

Town of Esopus Comprehensive Plan

Appendix 1: Community Profile and Review of Past Plans

May 21, 2019



Laberge
ENGINEERING
ARCHITECTURE



Group
SURVEYING
PLANNING

4 Computer Drive West • Albany, New York 12205
(518) 458-7112 • www.labergegroup.com

[Page Intentional left blank]

Table of Contents

REVIEW OF PAST PLANS1

COMMUNITY PROFILE10

Demographic and Growth Trends Analysis..... 10

 Population Trends 10

 Age Distribution 12

 Housing Composition 14

 Race and Ethnicity 15

 Income 15

 Potential Environmental Justice Area..... 17

Housing and Marketing Trends..... 19

Education 24

 School Districts (Kingston, Highland, and New Paltz) 24

 Educational Attainment 25

Civic and Community Organizations..... 26

 Religious Institutions 26

 Civic, Social, and Other Community Organizations..... 28

Arts,Culture, and Historic Resources..... 29

 Klyne Esopus Historical Society Museum..... 29

 Sojourner Truth..... 29

 Town of Esopus Library 30

 Hudson River Lighthouses..... 31

 John Burroughs’ Slabsides..... 32

 Kingston-Port Ewen Suspension Bridge..... 32

 Historic Places 33

Community Facilities and Infrastructure 33

 Esopus Town Facilities 33

 Cemeteries 34

 Emergency Services..... 35

 Municipal Water 38

 Municipal Sewer 39

 Stormwater Management System 40

Town Highway Department.....	40
Mail Delivery.....	40
Capital Improvement Plan for Drinking Water.....	41
Pedestrian and Bicycle Facilities	41
Transportation Network.....	43
Parks and Recreation.....	45
Shoreline	45
Esopus Town Parks.....	46
Publicly Accessible Parks, Preserves, and Nature Sanctuaries.....	49
Easements	53
Regional Park and Recreational Attractions and Trails	53
Economic Vitality	56
Regional Economic Perspective	56
Economic Development Resources	58
Resident Commutation and Employment	61
Port Ewen Hamlet Study.....	61
Tourism Accommodations.....	62
Agriculture and Tourism.....	63
Environmental and Natural Resources.....	64
Hudson River	64
Significant Coastal Fish and Wildlife Habitats (SCFWH)	65
Major Streams.....	67
Significant Biodiversity Areas.....	70
Wetlands	71
Esopus Forest Habitats.....	72
Ulster County Intact Habitat Core	73
Invasive Species.....	74
Climate Smart and Flood Resiliency	78
Climate Smart Community	79
Stormwater Management	80
Scenic Resources	81
Land Use and Zoning.....	83
Land Use Analysis	83

Tax-Exempt Properties	87
Town of Esopus Land Use Regulations	90
Land Pollution and Other Environmental Concerns	96
Public Input on Land Use Matters	99

APPENDICES

Appendix A-1: Natural Areas and Wildlife in your Community – A Habitat Summary Prepared for the Town of Esopus

LIST OF TABLES:

Table 1: Historic and Projection Population	11
Table 2: Population Trend Comparison	11
Table 3: Projected Percent Change in Population by Age Cohort, 2017-2022	13
Table 4: Median Age (2000-2022).....	13
Table 5: Household by Type and Size (2010).....	14
Table 6: Average Household Size.....	15
Table 7: Median Household Income.....	16
Table 8: Town of Esopus Household Income (2016)	17
Table 9: General Housing Characteristics (2012-2016).....	19
Table 10: Housing Units by Units in Structure (2012-2016).....	20
Table 11: Housing Unit by Year Built	21
Table 12: Residential Building Permit Activity (2006-2016).....	22
Table 13: Value of Owner-Occupied Housing Units (2016)	22
Table 14: Gross Rent Paid (2016).....	23
Table 15: Educational Attainment, Population Age 25 and Under	26
Table 16: Where Town of Esopus Residents Work	59
Table 17: Industries in Which Esopus Residents Are Employed	60
Table 18: Climate Projection for the Hudson Valley Region	78
Table 19: Land Use Breakdown.....	85
Table 20: Wholly Exempted Property Values 2018	89

LIST OF FIGURES:

Figure 1: Population by Age Cohort, 2017 12
Figure 2: Town of Esopus Potential Environmental Justice Area 18
Figure 3: Employment by Super-Sector, Ulster County, 2016 57

LIST OF MAPS (Located at the end of the document)

- Community Services Map
- Parks and Recreation Map
- Environmental Resources Map
- Land Use Map
- Existing Zoning Map

Cover Page Photo Credit: Scenic Hudson

REVIEW OF PAST PLANS

The Town of Esopus' prior Comprehensive Plan dates back to 1994. In addition to the 1994 Plan, several additional plans and studies have been conducted aimed at revitalizing hamlets, improving transportation networks, preserving the natural setting, and enhancing economic growth. This 2019 Comprehensive Plan builds upon those previous plans, which include:

- Town of Esopus Master Plan Update-1991
- Town of Esopus Comprehensive Plan-1994
- Town of Esopus Local Waterfront Revitalization Plan (LWRP)-1987 and the 2014 New York State Department of State (NYSDOS) Monitoring Report
- Port Ewen Street Interconnection Plan-2006
- Ulster County Main Streets: A Regional Approach: Port Ewen and Milton Case Studies-2011
- Tidal Rondout Creek Watershed Management Plan-2015
- Town of Esopus Scenic Resources Inventory Study-2016
- Hudson River Estuary Program-Restoration of Watershed Connectivity Study-2017
- John Burroughs-Black Creek Trail Plan-2017

TOWN OF ESOPUS MASTER PLAN UPDATE (1991)

The 1991 *Town of Esopus Master Plan Update* worked off the 1970 Town Comprehensive Development Plan, as well as the 1987 Local Waterfront Revitalization Plan. The document studies the changes in the 20 years which elapsed since the first 1970 plan and sets a course for the future, seeking a better representativeness of the Town at the time, in 1990. The document explains unrealized population growth, declining importance of large scale agriculture and industry, reduced importance of Kingston as a regional commerce center. The Plan was crafted using a questionnaire, which would later be used to complete and adopted, subsequent plan in 1994.

Within the Plan Update, policy recommendations were made, which would later be utilized in the completion of the 1994 Town of Esopus Comprehensive Plan. Additionally, and also later incorporated into the 1994 Plan, future land uses were proposed and densities were discussed as well as future commercial and industrial uses, and open space and recreation needs and locations. Furthermore the plan discusses transportation needs, improvements and connections that should be implemented due to cancellation of the realignment of US Rt. 9W and development patterns at the time. Lastly in regard to recommendations, the Plan discusses Community Facilities and vital infrastructure needs. Facilities examined include both town owned facilities as well other facilities serving the community at large to include fire district properties, library property, and community

schools. The Plan concludes with a concise method of implementation and mainly achieved envisioned goals based on land use regulations through zoning and other methods.

TOWN OF ESOPUS COMPREHENSIVE PLAN (1994)

The 1994 *Town of Esopus Comprehensive Plan* is the Town's Master Plan which shall be replaced with this 2019 Plan. Basing the 1994 Plan off a prior 1970 Plan, the Town developed numerous broad goals which reflected the changes in the Town since the 1970 Plan, and in accordance with the changing demographic and economic realities of the community in the late 1980's/early 1990's.

Like this 2019 Comprehensive Plan, a survey of residents was conducted which achieved about 1,000 responses. Residents were asked numerous questions touching upon land use, community services, and infrastructure. Responses in 2017, for this plan, were very similar to the 1990 survey results for the 1994 Plan. Respondents wanted to maintain the rural quality of Town while concentrating development to the established hamlets and maintain environmental resources. In addition, there was a perceived notion that housing was inadequate and little allowances were made for young families or senior citizens. Additionally, and also similar to 2017, residents favored access to rivers, streams, and lakes for recreation. Also, the majority of residents at that time felt the expansion of water and sewer was desirable, and about half of those residents felt it should be adequate not only to serve existing structures and uses, but also be suitable for future expansion.

Key 1994 Comprehensive Plan Regulatory Goals Include:

- Making substantial zoning revisions that reflect the Plan goals and will correct the laws that have conflicting provisions and are creating unintended issues.
- Setting standards for multi-family housing and creating protections for single family homes.
- Refining the regulations of business/ commercial districts.
- Protection of rural resources by determining appropriate rural uses, clustering development, protecting ridges, wetlands and viewshed areas, and determining sensible limits for timbering and agriculture.
- Revisions to. and clarification of PUD regulations.
- Creation of standards for reviewing communication towers, to include, visualization studies, mitigation measures, and establish locational criteria.
- Elimination of allowances for airports to be sited within the Town through zoning modifications.
- Creation of sign regulations to control height, size, number of signs, and billboards in the Town.
- Revisions to road standards and to parking regulations.

TOWN OF ESOPUS LOCAL WATERFRONT REVITALIZATION PROGRAM (1987)

The Town of Esopus Local Waterfront Revitalization Program (LWRP) was adopted in accordance with the Waterfront Revitalization and Coastal Resources Act of 1981, and the implementation regulation 6 NYCRR 601, in 1987. The LWRP is a plan for the preservation of a 14 mile stretch of coastal waterfront in the Town along the Hudson River and a portion of the Rondout Creek. In this designated area, the plan outlined and described desired changes in land and water use, geology, natural habitats, wetlands, air and water quality, and scenic resources.

The goals outlined in the plan are stated below and signify what was most important to improve upon and protect in order to achieve the goals of the State's LWRP program:

- Restore, revitalize and redevelop deteriorated and underutilized waterfront property, particularly in Connelly and Sleightsburgh.
- Reuse the Callanan Quarry in a manner which protects resources upon cessation of quarrying operations.
- Facilitate the creation of, and siting for, water dependent uses and facilities on or adjacent to coastal waters.
- Strengthen the economic base with small harbor areas where unique maritime activities and businesses will locate, and encourage other forms of associated development.
- Protect natural aquatic resources including fish and wildlife, from human activity and hazardous waste.

PORT EWEN STREET INTERCONNECTION PLAN (2006)

The *Port Ewen Street Interconnection Plan* was prepared to “to examine options for creating an interconnected street network in the southwesterly quadrant of Port Ewen, where local mobility is impacted periodically by regional traffic volumes. Provision of an interconnected street system is seen as an important tool to alleviate this condition.” Major roads taken into account with this Plan were: US Rt. 9W, Salem Street, Mountain View Avenue, Clay Road, and adjacent streets.

The Port Ewen Street Interconnection Plan recommends the following:

- Agencies of the Town, including the Planning Board, and the Sewer and Water District, should encourage private-sector developers to create a connected street network.
- The Town Board, Highway Superintendent, and School District officials should develop and adopt a policy on the construction and maintenance of new sidewalks and pedestrian pathways, especially for existing and proposed roadways that are located within a half mile of any elementary school.
- Redesign of additional streets should be evaluated for connections to school facilities, providing pedestrian and bicycle accommodations with any redesign.

- The Town should support greater transit opportunities and promote the expansion of available transit through Kingston CitiBus (along with Ulster County Area Transit).

In the 2019 Plan update process, traffic and pedestrian concerns were echoed by many residents in public input sessions and via other modes of comment. Therefore, the goals and strategies in this Plan update are in support of the Interconnection Study, with street and sidewalk improvements explored throughout Town, not just in the Port Ewen area.

TOWN OF ESOPUS SCENIC RESOURCES INVENTORY (DRAFT 2016)

The scenic resources in the Town of Esopus are part of a distinct cultural heritage that is nationally significant. To help understand and plan for the protection and enhancement of the Town's various scenic resources, Land Use and Environmental Planning students at Cornell University prepared this document. The analysis identified 57 properties considered important to protecting the local and regional scenic resources. Scenic resources may be defined as landscapes and physical spaces recognized for their distinctive and/or visually striking qualities. The benefits of scenic resources include: higher property values, increased tourist revenues, and a sense of pride for the beauty that is part of a community. The inventory listed plans and protections that fortify the need to keep these scenic resources, and the tools by which to do so.

The Scenic Resources Inventory noted specific tools for conservation of aesthetically pleasing locations which included the following:

- Create growth centers in hamlet areas and development regulations related to those. Growth Centers are located in areas where development has historically been established and sufficient infrastructure exists.
- Encourage the utilization of Cluster Development patterns, especially in rural or scenic areas.
- Codify scenic overlay districts to achieve preservation of viewsheds.
- Establish a Town conservation easement program, as well as a purchase or transfer of development rights program, allowing scenic areas to be preserved, but not at a loss for the property owner.

ULSTER COUNTY MAIN STREETS: A REGIONAL APPROACH: PORT EWEN AND MILTON CASE STUDIES (2011)

The Port Ewen and Milton Case Studies, prepared by the Ulster County Planning Department, is a report that includes two county case studies for the hamlets of Milton (Town of Marlborough) and Port Ewen, and presents a comprehensive approach to promoting main street revitalization.

Recommendations included in the Port Ewen and Milton Case Study include:

- Working collaboratively with landowners of key sites on redevelopment plans.

- Developing reuse plans for underutilized parcels and buildings that encourages density and connects them to the street.
- Maintain a “main street first” database that includes market supported data for needed businesses on main street.
- Utilize planning and zoning to encourage redevelopment, improve main street appearance, and provide a critical mass of appropriate uses.
- Create design guidelines for the main street area that include building to the street, landscaping and architectural details, and signage.
- Amend the zoning statute to encourage increased density, including second floor residential, and provide for shared parking and on-street parking.
- Provide for fast-track approvals for vacant building or redevelopment sites including pre-approvals for various uses.

Additional minor recommendations touched on parking, detailed streetscape improvements, connection to waterfronts, and promotion of the hamlets as destinations. The plan encouraged each town to work with the same methodology to create a thriving yet separate set of destinations, all within the same county on the busy US Rt. 9W corridor. This is in line with many residents’ comments on revitalizing Port Ewen and other hamlets with a focus on establishing a vibrant community.. This study also describes results of a design workshop and subsequent improvement designs provided as a result of this planning process.

TIDAL RONDOUT CREEK WATERSHED MANAGEMENT PLAN (2015)

The Tidal Rondout Creek Watershed Management Plan describes management practices and outlines goals and strategies for the management of the tidal Rondout Creek. The 11-square-mile watershed of the tidal section of Rondout Creek consists of portions of the city of Kingston, as well as the Towns of Ulster and Esopus. Land use actions within these three communities may directly affect water quality in the watershed.

Major recommendations described in the Watershed Plan, which are applicable to Esopus and in line with this 2019 Comprehensive Plan include:

- Restore tributary streams and sub-watersheds to improve water quality through improved stormwater management techniques and better drainage.
- Create a vibrant waterfront by improving water quality and encouraging appropriate water related or commercial development.

This Plan mainly deals with drainage and run off, and the infrastructure related to water quality assurance. The Plan also touches on development and growth and encourages the realistic use of waterfront areas. Both the environment and waterfront developability are important to Esopus residents and elements of ensuring proper and environmentally protective infrastructure have been included in this current Comprehensive Plan.

HUDSON RIVER ESTUARY PROGRAM RESTORATION OF WATERSHED CONNECTIVITY STUDY (2017)

In the summer of 2017, the Town of Esopus, with assistance from Tighe & Bond Engineers and Environmental Specialists, conducted the Town of Esopus Road and Stream Crossing Inventory Assessment. This assessment was funded by the New England Interstate Water Pollution Control Commission (NEIWPC), in cooperation with the New York State Department of Environmental Conservation's (DEC) Hudson River Estuary Program. The purpose of the inventory was to assess aquatic passability of stream-based organisms at road-stream crossings town-wide.

A total of 115 crossings were assessed, totaling about 5,082 linear feet of culverts throughout Esopus. Rated on 75 different criterion, Tighe & Bond provided a detailed reporting catalog to the Town. Included in each assessment was the overall condition and aquatic passability score which would and will play a role in subsequent Hudson River Estuary grant funding opportunities. Additionally, the North Atlantic Aquatic Connectivity Collaborative (NAACC) outlines eight metrics which identify crossings likely to be a barrier to aquatic organisms. Aquatic passability scoring is described in six categories: No Barrier, Insignificant Barrier, Minor Barrier, Moderate Barrier, Significant Barrier, and Severe Barrier. Based on these criterion, 25 of the 115 road-stream crossings assessed, or about 22%, were found to be in poor condition within the Town of Esopus.

The award of the Hudson River Estuary grant funding is typically the first of four similar funding opportunities aimed at the ultimate replacement of culverts which improve aquatic passability for stream based organisms. Within the initial report, Tighe & Bond recommended three next steps, in sequential order to reach the goal of ultimate elimination of constrictions for aquatic organism passability in culverts. The next step involves developing a municipal management plan to prioritize and mitigate documented road-stream crossings that are barriers to aquatic wildlife. As outlined in the report, subsequent Project Type 3 would involve the production of engineering plans for mitigation of problem road-stream crossings. Project Type 4, the final step in the removal of barriers, involves the request for construction funding necessary to replace culverts.

The initial 2017 inventory process identified two stream crossings as potential priority culverts for project Type 2. One culvert is located on Floyd Ackert Road, within close proximity to the Hudson River. This particular culvert has a rating of no Aquatic Organism Passability (AOP) and an NAACC aquatic rating of 0.00. Due to physical deterioration, the replacement of this culvert may be very beneficial across many levels. The other potential priority culvert indicated in the report is on Poppletown Road, just north of Old Post Road. Similar to the Floyd Ackert Road crossing, this culvert has no AOP and an NAACC score of 0.56. Replacement of this culvert would connect the over half mile of stream and wetland area that exists between Hardenburgh and Poppletown Roads. In addition to receiving a poor passability assessment, the round metal culvert at this location has completely deteriorated and is in need of replacement. Tighe & Bond identified five additional potential priority culverts which should be examined, these include two culverts at Carney Road, and culverts under New Salem Road, Loughran Lane, and Swartekill Road.

As a result of this study and documented need, the Town was awarded an additional \$101,800 to move to Project Type 2 and prepare the *Ulster County: Town of Esopus Road-Stream Crossing Municipal Management Plan*, encompassing the tributaries of the Swartekill-Wallkill Rivers, Black Creek, Twaalfskill Brook, and Rondout Creek tributaries including all culverts under town and county jurisdiction. In addition to preparing the

municipal management plan, the engineers will prepare three conceptual culvert management designs and a 100 percent shovel-ready engineering design.

JOHN BURROUGHS-BLACK CREEK TRAIL PLAN (2017)

The John Burroughs Black Creek Trail Plan studies and lays out an 11-mile multi-modal trail project which connects the 1,400 acres of existing conserved land along the Black Creek corridor. This effort was led by Scenic Hudson and John Burroughs Association and supported by a steering committee made up of representatives of the Towns of Esopus and Lloyd, regional non-profits, state agencies, and local businesses.

The low level of development in the corridor allows for a nearly continuous forest from Illinois Mountain in the Town of Lloyd to the Hudson River in the Town of Esopus. The corridor offers a wide variety of topography and habitat within a relatively urbanized region. These features not only create the beautiful landscape that inspired one of America's great nature writers, but it also supports a wide variety of plant and animal life. This landscape is projected to retain diversity as it adapts to climate change. The John Burroughs Black Creek Trail seeks to interconnect this landscape, improving accessibility while highlighting the life and legacy of John Burroughs. As this trail is developed, it is important to strike a balance between: 1) creating a regional recreation destination, 2) protecting the sensitive local ecology, and 3) promoting economic development within the Towns of Esopus and Lloyd

Key elements of the plan include determining access and connection points for the expansion of hiking, biking, and canoe and kayaking opportunities. Other major elements include a cohesive wayfinding and branding for the trail, setting it a recognizable multi-town destination. The revitalization of properties along the way is identified as connections can easily be made to these sites off the trail, this effort would work to support economic growth, putting property at its highest and best use and back on tax rolls. Some identified redevelopment proposals include the Saint Cabrini Home, Christian Brothers Monastery, Colonel Payne Estate, and Aberdeen. The plan describes these as key re-development sites, and that they would be instrumental in the creation of a boutique hotel cluster. The Plan is concluded by an aggressive implementation timeline for development of the trail which describes major milestones and possible funding sources.

CITY OF KINGSTON DOWNTOWN REVITALIZATION INITIATIVE (2017)

The Downtown Revitalization Initiative (DRI) application for the City of Kingston, Stockade Business District (SBD) proposed to help the struggling City and by proximity the Town of Esopus. With this project the Town would be able to capitalize and leverage more development, to draw additional economic spin off visitors or businesses. The winning DRI application integrates local and regional entrepreneurs to create businesses and jobs all in line with the Regional Economic Development Council (REDC). A key component of this application is that the SBD would be a regional expansion of tourism through marketing and rich cultural heritage, something that certainly would affect the Town of Esopus, right across the Rondout Creek.

Relationship to New York State Regional Economic and Sustainability Plans

MID- HUDSON REGIONAL ECONOMIC DEVELOPMENT COUNCIL STRATEGIC PLAN

The mid- Hudson Regional Economic Development Council Strategic Plan identified many regional goals and objectives for all communities in the mid-Hudson Valley region to collectively strive for. The councils serve as the central hub for identifying, outlining and supporting community priorities and seeking grant funding through the State’s Consolidated Funding Application (CFA) process. The Mid-Hudson objectives and goals have been tailored specifically for this region of the State and reflect the areas strengths and opportunities in support of key projects which are perceived to make a regional impact. Priorities in this region are related to job growth, revitalization, and growth of business all in order to compete and retain residents from relocating to larger urban areas to the north, such as the Albany area, or the south, the New York metropolitan area.

The major goals for the region are:

- Job creating in industry clusters such as biotech, high-tech manufacturing, and information technology.
- To initiate retention and stimulation of mature industries such as distribution, financial and professional services, food and beverage; and health care.
- To leverage the region’s outstanding natural resources, tourism industry and agriculture as a methodology to protect agriculture and the environment as these are important to tourism and quality of life attributes.
- To foster housing investment to attract and create jobs.
- Improvement to key infrastructure to make the region more business-ready.

All of these goals will make the region more attractive for recent graduates and young professional to stay in the region. This in turn will create opportunities for entrepreneurship and small business to help promote investment and create job opportunities. Linking the Town of Esopus 2019 Comprehensive Plan to these goals will increase the Town’s opportunity to access State funding assistance.

MID-HUDSON REGIONAL SUSTAINABILITY PLAN (2013)

The Mid-Hudson Regional Sustainability Plan was developed to address and improve sustainability across a seven county area in southern New York. The plan was developed as part of the New York State Energy Research and Development Authority’s (NYSERDA) Cleaner, Greener Communities program. The Plan reflects and builds on the region’s unique social, cultural, and natural history, with the goals of promoting economic development, environmental sustainability, and enhancing the quality of life for the region’s residents.

The Plan examines and makes recommendations related to transportation, waste management, climate change adaptation, land uses, water management, energy, and agriculture. Major goals are enumerated in the plan and are supported by outlining targets which should be met to reach goals. Some major goals include, but are not limited to:

- Reduction of fuel consumption and vehicle emissions.
- Reduction in volumes of solid waste created.
- Improvement and resiliency of major infrastructure.
- Creating “Complete Communities” inclusive of transit opportunities.
- Increasing water supply by overall reduction in consumption.
- Encouraging watershed management policies and practices.
- Lessening dependence on fossil fuels.
- An overall increase in agriculture and silviculture throughout the region.

COMMUNITY PROFILE

The following Community Profile of the Town of Esopus provides an overview of the Town's existing conditions including land use, zoning, transportation and infrastructure; environmental resources, recreation and open space; socio-demographics and the state of local economic conditions. In an effort to understand the existing conditions of the Town and help identify opportunities for revitalization, the following Community Profile was prepared. All maps referenced in this profile are found at the end of this Section.

Demographic and Growth Trends Analysis

The following section provides an overview of demographic trends in the Town of Esopus and surrounding areas. The comparisons that will be referenced are from Kingston, Town of Lloyd and Ulster County, mainly from the 2000 and 2010 US Decennial Census, and the most recent 2012-2016 American Community Survey (ACS) 5-year estimates are used to show trends over time. It is important to note that ACS results are estimates from samples of the population and therefore have a higher margin of error than the US Decennial Census. While the margin of error should be kept in mind, the ACS provides the most current and accurate statistics at this time. Additional estimates are provided by ESRI Business Analyst, a leading national provider of demographic and market data.

Population Trends

Since 1950, the Town of Esopus has experienced variable rates of growth in population, with the most dramatic increase occurring between 1950 and 1960, when the town's population grew by nearly 40%. This drastic increase was echoed county-wide, albeit at a lower rate of growth (about 30%) during the same period. Area growth at this time was stimulated in part by the opening of the IBM Kingston plant in 1956. Refer to **Table 1: Historic and Projected Population Growth** and **Table 2: Population Trend Comparison**.

Between 1970 and 2010, Esopus added more than 2,000 residents, a cumulative increase of 29.6%, a positive indication of the Town's desirability and good quality of life. When comparing adjacent communities, the rate of population growth in Esopus was less than that of the Town of Lloyd, with a growth rate of 54.5%, but on par with Ulster County as a whole at a 28.2% rate of growth. In contrast, the City of Kingston saw a population decline of over 6% during the same time period.

The Town Esopus experienced its first measured population decline between 2000 and 2010 at 3.1%. County-wide, population growth was concentrated in the southeastern section of Ulster County, with substantial increases occurring in the developing Towns of Shawangunk, Marlborough, Plattekill, and Gardiner.

By 2022, the Town’s population is projected to increase by 2.1%, whereas the projected county-wide population is only estimated to increase by 1.1%. This projection is currently supported by ESRI data which estimates a 3.8% population increase since 2010.

Table 1: Historic and Projection Population				
	Town of Esopus		Ulster County	
	Number	% Change	Number	% Change
1950	4,738		92,621	
1960	6,597	39.2%	118,804	28.3%
1970	6,974	5.7%	142,334	19.8%
1980	7,605	9.0%	158,158	11.1%
1990	8,860	16.5%	165,304	4.5%
2000	9,331	5.3%	177,749	7.5%
2010	9,041	-3.1%	182,493	2.7%
2017 estimates	9,388	3.8%	185,613	1.7%
2022 projections	9,589	2.1%	187,704	1.1%

Source: U.S. Census Bureau and ESRI (estimates and projections).

Table 2: Population Trend Comparison				
	Town of Esopus	Town of Lloyd	City of Kingston	Ulster County
1970	6,974	7,032	25,544	142,334
1980	7,605	7,875	24,481	158,158
1990	8,860	9,231	23,095	165,304
2000	9,331	9,941	23,456	177,749
2010	9,041	10,863	23,900	182,493
2017 estimates	9,388	11,126	24,224	185,613
% Change, 1970-2010	29.6%	54.5%	-6.4%	28.2%
% Change, 2010-2017	3.8%	2.4%	1.4%	1.7%

Source: U.S. Census Bureau and ESRI (2017 estimates).

Age Distribution

It is often useful to look at the distribution of population by age category to assess community needs. As illustrated in **Figure 1: Population by Age Cohort (2017)**, children under age 18 account for 19.5% of Town residents, or 1,831 people, compared with 18.2% of County residents. Adults between the ages of 25 and 44 represent 22.5% of the population.

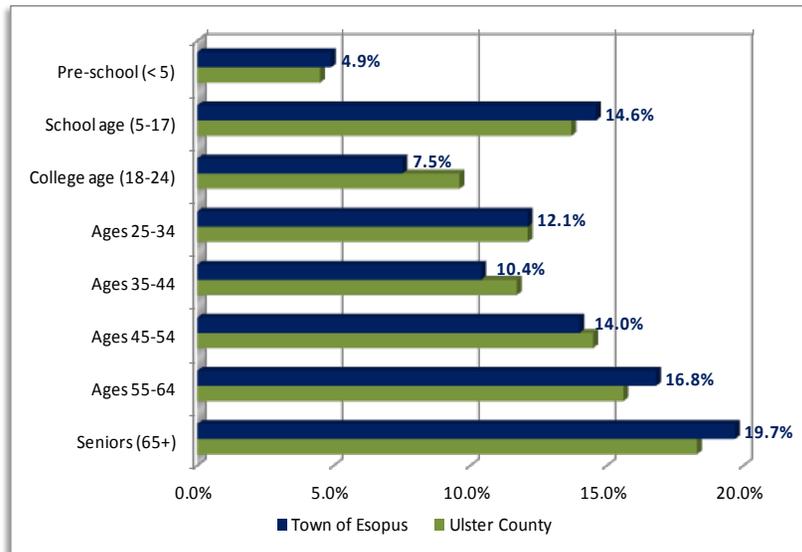


Figure 1: Population by Age Cohort (2017)

Approximately 14.0% of Esopus residents are between the ages of 45 and 54, 16.8% are 55-64, with 19.7% age 65 and over. The Town of Esopus has a higher percentage of residents between the ages of 5 and 17 (14.6%) than Ulster County overall (13.7%). It also has a higher percentage of residents at the other end of the age spectrum, individuals between the ages of 55 and 64 and ages 65 and over.

Based on projections provided by ESRI, the Town’s 65-and-over age cohort will continue to grow, reaching 15.1% of the population by 2022 a 2.5% increase from 2017 figures. The aging population mirrors national trends and is not unique to Esopus. The school-age population in the Town is expected to remain stable over the next few years, in spite of the slight decline projected for the County.

While the 65+ population is estimated to grow, residents between the ages 45 and 64 (currently making up 30% of the Town’s population base) are expected to decrease by approximately 18% as illustrated in **Table 3: Projected Percent Change in Population by Age Cohort, 2017-2022**. This decline mirrors anticipated Ulster County and national trends, reflecting a natural shift in population cohorts and is not necessarily related to economic conditions in the Town or region. Persons in the 45 to 54 age cohort are generally considered to be in their prime income-earning years and have significant purchasing power, a major benefit to their community.

Table 3: Projected Percent Change in Population by Age Cohort, 2017-2022			
Age Cohorts	Town of Esopus		Ulster County
Pre-school (< 5)		2.2%	-1.1%
School age (5-17)		0.7%	-1.8%
College age (18-24)		-7.7%	-9.4%
Ages 25-34		8.0%	3.6%
Ages 35-44		11.1%	4.6%
Ages 45-54		-13.9%	-11.4%
Ages 55-64		-3.9%	-0.8%
Seniors (65+)		15.1%	17.2%
Total		2.1%	1.1%

Source: ESRI Business Analyst.

As illustrated in **Table 4: Median Age (2000-2022)**, the median age in the Town of Esopus is estimated at 45.3, compared with 41.7 in the Town of Lloyd, 40.3 in the City of Kingston, and 43.6 in Ulster County. The Town of Esopus has a higher median age than any of the surrounding communities, exceeding the statewide median age of 38.9. While the median age for Esopus is projected to decrease by 1.1% to 44.8, it will remain above comparable communities.

Table 4: Median Age (2000-2022)				
	Town of Esopus	Town of Lloyd	City of Kingston	Ulster County
2000	39.0	38.0	38.0	38.2
2010	43.4	40.7	39.2	42.0
2017 estimates	45.3	41.7	40.3	43.6
2022 projections	44.8	42.1	41.0	44.2
% Change, 2000-10	11.3%	7.1%	3.2%	9.9%
% Change, 2010-17	4.4%	2.5%	2.8%	3.8%
% Change, 2017-22	-1.1%	1.0%	1.7%	1.4%

Source: U.S. Census (2000 and 2010); ESRI (estimates and projections).

Housing Composition

The Census Bureau defines a household as all persons who occupy a housing unit. The occupants may be a single family, one person living alone, two or more persons living together, or any other group of individuals who share living arrangements outside of an institutional setting. As shown in **Table 5: Household by Type and Size (2010)**, there were 3,492 households in the Town of Esopus in 2010, a 1.5% increase from 2000. Of these households, 37.6% were comprised of two people, 27.2% of one individual living alone, and 17.1% of three people, with the remaining comprising over 3 persons (18.1%). Overall, the household composition of the Town of Esopus is fairly consistent with the comparable communities.

Notably, 28.0% of Esopus households, compared to 32.6% of households in the Town of Lloyd, had children under age 18 living at home, further demonstrating an older population. Both towns, however, have higher percentages of family households than either the City of Kingston or Ulster County.

Table 5: Household by Type and Size (2010)					
	Town of Esopus		Town of Lloyd	City of Kingston	Ulster County
	Number	Percent			
Total Households	3,492	100.00%	4,112	10,219	71,049
Households with 2 or More People	2,543	72.80%	73.80%	62.60%	71.00%
Family Households	2,261	64.70%	65.80%	53.30%	62.50%
Husband-Wife Families	1,712	49.00%	48.70%	31.70%	46.00%
Other Family, No Spouse	549	15.70%	17.10%	21.60%	16.50%
Non-Family Households	282	8.10%	8.00%	9.30%	8.50%
All Households with Children	978	28.00%	32.60%	27.70%	29.20%
1-Person Households	949	27.20%	26.20%	37.40%	29.00%
2-Person Households	1,313	37.60%	33.50%	30.50%	34.40%
3-Person Households	597	17.10%	16.50%	13.70%	16.10%
4-Person Households	391	11.20%	14.80%	10.30%	12.50%
5- or More Person Households	241	6.90%	9.00%	8.10%	7.90%

Source: U.S. Census Bureau, 2010. Estimates for 2017 are not available.

