Town of Coeymans
Natural Resources Inventory

Prepared by the Coeymans Conservation Advisory Council

July 2019

TOWN OF COEYMANS CONSERVATION ADVISORY COUNCIL

Connecting Community Through Conservation

Contents

Contributors 3
Acknowledgements 4
Introduction 5
Why inventory natural resources? 5
What is a natural resources inventory (NRI)? 5
Community Setting 6
Historic Setting 6
Data and Methodology 11
How to Use This Inventory 12
Background Maps 14
Base Map (Map 1) 14
Aerial View (Map 2) 15
Infrared Aerial View (Map 3) 16
Topography 17
Elevation (Map 4) 17
Steep Slopes (Map 5) 19
Landslide Susceptibility (Map 6) 21
Geology and Soils 23
Bedrock Geology (Map 7) 23
Karst Geology (Map 8) 27
Surficial Geology (Map 9) 29
Soils (Map 10) 31
Water Resources 36
Public Water Supply Catchments (Map 11) 36
Wells and Major Aquifers (Map 12) 38
Streams and Watersheds (Map 13) 39
Flood Hazard Areas and Water Quality Classifications (Map 14) 42
Alcove Emergency Action Plan Inundation Area (Map 15) 46
Wetlands (Map 16) 47
Habitats and Wildlife 50
Land Cover and Land Use (Map 17) 50
Significant Ecological Features (Map 18) 53
Large Forests (Map 19) 60
Forest Types (Map 20) 63

Grassland, Shrubland, and Young Forest (not mapped) 65
Stream Habitats (Map 21) 66
Coastal Habitats (Map 22) 70
Hudson River Shoreline (Map 23) 74
Climate and Air 76
Climate and Sea Level Rise Scenarios (Map 24) 76
Air (not mapped) 81
Land Use 83
Zoning (Maps 25 and 25a) 83
Assessed Land Use (Maps 26 and 26a) 85
Regulated Facilities and Industrial Land Use (Map 27) 87
Agricultural Resources (Map 28) 90
Cultural Resources 92
Historic Sites (Map 29) 92
Conservation and Recreation Assets (Map 30) 95
Scenic Resources (not mapped) 100
Conclusion 102
Afterword 103
Appendix A: Ecologically Significant Habitats of the Binnen Kill and Tidal Habitats 105
Appendix B: Regulated Facilities List 108
Appendix C: Community Air Screen 113

Contributors

Principal Mapper: Andrew Varuzzo, Cornell University

Mapping and Editorial Assistance: Ingrid Haeckel, DEC Hudson River Estuary Program and Cornell University

Writers:
Sylvia Lawler (Introduction, Conservation, Recreation, and Scenic Assets, Conclusion)
Dan Bosworth (Base Map, Aerial View, Infrared Aerial View, Public Water Supply, Wells and Major Aquifers)
Ro Woodard (Elevation, Steep Slopes)
Bryan Rowzee (Bedrock, Surficial, and Karst Geology)
Ingrid Haeckel (Landslide Susceptibility, Soils, Streams and Watersheds, Floodplains, Alcove Flood Hazard, Wetlands, Habitats Section, Regulated Facilities)
Libby Zemaitis (Climate Section)
Mike McGuire (Zoning and Tax Parcels, Existing Land Use)
Laura DeGaetano (Agricultural Resources)
John Bonafide (Introduction-Historic Setting, Historic Sites)

Reviewers:
Laura DeGaetano, Albany County Dept. of Economic Development, Conservation and Planning
Elisa Chae, DEC Hudson River Estuary Program (Public Water Supply, Wells and Major Aquifers)
Nate Nardi-Cyrus, DEC Hudson River Estuary Program
Dr. Alexander Bartholomew, SUNY New Paltz (Bedrock Geology section)
Barbara Heinzen, Geographer and local resident
Joe Tracey, CAC member

This project was carried out through a partnership with Cornell University and the New York State Department of Environmental Conservation Hudson River Estuary Program with funding from the New York State Environmental Protection Fund.

NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation | Hudson River Estuary Program | Cornell University

Acknowledgements

The Town of Coeymans Conservation Advisory Council (CAC) was able to prepare a Natural Resources Inventory (NRI) of the town because we received stellar contributions and guidance from town, county, and state.

We very much appreciate the interest of town board members Philip Crandall, Daniel Baker, Thomas Dolan, Kenneth Burns, and Jim Youmans in the project.

Barbara Heinzen, a local resident, has participated energetically since the council's inception, providing valuable insight and a strong critical eye in the document's review.

Local historian and historic preservationist, John Bonafide, gave generously of his time in writing the historic sites chapter for the NRI, and created a wonderfully fast-paced nutshell chronicle of the town, adding valuable historical context, never mind a touch of color, to the Inventory.

In addition to writing the chapter on agricultural resources, Laura DeGaetano, Senior Natural Resources Planner for the Albany County Department of Economic Development, Conservation, and Planning, graciously agreed to be the principal reviewer of the final draft document.

A special note of thanks to Cornell University intern Andrew Varuzzo, who worked with the CAC for an entire summer to generate the NRI's exceptional mapping component. He is as delightful as he is capable.

We were fortunate to have the expertise of several persons at the Hudson River Estuary Program (HREP) available to us: Karen Strong who helped us organize the NRI's narrative, Libby Zemaitis who authored the climate section of the report and Elisa Chae and Nate Nardi-Cyrus who assisted in the review of the final draft document.

Also with HREP, land use specialist Ingrid Haeckel has been our primary mentor for the past three years. She has been tireless in this endeavor, and we consider ourselves greatly privileged to have enjoyed her strong and steady leadership.

Introduction

Why inventory natural resources?[1]

The Hudson River Valley's shorelines, wetlands, forests, streams, grasslands, and shrublands are not only habitat for abundant fish and wildlife, but also provide many vital benefits to people. These ecosystems help to keep drinking water and air clean, moderate temperature, filter pollutants, absorb floodwaters, and provide for pollination of agricultural crops. They also present opportunities for outdoor recreation and education, and create the scenery and sense of place that is unique to the region.

Land-use planning is instrumental to balancing future growth and development with protection of natural resources. Although municipalities frequently need to make decisions affecting these resources, they often don't have adequate data available to inform those decisions. Often they find themselves reacting to proposed development rather than planning for future growth, or making decisions on development projects without considering the larger context. This narrow approach to decision-making loses sight of broader-scale issues and goals, such as climate resilience, walkable communities, connected habitats, or watershed management.

By identifying and describing natural resources at the local scale, a natural resources inventory (NRI) provides communities with a strong foundation for proactive planning and informed decision-making. The process encourages participation in identifying and prioritizing natural resources important to the community, and provides information that will support careful land-use planning and improved resource protection measures. And by incorporating natural resources into every level of decision -making and planning, municipalities can make a meaningful contribution toward preserving the natural heritage of the region, and can ensure that healthy, resilient ecosystems—and the benefits they provide—are available to their communities for future generations.

What is a natural resources inventory (NRI)?[2]

A natural resources inventory (NRI) compiles and describes important, naturally occurring resources within a given locality (e.g., municipality, watershed, or region). Cultural resources, such as historic, scenic, and recreational resources, are often included in an NRI, as well. The inventory has two basic purposes: 1) to provide the building blocks for comprehensive land-use and conservation planning, and 2) to allow natural resource information to be included in local planning and zoning. The scope of the NRI is determined by the community. At its simplest, and

[1] Haeckel, Ingrid, and Laura Heady. *Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed*. (Ithaca, NY: Department of Natural Resources, Cornell University, and New York State Department of Environmental Conservation, 2014), 1. https://www.dec.ny.gov/lands/100925.html.
[2] Ibid.

NRI is the compilation and description of existing natural resources data. At its most complex, it includes detailed analysis of resources or new data collected specifically for the inventory. An NRI is not a static document. As new and revised data become available, the inventory should be updated to insure its completeness and accuracy.

Until an inventory has been conducted, many communities don't have a clear picture of where their natural (and cultural) resources are located, which resources are significant to the community, and why. The compilation of map data tables and descriptions in an NRI contribute to a better understanding and appreciation of the community's natural resources and provide the foundation for a wide range of planning and conservation applications.

Community Setting

The Town of Coeymans is a municipality of roughly 53 square miles situated along the Hudson River's western shoreline in the southeast corner of Albany County, approximately fifteen miles south of the City of Albany. The Hamlet of Coeymans and the Village of Ravena are located in the southeast corner of the town. NYS Route 144 follows the river north and south running nearly parallel to Interstate 87, the major highway extending through the eastern section of the town. Highway access is convenient, with Exit 22 (Selkirk) five miles to the north and Exit 21B (Coxsackie) five miles to the south. Exit 21A, almost immediately south of Exit 22, connects to the Berkshire Spur, allowing easy access to Interstate 90, the Massachusetts Turnpike. The proximity of the state transportation system provides the option of direct routes for town residents and commuters and a critical resource to area business and industry. NYS Route 9W is yet another north and south thoroughfare which travels through the heart of the town. NYS 143 provides the sole direct route east and west through the town, a beautifully scenic drive from the Hudson westward through the bucolic hamlets of Coeymans Hollow and Alcove. Adjacent municipalities include the Town of Westerlo to the west, the towns of Bethlehem and New Scotland to the north, the Town of New Baltimore in Green County to the south, and the Town of Schodack in Rensselaer County to the east. The Hudson River provides the eastern-most border of the town with approximately 3.75 miles of shoreline. Coeymans and its neighboring waterfront municipalities border the Hudson River Estuary, the tidal stretch of river extending from the Troy Dam to the Verrazano Narrows. An expanse of remarkable biological diversity, the estuary comprises only 13.5 percent of New York State's land area, but contains nearly 85 percent of the bird, mammal, reptile, and amphibian species found in the state.[3]

Historic Setting

The history of the Town of Coeymans encompasses more than 10,000 years of continuous human occupation. The earliest settlement identified in the town is a seasonal camp site along the

[3] Penhollow, M., P. Jensen, and L. Zucker. *Wildlife and Habitat Conservation Framework: An Approach for Conserving Biodiversity in the Hudson River Estuary Corridor.* (Ithaca, NY: New York Cooperative Fish and Wildlife Research Unit, Cornell University and New York State Department of Environmental Conservation, Hudson River Estuary Program, 2006), v. https://www.dec.ny.gov/lands/5096.html.

Hudson River in the Hamlet of Coeymans. The site was used by indigenous people from ca. 8000 to 3500 BCE. This Late Paleoindian and Early Archaic period camp/hunting site is one of the earliest known habitation sites in the state. Decedents of these earliest people, ancestors of the Stockbridge Munsee Band of Indians (a.k.a. Mohicans and Mahicans), had camps and settlements in the Town of Coeymans and across the Hudson River on Schodack Island throughout the 17th and 18th centuries.

In 1631 the Dutch Patroon, Killian Van Rensselaer, established a colony centered around what is now Albany. The colony was called Rensselarswyck. In 1643 the Patroon had an armed fortification constructed on Beeren Island. The island served as the southern terminus of the patroon's vast land grant. The fort was called *Rensselaers Steyn* and was used to enforce strict trading regulations on all ships approaching the southern line of the colony. Nicholas Coorn and Jan Direkse van Breman manned the outpost and were the first recorded European settlers in the town.

The formal establishment of the Town of Coeymans began with the purchase of 120-square miles of land from the Mahicans by Barent Pieterze Koijemans (Coeymans). The purchase was formally recognized in 1673 with a land patent issued by Governor Francis Lovelace. The land tract, adjacent to the Hudson River, possessed extensive fertile farmland, timber and two significant water courses, the Hannacroix to the south and the Coeymans/Onesquathaw Creek to the north. Both streams were prized for their water power.

Coeymans first arrived at Rensselaerswyck as a teenager with his father and brothers in 1639 from Texel, Holland. Apprenticed as a miller, Coeymans would operate several of the Patroon's saw and grist mills before his land purchase. After acquiring the tract, Barent built a significant saw and grain milling operation on the Coeymans Creek just above its confluence with the Hudson River. The mill complex would grow into one of the region's most productive and lucrative 17th century enterprises.

About 1673, Barent constructed a large stone house on the flats just south of the mills and the Coeymans Creek. Known as the Coeymans Castle, it was demolished in 1833. In 1700 he, along with his family, constructed the monumental stone house that still stands on the north side of the Coeymans Creek.

After his death in 1710 his children divided up the waterfront industries and remaining portions of the land tract. While milling was the primary industry in the town during this era, shipping from docks on the Hudson also began to develop. This portion of the riverfront, centered between the Coeymans family's two stone dwellings, became the center for river commerce for the family and the future town.

Prior to the American Revolution the Coeymans riverfront consisted of just the Coeymans' family homes, two grist mills and two saw mills, which were now in the ownership of the Ten Eyck family (grandsons of Barent). In 1778 Colonel Cornelius D. Wynkoop established a

Revolutionary War camp and boat building force just north of the Landing. By April of 1778, Wynkoop reported that he had about fifty carpenters at work building flat bottom boats at Coeymans.

On March 17, 1791, the Town of Coeymans was officially formed from the Town of Watervliet. When Watervliet was established in 1788 it included the entirety of present day Albany County except for the City of Albany. Coeymans was the first town to be set off from Watervliet. The town boundary encompassed a portion of the original Coeymans Patent with other sections of the original land grant becoming parts of the towns of Westerlo and New Baltimore.

By 1810 the Landing had grown to include about 30 dwellings, wharves, a post office, two grain mills (with 5 running stones) and a saw mill. The population exceeded 3,000 residents with 118 slaves being held in the town. Trade at the waterfront included molasses, tobacco, cloth, clothing, rice, brandy and spirits. During the 1820s the bluestone industry had developed in the western portion of the town and stone was shipped to New York City from the riverfront. Warehouses for grain and hay storage were constructed. Shipping of local goods between the Landing and New York City developed rapidly.

West of the waterfront, the upland sections of the patent had passed from Barent Coeymans to his son Pieter and then to his daughter, Maykie and her husband Andries Witbeck. After the Revolution this land tract evolved into several distinct communities. These included Aquetuck, Coeymans Hollow, Stephensville (Alcove), Indian Fields and Kiefers Corners. These settlements were largely founded on the extensive natural resources of this part of the town.

Aquetuck (previously known as Peacock's Corners) was situated three-miles west of the river adjacent to the southern boundary of the town along the Hannacroix Creek. This area of the town possessed significant farmlands and was first settled by early generations of the Verplanck, Witbeck, Tompkins and Ten Eyck families who gained land in this part of the patent through their familial relationships to the Coeymans family.

Coeymans Hollow possessed the extensive water power of the Hannacroix Creek and natural resources which attracted early settlers to this portion of the town. Industries included tanneries, carding mills, grist, saw mills and quarries. As sections of the land were deforested for the early commercial ventures, swaths of farmland were opened for tillage. Hay and grain crops would be shipped east to Coeymans Landing for storage and export down the Hudson River to New York City. At its peak in the late 19th century more than 175,000 bales of hay and straw were shipped from this area via the Coeymans Waterfront docks. Industries such as bluestone quarrying and the processing of limestone into quick lime flourished.

Stephenville, now the Hamlet of Alcove, was the site of an early mid-19th century carding and cloth-dressing mill. This facility would later be converted to produce straw paper for packaging. At the peak of its operations in the late 19th century the mill had the capacity to process more than five tons of straw daily. A sizable stone grist mill (three running stones), a flax mill, and a

tannery had also been erected in the community early in its settlement. The Mossy Hill stone quarry, which produced significant quantities of bluestone (and continues to do so to the present day) also developed at Alcove.

Indian Fields a was small community which, in the last quarter of the 19th century, was composed of a church, hotel, three stores, three blacksmith shops, two foundries, a carding mill, saw mill, a cemetery and about 18 dwellings. The initial settlement and development of mills and the community had been undertaken by several settlers linked to the Coeymans family, including Isaac VerPlanck, John and Thomas Witbeck and members of the Tompkins family. Between 1928 and 1932 the community was acquired by the City of Albany as part of the development of their water system. The buildings were leveled and the valley inundated with the waters of the Hannacroix Creek and several tributaries. The resulting Alcove Reservoir covers more than two square miles of the town.

At the far northwest portion of Coeymans was Keefer's Corners. This small enclave was settled by Balthus Keefer in 1791.

Coeymans Square was a community that developed just west of Coeymans Landing and the riverfront. The flatlands above the river were developed as farmland by Levi Blaisdell, who had first come to Coeymans with Wynkoop's Revolutionary War shipbuilding force. He returned after the war and through his marriage to Ariaantje VerPlanck (daughter of Barent's son-in-law and his third wife) acquired a large tract of the Coeymans Patent. Part of this large farm would become Coeymans Square.

In 1865 the Saratoga and Hudson Railroad was constructed through the western side of the community and a passenger/freight station was built. At that time Coeymans Square was renamed Coeymans Junction, which was the station stop name on the line. Dubbed the "White Elephant Line" it survived only 15 years and was abandoned in 1875. In 1885 the New York, West Shore, and Buffalo Railroads arrived in Coeymans. Coeymans Square developed quickly as an independent village from the Landing and in 1914 Coeymans Junction was formally incorporated as the Village of Ravena.

The population of the town in 1850, as well as 1870, remained at just over 3,000 residents. With the growth of the railroad and the brickyards the population in 1900 grew to 3,932 and by 1920 had reached 4,147.

The late 19th century saw an expansion of brick making at the Landing with more than 20 separate yards along the river in Coeymans. At the beginning of the 20th century these yards had coalesced into three companies, each producing hundreds of thousands of bricks annually. The seasonal labor needed to operate the brick yards and the expansion of the railyard in Ravena by the West Shore Railroad brought the largest growth in population in its history to the town. Scores of seasonal African-American brickyard workers from the south along with significant numbers of Italian immigrants were settling into the eastern part of the town.

Throughout this boom period in the Landing and Ravena, the western and northern portions of the Coeymans remained largely stable with ongoing and expanding agricultural development along with stone quarrying. Shipping of goods that once relied on the storehouses and docks at the riverfront now relied on the railroad freight depot in Ravena for the efficient movement of goods to markets. The rapidly developing Ravena railyard operations were relocated to the new New York Central Selkirk Yard in 1924. The West Shore Railroad merged with the New York Central in 1952. Passenger operations to Ravena ceased in 1958.

In the 1920s a new agricultural industry, commercial mushroom cultivation, began operating in the now vacant ice houses that dotted the Hudson River. At Coeymans the Knaust Brothers from Saugerties operated growing facilities in the former Briggs ice house at Coeymans Landing. In the 1930s the Knaust Brothers were replaced by the local Frangella Brothers mushroom company. This firm would expand rapidly, developing a massive growing facility north of Coeymans Landing and a commercial cannery operation in Ravena. By the last half of the 20th century the company was growing more than three million pounds of mushrooms annually and the cannery was producing more than six million pounds of processed product. The company ceased commercial operations in the town in the 1980s.

In May 1961 ground was broken north of the Village of Ravena for Atlantic Cement Company's new $64 million production facility. It was the largest single-built cement facility of its time and could produce 10-million barrels of cement annually. The company was attracted to Coeymans by the town's plentiful natural resources, including a vast limestone reserve and the Hudson River. In 1962 it was estimated that there were sufficient natural resources to supply the plant for a century.

In 2001 the town's last brickyard, Powell and Minnock, ceased operations in the landing. In 2010 the former brick yard was acquired by Carver Companies. The property has been redeveloped into the Port of Coeymans and the Coeymans Industrial Park, which has expanded the industrial footprint of the former brickyard to 400 acres along 3,500 feet of Hudson River shoreline. The new concern has also redeveloped much of the lands formerly occupied by the Frangella Brothers Mushroom Company.

Today the Town of Coeymans reflects more than 10,000 years of human occupation and chronicles 400 years of European settlement. Its surviving buildings and industrial concerns reflect a continuous arc of development and history along the Hudson River that is unparalleled in New York State. The significance of the historic and cultural resources of Coeymans are reflected in the designation of 17 Individual properties and three historic districts, including the entirety of Coeymans Landing, to the New York State and National Registers of Historic Places.

Data and Methodology

The Town of Coeymans Natural Resources Inventory was compiled by the Town Conservation Advisory Council (CAC) with the generous guidance and technical assistance of the DEC Hudson River Estuary Program (Estuary Program) and Cornell University. Comprised of a strong mapping component accompanied by supporting text, the inventory catalogues a broad variety of existing scientific data. This science-grounded approach provides the foundation upon which to build an understanding of the deep-rooted correlation between resources and the synthesis fundamental to making well-informed, responsible decisions to protect them.

As the CAC commenced work on this somewhat daunting project, most of us envisioned pulling on our boots and focusing our binoculars—a hands-on inventory of the town's abundant natural resources. Our decision to use instead existing data was time and man-power based. We also discovered that a wealth of natural resource data is already available from numerous government agencies and non-profit organizations and can provide a starting point for future, more detailed studies. In order to provide a useable document for municipal decision-makers and community residents in a timely manner, we agreed to expedite the inventory's completion by relying on available data.

Mapping for the Coeymans NRI was completed in 2017 through a technical assistance award from the Estuary Program, with funding from the NYS Environmental Protection Fund. The maps were created by a Cornell University intern, Andrew Varuzzo, under the supervision of Hudson River Estuary Conservation and Land Use Specialist Ingrid Haeckel and with input from the CAC. The maps display data from federal, state, and county agencies and non-profit organizations including Scenic Hudson and The Nature Conservancy. The original source and publication year of data sets are included on each map, and are described in the report.

All maps were produced using ESRI ArcGIS 10.6 Geographic Information Systems (GIS) software and data in the NAD 1983 State Plane New York East FIPS 3101 Feet coordinate system. Information on the maps comes from different sources, produced at different times, at different scales, and for different purposes. Most of the GIS data were collected or developed from remote sensing data (i.e., aerial photographs, satellite imagery) or derived from paper maps. For these reasons, GIS data may 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. Information provided by the maps can be enhanced by local knowledge, and the NRI should be updated every 5-10 years as new data become available.

The NRI report was largely written by CAC and community members, with assistance from Ingrid Haeckel and other Estuary Program staff including Elisa Chae (Source Water) and Libby

Zemaitis (Climate). It incorporates a *Habitat Summary*[4] report prepared for the town, as well as relevant descriptions of certain resources from inventories within the 2006 *Town of Coeymans Comprehensive Plan* and the 1995 *Draft Local Waterfront Revitalization Plan*. Additional background information was drawn from *Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed*.[5] The CAC followed the *Town of Rosendale Natural Resources Inventory*[6] as a general guide for style and format.

The completion of the NRI is only the first step. As we began gathering data, we soon learned that, while much of the material is plentiful and current, there are areas where data needs updating, as well as a few places where it is insufficient or altogether lacking. This is not discouraging. The NRI, like other documents is not static. It requires some supplementation and will need periodic revision. The Conservation Advisory Council is pursuing avenues to ensure that land-use decisions in the town have the benefit of up-to-date scientifically sound information. We look forward to engaging the community in this endeavor. Time for boots and binoculars!

How to Use This Inventory

The Inventory should be a valuable reference for town officials, interested community and watershed groups, industry, developers, and residents. Collectively viewed, the 30 maps in this NRI provide a holistic representation of the town's natural and cultural resources, the connections between them, and how they relate to patterns of land use and development in the community. The NRI clearly illustrates how nature knows no property or political boundaries. By visualizing resources at the townwide scale and beyond, the NRI maps help to understand the larger context in which resources occur, and can be used to help evaluate the potential impacts of land-use decisions on neighboring areas.

The NRI can be used to:[7]

- Educate residents and developers about important resources occurring in the town,
- Understand the resources occurring on or near your property to inform stewardship,
- Evaluate potential impacts of proposed actions during routine environmental reviews,
- Update the natural resources section of the town comprehensive plan,
- Inform municipal open space planning,
- Review and update existing zoning and subdivision regulations,
- Designate Critical Environmental Areas, and
- Inform development of new local policies and environmental review procedures.

---

[4] Haeckel, Ingrid. *Natural Areas and Wildlife in Your Community: A Habitat Summary Prepared for the Town of Coeymans, report* (New Paltz, NY: Cornell University and New York State Department of Environmental Conservation, 2017).
[5] Haeckel and Heady, *Creating a Natural Resources Inventory*.
[6] Town of Rosendale Environmental Commission. *Rosendale Natural Resources Inventory* (Rosendale, NY, 2010). http://www.townofrosendale.com/NRI.pdf.
[7] Haeckel and Heady, *Creating a Natural Resources Inventory*, 2.

In addition to the Albany County Interactive Mapper, frequently used by the town, the DEC Hudson Valley Natural Resource Mapper[8] illustrates many of the resources shown on maps in this NRI and is a valuable companion tool. Information is organized thematically under estuary habitats, streams and watersheds, wetlands, forests, biodiversity, and scenic and recreation features. Tax parcel boundaries are available for viewing under reference layers.

It is important to keep in mind that the NRI is best suited for municipal scale planning. The maps are not intended to provide site-specific accuracy and should not be used as a primary source for land use decisions. Any resource shown on a map should be verified in the context of environmental review. Nevertheless, the NRI can be used as a screening tool at the site-scale to raise questions or identify the need for additional site assessment.

The NRI maps are available as PDFs on the town website (https://coeymans.org/boards-committees/conservation-advisory-council/) and physical copies are available at the Coeymans Town Hall and the RCS Community Library. The PDF maps allow for ease of navigation with the ability to zoom in to an area of interest. In addition, tax parcel boundaries are embedded in the PDF maps. To view parcel boundaries, you must download the maps and open them using Adobe software (download free Adobe Reader software at https://get.adobe.com/reader/). Expand the layers by clicking the overlapping diamond symbol on the left-hand side of the window. Click the + sign next to the "Layers" folder to expand visible layers, and select the box to the left of the tax parcel layer to turn it on.

