Knox

[Table 2: Significant Birds](#) in Knox

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

Links in the summary will direct you to websites, publications, and fact sheets for supplemental information. In addition, Adobe Reader will enable you to zoom in and turn off data layers to customize your view of the maps. 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.

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. Effective conservation occurs across property and political boundaries and, therefore, necessitates a broader view of natural landscapes. By identifying areas with high-quality resources, this summary will be especially useful for setting priorities to inform town planning. Habitat summaries like this have been used by communities for open space plans, comprehensive plans, natural resource inventories, and other conservation and planning actions. One Hudson Valley town used the species lists in its comprehensive plan's generic environmental impact statement, another to designate critical environmental areas. Some communities have incorporated their summaries directly into plans, while others refer to the information when writing their own documents.

Though this summary does not contain adequate detail for site planning purposes, it can be useful for environmental review. First, by identifying high quality habitats on a town-wide scale, it helps land-use decision-makers and applicants understand how a proposed site plan might relate to important natural areas on- and off-site. Second, the summary highlights areas that may require more detailed assessment to evaluate potential impacts. Third, the tables identify species of conservation concern that may warrant special attention during reviews. If it's not already a routine step, the planning board should consider requiring applicants to produce a current letter from the [New York Natural Heritage Program](#) that identifies rare plants, rare animals, and significant ecosystems that are known to be on or near a proposed development site. The planning board and applicants should also work closely with DEC Region 4 Permits staff to ensure regulatory requirements are met.

Limitations of Maps in this Summary

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

How to find more information

Information in this summary can be enhanced by local knowledge. Local studies, maps, plans, and knowledgeable residents can provide details and may reveal previously unknown, high-quality ecosystems. Biological information in environmental impact statements may also be useful, especially when a town has habitat standards for environmental review. Additional information may be available from local biologists in Albany County. For help with incorporating additional information into the summary, 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 Knox's plans and land-use decisions. [The Helderberg Escarpment Planning Guide](#) provides additional recommendations and an in depth outline of many tools and techniques to achieve a sustainable balance between development and conservation. 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 Knox

Regional Context ([Figure 1](#))

The first step to understanding the natural areas and habitats of Knox is to consider how the town relates to the ecological features that extend beyond its borders. About half of Knox is in the Normans Kill watershed, which drains approximately 177 square miles of land within Albany and Schenectady counties, flowing into the Hudson River estuary in the City of Albany. The southwestern half of the town lies in the Fox Creek or Foxenkill watershed, which drains 107 square miles of land to the Schoharie Creek, a tributary of the Mohawk River and part of the greater Hudson River watershed.

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

– U.S. Environmental Protection Agency

The majority of Knox is in the Hudson Valley Limestone and Shale Ridges significant biodiversity area (SBA), a regionally significant landscape recognized by DEC's Hudson River Estuary Program for its diversity of plants, animals, and natural communities, and areas of karst terrain providing winter hibernacula for bats of conservation concern (Penhollow et al. 2006):

“The limestone bedrock supports a wide variety of diverse communities, many of which are rare in New York State and the Hudson River Estuary corridor. These include calcareous cliffs, calcareous talus-slope woodlands, and red cedar rocky summits. The shale ridge contains what may be the best examples of shale cliffs and talus slopes in the region. Several sizable limestone caves occur on the Helderberg Escarpment where eight species of bats are known to occur including the federally endangered Indiana bat. The limestone cliffs are one of only two areas in the Hudson River Estuary corridor to support a winter hibernaculum for the Indiana bat ... and also includes three sites for the state special concern eastern small-footed bat. Other rare animal residents include Henslow's sparrow, upland sandpiper, sedge wren, and least bittern. ...

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

Numerous species of amphibians and reptiles are commonly found within the Hudson Valley Limestone and Shale Ridges, including the spotted salamander and several other rare species such as Jefferson salamander, blue spotted salamander, and wood turtle. Numerous rare plants occur in the area, including the smooth cliff brake, ram's head lady's slipper, and American ginseng. More rare plant species are found throughout the rich uplands and lowlands.

Habitat conversion as a result of suburban expansion is of greatest concern in the largely unprotected lands of this significant area. Exploring opportunities for conservation agreements (easements or acquisition) that ensure the continued existence of the least disturbed and unfragmented examples of the state-rare communities ... is recommended. Exotic species including garlic mustard and tree-of-heaven are common throughout the area. Management efforts to reduce and prevent the spread of these exotic species in the highest quality areas are recommended. Implementing the *Helderberg Escarpment Planning Guide* will help to protect the unusual resources found here. More complete surveys of the karst areas, escarpment wetlands, and other significant habitats are needed.”

The Limestone and Shale Ridges SBA extends from the band of cliffs along the Helderberg Escarpment in Albany County and parallels the New York State Thruway south along the Potic Mountain ridge and as far

south as Marion Mountain in Ulster County. The curved ridgeline is approximately 54 miles long and is 5.6 miles wide at its widest point. The Helderberg Escarpment portion of the ridges corresponds to a Significant Habitat Complex identified by the U.S. Fish and Wildlife Service (1997).

Portions of the ridges within Knox are characterized by karst terrain formed by the process of water flowing through, dissolving, and eroding portions of the limestone bedrock above the Helderberg Escarpment over the course of thousands of years. Resulting karst features include caves, limestone pavement, sinking streams, sinkholes, and complex underground drainage systems and springs. Knox Cave and Skull Cave are significant karst features in the town. According to Penhollow et al. (2006), “the bedrock of the [ridges] mainly consists of limestone from the early to mid-Devonian Period (approximately 400 million years ago). These rocks were produced when the area was covered by shallow seas and fossils are not uncommon. The limestone acts as a buffer to neutralize the increased acid precipitation in the region, a helpful characteristic to the local flora and fauna. The boundaries of this area also include Ordovician (450 million years ago) deposits of shale, sandstone, siltstone, and limestone. The surficial deposits consist mainly of till and river and lake bottom deposits in the lowlands, with bedrock in the uplands.” The escarpment is also well known as one of the richer fossil-bearing formations from the Devonian age in the eastern United States. The USFWS (1997) description of the Helderberg Escarpment habitat complex cautions that “development in karst areas above the escarpment may result not only in the destruction of geologic features and associated habitat, but also in contamination of the aquifer.”

Large intact forests along the Helderberg Escarpment and eastern portions of Knox furthermore comprise a forest linkage zone important for regional forest connectivity between the Catskills and the Adirondacks. This feature is discussed further in the following sections.

Major Ecological Features ([Figure 2](#))

[Figure 2](#) shows the major ecological features known to occur in Knox, including a statewide important bird area, documented significant natural communities, and important areas for rare animals. The Bozen Kill forms the town’s northeast boundary with Guilderland and Beaverdam Creek bisects the southern half of the town from north to south. They are described below in the [Streams and Watersheds](#) section. [Figure 2](#) and the corresponding descriptions below are based on limited information and more study of the town is needed to better describe Knox’s natural features.

John Boyd Thacher State Park Important Bird Area. Audubon New York has identified the large unfragmented forest of the Helderberg Escarpment as an area of statewide importance for forest interior birds representative of deciduous and mixed forests, including a large number of regional conservation priorities. An [ornithological summary](#) of the area from Audubon states, “The forest habitat supports some of the Albany area’s highest densities of breeding songbirds, including the Winter Wren, Hermit Thrush, Wood Thrush, Magnolia Warbler, Black-throated Blue Warbler, Black-throated Green Warbler, Blackburnian Warbler, Worm-eating Warbler, Louisiana and Northern Waterthrush, and Canada Warbler. The cliffs historically harbored breeding Peregrine Falcons and could still support this species. The site supported the first Common Raven nest in the region, and is now the nucleus for the area’s population.” Audubon New York also states that residential and other development in areas immediately adjoining Thacher State Park may increase fragmentation of the forest and predation on bird populations by human-associated predators, including cats and raccoons.