Nationally, average household sizes have decreased over the last few decades due to an increase in single-parent households, smaller family sizes, and more people living alone. More recently, however, the decline has started to level off. The average household size in the Town of Esopus is estimated at 2.38 persons, a decrease from 2.45 as reported in the 2000 Census, as shown in **Table 6: Average Household Size**. In comparison, the average household size is 2.53 in Lloyd, 2.3 in Kingston and 2.8 for Ulster County. Future projections of average household size in Esopus hint at a continued slight uptick, another 0.40% by 2022.

Table 6: Average Household Size				
	Town of Esopus	Town of Lloyd	City of Kingston	Ulster County
2000	2.45	2.54	2.29	2.47
2010	2.37	2.52	2.27	2.4
2017 estimates	2.38	2.53	2.29	2.42
2022 projections	2.39	2.53	2.3	2.43
<i>% Change, 2000-2010</i>	<i>-3.30%</i>	<i>-0.80%</i>	<i>-0.90%</i>	<i>-2.80%</i>
<i>% Change, 2010-2017</i>	<i>0.40%</i>	<i>0.40%</i>	<i>0.90%</i>	<i>0.80%</i>
<i>% Change, 2017-2022</i>	<i>0.40%</i>	<i>0.00%</i>	<i>0.40%</i>	<i>0.40%</i>

Source: U.S. Census (2000 and 2010); ESRI (estimates and projections).

Race and Ethnicity

The majority of Esopus residents identify as white (87.0%); followed by 5.7% identifying as black, 1.8% identifying as Asian, and 3.3% identifying as multi-racial. Individuals of Hispanic origin, who may be of any race, account for 6.8% of Town’s population.

Income

Household income is an important indicator of personal wealth and purchasing power. Income levels impact the ability of residents to pay for housing, contribute to the tax base, and support the local economy.

According to the 2000 Census, the median household income was \$46,915 in the Town of Esopus and \$52,686 in the Town of Lloyd. These figures were above median income levels in both Ulster County (\$42,551) and New York State (\$43,393). The projected median income data was provided by ESRI and indicates that the Town of Esopus and comparison communities are expected to see their median incomes increase.

Based on the 2012-2016 ACS, there is a Town-wide poverty rate of 10.6% for individuals. Of the two census tracts within the Town of Esopus, poverty rates differ greatly, and range from 4.23%, in the northeastern corner of the Town (which include the Hamlets of Port Ewen, Sleightsburgh,

and Connelly) and up to 11.34% for the remainder of the Town, encompassing the Hamlets of Esopus, Rifton, St. Remy, Ulster Park, and West Park. Ulster County’s poverty rate is listed as 13% (2012-2016 ACS), while the State of New York poverty rate is now approaching 16%, based on the same data source.

It is important to note however, that there is a census tract in the southern portion of the Town wherein, approximately 25.56% of residents live below the federal poverty rate. Based on the poverty rate and numerous other criteria, this region is considered a Potential Environmental Justice Area and is discussed in more detail below under Potential Environmental Justice Area.

According to estimates produced by ESRI, the median income of households in the Town of Esopus has continued to increase, currently at \$69,238 (2017), again exceeding the county and state medians of \$61,302 and \$60,832, respectively and closing the gap with the Town of Lloyd (**Table 7: Median Household Income**).

Table 7: Median Household Income				
	Town of Esopus	Town of Lloyd	City of Kingston	Ulster County
2000	\$46,915	\$52,686	\$31,594	\$42,551
2012	\$66,595	\$61,801	\$43,680	\$58,590
2017 estimates	\$69,283	\$71,888	\$46,923	\$61,302
% Change, 2000-2017	47.7%	36.4%	48.5%	44.1%

Source: U.S. Census Bureau and ESRI (2017 estimates).

An estimated 29.3% of Town of Esopus households earn at least \$100,000 per year while 35.4% of all households in Esopus have an annual income of under \$50,000 or less (**Table 8: Town of Esopus Household Income (2016)**). Overall, the Town has a healthy distribution of income levels spread throughout its existing households, with the majority well over \$50,000.

Table 8: Town of Esopus Household Income (2016)		
	Number of households	Percentage
Less than \$10,000	170	5.3%
\$10,000-\$14,999	56	1.7%
\$15,000-\$24,999	217	6.7%
\$25,000-\$34,999	234	7.3%
\$35,000-\$49,999	465	14.4%
\$50,000-\$74,000	634	19.7%
\$75,000-\$99,999	502	15.6%
\$100,000-\$149,999	517	16.0%
\$150,000-\$199,999	323	10.0%
\$200,000 or more	108	3.3%

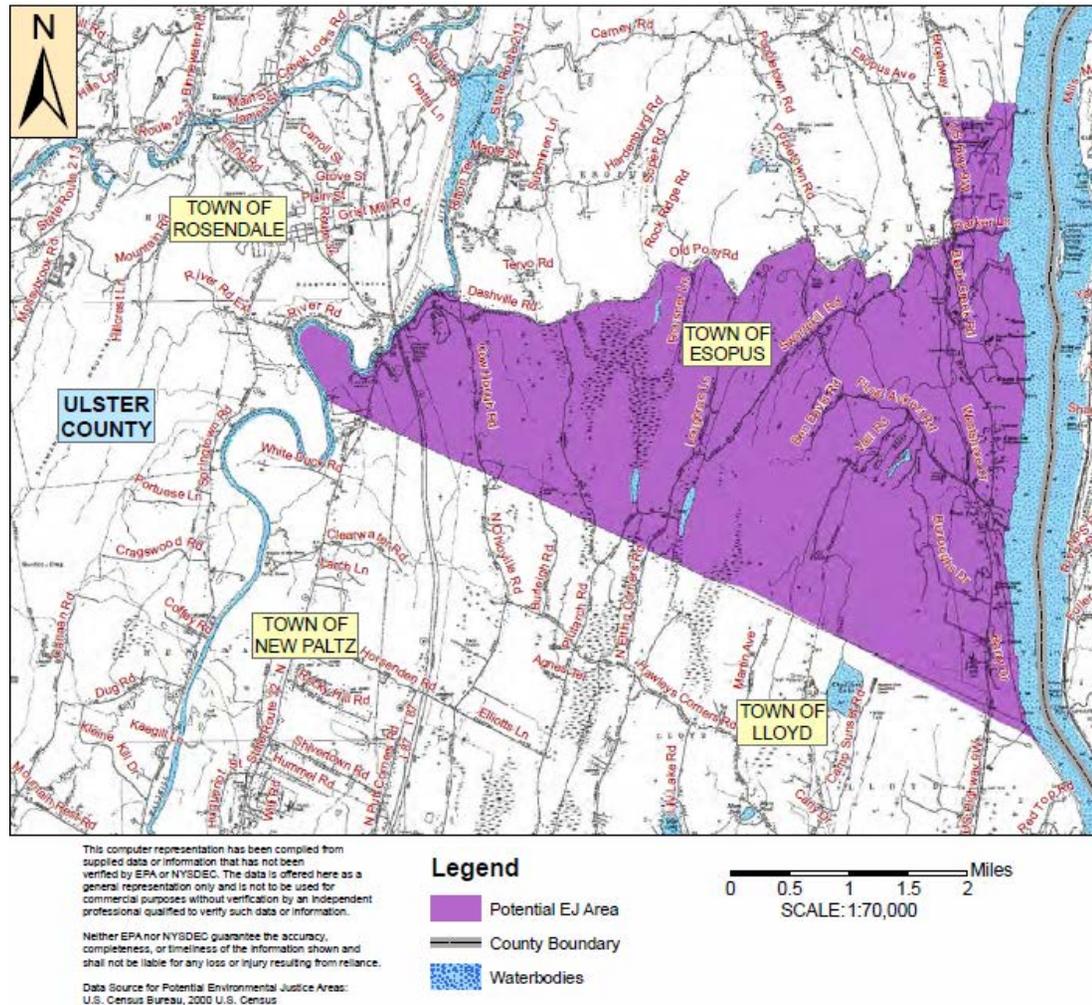
Source: 2012-2016 ACS.

Potential Environmental Justice Area

Despite the Town of Esopus’ high quality of life and its sizable population earning middle and upper incomes, a portion of the Town has been identified as a Potential Environmental Justice Area by the NYSDEC Office of Environmental Justice. **Refer to Figure 2: Town of Esopus Potential Environmental Justice Area**, for the subject area. Environmental Justice Areas in New York State take into account local income levels, minority and vulnerable populations, environmental hazards and pollution, and/or illicit discharges into nearby waterbodies, all factors which affect the quality of life for residents within a community or area of a community.

Within this identified area in the Town of Esopus, approximately 25.56% of residents live below the federal poverty rate. The designated area is a rural census block group with a relatively low population. While there is no large minority population, there is a relatively high level of low-income households and vulnerable populations (children). Additionally, there are specific environmental indicators such as resident’s proximity to traffic, areas of hazardous waste, and fairly high wastewater discharge levels that are of concern to the State of New York. Looking ahead, the Town will need to ensure the population of this area is taken into consideration during all future project proposals, and address all issues that are contributing to this status, this will be achieved working in close partnership with NYSDEC Division of Environmental Justice.

Figure 2: Town of Esopus Potential Environmental Justice Area



Source: NYSDEC Office of Environmental Justice

Housing and Marketing Trends

As illustrated in **Table 9: General Housing Characteristics (2012-2016)** below, according to the 2012-2016 American Community Survey (ACS) 5-Year Estimates, the Town of Esopus has a total of 3,625 housing units. Of these, 65.3% are non-seasonal owner-occupied homes and 23.7% are renter-occupied. Approximately 400 housing units in Esopus are categorized as vacant; however, more than half of these are classified as seasonal units, occupied by part-time residents who may have another home elsewhere. Ulster County has over 7,000 seasonal housing units, owned by individuals drawn to the area’s natural beauty, recreational resources, and quality of life.

Table 9: General Housing Characteristics (2012-2016)						
	Town of Esopus		Town of Lloyd		Ulster County	
	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	3,625	100.0%	4,593	100.0%	83,762	100.0%
Occupied Units	3,226	89.0%	4,074	88.7%	69,335	82.8%
Owner-Occupied Units	2,366	65.3%	2,912	63.4%	48,343	57.7%
Renter-Occupied Units	860	23.7%	1,162	25.3%	20,992	25.1%
Vacant Units	399	11.0%	519	11.3%	14,427	17.2%
Seasonal/Recreational Use	217	54.4%	52	10.0%	7,021	48.7%
Homeowner Vacancy Rate		2.0%		2.3%		2.1%
Renter Vacancy Rate		5.4%		13.7%		6.4%

Source: U.S. Census Bureau, American Community Survey 2012-16 Five-Year Estimates.

Per the ACS 2012-2016, there is an owner occupancy vacancy rate of 2.0% in Esopus, which is slightly higher than the national rate. The national homeowner vacancy rate is 1.8%, down from 2010 Decennial Census’ measure of 2.4%, demonstrating a continued tightening of the housing market. Prices are expected to continue to rise thereby possibly increasing the need for more affordable housing options.

Based on 2012-2016 census data, the rental vacancy rate in Esopus was estimated at 5.4% which is lower than the national rental vacancy rate of 6.2%. Due to the methodology used by the US Census Bureau to calculate vacancy rates, the census vacancy rates may be slightly higher than actual vacancy rates. Specifically, the Census Bureau includes vacant units that may not be currently available for rent. They may not be available for rent for a variety of reasons including the fact that they might be model units, manager units, units in the process of being made available for occupancy, units used for storage, units being renovated or any unit that cannot be rented in its current condition. As a result, it is important to recognize that the Town of Esopus rental vacancy rate may be lower than 5.4% and therefore, a tighter rental market which may increase housing costs and limit affordable choices.

As shown in **Table 10: Housing Units by Units in Structure (2012-2016)**, the majority of housing units in Esopus (73.8%) are single-family structures, while 20.6% are in multi-family structures. Most of the multi-family structures include two to four units per structure. Compared to the Town of Lloyd, the Town of Esopus has relatively few large apartment complexes: 9.3% of all renter-occupied units in Esopus, versus 28.4% of those in Lloyd, are located in buildings with ten or more units. Further verifying the rental shortages, the 2017 Ulster County Housing Survey of listed Apartments indicated that there were no three bedroom apartments listed for rent in Esopus at the time of that survey¹.

Based on this information the Town of Esopus may have a shortage of housing options, particularly for renters, recent graduates, young families, and senior citizens. This trend is extended to new construction as well. With the typically high cost for new construction, there may be a higher demand for lower cost housing to accommodate the aforementioned categories of individuals, which will most likely be met by older units². These older units very often may be in need for repair or be sold and rented in substandard conditions.

	Total of Esopus		Owner-Occupied Units		Renter-Occupied Units	
	Number	Percent	Number	Percent	Number	Percent
1 unit	2,676	73.80%	2,147	90.70%	270	31.40%
2 units	236	6.50%	27	1.10%	164	19.10%
3 or 4 units	235	6.50%	21	0.90%	180	20.90%
5 to 9 units	103	2.80%	19	0.80%	83	9.70%
10 or more units	171	4.70%	31	1.30%	80	9.30%
Mobile home	204	5.60%	121	5.10%	83	9.70%
Total Housing Units	3,625	100.00%	2,366	100.00%	860	100.00%

Source: U.S. Census Bureau, American Community Survey 2012-16 Five-Year Estimates.

¹ 2017 Ulster County Rental Housing Survey

² Joint Center for Housing Studies of Harvard University

According to the ACS, over 43% of the Town’s housing units were constructed prior to 1979, including 23.6% before 1940 and big construction booms in the 1960’s (17%) and 1980’s (17.7%) correlating to time periods with high population increases. The age of the housing units are consistent with adjacent communities and Ulster County as a whole. In contrast to both the County and Town of Esopus, the Town of Lloyd experienced a significant amount of residential construction (20.1%) after 2000, outpacing both the County at 10.7% and the Town of Esopus at 6.7%. Refer to **Table 11: Housing Unit by Year Built**.

Table 11: Housing Unit by Year Built						
	Town of Esopus		Town of Lloyd		Ulster County	
	Number	Percent	Number	Percent	Number	Percent
Built 2010 or later	-	0.00%	230	5.00%	1,297	1.50%
Built 2000 to 2009	243	6.70%	694	15.10%	7,708	9.20%
Built 1990 to 1999	314	8.70%	475	10.30%	7,042	8.40%
Built 1980 to 1989	641	17.70%	509	11.10%	9,694	11.60%
Built 1970 to 1979	403	11.10%	517	11.30%	9,917	11.80%
Built 1960 to 1969	616	17.00%	352	7.70%	9,709	11.60%
Built 1950 to 1959	382	10.50%	496	10.80%	11,308	13.50%
Built 1940 to 1949	172	4.70%	202	4.40%	4,657	5.60%

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

2012-2016 ACS figures indicate that no new residential units were constructed since 2009 in Esopus. However, based on data provided by the Town of Esopus Building Department, the Town issued building permits for a total of 38 new housing units between 2013 and 2017. Even with 38 new units constructed since 2013, the Town’s pace for new residential units has continued to decrease.

Based expanded data (see **Table 12: Residential Building Permit Data Activity (2012-2016)**), between 2006 and 2016, permits were issued for 101 single-family structures and 87 units in multi-family structures in the Town of Esopus This includes The Birches at Esopus, an 80-unit affordable senior housing community on Dick William Lane in Port Ewen that opened in 2009. This 80-unit community is for seniors earning no more than 50 to 60% of the area median income. There were more permits issued for residential construction in the Town of Lloyd, but the majority of the development activity in Ulster County were in the towns of Marlborough, Plattekill, and Rochester.

Table 12: Residential Building Permit Activity (2006-2016)			
	Units in Single-Family Structures	Units in Multi-Family Structures	Total
Town of Esopus	101	87	188
Town of Lloyd	152	87	239
Town of New Paltz*	102	0	102
Town of Rosendale	72	0	72
Ulster County total	2,398	1,370	3,768

Source: HUD User, SOCDs Database. *Does not include the Village of New Paltz.

According to **Table 13: Value of Owner-Occupied Housing Units (2016)**, the median owner-occupied home value in Esopus is \$211,000 (as of 2016) compared to \$219,800 in Ulster County. Housing values are considerably higher in Lloyd: only 15.8% of homes in Esopus versus 29.1% of those in Lloyd have a value of more than \$300,000.

Table 13: Value of Owner-Occupied Housing Units (2016)						
	Town of Esopus		Town of Lloyd		Ulster County	
	Number	Percent	Number	Percent	Number	Percent
Less than \$50,000	138	5.8%	127	4.4%	2,340	4.8%
\$50,000 - \$99,000	77	3.3%	66	2.3%	2,583	5.3%
\$100,000 - \$149,999	229	9.7%	251	8.6%	5,670	11.7%
\$150,000 - \$199,999	606	25.6%	535	18.4%	10,280	21.3%
\$200,000 - \$299,999	942	39.8%	1,083	37.2%	15,240	31.5%
\$300,000 - \$499,999	325	13.7%	738	25.3%	8,794	18.2%
\$500,000 or more	49	2.1%	112	3.8%	3,436	7.1%
Total Owner-Occupied Units	2,366	100.0%	2,912	100.0%	48,343	100.0%
Median housing value	\$211,000		\$235,500		\$219,800	

Source: U.S. Census Bureau, American Community Survey 2012-16 Five-Year Estimates.

Approximately 58% of homeowners in the Town of Esopus have a mortgage, with their median monthly housing cost at \$1,796, considerably less than homeowners in the Town of Lloyd with a mortgage (\$2,072). 24.1 % of homeowners in Esopus can be characterized as cost-burdened – paying at least 30% of their total household income towards housing costs, according to ACS estimates.

As shown in **Table 14: Gross Rent Paid (2016)**, the median gross rent paid in the Town of Esopus is \$100 more than in Ulster County as a whole, but on par with the median in the Town of Lloyd, as of 2016. The Census Bureau defines the gross rent as the contract rent plus the estimated average monthly cost of utilities and fuel, if these items are paid for by the renter.

According to available figures, renting in Esopus is costly to the point that 58.7% of renters are cost-burdened (paying a minimum of 30% of their household income for housing). According to the 2017 Ulster County Rental Housing Survey, more than half of Ulster County’s renters pay 30% or more of their income toward rent – 7th highest in the state. In addition, 29.8% of all Ulster County households are severely cost-burdened (spending more than half of their income on rent), also placing the county 7th highest in the state for severely cost burdened renters³.

The degree of cost-burdened renters in Esopus could be caused by increased rental cost and an estimated decrease in median income: \$34,176 (2007-2011) to \$31,597 (2012-2016). Based on the percentage of renters that are paying more than 30% of their income on gross rent, there is an assumed housing affordability issue in the Town of Esopus.

Table 14: Gross Rent Paid (2016)						
	Town of Esopus		Town of Lloyd		Ulster County	
	Number	Percent	Number	Percent	Number	Percent
Less than \$500	0	0.0%	13	1.3%	1,512	7.7%
\$500 - \$999	360	42.7%	332	32.8%	7,766	39.8%
\$1,000 - \$1,499	308	36.5%	479	47.3%	7,751	39.7%
\$1,500 - \$1,999	129	15.3%	86	8.5%	1,870	9.6%
\$2,000 - \$2,499	46	5.5%	92	9.1%	458	2.3%
\$2,500 or more	0	0.0%	28	2.8%	153	0.8%
Occupied Units Paying Rent	843	100.0%	1,013	100.0%	19,510	100.0%
<i>Median gross rent</i>		<i>\$ 1,122</i>		<i>\$1,116</i>		<i>\$1,022</i>

Source: U.S. Census Bureau, American Community Survey 2012-16 Five-Year Estimates.

³ Ulster County Planning Department, 2017 Ulster County Rental Housing Survey, pg. 12.

Observations:

1. The Town's population is expected to increase by 2.1% to 9,589 by 2022.
2. The projected change in the population between 2017 and 2022 will include an increase in the 25-44 cohort, which includes young families, recent graduates and working adults. Growth in this age range indicates the potential need for more diverse housing options.
3. The population cohort of 45-64 (currently making up 30% of the Town's population base) is projected to decrease by approximately 18%. This decline reflects a natural shift in population cohorts, is in line with county and national trends and is not necessarily related to economic conditions of the Town and region.
4. There is an expected increase in the 65+ year cohort, which may contribute to the need for senior housing and related services.
5. 65% of the housing is owner-occupied, with 91% being single family houses and 25% renter-occupied. While this may signal a healthy balance of owner versus renter occupied units, it may also be contributing to a lack of rental properties and higher rent rates.
6. The Town had a 2016 homeowner vacancy rate of 2% which may indicate a very tight housing market.
7. 2016 renter vacancy rate was approximately 5.4%, which may be lower due to Census Bureau calculation methods and supplemental data from the 2017 Ulster County Rental Housing Survey.
8. 59% of renters and 24% of homeowners in the Town are cost-burdened, paying at least 30% of their household income for housing with 57% of the renters in the Town are paying over \$1,000 per month.
9. With the rental vacancy rate and a high percentage of cost-burdened renters, rental housing costs may be pricing some out of the market and existing renters may find it difficult to cover all necessary expenses.

Education

School Districts (Kingston, Highland, and New Paltz)

There are three school districts serving residents in the Town of Esopus. In the northern portion of the Town is the Kingston Consolidated City School District (KCSD), to the south is the New Paltz Central School District, and in the southeast corner of Town is the Highland Central School District. Most students in the Town of Esopus attend the KCSD as a majority of residents live in the northern part of Town.

The Robert R. Graves Elementary School (KCSD) is the only public school operating in the Town. The Elementary School had a student enrollment of 378 in the 2016-2017 and educates children from kindergarten to fourth grade. Refer to the **Community Services Map** for the location of the Town's elementary school.

The KCSD has an economically diverse student body of 6,165 students, with approximately 60% considered economically disadvantaged. Data on which communities these students reside in is not readily available. Approximately 53% of the students receive free lunches and an additional 5%

are eligible for reduced-price lunches. Eligible students at Robert R. Graves Elementary School receive free or reduced price-lunches. For the 2018-2019 school year, the eligibility guidelines for free and reduced-price school lunches has increased slightly over the previous year. Under the new guidelines, a child from a family of two qualifies for free lunch, breakfast and milk if the annual family income is \$21,398 or less (\$32,630 for a family of four). Reduced-price lunch and breakfast would be available to the same family with an annual family income of \$30,451 or less (\$46,435 for a family of four).⁴ All children living in a household that receives aid through the Supplemental Nutrition Assistance Program (SNAP) or Temporary Assistance to Needy Families (TANF) are eligible for free meal benefits at school.

According to State Education Department data, the graduation rate for each school district in 2017 was as follows: KCSD 81%, New Paltz Central School District 93%, and the Highland Central School District 95%.⁵

The former Anna Devine Elementary School, located on Old Post Road in the Hamlet of Rifton (see the **Community Services Map**), is now the home of the Phoenix Academy, an alternative education facility. This facility is operated by Ulster Board of Cooperative Educational Services (BOCES) and offers specialized educational opportunities for students whose learning interests and unique learning styles differ from those typically found in a traditional school setting and who might also be at risk of not participating fully in their home schools. Characteristics of these programs include a smaller group setting, individualized learning plans, and digital/virtual access to coursework through a blended delivery model.⁶

The Ulster County Career-Tech Center (BOCES) is located in Port Ewen and provides innovative and cost-effective programs and services that benefit students, educators, employers and taxpayers. There are also private primary and secondary academies, including the Bruderhof Community School and Mount Academy.

Higher education institutions are located in nearby New Paltz, with SUNY New Paltz- a four year college, in Stone Ridge-with SUNY Ulster, a two year community college, and in Kingston with SUNY Ulster’s Kingston Center-a satellite two year community college with limited educational and training offerings. There are many private higher education institutions across the Hudson River, including Bard, Vassar, Marist, and the Culinary Institute of America.

Educational Attainment

As indicated in **Table 15: Educational Attainment, Population Age 25 and Under**, 91.6% of Town of Esopus residents age 25 and over have at least a high school diploma, while 27.0% have a bachelor’s degree or higher. The Town is slightly behind Ulster County in terms of the completion

⁴ <https://www.federalregister.gov/documents/2018/05/08/2018-09679/child-nutrition-programs-income-eligibility-guidelines>, Accessed October 2018.

⁵ data.nysed.gov; 2017 | Kingston City School District – Report Card | NYSED Data Site

⁶ www.ulsterboces.org/uploaded/Publications/UB_SG_2018-2019_Final.pdf, Accessed October 2018.

of a four-year college degree and the attainment of a graduate or professional degree. The Town of Esopus is behind in all educational categories, except the percentage of residents with a High School diploma/GED or higher, when compared to the Town of Lloyd.

Table 15: Educational Attainment, Population Age 25 and Under				
Educational Attainment	Town of Esopus	Town of Lloyd	City of Kingston	Ulster County
% with High School Diploma/GED or Higher	91.6%	91.2%	83.8%	90.1%
% with Bachelor's Degree or Higher	26.9%	32.2%	24.0%	31.0%
% with Graduate or Professional Degree	12.7%	13.6%	10.0%	14.1%

Source: U.S. Census Bureau, 2012-16 American Community Survey 5-Year Estimates.

Observations:

- The Town is served by three separate School Districts with the Kingston City School District serving the majority of Town residents.
- A high percentage of the residents of Esopus graduate from high school or have a high school equivalent diploma as compared to residents in the City of Kingston. This percentage is similar when compared to the Town of Lloyd, and Ulster County.

Civic and Community Organizations

Religious Institutions

Many religious and spiritual practice options and institutions exist in this region of the Hudson Valley and especially in the Town of Esopus. Refer to the **Community Services Map** for the location of the Town’s churches and religious institutions.

The Banner of Love Christian Fellowship is a non-denominational church located in Port Ewen, near the intersections of Old Rt.9W and Broadway (US Rt. 9W). The church holds monthly visitor Sundays, runs youth groups, bi-weekly small groups, bible schools, and holds a weekly service.

The Reformed Church of Port Ewen is located in Port Ewen. The Church provides weekly Sunday services, youth education, vacation Bible school, family care assistance, food collection and preparation for the needy with available kitchen and dining area resources, and overall case-by-case support for individuals and families in need. The church also serves as a location for local Cub Scout Pack, Boy Scouts Troop, and Girls Scout Troop meetings, and provides space to other community groups holding events (dances, etc.).

Also located in Port Ewen is the Esopus United Methodist Church which provides weekly Sunday services. While the congregation has declined to about 35 parishioners, the church is very active in the community by providing and coordinating many services to those in need. The Church hosts the Port Ewen Food Pantry, serves meals Fridays and Saturdays, provides weekly community lunches, provides potluck dinners, and holds numerous festivals and events throughout the year including the annual apple festival.

The Presentation Church in Port Ewen has approximately 300 parishioners. A unique feature of this Church is the 1941 Statue of the Virgin Mary cradling a tug boat, signifying this church's relation to Hudson River maritime history. In recent years, the Presentation church has merged with Sacred Heart Church which has about 400 parishioners. Both Churches and their congregations are strongly involved in the local community.

The Saint Remy Reformed Church serves many residents in the western area of Town. The church holds many community socials, dinners, and events. Many of these community events are held at the St. Remy Fire Department or the Port Ewen Fire Department buildings.

Ascension Holy Trinity Church is a small Episcopal church located in West Park. The Church provides weekly services on Sundays and hosts many public events and dinners. In addition, the Church serves as a vital food pantry open each Sunday from 1pm to 3pm. The food pantry is a 24-7 emergency feeding program. In 2017, the Church served approximately 632 households and 2,152 individuals residing in and around West Park. These figures include 749 children and 224 senior citizens, some of the most vulnerable populations. Another program provided by the Church is the Tools for Schools project, which collects and provides school items including pens, pencils, calculators, paper, folders, and other needed items. In 2017, 57 bags of supplies for students were packed and distributed. Another form of community assistance provided by the church is the yearly Thanksgiving and Christmas meals, provided to many residents in the Town of Esopus.

In addition to the above houses of worship, the Town is home to additional religious organizations which serve both residents of the community and those outside. These organizations include the Bruderhof community, the Holy Cross Monastery, the Missionary Sisters of the Most Sacred Heart at the St. Cabrini Home, and the Marist Brothers Center at Esopus.

Those who make up the Bruderhof Community are members of an incorporated religious organization practicing a vow of poverty and common treasury for all members. The communities have a presence in Esopus, Ulster Park and in Rifton. The location in Esopus is known as the Mount and is one of the numerous historic properties along the Hudson River. This is the location of the Bruderhof communities' high school, a private school open to all but with specially designed curriculum for those students who are part of the Bruderhof community. Bruderhof also has residential communities in Ulster Park and Rifton.

In Ulster Park the community know as Maple Ridge features collective housing, agricultural lands, recreational sites, and a factory producing children's toys. In Rifton, the Woodcrest Community features similar amenities and facilities. A point of difference in the Woodcrest Community is that the factory in that location creates adaptive equipment for disabled children and adults. Both the factory in Woodcrest and Maple Ridge sell

products throughout the United States. The Bruderhof Community has worked closely with the Town and community and civic organizations for the benefit of all residents within the Town of Esopus.

The Holy Cross Monastery is located along the Hudson River in between the Hamlets of West Park and Esopus. The monastery, located along the Hudson in a historic building is an Anglican Benedictine community of men and home to over a dozen monks. The public is invited to worship six days a week. Additionally, the monastery coordinates individual overnight retreats, retreat programs, group/family retreats, and extended stays. Retreats and stays attract not only individuals from the region, but also throughout the State, nation, and world.

The Missionary Sisters of the Most Sacred Heart of Jesus at the St. Cabrini Home is located near the southernmost border of the Town along US Rt. 9W in West Park. The sisters' property, totaling more than 500 acres, is nearly two miles in length and stretches from the Hudson River west into mountainous terrain. The property was the site of several previous uses, including an asylum, orphanage, school and a substance abuse rehabilitation center which closed in 2011. Over the years, the property has been on the market, and despite interest by some prospective purchasers, it remains unsold. An extensive demolition and asbestos abatement project began in early 2017 on the Hudson River portion of the property.

The Marist Brothers Center at Esopus has long been a sanctuary for young people seeking to develop and nurture a spiritual life. Each year nearly 4,000 young people spend time at the retreat house. Many youth from more urban areas come to this location for a spiritual respite. Not only is this center focused on urban youth, but serves as a year round retreat inclusive of individuals of all ages and abilities, and provides 9 weeks of camp for special needs populations. The property is over 120 acres along the Hudson River located between the Hamlets of Esopus and West Park.

Civic, Social, and Other Community Organizations

The Boy Scouts and Girl Scouts in the Town of Esopus meet at the Port Ewen Reformed Church and hold weekly meetings. Cub Scouts hold a monthly pack meeting and Den meetings are held bi-weekly. The organizations, in addition to providing youth character building, do a great deal of service for the Esopus community. Boy Scouts, aside from doing regularly scheduled troop service days, will often opt to do their large-scale individual Eagle service projects within the Town of Esopus. Girl Scouts also are active in community service on a troop-wide level and perform or establish different beneficial services or projects throughout the community. All of these groups aid in the development of youth, while creating good citizens of the Town of Esopus, ultimately benefiting all in the Town.

Esopus has a vibrant town-wide business community with the primary commerce center located in the Hamlet of Port Ewen. While Port Ewen may be considered the Town's business center, several of the Town's other hamlets are home to businesses. Many local businesses are members of the Esopus Business Alliance (EBA) which promotes and assists member businesses. The EBA establishes recognition and trust through networking and cooperative venture, cultivates support and cooperation with Town Government and develops and maintains strong bonds with the community, ensuring smart business growth and economic development in order to expand consumer opportunities for all Town residents.

Many senior citizens in the Town of Esopus meet at the Town Hall Community Center for a bi-monthly coffee hour organized by Town of Esopus Seniors, a senior-focused group that organizes numerous events, including a number of organized luncheons and party events, as well as cultural, recreational, and sightseeing excursions. Esopus Seniors serves as a resource for the elderly, assisting seniors and coordinating with the Town and other service providers to ensure the needs of elderly adults are met. The Town's support of this group is vital to its continued success in servicing the Town's aging population, encouraging seniors to be social and remain a part of their community. Also related to the Senior Citizen population, the Kingston Area Chapter of the American Association of Retired Persons (AARP) meets monthly in the Town of Esopus Community Center for chapter-wide meetings. Additionally, the local AARP governing board meets once a month separately at the Community Center.

The American Legion and the Lions Club also have a presence in the Town of Esopus. Each organization plays a vital role in the community and in the region. Outside of the Town of Esopus, including the City of Kingston, New Paltz, and other surrounding communities, there are many other civic, social, and community organizations that are available to Town of Esopus residents. These organizations include the Elks, Kiwanis, Rotary, VFW, and other specialized groups that invite members from, and show support to, the Town of Esopus community.

Arts, Culture, and Historic Resources

Refer to the *Community Services Map* for the location of some of the following arts and culture resources and attractions.