[8] New York State Department of Environmental Conservation (DEC), Hudson Valley Natural Resource Mapper, www.dec.ny.gov/lands/112137.html.

Background Maps

Base Map (Map 1)

The Town of Coeymans Base Map is the template for the full natural resources inventory (NRI) map series. It presents general geographic context, upon which additional map information is layered in subsequent maps. The Base Map includes roads, hydrology, and municipal boundaries. Interstate roads, NY /US highways, local streets, and railroads are shown. Open water areas, wetlands, and streams are illustrated under hydrology. The Town of Coeymans and the Village of Ravena municipal boundaries are shown by a thick grey line. Data sources are provided in the lower right corner of the map and in all subsequent maps in the NRI.

The Base Map is oriented to true north and has a scale of 1:60,000. This scale is a ratio that refers to the relationship of distance on the map to distance on the ground.

Aerial View (Map 2)

The Aerial View Map provides a bird's-eye view of Coeymans, displaying 1-ft resolution 4-band digital orthoimagery taken in spring 2014 by the NYS Digital Orthoimagery Program. These orthoimages or orothophotos are aerial photographs collected by flying a specially equipped aircraft over an area. The photos are "stitched" together and geometrically corrected to adjust for distortion and obtain a uniform scale. This allows the imagery to be used as a background image in GIS as it accurately represents the earth's surface and lines up with other geographically referenced data layers.

Aerial imagery provides the viewer a detailed view of the town and its features, and can help to distinguish different types of vegetation and land use, down to the location of buildings. It can serve as a reference for comparison with features shown on other maps in the Natural Resources Inventory.

For more detailed, interactive viewing of orthoimagery dating back to 1994, users can visit the Discover GIS Data NY website at https://orthos.dhses.ny.gov/ or visit Albany County GIS at http://gismap.albanycounty.com/gisviewer/.

Infrared Aerial View (Map 3)

The Infrared Aerial View Map shows the 2014 orthoimagery described in the Aerial View Map in a different light: the infrared band is displayed in red, increasing color contrast and helping to highlight details in the landscape that are otherwise invisible to the human eye. The infrared band detects and records energy reflected by the ground and the sun's spectral energy, displaying it at visible wavelengths.[9] Color infrared aerial imagery is particularly useful for predicting the occurrence of habitats and identifying surface water resources like small streams and wetlands that may not otherwise be mapped.

Different colors in the color infrared imagery correspond to different types of vegetation and land use.[10] Red tones are associated with live vegetation. More intensely red areas indicate places where vegetation is growing vigorously. Since this orthoimagery is taken in early spring before deciduous trees leaf out, red areas usually correspond to conifer (i.e., evergreen) trees or shrubs and fertilized lawns, crops, or pastures. Dormant or less vigorously growing vegetation typically appears in lighter shades of red or pink or various shades of green, brown, or tan. Bare soils appear in shades of white, blue, or green. Water typically appears black or dark blue. However, if the surface is frozen, it may appear white. Shallow or sediment-laden water bodies appear brighter shades of blue. Wetlands typically appear dark to varying degrees depending on depth of inundation or degree of soil saturation. Wetland vegetation will appear darker than surrounding upland habitats. In some cases, emergent marshes and wet meadows may appear whitish because of dead, standing vegetation from the previous growing season.

For more detailed, interactive viewing of color infrared aerial imagery from 1994 and 2001, users can visit the Discover GIS Data NY website at https://orthos.dhses.ny.gov/.

[9] U.S. Geological Survey. *Understanding Color-Infrared Photographs, USGS Fact Sheet 129-01*, 2001, pubs.usgs.gov/fs/2001/0129/report.pdf.
[10] U.S. Geological Survey. *What Do the Different Colors Represent*? www.usgs.gov/faqs/what-do-different-colors-a-cir-aerial-photograph-represent.

Topography

Elevation (Map 4)

The Elevation Map displays approximate height above sea level derived from 10-meter resolution digital elevation models from the U.S. Geological Survey. Land in the Town of Coeymans rises from sea level along the Hudson River to a high elevation of 1,283 feet in the west. Table 1 provides general statistics about land area at different elevation ranges in the town.

Table 1. Elevation classes and area in the Town of Coeymans

Elevation (ft.)	Percent Municipal Area	Example Area
< 100	5.4	Coeymans Landing
100 - 199	14.4	Downtown Ravena
200 - 399	16.2	Joralemon Town Park
400 - 599	17.1	Coeymans Landfill
600 - 799	29.5	Alcove Reservoir
800 - 999	13.1	Lindskoog Road
> 1000	4.2	Koong/Blodgett Hills

[1]Area percentages are taken from the combined area of the Town of Coeymans and Village of Ravena (52.97 miles^2).

Lowlands along the town's Hudson River waterfront, including the Binnen Kill flats, support tidal wetlands and floodplain areas. Most of the town's population, businesses, and industry are concentrated on gently sloping bluffs near the Hudson River. Further inland, Sycamore Country Club and Joralemon Park are located in a broad valley that is one of the more gently rolling areas of the town. As elevation rises toward the Helderberg Mountains, terrain becomes more steep and rugged. One of the most prominent topographical features is the escarpment that rises sharply from 200 to around 500 feet above sea level west of Under Cliff Road (County Route 101).[11] Further west are parallel north/south bands of steep slopes at the 800 -1,000 elevation with perpendicular steep slopes bending from them in the roughly east/west direction, usually along creek beds. This area corresponds to the Hudson Valley Limestone and Shale Ridges Significant Biodiversity Area (see the Significant Ecological Features Map). The City of Albany's Alcove Reservoir fills a basin among the western hills and was created from the damming of Hannacroix Creek.

Running roughly west-east through the valley of Coeymans Hollow, Hannacroix Creek, the outlet for the Alcove Reservoir, eventually flows into the Hudson River in the Town of New Baltimore in Greene County near the border with the Town of Coeymans.

[11] *Town of Coeymans Comprehensive Plan*, 2006.

Coeymans Creek enters the Town of Coeymans from the northeast after leaving the Town of Bethlehem and meanders south to the Hudson River after flowing over the picturesque Coeymans Falls below the bridge on Route 144.

Steep Slopes (Map 5)

Steep Slopes are defined by the percentage of vertical change over horizontal distance. For example, a 10% slope is one that rises 10 feet over a horizontal distance of 100 feet. A very steep slope is sometimes referred to as an escarpment, defined as long cliffs formed either by erosion or faulting of bedrock, and usually separates two otherwise flat sections of land.[12] The Steep Slope Map is derived from 10-meter resolution digital elevation models from the U.S. Geological Survey and should only be considered an approximate depiction of steeply sloped areas in the town. Darkly shaded areas on the map indicate the steepest slopes. Table 2 describes the slope classes shown in the Steep Slopes Map.

Table 2. Slope Classes and Area in the Town of Coeymans

Percentage Slope	Percent Municipal Area[1]	Description
<10%	61.4	Level to Gently Sloping
10 – 14%	13.4	Moderately Sloping
15 – 19%	9.1	Strongly Sloping to Steep
20 – 24%	6.1	Steep
25 – 49%	8.6	Very Steep
≥50%	1.5	Extremely Steep

[1]Area percentages are taken from the combined area of the Town of Coeymans and Village of Ravena (52.97 miles^2).

Steep slopes are abundant in Coeymans, from Hudson River bluffs in the Coeymans Hamlet to the sharply rising cliffs of Under Cliff Road (County Route 101). Steep slopes follow the corridors of Hannacroix and Coeymans Creeks, including landslide-prone areas (see Landslide Susceptibility Map). Steep ridges and escarpments running north-south and east-west abound in the rugged western end of the town, the southern terminus of the Helderberg Mountains. Steep slopes are also found between NYS Route 32 and Lawson Lake. In karst areas of Albany County, cliffs or escarpments are associated with sinkholes and other karst formations, which often occur near the base of these features (See Karst Geology Map).[13]

Several significant habitats are associated with steep slopes. Thinly soiled steep slopes may support rocky ledges and talus, which are used for denning, shelter, foraging, and basking by various wildlife species.[14] Steep slopes along the Hudson River may support unique clay bluff and ravine habitat characterized by narrow ridges, steep-sided ravines cut by small streams, and steep bluffs fronting on the river. Several significant examples of calcareous cliff communities

[12] Richards, P., M. David, and M. Rodgers. *Identifying Sinkholes and Manure Management Setbacks in Albany County using LIDaR and Aerial Photography: Final Report to the New York State Water Resources Institute*, 2015. https://wri.cals.cornell.edu/sites/wri.cals.cornell.edu/files/shared/documents/2014_Richards_Final.pdf.
[13] Ibid.
[14] Kiviat, E. and G. Stevens. *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* (Albany, NY: New York State Department of Environmental Conservation, 2001).

have been mapped by the New York Natural Heritage Program in the town (see Significant Ecological Features Map), in addition to documented rare plants and rare animals associated with rocky habitats (see Table 7).

Slopes greater than 15% generally pose significant limitations to development and are among the most sensitive environmental features in the landscape. Development in steep areas can increase the danger of erosion, landslides, and excessive polluted runoff.[15] Steep slope disturbance can introduce sediment to streams and water bodies, affecting downstream water quality. Grading and construction on steep slopes can also be prohibitively expensive, and such sites may not be able to support a properly functioning public or private sewer system. Steep slopes or escarpments may also have scenic value that may be impacted by development.

According to the *Town of Coeymans Draft Local Waterfront Revitalization Plan*, erosion causes major problems in many of the town's steep areas. Where mining occurs, fragile soil is washed into the creeks, eventually draining to the Hudson River, necessitating dredging. In areas where clay soils are prevalent, landslides present a hazard.

Concerns about the impacts of development on steep slopes can be addressed through zoning and the site plan review process. There are many examples of steep slope ordinances available that could serve as a model for Coeymans. A good overview of options is available from https//conservationtools.org.

[15] Southern Tier Central Regional Planning and Development Board, *Steep Slopes and Land Use Decisions*, 2012. www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/SCAP_steepslopes 2010_02_21_CR.pdf.

Landslide Susceptibility (Map 6)

Steep clay bluffs and ravines of eastern Coeymans are susceptible to landslides. According to the *New York State Hazard Mitigation Plan*,[16] landslide materials may be composed of natural rock, soil, artificial fill, or a combination of these materials. They can be caused by a variety of factors including earthquakes, fire, storms, and by human land modifications. Landslides can transpire quickly, with little or no warning. Depending on where they occur, landslides can pose significant risks to health and safety, as well as transportation and other services. Eastern Coeymans is located in one of the areas with highest potential for landslides in New York, where steep slopes occur atop ancient glacial lake clay deposits. Similar areas along the Normans Kill in the neighboring Town of Bethlehem have experienced a series of landslides in recent decades, most recently in 2015.[17]

Glacial lake clay soils have a higher risk for landslide occurrence than areas characterized by soils formed in glacial till.[18] The steeper the slope the higher the risk for landslide occurrence, assuming other conditions that lead to landslides are present. However, according to the New York State Geological Survey (NYSGS), landslides can occur with very little slope, sometimes classified as earth slumping or earth flow. The threshold is estimated at 10-degrees slope or higher when the susceptibility becomes significant. A tall slope or hill, commonly referred to as relief, could potentially lead to a high risk. Geologists at the NYSGS identify relief (height) greater than 40 ft. as the general threshold where the potential becomes more significant.

Causes or triggers of landslides on marginally stable slopes can be both naturally occurring or human induced and include three (3) primary factors: water saturation of the ground; loading, or increased weight at the top or high end of the slope; and taking away soil or removing mass from the bottom.[19] A major 2015 landslide on the Normans Kill has been attributed to the dumping of fill at the top of an unstable slope.[20]

The Landslide Susceptibility Map shows areas in the Town of Coeymans with co-occurrence of steep slopes (10-degrees or greater slope) and clayey soils (greater than or equal to 25% clay content in the top 20 inches of soil). This methodology is based on one used by the Albany County Department of Economic Development, Conservation, and Planning for the *Normans Kill Riparian Corridor Study*.[21] The most vulnerable areas in the town occur along the Hudson

---

[16] New York State Department of Homeland Security and Emergency Services (DHSES), "3.14.1 Landslide Profile." In *New York State Hazard Mitigation Plan* (2014), http://www.dhses.ny.gov/recovery/mitigation/plan.cfm.
[17] Albany County Department of Economic Development, Conservation, and Planning, *Normans Kill Riparian Corridor Study, report prepared for Audubon New York* (Albany, NY, 2007). http://www.hudsonwatershed.org/images/WaterShedManagementPlans/Normans-Kill-report.pdf
[18] DHSES, 2014.
[19] DHSES, 2014.
[20] Crowley, Cathleen, "Dumping before Bethlehem landslide under scrutiny: Albany accuses Bethlehem of negligence," *Albany Times Union*, 22 June 2015. https://www.timesunion.com/tuplus-local/article/Dumping-before-Bethlehem-landslide-under-scrutiny-6340815.php.
[21] Albany County, 2007.

River and in the Coeymans and Hannacroix Creek corridors. Some small, isolated areas of susceptibility are located in the town's western hills.

Careful attention to land disturbance is warranted in areas susceptible to landslides when planning and permitting new development, especially along the Coeymans Creek corridor. Notably, Routes 144 and 101 run parallel to vulnerable slopes. A landslide event would have potential ramifications for the health and safety of landowners, emergency services response, transportation, and habitat and water quality in Coeymans Creek and the nearby Hudson River.

Geology and Soils

Bedrock Geology (Map 7)

Bedrock is the solid rock that lies beneath the soil and other surficial materials.[22] Bedrock geology has shaped the natural landscape of the Town of Coeymans as well as the community's livelihood since the town's earliest days, from brick-making to mining and cement production. Bedrock features affect wide-ranging characteristics including topography, mineral resources, and groundwater storage, as well as the migration of contaminants in water supplies.[23] The properties of bedrock geology and surficial geology (loose deposits above bedrock) also strongly influence soil properties, as well as groundwater and surface water chemistry, which in turn influence the establishment of habitats and natural communities. For example, the calcium rich or *calcareous* soil that is associated with limestone bedrock often supports more unique or rare plants and biodiversity than other areas[24]. Several active mining operations in the town generate important economic activity, while other unique geologic areas such as Joralemon Park are outdoor recreation destinations which attract residents and tourists.

The Bedrock Geology Map displays bedrock information from statewide maps produced by the New York State Museum[25]. At a scale of 1:250,000, the data are highly generalized and cannot be relied on to describe the precise geology at any specific area on the ground. The map is nevertheless still useful for describing the general geology of an area. Table 3 contains additional description of the bedrock geology units from the New York State Museum.

Bedrock formations in the town range in age from 458 million years (Upper Ordovician) to 385 million years (Middle Devonian). Coeymans bedrock geology is made up of the Ordovician Normanskill, Schenectady, and Austin Glen formations, the Upper Silurian-Lower Devonian Helderberg and Tristates Group, the Middle Devonian Onondaga Formation, lower Hamilton Group, and the Plattekill Formation, in order of oldest to youngest. The eastern quarter of the Town consists of the Normanskill, Schenectady, and Austin Glen formations of the Ordovician Age. The Normanskill Formation consists of gray, impure sandstones (graywackes), overlying a bed of younger Snake Hill Shale.[26]

The oldest bedrock in Coeymans originates from the Taconic mountain-building event.[27] The earth's crust thrusted upward in slices forming the Taconic Mountains east of the present-day

---

[22] "Bedrock." *Wikipedia, The Free Encyclopedia* (2018).
[23] Haeckel and Heady, *Creating a Natural Resources Inventory*, 16.
[24] Kiviat and Stevens, *Biodiversity Assessment Manual*.
[25] New York State Museum. *Geologic Map of New York, Hudson Mohawk Sheet* (Albany, NY, 1970). http://www.nysm.nysed.gov/research-collections/geology/gis.
[26] *Town of Coeymans Comprehensive Plan*, 2006, 57.
[27] Driscoll, D. and L. Childs, editors, "Geology," In *Helderberg Escarpment Planning Guide*. (Slingerlands, NY: Albany County Land Conservancy, 2002), 19-28.

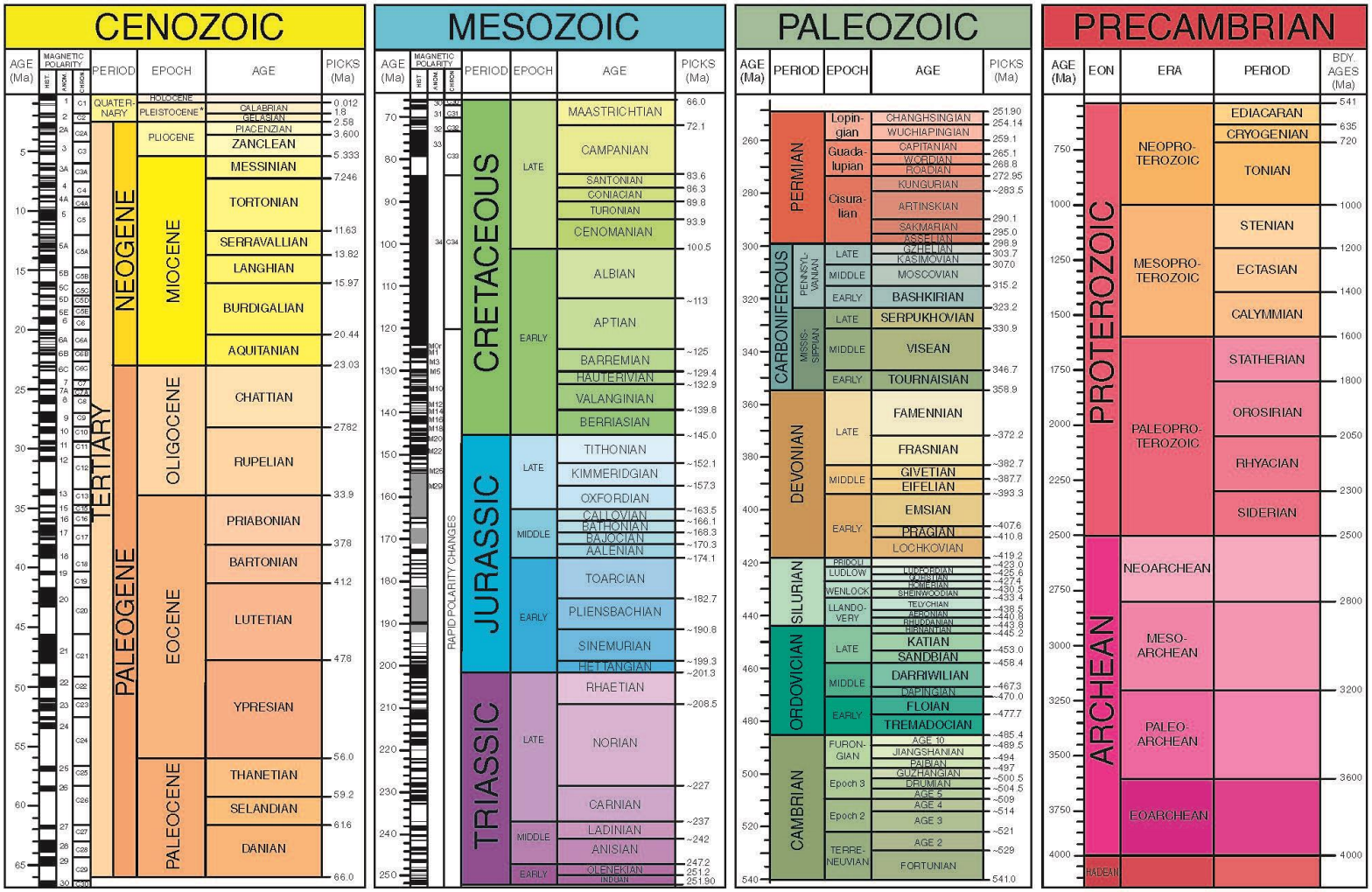
Table 3. Bedrock Geology units in the Town of Coeymans.

Code	Group	Unit	Formaion	Member	Description	Epoch
Dhm	Hamilton Group	Undifferentiated Lower Hamilton Group	Marcellus and Skaneateles Formation		Shales	Middle Devonian
Dhpl	Hamilton Group	Hamilton Group	Plattekill Formation		Sandstones and shales	Middle Devonian
Dou	Onondaga Limestone and Tristates Group	Lower Tristates Group		Onondaga Limestone	Limestone	early Middle Devonian
Dgl	Onondaga Limestone and Tristates Group		Glenerie Formation		Cherty, arenaceous limestone	Lower Devonian
Dhg	Helderberg Group	Helderberg Group	Port Ewen Formation		Limestones and shales	early Devonian
Osc	Lorraine & Trenton & Black River Groups & Metamorphic Equivalents	Trenton Group	Schenectady Formation		Sandstone, silts and shales	upper Late Medial Ordovician
Otm	Lorraine & Trenton & Black River Groups & Metamorphic Equivalents			Taconic Melange	chaotic mixture	Late Medial to Late Ordovician
Omi	Taconic Overthrust (Allochthonous) sequence		Mount Merino Formation		Shales & cherts	Early Medial Ordivician
Oag	Taconic Overthrust (Allochthonous) sequence		Austin Glen Formation		graywacke, shale	upper Early Medial Ordovician
On	Lorraine & Trenton & Black River Groups & Metamorphic Equivalents	Normanskill	Mount Merino & Austin Glen Formations	Normanskill Shale	Black shales	late Early Medial Ordovician
h2o	Water					

Hudson River. The easternmost area of Coeymans is underlain by black shales and impure sandstones (greywackes) originating from this time, some of them intensely folded. A shallow inland sea formed and gradually filled in by erosion of the Taconics around 440 million years ago (Late Ordivician). Sandstones and shales in the Normanskill Formation originate from this era. This region lay above sea level during the latest Ordovician through latest Silurian, resulting in a time of erosion and non-deposition, forming what is known as the Taconic Unconformity. Above this unconformity are layers of limestone and dolomite that were formed in the warm, shallow sea between 423 and 410 million years ago (Silurian and Early Devonian) including strata of the Helderberg Group.

Meanwhile, between 410 and 360 million years ago, the Acadian mountain-building event east of the heavily eroded Taconics formed a much higher mountain range, whose erosional sediment

GSA GEOLOGIC TIME SCALE v. 5.0



Walker, J.D., Geissman, J.W., Bowring, S.A., and Babcock, L.E., compilers, 2018, Geologic Time Scale v. 5.0: Geological Society of America, https://doi.org/10.1130/2018.CTS005R3C. ©2018 The Geological Society of America

*The Pleistocene is divided into four ages, but only two are shown here. What is shown as Calabrian is actually three ages—Calabrian from 1.80 to 0.781 Ma, Middle from 0.781 to 0.126 Ma, and Late from 0.126 to 0.0117 Ma.

The Cenozoic, Mesozoic, and Paleozoic are the Eras of the Phanerozoic Eon. Names of units and age boundaries usually follow the Gradstein et al. (2012), Cohen et al. (2012), and Cohen et al. (2013, updated) compilations. Numerical age estimates and picks of boundaries usually follow the Cohen et al. (2013, updated) compilation. The numbered epochs and ages of the Cambrian are provisional. A "~" before a numerical age estimate typically indicates an associated error of ±0.4 to over 1.6 Ma.

REFERENCES CITED

Cohen, K.M., Finney, S., and Gibbard, P.L., 2012, International Chronostratigraphic Chart: International Commission on Stratigraphy, www.stratigraphy.org (accessed May 2012). (Chart reproduced for the 34th International Geological Congress, Brisbane, Australia, 5–10 August 2012.)

Cohen, K.M., Finney, S.C., Gibbard, P.L., and Fan, J.-X., 2013, The ICS International Chronostratigraphic Chart: Episodes v. 36, no. 3, p. 199–204 (updated 2017, v. 2, http://www.stratigraphy.org/index.php/ics-chart-timescale; accessed May 2018).

Gradstein, F.M, Ogg, J.G., Schmitz, M.D., et al., 2012, The Geologic Time Scale 2012: Boston, USA, Elsevier, https://doi.org/10.1016/B978-0-444-59425-9.00004-4.

Previous versions of the time scale and previously published papers about the time scale and its evolution are posted to http://www.geosociety.org/timescale.

THE GEOLOGICAL SOCIETY OF AMERICA®

spread west forming the Catskill Delta between 380 and 345 million years ago (Early through Late Devonian). The resulting Tristates, Onondaga, and Hamilton strata in western Coeymans originate from this period. The Catskill Delta and underlying Early Devonian formations has yielded one of the most complete fossil records of the Devonian period found anywhere in the world.

The modern landscape of Coeymans reflects the product of both uplift and erosion processes during the past 200 million years. The Helderberg Plateau began lifting upward beginning in the Cenozoic Era and continues to this day. Through stream and atmospheric erosion, the layered rock formations of the plateau that once stretched toward the Taconics and north to the Adirondacks have been gradually worn away, creating modern topographical features. Successive glacial advances and retreats during the ice age marked the past two million years, with the most recent Wisconsin Glaciation responsible for today's surficial geology deposits. During the close of the glacial period, a large water body known as Lake Albany covered the Albany lowland, depositing clay, silt, and sands (see Surficial Geology Map).