The [J.B. Thacher and Thompson’s Lake Bird Conservation Area](#) (BCA) is modeled on Audubon’s Important Bird Areas program and includes the Thompson’s Lake portion of the state park. The Thacher/Thompson’s Lake BCA designation is based on the presence of at risk bird species, overall bird species diversity, and the site’s importance as a concentration area for migratory birds. Altogether, 171 species of birds have been identified within the park, of which 102 are confirmed or probable breeders.

Forest birds documented in Knox during the [2000-2005 NYS Breeding Bird Atlas](#) are shown in [Table 2](#) with links to guidance for conservation, and include species such as sharp-shinned hawk, northern goshawk, scarlet tanager, and wood thrush.

Significant Natural Communities. The New York Natural Heritage Program (NYNHP) has mapped 100 acres of [maple-basswood rich mesic forests](#) in Knox along the Helderberg Escarpment. These exemplary forest communities are part of a larger complex of maple-basswood forest patches extending along the Helderberg Escarpment and ranging from approximately 10 acres to over 100 acres, forming a mosaic with hemlock-northern hardwood forests. The maple-basswood forests are of moderate size, diverse and rich in species, with few invasive species in a moderately fragmented landscape. However, NYNHP notes that sugar maple regeneration is limited, possibly due to overbrowsing by deer, and garlic mustard is spreading in some locations. An [NYNHP guide](#) provides detailed description of the habitat and conservation recommendations.

Areas of Known Importance for Rare Animals. NYNHP has identified areas of importance for sustaining populations of rare animals based on existing records and the species' habitat requirements. Important Areas include the specific locations where species have been observed, as well as additional habitat areas which may be used at different times of the year and areas critical to maintaining the habitats of these rare animal populations. Proactive planning that considers how species move across the landscape, with careful attention to maintaining connected habitat complexes, will contribute to the long-term survival of rare animals. NYNHP identified areas of importance in Knox for bat overwintering sites and for grassland bird nesting, including NYS-threatened Northern harrier and Henslow's sparrow. A complete list of state rare animals and significant natural communities known from Knox is shown in [Table 1](#).

Bat hibernacula are sites where bats hibernate over the winter, most often caves. The Town of Knox lies in a karst-rich area, and is surrounded by and encompasses many caves used by a diverse group of cave-hibernating bats. Both the federally-endangered [Indiana bat](#) and federally-threatened [northern long-eared bat](#) are found in hibernacula in and around the town, as are NYS high-priority species of greatest conservation need: the [little brown bat](#), [eastern small-footed bat](#), and [tri-colored bat](#). Bats will return year after year to the same hibernation site and are susceptible to human disturbance and disease. The recent spread of the fungal disease [white-nose syndrome](#) has devastated bat colonies throughout the northeast, resulting in large die-offs of bats documented in Knox's caves and across the region. Research is ongoing by a number of agencies to determine if there are measures to protect these populations.

Northern harrier, also known as the marsh hawk, is a raptor that uses grasslands, wet meadows, and marshes for nesting and overwintering. Northern harrier breeding was last documented in Knox at a site along Ketcham Road in 2002. Historically, populations of northern harriers were considered abundant and widespread in New York. However, significant declines since the 1950s have been attributed to loss of breeding habitat and effects of pesticides. Farmland abandonment, reforestation, wetland filling, more intensive agricultural practices, and urban and industrial development have all contributed to habitat losses. Average home range area used by harriers is approximately 640 acres according to *The Birds of North America* (Smith et al. 2011), corresponding to extensive landscape areas of open habitats. Northern harrier nesting has been documented in both southeastern and western portions of Knox, in areas that include grazed fields, unmowed old fields, active hayfields, and small wetlands. Potential threats include further development for homes and large-scale farmland abandonment leading to forest regrowth and loss of suitable habitat for the species. Maintaining large grassland areas (at least 75 acres) and delaying hayfield mowing until after birds have fledged (August 1st) will help to conserve suitable habitat for northern harriers and other grassland-nesting birds.

Henslow's sparrow is a grassland species occurring in a few locations in the Hudson River Valley that prefers tall, dense, sometimes wet grassy fields without woody vegetation. As with most grassland birds in the last few decades, Henslow's Sparrow populations have been significantly

declining with the concurrent loss of grassland habitat in New York State. Nesting has been documented in Knox near the Middle and Beebe roads. Similar conservation and management recommendations apply as for northern harrier.

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 Knox.

Regional Forest Linkage Zone. Large intact forests along the Helderberg Escarpment and eastern portions of Knox comprise part of a regional forest link zone connecting the globally significant forest blocks of the Catskills and the Adirondacks. Forest connectivity facilitates wildlife movement and will play a critical role in species migration as climate changes. See the Forests section below for greater detail on forests of all sizes in the town.

Streams and Watersheds (Figure 3)

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).

All of the land in Knox ultimately drains to the Hudson River ([Figures 1 and 3](#)). About 14,300 acres or 53.7% of the town is within the Normans Kill watershed, primarily in the Bozen Kill subwatershed, and drains to the Hudson River at the City of Albany. The Bozen Kill flows through a deep ravine along the town’s northeastern boundary with Guilderland, an area noted for high quality riparian habitats. Wolf Creek also drains portions of the escarpment, entering the Bozen Kill at the ravine. Small areas of the town also drain to the Normans Kill via Black Creek. An additional 12,300 acres of land in Knox is within the Fox Creek or Foxenkill watershed, draining primarily via Beaverdam Creek. Fox Creek is a major tributary of the Schoharie Creek, which enters the Mohawk River at Fort Hunter in Schoharie County. Portions of Knox in the Normans Kill watershed lie within the watersheds of the Watervliet and Altamont water districts, important public water supplies. Two small reservoirs owned by the Village of Altamont are located between Witter and Lewis roads. The streams draining to these reservoirs are protected by DEC for drinking water use.

There are no watershed councils currently active in either watershed; however, Albany County Department of Economic Development, Conservation and Planning completed a [Normans Kill Riparian Corridor Study](#) in 2007 along the main stem (outside of Knox), and the Albany County Soil and Water Conservation District offers technical assistance on streambank protection, watershed management, and other natural resource concerns.

In addition to watershed boundaries, [Figure 3](#) shows streams, floodplains, waterbodies, and DEC water quality classifications. Streams shown on maps in this summary are from the 1:24,000 USGS Quadrangle Maps and were digitized from air photos. Note the resulting maps have inherent inaccuracies and will not capture many of the intermittent streams in Knox. Visiting sites and creating more accurate maps are methods to pursue to ensure these important resources are identified and considered during planning processes.

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.

DEC's [Water Quality Standards and Classifications](#) designate the "best uses" that waterbodies should support and are the basis for programs to protect New York State waters. Freshwater stream segments and open waterbodies are classified from high to low by the letters AA, A, B, C, or D. Class A, B, or C streams or waterbodies with sufficient amounts of dissolved oxygen to support trout and/or trout spawning or with fisheries studies showing trout have additional designations of "T" or "TS," respectively. Streams and waterbodies that are designated as "C (T)" or higher (e.g., "C (TS)," "B," "A," or "AA") are protected under Article 15 of the NYS Environmental Conservation Law. These streams provide residents the widest array of uses, and are subject to additional regulations and require a state permit for disturbance of the bed or banks. Note that Waterbodies can receive more comprehensive protection at the municipal level. The DEC Waterbody Inventory/Priority Waterbodies List (WI/PWL) tracks the degree to which waterbodies are meeting their "best uses" based on their DEC classification. Waterbody impairment is determined for stream or waterbody segments based on DEC's monitoring and other available information. Impaired waters that do not meet applicable water quality standards are considered for inclusion on the state's Clean Water Act Section 303(d) List and reported to Congress. WI/PWL data for tributaries in Knox is available on the DEC website under the [Lower Hudson River Basin WI/PWL](#) and [Mohawk River WI/PWL](#).