Klyne Esopus Historical Society Museum

The Klyne Esopus Historical Society Museum, located along US Route 9W in the Hamlet of Ulster Park, occupies the former Dutch Reformed Church (1791-1965). The brick church, the second building constructed by the congregation, was designated a National Historic Landmark in 2002.

The Klyne Esopus Historical Society Museum obtained a charter from the New York State Board of Regents in 1986. The mission of the museum is to preserve, interpret, and disseminate the history of the Town of Esopus. The museum houses a collection of objects, archeology, photographs, archival material, ephemera, maps, as well as a research and genealogy library that includes the inventory of historic properties (HABS Inventory), vital records, scrapbooks, and more. All objects and archival materials help tell the story of the people, industries, and issues relevant to the Town. Klyne Esopus Historical Society Museum works to make the lessons from the past clear and known to residents, visitors, and Town leaders through exhibits, programs, and by facilitation of dialogue on important issues in the community and society at large.

Sojourner Truth

Sojourner Truth, born as Isabella Baumfree in 1797, was a former slave who became an advocate for abolition, and women's rights in the nineteenth century. Born in the Rifton area into slavery, Truth resided in the Town of Esopus. She was eventually freed after a brief escape, before moving to

New York City in 1828 where she worked for a local minister. Truth participated in religious revivals popular throughout the State and in adjacent New England, and became a charismatic preacher and orator. She eventually settled in Battle Creek, Michigan in the 1850's but continued to speak nationally as an abolitionist, and continually advocated to help freed slaves⁷.

The Town of Esopus is very proud of its long and historical association with Sojourner Truth. To commemorate her and her significant role in American history, the Town established the Sojourner Truth Park in Port Ewen. The park includes a statue of Truth and interpretive signage telling her story. The Town of Esopus Sojourner Truth Park is just one of many in the region that commemorate this courageous woman. In addition, the Town highlights the Sojourner Truth Freedom Trail which follows Truth's 11-mile escape route from slavery. This is commemorated in part by historical plaques on NY Rt. 213 near Sturgeon Pool, her birthplace and at the Kingston Courthouse in the City of Kingston, across the Rondout Creek.

Town of Esopus Library

The Town of Esopus library has a collection of 27,286 volumes with a circulation of 72,779 per year as of 2018. The Library offers a number of activities and hosts a number of groups that use the library's space. Summer reading programs for all ages, year-round adult and youth programming, monthly art exhibits by local artists, the Repair Café, and several other programs are offered throughout the year. A Community Garden was finished in the summer of 2018 on the grounds of the Library which includes 20 garden plots. In addition, the Library hosts book clubs, artist groups, a stitchers group, a summer music series, Mahjongg games (tile-based game), guitar classes and jamming, and a Lend-a-Pole program, where anyone can borrow a fishing pole to try out fishing

The Library serves as the pickup location for Field Goods, a year-round local produce delivery service and fund raiser for the Library.. The Library is also assisted by The Friends of the Library, a very active volunteer group that helps to raise funds to supplement library programs, events, and projects. The friends sort book donations that are used to stock the on-site book store as well as the library's semi-annual book sales.

The library has been on the forefront of efficiency and energy cost saving. With the assistance of the New York State Energy Research and Development Authority (NYSERDA), the library installed photovoltaic arrays that are generating 30% of the library's electricity, saving nearly \$4,000 annually. The library also won a New Construction High Performance Building Award from NYSERDA for energy efficiency of the facility, including its innovative ground exchange heating and cooling system. The library created a water run-off pond, minimizing environmental impacts of the facility, directly supporting a great deal of aquatic wildlife.

⁷ National Women's History Museum, Sojourner Truth, <https://www.womenshistory.org/education-resources/biographies/sojourner-truth> (Accessed September 2018)

As the library has increasingly taken on a larger role within the Esopus community, it is exploring the feasibility for expansion and has assessed some of its needs. The library has determined that additional and expanded facilities are ideal which meet the changing dynamics of the community and the facility to include larger children and teen rooms, additional office spaces, a quiet reading room, a local history room, separated entry meeting space for community groups, a kitchen for programing, an updated security system, and HVAC systems modifications.

Additionally, as the physical site is challenging, the library, as well as some patrons have identified the difficulty for the ingress and egress of vehicular traffic to the site. This difficulty arises because of current driveway configuration, the sites building configuration, and the proximity to Broadway (US Rt. 9W). There are also very limited pedestrian accommodations available to community members who wish to walk or bike to the site. It has particularly been expressed that residents who live across Broadway, to the west of the library, are challenged in access due to high traffic volumes, speeds, and current pedestrian safety infrastructure.

Hudson River Lighthouses

There are two lighthouses in the Hudson River and adjacent to the Town of Esopus that were originally constructed to warn ships against hazards and to identify shipping channels. These two lighthouses are known as the Rondout Lighthouse, owned by the City of Kingston and operated by the Hudson River Maritime Museum, and the Esopus Meadows Lighthouse which is owned and operated by the Save Esopus Lighthouse Commission.

The Esopus Meadows Lighthouse was operated by the US Coast Guard until 1965 when the lighthouse was deactivated. The lighthouse was listed on the National Register of Historic Places. By 1990, the lighthouse had fallen into a state of extreme disrepair, it was then that Save Esopus Lighthouse Commission leased the lighthouse from the Coast Guard for purposes of restoration. In 2002, the Commission took ownership as part of a federal program called the National Historic Lighthouse Preservation Act⁸.

The Rondout Lighthouse was completed in 1915 and built to mark the entrance of the creek to the Hudson River. By 1950, the lighthouse was fully automated and was mostly abandoned until the 1980's when the Hudson River Maritime Museum initiated preservation efforts. By the late 1990's the Coast Guard conveyed the lighthouse to the City of Kingston. The City and the Maritime Museum now partner on preservation and educational interpretation of the lighthouse for the general public⁹.

⁸ Save Esopus Lighthouse Commission, Esopus Meadows Lighthouse, <http://www.esopusmeadowslighthouse.org/>, (Accessed September 2018).

⁹ Hudson River Maritime Museum, Rondout Lighthouse, <http://www.hrmm.org/rondout-lighthouse.html> (Accessed September 2018).

Both area lighthouses, visible from and immediately adjacent to Esopus, are important historical resources. Both sites offer tours and illustrates the importance of shipping and trade in this portion of the Hudson River Valley, and the strong links Esopus has to the industry.

John Burroughs' Slabsides

Slabsides, set within the John Burroughs' Nature Sanctuary, is the rustic cabin retreat of John Burroughs (1837-1921), father of the modern nature essay and one of the most popular writers of his day. In 1895 the naturalist built the cabin as a place to write and entertain not far from his home on the Hudson. He constructed much of the cabin himself using the rough bark-covered slabs and crafted its furnishings from the wood he found nearby, adding to the rustic appeal. Designated a National Historic Landmark, and a Hudson River Greenway Site of Special Interest, for over two decades Slabsides drew devoted readers and prominent friends like President Theodore Roosevelt, poet Walt Whitman, conservationist John Muir, and industrialist Henry Ford. Guest books bulged to nearly 7,000 signatures. Slabsides continues to draw visitors from across the country and around the world who seek out this literary and conservation icon. Through works written about nature close at hand, Burroughs inspired generations of readers to head out of doors and national leaders to preserve the land and it's wildlife in the emerging conservation movement of the early 20th century.

Seasonal open houses in May and October feature special presentations of timely topics that aim to bring the property and Burroughs to life. In addition, the cabin is open at no charge alternating weekend's spring through fall, most of which follow morning nature walks.

Kingston-Port Ewen Suspension Bridge

The Kingston-Port Ewen Suspension Bridge spans the Rondout Creek and connects the City of Kingston to the Town of Esopus and the Hamlet of Port Ewen. The bridge was built in 1921 to complete New York's first north-south automobile highway along the Hudson River's west shore and provided an alternative to using a ferry to cross the Rondout Creek. It was considered an important engineering accomplishment at the time and was associated with the development of early automobile travel¹⁰. Significant repairs to the bridge are slated to begin in the spring 2020 and expected to be completed by the fall of 2021, according to the NYS Department of Transportation, which will oversee the work. The project is estimated to cost approximately \$31.8M and has received both Federal and State funding. The work will serve to modernize the crossing and enhance its structural stability while preserving the bridge's historical character as it is listed on the National Register of Historic Places.

¹⁰ National Park Service, U.S. Department of the Interior, Kingston-Port Ewen Suspension Bridge, <https://www.nps.gov/nr/travel/kingston/k22.htm>, (Access September 2018).

The suspension bridge serves as a direct connection to the City of Kingston and the Historic Rondout District. It will be critical to ensure the new bridge maintains and enhances the safety of pedestrians crossing the bridge and should also take into consideration the safety of bicyclists as it will play an integral role in the Town's plans to link the Town of Esopus to the Empire State Trail and the City's Greenline Trail.

Historic Places

In addition to the previously mentioned historic and cultural sites, there are additional structures listed on the National and State Registers of Historic Places within the Town of Esopus. These include the Poppletown Farmhouse, built around 1800 (Hamlet of Esopus); Alton B. B Parker Estate, built in 1860 (Hamlet of Esopus); the Cumming-Parker House (also known as The Library) built in 1836 (Hamlet of Ulster Park); and The Col. Oliver Hazard Payne Estate (known as the Payne Mansion) and completed in 1911 (located between the Hamlets of Esopus and West Park). The Payne Mansion and 60-acre estate was recently gifted to Marist College by Raymond A. Rich, who bought it from the Marist Brothers in 1986.

There are also several historic sites on the east side of the Hudson River across from the Town including the Vanderbilt Mansion, Staatsburgh State Historic site, and the Home of Franklin D. Roosevelt National Historic Site. The FDR National Historic Site features the Presidential Library and Museum as well as the Val-Kill Cottage, a secluded retreat constructed for Roosevelt's wife Eleanor.

Observations:

- The Town has significant historical and cultural resources both public and private.
- The Esopus Library is an integral part of the community, serving not only as a center for educational enlightenment, but as a community social gathering space for residents of varied ages, interests, and abilities.
- The Town's historic and cultural resources are under-utilized as possible tourism attractions and could be better organized and integrated into the Town's tourism opportunities.

Community Facilities and Infrastructure

Esopus Town Facilities

The Town of Esopus Town Hall is a unique, multi-use, community facility located in the southern portion of Port Ewen and north of Ulster Park along US Rt. 9W. The current Town Hall facility was constructed in 2009, replacing the former Town Hall- a converted garage in the heart of the Port Ewen Hamlet. Town Hall is an impressively designed two-story, 18,000 square foot, highly efficient structure built into the side of a hill. The building was designed with a geo-thermal heating system and the site features an extensive solar array field immediately adjacent to the building.

Offices are built along the edge of the building and within there is a large open cupola reducing the overall need for artificial light. It was designed to be the “greenest” municipal building in New York State at the time.

Within Town Hall there is a 2,000 square foot community center and kitchen available to local civic groups, and for rent for private parties and events. The Town Hall also features a County Sheriff’s substation, a court, and typical governmental offices. Like in many municipalities Town hall houses the Town Clerk’s Office, Town Supervisor’s Office, Assessor’s Office, Tax Collector’s Office, and the Building Department. The Highway Department is housed off Mountain View Avenue, and the Water and Sewer Departments are located on River Road.

Similar to Town Hall, the Town Transfer Station has become “greener” with the recent construction of a solar array. This effort began in in the early part of the decade, but due to problems with coordination between Central Hudson, CSX, and the Town, the array wasn’t fully operational until summer of 2017. The operation and installation of this technology on the Town facility further proves the Town’s commitment to efficient and environmentally conscious efforts going forward.

Cemeteries

As with many communities in this region of the Hudson Valley, as well as the rest of Upstate New York, Esopus has many cemeteries within its borders. These cemeteries, like the Town itself are varied, and range from large traditional cemeteries as seen in many communities, to smaller unique family burial plots, and they range from relatively modern, to very old in both age and design. Considering and assessing these community facilities is important going forward into the future, and instrumental in the preservation of the Town’s long history, and the history of its residents. As Esopus has a long and varied history, all of the Town’s burial plots cannot be known with precise certainty, especially family cemetery locations, however the best and most commonly accepted listing is shown below:

- Ascension Church Cemetery
- Beaver Family Cemetery
- Freer Family Cemetery
- Lawrence Cemetery
- Port Ewen (Riverview) Cemetery
- Rifton Cemetery
- St. Remy Cemetery
- Terpenning Family Cemetery
- Ulster Park Cemetery

The largest of the above named cemeteries is the Port Ewen (Riverview) Cemetery, located along US Rt. 9W with at least 1,200 interments. This cemetery is followed by St. Remy cemetery, with just under 1,000 interments. Other cemetery sizes range from a few dozen to a couple hundred occupied burial plots. These cemeteries are all under different forms of management and ownership, and some are more private in nature whereas other, particularly the larger ones, are generally open to the public.

A thorough assessment and inventory of cemeteries is necessary in Esopus due to the growing trend in New York State of cemetery abandonment and the responsibilities of a Town as outlined in NYS Town Law §291. Each abandoned cemetery in the state on average costs local governments about \$65,000 annually to maintain, including an additional \$2,500 per acre for a municipality to do the most basic of maintenance. About 74 percent of New York's larger cemeteries were underfunded, and 66 percent of New York's small cemeteries were underfunded as of 2016 per a New York State Department of State report.

Although municipal takeover in New York is only applicable to cemeteries operated by a cooperation, courts have expanded this requirement in some cases (*Conn v. Boylan*) to any cemetery public in nature, where any plots are purchased creating a somewhat grey area. In order to confront this issue early, Esopus should assess the future viability of local cemeteries which may be subject to this clause. Though direct financial assistance in large amounts is generally not permitted and not in the taxpayer's best interest as it can be subject to permissive referendum, operational or management assistance services are permitted which may be enough to keep a cemetery solvent and include things such as mowing, general maintenance, road work, tree removal, snow removal, and bookkeeping (NYS General Municipal Law §165-a) by the Town for the cemetery.

Emergency Services

Police

Police protection in the Town of Esopus is provided by both the Ulster County Sheriff's Office and the New York State Police. The County Sheriff's headquarters are in City of Kingston adjacent to the County Jail. The Esopus Town Hall serves as a Sheriff sub-station, and staffed with deputies intermittently. The New York State Police – Troop F, encompassing the jurisdiction of Town of Esopus, is headquartered in Middletown in Orange County and has numerous substations, including stations in Kingston and Highland - nearest to the Town of Esopus.

Fire and EMS

There are five Fire Districts and seven fire stations in the Town of Esopus (refer to the ***Community Services Map***), which provide fire suppression and vital lifesaving first responder service along with a volunteer emergency medical service response team:

- The Port Ewen Fire Department

- The Rifton Fire Department
- The Esopus Fire Department
- The St. Remy Fire Department
- The Hasbrouck Engine Company of the Connelly Fire Department
- The Town of Esopus Volunteer Ambulance Squad

The following information was obtained through various methods, including two stakeholder meetings with the departments and TEVAS (April 20, 2018 and June 14, 2018), along with information provided directly by the departments and through on-line research.

The Port Ewen Fire Department is centrally located in the Hamlet of Port Ewen and utilizes two fire stations located at adjacent corners on Broadway and Legion Court. As of June 2018, the Department has 53 volunteer members. Of the 53 active members, 31 are certified for interior firefighting. The remaining members consist of drivers, exterior firefighters, and other support staff. The Port Ewen Fire Department averages about 155 calls per year, not only in Port Ewen but throughout the Town of Esopus. The Department describes its apparatus inventory to include two pumpers, a ladder truck, two rescue vehicles, a pickup, and an antique 1928 Sanford. Like many volunteer departments, Port Ewen is challenged with recruiting and retaining volunteer members. An additional, more physical challenge faced by the Department, are that of the current facilities. The two fire houses are outdated and undersized, requiring the department to retrofit their vehicles so they will fit into the stations. In addition, having multiple facilities results in increased expenses related to repair, maintenance, and utilities. The stations also lack some basic infrastructure including exhaust removal systems. The Department is in the early stages of planning to site and build a new fire station within Port Ewen. While the District is not under fiscal stress, it must raise their budget when mandates in training and other state mandates occur.

The Rifton Fire Department, located in Hamlet of Rifton also has two separate fire houses, both located on Maple Street. Operations are now out of the recently updated (2015) station at 24 Maple Street. The newly updated station features five bays, an exhaust system, office space, a communications room, a kitchen, showers, cascade system, and a turnout gear washer. As of June 2018, the Department indicated they had the following apparatus: two engines, one tanker, a brush truck, a light rescue-ems vehicle featuring ice rescue equipment and a 14' motor boat with water rescue equipment. The Department is in compliance with Ulster County radio systems frequencies and in 2016 the department installed a new VHF radio repeater system. Rifton Fire Department has approximately 29 active members and 18 of those members are certified as indoor firefighters.

The Esopus Fire Department, located on US Route 9W in the Hamlet of Esopus chiefly serves the hamlets of Esopus, West Park, and Ulster Park averages about 260 calls per year. The Department protects a land area of about 18 square miles, about one-third of this land is off the tax rolls due to tax exempt status (religious property, non-profits, conservation and NYS state lands, etc.). The Department members are highly skilled in basic lifesaving emergency medical services, automatic external defibrillation (AED), vehicular extraction, lifting airbags, and search and rescue. Based

upon information obtained from the fire departments community website, the Esopus Fire Department is equipped with the following apparatus: two engines, one tanker, two rescue vehicles, and one command vehicle.

The Saint Remy Fire Department serves the communities of Saint Remy, Ulster Park, and New Salem with one station located on Main Street in St. Remy and the other located on Union Center Road in Ulster Park. The Department was originally established in 1930 and the two facilities are seen as inadequate and outdated by the Department. According to the Department, the facilities lack an exhaust system and washing equipment. Having two facilities increases the overall maintenance costs for the Department.

The Hasbrouck Engine Company of the Connelly Fire Department is located on 1st Street in the Hamlet of Connelly. The Department primarily serves the Connelly area. Limited information was available at the time of this writing. The Port Ewen Fire Department supports the Hasbrouck Engine Company on all calls in Connelly.

The Town of Esopus Volunteer Ambulance Squad (TEVAS) is located at the corner of US Rt. 9W and Cross Street in the Hamlet of Esopus. TEVAS was established in 1983 and has 54 active members, including 41 EMTs and 3 CFRs. In 2016, TEVAS had 919 emergency calls. The squad has three ambulances, two of which are stationed at the headquarters to serve the 9W corridor and one stationed at the old Rifton firehouse to service the NYS Route 213 corridor. A total of 42 square miles are under the TEVAS protection jurisdiction and very often TEVAS works alongside of the Town's multiple fire departments.

Based on conversations with the departments, TEVAS, Town officials, and the general public fire protection and medical response is adequate. Many fire departments and TEVAS however face similar difficulties including a lack of volunteerism and retention; rising mandated costs, and concerns regarding the inconsistent availability and suitability of water supply in certain areas of Town, for certain departments.

During the two meetings with department officials and TEVAS, key issues were identified that will need to be addressed. Due to changing New York State mandates, some of the volunteer departments are becoming increasingly fiscally stressed which causes some of the Town's fire departments to forgo needed maintenance, equipment purchases, and beneficial upgrades or training. In locations without public water supply, tankers must be utilized and filling a tanker in nearby waterbodies is at times difficult due to insurance regulations. Where public water is available, some of the water lines that supply hydrants are inadequate.

Another major issue identified by some fire departments and EMS is the frequent blockage of at-grade railroad crossings by CSX trains. When this occurs, fire departments and TEVAS may be forced to travel significantly farther to reach the emergency, and this may force additional departments to respond to incidents. The Port Ewen Fire Department has indicated that they have not had issues with CSX and during calls where the Department and CSX had to communicate, they have been able to work together. There remains concerns about trains blocking rail crossings and the Town would like to seek improved dialogue with CSX on this issue.

The Town is also in need of a permanent location on the Hudson River for a water rescue boat. The departments identified this as a future need that will need to be addressed and could be accommodated by a cooperative agreement between the Town and the departments or between multiple departments. In addition, the idea of sharing services was discussed during the stakeholder meetings, including plowing, lawn maintenance for facilities, phone and telecommunication services, as well as sharing meeting and educational space. The Town of Esopus is committed to assisting the fire departments and TEVAS in any way that is practical and feasible, including assisting with applying for, and coordinating grants.

Municipal Water

Public water is supplied to customers within the Port Ewen Water District which roughly includes the Hamlets of Port Ewen, Sleightsburgh, Connelly, and northern sections of Ulster Park. The remainder of Town is served through a combination of on-site private wells and small scale distribution systems, including the Black Creek Apartments, Maple Ridge Community, Mirror Lake Trailer Park, Mount Community, Rosemary Mobile Home Park, and Woodcrest Community per New York State Department of Health Permit Information. Additionally there are a number of commercial sites and lodging facilities which have their own private distribution centers.

Town water is sourced from the Hudson River and treated at the Roger Mabie Water Treatment Plant located on River Road in Ulster Park (refer to the *Community Services Map*). The Town has a 2 million gallon storage tank located in Ulster Park between Esopus and Mirror Lakes. This water tower is in need of replacement and the Town received a \$2.2 million Water Infrastructure Improvement Act grant in November 2018 from New York State to replace the tank and to pay for the property upon which the new tank will sit. In addition, the Town is in the final stages of installing new water meters throughout the District.

As of 2017, the Port Ewen Water District serves an approximate population of 4,500 with just under 1,450 service connections. Based on 2017 data, an average of 282,000 gallons per day is treated and pumped into the distribution system. As of 2017, water customers were charged \$3.84 per 1,000 gallons of water which is in line with New York State averages ranging from \$30 to \$60 per month at a rate of 12,000 gallons of usage per month.

The 2017 Annual Water Report showed one violation of Total Trihalomethanes (TTHM), which was quickly corrected. The Town is in the process of addressing other water quality issues, specifically water discoloration.

The Town of Esopus is one of the founding members of the Hudson River Drinking Water Intermunicipal Council, formed in 2018. The establishment of this council was the first of its kind in the region and is a strong advocate for, and coordinator of the protection of the Hudson River as a drinking water source. Seven municipalities on both sides of the river cooperate to protect water quality for the over 100,000 people and numerous businesses in the region utilizing this important resource, improving and protecting life for all in the region.

Based on on-going water quality and discoloration issues and concern of future flooding at the water treatment plant associated with anticipated sea level rise, the Town is considering switching to City of Kingston water. However, for safety reasons, the state may require the Town of Esopus to maintain a reliable water source to supplement the City's. Formal negotiations and coordination with the City have yet to begin. This will likely be a focus for the Town in the coming years.

The Town does not have a long-term plan in place for the long-term replacement of the water distribution system. Such a plan will need to be developed over the next couple of years along with the allocation of necessary financing supplemented by possible grant opportunities to ensure the Town of Esopus adequately plans for and begins repairing their aging system before major failures occur and result in significant unplanned capital expenses.

The need for municipal water has been identified in the Hamlet of Rifton, along with municipal sewer. Residents utilize on-site water and septic systems and with limited room on the relatively small lots that dominate the Hamlet, there are concerns about water quality. Extending municipal services to the Hamlet is cost-prohibitive, requiring the consideration of alternative systems. An evaluation of the current conditions in the Hamlet related to water and sewer and associated water quality is necessary.

Municipal Sewer

The Port Ewen Sewer Improvement Area was established in 1974 and serves as the only municipal Sewer District in the Town of Esopus. The district covers an extensive area in the northern portion of the Town and is inclusive of the hamlets of Sleightsburgh, Port Ewen, and Connelly, and additionally provides sewer connections to northern Ulster Park. As of 2018, the district had 1,369 connections serving business and residents preventing health hazards, protecting the environment, and ensuring a high quality of life for all in the community.

Construction of the sewer system began in 1977 with the installation of numerous gravity mains and pump stations on Town land and in road right of ways, as well as the construction of a sewer main crossing the Rondout Creek into the City of Kingston. Due to the relatively low population and limited area of the district, the Town of Esopus and City of Kingston formalized an agreement for the treatment of wastewater at the Kingston Wastewater Treatment Plant. At the time, it was agreed that the Port Ewen Sewer Improvement District could pump up to 500,000 gallons of wastewater per day to the plant for treatment. This agreement was later amended in 1997 and the Port Ewen Wastewater Improvement District may now pipe up to 646,000 gallons of untreated wastewater to the plant daily and Sewer District users are responsible for 10.42% of all costs incurred by the plant for this service. As of 2017 the average daily flow from Esopus to Kingston has been about 340,000 gallons, however in the period of January 1, 2018 to September 30, 2018, flows have increased to an average of 387,000 gallons per day.

The district owns and maintains over 20 miles of sewer lines ranging in diameter size from 8 inches to 24 inches. The system was designed to have primarily gravity lines feed into the districts six pump stations decreasing reliance on pumps and force mains. The last station is located at North

Broadway and pumps all of the district's wastewater across the Rondout Creek via a 10" force main directly to the treatment plant in Kingston. Though there is a dedicated staff for the Water and Sewer District, the district relies heavily on the Town of Esopus Highway Department for excavation, also it has been necessary to hire private contractors for repair or installations through the years.

Stormwater Management System

The Town of Esopus has increasingly experienced stormwater flooding issues throughout Town in recent years and months. These issues are most prevalent in the urbanized areas of Connelly and Port Ewen, however they cause problems for all in the community, on both private and public property, affecting critical infrastructure and investments. As such the Town has opted to confront these stormwater issues head-on and commissioned the preparation of a road-stream crossings municipal management plan. This plan has been completed and assisted the Town in obtaining a grant from NYSDEC's Hudson River Estuary Program to design three (3) new culverts with a goal of reducing localized stormwater issues.

The Town also recently released a request for proposals seeking qualified consultants to do a complete inventory of all municipally owned drainage structures, natural flows, outfalls, swales, catch basins, and drainage piping; conduct site visits; map all inventoried structures; evaluate conditions of existing structures; assess and evaluate the capacity of identified structures; and prepare the Stormwater Infrastructure Assessment and Drainage Capital Improvement Plan. This project is anticipated to begin in early 2019.

Town Highway Department

The Town of Esopus Highway Department is located on Mountain View Rd, just northwest of Robert G. Graves Elementary School (refer to the ***Community Services Map***). The facility is for the storage of the Town's highway vehicles, equipment, fuel tanks and road salt. The Town is responsible for 371 lane miles of road and between five and seven miles of road are paved annually. The Town has 12 plow trucks and 12 drivers to maintain the Town's 371 miles of road during the winter.

Mail Delivery

There are Post Offices located in the Hamlets of Esopus, Ulster Park, West Park, Rifton and Connelly (refer to the ***Community Services Map***). Until recently, there was a permanent Post Office in Port Ewen, but it was closed for structural and health reasons in the spring of 2018. All mail service for Port Ewen was temporarily transferred to Ulster Park. A temporary trailer located across Browne Street from Ross Park is now being used as Port Ewen's Post Office. The U.S. Post Office is working on a permanent location for a Port Ewen office.

Besides the current issue with the Port Ewen Post Office, several Town residents and business owners have long-complained about the lack of door/curbside mail delivery services. The inconvenience of being required to pick up mail from a Post Office is a major issue in the community based on public feedback. The Town continues to advocate for door/curbside delivery. The Post Office's policy is to review requests for delivery on a case-by-case basis.

Capital Improvement Plan for Drinking Water

Similar to the Stormwater Management assessment, the Town of Esopus is seeking proposals from qualified consultants to assess the Town's drinking water infrastructure. Currently the Town has a limited public water delivery system mainly confined to the north-eastern portion of town, particularly in Port Ewen, Connelly, and northern Ulster Park. While there is support for expansion of the system among residents, a comprehensive examination of the complete system is needed to assess feasibility and practicality of any expansion going forward.

To achieve a complete assessment, the Town seeks a consultant to provide a complete inventory and GIS system mapping, modeling of the water distribution systems, a water main replacement needs analysis, a facilities evaluation, and a capital improvement plan/engineering report. Also inclusive of this request for proposal is a consultant experienced in the procurement of state or federal funding which may be used to improve or expand the system.

Pedestrian and Bicycle Facilities

Most neighborhood streets in the Town's Hamlets do not have sidewalks. There are some sidewalks in the Hamlets of Connelly and Port Ewen. Within Port Ewen, sidewalks are limited and the overall sidewalk system is unconnected with several areas in disrepair and many hamlet roads completely lacking sidewalks. There is a sidewalk on the west side of Old US Rt. 9W that crosses the Wurts Street Bridge into Kingston, providing the only pedestrian connection from Port Ewen into Kingston. While Port Ewen is also connected to the City of Kingston via US Rt. 9W, there are no sidewalks along North Broadway, north of the intersection of old Rt. 9 and US Rt. 9W. South of this intersection, the majority of sidewalks along US Rt. 9W are in relatively good condition, while the sidewalks to the east and west of US Rt. 9W are in poor condition or missing all together in many locations in Port Ewen.

In addition, there are no sidewalks, dedicated pedestrian, or bike infrastructure connecting Port Ewen with Sleightsburgh or Connelly. Many local roads in the Town have limited room for new sidewalks or paths due to the location of existing development, steep slopes and overall narrow right-of-ways. These obstacles will prove challenging to provide adequately safe pedestrian and bicycle infrastructure in the Town.

Dedicated pedestrian and bicycle connections to parks and recreational sites within the Town is inadequate and residents who do not wish to access these sites via automobile are left in dangerous situations in dealing with vehicular traffic. These conditions often force pedestrians and cyclists to

walk or ride on narrow shoulders or in vehicular travel lanes. This is most evident at Sleightsburgh Park. Pedestrians and cyclists are forced to use the narrow shoulder of an already narrow, unimproved access road, causing safety concerns to all road users both motorized and not. There is also limited off road connections to Freer Park Beach. In order to access this location pedestrians and cyclists are forced onto town roads to obtain access to the Park, excepting the established, but unofficial path at the end of Tilden Street, the only off-road access over a mowed grass area for the neighborhoods immediately south. Ross Park in the heart of Port Ewen, although in the middle of a residential neighborhood, has no sidewalk connections, making the only pedestrian access along road shoulders and on residential streets. A possible access corridor which could alleviate park access shortcomings could be the pedestrian path that connects Hamilton Court with Herriman Street in Port Ewen that is well used by pedestrians to access Freer Park Beach. The railings on this path are in poor condition and in need of repair, but the opportunity to extend this pedestrian access formally into the park, may be beneficial for residents, especially youth and elderly in the future and when adjacent development occurs along this corridor.

As described above, the Wurts Street Bridge is only one connection for pedestrian and bicycles between Port Ewen and Kingston, another connection on US Rt. 9W would connect the Town of Esopus to Kinston's Greenline Trail, a future part of the Empire Trail. As previously discussed, this bridge is slated to undergo significant repairs beginning in early 2020. It will be critically important that the new bridge safely accommodates both pedestrians and bicyclists. In addition, US Rt. 9W from Kingston and through Port Ewen should become a "complete street" providing pedestrian and bicycle amenities in addition to just serving automobiles.

There are many opportunities for the expansion of Mountain Biking in the Town. Currently, the only public location for mountain biking in the community is in Shaupeneak Ridge Park. In the park, mountain biking is permitted along any trails except the short Orange-Green Connector trail. The most notable and best suited trail for mountain biking in the park is the Green Trail, a trail which was constructed by volunteers expressly for mountain biking, passing over and crossing through impressive rock ledges. While there are additional locations throughout Esopus well suited for, and where mountain biking does take place, the trails generally are not "official", are not under public ownership and pass through private property in some locations.

Based on public meeting and stakeholder input there is significant support for a more walkable and safe community with interconnected parks, recreation areas/open space, hamlets, business centers, historical/cultural destinations and the waterfront. Connections to and between hamlets and parks are needed for safe passage and access to the parks. New and reconstructed sidewalks in key areas of the Town are also needed. In addition, construction of bike lanes where possible is encouraged and where not feasible, widening of the road's shoulders with proper maintenance of those shoulders for safe walking and biking should be considered.

Transportation Network

Rail

The Town is home to a major north-south rail corridor owned by the CSX Corporation with frequent freight train traffic. The nearest major CSX freight rail yards are located in Selkirk and Albany to the north, and Newburgh, New York City, and New Jersey to the south.

While waiting for track clearance, very often trains block at grade crossings, disrupting vehicle traffic on Town roads. As previously discussed, this issue causes concern for emergency services as it can significantly delay their response times. Because of this potentially life threatening issue, the Town has contacted CSX to inquire about changing the practice of halting rail cars at these grade crossings. However, at the time of this writing there has been no success in reaching an agreement.

Amtrak passenger service is located on the eastern side of the Hudson River. The nearest Amtrak stations can be accessed in Rhinecliff and Poughkeepsie, both a 20 minute drive from Port Ewen and both accessible via public transportation nearby. Also located in Poughkeepsie is the terminus of the Metro North commuter rail line. The Metro North lines fall under the jurisdiction of the Metropolitan Transportation Authority (MTA) – the transit authority for the greater New York City area. The proximity to MTA lines makes commuting to the New York City area an attractive prospect for residents in the region with rail travel time to midtown Manhattan being under two hours. The relatively short travel time to New York City, also makes this area of the Hudson Valley an ideal location for vacation and second homes for individuals seeking to escape the busy life of the greater New York City region. Passengers who travel from the City often have the option to bring their bicycle with them on both Metro North service at non-peak hours, and on select Amtrak service making regional trails, including those within Esopus, a destination.