The broad swath of Helderberg and Onondaga limestone bedrock is perhaps the most notable geologic feature in Coeymans. This area is recognized as part of the Hudson Valley Limestone and Shale Ridges Significant Biodiversity Area by the DEC and supports diverse natural communities and populations of rare plants associated with calcareous bedrock conditions (see Significant Ecological Features Map).[28] This area also supports important caves and other karst features, which are shown in the Karst Geology Map. In addition, it has been a valuable mineral resource for cement production and other industries. Lafarge North America mines Manlius and Coeymans limestones in the town for cement raw material. Overlying the Manlius and Coeymans limestones are the Kalkberg and New Scotland formations, two relatively impure limestones that have high silica contents. These units are important for road aggregate due to their high silica content making them more resistant to road wear. Callanan Industries runs a mining operation through which they strip off the underlying units. These units are then either stockpiled or used for aggregate.[29]

Knowledge of geologic properties is important for making sound planning decisions. For example, if bedrock is close to the surface, foundation and road construction is more expensive and may cause other environmental problems such as erosion. Karst bedrock features may be structurally unstable and are particularly sensitive to disturbance and vulnerable to the spread of contaminants (see the Karst Geology section for further discussion).

[28] Penhollow et al., *Wildlife and Habitat Conservation Framework*, 2006.
[29] *Town of Coeymans Comprehensive Plan*, 2006, 57.

Karst Geology (Map 8)

The term "karst" describes a distinctive geology characterized by surface water and groundwater dissolution of underlying rock, most often softer materials such as limestone (chalk) and dolomite. As rain water seeps into the rock, erosion occurs wearing away both at the surface and weak points inside the rock. This process can result in dramatic landscapes above ground and magnificent cave formations beneath the surface. Karst regions also typically contain aquifers, underground layers of permeable rock, which can provide large quantities of water.

The Karst Geology Map details locations of karst features identified in a 2015 county-wide study by researchers from The College at Brockport to inform farm management practices.[30] According to the researchers, "thinly-soiled karst areas, exposed bedrock, and sinkholes provide a direct route for surface pollutants like manure to travel into the groundwater table. As a consequence, it is very easy to pollute nearby domestic water supply wells." Using aerial imagery and high-definition topographical data derived from LiDAR, the team mapped a total of 26 sinkholes, 40 sinkhole complexes, 11 swallets, and over 150 miles of escarpments in the Town of Coeymans, defined as follows:

- **Sinkhole:** A depression or cavity with no surface drainage that conveys water underground.
- **Sinkhole Complex:** A collection of multiple sinkholes and associated rock fractures.
- **Swallet:** Individual sinkholes that are connected hydrologically to streams. Swallets are commonly locations where streams disappear underground.
- **Escarpment:** long cliff formed either by erosion or faulting of bedrock, usually separating two otherwise flat sections of land.

In Coeymans, karst features primarily occur within the Onondaga Limestone and Tristates and Helderberg bedrock groups, near the base or edge of escarpments. Within these areas, the study notes that soils in the Farmington series appear to be good indicators for thinly-soiled karst features. These soils tend to be shallow, well drained, medium textured and overlie limestone. Karst areas may also support examples of significant natural communities associated with limestone settings, such as calcareous cliff communities, maple-basswood rich mesic forest, and silver maple-ash swamp, which have been mapped in Coeymans by the New York Natural Heritage Program (see the Significant Ecological Communities Map).

Karst areas pose unique challenges to development, elevated risk of groundwater contamination, high variability in well yields, and the possibility of sinkhole formation.[31] Groundwater flow in karst aquifers is unique because of enlarged solution conduits (underground streams) caused by dissolving bedrock, which permits rapid groundwater flow. Because karst features like sinkholes and sinking streams allow pollutants to directly enter these conduits without first being filtered by the soil, karst aquifers are particularly vulnerable to groundwater contamination. It is

[30] Richards et al., *Identifying Sinkholes and Manure Management Setbacks in Albany County*, 2015, 1.
[31] Driscoll and Childs, *Helderberg Escarpment Planning Guide*, 2002, 29-36.

therefore especially important to minimize the potential for groundwater pollution in this region. Furthermore, for the physical safety of structures and that of residents, the stability of the underlying bedrock should be evaluated in karst areas. Care should be taken to ensure the safety of building foundations, and to direct surface water away from buildings to avoid further weakening of the bedrock.

Surficial Geology (Map 9)

Surficial geology refers to the unconsolidated geologic materials or loose deposits lying on top of the bedrock, and includes sand and gravel, clay and silts, and glacial tills.[32] The origin of surficial geology materials ranges from recent alluvial or stream deposits transported during flood events to materials that were deposited as glaciers retreated following the last ice age. Surficial geology materials influence soil development and resulting habitats and natural communities; for example, soils formed in lacustrine (lake) deposits tend to be fine textured, often supporting wet clay meadow or clay bluff and ravine habitats.[33] Areas with exposed bedrock (i.e., little to no surficial deposits) are associated with valuable habitats, as well. Examples of Red Cedar Rocky Summit and Rocky Grassland Summit as well as Calcareous Cliff Communities have been mapped by the New York Natural Heritage Program in the town (see Significant Ecological Features Map).

The Surficial Geology Map displays information from statewide maps produced by the New York State Museum[34]. As for bedrock geology, the map was developed at a scale of 1:250,000 and is best used as a general reference. There are nine types of surficial materials mapped in Coeymans, defined as follows:

- **Recent Alluvium:** Modern stream deposits.
- **Lacustrine Silt and Clay:** Fine-grained deposits deposited in glacial lakes.
- **Lacustrine Delta:** Sand and gravel deposits often underlain by finer-grained sand and silt/clay.
- **Lacustrine Sand**: Fine to medium sand often underlain by silt or clay deposits.
- **Outwash Sand and Gravel:** Sand and gravel deposits from glacial meltwater streams.
- **Kame Deposit:** Mound-like hill of poorly sorted drift, mostly sand and gravel, deposited at or near the terminus of a glacier.
- **Till:** Dense, unsorted clay, silt, sand, gravel, boulders.
- **Till Moraine:** An accumulation of till deposited by direct glacial action.
- **Bedrock:** Exposed bedrock, typically within one meter of the soil surface.

Much of Coeymans is blanketed in glacial till or till moraine deposits. Bedrock exposures occur at higher elevations and on steep slopes west of the Village of Ravena and County Route 101. Lacustrine sand, silt, clay, and delta deposits are dominant east of these areas, reflecting the approximate extent of ancient glacial Lake Albany. Outwash sand and gravel deposits occur in the Hannacroix Creek valley above Coeymans Hollow and in some low-lying areas along minor tributary streams. Hannacroix Creek valley downstream of Coeymans Hollow, the Coeymans Creek corridor, and the Binnen Kill flats are characterized by recent alluvial deposits. A single kame deposit is mapped south of Lafarge Cement Mine.

---

[32] Town of Rosendale Environmental Commission, *Rosendale Natural Resources Inventory*, 2010, 15.
[33] Kiviat and Stevens, *Biodiversity Assessment Manual*, 2001.
[34] New York State Museum. *Geologic Map of New York, Hudson Mohawk Sheet*, 1970.

The Surficial Geology Map also shows locations of active mine facilities according to DEC's Mining Database, available at https://www.dec.ny.gov/lands/5374.html.

Surficial geology affects the suitability of areas for septic systems, the productivity of agriculture, the flow and quality of surface water and groundwater, and appropriate locations for roads and buildings. Sand and gravel outwash deposits are of particular interest to many communities. They often support high-yield aquifers and are an important source of materials that are mined for road maintenance and construction uses.

Soils (Map 10)

Soils are the foundation for the establishment of natural communities of plants and animals as well as for critical ecological processes from decomposition and nutrient cycling to the water cycle. Soil characteristics including reaction (acidity or alkalinity), drainage, soil texture, depth to bedrock, and slope inform the natural habitats that become established in a particular area.[35] Soils also play a fundamental role in determining suitability for land uses. Soil characteristics influence stability for structures, erosion risk, vulnerability to flooding, capacity to filter pollutants and wastes, and suitability for agriculture (Farmland soils are further discussed in relation to Map 28, Agricultural Resources). Consideration of soil properties is important for planning and designing drainage systems; siting of structures; evaluating the potential for septic systems; assessing requirements for constructing foundations, basements, and roads; and determining the feasibility of excavation; among other uses.[36]

The *Soil Survey for Albany County*[37] includes detailed soil maps for the county along with descriptions of soil types and tables of chemical, hydrologic, and structural characteristics of the soils for various human uses. It's important to note that county soil maps are only approximate; any soil unit may contain "inclusions" of up to two acres of soil types different from the mapped unit. The soil data may also be viewed online using the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey. The soil survey report is available for download in PDF format on the NRCS website.

The Soils Map shows detailed soil units from the county soil survey classified according to general associations following the NRCS General Soil Map for New York State.[38] A soil association consists of one to four different soils that are found side by side, all usually developed from the same kind of parent material, but differing mainly in drainage and slope. The following descriptions of general soil associations found in the town are drawn from the county soil survey. Note that the general soils were mapped at a 1:250,000 scale and include some soils series not found in Albany County – they are denoted by an asterisk (*). The general soil map helps to visualize the distribution of dominant soils in the town.

> **Arnot Group:** *These soils are found in the highest elevations of northwest Coeymans primarily between Lawson Lake and the Alcove Reservoir.* These are shallow, somewhat excessively drained soils on bedrock-controlled uplands. They formed in glacial till deposits derived from siltstone, sandstone, and shale.
>
> **Nunda-Darien*-Cazenovia* Group:** *These soils are found locally in the hills of northwestern Coeymans.* These are very deep, moderately well drained soils on uplands,

[35] Heady, Laura, and Gretchen Stevens, *Biodiversity Assessment Guidebook* (Annadale, NY: Hudsonia Ltd, 2018).
[36] Haeckel and Heady, *Creating a Natural Resources Inventory*, 2014.
[37] Brown, James. *Soil Survey of Albany County, New York* (USDA Soil Conservation Service, 1992). www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/new_york/NY001/0/albany.pdf
[38] Natural Resources Conservation Service, *State Soil Geographic Dataset (STATSGO2)*, 2006. cugir.library.cornell.edu/catalog/cugir-008009

generally on the tops and sides of hills and along valley sides. They formed in a thin silty mantle over glacial till derived from clayey shale.

Oquaga-Lordstown-Arnot Group: *These soils are found locally in western Coeymans from Lawson Lake in the north to central New Baltimore in the south.* These are moderately deep, well drained to somewhat excessively drained soils on bedrock-controlled landforms on uplands. They formed in a thin mantle of glacial till deposits over sandstone, siltstone, and shale. Bedrock is at a depth of 20 to 40 inches.

Volusia*-Mardin*-Lordstown Group: *These soils are found in the hills of southwestern Coeymans surrounding much of the Alcove reservoir.* These are moderately deep, well drained soils on bedrock-controlled uplands. They formed in channery glacial till deposits derived from siltstone and sandstone.

Wayland-Palmyra*-Howard-Chenango Group: *These soils are found locally in two patches: one in northern Coeymans along Feuri Spruyt and one in southern Coeymans along Hannacroix Creek.* These are very deep soils on floodplains, outwash plains, kames, and terraces. They range from very poorly drained to somewhat excessively drained. They formed in recently deposited alluvium from nearby overflowing streams and in glacial outwash derived mainly from sandstone, limestone, shale and some granitic rocks.

Stockbridge*-Galway*-Farmington Group: *These soils occupy a large area of central Coeymans and are associated with much of the Town's karst geology.* These are shallow, well drained and somewhat excessively drained soils on bedrock-controlled uplands. They formed in a thin mantle of glacial till over hard bedrock, mainly limestone, at a depth of 10 to 20 inches.

Rhinebeck-Niagara*-Hudson-Dunkirk*-Collamer* Group: *These soils dominate much of eastern Coeymans along the I-87 and Route 9W corridors.* These are very deep, somewhat poorly drained soils that formed in the silt and clay deposits and on the former plains of glacial Lake Albany.

Wayland-Teel-Hamlin: *These soils are found locally in the Hudson River and Binnen Kill floodplain.* These are moderately to very deep soils on floodplains. They range from very poorly drained to well drained. These soils formed in recently deposited alluvium from nearby overflowing streams.

Table 4 lists the detailed soil units found in Coeymans along with some general characteristics relevant to habitat identification and land use planning such as drainage class, depth to bedrock, and soil reaction, based on tabular information provided in the county soil survey. The two- or three-letter symbol shown on the map corresponds to soil unit codes used in the county soil survey. Soil drainage class indicates the possible presence of wetlands, and is a particularly important factor to consider in the evaluation of proposed development. Somewhat poorly drained soils are good indicators of possible wetland areas and poorly drained and very poorly

drained soils are indicators of probable wetland areas.[39] These wetland indicator soils are shown on the Wetlands Map.

Depth to bedrock is another important soil characteristic to consider in land-use planning. Soil depth influences suitability for septic and other wastewater treatment systems, as well as the siting of buildings and roads. Shallow soils (<20 inches to bedrock) are often associated with steep slopes, increasing susceptibility to erosion. Shallow soils are also less capable of filtering pollutants draining to surface and groundwater supplies. With the exception of Arnot and Farmington soils, soils in Coeymans are generally moderately to very deep.

Soil reaction refers to the acidity or alkalinity of the soil, expressed in pH values.[40] Soil chemistry exerts a strong influence on plant and animal communities, and can be a useful predictor for certain habitats, from acidic bogs to calcareous wet meadows. Soils developing over calcium-rich bedrock such as limestone often support disproportionately high numbers of rare plants, animals, and natural communities. Many soils in Coeymans are at least somewhat calcareous.

Table 4. Soils in the Town of Coeymans, NY

Map Label[1]	**Name**	**Reaction[2]**	**Soil Depth (in)**	**Drainage[3]**	**Hydric[4]**
Ae	Allis silt loam	C	20-40	P	prh
AnA, AnB, AnC	Angola silt loam	C	20-40	SP	prnh
ArC	Arnot very channery silt loam	NC	≤20	MW-SX	nh
AsB, AsF	Arnot-Rock outcrop complex	NC	≤20	MW-SX	nh
Br	Birdsall mucky silt loam	C	>60	VP	h
BuA, BuB, BuC	Burdett silt loam	C	>60	SP	prnh
BxB	Busti silt loam	NC	>60	SP	nh
Ca	Carlisle muck	C	>60	VP	h
CeA, CeB	Castile gravelly loam	SC, NC	>60	MW	nh
ChB, ChC, ChD	Chenango gravelly silt loam	SC, NC	>60	SX-W	prnh
CkB	Chenango channery silt loam	SC, NC	>60	SX-W	nh
ClA, ClB	Claverack loamy fine sand	C	>60	MW	nh
CoB, CoC	Colonie loamy fine sand	SC	>60	SX-W	nh
DAM	*Dam*				*nh*
ElA, ElB	Elmridge fine sandy loam	SC, NC	>60	MW	prnh
EnA, EnB	Elnora loamy fine sand	SC	>60	MW	prnh
FaB	Farmington silt loam	C	≤20	SX-W	nh

[39] Kiviat, and Stevens, *Biodiversity Assessment Manual*, 2001.
[40] Heady and Stevens, *Biodiversity Assessment Guidebook*, 2018.

Map Label[1]	Name	Reaction[2]	Soil Depth (in)	Drainage[3]	Hydric[4]
FrB, FrC, FrF	Farmington-Rock outcrop complex	C	≤20	SX-W	nh
FwC	Farmington-Wassaic-Rock outcrop complex	C	≤20	SX-W	nh
Fx	Fluvaquents-Udifluvents complex	(variable)	>60	SP-VP	ph
Gr	Granby loamy fine sand	C	>60	P-VP	prh
Ha	Hamlin silt loam	C	>60	W	prnh
HnA, HnB	Hornell silt loam	NC	20-40	SP	prnh
HoB, HoC	Howard gravelly silt loam	C	>60 Outwash		nh
HuB, HuC, HuD, HuE	Hudson silt loam	C	>60	MW	prnh
In	Ilion silt loam	C	>60	P	prh
KeB	Kearsarge silt loam	NC	≤20	SX	nh
LoA, LoB, LoC, LoD	Lordstown channery silt loam	NC	20-40	W	nh
LrE	Lordstown-Arnot complex	NC	20-40	W	nh
Ma	Madalin silt loam	C	>60	P-VP	prh
MbB, MbC, MbD, MbE	Manlius channery silt loam	NC	20-40	X-W	nh
Mh	Medihemists and Hydraquents	(variable)	>60	VP	prh
NaB, NaC	Nassau channery silt loam	NC	≤20	SX	nh
NrC, NrD	Nassau very channery silt loam	NC	≤20	SX	nh
NuB, NuC, NuD, NuE	Nunda silt loam	C	>60	MW	prnh
NvC	Nunda silt loam	C	>60	MW	prnh
Pa	Palms muck	C	>60	VP	prh
Pm	*Pits*				nh
Pn	*Pits*				nh
Ra	Raynham very fine sandy loam	C	>60	SP-P	ph
RhA, RhB	Rhinebeck silty clay loam	C	>60	SP	prnh
RkB, RkC	Riverhead fine sandy loam	SC	M>60	W	nh
ScA, ScB	Scio silt loam	SC, NC	>60	MW	prnh
Sh	Shaker fine sandy loam	C, SC	>60	SP-P	ph
St	Stafford loamy fine sand	NC	>60	SP	prnh
SuA	Sudbury fine sandy loam	C	>60	MW	nh
Te	Teel silt loam	C	>60	MW-SP	prnh
TuB	Tuller-Greene complex	NC	≤20	SP-P	prnh
Ud	*Udipsamments*				nh
Ue	*Udipsamments*				nh
Uf	Udipsamments-Urban land complex	SC	>60	X-W	prnh

Map Label[1]	Name	Reaction[2]	Soil Depth (in)	Drainage[3]	Hydric[4]
Ug	*Udorthents*				nh
Uh	*Udorthents*				prnh
Uk	*Udorthents*				prnh
UnA, UnB, UnD	Unadilla silt loam	(variable)	>60	W	prnh
Ur	*Urban land*				nh
Ut	*Urban land-Udorthents complex*				nh
VaB, VaC, VaD	Valois gravelly loam	SC	>60	W	nh
W	*Water*				nh
Wa	Wakeland silt loam	C	>60	SP	prnh
WcA, WcB, WcC	Wassaic silt loam	C	20-40	MW-W	nh
Wo	Wayland soils complex	C	>60	P-VP	prh

Abbreviations Guide:

[1] **Slope** is indicated by the last upper case letter in the soil symbol (the "A" in "AnA"). Slopes are given letter codes A-F, with "A" signifying the gentlest slopes and "F" the steepest. The absence of a final uppercase letter indicates more-or-less flat terrain.

A	0-3%	level to gently sloping
B	3-8%	gently sloping
C	3-15%	gently to strongly sloping
D	15-35%	strongly sloping to steep, or hilly
E	25-45%	moderately steep to very steep

[2] **Reactions**: **c** = calcareous | **sc** = somewhat calcareous | **nc** = non-calcareous

[3] **Drainage**: **x** = excessively drained | **sx** = somewhat excessively drained | **w** = well drained | **mw** = moderately well drained | **p** = poorly drained | **sp** = somewhat poorly drained | **vp** = very poorly drained

[4] **Hydric**: **nh** = nonhydric | **prnh** = predominantly nonhydric | **ph** = partially hydric | **prh** = predominantly hydric | **h** = hydric

More Information:

Albany County Soil Survey:
https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/new_york/NY001/0/albany.pdf
Web Soil Survey: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Water Resources

Public Water Supply Catchments (Map 11)

Public water supply catchments or drainage basins refer to the geographical areas that drain to a public water supply reservoir or water intake. Approximately 18% of residential tax parcels in the Town of Coeymans rely on the public water supply systems fed by catchment areas shown in Map 11. It is imperative that land use in these catchment areas is managed to ensure clean water.

The unique land and vegetation characteristics of public water supply catchment areas are directly linked to the water quality of the supply system. Human activities and land uses in these areas also have the potential to impact the health of the water supply. Urban development, land clearing, agriculture, application of chemicals, and the use of septic systems all can contribute to the condition of water. The benefits of healthy catchment areas are not limited to clean drinking water; they include habitats for a variety of plants and animals as well as recreation areas for the community.

Within the Town of Coeymans there are three public water supply catchment zones draining to the Alcove Reservoir, the Potic Reservoir, and the Ravena Water Intake. General statistics about the catchments are provided in Table 5. The catchment boundaries indicated on the map distinguish the geographical perimeters of each public water supply. Both groundwater and surface water in these areas contribute to the public water supply systems. Groundwater is found within the soils and bedrock, recharged by cycles of rain and melting snow. Surface water is water draining the land above ground and is primarily found in streams, wetlands, ponds, lakes, and reservoirs.

Table 5. Public Water Supply Catchments in and near the Town of Coeymans

Reservoir	Catchment Area (acres)	Capacity
Alcove	21,071	12 billion gallons[1]
Basic Creek	11,204	716 million gallons[2]
Ravena	38,919	Unknown
Potic	13,166	Unknown

[1]City of Albany Waters System Specs and Capacity
http://www.albanyny.gov/Government/Departments/WaterAndWaterSupply/SystemSpecsandCapacity.aspx
[2]Albany County Report on Phosphorous Loads in Basic Creek Reservoir
http://www.dec.ny.gov/docs/water_pdf/tmdlbasicck.pdf

Alcove Reservoir

The Alcove Reservoir was built between 1928 and 1932 by damming the Hannacroix Creek and inundating an area known as the Village of Indian Fields. It serves a population of approximately 101,000 people in the City of Albany.[41] The reservoir is 1,426 acres, reaching a maximum depth of 75 feet.[42] Its catchment area is in the western end of Coeymans extending beyond the town border into Westerlo and is fed by the Hannacroix Creek, Silver Creek, and Gulf Creek. The City of Albany Department of Water & Water Supply issues an annual drinking water quality report that covers their withdrawals from the Alcove and Basic Creek (secondary source) reservoirs. Section 100.1 of the City of Albany Public Health Law regulates activities that could occur within the Alcove Reservoir and within each of the watercourses that discharge to the reservoir.

Basic Creek Reservoir

The Basic Creek Reservoir and its catchment area are located in the Town of Westerlo and are part of the City of Albany's water system. Basic Creek Reservoir serves as a feeder reservoir, allowing water from the Basic Creek catchment to be diverted to the Hannacroix Creek, which in turn flows into Alcove Reservoir, Albany's primary water source. The reservoir was constructed from 1928 to 1932 by damming the Basic Creek and flooding former farmland and forest.

Ravena Water Intake

The Ravena Water Intake is located on the Hannacroix Creek in the Town of New Baltimore and supplies public water to approximately 4,500 people in the Hamlet of Coeymans and the Village of Ravena.[43] Its catchment area is the largest on the map and includes land that drains to Hannacroix Creek as well as the Alcove Reservoir's catchment area, located upstream. The Village of Ravena issues an annual drinking water quality report covering their withdrawals from Hannacroix Creek, which is supplemented by Alcove Reservoir water.

Potic Reservoir

The Potic Reservoir catchment area supplies water to the Potic Reservoir Treatment Plant in Greene County. It is the smallest of the public water supply catchment area on the map and is located in the southwest corner of the town extending into the Town of Greenville.

---

[41] Environmental Protection Agency (EPA), *Safe Drinking Water Information System (SDWIS)*, Accessed 23 October 2017. oaspub.epa.gov/enviro/sdw_report_v3.first_table?pws_id=NY0100189&state=NY&source=Surface%20water&population=101082&sys_num=0.

[42] City of Albany, NY, *Albany Water System Vital Statistics*, Accessed 17 December 2018. www.albanyny.gov/Government/Departments/WaterAndWaterSupply/SystemSpecsandCapacity.aspx

[43] EPA, *SDWIS*. Accessed 23 October 2017.

Wells and Major Aquifers (Map 12)

Water is supplied to residents, businesses, and industries in Coeymans by either public water or by private wells. Most of the town outside of the Village of Ravena and Hamlet of Coeymans relies on private wells for water supply. The water within these wells is supplied by aquifers and other groundwater stored in the cracks and fractures of bedrock. Major aquifers shown on Map 12 consist of unconsolidated deposits of sand and gravel that can store large quantities of water. Major aquifers also provide important base flow to streams during dry periods of the year.

The Major Aquifers Map displays unconsolidated aquifers in the Town of Coeymans that were mapped at a scale of 1:250,000 by the US Geological Survey in partnership with the DEC. The mapping is based on the New York State Museum maps of surficial and bedrock geology shown in previous sections of this report. Aquifers in Coeymans are largely concentrated around the two major creeks. The Coeymans Creek aquifer area stretches north to south on the eastern side of the town through the hamlet and ultimately to the Hudson River. It is classified as high yield (>100 gallons/minute). The Hannacroix Creek aquifer area stretches west to east on the southern portion of the town passing through Alcove, Coeymans Hollow, and Aquetuck. It is classified as mid-yield (10-100 gallons/minute). The aquifer beneath the Feuri Spruyt is also classified as mid-yield; other aquifers mapped in the town have unknown yields. At present, the town does not utilize any of the major aquifers for public water supply.

The well mapping for the Town of Coeymans is incomplete, since many wells pre-date the state programs established to inventory them. Known wells are labeled on the map according to data provided by NYS Department of Environmental Conservation and NYS Department of Health. The presence of a well may also be inferred from the location of a residence outside of the public water service area.

Documenting the location of wells within the town is important to avoid the siting of potentially contaminating land uses near them. In addition to filling the gaps in well locations, mapping the recharge areas and zones of contribution for these wells is also recommended. Understanding the boundaries of these drainage areas is important in order to identify potential sources of contamination and gain a sense of pollutant travel times. Wells may be contaminated by naturally occurring sources or human activities, including residential, commercial, agricultural, or industrial sources. The US Geological Survey publication *Groundwater and the Rural Homeowner*[44] discusses common well contamination problems and some remedies.

[44] US Geological Survey, *Groundwater and the Rural Homeowner*, 1994. pubs.usgs.gov/gip/gw_ruralhomeowner/.