Limited information on stream habitat is available for the Town of Knox. DEC's water quality classifications indicate all streams in Knox are Class "C" or higher, indicating they are fishable, and no known impacts to waterbodies have been documented in the town in the WI/PWL. The DEC classifications suggest the near absence of coldwater conditions suitable for trout or trout spawning in Knox except for Thompson's Lake and a small tributary of the Fox Creek on the town's southern boundary. Fox Creek holds wild rainbow trout (a non-native species), suggesting the possibility for trout in Beaverdam Creek, as well. Note that the DEC classifications are generalized and do not reflect site-specific habitat quality. Many streams have simply not been assessed. It is likely that Knox has both warmwater and some coldwater streams. 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. A list of documented fish species from the Helderberg Escarpment and adjacent areas in Albany County from the New York State Museum's records is available in an Appendix of the Helderberg Escarpment Planning Guide (Driscoll and Childs 2002).

Local studies could document coldwater streams in Knox in more detail. The local Clearwater chapter of Trout Unlimited is currently monitoring temperatures in the Knox segment of the Bozen Kill, which has not been assessed by DEC fisheries biologists but is thought to have potential for trout. No impacts to the stream are known in Knox, although segments of the Bozen Kill further downstream are listed in the WI/PWL as being impacted by sewage effluent from the Altamont wastewater treatment plant. Results from Trout Unlimited's temperature study of the stream in Knox will help to determine habitat suitability for trout and guide management.

Perhaps the most significant water resource in Knox is the 128-acre Thompson's Lake, a naturally-occurring waterbody reaching a maximum depth of 62 feet that spans the towns of Knox and Berne (NYS OPRHP 2013). The lake has a DEC water quality classification of "A" meaning it is suitable for use as drinking water, and has a standard of (T), suggesting that it supports trout. The WI/PWL indicates no known impacts to water quality in the lake. There are approximately 75 residences and seasonal camps along the shoreline of the lake and there is an active Lake Association. Water quality is excellent according to monitoring at the beach operated by New York State Parks and is used as a public water source for Thacher Park and the Thompsons Lake State Campground. State Parks Water Quality Unit has determined that the trophic status of the lake is between oligotrophic and mesotrophic indicating a low to moderate level of productivity.

The invasive aquatic plant species Eurasian water milfoil (*Myriophyllum spicatum*) and curly-leaved pondweed (*Potamogeton crispus*) have been observed in varying densities in the lake. In addition, zebra mussels (*Dreissena polymorpha*) have been found in several locations along the lake shore (NYS OPRHP 2013).

Populations of the mussel are found along the shoreline of the entire lake including the park beach and car-top boat launch. In addition to being detrimental to the aquatic ecosystem, these mussels have been known to clog water intake structures and their shells are very sharp and known to cause deep cuts. This is a potential danger to all who are swimming, wading, fishing, launching water craft, etc. Rusty (*Orconectes rusticus*) and virile (*O. virilis*) crayfish are invasive crustaceans that have also been found in Thompson's Lake. Knox residents should report additional invasive species detections through New York iMapInvasives at www.nyimapinvasives.org.

Stormwater and wastewater problems can also impact a community's streams and waterbodies. New York State uses the State Pollutant Discharge Elimination System (SPDES) to control wastewater and stormwater discharges to groundwater and surface water in accordance with the Clean Water Act. Maintaining an inventory of SPDES permit locations for both wastewater and stormwater infrastructure is useful for analyzing cumulative effects of discharges on aquatic habitats. Known SPDES outfall locations in Knox include discharge to a Bozen Kill tributary from Kountry Knolls Trailer Court and a septic system draining to a Beaverdam Creek tributary from Knox Estates trailer park.

Floodplain information included in [Figure 3](#) comes from the [Federal Emergency Management Agency \(FEMA\)](#) Digital Flood Insurance Rate Map (DFIRM) Database. This information was included in the Habitat Summary to highlight the riparian corridors where stream and floodplain habitats occur, and where land-use change will likely influence stream quality. In addition to their high ecological value, floodplains provide many important functions including preventing erosion and recharging groundwater. They also act as a safety zone between human settlement and the damaging impacts of flood events. When left in their natural state, they provide space for the fluctuations in flow that cause streams to expand, contract, and sometimes change course. [Figure 3](#) shows the areas estimated by FEMA to have a 1% chance or greater probability of being inundated in any given year (often referred to as the "100-year flood"), including areas along the Bozen Kill, Beaverdam Creek, and several unnamed smaller tributaries, as well as the shores of Thompsons Lake.

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

It is important to note that 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 and may contain a variety of habitats, including but not limited to upland meadows, wet meadows, swamps, marshes, and forests (Kiviat and Stevens 2001).

Forested floodplains and other forested riparian zones support the in-stream food web and serve as a travel corridor for some wildlife (Knab-Vispo and Vispo 2010). In addition to their biological values, riparian forests play a vital role in minimizing soil erosion and surface runoff, control water temperatures, and help reduce downstream flood intensity. The Hudson River Estuary Program's "[Trees for Tribs](#)" initiative offers free consultation and native trees and shrubs for qualifying streamside buffer planting projects in the estuary watershed.

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

Wetlands (Figure 4)

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

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

Knowing about local wetlands enables municipalities to proactively plan to conserve this critical part of our life support system. Although several existing maps provide approximate locations and extent of wetlands, they are inherently inaccurate and not a substitute for site visits and on-the-ground delineation. Nonetheless, towns can use these maps as a starting point for inventorying local wetlands and supplement them with more refined data as they become available. Led by Steve Browne, the Town of Knox Conservation Advisory Council completed a wetlands inventory in 1993, which identified 82 wetland areas, including several not shown on public maps at the statewide level. However, documentation of the methods used for this inventory has been lost, and based on local knowledge, the inventory omits several smaller, seasonal wetlands known to occur in the town. Nevertheless, the inventory improves upon existing data sources and could be updated.

In [Figure 4](#), “known wetlands” are shown from the U.S. Fish and Wildlife Service’s (USFWS) [National Wetlands Inventory \(NWI\)](#) and DEC’s [Freshwater Wetlands Program](#) maps (which only include wetlands larger than 12.4 acres, unless designated “of unusual local importance”). NWI data are available for viewing on the NWI [Wetlands Mapper](#) or as a [download](#) for use in geographic information systems (GIS). NYS freshwater wetland maps are available for viewing using the [Environmental Resource Mapper](#) or to download as GIS files at the [NYS GIS Clearinghouse](#). In [Figure 4](#), information also comes from county soil maps, which are a good source for predicting the location of potential wetlands. “Probable wetlands” are those areas classified in the soil survey as very poorly drained or poorly drained soils, and “possible wetlands” are those classified as somewhat poorly drained (after Kiviat and Stevens 2001). Note that in [Figure 4](#), probable and possible wetlands cover a greater area than NWI and DEC wetland layers. NWI maps often underestimate wetland area and omit smaller and drier wetlands (Zucker and Lau unpublished report). In particular, vernal pools, wet meadows, and swamps are often under-represented on maps. Many of DEC’s regulatory maps are outdated and have similar inaccuracies (Huffman and Associates 2000). 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. Thus, areas shown as supporting probable or possible wetlands should always be verified in the field for the purposes of environmental review.

According to the Albany County soil survey (Brown 1992), about 12,600 acres or 47% of the land area in Knox is classified as having somewhat poorly drained soils, which may contain possible wetlands. Approximately 9,600 acres of the somewhat poorly drained soils area in Knox is classified within the Burdett silt loam soil unit. The soil survey indicates that these soils are located on glacial till plains and are characterized by a seasonal high water table that is perched on the clayey subsoil at a depth of 6 to 18 inches from December to May in most years. The more bedrock-controlled Angola silt loam soil unit accounts for an additional 2,150 acres of somewhat poorly drained soils in Knox and has similar high water table characteristics. Areas within these soil units where the seasonal high water table is close to the surface may

support shallow seasonal wetlands. Where drained, both of these soil units are noted to be among the best suited in the county for growing food and fiber crops. Among other considerations, the seasonal high water table is an important limitation for septic systems, which must be specially designed to achieve proper drainage under these conditions.