Roads

The major roads that run through Esopus include Interstate 87 (I-87), US Route 9W and NY Rt. 213, all running north-south. The average annual daily traffic (ADT) on I-87 is the highest with over 40,000 cars traveling this portion of the Thruway per day, followed by US Route 9W ranging from 10,717 to 13,195 vehicles per day within the Town, and NYS Rt. 213 seeing approximately 1,264 to 2,327 vehicles per day¹¹.

Parallel to US Route 9W and the Hudson River is River Road, which deviates from US Route 9W in Ulster Park and reconnects in Port Ewen. Between these major north-south corridors are many smaller County Roads connecting one side of Town to the other. Just south of Esopus is Co.

¹¹ NYS Department of Transportation, NYS Traffic Data Viewer, <https://gis3.dot.ny.gov/html5viewer/?viewer=tdv>, (Accessed September 2018).

Rd 299. Connecting the Hamlets of Esopus and Rifton is Co. Rd 16 (Old Post Road) which becomes Rt. 213. Co. Rd 24 (Union Center Rd) connects Ulster Park to Rt. 213, which is connected to Co. Rd. 25 (New Salem Road) in Port Ewen. Approximately ½ mile of NY Rt. 32 runs through the southwestern corner of the Town and connects with NY Rt. 213 just south of Perrine’s Bridge Park. NY Rt. 32 links New Paltz with Rosendale and eventually links to the City of Kingston.

Ulster County Transportation Council

The Ulster County Transportation Council serves as the Metropolitan Transportation Council (MPO) for the Kingston Urbanized area which the Town of Esopus is located in. The MPO designation permits members of the UCTC to have the privilege and responsibility for making final decisions concerning transportation planning and programming of Federal aid projects in Ulster County. Representatives of the Town of Esopus attend the UCTC Policy Committee meetings. Continued attendance at these meetings is important as the Town has a variety of transportation-related needs and projects identified in this Comprehensive Plan. Maintaining a close and positive relationship with the UCTC is critically important to remain aware of funding opportunities, how other member communities are addressing transportation issues and to obtain technical assistance and guidance, when available, to address the Town’s transportation needs.

Other Transportation

The nearest public airport is the Kingston–Ulster Airport, a small general aviation facility for non-commercial aircraft. The nearest airport with commercial airline service is Stewart Airport in the Newburgh area, just under 40 miles south. Additionally, the Town is within reasonable drive times of the major New York City area airports about 100 miles to the south and Albany International, roughly 70 miles north.

Local bus service, the Ulster County Area Transit (UCAT) is available through the Ulster County Department of Public Transportation. The bus route that runs from Marlboro to Kingston and back on US Route 9W, stops along the highway as requested or needed approximately every two hours. There is also a Mall Loop for the Ulster shopping centers, adjacent to the City of Kingston municipal border. There is a weekly rural service bus on Friday’s available to residents off of the typical bus routes, it is recommended to call ahead at least one day, if not a week.

As mentioned above other methods of connection are available to regional rail stations albeit not in Esopus. The Rhinecliff Amtrak can be accessed via water taxi from Kingston, a short distance away eliminating the need for parking at the station. Likewise the Poughkeepsie Train Station is accessible via Ulster County Bus service via LINK in Rosendale or New Paltz providing a service to commuters typically during normal work hours.

Observations:

1. Some of the Town's fire departments are experiencing fiscal limitations (primarily due to state and federal mandates,) decreasing membership and building deficiencies, including the need for major repairs to address deferred maintenance, need for a new station in Port Ewen, and the need to upgrade to current safety requirements at most other stations.
2. Pedestrian and bicycle safety is a major concern in Town. Vehicle speeds and the lack of sidewalks, bike lanes and sufficient shoulders have been identified by the public. Increases in safe pedestrian and bicycle facilities along major roads has been requested by the public.
3. CSX trains continue to block grade crossings which present a major health and safety issue for first responders and is a significant inconvenience for local residents and business owners.
4. The Town's municipal water quality remains a concern and the future flooding risk at the water treatment plant will need to be addressed.
5. A long-term water and sewer infrastructure plan is needed to adequately plan for and finance future improvements.
6. The Town is a founding member of the Hudson River Drinking Water Intermunicipal Council, formed in 2018 and should continue to work collaboratively through this group for the long-term protection of water quality.
7. The majority of the Town lacks municipal sewer and while many locations are not likely to ever be connected to the municipal system, there are some locations where alternatives to on-site treatment is necessary for health and safety reasons.

Parks and Recreation

Refer to the ***Parks and Recreation Map*** for the following discussion.

Shoreline

The Town of Esopus is located along the Hudson River, Wallkill River, and the Rondout Creek with an impressive 24 miles of shoreline. Despite this significant amount of shoreline, there remains limited access and no formal location for public swimming in the Town of Esopus. Additionally, it should be noted that the Town has only one formal boat launch located at Sleightsburgh Park at the confluence of the Rondout Creek and the Hudson River. The Town does have additional shoreline parks including Freer Park Beach and Lighthouse Park along the Hudson River and Perrine's Bridge Park located along the Wallkill River and south of the actual Perrine's Bridge. These parks and other recreational amenities offered in the Town are discussed next.

Esopus Town Parks

The Town of Esopus maintains and provides a number of park and recreational facilities, serving the diverse needs of Esopus residents. There are six Town Parks throughout Esopus at a number of different geographic locations. Town Parks are varied and feature playground equipment, hiking trails, pavilions, playfields, picnic areas, and restroom facilities.

- Ross Park, Bowne Street, Port Ewen
- George H. Freer Memorial Beach, Canal Street, Port Ewen
- Cas Landi Park, St. Remy Lane, Esopus
- James Rieker Park, Connelly
- Joseph H. Clark Recreational Park, Floyd Ackert Rd., West Park
- Lighthouse Park, River Rd., Esopus
- Sleightsburgh Park, Sleightsburgh

Ross Park

Ross Park is one of the most visible parks in the Town of Esopus. Located in the Hamlet of Port Ewen, Ross Park provides a great deal of amenities to all Town residents, including playground equipment, basketball courts, tennis courts, ice skating rink (no longer in use), ballfields, a pavilion, and restroom facilities. From May 1st to Columbus Day, the pavilion at Ross Park can be reserved for private functions. Town residents can rent the pavilion for a discounted rate compared to out-of-town residents. Pavilion rentals have proven to be very popular, with residents utilizing it nearly all weekends in season.

Ross Park is the home to the local Cal Ripken Baseball league as well as the Town's popular summer camp program running from June through August. Summer Camp is available to all children aged 5 to 13 years old. Children attending the camp mainly use the facilities at Ross Park, with occasional day trips from the site.

A new parking lot was established on lands recently acquired at the corner of Bowne Street and W. Stout Avenue. The Town has plans to pave the lot and add decorative landscaping.

Some of the park facilities are nearing their limits of use including the basketball courts and bathroom. The Town recognizes the need to make improvements and based on public feedback, a splash pad has been recommended along with improvements to the basketball courts which are currently uneven, general maintenance and upkeep of the tennis courts and new lighting. Going forward, the Town should continually evaluate the condition of park amenities and prepare a long-term maintenance and management plan.

George H. Freer Memorial Beach (Freer Park Beach)

Commonly referred to as Freer Park Beach, this park is located along the Hudson River in Port Ewen. Freer Park Beach has a children's playground, a picnic pavilion, open grass/picnic areas along the river, restrooms, educational/interpretive panels and adequate parking. Car-top boat launching is permitted at Freer Park Beach, there is also a new boat house measuring about 12' x 16', constructed in late 2018, in the northernmost portion of the park which will be utilized beginning in 2019 by residents and the Youth Sailing Club. Similar to Ross Park, Freer Park Beach's pavilion is available for rent and is often reserved most weekends from May to Columbus Day.

The river adjacent to the Park is susceptible to significant infestations of water chestnut during the summer which if left unchecked, would restrict passage of boats. Several years ago, the Town decided to prohibit swimming at Freer Park Beach due to the water chestnut issue. Swimming remains prohibited at the park. In recent years, the Town has made significant progress with the help of volunteers to keep the water along the park free of water chestnuts and open for those that launch canoes and kayaks. This effort requires a machine, nicknamed "Chester" that thins and cuts the chestnuts, ensuring access from the park out to the open waters of the Hudson River. There has been difficulty in recent years finding sufficient volunteers with the skill necessary for operating Chester.

Overall, the Park is in good condition and remains very popular with residents and visitors. Long term, the bathroom facilities will need significant renovations, if not a complete replacement. The interpretive/educational panels are significantly weathered and should be replaced. The pavilion could also be enhanced to provide additional amenities including space for concerts and other entertainment purposes. Formal kayak and canoe launching facilities should also be established. To ensure a well-coordinated approach is taken, the Town should consider preparing a long-term plan for enhancements and maintenance at Freer Park Beach. Finally, the Town may need to consider formally taking on the operation of Chester to ensure the water chestnut growth is kept in check.

Cas Landi Park

Cas Landi Park is a 4.4 acre park located at the corner of NYS Route 213 and Union Center Road in the Hamlet of St. Remy, serving residents in St. Remy, western areas of Ulster Park and Rifton, where there is no municipal park.

The park features basketball and tennis courts; a playground, seasonal ice rink, soccer field, baseball diamond with a backstop and bleachers; and sufficient parking on a gravel lot. A pavilion was constructed in 2017 with assistance from the local Bruderhof Communities. The park is served by temporary portable toilets as there are no permanent restroom facilities. A recent addition to the park is the Little Free Library, a box which contains books for residents to borrow and return at their will, which was constructed by local Girl Scout Troop 60162 as a service project to benefit residents in the Town of Esopus.

Permanent restroom facilities were recommended by the public along with improved basketball courts. A walking track around the fields were also recommended as a future amenity. A long-term improvement and maintenance plan should be prepared by the Town moving forward.

James Rieker Park

The 1.5 acre Rieker Park is located in the Hamlet of Connelly at the corner of 2nd and Spring Streets. The park features an open lawn area, a baseball field with backstop, a basketball hoop and playground. There is no formal parking lot and vehicles park along 2nd and Spring Streets. The fields are well maintained. The basketball hoop is located in the far northeast corner of the park and is difficult to see from the road and should be relocated and expanded to ensure greater visibility and allow for more players. The playground equipment is in fair condition, although the playground area base/groundcover should be replaced with a softer surface. Additional improvements to enhance this park could include picnic tables and a small pavilion. The Hamlet of Connelly has significant potential for future revitalization and will need an attractive and well-maintained park to support its positive growth. A long-term plan for improvements and maintenance should be considered.

Joe Clark Recreational Park

The Joe Clark Recreational Park, approximately 1.2 acres in size, is located along Floyd Ackert Road in West Park and serves the residents of the southern portion of the Town of Esopus, particularly the Hamlets of Esopus and West Park. The site features a basketball court, a small playground, picnic tables and benches. There are no restroom facilities at the park or any other permanent structures. This is generally more of a neighborhood park and requires little maintenance aside from normal upkeep.

The park is relatively small and adjacent to the CSX railroad which may be negatively impacting its attractiveness. Due to the park's limited size and location, no major improvements are likely, although restroom facilities should be considered, even if they are seasonal portable toilets. Due to the close proximity to bordering roads and the railroad tracks, the chain link fence should be extended the length of the park along Park Lane, which would help keep basketballs and children within the park.

Sleightsburgh Park

Sleightsburgh Park is located in the Hamlet of Sleightsburgh at the convergence of the Rondout Creek and the Hudson River. The 79 acre park is comprised of a combination of tidal wetlands and small pockets of upland areas. Owned and maintained by the Town of Esopus, and protected by a conservation easement with Scenic Hudson, the park includes boat launching facilities (the only boat ramp in the Town), a designated fishing platform and scenic views of the Rondout Creek, the City of Kingston and portions of the Hudson River. The conservation easement held by Scenic Hudson, ensures that the park will remain open and accessible for all in the community and in the region into the coming years. The easement also details permitted improvements and certain restrictions.

The boat launch and fishing areas are accessible via a narrow, one-lane gravel road from Everson Street to the Greenway Water Trail site. The narrow access road does limit the ability of two vehicles to pass and one or more pull-off areas should be considered to improve safety. The parking

area and boat launch facilities are well used and generally full during fair weather months. A small expansion and/or reprogramming of the parking area should be considered. Walking trails are overgrown and no longer maintained due to safety concerns with the strong currents and tides that can create dangerous conditions at the tip of the peninsula of the park. A long-term plan for either maintaining the limited trails or officially closing them off is needed in coordination with Scenic Hudson's conservation easements provisions. Going forward, an overall long-term improvement and maintenance plan is needed which continues to take into consideration the existing Scenic Hudson conservation easement established in 1996. In addition to the general management planning improvements, the park's sign will soon need to be updated along with the information kiosk.

Lighthouse Park

Lighthouse Park is a 0.7 acre riverfront park owned by the Town of Esopus and located on River Road in Ulster Park. This park gets its name from the eastern view of the iconic Esopus Meadows Lighthouse in the Hudson River and is adjacent to and connects with the Esopus Meadows Preserve, owned and operated by Scenic Hudson and discussed next. Lighthouse Park provides opportunities for walking and wildlife viewing.

The Town's Lighthouse Park includes a parking area suitable for approximately 6-8 vehicles, benches and several picnic tables along with access to the river. Lighthouse Park also includes a storage shed to house a rowboat for accessing Chester (the Town's mechanical water chestnut harvester) when anchored off-shore. The Esopus Meadows Preserve is accessible from Lighthouse Park via a small shoreline trail. Lighthouse Park is protected through a conservation easement with Scenic Hudson similar to Sleightsburgh Park.

A major issue with the park is the proliferation of water chestnuts, similar to that of Freer Beach Park and requires maintenance in order to ensure canoes and kayaks are able to navigate to and from the park. There is also no formal car-top launching facilities, although the shoreline is fairly easy to navigate and launch small craft. Water chestnuts make it hard for those wishing to fish. In addition, there is no ADA parking nor accessible trails to the benches and picnic tables at the Park. Finally, the Town should consider updating the park signage including the information kiosk. These important updates and improvements should be achieved as a result of mutual cooperation between the Town of Esopus and Scenic Hudson as requirements of the conservation easement indicate this as a necessity going forward.

Publicly Accessible Parks, Preserves, and Nature Sanctuaries

Esopus Meadows Preserve

Esopus Meadows Preserve is an expansive and diverse property along the shores of the Hudson River and owned and maintained by Scenic Hudson. The preserve is 96 acres in size and offers sweeping views of the Hudson River, Staatsburgh Mansion, and the Esopus Lighthouse. There is a pavilion for use as an outdoor classroom, performances and other events with a large maintained grass lawn, screened portable bathroom facilities, a nine-vehicle pervious parking lot and two miles of trails that pass through a variety of different landscapes. Another pavilion at the southern end of the

Preserve's shoreline serves as a Greenway Water Trail site and includes picnic tables, signage, and a Clivus Multrum composting toilet and a canoe/kayak launch. This site is accessed overland by foot along the white trail or by the water. There is interpretive signage and several locations for fishing. No formal canoe/kayak launching facilities are present from the parking area, as the shoreline is most easily accessible from Lighthouse Park.

The riverfront portion of the property features two long abandoned stone quarries, the northern area includes stunning intact wooded uplands with wetlands to the south. The Klyne Esopus Kill runs through the preserve carving out a valley that is both aesthetically pleasing, and environmentally beneficial for local plant and wildlife.

This site is known for its abundance of fish, particularly striped bass, providing an attractive fishing spot along the wooded land along the Hudson and the Klyne Esopus Kill. Not only are fish abundant here but birds outnumber visitors on any given day. The southern portion of the property is known for many bird species nesting and in flight. One bird often seen at this preserve is the American Bald Eagle – this alone draws many bird enthusiasts to this preserve hoping for a glimpse.

Along with birding, fishing, and hiking, the preserve is sited on the Hudson River Greenway Water Trail. Those on the water can easily transfer from boat to land to hike or read the numerous interpretive signage located throughout the property including the signage at the Preserve's southern end, part of the Greenway Water Trail.

High Banks Preserve

High Banks Preserve connects visitors with an astonishing variety of terrain and habits in the 287-acre preserve. The preserve opened in October 2016 as the Scenic Hudson Highbanks Preserve with a variety of recreation opportunities. The park features include walking, hiking, bicycling, skiing, picnicking, wildlife observation, and dog walking. The overlook area located at the parking area is ADA accessible. The preserve has a series of viewpoints of the Hudson River and informational signage explaining the site's history and ecological importance. One of the trails follows a former carriage road towards Esopus Lake while another leads to a 110-foot boardwalk spanning one of the preserves' forested wetlands.

Shaupeneak Ridge

In contrast to most Scenic Hudson lands in the Town of Esopus, Shaupeneak Ridge is a 937 acre inland preserve, rising along the Shaupeneak Ridge of the Marlboro Mountains. Shaupeneak Ridge is accessed by two entrances, one on Old Post Road and one on Poppletown Road. The recreational area features 9 miles of hiking and mountain biking trails through forested areas and around Louisa Pond. Wildlife includes beaver, deer, coyotes and turkeys. Aside from wildlife viewing, visitors are treated to scenic vistas stretching to the Hudson River and beyond. Every year during the fall, deer and turkey hunting is allowed by permit only, one of the only Scenic Hudson properties to allow for this provision.

This recreation area is maintained in cooperation with the Scenic Hudson, the State Department of Environmental Conservation, and the West Esopus Landowners Association. Other recreational activities available in Shaupeneak Ridge are picnicking, cross country skiing, fishing, canoeing and kayaking via a small hand launch onto Lake Louisa, and leashed dog walking.

Black Creek Preserve

Located just south of the Hamlet of Esopus, the 130 acre Black Creek Preserve rises above the Hudson River and bisected by the Black Creek, a major tributary of the river. Two miles of trails traverse the rolling forests, giving way to a stunning overlook of the Hudson and rolling hills to the east.

In the spring, the park features many ecologically-sensitive vernal pools and significant breeding wildlife, including many birds. In the winter, the site is excellent for snowshoeing and skiing. Summer and fall are ideal times for family friendly hikes that commence at a dramatic suspension bridge spanning Black Creek, making the preserve a memorable and convenient outdoor recreational site, with opportunity for many Town residents and the general public. Fishing is permitted along the creek with NYSDEC licensed permits and within park hours.

Recently, Scenic Hudson, the Town of Esopus, NYSDEC, the John Burroughs Association and several other individuals came together to protect and enhance the Black Creek corridor and have partnered to establish the future 11-mile John Burroughs Black Creek Trail that will connect the Black Creek Preserve to the John Burroughs Nature Sanctuary and to Illinois Mountain in the Town of Lloyd as, discussed in more detail below.

John Burroughs Nature Sanctuary and Slabsides

The John Burroughs Nature Sanctuary is a pristine and rugged 200-acre oasis in West Park off Floyd Ackert Road and is owned by the John Burroughs Association. It is where in 1895, John Burroughs built his cabin retreat Slabsides. He called this untamed land “Whitman Land” for his good friend Walt Whitman. Over four miles of trails, some featuring inviting stonework, are designated as part of the Hudson River Greenway and take visitors among rocky ridges and out a stunning peninsula on a three-acre pond. Trails connect to the New York State Black Creek Forest to the south and lands of Scenic Hudson to the north. A favorite destination for birding, other wildlife includes deer, beavers, salamanders, and snapping turtles. Visitors can experience the same forest, waterfalls, fern valleys, vernal pools, wildflowers, and wildlife that inspired Burroughs’ nature writing over a hundred years ago. Naturalist-led nature walks are offered throughout the year. The nature sanctuary is open to the public at no charge, every day from dawn to dusk.

The nature sanctuary lies along the Black Creek corridor, a sparsely developed area the length of the creek that includes a nearly continuous forest from Illinois Mountain in the Town of Lloyd to the Hudson River. Scenic Hudson, the John Burroughs Association, the Town of Esopus, New York State Department of Environmental Conservation, and other stakeholders are developing the John Burroughs Black Creek Trail, the plan for which

was completed in April 2017. The vision seeks to connect the land bordering the creek and improve access while highlighting the life and legacy of John Burroughs. The goals of the Trail are to create a continuous multimodal trail for biking, paddling, and hiking through the Black Creek corridor, promote economic development, and conserve the corridor's natural resources.

NYSDEC Black Creek State Forest

The Black Creek State Forest located near the southern border of the Town of Esopus, is managed by NYSDEC. The 595 acre forest is part of a network of public and private conservation lands surrounding the John Burroughs Nature Preserve along the Black Creek. Within the Forest, fishing, primitive camping, hunting and trapping are permitted. There are no formally marked trails. A herd path through the property provides visitors a main point of access in the Forest.

DEC is currently developing a recreation management plan which will detail the management activities related to public recreation on this State Forest land. As of the drafting of this Comprehensive plan, comments related to, or questions regarding the management plan are being accepted by the DEC.

DEC Fishing Access

Adjacent to the Black Creek Preserve operated by Scenic Hudson, the DEC has a fishing access point located on the Black Creek. This access point includes a small pull off along US Route 9W.

Perrine's Bridge and Perrine's Bridge County Park

Perrine's Bridge is the second oldest covered bridge in New York State, built in 1844 and maintained by Ulster County. Perrine's Bridge is one of five remaining covered bridges in Ulster County. Vehicular traffic across the bridge ceased in 1930, however since that time it has served as a vital link transporting pedestrians and cyclists across the Wallkill River between the Towns of Esopus and Rosendale. The site features a small pull off from NY Rt. 213 with interpretive signage about the history of the bridge. On the north side of the river there are two walking paths one going northeast and the other northwest under I-87. The south side of the bridge only has a pull off and no walking paths. The bridge was declared a State Historic Site in 1966, and included on the State and National Register in 1973. A great deal of preventative maintenance and restoration has occurred throughout the bridge's history, most recently in 1997 at the cost of \$195,000.

Perrine's Bridge Park, southwest of Perrine's Bridge, is a small park along the edge of the Wallkill River where NY Rt. 213 crosses the river just west of the I-87 overpass. The park is located between NY Rt. 213 and the river, while the park's parking facilities are located across NY Rt. 213,

requiring park visitors to cross the highway. Half the park is an open grass area and the other half is treed and has picnic tables and grills along the river, under shade.

Easements

Wallkill Valley Land Trust Easements

Two active farms are protected via conservation easement coordinated by the Wallkill Valley Land Trust: the Kellar and Hare West/East Easements. The Kellar Easement is approximately 88 acres of active farmland located in Rifton and occupies the northeastern half of an oxbow on the Wallkill River, west of I-87. The Hare West/East Easements are a combined 140+/- acres located north of and partially bordering Carney Road between Rifton and St. Remy. These easements preserve scenic views, habitat and agriculturally important soils in the Town.

Regional Park and Recreational Attractions and Trails

John Burroughs Black Creek Trail

As discussed above, the Town of Esopus, Scenic Hudson, the John Burroughs Association and several other key stakeholders, including NYSDEC are partnering to establish the future 11-mile John Burroughs Black Creek Trail that will connect the Black Creek Preserve to the John Burroughs Nature Sanctuary and to Illinois Mountain in the Town of Lloyd. The goals of the Trail are to create a continuous multimodal trail for biking, paddling, and hiking through the Black Creek corridor, promote economic development, and conserve the corridor's natural resources.

Sojourner Truth Freedom Trail

Sojourner Truth, as previously discussed in this document, was a prominent public speaker, preacher, abolitionist, suffragette, and National Women's Hall of Fame inductee. To commemorate her and educate others of her work and many contributions to society, the Sojourner Truth Freedom Trail was established. The trail is the 11-mile route of Sojourner Truth's escape from West Park to the northwest part of the Town of Esopus, following established rural roads. The Trail includes dedication plaques on NYS Rt. 213 near Sturgeon Pool, her birthplace and the Kingston Courthouse.

Kingston Point Rail Trail / Greenline Trail

The Kingston Point Rail Trail will be a 1.5 miles trail from midtown Kingston to the Rondout Creek. The trail will be a 10 foot wide paved surface with a 3% grade, and feature a protected pedestrian and bicycle route between residential neighborhoods. The construction of the trail will restore

the Hasbrouck Tunnel located under Livingston Street and Delaware Avenue in Kingston. In addition this construction will lead to the creation of community pocket parks, and bike stations along the way.

The Greenline Trail will be a hub for the Ulster County's growing system of rail trails, eventually linking the Catskill Mountains to the Hudson River Valley and to New York City. The plan is to create a more bike and pedestrian-friendly network, inclusive of both on-road and off-road trails which will bring the Greenline into neighborhoods, connecting residents with local parks and commercial areas throughout the region.

This trail will be well connected to other trails and pedestrian pathways and sidewalks in the Rondout neighborhood and is directly across the creek from Esopus. Pedestrian connections to the trail can occur over the Wurts Street Bridge. As this is intended to be a part of the Empire State trail, this would provide Esopus residents direct access to that trail, and other associated spurs, expanding multimodal transportation throughout the region and the State.

Wallkill Valley Rail Trail

The Wallkill Valley Rail Trail is 21.3 miles of asphalt, cinder, dirt and gravel, and begins on Denniston Road south of Gardiner and ends on Route 32 and Rockwell Lane in the Town of Ulster. The trail goes into Kingston and will be connected to the Empire State Trail connecting Ulster County to the rest of New York State for cyclist and pedestrians a link within a short distance from the Town of Esopus. The activities that are allowed on the trail are bicycling, fishing, horseback riding, walking, and cross country skiing.

Walkway Over the Hudson State Historic Park

The Walkway Over the Hudson State Historic Park, operated by the New York State Office of Parks, Recreation, and Historic Preservation, is a major regional trail connection and local tourism attraction. The former, highly elevated rail trestle connects the east side of the River in Poughkeepsie, to the west side of the River in Highland.

The deck of the walkway allows pedestrians and cyclists the opportunity to experience vast 360 degree views of Hudson River and Hudson Valley along with providing interpretive signage and comfort facilities along the way. The Walkway features two welcome centers, Ulster, on the Highland side, and Dutchess on the Poughkeepsie side, which is currently under construction. Access to the walkway is available via ADA accessible elevators when in service, or via stairs. Picnic tables are available for those who wish to spend the day there, and parking is available on both sides to differing degrees.

As mentioned the Walkway creates an important trail link across the Hudson, connecting the Hudson Valley Rail Trail on the west, with the Dutchess County Rail Trail on the east. This will eventually be a link in the Empire State Trail- a trail which will pass in close proximity to Esopus where further connections.

Empire State Trail

The Empire State Trail is a new initiative at the forefront of national efforts to enhance outdoor recreation, community vitality, and tourism development. Currently the trail is broken into 400 miles of disconnected segments throughout the state. By 2020, the trail will be a continuous 750 mile corridor spanning New York State in all directions, reaching from Canada to New York City, and from Albany to Buffalo connecting with each other at the confluence of the Mohawk and Hudson Rivers.

Along with the Empire State Trail, the Ulster County Rail Trail connects the City of Kingston with the Catskill Mountains along a 38.6 mile corridor. Once the Empire State Trail and the Ulster County trails are complete they will provide several other possible trail connections across the County and the State of New York all in very close proximity to the Town of Esopus.

Marinas

There are three marinas located in the Hamlet of Connelly along the Rondout Creek: Jeff's Yacht Haven, the Rondout Yacht Basin, and Certified Marina. Hidden Harbor Yacht Club is a private club located in Port Ewen, just south of Freer Beach Park. With only one public and free boat launch in Town (Sleightsburgh Park), the marinas appear to see a lot of local and regional business. However, the marinas primarily serve as a location to launch and recover boats and are not destination in themselves. With the Town's desire to reconnect with the Rondout Creek and Hudson River, these facilities are encouraged to offer more amenities that might attract boaters to stay longer and explore Esopus, including restaurants, lodging, and other attractions.

Central Hudson

Central Hudson owns a great deal of lands along the Sturgeon Pool near the Rifton hamlet. Currently this land is not publically accessible and is set aside for training and recreational opportunities for employees of Central Hudson and their families. As the lands are part of an overall hydro-electric power generation facility there has been some question about the provisions for public access, particularly due to some FERC regulations requiring utilities which have hydro-electric generation to provide access to navigable waters for canoes and kayaks. As this is use has been at this site for many years, it is assumed that these provisions do not apply to Central Hudson and they are grandfathered from having to allow for this use to the public. In alignment with other hydro-electric generation facilities, and as a community neighbor, some type of access should be explored at this site whether it be controlled as a special day, or a type of non-intensive access point to the Sturgeon Pool.

Observations:

1. Town Park facilities are in need of both minor and major repairs and each facility should have a long-term maintenance and improvement plan prepared.
2. The Town does not have a public swimming location.
3. Additional boat launches, primarily for canoe and kayaks are needed throughout the Town.
4. The Town has a significant amount of recreational opportunities along with agritourism, cultural and entertainment attractions clustered along US Route 9W corridor, between the Hamlets of West Park and Esopus. These significant tourism resources need a coordinated marketing program and steps should be taken to link each site via safe pedestrian and bicycle connections.
5. The marinas should be encouraged to provide additional amenities for visitors and tourists including waterside dining and other attractions that will bring and keep people in the Town of Esopus.

Economic Vitality

Regional Economic Perspective

The Ulster County economy has traditionally been based on agriculture and tourism. Rivers and canals, rail lines, and turnpikes connected small farming settlements, shaping development patterns and facilitating the growth of commerce. The earliest industries in the County capitalized on the region's abundant natural resources. Agricultural products, lumber, bluestone, bricks, and coal were shipped from Ulster County to New York City. At the same time, the railroads brought a steady flow of visitors from New York City and other urban centers, creating a thriving resort industry.

Manufacturing emerged as an important economic driver in the 1950s when IBM opened its Kingston plant in the Town of Ulster. At its peak, IBM Kingston employed more than 7,100 people. Its presence had a huge impact on surrounding communities, leading to a period of growth and development. New housing was constructed to support the local workforce, and roadway improvements were made to enhance transportation access to and from Ulster County. This brought additional businesses to the area.

Since the IBM Kingston facility closed in the 1990s, no single sector has dominated the local economy. Health services, retail, tourism, and other sectors generate jobs and revenue for the County's communities, and in spite of significant employment declines over the last few decades, manufacturing continues to provide thousands of jobs.

Nearly 60,000 people work in Ulster County, with 12,831 (21.4%) in the public sector (**Figure 3: Employment by Super-Sector, Ulster County, 2016**). The top private-sector industries for jobs are trade, transportation, and utilities (20.0%), education and health services (17.8%), and leisure and hospitality (12.8%), which combines accommodations and food services with arts, entertainment, and recreation. Major employers tend to be concentrated in the eastern part of the County, close to population centers and interstate access.

While not reflected in the employment data, agriculture remains an integral part of the Ulster County economy. According to the Census of Agriculture, Ulster County had 486 farms in 2012, with sales of agricultural products totaling \$55.9 million. Many of these operations, including several in the Town of Esopus, sell directly to consumers through seasonal farm stands and markets.

Quality of life has become a major contributor to the County’s economic development potential. Ulster County’s assets, including its natural beauty, opportunities for outdoor recreation, and a thriving arts community, attract businesses and draw employees to the area. The Catskill Mountains, parks and open spaces, farm markets, historic sites, and cultural venues fuel a growing tourism industry. In 2016, tourists spent \$554.2 million in Ulster County, supporting more than 8,800 jobs.¹²

An analysis prepared for the Ulster County Economic Development Alliance in 2015 recommended five industry clusters that should be the focus of the County’s economic development efforts:

- Advanced manufacturing;
- Agriculture and food production;
- Arts production;

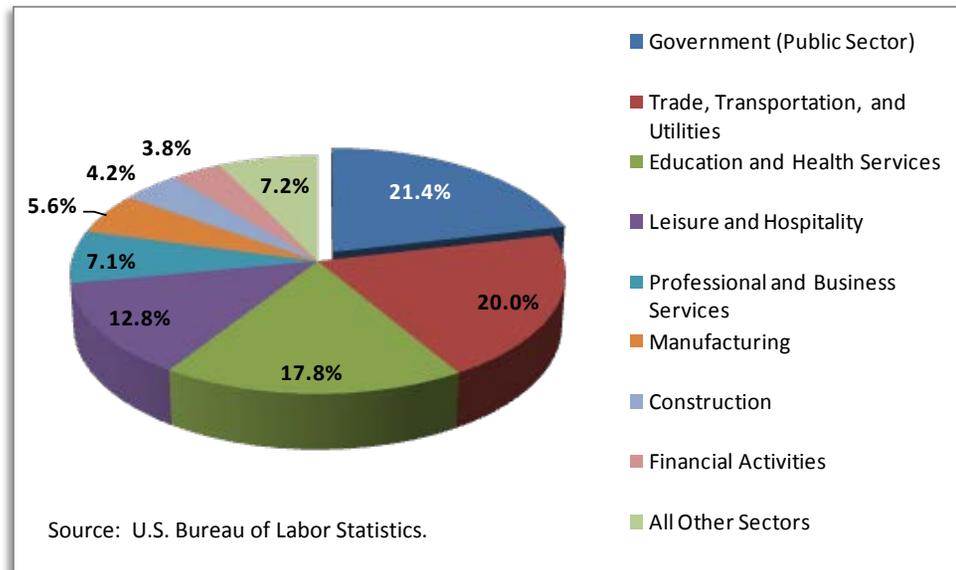


Figure 3: Employment by Super-Sector, Ulster County, 2016

¹² Tourism Economics, *The Economic Impact of Tourism in New York, 2016 Calendar Year, Catskills Focus*.