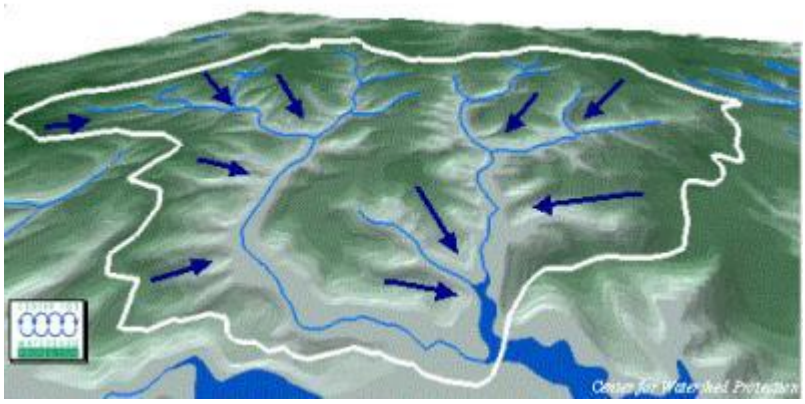
Streams and Watersheds (Map 13)

All land areas on earth are part of a watershed. A watershed is the land area that drains to one common stream, lake, or river. Watersheds are sometimes referred to as a drainage basins or catchments. Ridges that are high points in a watershed separate two watersheds and are called a drainage divide.

Watersheds exist at different geographic scales. Larger watersheds contain many smaller subwatersheds. For example, the Hudson River has a huge watershed that includes a large area of New York State from the Adirondacks to New York City. The Hudson River Watershed is made up of many smaller subwatersheds of still smaller local tributaries that eventually drain to the Hudson River. In the Town of Coeymans the Onesquethaw-Coeymans Creek and Hannacroix Creek watersheds, which comprise the majority of the town, are part of the larger Hudson River watershed.

The watershed is the appropriate geography in which to plan for water quality protection. Water pollution components are transported downhill and downstream within watersheds. Since all the activities within a watershed have the potential to impact the water quality downstream, it is at the watershed level that any analysis of water quality must occur, without regard to political boundaries.

A watershed is the area of land that drains into a stream, river, lake, or other waterbody.



Source: Center for Watershed Protection

All of the land in Coeymans ultimately drains to the Hudson River Estuary. The majority of the town lies within the Hannacroix Creek and Onesquethaw-Coeymans Creek subwatersheds, with smaller areas draining directly to the estuary and to Potic Creek, a tributary of Catskill Creek.

Watersheds are mapped on several scales referred to as its Hydrologic Unit Codes (HUCs)—based on the geography that is most relevant to its specific area. Major watersheds on the map are from the 12-digit Hydrologic Unit Code data set (HUC-12) delineated by DEC and the U.S. Geological Survey for New York State. Subwatersheds are outlined in grey and were delineated

by the New York Natural Heritage Program for the Statewide Riparian Opportunity Assessment. Streams and waterbodies shown on this map are from the 1:24,000 National Hydrography Dataset for New York State and were digitized from air photos.

Note that existing stream maps have inherent inaccuracies and will not capture most intermittent or ephemeral streams. Intermittent streams are in fact widespread, accounting for an estimated 59% of total stream length in the United States. The US Environmental Protection Agency compiled an extensive scientific review in 2015 highlighting their essential role in maintaining water quantity, quality, and overall watershed function on health[45]. Intermittent streams also play a vital role in dissipating stream energy during storms and reducing erosion and downstream flood impacts. Town agencies can visit sites and pursue creating more accurate maps to ensure that intermittent streams are identified and considered during planning processes.

The following brief descriptions of the town's major streams and waterbodies are based on the 2006 *Town of Coeymans Comprehensive Plan.*[46] See the Flood Hazard Areas and Water Quality Classifications and the Stream Habitat sections for additional discussion of streams in the town.

Hudson River

The Hudson River is the town's most dominant natural feature and forms its eastern boundary with the Town of Schodack. The Hudson River is a tidal estuary from the Verrazano Narrows to the Federal Dam in Troy. The river is entirely freshwater in Coeymans, while still being tidal. Freshwater tidal areas are globally rare ecosystems. The river provides habitat spawning areas for numerous resident and migratory fish species, described further in the Coastal Habitats section. The Hudson River is also vital to local commerce including the Port of Coeymans and the local marina and yacht club.

Coeymans Creek

Coeymans Creek (known as the Onesquethaw Creek in its northern reaches) enters the Town of Coeymans at its northern municipal boundary with the Town of Bethlehem, and runs in a southeast direction through the town, until it empties into the Hudson River in the Hamlet of Coeymans. The *Onesquethaw-Coeymans Creek Watershed Study*[47] describes the course of the creek through the town and some possible sources of impairment. The subsequent 2010 *Onesquethaw-Coeymans Watershed Management Plan*[48] lays out recommendations for improving water quality.

---

[45] EPA. *Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence*, 2015. cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=296414

[46] *Town of Coeymans Comprehensive Plan*, 2006, 59-61.

[47] Onesquethaw-Coeymans Creek Watershed Council (OCWC) and Capital District Regional Planning Commission (CDRPC), *Onesquethaw-Coeymans Creek Watershed Study*, 2008. http://www.hudsonwatershed.org/images/WaterShedManagementPlans/onesquethaw.pdf

[48] Onesquethaw-Coeymans Creek Watershed Council (OCWC), *Onesquethaw-Coeymans Creek Watershed Plan*, 2010. http://www.townofnewscotland.com/DocumentCenter/View/374/Onesquethaw-Watershed-Management-Plan-June-2010-PDF

Hannacroix Creek
Hannacroix Creek, another Hudson River tributary, flows into the town from the Town of Westerlo in an easterly direction through the hamlets of Alcove, Coeymans Hollow, and Aquetuck, then curving to the south into the Town of New Baltimore, before heading back north into the Hamlet of Coeymans, where it empties into the Hudson River. During dry weather, the City of Albany halts water releases from the Alcove Reservoir, causing the creek to go dry for about two miles below the dam. A surface water storage reservoir fed by Hannacroix Creek - which is supplemented by the Alcove Reservoir - provides public water for the Hamlet of Coeymans and the Village of Ravena.

Alcove Reservoir
The Alcove Reservoir is the largest surface water body in Coeymans, covering roughly 1300 acres. Located in the western part of the town, the City of Albany owns the reservoir, which provides a clean, fresh water drinking supply for Albany residents. Since the early 1930s the Town of Coeymans and Village of Ravena have had a water use agreement with the City of Albany. The City of Albany had to remove the Village of Indian Fields in 1929 to create the reservoir. The Alcove Reservoir has a capacity of 13.5 billion gallons, an average depth of 25 feet and a maximum depth of 75 feet. Albany owns a significant area of forested land around the reservoir to protect the public water supply.

Lawson Lake
Lawson Lake is a 28-acre lake located in Lawson Lake County Park in the northwest corner of the town. Located on the eastern escarpment of the Helderberg Plateau, the lake's basin was naturally formed in the process of glacial retreat following the last ice age. A large isolated block of ice was left behind, deepening the depression which resulted in the formation of the lake. There are also large wetland areas to the north and south of the lake.

The lake supports a variety of life. Fish commonly found in lake include largemouth bass, black crappie, brown bullhead, pumpkinseed, bluegill, and golden shiners. The lake also attracts many bird species including green heron, belted kingfisher, wood duck, and great blue heron. The surrounding wetlands, and tributary streams support a variety of amphibians and reptiles. Among the species documented are American toad, bull frog, green frog, leopard frog, spotted salamander, red backed salamander, painted turtle, and snapping turtle.

Flood Hazard Areas and Water Quality Classifications (Map 14)

Flood Hazard Areas

The Federal Emergency Management Agency (FEMA) has delineated areas with a 1% chance (1 in 100) or greater probability of being flooded in any given year (often referred to as the "100-year flood"). Zones A and AE (1% flood hazard areas) in Coeymans include the town's Hudson River shoreline, Shad Island floodplain the Coeymans and Hannacroix Creek floodplains, upper Feuri Spruyt, and the margins of Alcove Reservoir. The Flood Hazard Area includes a sizeable area around the mouth of the Hannacroix (including the Coeymans Sewer Plant) and Coeymans Creeks, the Coeymans Waterfront Park site, and the commercial marinas. Some narrow additional flood hazard areas are mapped by FEMA with a 0.2% chance (1 in 500) or greater probability of flooding in any given year (referred to as the "500-year flood"). FEMA Flood Hazard Areas include many natural floodplains, which are low-lying areas adjacent to streams and rivers that can become inundated during heavy precipitation or after snowmelt. It is important to note that FEMA mapped floodplains and their statistical flooding intervals are estimations based on the data and technology available at the time of mapping. Due to many variables, such as the unpredictable nature of some kinds of floods, local drainage problems, and the variable intensity of land development in watersheds, some flood prone areas may not appear on the maps. The riparian buffers shown on the Streams and Watersheds Map may indicate additional flood prone areas based on modeling for the 2% (50-year) floodplain.

As stated in the 2006 Town of Coeymans Comprehensive Plan, "Development within FEMA floodplains is restricted because they serve as water recharge areas, water storage areas during periods of heavy rains or snow thaw, and because the likelihood of water damage to homes and businesses is great. Besides focusing attention on the danger associated with flooding, floodplain boundaries are good indicators of sensitive environmental areas. Thus, efforts to restrict development in floodplains will usually have the added benefit of protecting other important natural resources and the hydrologic system. As stated in the 2006 *Town of Coeymans Comprehensive Plan*,[49] "Development within FEMA floodplains is restricted because they serve as water recharge areas, water storage areas during periods of heavy rains or snow thaw, and because the likelihood of water damage to homes and businesses is great. Besides focusing attention on the danger associated with flooding, floodplain boundaries are good indicators of sensitive environmental areas. Thus, efforts to restrict development in floodplains will usually have the added benefit of protecting other important natural resources and the hydrologic system.

Any development within Zones A and AE requires the purchase of mandatory flood insurance. In areas exposed to 100-year floods, according to FEMA Flood Insurance Program, new or substantially improved dwellings must have the lowest floor [including some basements] elevated to or above the base flood level. The purpose of these restrictions is to provide protection against the perils of flood losses and encourage sound land use by minimizing exposure of property to flood losses. Clearly, the impact of erosion and flooding can be mitigated

[49] *Town of Coeymans Comprehensive Plan*, 2006, 59-61.

by the exclusion of permanent structures from the Flood Hazard Area. Allowing the removal of vegetation and the creation of impermeable area adds to erosion and flooding potential. Restrictions on flood zone development are necessary not only in the interest of protecting the integrity of natural ecosystems, but also to protect life and property."

Water Quality Classifications

DEC Water Quality Classifications indicate the "best uses" that a waterbody should be supporting according to New York State. Waterbodies are classified by the letters AA, A, B, C, or D for freshwater. The letter classifications and their best uses are described in regulation NYS regulation 6 NYCRR Part 701.[50] For each class, the designated best uses are defined as follows:

- Class A, AA-water supply, primary and secondary contact recreation and fishing
- Class B-primary and secondary contact recreation and fishing
- Class C-fishing, suitable for fish propagation and survival
- Class D-fishing

Waterbodies classified as AA, A, B, or C may also have a standard of (T), indicating they are trout waters, or (TS), indicating they are trout spawning waters.

The Waterbody Inventory/Priority Waterbodies List (WI/PWL) is a statewide inventory of waters that DEC uses to track support (or impairment) of water uses, overall assessment of water quality, causes and sources of water quality impact/impairment, and the status of restoration, protection and other water quality activities and efforts.[51] WI/PWL information is used to identify those water quality issues and specific waterbodies where efforts will have the greatest impact and benefit, objectively evaluate needs for project funding, monitor water quality improvement, and record and report changes over time.

The WI/PWL includes waterbody fact sheets outlining the most recent assessment of use support, identification of water quality problems and sources, and a summary of activities to restore and protect each individual waterbody. The Hudson Valley Natural Resource Mapper[52] provides a convenient way to access WI/PWL fact sheets for specific waterbodies or stream segments.

The following descriptions summarize classification and known sources of impairment of the town's major streams and waterbodies. See the Stream Habitat section for additional discussion.

Hudson River

The Hudson River segment that runs along the eastern town boundary is a Class C waterbody, indicating it is best used for fishing, fish propagation and survival, but is not suitable for swimming. The Hudson River is listed as impaired for fish consumption due to elevated levels of PCBs, dioxin, heavy metals, and other toxins resulting from historical industrial discharges. It is listed as stressed for aquatic life, recreation, habitat/hydrology, and aesthetics. A NYSDOH

[50] DEC, *Water Quality Standards and Classifications*. https://www.dec.ny.gov/chemical/23853.html
[51] DEC, *Waterbody Inventory/Priority Waterbodies List*. https://www.dec.ny.gov/chemical/36730.html
[52] DEC, *Hudson Valley Natural Resource Mapper*. https://www.dec.ny.gov/lands/112137.html

health advisory that recommends eating no gizzard shad, channel catfish, or white catfish, and no more than one meal per month of American eel, Atlantic needlefish, bluefish, carp, goldfish, largemouth bass, smallmouth bass, rainbow smelt, striped bass, walleye, white catfish, and white perch because of elevated levels of PCBs. Advisories are also in place for blue crab along this stretch of the Hudson.

Coeymans Creek

From the mouth of Coeymans Creek to its confluence with the Onesquethaw Creek (a major tributary), Coeymans Creek is a Class C(TS) waterbody, suitable for fishing, fish propagation and survival, and capable of supporting trout spawning. Lower Coeymans Creek hasn't been stocked with trout since the 1960s, but DEC fish surveys in the mid-2000s documented brown trout in the entire length of the lower creek, including evidence of trout spawning one mile upstream of the Hudson River. Urban and industrial development and agriculture have influenced the natural condition of the creek, which is listed as having minor impacts due to agricultural non-point source activities, urban runoff, and industrial and municipal pollutants, which stress aquatic life in the stream. The 2006 *Comprehensive Plan* cites evidence of cement kiln dust leaching into the stream, altering its pH balance.[53] Industrial development continues to expand along the lower stretch of the creek. The *Onesquethaw-Coeymans Creek Watershed Study*[54] describes the course of the creek through the town and some possible sources of impairment. The subsequent 2010 *Onesquethaw-Coeymans Watershed Management Plan*[55] lays out recommendations for improving water quality.

Hannacroix Creek

From the mouth of Hannacroix Creek to one mile upstream (in New Baltimore), Hannacroix Creek is a Class C stream. Upstream from this point, the Hannacroix is a Class A(T) waterbody suitable for drinking water supply; culinary or food processing purposes; primary and secondary contact recreation; and fishing. The water body is also suitable for fish propagation and survival, including trout. Hannacroix Creek is a Class A(TS) waterbody between the crossing at Marshall Rd upstream to the Alcove Reservoir, supporting trout spawning. DEC stocks brown trout in the stream each spring and early summer. Within the coastal area, slopes of the Hannacroix are heavily wooded and undeveloped, filtering run-off and minimizing siltation into the stream. These characteristics contribute to the general quality rating of the Hannacroix Creek corridor. Nevertheless, the Hannacroix is listed as impaired as a result of hydrologic modification. During dry weather, no water is released to the Hanncroix from the Alcove Reservoir, causing the creek to go dry for about two miles below the dam.

Alcove Reservoir

The Alcove Reservoir is a Class A waterbody and serves as the public drinking water supply for the City of Albany. The most recent assessment through the NYSDOH Source Water Assessment Program in 2005 found no known impacts to the waterbody.

---

[53] *Town of Coeymans Comprehensive Plan*, 2006, 60.
[54] OCWC, *Watershed Study*, 2008.
[55] OCWC, *Watershed Plan*, 2010.

Lawson Lake
Lawson Lake is a Class B waterbody, indicating that it should support general and contact recreational use and aquatic life, but is not classified for use as a water supply. While the definition of contact recreation does include swimming, that activity in not permitted at the lake due to other factors.

In 2016, the lake was listed as impaired for recreational uses due to elevated nutrients, excessive algae, poor water clarity, and shoreline harmful algal blooms. There are no health advisories in place limiting the consumption of fish from this waterbody.

It is important to note that because of its unique geologic features, the unnamed tributaries to the lake flow both north and south to two different watersheds. The northern tributary is class C and drains to the Onesquethaw watershed. The southern outlet is class A as it drains to the Alcove Reservoir (the City of Albany's drinking water supply).

Alcove Emergency Action Plan Inundation Area (Map 15)

New York State Environmental Conservation Law (ECL) and Dam Safety Regulations (6NYCRR Part 673) require that the owners of all dams located in New York State operate and maintain their dams in a safe condition at all times.[56] For Class C-High Hazard and Class B-Intermediate Hazard dams, this includes developing, maintaining and following an Emergency Action Plan (EAP) for use in the event of a developing dam failure or other uncontrolled release of stored water.

The Alcove Reservoir EAP defines notification procedures to alert the appropriate emergency management officials to possible, impending or actual failures of the Alcove Reservoir Dam. The EAP consists of inundation maps, notification procedures and preplanned actions to provide for a timely response to dam failure in order to minimize impacts on life and property. The EAP outlines the responsibilities of the dam owner (City of Albany), Albany County Sheriff, Town of Coeymans, Albany County Critical Incident Management, and other involved agencies in order to implement a plan that may involve evacuation of residents along the downstream portion of Hannacroix Creek.

Alcove Reservoir Dam was constructed in 1929 and is a homogeneous earthfill embankment with a concrete cutoff wall. The embankment is 77 feet high; the upstream slope is 3:1 and the downstream slope is 3:1 with a terrace. The dam is 2,177 feet in length and 16 feet wide. The emergency spillway is located at the right abutment. Situated immediately downstream of the dam are County Route 111 and State Route 143, along with numerous property owners who would be impacted in the event of a dam breach. Additionally, as the inundation zone approaches the Hudson River, it encompasses a portion of 1-87.

The Alcove Flood Emergency Action Plan Inundation Area Map shows the potential inundation zone in the event of a dam failure at the Alcove Reservoir. The inundation mapping was developed using USGS Quadrangle Mapping and detailed surveyed cross sections from previous studies of the dam. The Rainy Day Dam Failure analysis occurs during the dam's design storm; the "Probable Maximum Flood" (PMF). This level is 1.4 feet over the top of dam elevation. The inundation mapping is for the worst-case scenario.

[56] DEC, *Dam Safety*. https://www.dec.ny.gov/lands/4991.html

Wetlands (Map 16)

Wetlands are areas saturated by surface or groundwater sufficient to support distinctive vegetation adapted for life in saturated soil conditions.[57] There are many types of freshwater wetlands in Coeymans, including wet meadows, emergent marsh, forested and shrub swamps, vernal pools, floating and submerged vegetation, and open water. Wetlands along the Binnen Kill and at the mouth of Hannacroix Creek are both freshwater and tidal, and are considered to be globally rare. They are described under the Coastal Habitats 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 is surrounded by pavement, buildings, and pollution-generating or other incompatible land uses.[58]

The Wetlands Map shows information from several existing sources that provide approximate locations and extent of wetlands. Open water habitats, including the Hudson River, are symbolized in blue as "waterbodies." New York State Freshwater Wetlands include only wetlands larger than 12.4 acres, unless designated "of unusual local importance." The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) includes wetlands of all sizes. 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). Note that NWI mapping has not been completed in southwest Coeymans. NWI maps often underestimate wetland area and omit smaller and drier wetlands. 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.[59]

County soil maps are also a good source for predicting the location of potential wetlands. Soils classified in the *Soil Survey for Albany County* 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 (see Soils section for further discussion of soil properties).**[60] 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 warrant verification in the field for the purposes of environmental review.

---

[57] DEC, *Wetlands*. https://www.dec.ny.gov/lands/305.html.
[58] Environmental Law Institute, *Planner's Guide to Wetland Buffers for Local Governments* (Washington, DC: 2008). www.eli.org/sites/default/files/eli-pubs/d18_01.pdf.
[59] Huffman & Associates, Inc, *Wetlands Status and Trend Analysis of New York State - Mid-1980's to Mid-1990's, Prepared for New York State Department of Environmental Conservation* (Larkspur, CA, 2000). http://www.dec.ny.gov/docs/wildlife_pdf/wetstattrend2.pdf
[60] Kiviat and Stevens, *Biodiversity Assessment Manual*, 2001.

The Hudson River tidal wetlands and the forested swamps near Starr and Bushendorf roads are the largest and most biologically significant in the town. The large red maple-hardwood swamps east of these roads are reported by NYNHP to have good habitat and species diversity, surrounded by a mature, intact forest community. NYNHP described the example of silver maple-ash swamp northwest of Joralemon Park as mature and minimally disturbed, with unusual composition for the Hudson Valley, possibly due to the limestone substrate and flooding regime. NWI maps offer some general information on wetland habitat (e.g., forested, emergent), but in general, existing map resources are not very informative as far as habitat type or importance for biodiversity. Communities can learn more about habitat values by conducting local surveys and studies. The 2005 Biodiversity Assessment Training Study of the Coeymans-Onesquethaw Creek corridor noted an abundance of wet meadow habitats associated with poor drainage conditions on clayey soils. Large areas of hardwood swamp in the riparian areas along Coeymans Creek and in other low-lying areas subject to frequent flooding were also observed. Additional local studies or surveys could improve understanding of wetland habitat values 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. Although no vernal pools have been mapped in Coeymans, spotted salamander and NY-Special Concern hybrid Jefferson-blue spotted salamander records in the *NY Amphibian and Reptile Atlas* indicate that vernal pools likely occur in the town. Specific development and management recommendations are available to minimize impacts to vernal pools and associated wildlife.[61]

Existing wetland maps are inherently inaccurate and omit many smaller, drier wetlands. When it comes to identifying wetlands, there is no substitute for site visits and on-the-ground delineation. The Wetlands Map as a starting point for inventorying local wetlands add more refined data as they become available. It is also important to recognize that upland buffer areas around wetlands play an essential role in protecting wetland habitat and water quality, although in many cases they have no formal protection.

The New York State Freshwater Wetlands Act (Article 24 of Environmental Conservation Law) generally regulates activities in and around large wetlands, including a 100-foot adjacent area.[62] To be protected, a wetland must be at least 12.4 acres or considered of unusual local importance, and appear on the NYS Freshwater Wetlands Map. The U.S. Army Corps of Engineers regulates wetlands of all sizes in New York under section 404 of the Clean Water Act.[63] However, to be

---

[61] Calhoun, Aram, and Michael Klemens, *Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Development in the Northeastern United States, MCA Technical Paper No. 5* (Bronx, NY: Metropolitan Conservation Alliance, Wildlife Conservation Society, 2002). http://www.maineaudubon.org/wp-content/uploads/2017/03/Best-Development-Practices-Conserving-Pool-breeding-Amph.pdf.
Morgan, Dawn, and Aram Calhoun, *Maine Municipal Guide to Mapping and Conserving Vernal Pool Resources* (Orono, ME: University of Maine, Sustainability Solutions Initiative, 2012). http://www.maineaudubon.org/wp-content/uploads/2017/03/MeAud-ME-Municipal-Guide-to-Mapping-and-Conserving-Vernal-Pool.pdf.
[62] DEC, *New York State Freshwater Wetlands Program*. http://www.dec.ny.gov/lands/4937.html
[63] EPA, Section 404 of the Clean Water Act. https://www.epa.gov/cwa-404

protected, wetlands must be connected to a navigable waterway. Vernal pools and other isolated wetlands less than 12.4 acres are thus generally unprotected by state or federal wetland regulations.[64] The Town of Coeymans zoning code does not currently provide any additional protection to wetlands.

[64] DEC, *Conserving Small Wetlands in the Hudson Valley*. http://www.dec.ny.gov/lands/47486.html

Habitats and Wildlife

Land Cover and Land Use (Map 17)

The 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 Coeymans 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. 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[65]. 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 [66] 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. Table 6 provides a summary of the acreage and percentage of land in Coeymans for each land cover or land use class. Definitions for land cover and land use classes shown on the map are as follows:[67]

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.

---

[65] Wickham, J., S. Stehman, L. Gass, J. Dewitz, D. Sorenson, B. Granneman, R. Poss, L. Baer, "Thematic accuracy assessment of the 2011 National Land Cover Database," *Remote Sensing of Environment*, 191. 328-341. 10.1016/j.rse.2016.12.026.
[66] U.S. Geological Survey, *National Land Cover Database Fact Sheet*, 2012. pubs.usgs.gov/fs/2012/3020/
[67] U.S. Geological Survey, *National Land Cover Database 2011 (NLCD).* https://www.mrlc.gov/data/legends/national-land-cover-database-2011-nlcd2011-legend

Deciduous Forest - areas dominated by trees generally greater than five 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 five 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 five 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 five 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 gramanoid 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.

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.