While NWI maps offer some general information on wetland habitat (e.g., forested, emergent), most existing map resources focus on wetland locations and do not yield information about habitat or importance for biodiversity. Towns can learn more about habitat values from other sources and by conducting local surveys and studies. The Town of Knox 1993 wetlands inventory does not provide information about wetland type or habitat values, but a description from the 1994 comprehensive plan states that “wetland areas in the Town provide suitable habitats for species such as beaver, muskrat, mink, river otter, wood duck, mallard, great blue heron, northern harrier and osprey. Many of the wetland communities in the Town also provide suitable habitat for numerous reptile and amphibian species.” The large emergent marsh on the town park property was assessed in an ecological study of urbanization and wetland habitat quality and described as stream-fed and high quality, having a wide vegetated buffer (500 m) and dominant cover of wideleaf cattail and native grasses (Kleppel et al. 2004). Invasive plant species were absent. The study provides evidence for the benefit conserving or restoring wide vegetated buffers around wetlands and limiting the spatial extent of development to maintain water quality and ecosystem function in wetlands.

Although no [vernal pools](#) have been formally identified in Knox, records of blue-spotted salamander, Jefferson salamander, spotted salamander, and wood frog in the *NY Amphibian and Reptile Atlas* attest to the presence of vernal pools in the town. Local volunteers participating in the [DEC Amphibian Migrations and Road Crossings Project](#) have documented spring migrations of such vernal pool-breeding amphibians from Tabor and Witter roads in Knox. [Vernal pools](#) are small, isolated wetlands that are often dry in summer. They provide habitat for many animals, including forest amphibians like wood frog and several salamander species, which use the pools for breeding. Vernal pools often go undetected in the forest due to their small size and seasonal drawdown, and are vulnerable due to reduced regulatory protection of isolated wetlands (see [Conserving Small Wetlands in the Hudson Valley](#) for more information.). Biodiversity assessment in the town may reveal additional wetland habitat types and provide detail on quality and habitat use. Knowing there are unmapped vernal pools in Knox, outreach to landowners and planners may help promote stewardship and land-use decisions that protect the pools, surrounding forest habitat, and associated wildlife. Specific management recommendations can be found in [Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Development in the Northeastern United States](#) (Calhoun and Klemens 2002) and [Maine Municipal Guide to Mapping and Conserving Vernal Pool Resources](#) (Morgan and Calhoun 2012).

Forests ([Figure 5](#))

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

We know little about the on-the-ground habitat quality of individual forests in Knox (e.g., presence of invasive species, lack of understory vegetation, etc.) beyond the few areas that have been mapped and surveyed by the New York Natural Heritage Program. However, the “birds-eye view” shows that most of Knox is covered in

forests of varying sizes. [Figure 5](#) shows forest patches 200 acres and larger in Knox. The map was created from land cover data developed for the Coastal Change Analysis Program (National Oceanic and Atmospheric Administration 2010). Land cover categories considered 'forest' for this analysis included deciduous forest, evergreen forest, mixed forest, and palustrine forested wetland. Roads were buffered and removed from forest patches to show results of development-related fragmentation. Interstate roads were buffered by a total of 300 feet and state and county roads by 66 feet (Dunn 2008). Forest patch size classifications follow the Orange County Open Space Plan (Orange County Planning Department 2004) as cited in Strong (2008).

Two "locally significant" forest blocks occur along the Helderberg Escarpment in Knox. The southern and more compact of these blocks spans the towns of Knox, Guilderland, and New Scotland, measuring 4,648 acres. The more fragmented northern block spans Knox, Guilderland, and Duanesburg, and measures 5,373 acres. These smaller but locally important forest ecosystems often represent the lower limit of intact, viable forest size for forest-dependent birds. Such bird species often require 2,500 to 7,500 acres of intact interior habitat. These forests can also provide important corridors and connectivity among larger forest ecosystems.

Smaller "stepping stone" forest patches connect these two larger forest areas and other smaller forests in the town and may provide valuable, relatively broad corridors for wildlife movement and plant dispersal. These smaller forests enable a large array of species, including wide-ranging and area-sensitive species, to move from one habitat to another across an otherwise hostile and fragmented landscape. They also provide important habitat at key times during many animals' life cycles. These forests should be considered the absolute minimum size for intact forest ecosystems. Forests as small as 200 acres will support some forest interior bird species, but several may be missing, and species that prefer "edge" habitats will dominate. Smaller forests are nevertheless more vulnerable to the spread of invasive species and less viable for timber production, among other values. Note that a third "locally significant" forest block spanning the boundary between Knox and Wright is very fragmented and probably closer in function to this "stepping stone" forest class.

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 combined forest blocks of eastern Knox correspond to an important forest linkage zone connecting "matrix forests" of the Catskills and Adirondacks, identified by the New York Natural Heritage Program and the Nature Conservancy. Matrix forests represent the largest, most intact forests, whose size and natural condition allow for the maintenance of ecological processes, natural forest communities, and populations of forest-interior species (Anderson and Bernstein 2003). These characteristics facilitate species movement and will likely contribute to resilience in a changing climate. Conserving large, high quality natural areas such as these and natural connections between them will also allow plants and animals to move northward and higher in elevation as temperatures increase with climate change. The Knox portion of the forest linkage zone includes John Boyd Thacher State Park, where high quality [maple-basswood rich mesic forest](#) and other significant natural communities have been documented, which are outlined in the [Significant Natural Communities](#) section.

The [NYS Breeding Bird Atlas](#) has numerous records of birds that indicate the availability of high-quality forest habitat (e.g., [black-throated blue warbler](#), [scarlet tanager](#), [wood thrush](#)) and high-quality riparian forest habitat ([Louisiana waterthrush](#), [yellow-throated vireo](#)) in Knox (see [Table 2](#)). Three raptors listed as NYS special concern were documented in the atlas: [Cooper's hawk](#), [northern goshawk](#), and sharp-shinned hawk. The remarkably intact forest communities and bird assemblages of the Helderberg Escarpment were justifications

for Audubon NY's designation of the [John Boyd Thacher State Park Important Bird Area](#) (see [Figure 2](#)). Conserving the town's large, contiguous forested areas, particularly those that provide broad, connected corridors; smaller forest patches that act as stepping stones between larger forests; and forested riparian zones will help ensure there is adequate habitat to sustain these species, as well as other forest plants and animals. This strategy will also help to preserve the ecosystem services that the town's forests are providing to its residents. Audubon New York's website has specific information on [managing habitat for forest birds](#).

Several species of bat of special conservation concern roost and forage in Knox's forests. The federally-endangered [Indiana bat](#), federally-threatened [northern long-eared bat](#), NYS special concern [eastern small-footed bat](#), and NYS high-priority species of greatest conservation need [little brown bat](#) and [tri-colored bat](#) all use forested area for protection and to forage for insect prey. Female bats roost in trees and snags in maternity colonies to raise their young each summer; some restrictions protect threatened bat species from tree-cutting, especially during the period when mothers are birthing and raising pups. The DEC Region 4 Office in Schenectady should be contacted at (518) 357-2355 with any concerns or questions about protected bat species in Knox.

Limited forest regeneration and the spread of disease and invasive species are major threats to Hudson Valley forests. Sustained overbrowse by deer limits regrowth of many trees, shrubs, and forbs. Consequent changes in forest composition and structure can have indirect effects on other wildlife such as songbirds and facilitate the dispersal of non-native invasive plants. Meanwhile, foreign diseases introduced through global commerce such as beech bark disease, Dutch elm disease, and the Chestnut blight have had major impacts region-wide on forests. And more recently, introduced forest pests such as hemlock woolly adelgid and emerald ash borer have devastated these tree species in areas south and east of Knox, but have not yet been detected in the town as of August 2015. Individuals should follow regulations on the transport of untreated firewood and can help to monitor local forests and report possible forest pests or diseases with a photo or specimen to the DEC Forest Health Diagnostic Laboratory at foresthealth@dec.ny.gov to assist with early detection and rapid response.