- Digital design and technology; and
- Tourism and hospitality.¹³

These clusters align with the “LIVE, WORK, and PLAY” vision for the Mid-Hudson region as presented in the 2017 progress report of the Mid-Hudson Regional Economic Development Council (REDC). The REDC’s “WORK” initiative aims to attract and retain quality jobs in the region’s “mature and emerging clusters,” such as health care, advanced manufacturing, information technology, and financial and professional services. Similarly, the “PLAY” initiative “seeks to position the region as a premier tourist location based on its scenic beauty, local agriculture, food and beverage industry, arts, culture, history, and recreational assets, as well as its proximity to New York City.” Industries associated with this initiative include agriculture; tourism, arts, and culture; and food and beverage manufacturing.¹⁴

Economic Development Resources

Economic Development Committee

The Town of Esopus Economic Development Committee is charged with showcasing the economic potential and opportunities available in the Town of Esopus, for both new and established businesses, large and small. The committee is made up of town officials, county officials, residents, and business owners.

The Committee seeks to make it as easy as possible for individuals to open and operate a new business in town, by providing information that will make the process smoother. Existing businesses concerns are heard by the committee often, and any assistance possible is offered in order to maintain success and a positive atmosphere for economic growth and development. The Committee works hand in hand with the Ulster County Office of Economic Development which offers an extensive listing of [business resources](#) and services for new and existing enterprises. The committee maintains a strong social media presence and has an active outreach strategy for community members and businesses.

A revolving loan program, the Town of Esopus Waterfront Development Loan Fund, overseen by the Economic Development Committee, was funded with \$2 million from the U.S. Department of Housing and Urban Development's (HUD) Section 108 loan program. Through the fund, the Town provides financing to Esopus businesses for projects that range from a \$50,000 minimum to a \$1 million maximum. Loans are for development and job creation for new and existing businesses. The interest rates are between three and one-half percent (3.5%) and four and three-quarters percent

¹³ Fairweather Consulting, *An Industry Targeting Analysis for the Ulster County Economic Development Alliance*, November 2015.

¹⁴ Mid-Hudson Regional Economic Development Council, *Progress With Purpose: Future Forward, 2017 Progress Report*, September 2017, p. 15.

(4.75%) depending on project size. Additional financing and incentives are available to Town businesses through the Ulster County Office of Economic Development.

Table 16: Where Town of Esopus Residents Work, presents data on where Esopus residents who participate in the labor force are employed. The information is restricted to those working in primary jobs as of 2015, the most recent year for which data are available.¹⁵

Table 16: Where Town of Esopus Residents Work		
Location	Count	Share
Ulster County	1,427	44.9%
City of Kingston	593	18.7%
Town of Ulster	272	8.6%
Town of New Paltz	150	4.7%
Town of Esopus	149	4.7%
Other Towns	263	8.3%
Dutchess County	557	17.5%
Town of Poughkeepsie	175	5.5%
City of Poughkeepsie	108	3.4%
Other Towns	274	8.6%
New York City (All 5 Boroughs)	339	10.7%
Orange County	190	6.0%
Westchester County	95	3.0%
All Other Counties	569	17.9%
TOTAL	3,177	100.0%

Source: U.S. Census Bureau, LED OnTheMap Origin-Destination Database (2015).

¹⁵ *Primary jobs* are public- and private-sector positions covered under the state unemployment insurance system. A primary job is the highest paying job for an individual worker for the year.

As the table indicates, less than 5% of employed Town residents work in Esopus. More than 40% work elsewhere in Ulster County, with 18.7% in the City of Kingston and 8.6% in the Town of Ulster. About 17.5% of Esopus residents commute to jobs in Dutchess County to the east. Other commuting destinations include New York City, Orange County, and Westchester County.

According to the 2012-16 American Community Survey (ACS), 86.0% of Esopus residents who are employed drive to work. The mean travel time to work is 24 minutes; however, more than 10% of those who do not work at home travel 45 minutes or more.

As shown in **Table 17: Industries In Which Esopus Residents Are Employed**, nearly 20% of the jobs held by Esopus residents, regardless of their location, are in the public sector. This includes jobs in local, state, and federal government as well as public schools and universities. Health care and social assistance, retail trade, and accommodation and food services are the top private-sector industries in which residents are employed.

Table 17: Industries in Which Esopus Residents Are Employed		
Sectors	Count	Share
Public Administration and Government	607	19.1%
Health Care and Social Assistance	520	16.4%
Retail Trade	363	11.4%
Accommodation and Food Services	230	7.2%
Manufacturing	226	7.1%
Construction	168	5.3%
Professional and Technical Services	145	4.6%
Wholesale Trade	126	4.0%
Administrative & Waste Services	120	3.8%
Personal and Repair Services	118	3.7%
Finance and Insurance	98	3.1%
Information	95	3.0%
All Other Industries	361	11.4%
TOTAL	3,177	100.0%

Source: U.S. Census Bureau, LED OnTheMap Origin-Destination Database (2015).

Resident Commutation and Employment

Employment in Esopus

Based on Local Employment Dynamics data from the U.S. Census Bureau, an estimated 617 individuals work in the Town of Esopus. The top five industries with respect to employment, comprising slightly more than half of the jobs, are information (12.5%), retail trade (11.5%), transportation and warehousing (11.3%), government (9.2%), and wholesale trade (8.4%). With the exception of the Ulster BOCES Career and Technical Center and Iron Mountain in Port Ewen, there are no major employers in Esopus. Most businesses in the Town are small- to mid-sized establishments.

More than three-quarters of those who are employed in Esopus live elsewhere, although they tend to commute relatively short distances (i.e., less than 25 miles). The majority come from other locations in Ulster County and to a lesser extent, Dutchess County.

Not surprisingly given the lack of major employers in the Town, Esopus is a net exporter of jobs: the number of residents leaving to go to work each day (3,028) exceeds the number of workers commuting into Esopus (468). The outflow of workers suggests that local businesses are unlikely to be successful catering to the daytime employment base. Increasing the number of local employers that bring employees from outside will be a key aspect of enhancing the Town's local service and entertainment business sector.

Port Ewen Hamlet Study

Under the aegis of the Ulster County Main Streets Program, a study of the hamlets of Milton (Town of Marlborough) and Port Ewen (Town of Esopus) was completed in 2011. The Report, entitled *Hamlets of Port Ewen and Milton Case Studies* was summarized in Section 1 of this Comprehensive Plan, and is being examined here due to its applicability to economic development within the Town of Esopus. The report discusses the challenges and opportunities faced by the hamlets and their Main Streets, identifying the potential for them to capitalize on their proximity to the waterfront and increase their market share of retail and restaurant sales.

Among Port Ewen's major assets that could be leveraged for economic development, the study lists the following:

- Completion of a NYS Department of Transportation-funded sidewalk and streetscape project in 2007;
- Water and sewer infrastructure;
- Traffic counts of 11,500 vehicles per day passing through the hamlet;
- A "tightly knit, walkable residential neighborhood" less than a quarter-mile from Broadway (US Route 9W);
- Proximity to public parks, boat launches, and private marinas along the Hudson River and Rondout Creek;
- Nearby recreational, cultural, and historic resources and public institutions including the post office, Town Hall, and library; and

- Underutilized parcels and buildings with the potential for redevelopment and reuse.

The report cites the nearby Rondout waterfront district in Kingston as both an opportunity and a threat to commercial activity in Port Ewen: “The number of established restaurants, cultural offerings, and the growing retail sector in the Rondout could overshadow Port Ewen’s efforts to attract business. However, if done correctly, Port Ewen could benefit from its proximity of the Rondout. This requires attracting certain retail anchors to the hamlet, and then increasing the visibility of those businesses¹⁶.” The report goes on to say that Port Ewen may have an advantage over the Rondout in some respects, because lot sizes in the hamlet are larger, ample on-street parking is available, and several sites have unobscured views of the river.

Recommendations in the report are provided to help Port Ewen develop a “cohesive sense of place” and get more people out of their cars to patronize local businesses. These include addressing specific planning and zoning issues, establishing an economic development committee to recruit businesses and reduce building vacancies, increasing cooperation between the public and private sectors, and undertaking promotional activities to build the hamlet’s reputation as a waterfront designation.

Tourism Accommodations

Visitors coming to Esopus have limited choices in where they can stay. The Lake Motel, provides 10 rooms in Ulster Park along US Rt. 9W. The motel is open year-round with rooms available at nightly, weekly, and monthly rates. Also of a similar motel style, the Capri Motel is located on Broadway in Port Ewen, featuring similar offerings as the Lake Motel. There are two bed and breakfast type establishments in Town, including the Jingle Bell B&B, located along Swartekill Road in the heart of the southern central portion of Town, as well as the Vacation House B&B in Ulster Park. Additionally there are cottage type accommodations are available at the Pinecrest Acres Bungalows, located on Ulster Avenue, in Ulster Park.

There are seven overnight accommodations in neighboring Highland and six in New Paltz. The City of Kingston has 18 overnight accommodations, and 11 across the Hudson River in Hyde Park.

The sharing economy pioneer Airbnb is used by many residents in the Town of Esopus. As of June 2018, the Airbnb website has 70 rooms listed as available in the Town of Esopus. These overnight accommodations range from single bed rooms to full houses. Surrounding towns also have

¹⁶ Ulster County Planning Department, *Hamlets of Port Ewen and Milton: Case Studies*, October 2011, p. 43.

numerous listings on Airbnb, the exact number is unknown. The proliferation of Airbnb units in Esopus is concerning for some community residents due to unregulated and incidental impacts to community character and safety.

Agriculture and Tourism

Ulster County adopted the Ulster County Agricultural and Farm Plan Protection Plan in 1997. This plan covered the pressing issues that farms were facing and devised a plan to help mitigate those issues. Agriculture is an important part of Ulster County and the Town of Esopus. Farming has and continues to play an important part in the Town as discussed in more detail below.

The New York Farm Winery Act of 1976 and the Farm Brewery license in New York State are laws that make it possible to grow and directly sell wine, beer, cider and spirits to visitors. This is further enhanced by the fact that Esopus is located within the Hudson River Region American Viticulture Area, a designated and federally recognized wine grape-growing region. Most vineyards are located within 2 miles of the River and are generally planted on the western side of the river where early morning sunshine can rapidly warm the vines. The river valley also helps moderate the climate, making it cooler in the summer and warmer in the winter than surrounding areas, all beneficial to growing grapes.

Esopus has a limited number of remaining farms, six have websites for visitors. Of those farms, three are vineyards, some with tastings rooms. Star Distilleries, which will produce Vodka and offer high end accommodations, has been approved by the Town Planning Board and is currently under construction at the time of this writing in West Park. El Paso Winery, located in Ulster Park is a popular attraction for both Town residents and visitors alike. The winery gives tours, has special events, features wine talks and has evening live music events. Red Maple Vineyard, located in West Park, is a 143 acre farm-to-table wedding venue and vineyard, with 5 acres of vegetable gardens and nine acres of vineyards. There are also two “you-pick” farms that attract visitors from throughout the region. Frog Hollow Farms is located in the Hamlet of Esopus along Old Post Road and offers horse stables and riding on their 135 acre property overlooking the Hudson River.

The US Rt. 9W corridor and the River Road area in Ulster Park has been identified as a major eco/agritourism corridor through the Town. Many farms, wineries, and outdoor attractions are located within this area. Due to the natural location of these businesses and attractions, the Town continues to encourage additional eco/agritourism uses and attractions along this corridor.

Additional related attractions along the Town’s eco/agritourism corridor, includes the Headless Horseman Hayrides and Haunted Houses, located in Ulster Park and open year round. The site features ten attractions, gift shops and numerous food cafes. This has been identified nationally as a top attraction by national media outlets. The attraction is set on a 65 acre farm along US Rt. 9W. Not only does this attract visitors from throughout the region and state, but the attraction provides a considerable amount of seasonal employment hiring actors, designers, builders, office operation staff, and many other support staff. In winter, the site is transformed to the Frosty Fest, a Christmas themed village and light attraction in December.

Observations:

1. A small percentage (5%), of Esopus residents work in the Town with the majority (86%), commuting out of Town to work.
2. The Town of Esopus has an opportunity to capitalize on its agricultural, recreational and historic/cultural amenities, particularly along the US Route 9W eco/agritourism corridor between West Park and Ulster Park.
3. There is a severe lack of overnight accommodations in the Town of Esopus.

Environmental and Natural Resources

The following section focuses on the Town of Esopus’ complex and critically important environmental and natural resources that are key to the Town’s community character and makes the Town a sought-after outdoor recreational destination. These resources are also critically important to the region’s biodiversity and ability to withstand the changing climate. The following summary relies heavily on the Town of Esopus Habitat Summary prepared by NYSDEC – Natural Areas and Wildlife in Your Community – A Habitat Summary Prepared for the Town of Esopus, March 2019 (hereinafter referred to as the “Habitat Summary”). With the permission from NYSDEC, the Habitat Study has been included in this Profile as an Appendix – see *Appendix A-1: Habitat Summary for the Town of Esopus*.

Hudson River

The Hudson River, which flanks the eastern edge of the Town of Esopus for approximately 13 miles is inarguably the most defining feature of the Town. Due to variations of topography, the river can be viewed from US Rt. 9W in Port Ewen, northern Ulster Park, West Park, and Esopus hamlets, areas where the shoreline is not bifurcated and obstructed by railroad tracks. The Town also owes a great deal of its development pattern to this important natural topography influenced by the river.

This portion of the Hudson River is an estuary, which is entirely freshwater along the shoreline of Esopus and considered a globally rare ecosystem. The estuary portion of the river, located within the Lower Hudson Watershed (LHW) extends from the Battery at the southern end of Manhattan to the Troy Dam at the confluence of the Mohawk River. The LHW makes up about 40% of the larger Hudson/Mohawk River Basin which is one of the largest drainage areas on the eastern seaboard of the United States.¹⁷

¹⁷ <https://www.dec.ny.gov/lands/48367.html>

As an estuary, the Hudson River is influenced by tides from the Atlantic Ocean that change the direction of water flow four times per day. The tides are apparent along the shoreline and water can fluctuate up to five (5) feet in normal weather conditions and major storms that coincide with high tide can exacerbate water level fluctuations. As a result, damaging storm surge can occur in low-lying areas of the Town which may increase in severity as sea and associated river levels are expected to rise. The Town will need to continue monitoring this issue and begin planning improvements in key areas to increase flood resiliency.

In accordance with the Protection of Waters Program, the policy of New York State is to preserve and protect lakes, rivers, streams and ponds. All waters of the state are provided a class and standard designation based on existing or expected best usage of each water or waterway segment. The Hudson River is a Class A waterbody, and therefore considered a source of water supply for drinking, culinary or food processing; primary and secondary contact recreation; and fishing. The waters are considered suitable for fish, shellfish and wildlife propagation and survival.

The Hudson River is utilized as the Town of Esopus' drinking water source for the northern portion of the Town, with the intake and treatment plant located south of Port Ewen along River Road. The water treatment plant is located within the 100-year floodplain and has been negatively impacted by flooding events in the past. If the Town decides to maintain the treatment plant in its current location, long-term flood resiliency improvements will be necessary to protect the integrity and functionality of the plant.

Esopus' water intake and treatment plant is located downstream from the City of Kingston wastewater treatment plant (WWTP) and discharge point. Due to major rain events and combined rain and snowmelt conditions, Kingston's WWTP occasionally experiences combined sewer overflow (CSO) events releasing partially treated effluent into the Rondout Creek near the confluence with the Hudson River. When these CSO events have occurred, NYSDEC has identified the Town of Esopus' drinking water intake as potentially impacted. Continued improvements to Kingston's wastewater infrastructure is necessary going forward to protect Esopus' drinking water quality.

According to the NYSDEC, this portion of the Hudson River is considered an impaired waterway due to the presence of certain pollutants. Major pollutants cited include metals and organics, with the possibility of pathogens. These pollutants are a result of toxic/contaminated settlement, combined sewer overflow, and urban/stormwater runoff, factors that lead to numerous potential health problems for both humans and wildlife. This has chiefly resulted in advisement against, or restrictions for, the consumption fish from the river.

Significant Coastal Fish and Wildlife Habitats (SCFWH)

The New York State Department of State's (NYSDOS) Office of Planning and Development, in cooperation with the New York State Department of Environmental Conservation (NYSDEC) has designated over 250 locations across the State of New York as Significant Coastal Fish and Wildlife Habitats. For formal designation of a SCFWH, the NYSDEC evaluates the significance of coastal fish and wildlife habitat areas based on a number of technical points. Following any positive recommendation from the NYSDEC, the NYSDOS designates and maps specific areas and creates a

narrative. The narrative creates a supporting record of the SCFWH's designation, providing precise information regarding the areas fish and wildlife resources which depend on habitat and make it significant. This data is provided to aid in the evaluation of the impacts of proposed activities related to the identified characteristics of the habitat-those being essential for the continuation of the habitat's viability as described. The Kingston-Poughkeepsie Deepwater Habitat is a local SCFWH.

Kingston-Poughkeepsie Deepwater Habitat

The Kingston-Poughkeepsie Deepwater Habitat is a 6,350 acre area encompassing a 25 mile stretch of the Hudson River, extending from the City of Kingston, south to Wappinger Creek in the Town of Wappinger, south of Esopus. The habitat is located along the Towns of Esopus, Lloyd, and Marlborough, and the City of Kingston in Ulster County. The habitat is also located along the Towns of Rhinebeck, Hyde Park, Poughkeepsie, Wappinger, and Newburgh. This significant habitat is a nearly continuous deepwater segment of the Hudson River and ranges in depth from 20 feet to 50 feet or greater, with a maximum depth of 125 feet.

Deepwater areas provide safe wintering habitat and support a variety of freshwater and migratory species in the Hudson River. Species found in this section of river include the following:

- Alewife
- American eel
- American shad
- Atlantic sturgeon
- Blueback
- Bluegill
- Brown bullhead
- Canadian geese
- Common carp
- Four spine stickleback
- Herring
- Hog choker
- Golden shiner
- Killifish
- Largemouth bass
- Pumpkinseed
- Shortnose sturgeon
- Striped bass
- Smallmouth bass
- Spot tail shiner
- Three spine stickleback
- Yellow perch
- White catfish
- White perch

The Kingston-Poughkeepsie Deepwater is inarguably one of the largest and most recognized spawning locations for Atlantic sturgeon, and the chief wintering area for shortnose sturgeon, both endangered species in New York State. Per NYSDOS, it is believed that these deepwater areas may be critical year round habitats. Fish larvae, assumed to be that of the Atlantic sturgeon, have been found at depths of 45 feet to 120 feet. Atlantic sturgeon have been routinely caught in deep water on both sides of the river throughout the habitat area. Shortnose sturgeon are usually found at depths of 30 feet.

The majority of both Atlantic and shortnose sturgeon taken for age-growth analysis during the biological survey in the 1930s came from within this habitat near Rhinecliff and Port Ewen. The Kingston-Poughkeepsie Deepwater Habitat also encompasses the reach of highest mean striped bass egg density from 1974-2006. Striped bass spawning over deepwater has been observed in this reach of the river. This area contributes directly to the production of in-river and ocean populations of food, game, and forage fish species. Consequently, commercial and recreational fisheries throughout the North Atlantic benefit from these biological input from this habitat. The area has also been shown to provide habitat for blue crab, and concentrations of waterfowl such as American black duck, blue-winged teal, common goldeneye, common merganser, gadwall, greater scaup, green-winged teal, hooded merganser, lesser scaup, mallard, northern pintail, red-breasted merganser, and wood duck, further demonstrating the diversity of this critical habitat.

Major Streams

Rondout Creek

The Rondout Creek habitat, is an approximate four-mile tidal segment of the Rondout Creek, extending from its mouth on the Hudson River to the dam located slightly upstream from the NYS Route 213 crossing at Eddyville. The Creek is a large, warm water stream featuring a drainage area of over 1,100 square miles with an average discharge volume of approximately 1,600 cubic feet per second. This critical habitat is within the tidal range of the Hudson River, and is relatively deep with a portion of the habitat consisting of flats, tidal wetlands, and shallows, especially in the vicinity of Gumaer Island, just north and west of the Hamlet of Connelly. The eastern few miles of the Rondout Creek has been channelized to facilitate barge traffic in the adjacent Kingston Rondout district. A far-reaching swamp and flats zone occurs at the confluence of the Creek and River and features submerged aquatic vegetation, mainly water celery. Several threatened, endangered and rare plants also grow in this critical habitat to include:

- Frank's sedge
- Heartleaf plantain
- Smooth bur-marigold
- Spongy arrowhead
- Swamp cottonwood
- Winged monkey flower
- Southern estuary tick

Dredging and the discharge of wastewater from industrial and municipal point sources, including CSO as previously discussed, have created habitat disturbances at the mouth of the Rondout Creek. Additionally, the dam at Eddyville controls flows and is a barrier to typical fish migrations. Despite considerable human disturbance, the Rondout Creek has historically supported large and diverse concentrations of fish species. This is an important spawning habitat for numerous species including alewife, smelt, herring, striped bass and perch. The deep water area where the Creek meets the Hudson River is one of the most important wintering areas for largemouth and smallmouth bass along the Hudson. In shallow areas, the submerged

aquatic plant life provides food for fish, animals, and birds. The banks of Rondout Creek also provide habitat for common snapping turtles and common map turtles, similar to areas downriver.

The abundant fisheries resources and public access to the Rondout Creek provide significant opportunities for fishing. The habitat is popular among fisherman from throughout the valley, especially in spring and summer. This area is also highly utilized by hunters seeking waterfowl and canoers and kayakers seeking respite from the busy Hudson River. In addition, marinas and boating related uses and industries occupy almost ten percent of the Rondout Creek's significant habitat area, indicating that this is a highly disturbed area.

Wallkill River

A tributary of the Hudson River, the Wallkill River flows through two states, from its source in Lake Mohawk in Sparta Township, New Jersey. Twenty-two towns, villages and cities in Orange County drain wholly or partially to the Wallkill, and the river flows 26 miles through Ulster County draining 170 square miles before it merges with Rondout Creek, flowing on to the Hudson River.¹⁸

The Wallkill River enters the Town of Esopus at the Town's southwestern border in the Hamlet of Rifton, crossing under NY Route 32/213 and Interstate 87. The Town's Perrine's Bridge Park is located along the Wallkill River in Rifton between NYS Rt. 213 and I-87 and provides canoe/kayak access. Just north of the Town's park is Perrine's Bridge (the second oldest covered bridge in NYS) that provides pedestrian/bicycle access over the Wallkill to the Town of Rosendale. From this location, the River continues north serving as the Town's western border before flowing into Sturgeon Pool. North of Sturgeon Pool, the River ends where it meets the Rondout Creek. There are two dams on the Wallkill River within the Town of Esopus; one in Rifton and one at the northern end of and creating Sturgeon Pool. The Swartekill Creek drains into the Wallkill River at Sturgeon Pool. A more detailed discussion of the Swartekill Creek is provided below, under *Significant Biodiversity Areas*.

In 2018, the Lower Main Stem of the Wallkill River (between Sturgeon Pool and Tuthill, NY) was listed as impaired by NYSDEC. It is known to be impaired by excessive nutrients from agricultural runoff and point source discharges, including urban/storm runoff. This portion of the Wallkill is a Class B waterbody, indicating that the water quality is suitable for primary and secondary contact recreation and fishing. However, according to NYSDEC, aquatic life is impaired based on biological sampling that shows moderate impacts from nutrients and based on the type of sampling, it can be inferred that secondary contact recreation use may also be impaired. As a result, more specific sampling is necessary to confirm that secondary contact recreation is impaired. There is currently inadequate data/information to evaluate primary contact recreation (public bathing) use in this

¹⁸ Orange County Soil and Water Conservation District, et al., Wallkill River Watershed Conservation and Management Plan.
www.orangecountygov.com/DocumentCenter/View/4134/Wallkill-River-Watershed-Conservation-and-Management-Plan-2010-PDF

portion of the Wallkill River. Fish consumption is unassessed and there are no advisories limiting the consumption of fish, beyond the general advice for all waters, pursuant to NYS DOS Health advisories 2018.¹⁹

Black Creek

The Black Creek habitat as outlined by the New York State Department of State is approximately 41 acres and located at the 130 acre Black Creek Preserve, owned by Scenic Hudson. The principal habitat is forested lands with vernal pools, bordered by tidal wetlands featuring submerged aquatic vegetation where the creek meets the Hudson River. Many invasive plant species are present including purple loosestrife and water chestnuts. In addition, a number of endangered, threatened and rare plants are found within or adjacent to this habitat area, including false hop sedge and reflexed sedge, winged monkey flower, and swamp lousewort.

A number of ecological communities make up the Black Creek habitat area, including a freshwater tidal creek, freshwater tidal wetlands, submerged aquatic vegetation, tidal swamps, and shrub swamps. Black Creek is also diverse in animal life as it is an important spawning, nursery, and refuge ground for both seasonal and resident fish species. This critical habitat has historically sustained one of the largest herring runs in the Hudson Valley and most recently was dominated by Alewives. White perch, sea lamprey, white sucker and spot tail shiner also use this habitat as a principal spawning ground in the area.

A great deal of wildlife diversity is found at the preserve including the American eel. The underwater aquatic plant, water celery provides food and refuge for fish and land animals. This habitat supports a number of amphibians and reptiles and is a primary habitat for the common map turtle in the Town of Esopus. These turtles are often found along the banks of the creek mouth living amongst the rocks near the Hudson River. Additional noteworthy animals who call this habitat home include the following:

- Northern cricket frog
- Northern slimy salamander
- Red-spotted newt
- Wood frog
- Spring peeper
- Green frog
- Northern black racer
- Grey tree frog
- Northern water snake
- Marbled salamander
- Jefferson salamander

¹⁹ www.dec.ny.gov/docs/water_pdf/wilhudslowwallkill.pdf

Significant Biodiversity Areas

Significant Biodiversity Areas (SBAs) are locations of high concentration of biodiversity or unique ecological features, described in NYSDEC's Hudson River Estuary Wildlife and Habitat Conservation Framework. These areas contribute to and serve as a framework for conservation partnerships and voluntary protection efforts.

Black Creek

Black Creek is one of the few low-elevation cold water streams in the region, with the ability to support Brown Trout and other coldwater-dependent species. Black Creek empties into the Hudson River at Black Creek Preserve, just south of the Hamlet of Esopus. The mouth of Black Creek is bordered by forests and opens to a freshwater tidal wetland dominated by submerged aquatic vegetation beds where the creek meets the Hudson River. The creek has historically supported one of the largest river herring spawning runs in the Hudson Valley, most recently dominated by Alewives. American Eel are also present in the creek and Map Turtles are found along the banks at the creek mouth.²⁰ Beginning in 2013, the NYSDEC has placed an instream fish counting device in Black Creek within the Black Creek Preserve to gain a better understanding of the river herring use of tributaries during spawning runs.²¹ There is a NYSDEC designated fishing access location on Black Creek on the west side of US Rt. 9W south of the entrance to Black Creek Preserve. NYSDEC stocks the creek with brown trout at this site each spring.

Swartekill

The Swartekill is located in the south-central portion of the Town and originates in the Town of Lloyd, draining a large area including the southern portion of Shaupeneak Ridge Park in the Town of Esopus. The creek drains into the Wallkill River/Sturgeon Pool in the Hamlet Rifton, near the intersection of NY Rt. 213 and Carney Road. The Swartekill provides exceptional habitat for the northern cricket frog and other species of concern, including, but not limited to the four-toed salamander and the worm-eating warbler. In addition, the Swartekill is associated with several large wetland complexes as previously discussed. NYSDEC provides two fishing access locations on the Swartekill.

Esopus/Lloyd Wetlands and Ridges

The Esopus/Lloyd Wetlands and Ridges Significant Biodiversity Area is straddled between the Towns of Lloyd and Esopus (but also inclusive of minor areas of the Towns of Marlborough, New Paltz, and Plattekill) is home to wetland and upland habitat that is of chief importance to many animals and plant life. This importance is of most identifiable with breeding waterfowl and amphibian species as well as some state threatened plant

²⁰ NYSDEC Hudson River Estuary Program, *Natural Areas and Wildlife in Your Community – A Habitat Summary Prepared for the Town of Esopus*, pg. 10-12

²¹ <https://www.dec.ny.gov/animals/9969.html>

life. The area of this significant habitat has been identified at nearly 32,400 acres or an area of about 51 square miles, and is inclusive of public, private, and nonprofit land ownership categories. The remarkably undeveloped and pristine upland communities include ridges, ledges, and a mature hemlock hardwood forests. This area of the Town supports one of the largest populations of endangered large twayblade orchid in the Northeast. Also within this identified territory is a rare habitat for the state-listed northern cricket frog, and amphibian preferring sunny marshes and ponds with floating vegetation mats. Lastly that significant habitat includes several significant and rare ecological communities and features one of the largest dwarf shrub bog locations in the Hudson Valley.²²²³

The preservation of this significant area of ecological integrity is most threatened by suburban expansion/habitat fragmentation by new development and associated new runoff into wetlands and streams. It is foreseen that responsible planning and appropriate adjacent development will secure this successful viability of this significant habitat community into the future for species protection and general health, safety, and welfare for all in the Hudson Valley.²⁴

Wetlands

The Town of Esopus has a significant amount of tidal and non-tidal wetlands which are home to many species of plant and animal life including rare species such as large twayblade orchid, northern cricket frog, red-headed woodpecker, musk turtle, marbled salamander, and comet darner, among others. Refer to *Appendix 4: A Habitat Study Prepared for the Town of Esopus* for additional information on wetland species. Town of Esopus These wetlands are located throughout the Town, with the largest concentration of non-tidal wetlands on the southern border near the Town of Lloyd and New Paltz Town lines, within the Esopus and Lloyd Wetland and Ridges Significant Biodiversity Areas. NYSDEC has jurisdiction over mapped wetlands with an area of 12.4 acres or larger pursuant to the New York State Freshwater Wetlands Act. Smaller wetlands may be protected if they are considered of unusual local importance. Additionally, the Army Corps of Engineers may have jurisdiction over wetlands that are associated with waters of the United States. All of the Town's wetlands generally run north-south, consistent with the Town's terrain and hydrology.

There are very significant wetland complexes in the headwaters of the Swartekill and Black Creek – a 180-acre wetland located on lands partially owned by Scenic Hudson and bordered by Floyd Ackert Road and a 420 acre wetland associated with the Swartekill in the southern portion of the Town and located on New York State, Ulster County, Scenic Hudson and privately-owned. There is also state-significant wetland owned by Scenic Hudson, a dwarf shrub bog at Louisa Pond within Shaupeneak Ridge Park. In addition, there are two wetland complexes in the Esopus Lake and

²² NYSDEC, Hudson River Estuary's, Wildlife and Habitat Conservation Framework – *An Approach for Conserving Biodiversity in the Hudson River Estuary Corridor*. 2006. Pg. 69-70. www.dec.ny.gov/docs/remediation_hudson_pdf/hrebcf2sba.pdf

²³ NYSDEC Hudson River Estuary Program, *Natural Areas and Wildlife in Your Community – A Habitat Summary Prepared for the Town of Esopus*, pg. 14

²⁴ NYSDEC, Hudson River Estuary's, Wildlife and Habitat Conservation Framework – *An Approach for Conserving Biodiversity in the Hudson River Estuary Corridor*. 2006. Pg. 69-70. www.dec.ny.gov/docs/remediation_hudson_pdf/hrebcf2sba.pdf

Mirror Lake area of the Town. These wetlands are under the ownership of Scenic Hudson totaling 114 acres and 76 acres. Finally, there are numerous additional wetlands in the southern portion of the Town, many of which cross the Town of Esopus/Lloyd border, including a New York Natural Heritage Program mapped state-significant wetland, a large red maple-hardwood swamp complex on the Esopus-Lloyd border.

Other significant natural communities in Esopus include the rare Freshwater Tidal Marsh and Freshwater Intertidal Shore habitats located along Sleightsburgh Park. Nearly all of Sleightsburgh Park is considered to be tidal wetlands and inundation is dependent upon Hudson River water levels. Tidal wetlands within the Town are discussed in more detail below under “Significant Habitat.”

Vernal pools, which are seasonal wetlands, occur throughout the Town with a major complex of 15 high quality pools in the Black Creek preserve. Many animals depend on these vernal pools, especially for breeding. Many forest amphibians, such as frogs, toads, and salamanders spend a majority of their life in nearby uplands and other wetlands, but migrate to breed in the fish-free vernal pools.