Table 6 summarizes the area and percentage of Coeymans (including the Village of Ravena and underwater lands of the Hudson River) represented by each land cover or land use class:

Table 6. Land Cover by Area in the Town of Coeymans

Land Cover/Land Use Class	Acres	Square miles	Percent
Developed, Open Space	1871	2.9	5.5%
Developed, Low Intensity	800	1.3	2.4%
Developed, Medium Intensity	342	0.5	1.0%
Developed, High Intensity	167	0.3	0.5%
Barren Land	1049	1.6	3.1%
Deciduous Forest	11072	17.3	32.6%

Mixed Forest	5557	8.7	16.4%
Evergreen Forest	5082	7.9	15.0%
Shrub/Scrub	609	1.0	1.8%
Herbaceous	70	0.1	0.2%
Hay/Pasture	1884	2.9	5.6%
Cultivated Crops	1617	2.5	4.8%
Woody Wetlands	1715	2.7	5.1%
Emergent Herbaceous Wetlands	219	0.3	0.6%
Open Water	1861	2.9	5.5%

The Town of Coeymans (including Village of Ravena) spans approximately 53 square miles, including underwater lands in the Hudson River along its eastern boundary. Approximately 3.9% of the town is classified as developed, with an additional 5.5% of land in developed "open space" such as lawns and golf courses. Most development is concentrated in the Village of Ravena, Hamlet of Coeymans, and along the town's major roads. Industrial and mining enterprises associated with the Port of Coeymans, LaFarge Cement, and Callanan Industries account for the occurrence of barren land (3.1%). Despite the relatively high concentration of development and industry in Coeymans, much of the town is forested: 32.6% deciduous forest, 15.0% evergreen forest, and 16.4% mixed deciduous and evergreen forest. Substantial open agricultural areas persist in flat or gently sloping areas of the town, including hay or pasture (5.6%), cultivated crops (4.8%), or herbaceous (0.2%) or shrubland (1.8%) vegetation typically associated with abandoned fields. In addition, large wetlands occur along riparian corridors and in the town's tidal shore zones. Coastal habitats, floodplains, wetlands, and large forests, as well as grassland and shrubland habitats are further described in subsequent sections of this report.

Significant Ecological Features (Map 18)

The Significant Ecological Features Map highlights the most significant *known* ecological features in Coeymans based on state and regional assessments. The map and descriptions are based on limited existing information; more study is needed to better document the town's natural features. Some of the overlapping layers in the map may be viewed in greater detail using the Hudson Valley Natural Resource Mapper.[68]

Significant Biodiversity Areas

Significant Biodiversity Areas are locations of high concentration of biological diversity or value for regional biodiversity, described in DEC's *Hudson River Estuary Wildlife and Habitat Conservation Framework*.[69] The town's Hudson River waterfront lies within the Upper Hudson River Estuary Significant Biodiversity Area, a globally rare ecosystem that supports many rare species as well as regionally important fisheries.

The *Framework* states: "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."[70]

The town's Hudson River shoreline and tidal wetlands are within the SBA and support occurrences of several rare plant species and important habitats for migratory fishes and freshwater mussels. The mouths of Hannacroix and Coeymans Creeks and Shad Island are also designated Significant Coastal Fish and Wildlife Habitats by the New York State Department of State. These attributes are discussed further in the Coastal and Shoreline Habitat section.

In addition to significant coastal features, much of Coeymans lies in the Hudson Valley Limestone and Shale Ridges Significant Biodiversity Area, recognized for its diversity of plants, animals, and natural communities, and areas of karst terrain providing winter hibernacula for bats of conservation concern.

According to the *Framework*, "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

[68] DEC, *Hudson Valley Natural Resource Mapper*. www.dec.ny.gov/lands/112137.html
[69] Penhollow et al., *Wildlife and Habitat Conservation Framework*, 2006.
[70] Ibid, 77, 81-82.

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. … 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."[71]

The Limestone and Shale Ridges Significant Biodiversity Area extends from the band of cliffs of the Helderberg Escarpment in Albany County and parallels the New York State Thruway south into Ulster County. Several occurrences of significant limestone and shale-associated habitats and rare plants in Coeymans are listed in Table 7.

Significant Natural Communities

The New York Natural Heritage Program (NYNHP) has mapped several occurrences of rare and/or high quality natural communities in Coeymans. They include coastal ecosystems and upland communities associated with the limestone and shale ridges. The following list of mapped communities includes links to online guides with illustrated descriptions and conservation and management guidance.

- Calcareous cliff community
- Chestnut oak forest
- Freshwater intertidal mudflats
- Freshwater tidal marsh
- Maple-basswood rich mesic forest
- Red cedar rocky summit
- Red maple-hardwood swamp
- Rocky summit grassland
- Silver maple-ash swamp

Known Important Areas for Rare Plants, Rare Animals, and Significant Natural Communities

NYNHP has also identified important areas for sustaining populations of rare plants, rare animals, and significant natural communities based on documented occurrences.[72] These areas include the specific locations where a species has been observed, the adjacent habitat, as well as areas critical to maintaining the habitat or the integrity of the significant natural community. Proactive planning that considers how species move across the landscape, with careful attention to maintaining connected habitat complexes, will contribute to the long-term survival and persistence of rare species and significant natural communities.

[71] Ibid., 84-85.

[72] New York Natural Heritage Program and New York State Department of Environmental Conservation, *Biodiversity Databases, Important Areas Digital Data Set* (Albany, NY, 2013).

NYNHP has identified areas of importance in Coeymans for bald eagle, diadromous fishes, freshwater mussels, a coastal dragonfly, a bat overwintering area, and wood turtle, in addition to important areas for rare plants. A complete list of state rare plants and animals known from Coeymans is shown in Table 7.[73] Rare animals with modeled important areas in Coeymans are briefly described here along with general threats and vulnerabilities:

Bald eagle nesting occurs along the Hudson River and the Alcove Reservoir. 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.

Shortnose sturgeon, blueback herring, alewives, and American eel are diadromous (i.e., migratory) fish of the town's Hudson River coastal habitats. Those that return to freshwater habitats to spawn are also referred to as anadromous and include sturgeon and herring species. NYNHP recognizes the mouths of Hannacroix and Coeymans Creeks as an anadromous fish concentration area. Stream reaches used by American eel are shown in the Stream Habitat Map.

Tidewater mucket is a mussel documented in the Hudson River between Coeymans Creek and the Binnen 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.

Russet-tipped clubtail is a dragonfly documented near the mouth of Coeymans Creek. It may occur elsewhere in the town along the Hudson or its tidal tributaries, and is sensitive to water contamination, hydrological alteration, removal of mature trees (preferred perching sites), and other impacts from surrounding upland development.

Bat hibernacula are sites where bats hibernate over the winter, most often caves. Coeymans lies in a limestone-rich area and hosts a diverse group of cave-hibernating bats. Both the Indiana bat and eastern small-footed bat overwinter in a local cave. Northern long-eared bat overwinters in a neighboring town and likely occurs in Coeymans during warmer months. Bats will forage for insects throughout wooded areas and along streams, and female bats will roost in snags and dying trees. Since 2006, the spread of white-nose syndrome (a fungal disease) has devastated bat colonies throughout the northeast, resulting in die-offs of up to 99%. Retaining forest canopy, mature trees, and minimizing fragmentation of mature forest patches may be important for local bat populations. Some restrictions protect threatened bat species from tree-cutting, especially during the period when mothers are birthing and raising pups.

Wood turtle occurs along low gradient perennial streams but also spend time in adjacent forests and grasslands. Wood turtle has been documented in riparian settings along several

[73] New York Natural Heritage Program and New York State Department of Environmental Conservation, *Biodiversity Databases, Element Occurrence Record Digital Data Set* (Albany, NY, data retrieved July 2016).

streams in Coeymans and is threatened by habitat loss, stream degradation, nest predation, and the pet trade.

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

Table 7. Species and Ecosystems of Conservation Concern in Coeymans, NY

The following table lists species of conservation concern that have been recorded in Coeymans, NY. The information comes from the New York Natural Heritage Program (NYNHP) biodiversity databases, the *Atlas of Inland Fishes of New York*,[74] the *1990-1999 New York Amphibian and Reptile Atlas* (NYARA),[75] and the *2000-2005 New York State Breeding Bird Atlas* (NYBBA).[76] Species from the NYBBA are included in the table if they were documented in Atlas blocks that are more than 50% in Coeymans. The table only includes species listed in New York (NY) or federally (US) as endangered, threatened, special concern, rare, a Species of Greatest Conservation Need (SGCN), or a Hudson River Valley Priority Bird species recognized by Audubon New York. 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 www.guides.nynhp.org. Note: additional rare species and habitats may occur in the Coeymans.

			NYS Conservation Status						
Common Name	**Scientific Name**	**Primary Habitat**	Species of Greatest Conservation Need XX = high priority	**Rare**	Special Concern	Threatened	Endangered	Hudson Valley Priority Bird	**Data Source**
Mammals									
Eastern small-footed bat	*Myotis leibii*	forest, caves	**X**		**X**				NYNHP
Indiana bat	*Myotis sodalis*	forest, caves	**XX**				**US NY**		NYNHP
Northern long-eared bat	*Myotis septentrionalis*	cave, forest	**XX**			**US NY**			
Birds									
American black duck	*Anas rubripes*	wetland	**XX**					**X**	NYBBA

[74] Carlson, D., R. Daniels, and J. Wright, *Atlas of Inland Fishes of New York* (Albany, NY: New York State Museum). http://www.nysm.nysed.gov/staff-publications/atlas-inland-fishes-new-york
[75] DEC, *New York Amphibian and Reptile Atlas 1990-1999* (Albany, NY). http://www.dec.ny.gov/animals/7140.html
[76] DEC, *New York State Breeding Bird Atlas 2000. 2000 – 2005* (Albany, NY, 2007 update). http://www.dec.ny.gov/animals/7312.html

			NYS Conservation Status						
Common Name	**Scientific Name**	**Primary Habitat**	Species of Greatest Conservation Need XX = high priority	**Rare**	Special Concern	Threatened	Endangered	Hudson Valley Priority Bird	**Data Source**
American goldfinch	*Spinus tristis*	young forest, shrubland						**X**	NYBBA
American kestrel	*Falco sparverius*	grassland	**X**					**X**	NYBBA
American redstart	*Setophaga ruticilla*	forest						**X**	NYBBA
American woodcock	*Scolopax minor*	young forest, shrubland	**X**					**X**	NYBBA
Bald eagle	*Haliaeetus leucocephalus*	forest/open water	**X**			**X**		**X**	NYBBA
Baltimore oriole	*Icterus galbula*	forest						**X**	NYBBA
Belted kingfisher	*Megaceryle alcyon*	open water						**X**	NYBBA
Black-and-white warbler	*Mniotilta varia*	forest						**X**	NYBBA
Black-billed cuckoo	*Coccyzus erythropthalmus*	young forest, shrubland	**X**					**X**	NYBBA
Blackburnian warbler	*Dendroica fusca*	forest						**X**	NYBBA
Black-throated blue warbler	*Dendroica caerulescens*	forest	**X**					**X**	NYBBA
Black-throated green warbler	*Dendroica virens*	forest						**X**	NYBBA
Blue-winged warbler	*Vermivora pinus*	young forest, shrubland	**X**					**X**	NYBBA
Bobolink	*Dolichonyx oryzivorus*	grassland	**XX**					**X**	NYBBA
Broad-winged hawk	*Buteo platypterus*	forest						**X**	NYBBA
Brown thrasher	*Toxostoma rufum*	young forest, shrubland	**XX**					**X**	NYBBA
Cerulean warbler	*Dendroica cerulea*	forest	**X**		**X**			**X**	NYBBA
Chestnut-sided warbler	*Setophaga pensylvanica*	young forest, shrubland						**X**	NYBBA
Chimney swift	*Chaetura pelagica*	urban						**X**	NYBBA
Cooper's hawk	*Accipiter cooperii*	forest	**X**		**X**			**X**	NYBBA
Downy woodpecker	*Picoides pubescens*	forest						**X**	NYBBA
Eastern kingbird	*Tyrannus tyrannus*	young forest, shrubland						**X**	NYBBA
Eastern meadowlark	*Sturnella magna*	grassland	**XX**					**X**	NYBBA
Eastern towhee	*Pipilo erythrophthalmus*	young forest, shrubland						**X**	NYBBA
Eastern wood-pewee	*Contopus virens*	forest						**X**	NYBBA

			NYS Conservation Status						
Common Name	**Scientific Name**	**Primary Habitat**	Species of Greatest Conservation Need XX = high priority	**Rare**	Special Concern	Threatened	Endangered	Hudson Valley Priority Bird	**Data Source**
Field sparrow	*Spizella pusilla*	young forest, shrubland						**X**	NYBBA
Kentucky warbler	*Oporornis formosus*	forest	**XX**					**X**	NYBBA
Least flycatcher	*Empidonax minimus*	forest						**X**	NYBBA
Louisiana waterthrush	*Seiurus motacilla*	forest	**X**					**X**	NYBBA
Marsh wren	*Cistothorus palustris*	wetland						**X**	NYBBA
Northern flicker	*Colaptes auratus*	forest						**X**	NYBBA
Northern harrier	*Circus cyaneus*	grassland	**X**			**NY**		**X**	NYBBA
Peregrine falcon	*Falco peregrinus*	cliffs	**X**				**NY**	**X**	NYBBA
Prairie warbler	*Dendroica discolor*	young forest, shrubland	**X**					**X**	NYBBA
Purple finch	*Carpodacus purpureus*	forest						**X**	NYBBA
Red-shouldered hawk	*Buteo lineatus*	forest	**X**		**X**			**X**	NYBBA
Rose-breasted grosbeak	*Pheucticus ludovicianus*	forest						**X**	NYBBA
Ruffed grouse	*Bonasa umbellus*	young forest, shrubland	**X**					**X**	NYBBA
Savannah sparrow	*Passerculus sandwichensis*	grassland						**X**	NYBBA
Scarlet tanager	*Piranga olivacea*	forest	**X**					**X**	NYBBA
Sedge wren	*Cistothorus platensis*	grassland	**XX**			**NY**		**X**	NYBBA
Sharp-shinned hawk	*Accipter striatus*	forest	**X**		**X**			**X**	NYBBA
Veery	*Catharus fuscescens*	forest						**X**	NYBBA
Vesper sparrow	*Pooecetes graminues*	grassland	**XX**		**X**			**X**	NYBBA
Whip-poor-will	*Caprimulgus vociferus*	young forest, shrubland	**XX**		**X**			**X**	NYBBA
Willow flycatcher	*Empidonax trailli*	young forest, shrubland	**X**					**X**	NYBBA
Wood thrush	*Hylocichla mustelina*	forest	**X**					**X**	NYBBA
Worm-eating warbler	*Helmitheros vermivorum*	forest	**X**					**X**	NYBBA
Yellow-billed cuckoo	*Coccyzus americanus*	young forest, shrubland						**X**	NYBBA
Yellow-throated vireo	*Vireo flavifrons*	forest						**X**	NYBBA

			NYS Conservation Status						
Common Name	**Scientific Name**	**Primary Habitat**	Species of Greatest Conservation Need XX = high priority	**Rare**	Special Concern	Threatened	Endangered	Hudson Valley Priority Bird	**Data Source**
Reptiles									
Common snapping turtle	*Chelydra s. serpentina*	wetland	**X**						NYARA
Northern map turtle	*Graptemys geographica*	coastal	**X**						NYARA
Wood turtle	*Clemmys insculpta*	forest, riparian, grassland	**XX**		**X**				NYARA
Amphibians									
Fowler's toad	*Bufo fowleri*	forest, wetland	**X**						NYARA
Jefferson-blue spotted salamander hybrid	*Ambystoma jeffersonianum x laterale*	forest, vernal pool	**X**		**X**				NYARA
Fish									
Shortnose sturgeon	*Acipenser brevirostrum*	coastal					**NY US**		NYNHP
American eel	*Anguilla rostrata*	stream	**XX**						NYNHP
Invertebrates									
Russet-tipped clubtail	*Stylurus plagiatus*	coastal	**X**						NYNHP
Plants									
Back's sedge	*Carex backii*	forest, rocky areas				**NY**			NYNHP
Davis' sedge	*Carex davisii*	forest, riparian				**NY**			NYNHP
Delmarva beggar-ticks	*Bidens bidentoides*	coastal		**X**					NYNHP
Estuary beggar-ticks	*Bidens hyperborea var. hyperborea*	coastal					**NY**		NYNHP
Golden-seal	*Hydrastis canadensis*	forest				**NY**			NYNHP
Green rock-cress	*Boechera missouriensis*	forest, rocky areas				**NY**			NYNHP
Heartleaf plantain	*Plantago cordata*	coastal		**X**					NYNHP
Hudson River water-nymph	*Najas guadalupensis ssp. muenscheri*	coastal					**NY**		NYNHP
James' sedge	*Carex jamesii*	forest, riparian				**NY**			NYNHP

Large Forests (Map 19)

The Large Forests Map shows forests greater than 200 acres in size, which provide numerous benefits including wildlife habitat, clean water, climate moderation, and forest products. Though each forest's value is relative to the surrounding landscape, in general, larger forests provide higher quality habitat and greater benefits than smaller ones. Across the region, however, many large forests have been divided into smaller forest patches through the process of fragmentation. Forest fragmentation often occurs through clearing for new roads or development and is linked to decreased habitat quality and health, disruptions in wildlife movement, and 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 bird's-eye view of forests in Map 19 shows that Coeymans supports many large tracts of contiguous forest. The forest patches were identified by the DEC Hudson River Estuary Program and Cornell University based on 2010 land cover data[77]. 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.[78]

A "regionally significant" forest block measuring over 13,000 acres extends from south Coeymans into New Baltimore and Greenville. Forest patches greater than 6,000 acres provide habitat to more area-sensitive species and can accommodate large-scale disturbances (e.g. widespread wind damage, wildfire) that maintain forest health over time. Forests in this size range are able to maintain the wider range of habitats and conditions often required by forest-dependent species.

Three "locally significant" forest blocks are mapped north of Hannacroix Creek in Coeymans, ranging in size from 2,300 to 5,600 acres. These forests are relatively intact and include high quality examples of natural communities mapped by NYNHP, including maple-basswood rich mesic forest and chestnut oak forest, as well as red cedar rocky summit and calcareous cliff communities. Several rare and threatened plant species associated with rich soils and limestone bedrock have been documented in this area of the town, including Back's sedge, Davis' sedge, golden-seal, green rock-cress, and James' sedge. Two additional "locally significant" forest blocks occur along the town's boundary with Westerlo. "Locally significant" forest blocks represent the lower size limit of viable habitat for forest-dependent birds, which often require 2,500 to 7,500 acres of intact interior forest habitat. They can also provide important travel corridors between larger forest blocks.

Smaller, "stepping-stone" forest patches occur in the north and eastern ends in the Town and may

---

[77] National Oceanic and Atmospheric Administration (NOAA), *Land Cover data for the Coastal Change Analysis Program* (Charleston, SC: NOAA Coastal Service Center). https://coast.noaa.gov/dataregistry/search/collection/info/ccapregional

[78] Orange County, *Orange County, NY Open Space Plan*, 2004. www.orangecountygov.com/301/Open-Space-Plan

provide valuable, relatively broad corridors for wildlife movement and plant dispersal. These smaller forests enable a large array of species, including both wide-ranging and forest-interior species, to move safely from one habitat to another. 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 more vulnerable to the spread of invasive species and less viable for timber production, among other values. 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 benefits.

The Biodiversity Assessment Training study described in the *Onesquethaw-Coeymans Creek Watershed Study* indicates that many of the "stepping stone" forests along Coeymans Creek occur in settings with steep clay bluffs and ravines. Clay bluff and ravine habitats near the Hudson River are "…characterized by narrow ridges, steep-sided ravines cut by small streams, and steep bluffs fronting on the river. The clayey soils formed in prehistoric Lake Albany during the melting of the glaciers."[79] Maintaining forest along clay bluffs and ravines is especially beneficial to stabilize slopes, prevent further erosion, and protect stream habitat.

The combined forest blocks of western Coeymans correspond to an important regional forest linkage zone connecting globally significant forests of the Catskills and Adirondacks, identified by NYNHP and the Nature Conservancy. Forest connectivity facilitates wildlife movement and will play a critical role in allowing plants and animals to move north and higher in elevation in response to climate change. Over 1,500 acres of locally significant and regional forest linkage zones around the Alcove Reservoir are owned by the City of Albany. The City has developed a *Working Woodlands Forest Management Plan* which includes a forest and wildlife habitat inventory as well as cultural and historic resources.

Wildlife records reflect the presence of high-quality forest habitat in Coeymans. The *2000-2005 NYS Breeding Bird Atlas* documented numerous forest-interior bird species of conservation concern in the town, including NY-Special Concern cerulean warbler and many Species of Greatest Conservation Need such as black-throated blue warbler and worm-eating warbler (Table 7). Three NY-Special Concern raptors were also documented in Coeymans: Cooper's hawk, red-shouldered hawk, and sharp-shinned hawk. Audubon New York's website has specific information on managing habitat for forest birds. In addition to birds, NY and federally-Endangered Indiana bat and NY-Special Concern eastern small-footed bat use forests in Coeymans for shelter 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.

[79] Kiviat and Stevens, Biodiversity Assessment Manual, 2001, 197.

Conserving the town's large intact forested areas and connections between them will help ensure that there is enough habitat to sustain forest plants and animals. This strategy will also help to preserve the numerous other benefits that forests provide residents.

Forest Types (Map 20)

The Forest Types Map shows forests in Coeymans classified by habitat type according to the Ecological Systems Model for New York State. The Ecological Systems Model was developed by the North Atlantic Landscape Conservation Cooperative based on the Nature Conservancy's Northeast Terrestrial Habitat Classification System.[80] The following descriptions of the forest types are provided from the Terrestrial Habitat Guides developed by the Nature Conservancy to accompany the Northeast Terrestrial Habitat Map.[81] Note: the forest types were identified based on remote assessment at a regional scale, and have not been field verified. Nevertheless, the map can provide a starting point for understanding the diversity of forest habitats and associated natural communities in Coeymans.

Appalachian (Hemlock)-Northern Hardwood Forest
A hardwood forest of sugar maple, American beech, and yellow birch, mixed with or dominated by eastern hemlock. Northern red oak and white oak occur, but do not dominate. Black cherry, black birch, white pine, and tuliptree are typical on nutrient rich or disturbed sites. This forest system is broad and is the only one to occur in parts of all 13 Northeast and Mid-Atlantic states. *This forest type covers approximately 8,000 acres of Coeymans and occurs as predominantly large patches in central and eastern parts of the Town.*

Central Appalachian Alkaline Glade and Woodland
A mosaic of woodlands and open glades on thin soils over calcareous rock. Its core distribution is the Central Appalachians but extends into New England. In some cases, woodlands grade into closed-canopy forests. Eastern red-cedar is a common tree in the absence of fire and chinquapin oak is indicative of limestone. Other locally occurring trees and shrubs are sugar maple, red and white oak, pignut hickory, eastern redbud, and hackberry. *This forest type covers less than 10 acres of Coeymans and occurs in just two patches atop Helderberg Group bedrock substrate.*

Central Appalachian Dry Oak-Pine Forest
An oak or oak-pine forest of dry sites characterized by a mixture of drought tolerant oaks (chestnut oak, white oak, red oak, black oak, scarlet oak) and pines (pitch, white). It occurs in the Central Appalachians and northern Piedmont regions commonly as a large patch habitat. It has a much more limited range in New England where hickories may be present. Community structure ranges from open woodlands to closed forest. The herb layer is often sparse and lacks diversity. In the absence of fire this system may tend to succeed to hemlock and local hardwoods. *This forest type covers approximately 1,100 acres of the Town and occurs predominantly on south-facing hillsides in western Coeymans.*

---

[80] The Nature Conservancy, *New York State Ecological Systems Model*. databasin.org/datasets/84be93d3d9cf4bc3bec7f407c60979f9.

[81] Anderson, M.G. M. Clark, C.E. Ferree, A. Jospe, A. Olivero Sheldon and K.J. Weaver, *Northeast Habitat Guides: A companion to the terrestrial and aquatic habitat maps* (Boston, MA: The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office, 2013). easterndivision.s3.amazonaws.com/NortheastHabitatGuides.pdf.

Central Appalachian Pine-Oak Rocky Woodland
A mixed forest or woodland of pitch pine mixed with dry-site oaks (primarily scrub oak, scarlet oak, and chestnut oak). Red pine may also occur. Woodland is patchy and gives way to open portions or even sparse cover on dry rocky hilltops and outcrops. *This forest type covers less than 15 acres of Coeymans and occurs in just three patches in central parts of the Town.*

Laurentian-Acadian Pine-Hemlock-Hardwood Forest
A coniferous or mixed forest widespread in the northeast. White pine, hemlock and red oak are typical canopy dominants. Red maple is common while other hardwoods like sugar maple, beech and birch also occur. These forests are typically successional and often reflect past agriculture. *This forest type dominates the highlands of western Coeymans and covers over 8,000 acres.*

North-Central Appalachian Acidic Swamp
A conifer or mixed conifer-hardwood swamp of poorly drained acidic substrates throughout central New England and Central Appalachians. It covers a broad range of basin, seepage and stream-associated wetlands. Hemlock is usually present and may be dominant. It is often mixed with deciduous wetland trees such as red maple or black gum. *The model suggests that this ecosystem occurs in small patches throughout Coeymans totaling about 2,000 acres. However, we question the accuracy of the mapping around the Alcove Reservoir and Binnen Kill flats.*

North-Central Interior and Appalachian Rich Swamp
A hardwood or mixed swamp of alkaline wetlands associated with limestone or calcareous substrate. Red maple and black ash are the dominant deciduous trees in most examples. Conifers may include larch, but typically not northern white cedar. The canopy can be variable with shrubby or herbaceous openings within the swamp. A diverse ground cover includes herbs indicative of nutrient-rich conditions, ferns, and mosses. *This ecosystem encompasses approximately 1,200 acres of central Coeymans and primarily atop limestone bedrock.*

North-Central Interior Wet Flatwoods Undifferentiated
A hardwood forest of upland and wetland species occurring in depressions or poorly drained lowlands. Pin oak dominates in many areas. Other common (sometimes dominant) trees include swamp white oak, black gum, and red maple. Areas with denser tree cover have less shrub and herbaceous ground cover. Buttonbush, winterberry, and alder are typical shrubs. *This ecosystem is common on clayey soils in the Coeymans Creek corridor. It occurs in fragmented patches covering approximately 600 acres in total.*

Northeastern Interior Dry-Mesic Oak Forest
An oak-dominated, mostly closed-canopy forest that is dominant throughout the central part of the Northeast U.S. Oak species characteristic of dry conditions (red, white, black, and scarlet oak) and hickories dominate mature stands. Red maple, black birch, and yellow birch may be common associates. Heath shrubs are often present but not well developed. Local areas of limy bedrock may support forests that reflect the richer soils. *This forest type covers 1,500 acres throughout Coeymans however it is most pronounced in large tracts south of the Alcove reservoir.*

Grassland, Shrubland, and Young Forest (not mapped)

Recently disturbed sites, such as hayfields, abandoned farm fields, or forest clearings, can provide important habitat for species that require grassland, shrubland, and young forest habitats. 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 Aerial View maps and Land Cover and Land Use Map as well as from breeding bird records that valuable grasslands, shrublands, and young forests occur in Coeymans (see Table 7).