Grasslands, Shrublands, and Young Forests (not mapped)

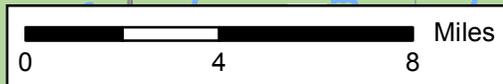
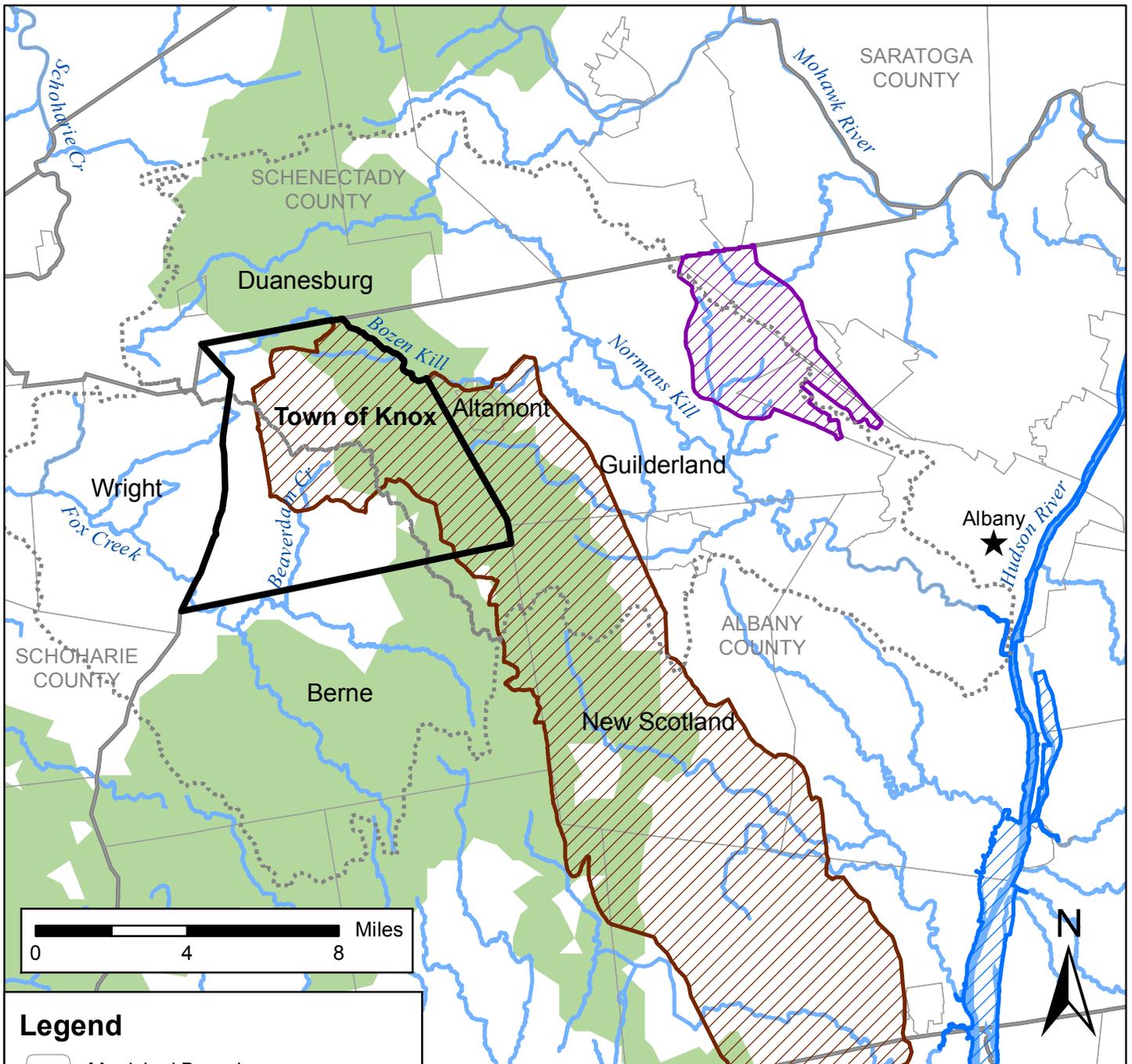
Recently disturbed sites, such as hayfields, abandoned farm fields, or forest clearings, can provide important habitat for species that require grasslands, shrublands, and young forests. These successional habitat types are transitional and relatively short-lived, and typically require periodic maintenance to avoid becoming more densely vegetated, eventually developing a canopy and becoming forest. We can infer from breeding bird records and a birds-eye view of aerial photography that valuable grasslands, shrublands, and young forests occur in Knox (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. The [NYS Breeding Bird Atlas](#) documented breeding by seven grassland bird species of state conservation concern in Knox, including NYS threatened Henslow's sparrow, northern harrier, and vesper sparrow (see [Table 2](#)). Grassland breeding birds respond to habitat structure rather than species composition, so even hayfields dominated by non-native grasses can provide suitable habitat for species of conservation concern if they are managed appropriately. Audubon New York offers guidance on [managing habitat for grassland birds](#). The New York Natural Heritage Program has identified important areas for nesting by northern harrier and Henslow's sparrow in Knox. These are shown in [Figure 2](#) and described in the [Areas of Known Importance for Rare Animals](#) section.

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. The [NYS Breeding Bird Atlas](#) documented eleven species of conservation concern in Knox that prefer young forest and shrubland habitat, including [American woodcock](#), [blue-winged warbler](#), [prairie warbler](#), and [ruffed grouse](#). Extensive young forests and those that form large complexes with meadow habitats may be particularly important for nesting by these species, as well as for grassland nesting birds; for more information, see Audubon's guidance on [managing habitat for shrubland birds](#).

Figure 1: Regional Context of Knox, NY



Legend

- Municipal Boundary
- County Boundary
- Watershed Boundary
- Stream
- Regional forest linkage zone

Significant Biodiversity Areas

- Hudson Valley Limestone and Shale Ridge
- Albany Pine Bush
- Upper Hudson River