Esopus Meadows

Esopus Meadows is a shoal of freshwater shallows (less than 10 feet deep at mean low water), and intertidal mudflats with extensive underwater aquatic vegetation dominated by water celery. The preserve is located off the shores of Ulster Park and adjacent to the Town’s Esopus Meadows Lighthouse Park and Scenic Hudson’s Esopus Meadows Preserve.

The shallow, subtidal lands provide feeding, breeding, and nursery habitats for many aquatic fish species including Striped Bass and American Shad. A sizable population of shortnose and American sturgeon winter in the adjacent channels of the Meadows and can be found in the area year round. A significant concentration of waterfowl also occur in the Esopus Meadows area during spring and fall migrations, attracted by the many valuable feeding areas. Esopus Meadows is adjacent to the Kingston-Poughkeepsie Deepwater Habitat on the opposite side of the River. The Meadows are one of the southernmost locations of freshwater shallows on the Hudson. In recent years the invasive, non-native water chestnut has expanded to the site and has proved problematic to fish species as well as humans who seek to use the river for recreational purposes.

Esopus Forest Habitats

The Nature Conservancy and New York Natural Heritage Program have identified globally-rare “matrix forests” at the statewide level. These forests are large enough to withstand major natural disturbances, maintain important ecological processes, and support populations of forest-interior wildlife plants. The approximate 26,000-acre Shaupeneak matrix forest block covers much of Esopus west of US Rt. 9W and is critical for regional habitat connectivity. The importance of this forest block is disproportionate to its size. Specifically, the region’s larger, forested mountain

and ridge areas – the Catskills, Shawangunks, Taconics, and Hudson Highlands, are all connected via relatively intact linkage zones through the Shaupeneak forest matrix block. A broader discussion of the major forest blocks in the Town of Esopus is provided next.²⁵

Large forests provide numerous benefits, with the major ones being wildlife habitat, clean water, climate moderation, and forest products. Larger forests generally provide higher quality habitat and greater benefits than smaller ones. In particular, forested shorelines help maintain water quality while creating a wildlife travel corridor. The Town of Esopus lies in one of the most intact forested regions of New York State and includes the significant forested areas of the Shaupeneak Ridge and the Black Creek Corridor, which have been protected by state and non-profit organizations (including Scenic Hudson), although most forested lands in the Town remain in private ownership. Conserving Esopus’ large forest areas and the connections between them will help sustain the Town’s rich diversity of forest plants and animals and the numerous other benefits that forests provide residents.²⁶

The largest continuous forest block in Esopus extends from Old Post Road south in neighboring Towns of New Paltz and Lloyd and mapped as “globally significant.” As stated above, forests of this size are considered large enough to survive catastrophic natural disturbances. These forests are also large enough to support breeding populations of forest-interior species, including numerous forest songbirds, raptors, and far-ranging mammals like black bear, fish, and bobcat. Such characteristics will likely contribute to resilience in a changing climate.²⁷ It is critically important to protect these large, high quality forest areas and the natural connections between them.

Two additional major forest areas reside to the north – the Shaupeneak Ridge forest block, measuring over 5,200 acres and the Hussey Hill forest block, measuring over 3,000 acres (both within the Shaupeneak Forest Matrix Block). While these forest blocks as classified as “locally significant,” they comprise important sections of the “matrix forest” of statewide and global significance and should be considered of high significance based on the low density of development and the presence of extensive exemplary forest communities.²⁸

Ulster County Intact Habitat Core

The most intact areas of undisturbed habitats that highlight valuable interior forest habitat present in the Town of Esopus are also recognized as “High” to “Outstanding” Intact Habitat Cores for Ulster County. These habitat cores were previously identified through a study by the Green Infrastructure Center in collaboration with Ulster County and NYSDEC staff. These areas represent significant natural “green infrastructure” on the landscape providing clean area and water and valuable ecological functions that are otherwise costly to replicate through engineering. They can

²⁵ NYSDEC Hudson River Estuary Program, *Natural Areas and Wildlife in Your Community – A Habitat Summary Prepared for the Town of Esopus*, pg. 8

²⁶ Ibid., 15

²⁷ Ibid

²⁸ Ibid

be used to inform local planning and prioritization for conservation and could be integrated into an Open Space Plan that seeks to ensure these habitats are not fragmented or otherwise impacted and continue to provide the above-mentioned critical benefits. The introduction of invasive species is perhaps one of the greatest threats to Esopus' forests and other habitats. Guiding future development to minimize forest fragmentation and loss will help minimize the spread of invasive species into interior forests and conserve important habitats in the Town.²⁹

Invasive Species

The following is a summary of invasive species present in the Town of Esopus that are of high management priority for the Town. As the Town is focused on the protection of the natural environment, wildlife, agriculture and personal property, it is committed to monitoring these invasive and any further invasive species with the help of state agencies and not-for-profit organizations and volunteers. When practical, the Town is committed to confronting these species and the problems they create, head on as to ensure control, and if necessary and feasible, complete eradication.

Water Chestnut

The proliferation of water chestnuts along the Hudson River and specifically along Sleightsburgh Park, Freer Park Beach, and Esopus Meadows/Lighthouse Park is problematic. More recently, water chestnut has been found in Black Creek. Water chestnut (*Trapa natans*), is an invasive aquatic species that can clog rivers, lakes and ponds, negatively impacting aquatic habitats, boating, shipping, swimming, and other recreational opportunities. This invasive species can reproduce rapidly and each year there is a marked increase in their presence along the Town's shorelines since the mid 1980's.

Water chestnuts form a nearly impermeable mat of vegetation atop the water. These masses of floating vegetation create hazards for those who use the waters for recreational uses. The thickness of the masses of vegetation can also significantly limit light permeation into the waters, thus reducing or eliminating the development of the native aquatic plants beneath. The reduction in native plant growth coupled with the breakdown of the many water chestnut plants which die each year can result in reduced levels of dissolved oxygen in the water, impacting aquatic organisms, and has been shown to lead to the mass deaths of fish. The swift and profuse advancement of the water chestnut can also out-compete with floating native aquatic flora.

Control of this aquatic invasive is important to Town residents, visitors, and the overall local recreational and tourism-based economy. Controlling this invasive species however can be an expensive undertaking. Based on records from New York State and Vermont, two states most deeply affected

²⁹ Ibid., 16

by this invasive species, approximately \$9,600,000 (between 1982 and 2011) has been spent on water chestnut control on Lake Champlain alone. No dollar figures are available for the control of water chestnut on the Hudson River.

Initial attempts to combat the growth of water chestnuts were organized by the Town in the mid 1980's and utilized dedicated volunteer labor. At that time volunteers would attempt to pull the plants manually from the riverbed, mostly by hand. This effort, though well intended, proved fruitless as growth rates proliferated rapidly into the late 1980's and 1990's. As the shores of Esopus became inundated with the invasive, the Town purchased a small boat in order to expand their clean out area, doing so in a more methodical and efficient manner. As the boat was used a great deal and began to age, repair became cost prohibitive.

In the late 2000's the Town determined another method was needed and explored harvesters or herbicide application, opting to pursue the former. In 2009 the Town secured New York State grant funding for the purpose of purchasing a new mechanical harvester. Commencing cutting in 2010, the harvester - "Chester" has proven to be of great assistance in creating open waterways, along with the dedication of many volunteers logging extensive hours of cutting.

Since the purchase of Chester, extensive progress has been made on containing water chestnuts in the northern portion of Town by Freer Park Beach, and Hidden Harbor. The southern shores of Esopus, near Lighthouse Park prove to be more challenging to contain such an invasive, as the area is vast, shallow, and open. Total abatement may not be the ideal focus for this area as it is in the north, but cutting open paths through water chestnuts for recreational purposes has proven successful and is now typical procedure. The Town should continue to focus on maintaining and eventually work to reduce the annual growth of water chestnuts, with an eventual goal of complete eradication during the growing season, if possible. . It is understood that permanent eradication may not be feasible at this point and the Town must anticipate having to maintain the water chestnut on an annual basis into the foreseeable future.

Continued partnerships with local volunteers and the pursuit of grants to assist with this issue will be necessary. Due to the short and tidal dependent harvesting window, the Town may wish to consider formally taking over responsibility of fighting water chestnuts spread by utilizing Town employees, or qualified contractors, able to proficiently and consistently operate Chester as finding adequately trained, and available volunteers is becoming increasingly difficult. Furthermore, the Town is in need of an additional harvester that would allow for the removal of water chestnuts south of Freer Park, at Lighthouse Park/Esopus Meadows Preserve. Currently, the Town has to choose which location to focus on during the growing season. This usually leaves Lighthouse Park and Esopus Meadows last in the schedule and as a result, this area has a much higher water chestnut proliferation, negatively impacting water-based recreation opportunities.

Eurasian Watermilfoil

Another aquatic invasive species identified by NYSDEC as having a presence in the Town of Esopus is Eurasian watermilfoil. Not considered as significant an issue as the water chestnuts, it does result in minor negative impacts along the shores of Esopus, Ulster County, and in much of the Mid-Hudson Valley region.

Eurasian watermilfoil (*Myriophyllum spicatum*) is an underwater aquatic species that spreads easily and grows quickly, crowding out native plants, reducing biodiversity, diminishing fish habitat and negatively impacts wetland habitats. The milfoil beds reduce light penetration early in the season before native vegetation begins significant growth, obscuring them from surficial light thus reducing growth potential. As a result of this reduction of native vegetation, milfoil beds have been found to contain significantly fewer living organisms, concomitantly a decreased abundance of native fish species, and diversity thereof.

Like water chestnuts, there are many problems that result due to milfoil concentrations. Recreation, boating and fishing losses have been shown in adjacent communities where the species has proliferated. Additionally, devaluation of shoreline properties values has been evidenced. Long-term monitoring of the milfoil situation will be necessary by NYSDEC and the Town of Esopus to ensure the recreational assets of the Hudson River are not diminished and the quality of shoreline property is preserved.

Emerald Ash Borer

First discovered in Michigan and later in 2009 in the State of New York, the Emerald Ash Borer has led to the destruction of millions of ash trees in the State and in the United States. While this species is found in more than 30 counties, the infestation is primarily concentrated around Ulster and Greene Counties with additional infestations in the Southern Tier and western New York. The Town of Esopus falls within the newly expanded NYSDEC Restricted Zone. The State recently merged the previous Restricted Zones into a single zone in order to strengthen the State's efforts to slow the spread of this invasive pest. .

The adult ash borer has a shiny emerald green body with a reddish abdomen and can measure up to 1/2 inch long. Emerald Ash Borers may be present from late May through early September but are most common in June and July. Signs of infection in ash trees include tree canopy death preempted by a gradual yellowing or browning of leaves. The majority of the ash trees die shortly after infestation of ash borers, generally within 2 to 4 years, depending on severity of infestation.

Mile-a-Minute

In recent years Mile-a-Minute, an invasive weed has proliferated along the edges of woods, streams, wetlands, uncultivated fields, and roads throughout the Town of Esopus. The invasive, as can be assumed by its name, spreads rapidly in habitats where it grows. The weeds is able to grow up to 6 inches per day, forming dense vegetative mats coving other plants, stressing and weakening them through a process of smothering and physical damage. The dense mats cause sunlight to become obscured to the plant life below, decreasing that covered plant's ability to thrive. The sheer weight and pressure of the invasive weed lead to the poor growth of branches and foliage on larger trees and plants which they are located adjacent to.

A number of methods can be employed to control the spread or even eradicate the Mile-a Minute selected locations and have proven to be successful into the long-term. These include the introduction of Mile-a-Minute Weevils. Mile-a-minute weevil feeding damage can stunt plants by causing the loss of apical dominance and can delay seed production. In the presence of competing vegetation, mile-a-minute weed can be killed by the weevil. The mile-a-minute weevil is more effective in the sun than in the shade. Over time, mile-a-minute weevils have been shown to reduce spring seedling counts. Biological control of mile-a-minute weed is currently the most promising and cost effective method. Additionally Mile-a-Minute is able to be controlled by creating distances in existing vegetation and buffers along stream and wooded areas to prevent establishment. Success has also been shown by physically removing the weed and burning or incinerating. Lastly moderate doses of spray herbicide have been shown to kill the invasive in conjunction with spot treatment of pre-emergent herbicides fighting both the spread and germination.

Others

Although not identified as a major problem by the Town, it should be noted that additional invasive species were noted throughout Esopus according to NYSDEC data, including the following:

- Asian clam
- Bittersweet vine
- Gypsy moth
- Giant hogweed
- Hemlock woolly adelgid
- Japanese knotweed
- Quagga mussel
- Multiflora rose
- Zebra mussel

As the Town is committed to the protection of the natural environment, wildlife, agriculture and personal property, the Town should continue to monitor these, and any future invasive species and confront these species and problems they create head on as to ensure control, and if necessary and possible, complete eradication.

Climate Smart and Flood Resiliency

Major precipitation events are projected to continue to increase due to climate change. The northeast has seen a 70% increase of very heavy precipitation events between 1985 and 2010.³⁰ With the increase in precipitation events, NYSDEC projects that the Mid-Hudson Region will experience continued sea-level rise, with an estimated rise of 1-9 inches for the Mid-Hudson Region by the 2020's. The projection for the 2080's is 10-54 inches (or 4.5 feet) of sea-level rise. Along with projected sea-level rise, precipitation is projected to increase almost 14% by the 2080's. Refer to **Table 18: Climate Projection for the Hudson Valley Region**. Changes in precipitation patterns are also anticipated to increase drought occurrence in addition to flood risk as more precipitation falls during scattered large events.

Table 18: Climate Projection for the Hudson Valley Region				
	Baseline 1971-2000	Projection 2020's	Projection 2050's	Projection 2080's
Sea Level Rise	-	1-9"	5-27"	10-54"
% increase in annual precipitation		1-8%	3-11%	6-14%
Increase in probability of 100-year flood	0%	20-50%	70-190%	140-610%
Flood height of 100-year flood	15'	15.3-15.7'	15.9-16.8'	16.5-18.3'
Annual average air temperature	50°F	52.3°-53.2°F	54.5°F-56.2°F	55.6°F-59.7°F
# 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
# Days per year ≤ 32°F	155	127-136	104-119	84-109

Source: *Climate Projections in the Hudson River Estuary, Hudson River Estuary Program NYSDEC*

The Town of Esopus Habitat Summary, prepared by NYSDEC identifies the location of Potential Tidal Wetland Pathways, where tidal wetlands are likely to move by year 2100 as sea levels increase (See Figure 3 in the Habitat Summary). According to the Habitat Summary, tidal wetlands are projected to expand in low lying areas along the Rondout Creek and the mouth of Black Creek, while being lost from portions of Sleightsburgh Marsh as water becomes too deep. Existing roads, railroads and land development along with steep shorelines are all barriers to wetland movement. The wetland pathways do not account for all of the barriers that may be present. For example, bulkheads and revetment (a sloping structure placed

³⁰ Karl, T.R, J.T. Melillo, and T.C Peterson, 2009: *Global Climate Change Impacts in the United States*, Cambridge University Press, 189 pp.

along shorelines to absorb the energy of incoming water) may be a barrier to inland wetland migration along some stretches of Esopus' Hudson River shoreline.³¹

Protecting and managing the areas where wetlands may move are the most effective ways for municipalities to conserve tidal wetlands in the face of these changes. Minimizing future development in the pathways and designing public waterfronts to allow for these changes will ensure that tidal wetlands have room to adapt to rising sea levels. In addition, this strategy will reduce risks to communities and property owners in the changing Hudson River flood zone.³² Additional information can be found in the Protecting the Pathways an initiative by Scenic Hudson and partners to study and help preserve the Hudson River's tidal wetlands in the face of sea level rise.³³

In addition to rising sea-levels and increased precipitation amounts, there will be an increase in the probability and severity of 100-year flood events. By the 2020's there could be a 20-50% increase and by the 2080's, upwards of a 610% increase is predicted. Over the next 40 years, average annual temperature will increase almost 10 degrees and the number of days above 95 will increase from 1 to potentially 25, while the number of days at or below 32 degrees will decrease significantly. These changes will affect the region's infrastructure, ecosystems, agriculture, economics, and the vulnerable populations.

Climate Smart Community

The Town Board of Esopus approved a resolution in December of 2017 that reads: "...the Town Board believes that climate change poses a real and increasing threat to our local and global environments and is primarily due to the burning of fossil fuels; and WHEREAS, the effects of climate change will endanger our infrastructure, economy and livelihoods, and pose health threats to our citizens." This language is from the Town's pledge to become a Climate Smart Community (CSC). The CSC program helps local governments take actions to adapt to the changing climate. Esopus has registered and is working towards certification. The elements that must be included as follows;

- Build a Climate-smart community;
- Inventory emissions;
- Set goals and plan for climate action;
- Shift to clean, renewable energy;
- Use climate-smart materials management;
- Implement climate-smart land use;

³¹ NYSDEC Hudson River Estuary Program, *Natural Areas and Wildlife in Your Community – A Habitat Summary Prepared for the Town of Esopus*, pg. 11

³² Ibid

³³ (<https://scenichudson.maps.arcgis.com/apps/MapSeries/index.html?appid=9190b7560a574ad69cd91b43e383b203>)

- Enhance community resilience to climate change;
- Support a green innovation economy;
- Inform and inspire the public; and
- Engage in an evolving process of climate action, innovation, and performance.

Of these 10 elements, the Town has determined a set of actions for each, which will fully embrace the intention of each element. The Town determined a set of 23 actions which will fulfill the Climate Smart Community pledge elements. These actions range from simply passing a resolution to adopt the CSC pledge, to other more major undertakings such as installing solar technology on Town facilities, establishing working committees, identifying brownfield remediation needs, and creating a comprehensive plan- this document.

Flood Resiliency

With increasing sea-level projections, major impacts to existing and future developments on both the Hudson River and the Rondout Creek are anticipated. The water treatment plant, which flooded in 2011, is the most notable infrastructure facility that will be affected by sea-level rise. The Town's 1987 Local Waterfront Revitalization Plan (LWRP) did not address climate resiliency and should be revised to reflect the Town's Climate Smart Community (CSC) pledge. When encouraging development along the shoreline, a vulnerability assessment is needed to fully understand the risks. A long-term evaluation and plan should address the anticipated rising water levels and with proper planning, land use and development practices in an effort that makes future development cohesive with the changing climate challenges.

As previously discussed, rising water levels also threaten the future of Hudson River tidal wetlands, essential to fish and wildlife in the estuary. Minimizing future development in the areas where wetlands may move, and preserving and restoring natural shorelines will ensure that tidal wetlands have room to adapt and persist.

Stormwater Management

There are two Municipal Separate Storm Sewer Systems (MS4) areas in the Town of Esopus. The first includes the Hamlets of Port Ewen, Sleightsburgh, Connelly and northern area of Ulster Park along US Route 9W. The second MS4 area includes the Hamlet of Rifton, south along NYS Route 213 near the Walkkill River, New Paltz town line adjacent to the New York State thruway. According to the 2010 census, a population of approximately 4,369 residents live within these two MS4 areas.

The Town has recognized the undesirable effects of stormwater pollution and erosion caused as a result of uncontrolled runoff. As such, Chapter 106 of Town of Esopus Town Code addresses stormwater provisions and requirements for development both within the MS4 boundaries and outside of those areas. It should be noted that agricultural and horticultural activities are exempt from requirements of Chapter 106.

Scenic Resources

Scenic Areas of Statewide Significance (SASS)

The Town of Esopus (and areas immediately adjacent) is home to two New York State Scenic Areas of Statewide Significance (SASS) as designated by the Office of Planning and Development at the New York State Department of State (DOS). The following two designated SASS areas play important roles in preserving the traditional landscape of this important region of the Mid-Hudson Valley.

Estates District SASS

The Estates District SASS consists of the Hudson River and its eastern shorelands in the Towns of Germantown and Clermont, Columbia County, and in the Towns of Red Hook, Rhinebeck, and Hyde Park and the Villages of Tivoli and Rhinebeck in Dutchess County. The western half of the Hudson River lies in the Towns of Saugerties, Ulster, Esopus, and Lloyd, the Village of Saugerties, and the City of Kingston in Ulster County.

The Estates District SASS is of statewide aesthetic significance due to the combined scenic values of its natural character and its uniqueness, public accessibility and public recognition. There is a variety as well as unity of major landscape components along with striking contrasts of lines, forms, textures and colors throughout the visual survey area. The collection a massing of large estates with their specially and distinctly designed landscapes, the many untouched natural features, and the significant public historic sites and architectural treasures make this a visually unique feature in Hudson River coastal area, the State of New York and the nation. The Hudson River and its influence on the historical development of the area create the unifying features which have led to this designation. This particular SASS is generally free of discordant features, evidence of the strong conservation ethic and historical traditions operating there.

Although private estates cover most of the eastern shore of the Hudson River, the Estates District is publicly accessible to a great extent, both visually and physically, from the Hudson River, local streets and principal highways, and from major well-known national and state parklands and sanctuaries.

Because of the attraction these facilities create and because the area has been the subject of treatises and art works, surveys and designations at both the state and national level, the Estates District Scenic Area is well recognized by the public for its aesthetic values across both the region and country.

Esopus Lloyd SASS

The Esopus/Lloyd SASS is of statewide significance by the very nature of its combined aesthetic values and landscape character, uniqueness to the Mid-Hudson valley, public accessibility, and extensive public recognition.

Within this particular SASS there lie both a high variety and a unity of factoring components associated with this designation; striking contrasts between scenic natural and manmade elements, and a general lack of discordance in visual amenities such as highways, industry, or working waterfronts. The designated area is both visually and physically accessible to the public, and the areas aesthetic quality is well recognized by nearly all New Yorkers.

The historic grand homes and religious institutions of the Esopus/Lloyd SASS, a major manmade component and supporting features of this designation, form part of a series of structures on both sides of the Hudson River throughout this Mid-Hudson Region that is unique in New York. Each estate and institution is distinctive with unparalleled and often dissimilar architectural stylings and history. Many of these buildings have been maintained in their historic form creating a view of the past. Unlike other parts of the Hudson River Valley, most have direct access to the shore of the Hudson River, unrestricted by the railroad, highways, or other common shoreline features. Complementing the estates, the landscape of the designated area is comprised of farms, orchards, and vineyards, and represents a distinct remnant of the historical traditional land uses of the Mid-Hudson Region.

Within the river there is a broad expanse of tidal flats known as Esopus Meadows which creates a unique landform for this area as tidal flats of a similar size are rare in other coastal regions of New York State. Also within the River and at the border between shallow and deep waters stands the only wooden lighthouse on the Hudson River, the historical Esopus Meadows Lighthouse, a rare maritime feature in the in the River.

Other Scenic Area Identification

The Town of Esopus is one of only a few communities along the Hudson River where shoreline access is not obstructed by railroad tracks. North of West Park, the CSX railroad turns west allowing for unobstructed views and access to the Hudson River on both public and private property. This is a unique situation and the Town should focus on enhanced riverfront connections throughout this area, where practical.

As mentioned prior in the Review of Past Plans section, in the 2016 report entitled *Town of Esopus Resources Inventory Study* was prepared by Cornell University. This report identified 57 individual parcels throughout the Town of Esopus which were indicated to have scenic qualities and were located in key community viewsheds. This report, though valuable for identifying these locations, is still in draft form and has undergone no formal evaluation by the Town of Esopus. Though no formal acceptance, reviews, or comments have been provided, this draft report may be a valuable tool for the Planning Board and the Town Board when considering future developments and developable areas, including when updating the Town's land use regulations. Greater detail of this report has been referenced in the aforementioned Review of Past Plans portion of this document.

Observations:

1. There are many documented habitats of regional, statewide, and global significance in Esopus, including the Hudson River Estuary, Esopus/Lloyd Wetlands and Ridges, the extensive Shaupeneak Forest, and the Black Creek and Swartekill stream corridors. These areas support a remarkable diversity of plants and animals and provide numerous ecosystem benefits to the Town.
2. There are many invasive species found in the Town of Esopus, with the aquatic species proving to be a detriment to the recreational capacity of the Town's waterways.
3. The deepwater habitat located along the northern area of the Town's Hudson River shoreline is important to Atlantic Sturgeon and Striped Bass for spawning and therefore to commercial and recreational fishing.
4. The Wallkill River and the section of the Hudson River along which Esopus is located is listed as an impaired waterway due to pollutants.
5. The Town of Esopus is in the process of becoming a Climate Smart Community.

Land Use and Zoning

Land Use Analysis

A land use analysis was conducted for the Town of Esopus using Real Property data provided by Ulster County. This analysis provides a snapshot of current land uses, development patterns, and allows for an initial evaluation of the effectiveness of existing land use regulations. Using year 2016 parcel data from Ulster County, the analysis assigned land use categories based upon the New York State Real Property Type Classification Codes. The local tax assessor uses these codes to complete real property tax assessment for the Town. To supplement the analysis, the ***Land Use Map*** was prepared depicting the different land use types throughout the Town, based on data provided. Refer to this map for the following land use analysis.

The following nine (9) primary categories classify the land uses in the Town of Esopus:

100 Agriculture (NYS): Property used for the production of crops or livestock.

200 Residential (NYS): Property used for human habitation. For the purposes of this evaluation, residential land uses have been broken down into single-family, two-family and structures that accommodate three or more family units (multi-family) along with seasonal homes, manufactured homes (mobile homes) and manufactured (mobile) home parks.

300 Vacant Land – Property that is not in use, is in temporary use, or lacks permanent improvements.

400 Commercial – Property used for the sale of goods and/or services. The sub-category of “mixed-use” is included in this analysis which comprises buildings that have or are readily adaptable for more than one use.

500 Recreation & Entertainment – Property used by groups for recreation, amusement, or entertainment and generally includes parks, playgrounds, athletic fields, fairgrounds, amusement parks, game farms, social organizations, public golf courses, and camps (These lands do not include local and state parks and recreation areas or lands protected by conservation easements.).

600 Community Services – Property used for the wellbeing of the community and generally include libraries, schools and other educational facilities; cultural facilities, religious uses and hospitals along with government facilities and buildings.

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 and generally include water and wastewater treatment facilities; electric and gas facilities; infrastructure, communication infrastructure and railroads, along with landfills and dumps.

900 Wild, Forested, Conservation Lands & Public Parks – Includes forests land under Section 480 and 480-a of the Real Property Tax Law, private hunting and fishing clubs; local, state and county-owned forest lands; parks and recreation areas, and land under conservation easements.

As depicted in **Table 19 Land Use Breakdown**, the largest use of land in the Town is Residential, accounting for more than 40% of land area. Single Family Residential, totaling just over 8,433 acres or 35.76% of the land area, occupies 2,700 parcels. The average single-family lot size is approximately 3.12 acres. There are 124 parcels (223.5 acres) occupied by Two-Family dwellings with 83 parcels (668 acres) occupied by Multi-Family dwellings, 64 parcels (96 acres) accommodating Manufacture (Mobile) Homes and 4 parcels (48 acres) classified as Manufactured Home (Mobile) Parks.

The highest density of residential lots including the majority of Two- and Multiple Residential are found in the Hamlets of Connelly, Port Ewen, Sleightsburgh and Ulster Park. In addition, lot sizes in these Hamlets are generally smaller than those found throughout the remainder of the Town as they are supplied with municipal water and sewer services. The Hamlets of St. Remy, Rifton, Esopus and West Park are home to additional concentrations of residential properties, primarily Single Family and larger lots as these areas are not served by municipal water and sewer services. Outside of the Hamlets, the major road corridors of US Rt. 9W, NYS Rt. 213, Dashville Road, Old Post, Hardenburg, Union Center and Swartekill Roads have additional concentrations of primarily Single-Family residential on larger lots where no municipal water and sewer services are available.

There are four Manufactured (Mobile) Home Parks, two being located in the Hamlet of Connelly and one each in the West Park and in the Esopus hamlet vicinity. Single Manufactured (Mobile) Homes outside of the parks are found throughout the Town, including in and around the Hamlets of Connelly, Port Ewen, Ulster Park, St. Remy and Rifton.

Table 19: Land Use Breakdown			
Land Use Class	Parcels	Acres	Percent
Single Family	2,700	8,433.51	35.76%
Two-Family	124	223.52	0.95%
Multi-Family	83	667.72	2.83%
Manufactured Home	64	96.11	0.41%
Manufactured Home Park	4	48.12	0.20%
Mixed Use	20	36.35	0.15%
Commercial	66	431.46	1.83%
Industrial	12	484.18	2.05%
Agricultural	22	653.04	2.77%
Forest, Conservation Lands & Parks	59	3,095.12	13.12%
Public Services	39	511.66	2.17%
Community Services	67	1,904.27	8.07%
Recreation and Entertainment	11	83.75	0.36%
Vacant	912	6,265.84	26.57%
Null	127	649.78	2.76%

Source: Ulster County Information Services Office, 2016.

There are 20 parcels classified as Mixed-Use, occupying 36 acres. It should be noted that not all properties may be occupied by more than one use at this time. The Hamlet of Port Ewen is home to the majority of Mixed-Use lots, with additional lots found in the Hamlets of Ulster Park, Esopus, West Park and Rifton.

The second largest land use category is Vacant, accounting for over 26% of the land area (6,266 acres) occupying 912 parcels. The major concentration of lands classified as Vacant are found in the north-central area of the Town, including Hussy Hill, a 600 feet (above mean sea level) high ridge running north-south with significant development constraints due to steep slopes and limited access. Additional concentrations of Vacant lands are found between Union Center and Dashville Roads, east of NYS Rt. 213, south of Dashville Road, and southern West Park – primarily at Timberline Trail, east of US Rt. 9W in the Hamlet of Esopus along with the northern and southern portions of Port Ewen.

The third largest land use category is Forest, Conservation Lands and Public Parks, occupying more than 13% of land area (3,085 acres) on 59 parcels. This category is made up parks, recreation areas and other protected lands owned by the Town of Esopus (including Sleightsburgh, Ross, Lighthouse and Freer Parks) Scenic Hudson (including Esopus Meadows Preserve, Highbanks Preserve, Shaupeneak Ridge, and the Black Creek

Preserve,) New York State (including the Black Creek State Forest), Ulster County, the John Burroughs Association (John Burroughs Nature Sanctuary), and the Lake Katrine Road & Gun Club.

Land classified as Community Services accounts for over 8% of land area covering 1,904 acres on 67 parcels. Community Services is the fourth largest land use category in the Town of Esopus and includes the 510 acre parcel owned by the Missionary Sisters of the Sacred Hart along the southern border of the Town; a 26.7-acre parcel owned by the Christian Brothers Institute at the corner of US Rt. 9W and Burroughs Drive; the 142-acre Marist Brothers Center along the Hudson River; the 407-acre parcel occupied by The Mount Academy in Ulster Park (Bruderhof Communities); the 200-acre Maple Ridge community in Ulster Park (Bruderhof Communities); the approximate 96-acre Woodcrest Community in Rifton (Bruderhof Communities), and a 100-acre facility off Carney Road in Rifton (Church Communities Foundation). There are additional smaller parcels classified as Community Services including the Town of Esopus Town Hall and other Town-owned properties; Robert R. Graves Elementary School, BOCES Career and Technical Center; Fire Department and EMS facilities; the Town of Esopus Library, and local churches with associated properties. All of these properties are tax-exempt.

Business related land uses are made up of Commercial, Industrial and Agricultural classified lands, which together account for 1,570 acres, approximately 6.65 % of land area on 100 parcels. The majority of the Commercial parcels (66 parcels occupying 484 acres) are found in Port Ewen and along US Rt. 9W and within the remaining Hamlets of West Park, Esopus, Ulster Park, Rifton and St. Remy. Commercial properties are located consistent with the General Commercial District (GC) and Business Commercial (BC) Zoning District.

Properties classified as Industrial (12 parcels occupying 484 acres) are found in Connelly (Callanan Industries and Clemente Latham Concrete), Ulster Park (Former Dyno Noble explosives manufacturing facility) and the manufacturing facility in the Hamlet of Rifton operated by Bruderhof (Rifton – manufacturer of furniture and equipment for children and adults with disabilities). With the exception of Rifton, the Industrial lands generally correlate with the Town's Heavy and Light Industrial Zoning districts, discussed later in this section.

The majority of Agricultural lands are clustered around Ulster Park and serve as a key resource for the Town's growing agritourism-related industries, including Apple Bin Farm Market and Maynard Farms. Also located within this cluster (although not classified as Agricultural land) is El Paso Winery and the Headless Horseman Hayrides and Haunted Houses attraction. In addition to the cluster in Ulster Park, there are properties classified as Agricultural including a 62-acre farm located within an oxbow of the Wallkill River in Rifton and a few smaller parcels scattered throughout the remainder of the Town. In addition, there is agricultural lands no longer in use or not classified as Agricultural by the assessor elsewhere in the Town of Esopus, including an 88-acre property known as the Kellar Easement and protected by the Wallkill Valley Land Trust and adjacent to the 62-acre farm (see above) and occupying the remainder of the land in the oxbow of the Wallkill River in Rifton.

It should be noted that 2.76% of the parcels (almost 650 acres) are labeled as “Null” meaning no parcel data was provided by Ulster County. Parcel data is collected at the County level and changes with new development and filing of deeds. Due to the amount of property that requires classification, errors occasionally occur. Ulster County has been made aware of the lack of classification for these parcels.