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 *2000-2005 NYS Breeding Bird Atlas* documented breeding by seven grassland bird species of conservation concern in the Coeymans area, including Species of Greatest Conservation Need such as eastern meadowlark, bobolink, and American kestrel, NY-Special Concern vesper sparrow, and NY-Threatened northern harrier and sedge wren. Audubon New York offers guidance on managing habitat for grassland birds.[82]

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 *Breeding Bird Atlas* support the presence of 14 species of conservation concern in Coeymans that prefer young forest and shrubland habitat, including American woodcock, blue-winged warbler, brown thrasher, and ruffed grouse. The northwest area of Coeymans supports one of two known locations in the upper Hudson estuary watershed for NY-Special Concern whip-poor-will, which is also a high-priority Species of Greatest Conservation Need in the New York State Wildlife Action Plan and a target species for DEC's Young Forest Initiative. For more information, see the DEC Young Forest Initiative[83] and Audubon's guidance on managing habitat for shrubland birds.[84]

---

[82] Audubon New York, *Managing Habitat for Grassland Birds*, ny.audubon.org/conservation/managing-habitat-grassland-birds
[83] DEC, *Young Forest Initiative on Wildlife Management Areas*, www.dec.ny.gov/outdoor/104218.html
[84] Audubon New York, *Managing Habitat for Shrubland and Young Forest Birds*, ny.audubon.org/conservation/managing-habitat-shrubland-and-young-forest-birds

Stream Habitats (Map 21)

From cold, moderate gradient, headwater streams like Hannacroix Creek to the large, warm Hudson River Estuary, Coeymans 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.

Stream Habitats

The Nature Conservancy 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).[85] The following stream habitat descriptions are based on TNC's accompanying aquatic habitat guides.[86] Note: the stream habitat classification system was developed based on remote assessment at a regional scale, and has not been field verified. The assessment failed to classify several tributaries to the Coeymans Creek, including Feuri Spruyt and Mosher Brook. Nevertheless, the general habitat information can provide a starting point for understanding the diversity of stream conditions and associated aquatic communities in the town.

High gradient, cool to cold, headwaters and creeks *(Examples: Alcove tributaries)*
Cold to cool, fast-moving headwaters and creeks of steeper slopes at moderate to high elevations. These small streams of northern regions or high elevations occur on steep slopes in small watersheds (< 39 sq.mi). The cold, fast moving water has high water clarity and is well oxygenated. Instream habitats are dominated by riffles and cascade and step-pool systems. Bed materials often consist of bedrock, boulders, cobbles, and coarse gravel. The fish community of cold temperature streams is likely to be dominated by coldwater fish species, such as brook trout and slimy sculpin. Cool temperature streams contain a higher proportion of cool and warm water species, such as smallmouth bass and white sucker relative to coldwater species.

Medium gradient, cool to cold, headwaters and creeks *(Examples: Hannacroix 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 water with good oxygenation. Instream habitats are dominated by riffle-pool development. They have substrates dominated by cobble, gravel, and sand, with occasional small patches of boulders. Cold and cool to warm water species may be present, as described above.

Medium gradient, cool, small river *(Examples: Hannacroix and Coeymans Creeks)*

---

[85] Olivero, A. and M. Anderson, *Northeast Aquatic Habitat Classification System* (Boston, MA: The Nature Conservancy, Eastern Regional Office, 2008). http://easterndivision.s3.amazonaws.com/Freshwater/nahcs_report_20080930rev1NE_AquaticHabitatClassificationSystem2008.pdf

[86] Anderson et al., *Northeast Habitat Guides*, 2013.

Cool, moderately fast-moving, small rivers at moderate to low elevations. These small rivers drain watersheds up to 200 sq.mi. The moderately fast-moving waters are dominated by a well-defined pattern of alternating pools, riffles, and runs. Their substrate is composed of sand, gravel, and cobble, and they often have high water clarity and are well oxygenated. Cool to warm water fish species predominate.

Tidal, low gradient, cool, small rivers and creeks *(Example: Hannacroix Creek, Coeymans Creek, Binnen Kill)*
Slow-moving, shallow, tidally influenced rivers. These tidal creeks and rivers connect directly to large estuaries and drain small to medium watersheds. The water flow and level in these creeks and rivers is tidally influenced. Most tidal creeks and rivers 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.

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.

Trout and Trout Spawning Waters

Trout Waters are shown according to DEC's Water Quality Standards and Classifications[87], which identify trout or trout-spawning presence based on dissolved oxygen levels, temperature, and fish survey records (see Water Quality Classifications section). The classifications suggest there is cool or coldwater habitat suitable for trout in many streams in Coeymans, including nearly the entirety of the main stems of both Onesquethaw-Coeymans Creek and Hannacroix Creek, as well as smaller tributaries of each. Coeymans Creek and Hannacroix Creek upstream of Marshall Road support trout-spawning. 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. The town also supports known important areas for NY-Special Concern wood turtle, a species occurring along low gradient perennial streams (see the Significant Ecological Features Map).

[87] DEC, *Water Quality Standards and Classifications*, www.dec.ny.gov/chemical/23853.html

Riparian Areas

Riparian areas are sensitive transition zones between land and water adjacent to streams, ponds, wetlands, and other waterbodies. These areas significantly influence stream physical processes, habitat, and water quality. Riparian buffers intercept stormwater runoff, filter sediment and nutrients, and help attenuate flooding. Forested stream 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. The riparian areas shown on the map are from the New York Natural Heritage Program's Statewide Riparian Opportunity Assessment, and were developed for the primary purpose of guiding streamside tree planting projects.[88] They are based on digital elevation data, known wetlands, and modeling for the 50-year flood zone. The riparian areas overlap partially with FEMA floodplain data and may indicate additional flood-prone areas. However, they are not a substitute for the regulatory flood insurance rate maps. Note that the riparian areas were developed through modeling and have not been field verified, and that wider stream buffers are in many cases recommended to adequately conserve wildlife habitat corridors and other functions of the riparian zone. Nevertheless, the mapped riparian areas can provide a starting point to inform land use and stream protection efforts. The Hudson River Estuary Program's "Trees for Tribs"[89] initiative offers free consultation and native trees and shrubs for qualifying streamside buffer planting projects in the estuary watershed.

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.

---

[88] Conley, A., T. Howard, and E. White. *New York State Riparian Opportunity Assessment* (Albany, NY: New York Natural Heritage Program and State University of New York College of Environmental Science and Forestry, 2018). http://nynhp.org/files/TreesForTribs2017/Statewide_riparian_assessment_final_jan2018.pdf

[89] DEC, *Hudson River Estuary Trees for Tribs Program*, http://www.dec.ny.gov/lands/43668.html.

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 from the Town of Coeymans Road and Stream Crossing Inventory Assessment completed in 2017 by the firm Tighe & Bond with funding from the New England Interstate Water Pollution Control Commission (NEIWPCC) in cooperation with the DEC Hudson River Estuary Program. In total Tighe & Bond assessed 63 total road-stream crossings within the Town of Coeymans and the Village of Ravena. The inventory and assessment followed a protocol developed by the North Atlantic Aquatic Connectivity Collaborative[90] (NAACC), a network focused on improving aquatic habitat connectivity across the Northeast region. Information about assessed road-crossings is accessible through NAACC's online database. The road-stream crossings for passability by aquatic organisms and barriers were ranked on a scale of significance or severity. The assessment identified several potential priority culverts for replacement, including:

- #20951– Route 143, just east of Lindskoog Road. This culvert has a large drop at the outlet which is goes directly to the Alcove Reservoir.
- #51612 – Mud Hill Road, just north of the intersection of Mud Hill Road and Stanton Road. The replacement of this culvert structure with a more appropriate culvert would help to connect the over one mile of stream to the Hannacroix creek.
- #48959 – Lower Camp Road
- #49009 – Rt. 101
- #51592 – Miller Road
- #53041 – Cedar Grove Road
- #54906 – North Jarvis Road

The recommended next step is to develop a municipal management plan for prioritizing and mitigating documented road-stream crossing that are barriers to aquatic organisms.

[90] North Atlantic Aquatic Connectivity Collaborative, streamcontinuity.org/.

Coastal Habitats (Map 22)

Connections to upper watersheds, the Atlantic Ocean, and the changing tides make the coastal and shoreline zones of the Hudson River Estuary a dynamic area. The northern Hudson River Estuary is entirely freshwater, supporting globally rare natural communities such as freshwater tidal marsh and swamp. Coastal habitats along the tidal Hudson in the Town of Coeymans are shown in Map 22. Tidal shoreline habitat and tidal wetland migration pathways are shown in Map 23.

Significant Coastal Fish and Wildlife Habitats

Diverse coastal habitats occur in New York, providing critical habitat and feeding areas for animals as well as economic values to communities. The DEC has identified and evaluated coastal habitats throughout the state's coastal regions, contributing recommendations to the NYS Department of State (DOS) 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 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.

The Coastal Habitats Map shows the two designated Significant Coastal Fish and Wildlife Habitat areas in Coeymans. Detailed descriptions of the Coeymans-Hannacroix Creeks Complex[91] and Shad and Schermerhorn Islands[92] sites are available from the NYS Department of State website, including discussions of their value to fish and wildlife, and information on potential impacts to their habitat values. See Table 7 for more information on the documented rare species associated with Coeymans' coastal habitats.

The *Coeymans and Hannacroix Creeks Complex* includes 93 acres of shallow water and marsh extending along the Hudson River's edge from the mouth of Coeymans Creek south to the mouth of Hannacroix Creek, which broadens into an undeveloped sheltered, tidal cove containing mudflats, freshwater tidal marsh, submerged aquatic vegetation beds, and shallow offshore areas (less than six feet deep below mean low water). The DOS habitat profile states that this area provides favorable spawning conditions for a variety of migratory and resident fish species, including alewife and blueback herring. The shallows are a valuable nursery area for larval fish moving into the estuary from upstream spawning areas. In addition, the shallow, subtidal areas at

[91] New York State Department of State (DOS). *Coeymans-Hannacroix Creeks Complex Habitat Assessment Form*, 2012. www.dos.ny.gov/opd/programs/consistency/Habitats/HudsonRiver/Coeymans_Hannacroix_Creeks_Complex_FINAL.pdf

[92] DOS. *Shad and Schermerhorn Islands Habitat Assessment Form*, 2012. http://www.dos.ny.gov/opd/programs/consistency/Habitats/HudsonRiver/Shad_and_Schermerhorn_Islands_FINAL.pdf

the mouth of Coeymans and Hannacroix Creeks serve as spawning sites for American shad and other fishes. Submerged aquatic vegetation beds in the tidal cove provide food for fish, invertebrates, and waterfowl as well as refuge for fish and invertebrates. The area is also known to be habitat for NY-Special Concern wood turtle and northern map turtle, a NY Species of Greatest Conservation Need.

The *Shad and Schermerhorn Islands* habitat area is a large, relatively undeveloped floodplain ecosystem spanning 1100 acres from the mouth of the Binnen Kill in Coeymans to the Vloman Kill in Bethlehem. The significant fish and wildlife habitat includes riverine shore zones, submerged aquatic vegetation beds, tidal freshwater wetlands, tributary streams, floodplain forest, cliffs, and active agricultural lands. When this area of the Hudson was dredged for navigation, large areas of shallow, secondary channel habitat were filled with dredged material behind the historic islands, eventually connecting the islands to the mainland.

Freshwater tidal wetlands, tidal mudflats, and important shore zone areas along the main stem Hudson River serve as a nursery area for migratory young blueback herring, American shad, and striped bass, as well as spawning and feeding areas for resident freshwater species. The submerged aquatic vegetation provides food and refuge for fish and invertebrates and adds dissolved oxygen to the water. The Binnen Kill also provides spawning and feeding habitat for American shad, blueback herring, alewife, and resident freshwater species. NY-Threatened least bittern and NY-Special Concern American bittern use the area for nesting and northern map turtles are found here.

In 2017, a detailed natural resources inventory and assessment of conservation priorities was completed for the Binnen Kill area to inform habitat management and restoration on protected lands.[93] The *Ecologically Significant Habitats* map and corresponding habitat tables from the study are provided in Appendix A.

Underwater (Subtidal) Habitats

Submerged Aquatic Vegetation (SAV) is a term for plants that grow under water. 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. 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 Habitats Map shows all areas where SAV has been found since 1997. Even if SAV is not present today, these areas could support it in the future.

Historic flooding from Hurricane Irene and Tropical Storm Lee in 2011 buried SAV beds with sediment throughout the estuary, including in Coeymans. DEC's 2014 SAV mapping effort

[93] Edward Samanns, Erik Kiviat, et al, *Natural Resource Inventory and Assessment of Conservation Priorities of the Binnen Kill and its Tidal Habitats* (New York State Department of Environmental Conservation, Hudson River Estuary Program, 2017).

recorded small SAV areas returning in the mouths of Hannacroix and Coeymans Creeks, the Binnen Kill, and the shore zone of Shad Island (Map 21). Prior surveys documented SAV along much of the town's Hudson River shoreline. Anecdotal evidence suggests that SAV recovery has accelerated in the estuary since 2014. Invasive, non-native water chestnut has not reported along Coeymans' shore zone as of 2014.

Tidal Hudson River Estuary Wetlands

Tidal wetlands are areas regularly inundated to some degree by tides. There are different types of tidal wetlands depending on plant life present and water depth during high and low tides. Tidal wetlands provide vital habitat in the estuary for rare plants and young fish. In addition, waterfront communities benefit from the ability of tidal wetlands to remove some pollutants from wastewater and protect shorelines from waves and strong storms.

A 2007 inventory by the DEC identified 51 acres of tidal wetlands in the Town of Coeymans. Cattail marsh and other low marsh types are dominant in the cove south of the Hamlet of Coeymans. The mouth of Hannacroix Creek is primarily tidal mudflats and shallow water habitat. The Binnen Kill and Shad Island complex supported the greatest extent of tidal wetlands in the town, including a diverse mix of wetland types. The 2017 Binnen Kill NRI notes that the DEC's 2007 tidal wetland mapping substantially underestimates the extent and complexity of freshwater tidal wetlands in the study area.[94] See Appendix A for the detailed *Ecologically Significant Habitats* map produced for the study.

The New York Natural Heritage Program has also mapped high quality examples of freshwater tidal marsh and freshwater intertidal mudflats in the Binnen Kill, along the eastern shoreline of Shad Island, and in mouth of Hannacroix Creek. Several rare plant and animal species are documented from the town's coastal habitats, including NY-Endangered Hudson River water nymph and estuary beggar-ticks. See Table 7 for a full list.

Hannacroix Creek and the Binnen Kill extend beyond the town's boundaries; there are opportunities for intermunicipal cooperation with New Baltimore and Bethlehem, respectively, to protect and manage these shared resources.

Stream Habitat for Migratory Fishes

DEC Bureau of Fisheries data and an aquatic habitat connectivity study by NYNHP indicate that the full length of Hannacroix and Onesquethaw-Coeymans Creeks in Coeymans comprise migratory routes for American eel, a fish species that begins life in the Atlantic Ocean and migrates to the headwaters of North American tributary streams as tiny "glass eels".[95] American eel is in decline throughout much of its range, and though eels are able to bypass certain dams,

---

[94] Sammans et al., 2017, 33.

[95] White, E.L., J.J. Schmid, T.G. Howard, M.D. Schlesinger, and A.L. Feldmann. *New York State freshwater conservation blueprint project, phases I and II: Freshwater systems, species, and viability metrics* (Albany, NY: New York Natural Heritage Program and The Nature Conservancy, 2011). nynhp.org/files/FreshwaterBlueprint2011/NYS_Freshwater_Blueprint_30Dec2011.pdf

culverts, and other aquatic barriers, they rely on aquatic connectivity along streams to complete their life cycle and return to the sea to spawn. In addition, the lower section of Hannacroix Creek provides spawning habitat for alewife and blueback herring, and shallow subtidal areas at the mouth of Hannacroix and Coeymans Creeks serve as spawning sites for American shad. The Binnen Kill provides spawning and feeding habitat for American shad, blueback herring, alewife, and has documented use by NY-and US-Endangered shortnose sturgeon. American eel are also present in the Binnen Kill.

Hudson River Shoreline (Map 23)

Tidal Shoreline Habitats

Natural shorelines are an important transition zone between water and land and provide habitat for diverse plants, fish, and wildlife. Natural shorelines located in the tidal wetland pathways may also allow tidal wetland and shoreline habitats to move to higher ground as sea level rises. The Town could evaluate the tidal shoreline to identify places where natural shorelines could be conserved or where the ecology of built shorelines could be enhanced.

Coeymans has approximately 4.4 miles of Hudson River shoreline. A 2005 DEC inventory of shoreline conditions found most of the shoreline to be naturally vegetated. Small stretches of engineered bulkhead, unconsolidated rock revetment, timber cribbing, and unvegetated shoreline were observed, primarily in the northern reaches along Shad Island. A 2017 resource inventory of the Binnen Kill floodplain documented extensive use of the degraded bulkheads by adult American eels, a High Priority Species of Greatest Conservation Need.[96] Tidal portions of Coeymans Creek also provide shoreline habitat, but were not mapped in the 2005 inventory. Note that Map 22 does not reflect shoreline changes since 2005 at the Port of Coeymans.

There are opportunities to conserve, restore, and manage shoreline habitats throughout the Coeymans 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. Even along working waterfronts there are ways to improve the habitat value of bulkheads and rip-rap revetments. The Hudson River Sustainable Shorelines Project[97] provides information and tools on enhancing the ecology of built shorelines as well as how to conserve natural shorelines.

Tidal Wetland Pathways

The Hudson River estuary is connected to the Atlantic Ocean and affected by sea level rise (SLR) due to climate change. The Hudson has already risen by one foot since 1900 and is likely to rise an additional three to six feet due to SLR by 2100 (see Sea Level Rise Scenarios Map).[98] Such a rapid change in water levels threatens waterfront development and infrastructure as well as the future of tidal wetlands. Tidal wetlands along the Hudson River will disappear with SLR unless they can build up in place or move to higher ground. However, wetlands bordered by steep shorelines or existing development may have no place to go. Potential tidal wetland loss threatens the health of the entire estuary. A recent study by Scenic Hudson shows areas along the Hudson most likely to support tidal wetlands in the future as sea level rises.[99] The study predicts

---

[96] Sammans et al., 2017, 57.

[97] Hudson River Sustainable Shorelines Project, www.hrnerr.org/hudson-river-sustainable-shorelines/.

[98] Horton, R., D. Bader, C. Rosenzweig, A. DeGaetano, and W.Solecki. *Climate Change in New York State: Updating the 2011 ClimAID Climate Risk Information* (Albany, NY: New York State Energy Research and Development Authority, 2014) www.nyserda.ny.gov/climaid

[99] Tabak, N., M. Laba, and S. Spector, "Simulating the Effects of Sea Level Rise on the Resilience and Migration of Tidal Wetlands along the Hudson River," *PLoS ONE* 11(4), 2016. e0152437. doi:10.1371/journal.pone.0152437. www.scenichudson.org/sites/default/files/tabak-et-al-2016.pdf

a significant expansion of tidal wetlands in low-lying areas of the Town of Coeymans by 2100. See further discussion of tidal wetland pathways under the Sea Level Rise section.

Climate and Air

Climate and Sea Level Rise Scenarios (Map 24)

As in most areas of the Northeast, Coeymans experiences cold winters with snow and warm summers. According to data collected in Albany by the National Weather Service, for the period of 1981-2010 the average temperature was 48 degrees and the average precipitation received was 39.35 inches. However, local data show steady and rapid changes in our climate that reflect global trends. It is vital for local decision-makers to understand these trends and the related climate hazards facing the region and to plan for future conditions. Natural resources can offer climate change protection because plants and trees purify water and air, store carbon, cool the air, and can even grow back stronger after a storm. This section presents general climate information prepared for Hudson Valley communities by the DEC Hudson River Estuary Climate Program.[100]

Climate Projections

Responding to Climate Change in New York State (the ClimAID Report), written in 2011 and updated in 2014, provides the most accurate and up to date climate projections for New York State.[101] ClimAID translated Intergovernmental Panel on Climate Change (IPCC) scenarios into more robust regional-scale predictions incorporating local data inputs and expert knowledge. Coeymans is located within the ClimAID climate region 5. *Note that models are inherently uncertain and simply present a range of possible scenarios to assist people and communities plan for the future*. Future climate changes in Coeymans could exceed or fall short of these projections.

Looking towards the future there are three prominent climate trends that will affect Coeymans and the region: increasing temperatures, shifting precipitation patterns, and sea-level rise (SLR).

Temperature

New York has experienced particularly rapid changes to the regional climate in the last century and this trend is projected to continue through the 21st century. Global average temperature has been rising in unison with increasing input of insulating greenhouse gases, driving changes to regional and local climate. Warming atmospheric temperature alters the water cycle, leading to more extreme precipitation, short-term drought, and severe storms. Since 1970 Coeymans has seen a 2°F increase in average annual temperature and a 5°F winter temperature increase. These increases are above both the national and global increase in annual temperature during the same period. Current projections see an additional increase of about 4-6°F in the coming decades and up to 11°F by 2100.

---

[100] Zemaitis, Libby, *Working Toward Climate Resilience: General Climate Information Prepared for Hudson Valley Communities* (New Paltz, NY: DEC Hudson River Estuary Program, 2018). wri.cals.cornell.edu/sites/wri.cals.cornell.edu/files/shared/documents/HV%20Climate%20Summary%20General%20MAR2018.pdf

[101] Horton et al., *Climate Change in New York State*, 2014.

AIR TEMPERATURE PROJECTIONS FOR REGION 5

	Baseline 1971-2000	2020s	2050s	2080s	2100
Annual average air temperature	50˚F	52.3 - 53.2˚F	54.5 - 56.2˚F	55.6 - 59.7˚F	56.1 - 61.4˚F
Increase in annual average	-	2.3 - 3.2˚F	4.5 - 6.2˚F	5.6 - 9.7˚F	6.1 - 11.4˚F

Increasing annual temperatures will lead to more frequent, intense, and long-lasting heat waves during the summer, posing a serious threat to human health and increased electricity demand from air conditioning. Heat waves are a particular concern in more urbanized areas of Coeymans, where the urban heat-island effect can further exacerbate high temperatures. By mid-century, Coeymans could annually experience three to 10 days above 95 degrees, and five to seven heat waves that last one to two days longer than average. Increasing temperature not only affects human health and ecosystems but can impact the electrical needs of a community putting strain on both budgets and the grid while creating more challenges in agriculture and other industries. Higher temperatures could also stress coldwater stream habitats in Coeymans and Hannacroix Creeks.

HEAT WAVE PROJECTIONS FOR REGION 5

	Baseline 1971-2000	2020s	2050s	2080s	2100
# Days per year above 90˚F	10	26 - 31	39 - 52	44 - 76	*
# Days per year above 95˚F	1	2 - 4	3 - 10	6 - 25	*
# Heat waves per year	1	3 - 4	5 - 7	6 - 9	*
Average # days of each heat wave	4	5	5 - 6	5 - 7	*
# Days per year ≤ 32˚F	155	127 - 136	104 - 119	84 - 109	*

*Projections not available at this time

Precipitation

Precipitation has become more variable and extreme, whereas total rainfall has changed only marginally. The amount of rain falling in heavy downpour events increased 71% from 1958 to 2012 in the Northeast.[102] Projections indicate total annual precipitation could increase as much as 12% by mid-century and 21% by 2100. Overall, New York State models project more dry periods intermixed with heavy rain and decreased snow cover in winter. However, climate projections for precipitation are considered more uncertain since it they are difficult to model. In addition to elevating flood risk, infrastructure such as roads and the town's wastewater system can become strained during heavy rains.

[102] Melillo, Jerry M., Terese Richmond, and Gary W. Yohe, Eds., C*limate Change Impacts in the United States: The Third National Climate Assessment* (Washington, D.C.: U.S. Global Change Research Program, 2014), doi:10.7930/J0Z31WJ2. nca2014.globalchange.gov/

PRECIPITATION PROJECTIONS FOR REGION 5

	Baseline 1971-2000	2020s	2050s	2080s	2100
Total annual precipitation	51"	52" - 54.5"	53" - 57"	53.5" - 58.5"	53.5" to 61.5"
% Increase in annual precipitation	-	2 - 7%	4 - 12%	5 - 15%	5 - 21%
# Days with precipitation > 1"	10	14 - 15	14 - 16	15 - 17	*
# Days with precipitation > 2"	1	3 - 4	4	4 - 5	*

*Projections not available at this time

Sea-Level Rise

Global sea level is rising due to various factors, including thermal expansion from warmer water temperatures and melting of land-based ice. The Hudson River is connected to and influenced by the sea; therefore, it experiences tides and is rising with global sea level. Since 1900, sea level in New York Harbor has risen 13 inches. More concerning, the water is rising faster and faster (from 2000 to 2014 the average rate was 6.8 millimeters per year compared to 4.6 millimeters per year from 1990 to 2014). Projections for additional sea-level rise along the Hudson River range from one to 9 inches by year 2020 and five to 27 inches by mid-century. It is possible that Coeymans could experience as much as 71 inches of sea-level rise by the end of the 21st century if rapid ice melt from the Greenland ice sheet continues. Although this "high projection" scenario is considered very unlikely by DEC to occur by 2100, there is relative certainty that global sea level will ultimately rise at least six feet over current levels after 2100 due to warming that is already locked in to the atmosphere.