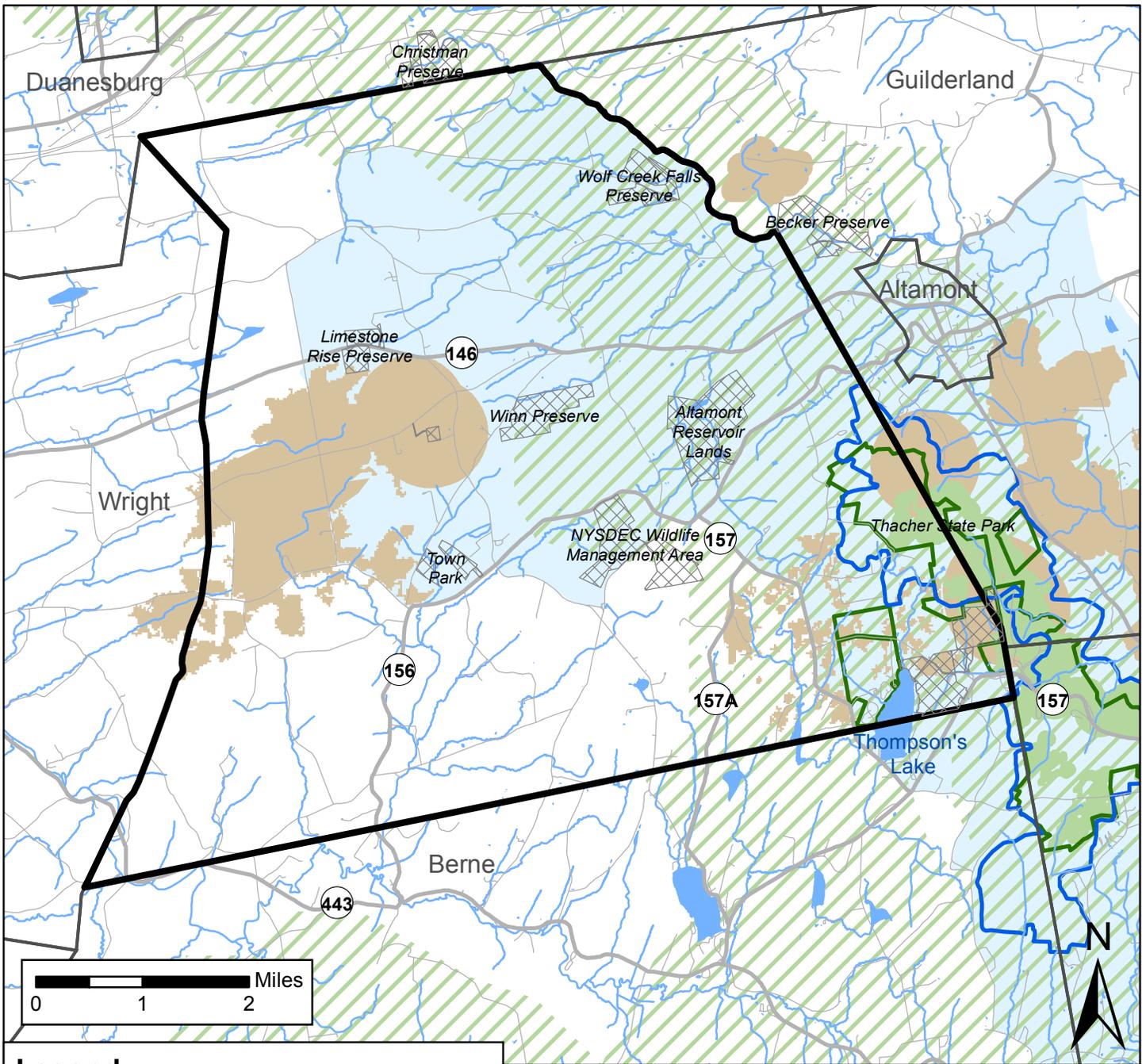
This map shows the location of the Town of Knox, Albany County in relation to its major watersheds, important forest corridors, and significant biodiversity areas. This map was produced as part of a Habitat Summary for the Town. For more information, please contact NYSDEC's Hudson River Estuary Program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

Data Sources:
 NYS Department of Environmental Conservation
 NYS Office of Information Technology Services
 New York Natural Heritage Program
 The Nature Conservancy
 US Geological Survey

Map Created 2015



Figure 2: Major Ecological Features in Knox, NY



Legend

- Road
- Stream
- Waterbody
- Regional forest linkage zone
- Hudson Valley Limestone and Shale Ridge Significant Biodiversity Area
- Audubon Important Bird Area
- State Park
- Other protected land

Areas of known importance for:

- rare animals
- significant natural communities

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

Data Sources:

- NYS Department of Environmental Conservation
- NYS Office of Information Technology Services
- New York Natural Heritage Program
- The Nature Conservancy
- Audubon New York
- US Geological Survey

Map created 2015

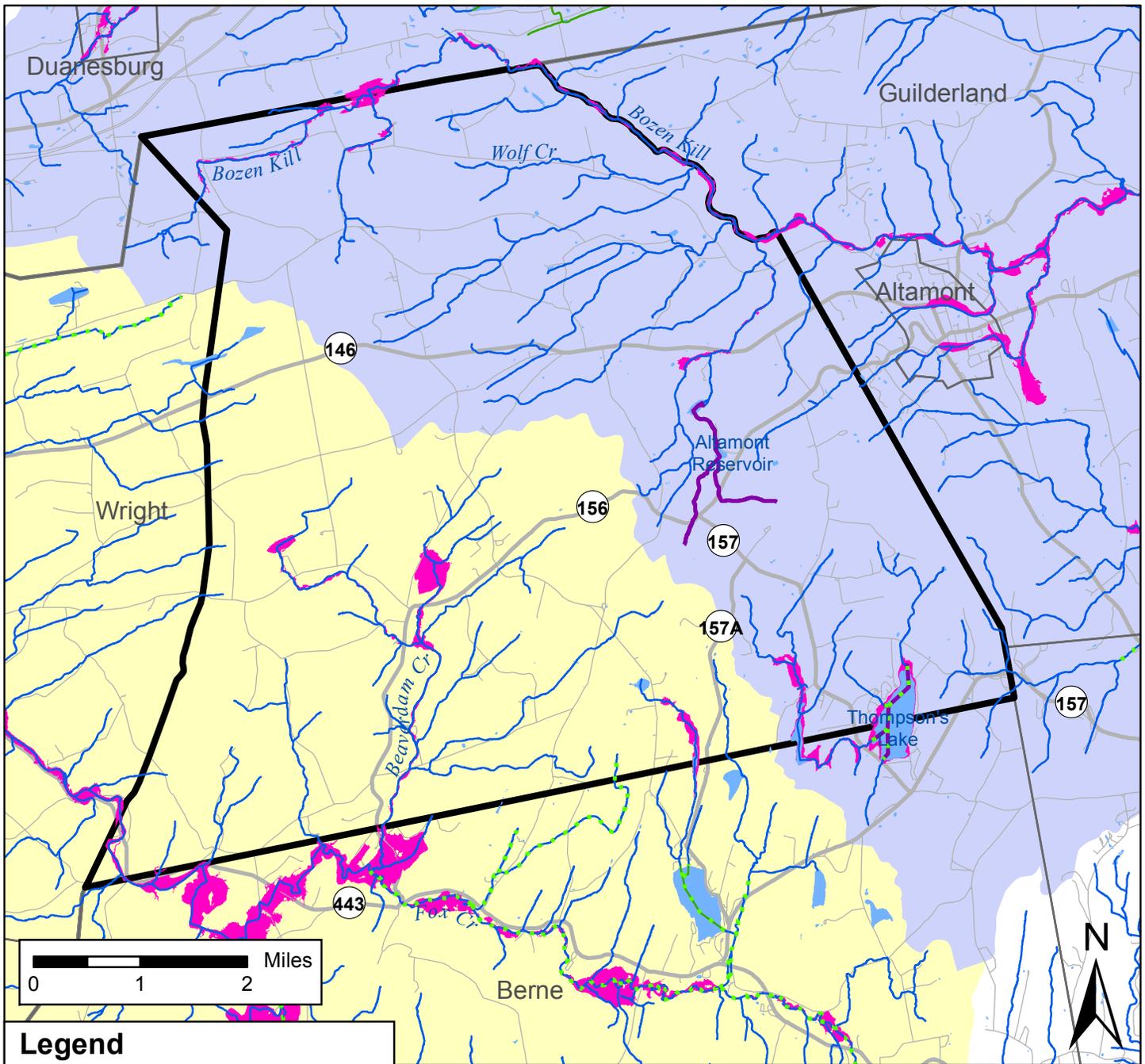


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Figure 3: Streams and Watersheds in Knox, NY



Legend

- Road
- NYSDEC Stream Classification**
- A
- B
- C
- - - Trout or trout spawning stream
- Waterbody
- FEMA 100 Year Floodplain (1% annual chance of flooding)
- Normans Kill watershed
- Schoharie Creek watershed