Tax-Exempt Properties

Property can be fully or partially exempt from property taxes for various reasons. Specifically, exemptions are provided for property owned by public and private educational and religious institutions; not-for-profit organizations; local, county, state and federal property (New York State and the federal government sometimes make voluntary payments to municipalities to off-set loss in property taxes) along with open space, recreational and agricultural lands under protective easements. Exemptions are also provided for property under certain circumstances and for economic development and energy conservation purposes.

Property tax exemptions can also be a valuable tool to improve the affordability of housing for certain populations including tax reductions for Veterans and the School Tax Relief (STAR) program that allows many homeowners to pay tax on a reduced property value. In addition, property tax reductions can fuel economic growth through payment in lieu of taxes (PILOT) programs or similar programs by industrial development agencies and similar organizations. Finally, property tax reductions can be used to encourage the adoption of energy-smart technologies, including the use of solar or wind power.³⁴

The Town of Esopus is home to several not-for-profit religious organizations. Combined with property that is under conservation or related protective easements, the Town is considered to have a high percentage of non-taxable property, a major concern to the community. As noted above under *Land Use Analysis*, lands classified as Community Services and Forest, Conservation Lands and Public Parks are the primary lands having tax-exempt status.

Based on 2018 real property tax data obtained from the Ulster County Real Property Tax Service Agency, and as depicted in **Table 20: Wholly Exempted Property Values**, the Town of Esopus has the second highest percentage of wholly exempt parcels in the County at 5.4%. Wholly exempt parcels are parcels that are 100% tax exempt and do not include parcels that may have partial exemptions due to the STAR rebate or for renewable energy infrastructure, among other partial exemptions. The Town of Denning has the highest percentage at 6.23% of all parcels with the City of Kingston ranked 3rd at 4.87% of all parcels wholly exempt.

³⁴ Office of the New York State Comptroller, *Property Tax Exemptions*, February 2018, pg. 1.

While the Town is ranked second in the percentage of wholly exempt parcels, it has the third highest amount of assessed value wholly exempt from taxes at \$211,388,675, equaling almost 20% of property. The Town is ranked below the Town of New Paltz at \$551,071,505 (31.89%) and the City of Kingston at \$385,156,050 (19.41%).

Property tax represents the largest single source of revenue for many local communities and is therefore heavily relied upon for funding public expenses. Property tax is also more stable and predictable as a revenue source when compared to other major sources of revenue including sales tax or State aid which are subject to larger year-to-year variations, due to economic swings or policy changes beyond local government control³⁵. As more taxable land is removed from the Town of Esopus tax rolls, the greater the tax burden pushed onto remaining landowners. This generally contributes to rising tax rates and overall increases in land costs making it increasingly difficult for lower to medium income property owners to remain in Town, especially those on fixed incomes, including seniors.

³⁵ Office of New York State Comptroller, *Property Tax Exemptions*, February 2018, pg. 3.

Table 20: Wholly Exempted Property Values 2018

Municipality	Total Parcels	Wholly Exempt Parcels	Percentage Parcels Wholly Exempt	Total Assessed Value	Assessed Value Exempt	Percent Value Exempt
Town of New Paltz	4,251	152	3.58%	\$ 1,728,030,575.00	\$ 551,071,505.00	31.89%
City of Kingston	8,662	422	4.87%	\$ 1,983,975,274.00	\$ 385,156,050.00	19.41%
Town of Esopus	4,452	240	5.39%	\$ 1,061,762,864.00	\$ 211,388,675.00	19.91%
Town of Ulster	5,408	174	3.22%	\$ 1,195,473,169.00	\$ 169,136,355.00	14.15%
Town of Wawarsing	6,348	262	4.13%	\$ 1,317,427,364.00	\$ 145,868,278.00	11.07%
Town of Saugerties	9,533	209	2.19%	\$ 1,968,279,390.00	\$ 124,925,470.00	6.35%
Town of Lloyd	4,411	116	2.63%	\$ 1,152,685,354.00	\$ 72,533,206.00	6.29%
Town of Woodstock	4,794	132	2.75%	\$ 1,454,460,178.00	\$ 61,055,300.00	4.20%
Town of Marbletown	3,839	86	2.24%	\$ 1,019,663,313.00	\$ 54,481,300.00	5.34%
Town of Shawangunk	4,666	103	2.21%	\$ 242,654,731.00	\$ 43,244,920.00	17.82%
Town of Marlborough	3,827	74	1.93%	\$ 820,507,324.00	\$ 40,674,400.00	4.96%
Town of Rochester	4,828	91	1.88%	\$ 879,957,744.00	\$ 36,014,600.00	4.09%
Town of Rosendale	2,803	88	3.14%	\$ 547,939,290.00	\$ 27,614,000.00	5.04%
Town of Olive	3,151	48	1.52%	\$ 1,259,498,138.00	\$ 23,052,574.00	1.83%
Town of Plattekill	3,941	66	1.67%	\$ 706,761,533.00	\$ 18,806,600.00	2.66%
Town of Gardiner	2,976	59	1.98%	\$ 882,224,019.00	\$ 18,806,000.00	2.13%
Town of Hurley	3,798	40	1.05%	\$ 862,362,535.00	\$ 15,758,079.00	1.83%
Town of Shandaken	3,516	142	4.04%	\$ 182,454,888.00	\$ 7,185,867.00	3.94%
Town of Hardenburgh	784	14	1.79%	\$ 113,280,072.00	\$ 5,597,800.00	4.94%
Town of Kingston	663	11	1.66%	\$ 83,643,984.00	\$ 4,107,800.00	4.91%
Town of Denning	1,203	75	6.23%	\$ 32,801,100.00	\$ 3,633,855.00	11.08%

Source: Ulster County Real Property Tax Service Agency.

By law, municipalities have no authority to levy property taxes on not-for-profit organizations (including religious and charitable organizations, hospitals and educational institutions). In addition, municipalities are not able to prohibit the purchase of property by tax-exempt organizations or to prevent property from being protected through conservation easements that can partially exempt property tax.

Municipalities do have some options for off-setting the financial burden of tax-exempt properties such as levying special assessments on not-for-profits for certain public improvement costs, including those for water, sewer and drainage. However, some municipal services that non-for-profit organizations use, including general police and fire protection and road maintenance cannot be funded by fees or special benefit assessments. The solution some municipalities have resorted to include negotiating voluntary payments from certain not-for-profit institutions to help offset the costs of providing these services³⁶.

It is recommended that the Town, fire departments and TEVAS conduct an evaluation of the services provided to tax-exempt organizations and determine if there are opportunities for negotiating reasonable voluntary payments. In addition, establishing and continuing mutually-beneficial partnerships with these organizations is critically important to assist the Town in providing amenities, including, but not limited to recreational assets.

Town of Esopus Land Use Regulations

The following is a general overview of the Town's existing land use regulations accompanied by a preliminary analysis of these regulations to identify key issues for consideration in the Plan and issues which may need to be addressed in the Town's next regulatory update. This initial analysis should not take the place of a full and detailed evaluation of land use regulations during the formal regulatory update that generally follows the adoption of a comprehensive plan.

The majority of land use and development in the Town of Esopus is governed by key Chapters within the Town of Esopus Town Code, including Chapters: 34, Planning Board; 43, Waterfront Advisory Board; 44, Waterfront Revitalization Program; 56, Building Construction; 80, Flood Damage Prevention; 106, Stormwater Management and Erosion and Sediment Control; along with Chapters: 107, Subdivision of Land; and 123, Zoning, which are the two primary tools for guiding and regulating new land use.

Public safety related to existing uses and structures along with the protection of community character and property maintenance are regulated through Town of Esopus Town Code Chapters 56, Unsafe Buildings; 85, Garbage, Rubbish and Refuse; 90, Junkyards; 96, Lawn Maintenance; and 113, Abandoned Vehicles.

The Town of Esopus adopted a previous version of Chapter 123, Zoning on August 20, 1980 by Local Law No. 19-1980. Chapter 123 was updated in 1995 through Local Law No. 1-1995 to be in accordance with the Town's 1994 Comprehensive Plan. Amendments to Chapter 123 have occurred since the last full update to the regulations. Pursuant to Chapter 123, there are twelve (12) Zoning districts two (2) overlay districts, as depicted on

³⁶ Ibid pg. 9

the **Existing Zoning Map**. The following is a summary of those Zoning districts, followed by a preliminary analysis of the Town's land use regulations.

- **(RF-1) Riverfront Estate District:** The Riverfront Estate District has been established to preserve the unique character of the Town's waterfront area located south of River Road and between the Hudson River shoreline and US Route 9W. The area generally consists of a mix of vacant, low-density residential, private and institutional estates; and protected open space lands. The minimum lot size is 200,000 sq. ft. (approximately 4.60 acres) with a five-acre requirement for single-family dwellings. Existing landmark structures may be converted into other purposes such as corporate offices, inns, and conference centers. Cluster developments are permitted under certain provisions.
- **(RF-2) Riverfront District:** The Riverfront District has been established to regulate development in existing low density areas adjacent to the Hudson River. The RF-2 District currently encompasses an area boarded to the south and east by River Road with Mirror and Esopus Lakes acting as approximate western borders and Scenic Hudson's High Banks Preserve to the north. The minimum lot size in RF-2 is 100,000 sq. ft. (approximately 2.30 acres), with single-family dwellings allowed at one unit for each 2.5 acres. This district is intended to complement the RF-1 District with allowed uses being residential and agriculture, with limited commercial and manufacturing uses. Cluster developments are also permitted under certain provisions.
- **(R-40) Residential District:** The R-40 Residential District encompasses the majority of the Town of Esopus and primarily areas not currently served by municipal water and sewer, except the Hamlets of St. Remy, Rifton, West Park, Esopus and Ulster Park. Within the R-40 District, single-family dwellings are allowed at a density of one unit per acre, where feasible. In addition to residential, the district allows for agriculture and related uses, open space and limited commercial and manufacturing, among other uses.
- **(R-12) Moderate Density/Hamlet Residential District:** The Moderate Density/Hamlet Residential District has been established to regulate development in two distinct categories of town: the areas in and around Port Ewen developed within the water and sewer districts and the rural hamlet areas in the southern part of Town which were developed at a higher density than the surrounding area but which lack central utilities. Development density is based on a sliding scale, geared to the availability of municipal water and sewer services and range from 1/3 of an acre to one acre per dwelling unit. Currently, the R-12 District encompasses the Hamlets of Port Ewen, Sleightsburgh, Connelly and portions of St. Remy, Rifton, West Park and Esopus. Two-family homes are also permitted and multifamily housing is permitted under certain circumstances.
- **(NC) Neighborhoods Commercial District:** The Neighborhood Commercial District has been designated to include businesses which provide goods and services for residents of the surrounding neighborhood. The District covers the smallest area of any zoning district in the Town with small pockets in Connelly, Port Ewen and Esopus with the largest concentration in Rifton. The minimum lot size in NC is 20,000 sq. ft. (approximately 0.46 acres) while lot area and dimensions for residential uses being subject to the requirements of the R-12 District. Allowed uses are single- and two-family housing, agriculture, and commercial uses, among others.
- **(BC) Broadway Commercial District:** The Broadway Commercial District has been delineated to recognize the unique character of Port Ewen's established business district along US Rt. 9W, bordered by Horton Lane to the north and West Stout Avenue to the south. Within in this District,

lot sizes are small (minimum 5,000 sq. ft. for non-residential) with little or no setbacks. All properties are served by municipal water and sewer. The associated regulations have been established to maintain a higher density, pedestrian-scaled business area with allowed uses being residential and commercial, among others.

- **(GC) General Commercial District:** The General Commercial District has been established to include a wide range of business uses on the Town's major highways (NYS Rt. 213 and US Route 9W), which serve not only Town residents, but also through traffic and visitors as well. The existing GC District is found along US Rt. 9W in Port Ewen, Ulster Park, Esopus, and West Park as well as along NYS Rt. 213 in Rifton and St. Remy. The minimum lot size in GC is 40,000 sq. ft. (approximately 0.9 acres) with residential uses subject to the lot size and dimensions set forth in R-12. In addition to residential, allowed uses include commercial and agriculture, among others. Associated development standards are intended to provide adequate parking, separation of access drives and protection to adjacent residential areas.
- **(LI) Light Industrial:** The Light Industrial District has been established to regulate the development of office, storage, research and light manufacturing (such as assembly or finishing, but excluding chemical or heat transformation) at a low density and lot coverage, with ample buffers and performance standards to ensure that activities do not have effects beyond the site. The current LI District is located on the west side of US Rt. 9W between Port Ewen and Ulster Park and includes a the Iron Mountain storage facility, a portion of the former Dyno Global site along with nearby vacant and residential lands.
- **(HI) Heavy Industrial District:** The Heavy Industrial District has been established to regulate the industries which process or extract raw materials or engage in manufacturing using chemicals, heat or similar processes to transform materials. There are two HI Districts with one to the southwest of Connelly that includes Callanan Industries, Inc., Clemente Latham Concrete and the abandoned quarry. The second district is located south of Port Ewen and includes the former Dyno Global site west of the CSX railroad line.
- **(W)Waterfront District:** The Waterfront District has been established to regulate the areas on the Rondout Creek which are the historic location of water dependent commercial activities, such as boatyards, marinas and uses dependent on transportation of goods by water. One Waterfront District is located in Sleightsburgh and includes the former Kosco Oil Terminal property and a residential lot along the Rondout Creek. The second area is located along the Rondout Creek in the Hamlet of Connelly from approximately Center Street to the western property boundary of property owned by Callanan Road Improvement Company. Since suitable sites for water dependent uses are limited in Town, non-water dependent uses are precluded, except accessory uses. Allowed uses include marinas and shipping related uses, along with boating clubs and docks; recreation, agriculture, bed and breakfast inns and restaurants, among other similar uses, with residential uses prohibited.
- **(WR) Waterfront Recreational District:** The Waterfront Recreation District includes those areas along the Rondout Creek and Hudson River which are suitable for water-dependent recreation uses, such as parks, boat launches and marinas, but due to their sensitive environmental resources, cannot support more intensive types of uses. The WR District is located in Port Ewen, Sleightsburgh and Connelly along with the entirety of Gumaer Island and the sliver of land bordered by the Rondout Creek and New Salem Road just south of Gumaer Island. In Connelly, the WR District includes an existing marina, while in Sleightsburgh, the WR District covers Sleightsburgh Park. A private boat club, Freer Park Beach and the shoreline in front of the Riverview condominiums are zoned WR in Port Ewen.

- **(PUD) Planned Unit Development District:** The PUD District provides the opportunity for development of large, mixed use, self-contained developments upon approval of specific proposals by the Town Board. The Riverview Condominium development in Port Ewen is the only existing PUD development.
- **MH Manufactured Home Overlay District:** The Manufactured Home Overlay District has been established to designate areas in which manufactured homes and manufactured home parks are permitted. As an overlay district, all other regulations of the underlying district also apply. The MH District is located in Connelly and western Port Ewen and includes two existing manufactured home parks: Connelly Terrace and Dutcher Mobile Home Park. The District is bordered to the west by the CSX railroad line and approximately bordered by Salem Street to the south and Mill Brook Drive to the east.
- **Rt. 9W Overlay District:** The Rt. 9W Overlay District has been created to regulate expanded opportunities for commercial development along the US Rt. 9W corridor by establishing additional standards and review procedures to protect residential uses, maintain traffic safety and preserve the scenic and historic settings in this area. All lands within the GC, LI and NC Zoning Districts along US Rt. 9W are considered to be within the Rt. 9W Overlay District including property in West Park, Esopus, Ulster Park and Port Ewen.

Renewable Energy Sources

The Town does allow for the installation of eligible small-scale solar photovoltaics (PV) via the NY State Unified Solar Permit along with electric and/or building permits issued by the Building Inspector. This process does not allow the construction of large-scale or utility-scaled solar systems. The Town does not have regulations in place for utility-scaled solar or wind projects which should be addressed in the next regulatory update process, along with other forms of renewable energy generation.

Signage

The Town has limited regulatory oversight regarding the appearance and placement of signage, with the exception of the need for Sign and Operating Sign Permits issued by the Building Inspector, the Town-wide prohibition on billboards and Planning Board authority for projects seeking approval in the 9W Overlay District. Section 123-12, Billboards, prohibits the placement of billboards within the Town of Esopus. The term “Billboard” is defined as “A sign or structure, where the area of one face exceeds 24 square feet, which directs attention to an idea, product, business activity, service or entertainment which is conducted, sold or offered at a location other than the premises on which such sign is located.” Based on this definition, a sign less than 24 SF would not be considered a billboard and may not be subject to the prohibition.

Based upon the above, it is recommended that the next regulatory update address signage more comprehensively and within its own Article in Chapter 123 and that applicable regulations be revised to prohibit billboards of any size to protect the Town’s desired community character. The

new sign regulations should also evaluate the aesthetic impacts of digital signage to ensure all new signs allowed in the Town are consistent with the community's desired character.

Property Maintenance

As noted above, the Town regulates property maintenance through various Code Chapters. Three key Chapters are discussed here.

Dumping on private property is prohibited through Chapter 85, Garbage, Rubbish and Refuse. While this Chapter specifically prohibits dumping on private property, it does not include a process to remediate a situation beyond fines and possible jail time when the responsible party refuses to remedy the violation.

Lawn maintenance is regulated by Chapter 96, Lawn Maintenance. Pursuant to this Chapter, groundcover is required to be kept trimmed to a certain height. However, pursuant to § 96-1, this regulation applies only to vacant, unoccupied, or abandoned buildings: "The owner, operator, or person in control, as the case may be, of any vacant, unoccupied, or abandoned building within the Town of Esopus shall comply with the following..." There are no lawn maintenance requirements for occupied structures. While the Town may be enforcing this provision on all properties, it is recommended that Chapter 96 be revised to include property associated with occupied structures to close this loophole.

The Town regulates the outdoor storage of abandoned, junk, discarded and unlicensed motor vehicles pursuant to Chapter 113, Vehicles, Abandoned. These regulations prohibit the storage or deposit or allowing for the storage or deposit of abandoned, junked discarded or unlicensed motor vehicles on private property and include provisions allowing the Town to remove a vehicle or vehicles from property if the violator fails to remedy the situation. The regulations also allow for up to one roadworthy unlicensed vehicle or one unlicensed antique car in the process of restoration to be stored on private property for a maximum of 12 months. It is recommended that the Town revise this law to require adequate screening of unlicensed vehicles from adjoining properties and/or public rights-of-way for community character protection purposes.

Lot Sizes, Density and Setbacks

Pursuant to § 123-20, Schedule of District Area and Bulk Regulations, the BC District only allows up to 50% lot coverage. "Coverage" is defined as "The lot area or percentage of lot area covered by all principal and accessory buildings and structures." As a result, future infill development may be inefficient leaving open unnecessary space that could be occupied by structures. Port Ewen is the Town's primary mixed-used center and is served by municipal water and sewer. While ultimate lot coverage is usually dependent on multiple factors including the need to properly handle stormwater runoff and parking requirements, it is suggested that the Town consider increasing the maximum lot coverage in the BC District.

Dollar General, located at the corner of Horton Lane and US Route 9W in Port Ewen is an example of suburban-style development inconsistent with the majority of development within the Hamlet. Specifically, the structure is setback approximately 200 feet from the sidewalk and thereby breaks up the streetscape character of the Hamlet with a large un-vegetated parking lot as the primary element visible to passersby. This site is located within the General Commercial (GC) Zoning District which requires a minimum front setback of 40 ft. compared to the 4 ft. front setback required within the adjacent Business Commercial (BC) District. Dollar General replaced a former grocery store on the site damaged by fire and therefore it is assumed the new structure was able to maintain the large setback. Future redevelopment of site should bring any new building closer to the sidewalk along US Route 9W, to be more consistent with the majority of development in the Hamlet and alleviate the large parking area that disrupts the Hamlet's streetscape.

For the GC District, in addition to allowing a deeper setback than the BC District, it also requires a minimum 40,000 sf lot size and only permits a maximum lot coverage of 20%. There is developable property north of Horton Lane in the GC District that, under the current zoning regulations, could be permitted to buildout in a suburban-style and may result in further adverse impacts to the Town's northern gateway. This area is served by municipal water and sewer and could be permitted to build out in a more compact manner, with the BC District a preferred alternative to GC.

The front yard setback requirements in Chapter 123 are considered "minimum" and therefore, an applicant may be able to locate a building beyond the minimum setback line and contrary to the majority of the other structures thereby impacting the Hamlet's character. The Town should consider instituting a "maximum" front setback range to prohibit incompatible new development in the BC District.

Noise

The Town does not have regulations related to minimizing or preventing noise impacts. Ensuring all residents, visitors and business owners respect their neighbors by not creating or allowing unusually loud noise is critically important to preserving the Town's community character and quality of life standards. It is recommended that the Town consider preparing and adopting noise regulations that protect residents, business owners and visitors from harmful noise levels while at the same time ensuring the rules do not unnecessarily prohibit reasonable actions that may contribute to increases in ambient noise levels.

Tiny Homes

Smaller homes, commonly referred to as "tiny homes" are becoming a more acceptable for lower-cost housing. On average, a tiny home has a total floor area of less than 400 square feet. While this type of housing may be beneficial in providing alternative housing options, building code and Town regulations will need to be aligned to ensure health and safety concerns are addressed.

The Town should consider setting a minimum square footage for any future stand-alone inhabitable structures, in compliance with the State Uniform Fire Prevention and Building Code, ensuring a degree of control over the size, look and feel of this type of development. To accomplish this it would be necessary for the Town to solidly define “tiny homes” and include a desired square footage minimum within and ensure they are considered permanent structures over mobile as many are built off-site on a trailer frame and wheeled to their final location- this could include provisions of a foundation and removal of any wheels if applicable.

Lastly the Town should consider if it is acceptable and desirable that these structures be permitted as an accessory to current residential uses or permitted by right on individual parcels and if so within what zoning districts. All of these factors should be considered and completed in any subsequent zoning updates in order to accomplish a predictable and desired future growth pattern, protect current and future residents property investments, and ensure the maximum health, safety, and welfare for all in the community while balancing property rights of those individuals seeking to construct these types of structures.

Land Pollution and Other Environmental Concerns

Like many communities in post-industrial upstate New York, Esopus has environmental concerns identified by State and/or Federal agencies arising from past industrial operations. When considering future development, or the potential thereof, specific sites should be evaluated for appropriate restrictions on use so as to protect public health and the environment; with the goal being the appropriate reuse and redevelopment of such sites.

Dyno-Nobel Site

By far the most impacted site within the Town of Esopus is the Dyno-Nobel property. This 350 acre site has an industrial past dating back to the early 20th century. Beginning in 1912, the site began its long history of manufacturing explosive components, particularly primers and igniters. Through the next decades the site would change hands numerous times, each bearing a role in the sites status as a New York State identified Superfund Site. The original site owner was Brewster Explosives Company, followed by Hercules in the early 1920's. Later in the mid 1980's the site was sold to IRECO- later renamed Dyno-Nobel, Inc.

The business was once a major employer in the Town of Esopus employing hundreds of individuals, operating on three shifts around the clock in the 1940's. Since the 1940's a gradual decline occurred with continued labor reductions through the ensuing decades culminating with a 2010 layoff of about 40 people. Since the 2010 layoff, a skeleton crew has remained at the site which has continued as a distribution, sales, and support center.

Today, the site is a State designated superfund site and remedial investigations began in the early 1990s under the oversight of both the U.S. Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (DEC). Finding contamination on the

site, a Resource Conservation and Recovery Act (RCRA) Facility Assessment was later finalized in 1994. In 1996, a survey of the Plant Area was performed as an Interim Corrective Measure to find and remove reactive contaminated soil.

A 1997 report indicated a significant amount of soil was screened for primary and secondary explosives. Two specific areas were found to contain both primary and secondary explosives. This material was removed and subsequent sampling confirmed explosives were no longer present. Three additional areas- the former detonation pond, and two suspected grenade disposal areas were found to contain numerous caps and related debris that was then collected for disposal. Investigations continued resulting in the preparation of a Corrective Measures Study (CMS) Report in 2000 that evaluated remediation alternatives for the Site. The report also identified 39 Solid Waste Management Units and 15 areas of concern (AOCs) identified within the site.

One AOC near the Shell Plant was shown to have elevated levels of TCE in groundwater, several other areas of the site have soil contaminated with metals, including mercury, lead and arsenic. The report also identified surface water at the site is captured by three drainage swales that run to the east and empty into a wetland area just to the east of the facility. The wetland contains a Shooting Pond, which was used to dispose of off spec explosives. This wetland complex drains to the north to an unnamed tributary of the Rondout Creek, which in turn empties into Rondout Harbor and then to the Hudson River- about 1.5 miles away. Groundwater throughout most of the manufacturing site is about 20 feet deep. Subsequent revisions to the initial CMS were submitted to NYSDEC in 2005 and 2006.

More recent, up-to-date information about the conditions of the Hercules Inc. /Dyno-Nobel site have been difficult to locate. However, around the time the Town of Esopus released the Draft Comprehensive Plan, NYSDEC released a Proposed Remedial Action Plan for the site and announced that it was going to accept public comments on proposed plan.

According to the NYSDEC Proposed Remedial Action Plan for the Hercules Inc. State Superfund Project, dated February 2019³⁷, the remediation plan was prepared after reviewing the detailed investigation of the site and evaluating the remedial options in the “Revised Corrective Measures Study” – submitted by Hercules Inc. /Dyno Nobel. This remediation plan calls for the excavation of source area soils and soils which exceed commercial soil cleanup objectives (SCOs). Source soils will be disposed off-site and the balance of the excavated soils will be consolidated in a wetland area which current contains potentially explosive material that cannot be moved. Additional remedial actions proposed, include:

- The creation of a new wetland to replace the wetland which will contain the waste consolidation area and the re-routing of the associated Plantasia Kill;

³⁷ www.dec.ny.gov/docs/remediation_hudson_pdf/356001prap.pdf, accessed May 2019

- Installation of a soil cover to isolate soils which cannot be excavated due to the presence of potentially explosive materials;
- Excavation and off-site disposal of sediment which exceeds the threshold for hazardous waste and excavation and on-site consolidation and capping of sediments which exceed Class A guidance values, but which are not hazardous waste;
- Treatment of contaminated groundwater through injection of chemical oxidants;
- Groundwater monitoring to evaluate the effectiveness of the remedy;
- Implementation of a Site Management Plan (SMP) for long term management of the site; and
- Recording of an Environmental Easement to ensure proper use of the site.

Upon review of the Remedial Action Plan, concerns about the limited timeframe for public comments were raised by the Town of Esopus to the NYSDEC. Based on these concerns, NYSDEC has agreed to hold a total of four public information sessions in June and July of 2019. In addition, the deadline for public comments has been postponed. Specific Town concerns related to the cleanup plan includes the proposed level of remediation, the protection of drinking water systems that rely upon groundwater in the area of the Site, the protection of off-site natural resources and the elimination of all potential exposure pathways to the public. The Town is seeking clarification on the types of uses that would be allowed to operate at the site post remediation. There is concern that a remedial program may allow contaminants or conditions on the site that would severely restrict its future use such that the site would no longer be viable for productive commercial uses and would instead be left as an unmarketable vacant wasteland. The Town supports a remedial program that allows for the redevelopment and reuse of the property in accordance with applicable zoning and the Town's Comprehensive Plan. The Town has limited lands designated for commercial and industrial uses, so it is essential that the Department select a remedial plan that permits the safe use of the property for future commercial and light industrial development.

Other Environmental Concerns

Callanan Industries site has been shown to be State Air emissions Facility. NYSDEC has issued a permit for the regulation of air emissions from a 180 ton per hour batch mix asphalt plant, a 450 ton per hour drum mix asphalt plant, a portable aggregate processing plant with engines for electrical power, and a concrete batch plant. The asphalt plants are permitted to burn natural gas, number 2 oil, number 4 oil, and waste fuel A as defined per state regulations. The permit also includes requirements, limiting the opacity from emission sources, limit particulate emissions from the asphalt plants, limit sulfur content in the fuel oil, direct the facility to combustion test and maintain records of any waste fuel received, and direct the facility to operate water spray at the plant to reduce dust emissions.

The Rifton Post Office, due to a number of former uses is included in the Environmental Restoration Program. The site bears the classification of N, which indicates no direct further action is needed. Per NYSDEC information, reportedly, gas tanks remain buried at the site, and at a test boring, traces of petroleum contamination were found. This is likely due to a former use of the site being a gas station as indicated in DEC information.

Solid waste site are indicated at two locations in the Town of Esopus. One being the current Town Transfer Station and another on 9W near West Park, indicated as a Vehicle Dismantling site.

Specific addresses and permit numbers for remediation sites, water discharge and withdrawal sites, solid waste facilities and air emission sites can be found online or by request from NYSDEC Offices

Public Input on Land Use Matters

The Town conducted two public outreach efforts in support of the Comprehensive Plan update: the May 5th 2018 Open House and the May 24th 2018 Design Workshop. In addition, the Town conducted numerous stakeholder interviews and a community-wide survey during the spring and summer of 2017. The following public input was received related to land use regulations.

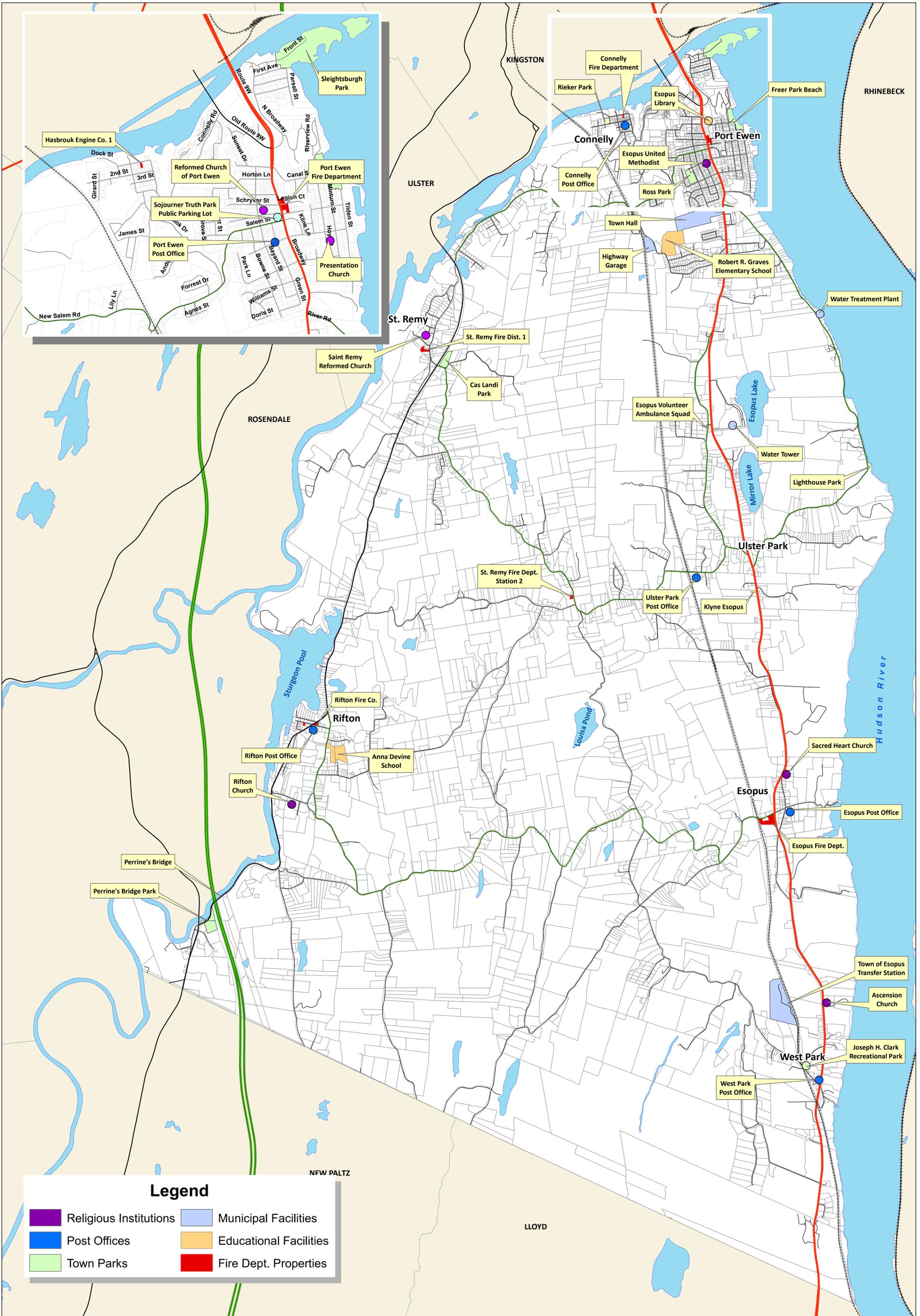
Meeting attendees and survey respondents felt the best asset and opportunity in Town was the extensive waterfront, and cited that development along the water had the potential to expand the local economy, bring new opportunities, and draw visitors in pursuit of ecotourism. Specifically, there should be a greater amount of compatible infill along the Rondout Creek and in the Town’s hamlets. This infill could be residential, commercial, recreation, tourism-focused and/or a mix of uses. The community is also in support of the continued repurposing of vacant and underutilized structures/properties, with several requests to see improvements in property maintenance throughout Town with a focus on the Hamlet of Connelly and areas within Port Ewen.