SEA LEVEL RISE PROJECTIONS FOR THE HUDSON

	Baseline 1971-2000	2020s	2050s	2080s	2100
Mid-Hudson region	-	1 - 9"	5 - 27"	10 - 54"	11 - 71"

The Community Risk and Resiliency Act (CRRA) was signed into law in New York in 2014 to advance planning for climate resilience. DEC officially adopted sea-level rise projections (see Table 7) in 2017 and is developing guidance for natural and nature-based solutions. CRRA requires the NYS Department of State to develop model local laws to enhance community resiliency.

The Sea-Level Rise Scenarios Map shows the current water level and "100-year" flood zone with projections of potential sea-level rise (SLR) at 12, 30, 54 and 72 inches over current levels. See the Hudson River Shoreline Map (Map 22) for tidal wetland pathways. Sea-level rise scenarios come from Scenic Hudson's Sea Level Rise Mapper.[103] Scenic Hudson utilized high resolution LiDAR topography and local tidal datum research in a modified-bathtub approach to estimate current and future inundation zones. It's important to note that the modeling does not account for storm surge and wave action, and that estimates for future flood zones do not account for

[103] Scenic Hudson, *About the Sea Level Rise Mapper*, www.scenichudson.org/about-slr-mapper.

Table 7. New York State Sea-level Rise Projections for the Mid-Hudson region (6 NYCRR Part 490). "Low" signifies the lower end of model forecasts, while "high" signifies the upper end over the range of different model formulations and initialization scenarios.

Mid-Hudson region (from Troy south to Kingston)					
Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	1 inch	3 inches	5 inches	7 inches	9 inches
2050s	5 inches	9 inches	14 inches	19 inches	27 inches
2080s	10 inches	14 inches	25 inches	36 inches	54 inches
2100	11 inches	18 inches	32 inches	46 inches	71 inches

projected changes in precipitation patterns. The 72" (6 ft) projection is the high range projection, which will be achieved if rapid ice melt from the Greenland Ice Sheet continues. The map illustrates the vital need to plan for the potential of our changing landscape and river system in the near future. The map shows the possibility of near complete permanent inundation of the Hudson River and Binnen Kill floodplains by 2100. Additional inundation is also projected within floodplains along the mouths of the Hannacroix and Coeymans Creeks.

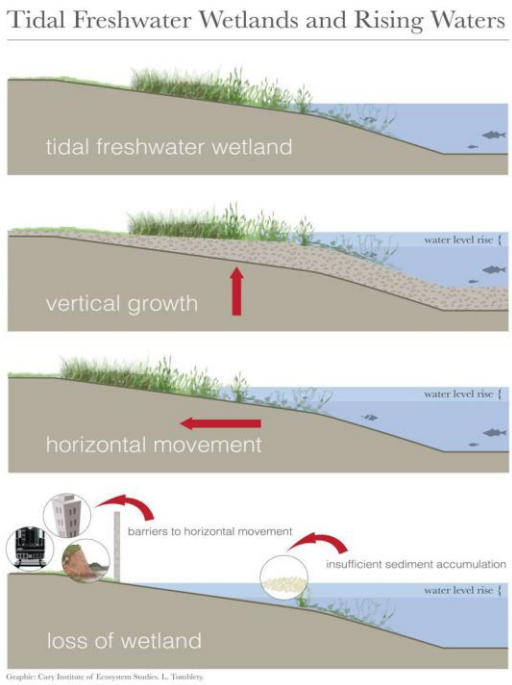
Projections for rapid sea-level rise on the Hudson threaten waterfront development and infrastructure, as well as the future of tidal wetlands. Along the Hudson River Estuary there are about 7,000 acres of tidal wetland, most of which occur north of the City of Kingston. With a projection of 36-72" (3-6ft) of SLR by the end of the century, up to 4,000 acres of tidal wetland may be completely inundated in the estuary. Tidal wetlands along the Hudson River will disappear as water rises unless they can build up sediment in place (through the process of accretion; see Figure below) or move horizontally to higher ground. However, wetlands bordered by steep shorelines, walls, or existing development may have no place to go. Potential tidal wetland loss threatens the health of the entire estuary. Wetlands are also one of the most important tools in flood control as they are able to absorb and slow the movement of rising waters. A recent study by Scenic Hudson shows areas along the Hudson most likely to support tidal wetlands in the future as sea level rises.[104] The study predicts a significant expansion of tidal wetland acreage in the northern portions of the Hudson River, including Coeymans, by 2100.

The tidal wetland pathways in Map 22 (Hudson River Shoreline) show where tidal wetlands are likely to move by 2100 as sea level rises under the full range of sea-level- rise and accretion rates examined in the study. Tidal wetlands are projected to expand throughout the Binnen Kill and Hannacroix and Coeymans Creeks wetland systems east of I-87. The undeveloped floodplain lands of the Binnen Kill are one of the most important opportunity areas in the estuary for new

[104] Tabak, Nava, and Sacha Spector, *Protecting the Pathways: A Climate Change Adaptation Framework for Hudson River Estuary Tidal Wetlands* (Poughkeepsie, NY: Scenic Hudson, 2016). www.scenichudson.org/sites/deafult/files/protecting-the-pathways.pdf

tidal wetlands to be established in the 21st century.[105] Elsewhere in the estuary, steep shorelines, existing roads, railroads, and development pose a physical barrier to tidal wetland migration. The wetland pathways do not account for all of the barriers that may be present; for example, bulkheads, revetment, and other hard engineered shorelines may be a barrier to inland wetland migration along sections of Coeymans' Hudson River shoreline.

Figure: Tidal Wetland Responses to Rising Waters:[106]



***

Existing natural resources can help protect against the impacts that climate change could have on the Town of Coeymans. The most effective way for towns to conserve tidal wetlands in the face of projected changes is to protect and manage the areas where wetlands may move. There is significant opportunity for wetland expansion in Coeymans through this century. Minimizing future development in these pathways and designing public waterfronts to allow for these changes will ensure that tidal wetlands have room to adapt to rising sea levels. This strategy will also reduce risks to communities and property owners in the changing Hudson River flood zone. For more information, see *Protecting the Pathways: A Climate Change Adaptation Framework for Hudson River Estuary Tidal Wetlands*. Sea-level rise projections for the town's waterfront can be viewed using Scenic Hudson's Sea Level Rise Mapper[107] as well as Columbia's Hudson River Flood Impact Decision Support System.[108]

---

[105] See Figure 7 in Tabak et al., *PLoS ONE* 11(4), 2016.
[106] Tabak and Spector, "Protecting the Pathways," 2016.
[107] Scenic Hudson, *Sea Level Rise Mapper*, www.scenichudson.org/slr/mapper.
[108] Columbia University, *Hudson River Flood Impact Decision Support System*, www.ciesin.columbia.edu/hudson-river-flood-map/.

Air (not mapped)[109]

Air pollution can harm human health and damage all the elements of the ecosystem. For nearly four decades, state and federal governments have controlled the emission of pollutants through permits with enforceable requirements and have measured and monitored pollution levels in the air. In addition, the Town of Coeymans "Clean Air Law" (Local Law #1 of 2019) regulates the burning of waste in the town.

Air pollutants originate from many human activities. Most pollutants come from industries that manufacture chemicals and other goods, from on- and off-road vehicles and power equipment, and from energy facilities that burn oil, gas or coal. Pollutants emitted from tall stacks move high in the air, descending to earth to do damage miles downwind from their source.

Air pollution damages health and the environment in a variety of ways. Hot summer weather sets the stage for formation of ozone (O_3) and fine particulate matter ($PM_{2.5}$), two pollutants of concern for human health. Fish and wildlife show harmful effects from acid rain and mercury in air. *Greenhouse gases* (chiefly carbon dioxide) in the air are changing the world's climate.

The federal and state air pollution programs include permits and technical requirements to control emission of pollutants, along with extensive measurement and monitoring of ambient pollutant levels. For information about the New York State air quality forecast and current observations, visit: https://www.dec.ny.gov/chemical/34985.html

The Coeymans "Clean Air Law" regulates the burning of waste, requiring continuous monitoring for certain pollutants with data made available "in real-time," on a public website. Data shall also be provided in summary form, including total amounts of releases of each chemical in pounds per day and per year.

Community Air Screen Program[110]

In 2018, the Historic Coeymans Landing Neighborhood Association participated in DEC's Community Air Screen Program, a community-based screening program for toxic air pollutants. The purpose of the program is to conduct community-level air quality surveillance with the help of community groups and interested citizens. DEC provides the sampling equipment, trains people on how to use the equipment and works with the community to determine the best location and time period for sampling. All air sampling equipment are returned to the DEC offices in Albany for analysis of the samples and interpretation of the results.

Five ambient air samples were collected between September 27-October 3, 2018 at Mosher Park, the intersection of Van Hoessen St and Aluise Dr, and the end of Stone House Hill Rd. The samples were measured by DEC staff for 43 pollutants. All results were well below the short-

[109] DEC, *Air*, https://www.dec.ny.gov/chemical/281.html.
[110] DEC, *Community Air Screen Program*, https://www.dec.ny.gov/public/81649.html.

term health-based air concentration values and therefore are not considered an immediate public health concern. The results were also below or within an order of magnitude of the long-term health-based air concentration values or similar to concentrations found in DEC's ambient air monitoring network. In short, the sampling did not identify anything unusual or that would warrant follow-up sampling. The full technical report is provided in Appendix C.[111]

[111] DEC Bureau of Air Quality Analysis and Research and Bureau of Air Quality Surveillance, Ambient Air Quality Screening Report: Coeymans (Albany County), 2019.

Land Use

Zoning (Maps 25 and 25a)

The State of New York, through Article 16 of Town Law, grants town boards the power to establish local zoning to promote the health, safety, and general welfare of the community. Zoning is one the most powerful land use planning tools available to local governments. Zoning governs the appropriate uses of land within a municipality. The objective of zoning is to help pursue the long-term development and land use goals of the community. Local zoning, like that of Coeymans, divides the town into different land use areas, or zones. A typical zone will include homogenous uses and seek to promote additional similar uses through the restriction and permission of specific land uses and types of development.

The Town of Coeymans first adopted a comprehensive zoning law in 1961. Since that time there have been minimal updates to the town's zoning. The Town of Coeymans' zoning code can be found in Chapter 165 of the Town Code. The stated purposes of the town's zoning are:

- Facilitation of the provisions of adequate public services and facilities;
- Preservation and protection of residential lands, both visually and physically from those of nonresidential use, and wherever reasonable, the elimination of nonconforming uses, which have deleterious effect on their surroundings;
- Reduction and prevention of traffic hazards and congestion;
- General enhancement of the town appearance;
- Conservation of property values through the encouragement of the most appropriate use of land within the municipality.

In order to realize the stated purposes, the town has been divided into thirteen (13) zoning districts. The districts have been recreated on the Zoning and Tax Parcels Map. A detailed schedule of permitted uses, area and size standards, and other requirements for each zone can be found in Section 165 of the Town of Coeymans Town Code.

The zoning districts can be grouped into four (4) broad categories based upon their permitted and intended use:

- Residential
    - RA: Residential/Agricultural
    - R-1: Single-Family Residence
    - R-2: Single- and Two-Family Residence
    - R-3: Multifamily Residence
    - R-4: Planned Residential
- Commercial
    - C-IP: Planned Commercial
    - B-1: General Business
- Industrial

    - I: Industrial
    - I-2: Industrial
    - I-3P: Planned Industrial
    - I-B: Industrial Buffer
- Community Facility / Town Owned Properties
    - CF-1: Community Facility
    - CF-2: Town Owned Properties

The largest area in Coeymans is dedicated to residential use. Residential zoning dominates the western two thirds of the town, the Coeymans Landing area, the land along Route 144 north of the Port of Coeymans, and the area north of the Ravena Coeymans Selkirk Middle / High School between County Route 101 and Route 9W.

The commercial heart of Coeymans is located along Route 9W. This use stretches from the town's northern border with the Town of Bethlehem to the southern border with the Town of New Baltimore. There are a few interruptions of this area, most notably the Village of Ravena. The Second largest land use within the town is Industrial. A large tract west of the Village of Ravena and Route 9W is zoned industrial. Additionally, there is a significant industrial area located between Route 9W and the Hudson River.

Community Facilities and Town Owned Properties is the smallest zone. These areas are scattered throughout the town and tend to be recreational facilities or municipal facilities like water treatment or water pumping.

Tax Parcels

The map also includes the parcel boundaries for all of the properties located within the town. Tax parcels boundaries are defined within the deed of each individual property. Parcel level information including owner, type of use, and physical size, can be found in the town's assessment roll. The Town of Coeymans Assessor's Office and the Albany County Real Property Service Agency maintain detailed tax parcel maps that can be accessed online. The assessor is responsible for updating tax maps to show recent changes in parcel size and boundary.

***

The Zoning and Tax Parcels Map displays a wide range of information that is invaluable when making decisions on potential development projects. By pairing this information with the information found in the other maps of the Natural Resources Inventory it is possible see how potential development could affect the natural resources of the town.

Assessed Land Use (Maps 26 and 26a)

The Assessed Land Use Maps shows designated land uses in the town based on parcel assessment data. While the Zoning Map describes the *allowed* use for a parcel of land, the tax assessor determines the *actual* use of the land to assess its value for setting the property tax. The use shown is as of March 1st, 2016. Some uses may have changed.

Parcel Use Classes

The Parcel Use Classes illustrated on this map are based upon the town's assessment data. Property classification codes were developed by the New York State Office of Real Property Tax Services for describing the primary use of a given tax parcel.[112] The same classification codes are used by all municipalities within New York State. The town's assessor assigns a property classification code that best describes the overall use of an individual parcel. If a parcel has more than one use, the assessor must determine which property classification code best describes the parcel. This explains in part the limited "agricultural" land within the town. Many of the town's agricultural properties have more than one use and the assessor has used a property classification code other than agricultural to describe these parcels.

The classification codes are three-digit codes that are broken down into nine categories. Each of the nine categories defines a major land use group. The first digit indicates into which group the use falls. The second and third digit further define the use of a parcel. A comprehensive list of property classification codes can be found at https://www.tax.ny.gov/research/property/assess/manuals/prclas.htm. The nine general land use categories can be described as follows:

- 100 – Agricultural – Property used for the production of crops or livestock
- 200 – Residential – Property used for human habitation. Living accommodations such as hotels, motels, and apartments are in the Commercial category
- 300 – Vacant Land – Property that is not in use, is in temporary use, or lacks permanent improvements (buildings)
- 400 – Commercial – Property used for the sale of goods and/or services
- 500 – Recreation & Entertainment – Property used by groups for recreation, amusement, or entertainment
- 600 – Community Services – Property used for the well- being of the community, including religious institutions
- 700 – Industrial – Property used for the production and fabrication of durable and nondurable man-made goods
- 800 – Public Services – Property used to provide services to the general public
- 900 – Wild, Forested, Conservation Lands & Public Parks – Reforested lands, preserves, and private hunting and fishing clubs

[112] New York State Office of Real Property Tax Services, "Property Type Classification Codes," *Assessors' Manual*, 2016. www.tax.ny.gov/research/property/assess/manuals/prclas.htm.

Land Use Patterns

The primary land uses within Coeymans are Residential and Vacant. Industrial and Public Services also make up a large portion of the land use within the town.

The western portion of the town is primarily composed of residential and vacant land. Agricultural parcels are scattered. One of the largest single continuous uses surrounds the Alcove Reservoir. The Alcove Reservoir is the primary source of drinking water for the City of Albany. The land surrounding the reservoir has been designated as a Public Service use.

A large section of the town is dedicated to industrial land uses. This area consists of multiple mines, quarries, industrial parks, and port facilities. Commercial development is centralized along the Route 9W corridor and along Main Street in the Village of Ravena. Additional commercial uses are sprinkled throughout the town. The northeastern corner of Coeymans is devoted to residential use. The Coeymans Landing area, east of Ravena, is a densely developed mixed use area.

***

The Assessed Land Use Map can be used to identify general land use patterns in the town at the parcel scale. Viewing this map alongside other maps in the Natural Resources Inventory can help to understand the relationship of existing land uses to natural features and cultural resources.

Regulated Facilities and Industrial Land Use (Map 27)

The Regulated Facilities and Industrial Land Use Map shows the location of petroleum and chemical bulk storage facilities, salt storage sites, mining and waste facilities, industrial land uses, and the locations of point source discharges to groundwaters and surface waters regulated under the Clean Water Act. Information about individual permitted facilities identified on the map is available through the DECinfo Locator interactive online map at https://www.dec.ny.gov/pubs/109457.html. A complete list of the locations shown on this map is available in Appendix B.

SPDES Permit Sites

New York's State Pollutant Discharge Elimination System (SPDES) program is intended to control surface wastewater and stormwater discharges in accordance with the Clean Water Act. Permits are required for constructing or using an outlet or discharge pipe (i.e. a "point source") discharging wastewater to surface waters or ground waters of the state and disposal systems such as a sewage treatment plant.[113] Municipal SPDES permits are issued for the Coeymans-Ravena Sewer Plant and the Ravena Sewage Overflow Facility at Van Hoesen Street (a combined sewer overflow), the Ravena-Coeymans-Selkirk High School Campus, and for the closed Coeymans Landfill. Additional SPDES permits are issued to mobile home parks and commercial and industrial enterprises in the town.

Petroleum Bulk Storage Facility

These locations are regulated under the NYS Petroleum Bulk Storage Program, which applies to facilities that store more than 1,100 gallons of petroleum in aboveground and underground storage tanks.[114] The majority of these facilities are gas stations, fuel suppliers, and industrial or mining facilities.

Chemical Bulk Storage Facility

These locations are regulated under the NYS Chemical Bulk Storage (CBS) program which applies to facilities that store a "hazardous substance" listed in 6 NYCRR Part 597 in an aboveground storage tank larger than 185 gallons, any size underground storage tank, with some exceptions, or in a non-stationary tank used to store 1,000 kg or more for a period of 90 consecutive days or more.[115] A single active chemical bulk storage facility is located at the Lafarge Cement Plant.

Salt Storage Facilities

[113] DEC, *State Pollutant Discharge Elimination System (SPDES) Permit Program*, www.dec.ny.gov/permits/6054.html (accessed December 5, 2018).
[114] DEC, *Bulk Storage of Chemicals, Petroleum, and Liquefied Natural Gas*, www.dec.ny.gov/chemical/287.html (accessed December 5, 2018).
[115] Ibid.

These facilities include known industrial salt stockpiles as well as locations where road salt and other materials used for snow and ice operations by public agencies are stockpiled. Industrial salt storage facilities are located at the Port of Coeymans and in the Coeymans Industrial Park. The Town of Coeymans DPW salt storage shed is located at the old landfill on Jarvis Road S.

Mine Facilities

Identified in DEC's Info Locator.[116] There are six (6) active permitted mines listed in the town (commodity in parentheses): Biers Road Cattle Pond (dolostone), Callanan South Bethlehem Quarry (limestone), Gedney Hill Mine (shale), Mossy Hill Quarry (bluestone), Nikoncyk Mine (shale), and the Lafarge Ravena Quarry (limestone). In addition, there is a reclaimed clay mine at the Port of Coeymans.

Waste Facilities

Waste Facilities are identified according to the assessor's property class data (see Map 26). Sites include the closed Coeymans Landfill on Jarvis Road S., the Coeymans-Ravena Sewage Treatment Plant, the Ravena Sewage Overflow Facility, and two junkyards along Coeymans Creek.

Industrial Land Uses

Industrial properties are identified according to the assessor's property class data (see Map 21) and cover a significant area in the town, including the Port of Coeymans, Lafarge Cement, and Callanan Industries.

***

The regulated activities and industrial lands shown on this map have the potential to impact the town's water resources, both in their current extent and if they expand. As shown on Map 17, Land Cover & Use, the actual extent of industrial development is less than the area shown on the maps for Zoning (#XX) and Assessed Land Use (#XX). Inventorying Regulated Facilities and Industrial Land helps to analyze cumulative effects of surface and groundwater discharges on water resources. It is also useful for understanding the extent and distribution of industrial and waste management land uses, which may pose cumulative impacts more broadly to the natural environment both currently and if such discharges increase.

SPDES permit compliance status information is available from the EPA's Enforcement and Compliance History Online (ECHO).[117] ECHO is a web-based tool that provides public access to permit, inspection, violation, enforcement action, and penalty information from the past three years. ECHO offers the most comprehensive way of searching for SPDES locations and information about individual SPDES-permitted facilities. The easiest way to access data on this

[116] DEC, *DECinfo Locator*, www.dec.ny.gov/pubs/109457.html (accessed December 5, 2018).
[117] EPA, *Enforcement and Compliance History Online*, echo.epa.gov/?redirect=echo.

website is to enter a zip code into the search tool in the upper left of the opening webpage. Each resulting pinpoint on the map can be clicked on for individual information.

Despite having both urbanized village and hamlet areas and extensive industrial development, the Town of Coeymans and Village of Ravena are below the population density threshold requirements for EPA's Municipal Separated Storm Sewer System (MS4) Program, which provides a regulatory framework for municipalities to better manage stormwater and non-point source pollution. Nevertheless, the MS4 Program's six minimum control measures are effective options that can be adopted by non-MS4 communities to protect water quality.
With the heavy rainfall events expected to increase with climate change, good management of stormwater runoff becomes even more important for reducing pollution and reducing the risk of diseases carried by dirty stormwater.

Many sources of stormwater management guidance are available including:

- Stormwater Coalition of Albany County
  http://www.stormwateralbanycounty.org/
- DEC Stormwater Management Guidance Manual for Local Officials
  http://www.dec.ny.gov/chemical/9007.html
- Reviewing Stormwater Management in Site Design: A Guide for Planning Board Members.
  http://www.lhccd.net/uploads/7/7/6/5/7765286/planning_board_sw_guide_2015.pdf
- Green Infrastructure Code Audit
  https://cdrpc.org/green-infrastructure-code-audit

Agricultural Resources (Map 28)

The Agricultural Resources Map shows areas of productive agricultural soils (as defined by the Natural Resources Conservation Service), parcels receiving an agricultural assessment, and land included in the County Agricultural District. These factors, in addition to the Land Cover and Land Use Map, were used to identify the town's important agricultural resources.

Soils

According to US Department of Agriculture Natural Resources Conservation Service, prime farmland soils are soil types that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and the qualities to produce economically sustained high yields of crops when treated and managed properly. Farmland soils of statewide importance are soils types that nearly meet criteria for prime farmland.

There is a small percentage of prime farmland scattered throughout the town, primarily in the areas surrounding Coeymans and Hannacroix Creeks. Most of the larger areas of contiguous prime farmland soils are actively farmed and are enrolled in the County Agricultural Districts Program. The areas mapped as farmland soils of statewide importance occur primarily on steep slopes in the western portion of the town and are not generally used for agriculture.

Land Use

Agriculture comprises a relatively small percentage of the town's land uses. Most of the prime farmland soils east of Route 9W are zoned industrial or residential while most of the productive farmland to the west is zoned residential/agricultural. The predominant types of agriculture in the town are dairy and livestock, crops, and hay. Some vegetables are grown in the eastern portion of the town. Except for a large dairy farm, most farming in the town is small-scale.

Value of Farmland

Agriculture plays a role in the economy and the environment in the town. Farmland provides a valuable soil resource for food production. Farms supply locally grown food, provide jobs in the community, generate sales, and contribute property taxes. In addition, farmland provides open space, scenic values, wildlife habitat, and buffers for sensitive natural resources and contributes to the rural character that is valued by residents.

Agricultural land such as hayfields, abandoned farm fields and forest clearings provide important grassland, meadow and shrubland habitat for a variety of species including rare plants, butterflies, reptiles, and grassland birds that have adapted to the agricultural environment. A number of bird species that use this habitat, and are listed as species of conservation concern, have been confirmed in Coeymans (See Grassland and Shrubland Habitat section)

***

Local laws, programs, and plans such as zoning, Agricultural Districts, conservation easements, Agricultural Environmental Management (AEM), Right to Farm Laws, and Agricultural and Farmland Protection Plans support farm viability and the preservation of agricultural resources. The town's 2004 Comprehensive Plan recommends that prime lands valued for agriculture be identified and an Agricultural Preservation District be created to strengthen the town's ability to protect and preserve the rural and agricultural landscape.

At the site level, best management practices used on agricultural land help to increase productivity and efficiency while improving and protecting wildlife habitat. For example, certain mowing and grazing schedules and patterns can improve habitat for nesting birds and turtles; soil and water conservation practices like stream buffers help protect streams and other aquatic habitats; maintenance of field borders can improve pollination and support wildlife; and integrated pest management techniques support healthy crops and habitat.

Cultural Resources

Historic Sites (Map 29)

Historic Sites

Historic Sites refers to the location of resources of historic and archaeological significance within the town. This includes individual properties and historic districts that are listed in the New York State and/or National Registers of Historic Places and areas of Archaeological sensitivity.

The historic context of the Town of Coeymans reflects more than 10,000 years of human occupation. This documented history begins at the Crabapple Site,* a multi-component archaeological site located in the Hamlet of Coeymans that includes both Late-Paleoindian (8,500-8,000 BCE) and Early-Archaic era (3,500-1,800 BCE) episodes of occupation.