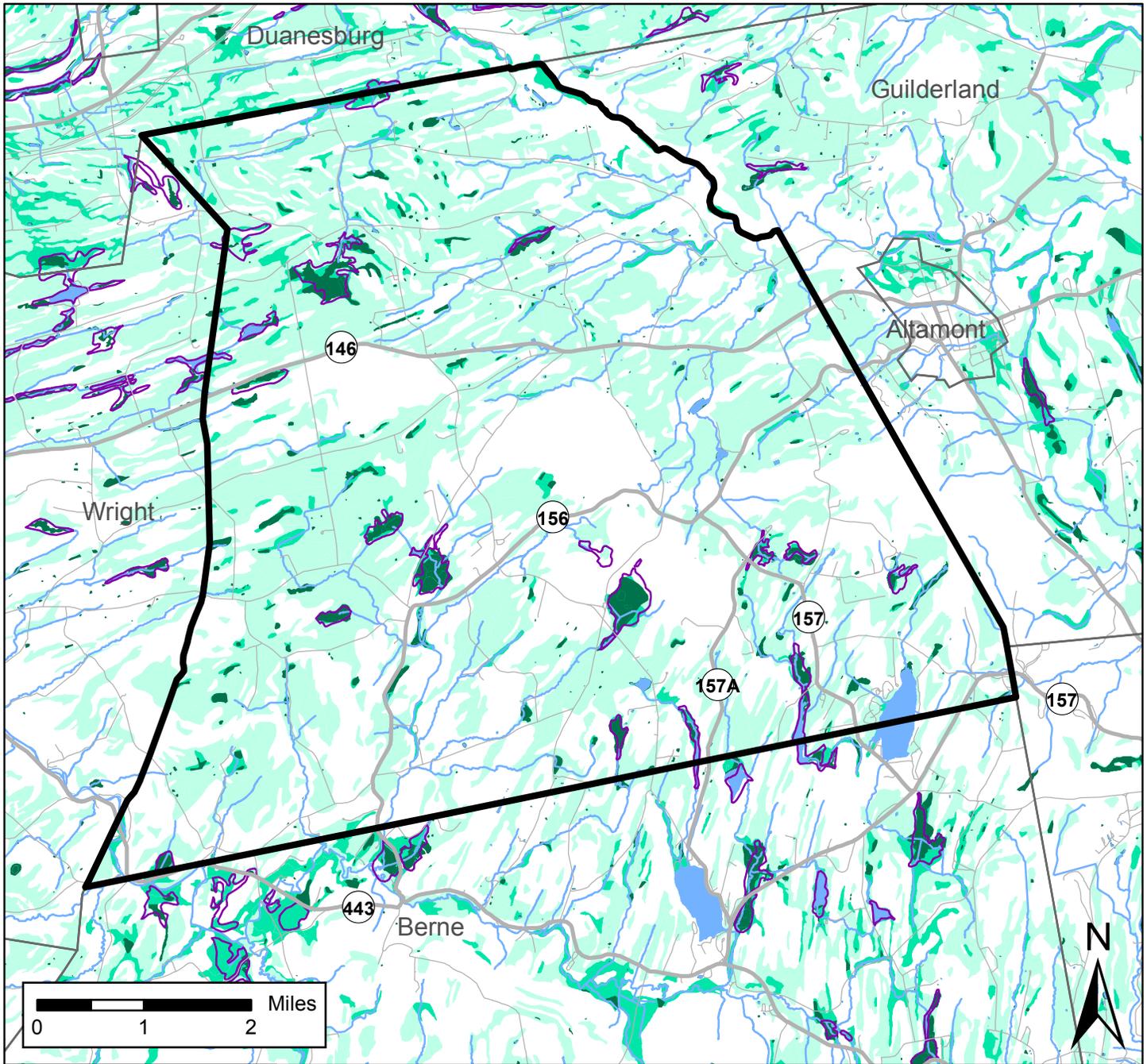
This map shows streams and their NYSDEC classification, waterbodies, floodplains, and watersheds for the Town of Knox, Albany County. This map was produced as part of a Habitat Summary for the Town and is not intended for regulatory purposes. Contact the NYSDEC Region 4 office to verify stream and waterbody classifications. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at (845)256-3829 or ingrid.haeckel@dec.ny.gov. <http://www.dec.ny.gov/lands/5094.html>

Data Sources:
 NYS Department of Environmental Conservation
 NYS Office of Information Technology Services
 Federal Emergency Management Agency
 US Geological Survey

Map Created 2015



Figure 4: Wetlands in Knox, NY



Legend

-  Road
-  Stream
-  Waterbody
-  NYSDEC wetland
-  NWI wetland
-  Probable wetland
-  Possible wetland

This map shows *known* wetlands from the National Wetlands Inventory (NWI) and NYSDEC Freshwater Wetland Map and potential wetlands in the Town of Knox, Albany County, NY. Probable and possible wetlands were identified based on soil drainage class in the Albany County Soil Survey; see habitat summary text for more details. This map was produced as part of a Habitat Summary for the town and is not intended for regulatory purposes. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at (845)256-3829 or ingrid.haeckel@dec.ny.gov <http://www.dec.ny.gov/lands/5094.html>

Data Sources:

- US Fish and Wildlife Service National Wetlands Inventory
- NYS Department of Environmental Conservation
- NYS Office of Information Technology Services
- Natural Resources Conservation Service
- US Geological Survey

Map Created 2015

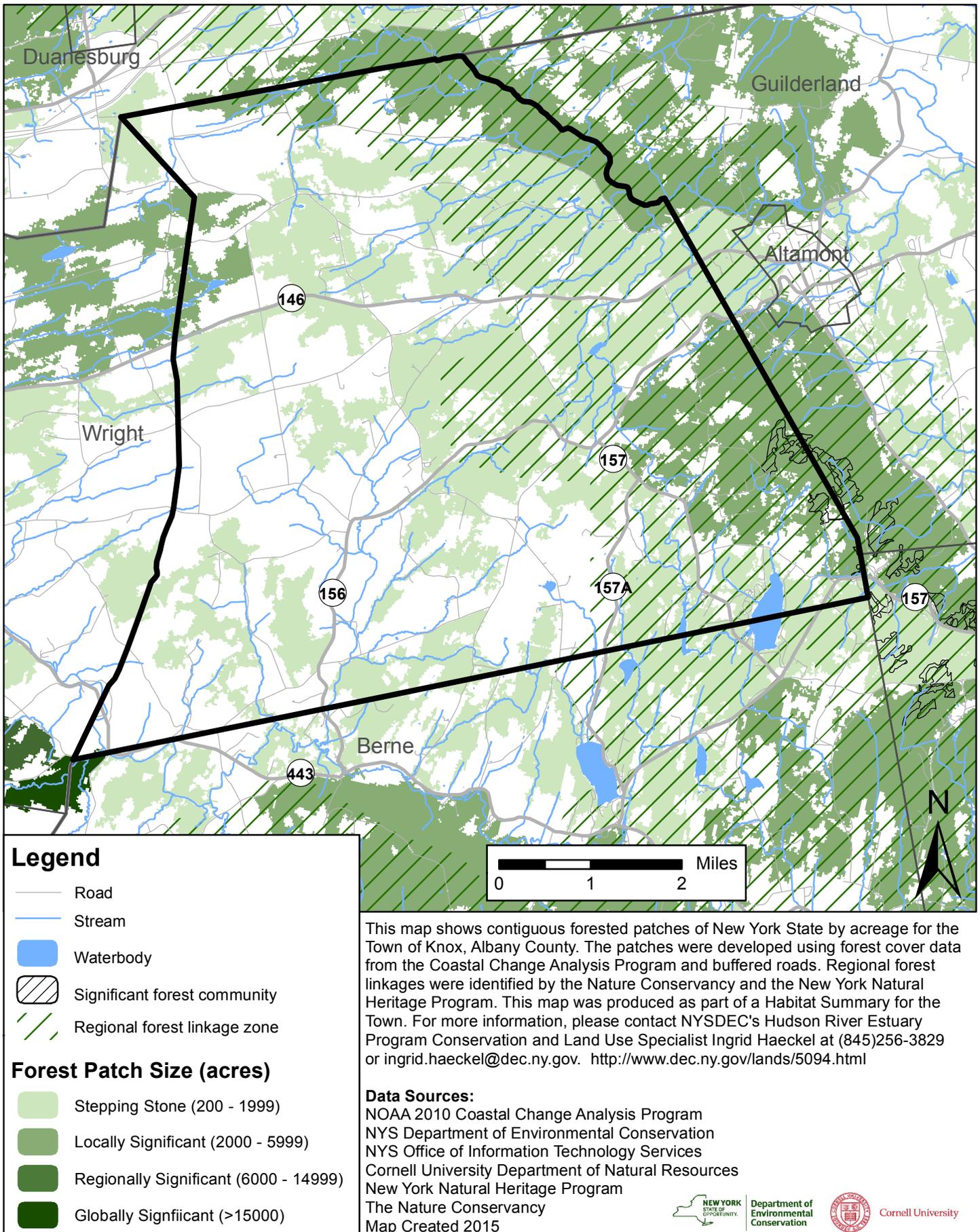


Department of Environmental Conservation



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Figure 5: Large Forests (200 acres and larger) in Knox, NY



Species and Ecosystems of Conservation Concern in Knox

The species and ecosystems of conservation concern that have been recorded in Knox are listed in Tables 1-2. [Table 1](#) lists state rare species and ecosystems and [Table 2](#) lists bird species of conservation concern; both are referenced throughout the [Habitat Summary text](#). In Tables 1 and 2, species are included if they are: on state or federal endangered and threatened species lists; listed as a Species of Greatest Conservation Need; recognized as a [Hudson River Valley Priority Bird](#) by Audubon New York; or are otherwise indicators of high quality habitat. All species and ecosystems on the lists are linked to a habitat described in the summary. A more comprehensive list of the flora and fauna documented in the Helderberg Escarpment region is available in the appendices of [The Helderberg Escarpment Planning Guide](#) (Driscoll and Childs 2002).

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

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

The following information comes from the [New York Natural Heritage Program](#) (NYNHP) biodiversity databases, NYS DEC bat surveys, the [NY Amphibian and Reptile Atlas](#) (NYARA), and the [2000-2005 New York State Breeding Bird Atlas](#) (NYBBA). Data from NYNHP are available online from the [New York Nature Explorer](#) and information on rare animals, plants, and ecological communities can be found at <http://guides.nynhp.org>. The NYARA documented more reptile and amphibian species in Knox than listed below; the table only includes those that are of conservation concern or are indicators of high quality habitat. For wildlife species, the “Description” column is largely based on the species groups in the [NYS Comprehensive Wildlife Conservation Strategy](#) (2005).

Common Name	Description	Scientific Name	Data Source
maple-basswood rich mesic forest	high quality forest community	n/a	NYNHP
bat colony (hibernaculum)	animal assemblage	n/a	NYNHP
Indiana bat ^{5*}	forest mammal	<i>Myotis sodalis</i>	NYNHP
northern long-eared bat ^{3, 4*}	forest mammal	<i>Myotis septentrionalis</i>	NYNHP
eastern small-footed bat ^{1, 2}	forest mammal	<i>Myotis leibii</i>	NYNHP
little brown bat ^{1*}	forest mammal	<i>Myotis lucifugus</i>	NYNHP
tri-colored bat ^{1*}	forest mammal	<i>Perimyotis subflavus</i>	NYSDEC
northern harrier ^{1, 3}	grassland bird	<i>Circus cyaneus</i>	NYBBA
Henslow's sparrow ^{3*}	grassland bird	<i>Ammodramus henslowii</i>	NYNHP
Jefferson salamander ²	vernal pool/forest amphibian	<i>Ambystoma jeffersonianum</i>	NYARA
blue-spotted salamander ^{2*}	vernal pool/forest amphibian	<i>Ambystoma laterale</i>	NYARA
spotted salamander	vernal pool/forest amphibian	<i>Ambystoma maculatum</i>	NYARA
wood frog	vernal pool/forest amphibian	<i>Rana sylvatica</i>	NYARA

¹[NYS Species of Greatest Conservation Need](#) (SGCN). * denotes High Priority SGCN.

²[NYS Special Concern](#)

³[NYS Threatened Species](#)

⁴[Federal Threatened Species](#)

⁵[NYS and Federal Endangered Species](#)

Table 2. Significant Birds in Knox

The following table lists bird species of conservation concern that were observed in Knox during the [2000-2005 New York State Breeding Bird Atlas](#) or were documented by the New York Natural Heritage Program (NYNHP). Species are included in the table if they were documented 1) in Atlas blocks that are more than 50% in Knox, or 2) by NYNHP, and 3) they have been identified as [Hudson River Valley Priority Birds](#) by Audubon NY (2009). Associated habitat information and links to species profiles, when available, are also from Audubon NY (2009); young forest and shrubland habitat designations are from DEC Biologist Paul Novak.

Common Name	Scientific Name	NYS Conservation Status			
		Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered
Forest Birds					
American Redstart	<i>Setophaga ruticilla</i>				
Baltimore Oriole	<i>Icterus galbula</i>				
Black-and-white Warbler	<i>Mniotilta varia</i>				
Blackburnian Warbler	<i>Dendroica fusca</i>				
Black-throated Green Warbler	<i>Dendroica virens</i>				
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	x			
Broad-winged Hawk	<i>Buteo platypterus</i>				
Cooper's Hawk	<i>Accipiter cooperii</i>		x		
Downy Woodpecker	<i>Picoides pubescens</i>				
Eastern Wood-Pewee	<i>Contopus virens</i>				
Louisiana Waterthrush	<i>Seiurus motacilla</i>	x			
Northern Flicker	<i>Colaptes auratus</i>				
Northern Goshawk	<i>Accipiter gentilis</i>	x	x		
Northern Saw-whet Owl	<i>Aegolius acadicus</i>				
Purple Finch	<i>Carpodacus purpureus</i>				
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>				
Scarlet Tanager	<i>Piranga olivacea</i>	x			
Sharp-shinned Hawk	<i>Accipiter striatus</i>		x		
Veery	<i>Catharus fuscescens</i>				
White-throated Sparrow	<i>Zonotrichia albicollis</i>				
Wood Thrush	<i>Hylocichla mustelina</i>	x			
Yellow-throated Vireo	<i>Vireo flavifrons</i>				

Common Name	Scientific Name	NYS Conservation Status			
		Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered
Grassland Birds					
American Kestrel	<i>Falco sparverius</i>				
Bobolink	<i>Dolichonyx oryzivorus</i>	xx			
Eastern Meadowlark	<i>Sturnella magna</i>	xx			
Henslow's Sparrow	<i>Ammodramus henslowii</i>	xx		x	
Northern Harrier	<i>Circus cyaneus</i>	x		x	
Savannah Sparrow	<i>Passerculus sandwichensis</i>				
Vesper Sparrow	<i>Pooecetes gramineus</i>	xx		x	
Young Forest and Shrubland Birds					
American Woodcock	<i>Scolopax minor</i>	x			
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	x			
Blue-Winged Warbler	<i>Vermivora pinus</i>	x			
Brown Thrasher	<i>Toxostoma rufum</i>	xx			
Eastern Kingbird	<i>Tyrannus tyrannus</i>				
Eastern Towhee	<i>Pipilo erythrophthalmus</i>				
Field Sparrow	<i>Spizella pusilla</i>				
Indigo Bunting	<i>Passerina cyanea</i>				
Prairie Warbler	<i>Dendroica discolor</i>	x			
Ruffed Grouse	<i>Bonasa umbellus</i>	x			
Willow Flycatcher	<i>Empidonax traillii</i>				
Birds of Other Habitats					
Belted Kingfisher (open water)	<i>Megaceryle alcyon</i>				
Chimney Swift (urban)	<i>Chaetura pelagica</i>				
Osprey (open water/wetland)	<i>Pandion haliaetus</i>		x		

General Conservation Measures for Protecting Natural Areas and Wildlife



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

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

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