The town's European settlement is almost conterminous with that of New York itself. The first recognized European settlement in Coeymans was at "*Rensselaers-Steyn,*" a fort located on Barren Island just south of Coeymans Landing. The post was built in c.1642 and manned under the direction of Killian Van Rensselaer 18 years after the establishment of Fort Orange and only 34 years after Henry Hudson first sailed up the Hudson River.

By the mid-17th century water powered mills had been established on parts of the Onesquathaw (Coeymans) Creek within the current boundary of the town. In 1673 Barent Pieterze Coeymans acquired a sizable 120 square-mile land tract from the Mahican Indians. This land tract would be known as the Coeymans Patent. A portion of this land would later become the Town of Coeymans in 1791.

The National Register listed Arriantje Coeymans Stone House (c.1700/1720, NR Listed 1972),* at the confluence of the Coeymans Creek and Hudson River is one of the state's earliest surviving dwellings. Built during the life of Barent Coeymans, the baronial manor reflects the wealth and power associated with the town and state's earliest commercial development.

The Coeymans Landing Historic District (SR/NR listed 2018), which includes the Coeymans Stone House and much of the original settlement of Coeymans Landing, chronicles 10,000 years of continuous human habitation and development in the town (c.8,000 BCE – 1967 CE).

Also, located within the boundary of the town are following National Register of Historic Places[118] listed resources:

- Coeymans School/Acton Civill Polytechnic Institute (SR/NR Listed 1970)*

[118] * Denotes a resource that is also a contributing component of the New York State and national Registers of Historic Places listed Coeymans Landing Historic District.

- Alcove Historic District (SR/NR Listed 1980)
- Onesquethaw Valley Historic District (Coeymans & New Scotland) (SR/NR Listed 1994)
- Tobias C. Ten Eyck House and (Slave) Cemetery (SR/NR Listed 1994)
- District School No. 7 (SR/NR Listed 1996)
- Israel Shear House (SR/NR Listed 1996)
- Abraham Houghtaling House (SR/NR Listed 1998)
- Mull House and Cemetery (SR/NR Listed 1999)
- Fletcher Blaisdell Farm Complex (SR/NR Listed 2001)*
- Vanderzee House (SR/NR Listed 2002)
- Coeymans-Bronck Stone House (SR/NR Listed 2003)
- Valley Paper Mill Chimney & Site (SR/NR Listed 2004)
- Alexander Willis House (SR/NR Listed 2004)*
- Cornelius and Agnietje Van derzee Farm (SR/NR Listed 2005)
- Dr. Wesley Blaisdell House (SR/NR Listed 2012)*
- Brigadier General David McCarty Stone Cottage (SR/NR Listed 2015)*

The following two properties were listed in the New York State Register of Historic Places:

- Former Reformed Protestant Church of Coeymans Parsonage (SR Only 2015)*
- St. Patrick's Church Complex (Ravena) (SR Only 1993)

In addition to the resources and areas documented on the map, a number of buildings that have been determined by the NYS Historic Preservation Office to be “eligible” for inclusion in the New York State and National Registers of Historic Places are not depicted. These identifications have been undertaken as part of various cultural resource survey efforts and projects that required review under either Section 14.09 (NYS Parks Law) or Section 106 (National Historic Preservation Act of 1966).

Archaeologically, more than a dozen archaeologically sensitive areas (depicted as area circles on the Map) have been identified in the town. Areas associated with Native or pre-contact sites are buffered with a 0.5-mile radius. Sites associated with historic period resources utilize 400- foot buffers. All sites depicted are based on identified sites. As such, the map does not represent the town’s full potential for archaeological sensitivity. To better define areas of potential archaeological sensitivity, areas within 500 feet of water and with less than 12% grade should be considered potentially sensitive.

The information contained on Map 29 should be considered a snapshot in time and not an exhaustive list. New information is being added regularly. The use of the following map in conjunction with the NYS Office of Parks, Recreation & Historic Preservation's Cultural Resources Information System (CRIS) is recommended for evaluating Historic Sites in conjunction with the use of this document.

The CRIS program can be accessed at https://cris.parks.ny.gov or by going to the New York State Office of Parks, Recreation and Historic Preservation's web site and searching for the Historic Preservation Office and Online Tools. New information will be included in future updates of this document.

Conservation and Recreation Assets (Map 30)

The Conservation and Recreation Assets Map identifies parks and protected areas in the town. Many areas are open to the public, offering opportunities for recreation. A few are not – notably, the Alcove Reservoir Water Supply lands are closed to all activities except trapping by permit. These areas still provide important conservation benefits such as water resource protection and wildlife habitat, among others. Table 8 provides information about ownership, public access, boating, and other activities allowed in each of the parks or protected areas shown on the map, and is followed by brief descriptions of each.

The Town of Coeymans offers a considerable range of recreational resources to the community through its three town parks. Mosher Park, a neighborhood sports complex located in the Village of Ravena, limits its resources to local residents, but both Coeymans Landing Park on the town's Hudson River waterfront and Joralemon Memorial Park on County Route 102 attract visitors and tourists from the Capital District and well beyond. County, state, and privately- owned parks and preserves, home to an impressive array of rare flora and fauna, add miles of hiking trails and varied activities to the community's recreational opportunities. The Hudson River draws many forms of watercraft and, according to local anglers, area lakes and streams boast some of the best fishing in Albany County.

Table 8. Conservation and Recreation Areas in the Town of Coeymans

Name	Area (ac)[1]	Ownership	Public Access	Boat Access	Activities
Alcove Reservoir Water Supply[2]	4,232	City of Albany	No	No	Trapping by permit only
Coeymans Landing Park[3]	5.0	Town of Coeymans	Yes	Yes	Athletics, Boating, Concert Events, Picnicking, Playground
Deer Mountain Preserve	430	Lafarge Cement Co.	Yes	No	Bird Watching, Hiking
Joralemon Memorial Park[4]	246	Town of Coeymans	Yes	No	Athletics, Disc Golf, Geology, Hiking, Historic Sites, Pavilion Events, Picnicking, Playground
Lawson Lake County Park[5]	444	Albany County	Yes	Yes	Boating, Cross Country Skiing, Events, Fishing, Picnicking, Wildlife Viewing, Youth Education
Louise E. Keir WMA[6]	188	NYS DEC	Yes	No	Hiking, Hunting, Trapping, Wildlife Viewing
Mosher Village Park[7]	19.7	Village of Ravena	Yes	No	Athletics, Pavilion Events, Picnicking, Playground, Swimming

Unnamed	103	Mohawk-Hudson Land Conservancy	No	No	Unknown

Notes:

[1]Acreage of conservation/recreation area *within* the Town of Coeymans or Village of Ravena. Sizes are based on tax parcels with conservation status.

More Information:

[2] **Alcove Reservoir Water Supply**
http://www.albanyny.gov/Government/Departments/WaterAndWaterSupply/SystemSpecsandCapacity.aspx
[3] **Coeymans Landing Park**
https://coeymans.org/community/townparks/
[4] **Joralemon Memorial Park**
https://coeymans.org/community/townparks/
[5] **Lawson Lake County Park:**
http://www.albanycounty.com/lawsonlake.aspx
[6] **Louise E. Keir Wildlife Management Area:**
http://www.dec.ny.gov/outdoor/86048.html
[7]**Mosher Village Park**
http://www.villageofravena.com/park---pool.html

Mosher Park Complex

Coeymans residents share many of the recreational facilities at the Mosher Park Complex operated by the Village of Ravena. A broad range of activities are available, including volley ball, tennis, basketball, baseball, swimming and picnicking. The complex hosts Babe Ruth baseball and Legion baseball as well as Pop Warner football. Adult softball leagues enjoy the benefit of the ballfields throughout the season. For younger children there is a well-equipped, handicapped accessible playground.

Swimming facilities are free to village residents and at a reasonable fee to town residents. The pool is open to all ages from mid-June through Labor Day weekend, and is always staffed with certified lifeguards while the pool is in use. Children, seven years or older, can participate in a two-week American Red Cross Learn-to-Swim Program. Adult swim time is scheduled twice daily, before and after regular pool hours.

Coeymans Landing Park

Coeymans Landing Park is located along the Hudson River in the Hamlet of Coeymans, recently designated as a Preservation District by both the State and National Registers of Historic Places. The park green's focal point, a charming and spacious gazebo was the gift of the townspeople to the town in the early 1990s. Evenings on the Green, a series of concerts, are well-attended here weekly during July and August as are several other cultural events throughout the year.

Shoreline and dock fishing are popular, especially during the spring when striped bass migrate into the Hudson River to spawn. The shoreline promenade is a wonderful spot for bird watching,

both on the Hudson and on Schodack Island. Short trails pass through a quiet grove of cottonwoods with a lovely wild flower understory. Other park features include a playground, boat launch, ballfields, and picnic tables.

Kayaking is especially popular along the Coeymans waterfront. As part of their commitment to develop and promote the Hudson Water Trail, the Hudson Valley Greenway has installed 65 storage racks at 33 sites along the river on a first-come, first-served basis. One of three Water Trail sites in Albany County sites is located at the New York State Boat Launch in Coeymans Landing Park.

Joralemon Memorial Park

Joralemon Memorial Park is located at the heart of the Town of Coeymans, 1.5 miles north of State Route 143 on either side of County Route 102 (Starr Road).

The park's offerings range from ballfields, playground, tennis courts and a disc golf course at one end of the recreational spectrum to several miles of hiking trails through a series of meadows, fields, and woods at the other. The park is rich with ferns, wildflowers, and lichens, to say nothing of fossils, wildlife, and several notable geologic features, thrust fault, drag fold, and small cave, and karst pools.

The New York Natural Heritage Program has identified six high quality or rare examples of ecological communities in the park: Rocky Summit Grasslands, Silver Maple-Ash Swamp, Maple-Basswood Rich Mesic Forest, Red-Maple Hardwood Swamp, Red Cedar Rocky Summit, and Calcareous Cliff Community. Rare plant species also occur within the park (See the Significant Ecological Features Map).

Lawson Lake County Park

Lawson Lake County Park is located in southern Albany County on the border of the towns of Coeymans and New Scotland. This beautiful 420-acre park includes a lake, forested upland, open fields, waterfalls and streams and wetlands and is open year-round to the public for a wide range of activities: bird watching, fishing, hiking, nature study, picnicking, cross country skiing, ice fishing and the use of canoes and portable car-top watercraft.

The woods on the hill are mature second-growth hardwoods and conifers. The understory of this forest and the wetland areas associated with the intermittent streams and springs support a wide diversity of ferns and wildflowers, including several rare plants.[119]

Once home to Camp Opportunities, the County has worked hard to restore summer youth programs and has renewed efforts to improve park facilities to better accommodate public use and protect the natural resources.

[119] Schmitt, Claire, *Natural Areas of Albany County, 3rd Edition* (Schenectady, NY: Environmental Clearinghouse of Schenectady, 1996).

Louise Keir Wildlife Management Area

The 187-acre Louise Keir Wildlife Management Area (WMA), located in southern Albany County is managed by DEC's Division of Fish and Wildlife for wildlife conservation, wildlife habitat protection, and wildlife-associated recreation (hunting, trapping, wildlife viewing, and photography). There are opportunities for hunting, white-tailed deer, black bear, wild turkey and gray squirrel. Trappers can expect to find coyote, fox, raccoon, fisher, and bobcat. For the bird watcher, a host of songbirds frequent the area.

There are two primary forest types on the Louise Keir WMA, a relatively young oak forest on the northern half of the property and a mixed hardwood-conifer forest on the south facing hillside. The upper elevations, reaching over 1000 feet, are home to the uncommon pitch pine-oak-heath rocky summit community.

Focal to the WMA's management objective is the preservation of the present forest character. In 2007 a commercial timber harvest thinned white pine to improve stand health and establish diversity in stand age. Openings were created in the forest canopy, releasing the pitch pines from shading. Future timber harvests are anticipated for the creation and maintenance of young forest habitat (see Grassland, Shrubland, and Young Forest Habitat section). In the spring of 2018 a controlled burn was performed to benefit the fire-dependent pitch pine-oak-heath rocky summit community.

Alcove Reservoir

Located in the western part of the town and surrounded by wonderfully scenic conservation lands, the City of Albany's Alcove Reservoir is the largest water body in Coeymans. In 1929 the City of Albany ordered the evacuation of the Village of Indian Fields to create its major water supply reservoir. A cemetery was moved to its present location east of the reservoir, and much of Indian Fields was destroyed by the flooding resulting from the damming of the Hannacroix Creek. (Trapping in the Alcove Forest is the only recreational activity allowed. Permits can be obtained from the City of Albany Water Department.)

Deer Mountain Nature Trail

Deer Mountain Nature Trail in the Village of Ravena is owned by LaFarge North America Cement. The company and its employees have turned 170 acres of protected wetlands on their property into a natural area open to visitors.

Spring wildflowers and ferns highlight two trails surrounding a wetland. The wetland is in a ravine between two hills, and the trails follow the edges of the swamp, one to the east and one to the west. The steep hillsides are covered with hemlocks and chestnut oaks. Waterfowl are often spotted in the wetland. The yellow spice bush flowers smell as well as look beautiful in the spring. Winterberry is lush in autumn with its bright red berries.[120]

[120] Schmitt, 1996.

Mohawk Hudson Land Conservancy Parcel

The Mohawk Hudson Land Conservancy (MHLC), a non-profit organization and an accredited land trust, was founded in 1992 to protect the natural, scenic, agricultural and cultural landscapes of the Mohawk and Hudson River Valleys. MHLC's conservation work in the Capital District offers many public benefits, including 18 public preserves for recreation and education.)

Recently MHLC acquired a 99.9-acre parcel of land, just a mile north of Joralemon Memorial Park and slightly to the west of Lafarge's Deer Mountain Nature Trail. The landscape is quietly stunning and very similar in character to Joralemon. In 2018, a large group of volunteers turned out for an Earth Day clean up at the not-yet-open nature preserve.

There are several recreation area guidebooks which include more detailed descriptions of the areas than those included here, as well as exhaustive lists of the flora and fauna. A good one, *Natural Areas of Albany County* has been referenced here. New York State, Albany County, and Town of Coeymans websites are the best sources for current information regarding rules and regulations and facility seasons and hours.

The Environmental Clearinghouse of Schenectady conducts hikes weekly in the spring and fall. The hike leaders are knowledgeable botanists, and their website is most definitely worth visiting.

Scenic Resources (not mapped)

Coeymans is noteworthy for its wealth of lovely scenic vistas. Looking east from the Hudson River shoreline, north or south along the Alcove causeway or taking in the majestic panoramas from the western hills of Coeymans Hollow, the town's scenery is quite remarkable. In 1974, the Albany County Environmental Management Council prepared an open space plan for the town's Environmental Conservation Commission.

"Commission members and project staff felt that a human-oriented study had to include mention of the town's beauty. Staff concluded, after driving the town, that any attempt to map scenic areas would result in a map of most of the town."

The result today would be little changed.

Scenic assets are not easily quantifiable, perhaps because they are such a remarkable mixture of natural resources. Landscape is juxtaposed with waterscape. Habitats merge. Fauna looks stunning against a woodland backdrop. And the list goes on and on. They are a wondrous mingling of natural elements making the whole larger than the sum of its parts, providing inspiration for the naturalist in all of us.

The town's scenic beauty abounds. Agricultural and forested lands create a strong and pleasing transition from urban to rural. The town's topography varies from steep to gently rolling, affording generous scenic vistas along roadways and walkways throughout the town.

The Helderberg Escarpment, located in the center of Albany County, is the county's signature landform. The most dramatic part of the escarpment, with relief of over a thousand feet, stretches for about ten miles from Knox and Altamont to southern New Scotland, Westerlo, and Coeymans.[121] The 1200-foot elevation of the Helderberg Mountains in northwest Coeymans offers magnificent panoramic views. Coming down to less than 10 feet above sea level along the town's Hudson River waterfront, the contrasting scenery is no less spectacular than that of the mountain heights.

In 1981, the State Legislature established the Coastal Management Program. With this program the Act declares that the public policy of the State within the coastal area is to achieve a balance between economic development and preservation that will permit the beneficial use of coastal resources while preventing the loss of living marine resource and wildlife, reduction of open space areas or public access to the waterfront, shoreline erosion, impairment of scenic beauty, or permanent damage to ecological systems (Article 42 § 912). Policy 24 of the State's Costal Management Plan provides for the designation of Scenic Areas of Statewide Significance

[121] Driscoll et al., *Helderberg Escarpment Planning Guide*, 2002.

(SASS) and Policy 25 requires that proposed actions located outside a designated SASS must protect, restore or enhance the overall scenic quality of the coastal area.[122]

The Hudson River coastal area was the first area to be studied based on New York's Scenic Evaluation Method, established through Policy 24. Six stretches of the Hudson River and its shoreline were designated as Scenic Areas of Statewide Significance (SASS), including the Columbia-Green North SASS. The Coeymans Hamlet Waterfront and the Hannacroix Creek Outlet were both designated as subunits of the Columbia-Greene North SASS.

The Coeymans Hamlet Waterfront Subunit is designated a SASS because it is visually and physically accessible to the general public. The area offers un-obstructed views of the Hudson and is noteworthy because of its historic connection to the river. Views of the river are as pleasing as they are various, both the vistas north of the Hamlet and the panoramic views from other points in the Hamlet, notably Church Street, Uthe Boulevard, James Drive, South Main Street and Grove Cemetery. The waterfront dock site affords additional up-river vistas, as well as good views of Schodack Island. The down-river panoramas just south of the Coeymans Water Pollution Control Facility are equally remarkable. Barren Island, historically home to an amusement park, affords lovely river and island views, and one can watch the waterfalls of Coeymans Creek from the bridge along Route 144.

The Hannacroix Creek Outlet Subunit is considered a SASS because it is in a largely undisturbed and natural state and has diverse vegetation. The vegetation attracts waterfowl and other wildlife and steep bluffs rising above the alluvial plain and marshland provide long views to the south of the Hudson River and vistas of 90 and 180 degrees in width.

Driving west through Coeymans Hollow, every other bend in the road catches a glimpse of the Hannacroix Creek winding its ways through the landscape. The forests are somehow reassuring, the rock formations intriguing. There is no sense of being in a hurry here. If one gives in to the urge to explore, the climb may curve up any number of hills, Gedney Hill, Copeland Hill, Blossom Hill, Blodgett Hill, Powell Hill, and at every hilltop there awaits a pleasant view. Down tree lined lanes movement is peacefully in and out of shadow and the sense is one of profound quietude. Finding the way back to the main road the sunlight truly sparkles across the broad expanse of the Alcove Reservoir and the wind dances through an overgrown field. Nothing short of magical.

Scenic and visual resources are important because they provide economic and environmental benefits. Scenic assets attract tourism and homeowners. Property values as well as the physical environment are enhanced. The maintenance and enhancement of Coeymans' scenic viewsheds is of singular importance to the community.[123]

---

[122] New York State Department of State Division of Coastal Resources and Waterfront Revitalization, *Scenic Areas of Statewide Significance*, 1993. www.dos.ny.gov/opd/programs/HudsonSASS/Hudson%20River%20Valley%20SASS.pdf.

[123] *Draft Town of Coeymans Waterfront Revitalization Plan*, 1995.

Conclusion

The Natural Resources Inventory is not so very different from the inventories we perform every day. We started with a list of natural resources to include in our inventory, and another list of the data needed to describe each resource, yet another of available data sources. Many lists to distill into one final inventory. The process was remarkably similar to stocking and organizing a pantry. We now have a fair sense of which data are current and which need updating. Data based on modelling await field verification. Data gaps require attention. Field verification and data gathering are two goals for future study by the group and will provide an opportunity to actively engage the community. Residents participated in a Hudson River Estuary Program sponsored biodiversity training in 2005. Now might be the time to consider another such project.

Our primary goal in preparing this inventory was to provide the municipal boards with scientific data to inform their decision making, while furnishing residents with some guidelines for responsible stewardship of the town's various ecosystems.

Hindsight makes clear the common denominator of error in areas of human endeavor. Progress necessarily includes wear and tear and mistakes along the way. It certainly would have been beneficial to have tools such as the natural resources inventory long before now to guide towns in their land use planning. The benefit of hindsight, however, is the potential improvement of our foresight, in this case an increasingly attentive approach to environmental deliberations. Specifically, revision of the town's 2006 Comprehensive Plan, updating of the town's 1961 zoning, and revisitation of the town's draft Local Waterfront Revitalization Plan, dating back to the mid-1990s, can all profit from the material compiled here. The Department of State has suggested that the three documents may be best addressed concurrently, applying the kind of interdisciplinary approach now widely preferred as a method of study.

The Town of Coeymans Conservation Advisory Council encourages the municipal boards, area businesses, and residents to review the completed inventory. The document is intended to promote projects and policies which can be implemented locally. We encourage people to become familiar with the inventory so that there is a broad understanding of our truly remarkable shared natural resources, which will enable us to move forward as a community, giving our best effort to sustaining and protecting them.

Afterword

As is so often the case, one starts out on a specific mission, in this instance to build a natural resources inventory. Along the way, without intentionally diverging from the path, questions arise which lead in other directions. At first glance they may seem unrelated to the study, but a few recurring thoughts broaden into larger considerations very much at the heart of where we humans fit into the ecosystem.

The copyediting phase of this project was a blessing in disguise. The requisite multiple readings were surprisingly interesting. Correlations between natural resources became clear, landscapes familiar. The reader cannot be other than astounded at the diversity and rarity of Coeymans' natural habitats. Throughout the review two thoughts/questions arose several times, one which speaks more to the quantitative aspect of the inventory, the other more to the qualitative.

How does a very young science study a very old earth?

From ancient times, starting with Aristotle and the metaphysicians, the study of nature and the physical universe was dominated by philosophical thought. It was actually called natural philosophy. Science, as we think of it, did not really start to take shape until the 19th century. Words like biology entered our vocabulary shortly before the twentieth century, while terms such as ecosystem did not appear until 1935. Theodore Roosevelt's notion of land conservation gave birth to the National Park System in 1916 . In New York there was a three-member Fisheries Commission established in 1868. However, more than 100 years passed before the environment received any kind of legal protection. The first Earth Day, April 22, 1970 was marked by the creation of the New York State Department of Environmental Conservation, one of the first governmental agencies specifically formed for the purpose of overseeing all environmental concerns through a single organization. Later that year, on December 2, the federal Environmental Protection Agency was established.

The leaps and bounds achieved by science and technology in the past several decades are impressive. Modern science is strongly data driven, and the internet facilitates easy access to a wealth of statistics. During the recent governmental shutdown, NOAA and other scientific agencies were very much concerned because furloughed workers were unable to keep two hundred years of continuous data intact. Think of it. Two hundred years of data to help us grasp the earth's four and a half billion years. Modern science is in its infancy. Recognizing this, science should proceed with minds wide open, constantly questioning what it is we think we know. Mistakes will be made, data misconstrued, theories disproven. How we rank and prioritize natural resources and identify critical land areas require careful consideration, and we need to regularly scrutinize the validity of our methodologies.

While the main focus of the inventory concerns the compilation of scientific data, it also catalogues historic, cultural, and recreational assets and speaks to their value to community life. It recognizes the significant role scenic features play in enhancing the landscape and at very least

gives glimpses of the more elusive and unfathomable side of nature which captures the spirit of a region. It is worth noting that the Hudson River Estuary Program, our sponsors and mentors in this project base their mission on six benefits, several of which speak to the qualitative:

- Clean water
- Resilient Communities
- Vital Estuary Ecosystem
- Estuary Fish, Wildlife, and Habitats
- Natural Scenery
- Education, River Access, Recreation, and Inspiration

It is this lastly listed benefit, inspiration, which while the least quantifiable, is perhaps as key as any to an understanding of our relationship with the natural world. True to its enigmatic quality, it dodges a clear articulation of just how it percolated through the narrative.

What is man's role in the natural world?

In earlier centuries, nature was the most often expressed inspiration of artists. There was an interesting circle in which nature inspired the artist to create his art, which, in turn, inspired his audience to seek out nature. Painters worked in the open air, choosing natural subjects more than any other for their work. Musicians not only attributed their inspiration to the natural world but often sought to reproduce the actual sounds of nature in their compositions. In literature nature was prominently in the foreground. One might expect this of the Romantics but even Sherlock Holmes routinely paused in his sleuthing to expound on the wonders of the natural world. It is not much of a stretch to extrapolate here and make an argument for man's attraction to his natural world. The manifestation, while abundantly clear in art, is also amply apparent in daily life. Children prefer to play out of doors and there is a wide demand for out of doors recreational activities at all age levels. Nature recordings are the most popular background for personal meditation and relaxation. Environmental vocabulary moves quickly from science into the everyday. "Ecosystem," for example, has become synonymous with office interaction. Well documented "back to nature" movements coincide with the Industrial Revolution in the 1840s, the Great Depression in the 1930s, wartime, and during and following the civil unrest of the 1960s. There is much to suggest man's innate affinity for the natural world and a heightened need to turn to it during difficult times. Some might define nature as home, that soft place to land. Naturalists have written extensively on the tug of nature on the human spirit. The scientist might posit that, whether or not we acknowledge our attachment to the natural world, there is biology that supports an inextricable bond. The relevance of positive human disposition toward nature is that persons with seemingly widely divergent views on issues such as conservation practices may have considerably more common ground than they perceive. This allows movement toward consensus on critical environmental issues and gives one hope for a positive unified vision for the natural world with the human presence as one of (wise) conservator.

- Sylvia Lawler, Chair, Town of Coeymans Conservation Advisory Council