Based on the survey and public meetings there is high support for mixed residential-commercial, single family dwellings and apartments. There is a perceived difficulty in obtaining approvals for business. Billboards and electric/digital signage were identified as undesirable and there is support for the current/historical development patterns and compatible infill of the denser core areas for missing uses such as small scale offices, medical facilities, and development that directly and positively impacts the local economy.

Observations:

1. Property classified as Residential and Vacant are the Town’s top two land use categories by acreage.
2. The Town is ranked second (out of 21 communities in Ulster County) in the percentage of wholly tax exempt parcels and has the third highest amount of assessed value being wholly exempt from property taxes at \$211,388,675, equaling almost 20% of property value.
3. The next round of regulatory updates by the Town should include regulations for renewable energy sources, signage, enhance property maintenance, noise impacts, allowances for “tiny homes,” and adjustments to lot coverage and setbacks for commercial property within Port Ewen, among additional recommendations identified in the analysis and specified in more detail in Section IV Goals and Recommendations.

COMMUNITY PROFILE MAPS



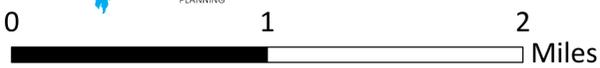
Legend

- | | |
|---|--|
| Religious Institutions | Municipal Facilities |
| Post Offices | Educational Facilities |
| Town Parks | Fire Dept. Properties |

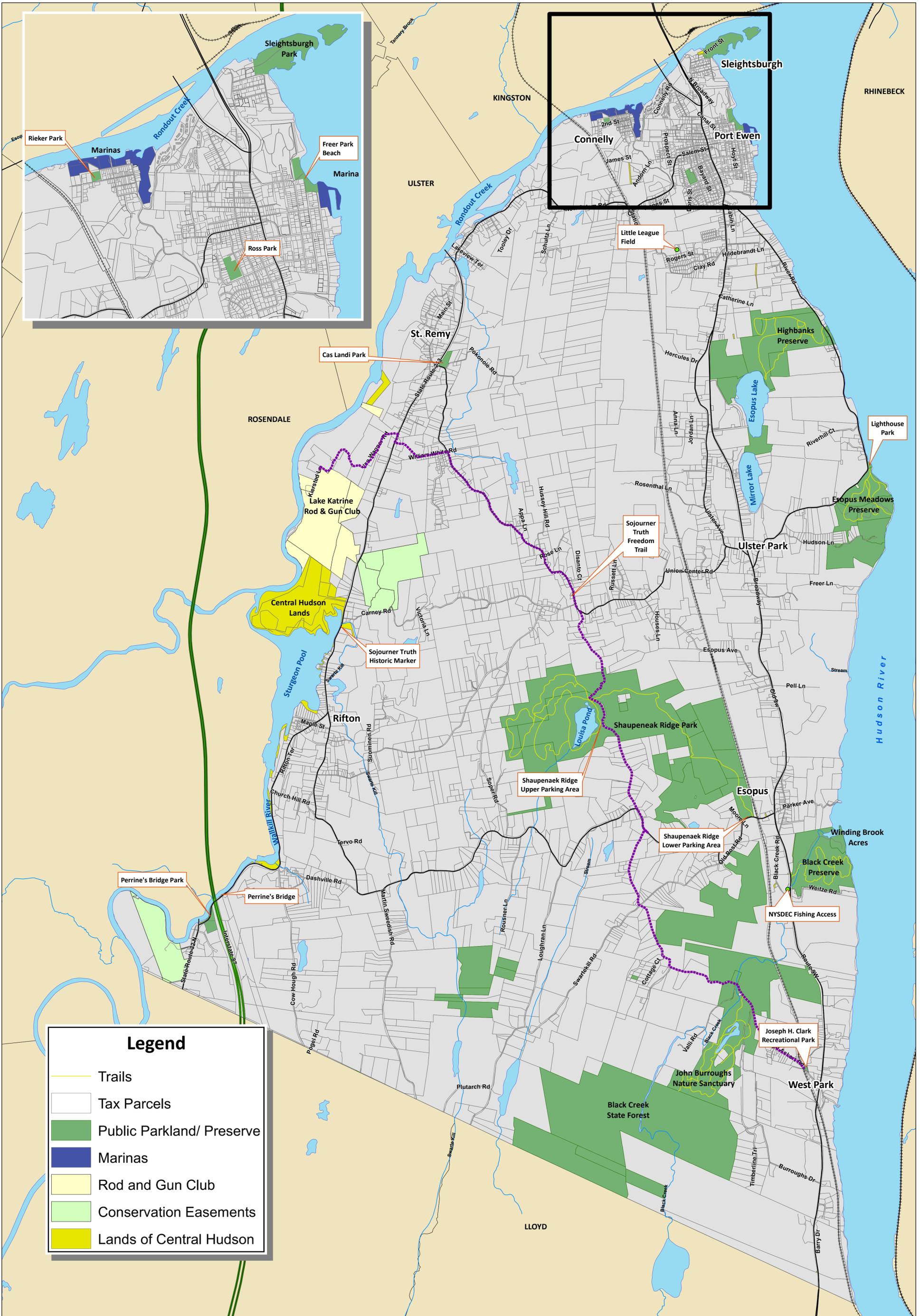


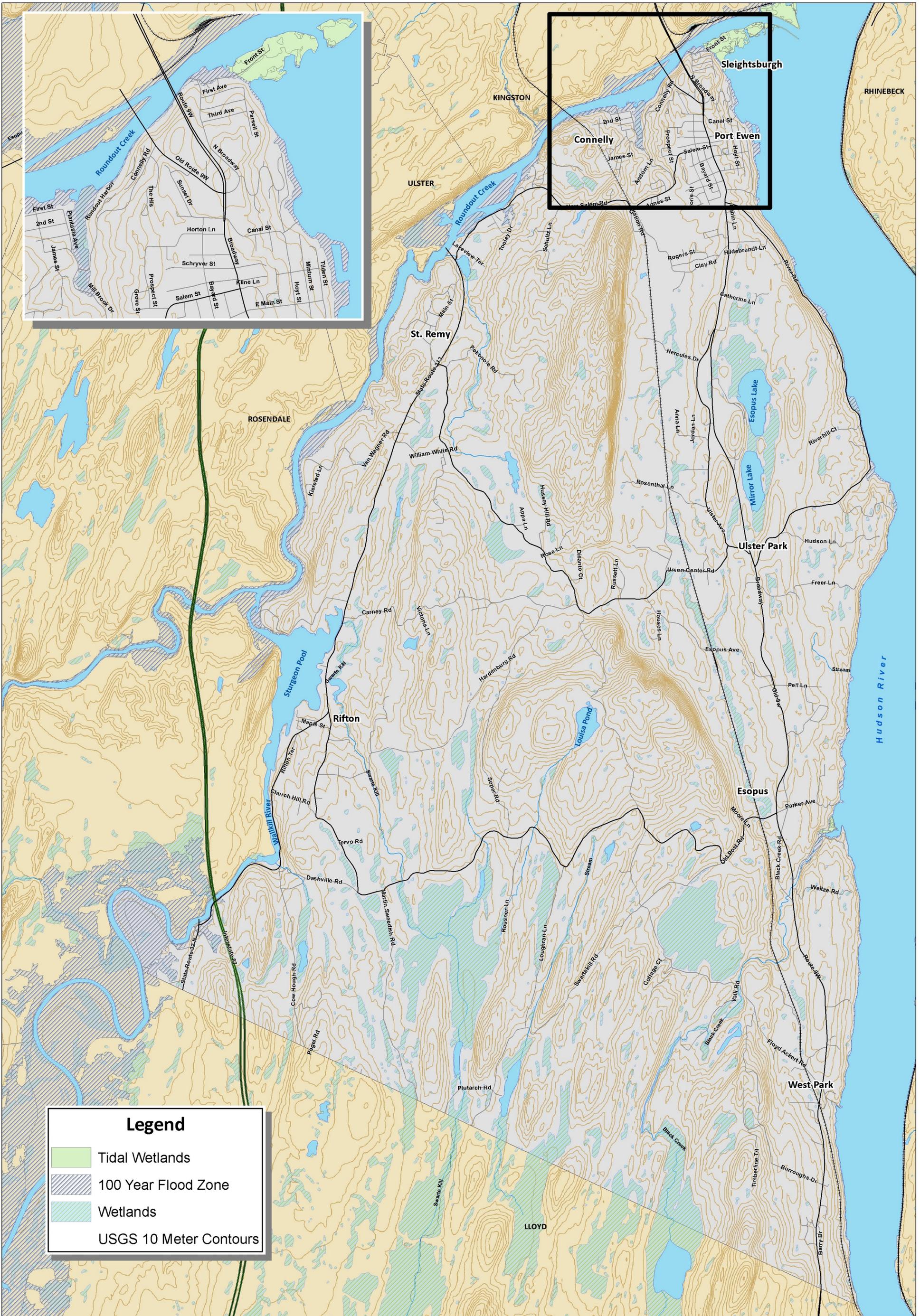
Town of Esopus Comprehensive Plan

Community Services Map



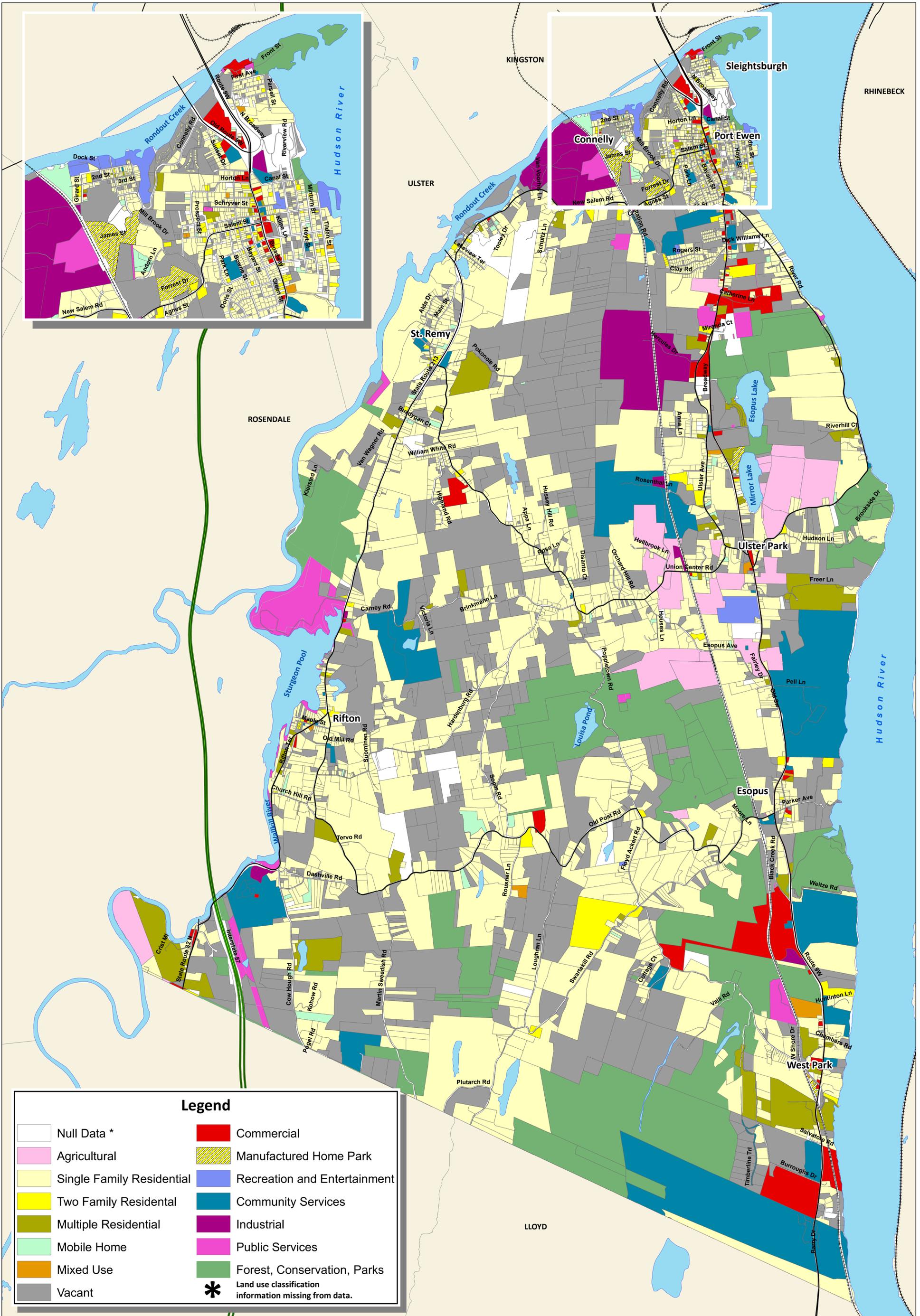
Created 4-23-18. For illustrative purposes only. Accuracy not guaranteed. Data provided by Ulster County and NYSGIS Clearinghouse



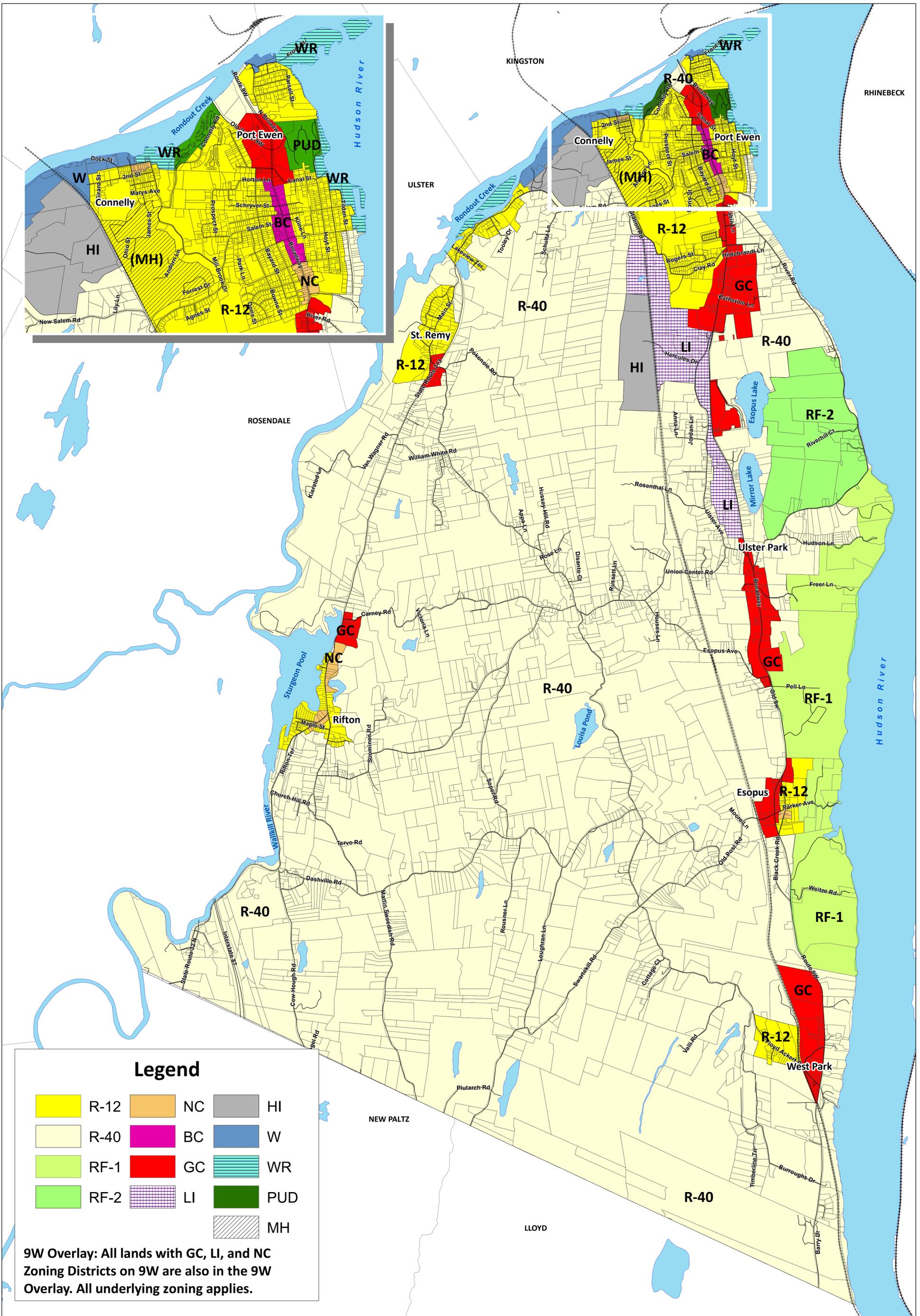


Legend

- Tidal Wetlands
- 100 Year Flood Zone
- Wetlands
- USGS 10 Meter Contours



Legend			
	Null Data *		Commercial
	Agricultural		Manufactured Home Park
	Single Family Residential		Recreation and Entertainment
	Two Family Residential		Community Services
	Multiple Residential		Industrial
	Mobile Home		Public Services
	Mixed Use		Forest, Conservation, Parks
	Vacant		Land use classification information missing from data.



Legend

- | | | |
|--|--|---|
|  R-12 |  NC |  HI |
|  R-40 |  BC |  W |
|  RF-1 |  GC |  WR |
|  RF-2 |  LI |  PUD |
| |  MH | |

9W Overlay: All lands with GC, LI, and NC Zoning Districts on 9W are also in the 9W Overlay. All underlying zoning applies.

Appendix A-1:

Natural Areas and Wildlife in your Community – A Habitat Summary Prepared for the Town of Esopus

NYSDEC – Hudson River Estuary Program

NATURAL AREAS AND WILDLIFE IN YOUR COMMUNITY



Hudson River Estuary Program

A Habitat Summary Prepared for the Town of Esopus

This summary was completed in March 2019, providing information for land-use planning and decision-making as requested by the Town of Esopus. It identifies significant ecosystems in the Town, including coastal habitats, streams, forests, wetlands, and other natural areas with important biological values. This summary is based only on existing information available to the New York State Department of Environmental Conservation (DEC) and its partners, and, therefore should not be considered a complete inventory. Additional information about habitats in our region can be found in the *Wildlife and Habitat Conservation Framework* developed by the Hudson River Estuary Program (Penhollow et al. 2006) and in the *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* developed by Hudsonia and published by DEC (Kiviat and Stevens 2001).

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

The Estuary Program works toward achieving key benefits:

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

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

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

CONTACT INFORMATION

Ingrid Haeckel

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

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



Department of Environmental Conservation



Cornell University

Table of Contents

■ Introduction.....	3
Summary Content.....	3
How to use this summary	4
Limitations of Maps in this Summary	4
How to find more information.....	4
Conservation.....	5
■ Important Habitats in the Town of Esopus.....	6
Regional Context (Figure 1)	6
Significant Ecological Features (Figure 2)	6
Significant Coastal Fish and Wildlife Habitats.....	7
Significant Natural Communities.....	7
Known Important Areas for Rare Plants and Rare Animals.....	7
Matrix Forest Blocks and Linkage Zones.....	8
Stream Habitat for Migratory Fishes.....	9
Hudson River Coastal and Shoreline Habitats (Figure 3)	9
Significant Coastal Fish and Wildlife Habitats.....	9
Underwater (Subtidal) Habitats.....	10
Tidal Hudson River Estuary Wetlands.....	10
Tidal Shoreline Status.....	11
Potential Tidal Wetland Pathways.....	11
Streams (Figure 5)	11
Wetlands (Figure 5)	13
Large Forests (Figure 6)	14
Grasslands, Shrublands, and Young Forests (not mapped)	16
■ Species and Ecosystems of Conservation Concern in the Town of Esopus.....	23
Table 1. Species and Ecosystems of Conservation Concern in Esopus, NY	23
■ References.....	29

Introduction

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

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

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

- Ecological Society of America

Summary Content

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

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

[Figure 2: Significant Ecological Features](#) in Esopus, NY

[Figure 3: Hudson River Coastal Habitats](#) in Esopus, NY

[Figure 4: Streams and Watersheds](#) in Esopus, NY

[Figure 5: Wetlands](#) in Esopus, NY

[Figure 6: Large Forests](#) in Esopus, NY

Descriptions of shrubland and young forest habitats and grasslands are included in the text but not mapped. Following the maps, [Table 1](#) lists known **Species and Ecosystems of Conservation Concern** that have been recorded for Esopus, including species listed in New York (NY) or federally (US) as [endangered](#), [threatened](#), [special concern](#), [rare](#), a [Species of Greatest Conservation Need](#) (SGCN), or a [Hudson River Valley Priority Bird](#) species. SGCN are species identified in the State Wildlife Action Plan that are experiencing some level of population decline, have identified threats that may put them in jeopardy, and need conservation actions to maintain stable population levels or sustain recovery (NYSDEC 2015). High priority SGCN are species in need of timely management intervention or they are likely to reach critical population levels in New York within 10 years. Audubon New York identified the Hudson River Valley priority birds by assessing continental, national, and regional bird planning initiatives in addition to state and federal priority designations.

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

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

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

Please note that some habitats and species identified in this document may be protected by state or federal programs. The [Environmental Resource Mapper](#) on DEC's website can help identify those resources. Please work with DEC's Region 3 Office in New Paltz and other appropriate entities as necessary.

How to use this summary

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

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

Limitations of Maps in this Summary

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

on- and off-site. Second, the summary highlights areas that may require more detailed assessment to evaluate potential impacts. Third, the tables identify species of conservation concern that may warrant special attention during reviews. If it's not already a routine step, the planning board should consider requiring applicants to produce a current letter from the [New York Natural Heritage Program](#) that identifies rare plants, rare animals, and significant ecosystems that are known to be on or near a proposed development site. The planning board and applicants should also work closely with DEC Region 3 Permits staff to ensure regulatory requirements are met.

How to find more information

Most of the GIS data presented in the Habitat Summary maps may be obtained for free from the [New York State GIS Clearinghouse](#) or from other public websites. The summary can be enhanced by local knowledge. Local studies, maps, plans, and knowledgeable residents can provide details and may reveal previously unknown, high-quality ecosystems. Biological information in environmental impact statements may also be useful, especially when a municipality has habitat standards for environmental review. For help with incorporating additional information into the summary or questions about obtaining GIS data used in the maps, please contact Ingrid Haeckel, Hudson River Estuary Conservation and Land Use Specialist.

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

Conservation

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

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

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

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

Important Habitats in the Town of Esopus

Regional Context ([Figure 1](#))

The first step to understanding the natural areas and habitats of Esopus is to consider how the town relates to its surrounding area. The town spans approximately 42 square miles including underwater lands in the Hudson River. All land in Esopus ultimately drains to the Hudson River Estuary. Western portions of Esopus lie within the Wallkill River watershed and Rondout Creek watersheds. Central and eastern Esopus drain primarily via Black Creek, or via small streams directly to the Hudson River Estuary.

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

– U.S. Environmental Protection Agency

Esopus's eastern boundary is defined by over 13 miles of shoreline along the tidal Hudson River. Tidal wetlands, tributary mouths, and shallow water habitats in the estuary encompass some of the town's most biologically significant habitats. The Upper Hudson River Estuary is identified as a Significant Biodiversity Area (SBA) by the DEC Hudson River Estuary Program and is a globally rare ecosystem that supports many rare species as well as regionally important fisheries (Penhollow et al., 2006):

“The Hudson River Estuary contains significant freshwater and brackish tidal wetlands, as well as other riverine and estuarine habitats, islands, riparian zones, and important tributaries. These habitats support a high diversity of fish, birds, and mammals....The 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.”

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

The town's Hudson River and tidal Rondout and Black Creek shorelines and tidal wetlands are within the SBA and support occurrences of several rare plant species and important habitats for migratory fishes. These areas are also designated Significant Coastal Fish and Wildlife Habitats by the New York State Department of State, discussed further in the [Hudson River Coastal and Shoreline Habitat](#) section.

In addition to significant coastal features, the southern half of the Town lies in the Esopus/Lloyd Wetlands and Ridges SBA, recognized for wetland and upland habitat that is of particular importance to amphibian species and breeding waterfowl (Penhollow et al. 2006). Significant wetland resources of this area are discussed further in the [Wetlands](#) section.

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

[Figure 2](#) shows the major ecological features known to occur in Esopus, including the significant coastal fish and wildlife habitats, known important areas for rare animals and rare plants, significant natural communities, matrix forest blocks and linkage zones, and stream habitat for migratory fishes. Note that [Figure 2](#) and the corresponding descriptions below are based on limited existing information. Overlapping layers in the map may be viewed in greater detail using the [Hudson Valley Natural Resource Mapper](#).

Significant Coastal Fish and Wildlife Habitats. The DEC has identified and evaluated coastal habitats throughout the state's coastal regions, providing recommendations to the NYS Department of State so that the most important or "significant" habitats may be designated for protection in accordance with the Waterfront Revitalization and Coastal Resources Act. There are four designated significant coastal fish and wildlife habitats in Esopus: Black Creek, Esopus Meadows, Rondout Creek, and the Kingston-Poughkeepsie Deepwater. They are described under [Hudson River Coastal and Shoreline Habitat](#).

Significant Natural Communities. Seven exemplary natural community types have been mapped in Esopus by NYNHP including upland forests, forested and shrub wetlands, vernal pools, and tidal wetlands. NYNHP describes the complex of [Hemlock-Northern Hardwood Forest](#) running from Shaupeneak Mountain south to Illinois Mountain as large, mature, and relatively undisturbed, though threatened by hemlock loss due to woolly adelgid infestation. Adjacent [Appalachian Oak-Hickory Forest](#) occurs on the rolling hills and south and west slopes of Shaupeneak Mountain and the ridges to the south and is described as large, good-quality, maturing to mature, but beginning to show impacts from invasive plants, forest pests and deer browse pressure. Excellent examples of small [Red Maple-Hardwood Swamps](#) occur in depressions within these forest communities. Louisa Pond supports an uncommon [Dwarf Shrub Bog](#) in a small, glacially carved bowl near the summit of Shaupeneak Mountain. A complex of 15 high quality [Vernal Pools](#) is documented at Black Creek Preserve (not mapped in Figure 2). Rare [Freshwater Tidal Marsh](#) and [Freshwater Intertidal Shore](#) habitats are mapped in Sleightsburg Marsh, but are described as moderately to extremely disturbed. NYNHP guides are available through linked text and offer detailed descriptions of the habitats and conservation recommendations. The large extent and diversity of these habitats suggests that other high quality examples of natural communities likely occur in Esopus.

Known Important Areas for Rare Plants and Rare Animals. The New York Natural Heritage Program (NYNHP) has identified areas of importance for sustaining populations of rare plants and rare animals based on existing records and the species' habitat requirements. Known important areas include the specific locations where species have been observed, as well as areas critical to maintaining the species' habitat. Proactive planning that considers how species move or disperse across the landscape, with careful attention to maintaining connected habitat complexes, will contribute to the long-term survival and persistence of rare species. NYNHP has identified known important areas in Esopus for migratory fishes, Bald Eagle, Indiana Bat, Kentucky Warbler, Northern Cricket Frog, Red-Headed Woodpecker, and Wood Turtle, in addition to known important areas for several rare plants. A complete list of state rare plants and animals known from Esopus is shown in [Table 1](#).

[Atlantic Sturgeon](#) (US-Endangered, High Priority SGCN) and [Shortnose Sturgeon](#) (NY-Threatened, SGCN) and other SGCN including Blueback Herring and Alewives are migratory fishes that return from the ocean to spawn in Esopus' freshwater habitats. Threats include dredging and other potentially harmful activities that take place in spawning and nursery areas, as well as historic overfishing/bycatch. Streams used by American eel, a migratory species that returns to the ocean to spawn, are shown in [Stream Habitat for Migratory Fishes](#).

[Bald Eagle](#) (NY-Threatened, SGCN) nesting is known in Esopus along the Hudson River and the Wallkill River. While Bald Eagle breeding and non-breeding populations are increasing in New York, development pressure and its impacts on habitat remain significant threats. Nesting sites are sensitive to human disturbance.

[Indiana Bat](#) (US-Threatened, High Priority SGCN) and [Northern Long-eared Bat](#) (US-Threatened, High Priority SGCN) have been documented foraging in a forested area of Esopus and are known to overwinter in caves and abandoned mines just outside of the Town. 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.

The [Comet Darner](#) damselfly (SGCN) inhabits small ponds with an abundance of floating and submerged vegetation and has been documented near Black Creek in Esopus. It is sensitive to alterations in hydrology and water quality, as well as herbicide use.

[Kentucky Warbler](#) (High Priority SGCN) is a bird of forest interiors that was last documented nesting in woodlands of Ulster Park in 1994. The species reaches its northernmost extent in New York and is declining in the state. Kentucky Warblers and other woodland bird species are most threatened in New York by forest fragmentation and excessive deer browse, which reduces the amount of dense, low vegetation needed during the breeding season. See [Table 1](#) for a list of other forest bird species of conservation concern occurring in Esopus.

[Least Bittern](#) (NY-Threatened, SGCN) is a marsh bird with a preference for large emergent wetlands with cattails, bulrushes, and sedges, and large open water areas. Least bittern nesting was last documented near the mouth of Rondout Creek in the 1980s. The species is threatened by continued wetland loss in the Hudson Valley and by habitat degradation due to fragmentation, exotic plant invasions, and nutrient enrichment in wetlands.

[Lyre-tipped Spreadwing](#) (SGCN) is a damselfly species that inhabits small ponds and marshy wetlands, often in open, temporary situations that dry up in mid-summer. It has been documented using vernal pool habitat near Black Creek in Esopus.

[Northern Cricket Frog](#) (NY-Endangered, High Priority SGCN) relies on ponds, lakes, and emergent wetlands with floating mats of mosses, water lilies and other aquatic plants. They move between the wetlands and adjacent upland habitat areas for overwintering and are vulnerable to nearby development and alteration of wetland habitat including changes in water quality and hydrology. Cricket frogs have been documented in at least three locations of the Wetlands and Ridges SBA in Esopus since 2010.

[Red-headed Woodpecker](#) (NY-Special Concern, High Priority SGCN) occurs in open swamps with dead, standing trees, and other open areas with scattered trees and has been documented in the Wetlands and Ridges SBA in Esopus. Dead trees with cavities provide nesting habitat and should be preserved where feasible.

[Wood Turtle](#) (NY-Special Concern, High Priority SGCN) occurs along low gradient streams and adjacent forested and open uplands in the Wetlands and Ridges SBA in Esopus. Wood Turtles are 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 3 Office in New Paltz should be contacted at 845-256-3098 with any concerns or questions about the presence of protected species in the Town of Esopus.

Matrix Forest Blocks and Linkage Zones. The Nature Conservancy and New York Natural Heritage Program have identified globally-rare “matrix forests” at the statewide level -- forests large enough to withstand major natural disturbances, maintain important ecological processes, and support populations of forest-interior wildlife and plants (Anderson and Bernstein, 2003). The nearly 26,000-acre Shaupeneak matrix forest block covers much of Esopus west of US Rt 9W and is crucial for regional habitat connectivity. Its

importance is disproportionate to its size: the region's larger, forested mountain and ridge areas—the Catskills, Shawangunks, Taconics, and Hudson Highlands—all connect via relatively intact forest linkage zones through the Shaupeneak forest matrix block. The proximity of this forested area to the Hudson River Estuary is unusual, as is the presence of several large forest blocks over 500 acres in size along the Hudson River shoreline. Large forested areas provide many ecosystem services, and support vulnerable groups such as forest interior (area-sensitive) breeding birds who are able to find suitable habitat in this largely forested landscape. These attributes are discussed further in the [Forest](#) section.

Stream Habitat for Migratory Fishes. Esopus's main Hudson River tributaries provide important stream habitat for migratory fishes according to DEC Bureau of Fisheries data and an aquatic habitat connectivity study by NYNHP (White, et al., 2011). American Eel occur along the full length of Rondout Creek and Black Creek in the Town. River herring (Alewife and Blueback Herring) spawn in reaches of Rondout Creek below the Eddyville dam and lower reaches of Black Creek support one of the most important Alewife spawning runs in the region. American Eel is in decline throughout much of its range, and though eels are able to bypass certain dams, culverts, and other aquatic barriers, they rely on aquatic connectivity along streams to complete their life cycle and return to the sea to spawn. River herring spend most of their time in coastal waters and return to the fresh water of the Hudson River each spring to spawn before returning back to ocean waters. NYSDEC fisheries biologists have monitored herring spawning in Black Creek since 2013, identifying as many as 590,000 Alewives in a given year (Eakin et al. 2014). See the [Streams and Watersheds](#) section, below, for additional information on stream habitat in Esopus.

Hudson River Coastal and Shoreline Habitats ([Figure 3](#))

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. Conditions throughout this reach of the estuary are entirely freshwater, supporting globally rare natural communities such as freshwater tidal marsh and swamp. The Town of Esopus's coastal habitats and general shoreline type along the tidal Hudson are shown in [Figure 3](#).

Significant Coastal Fish and Wildlife Habitats. Diverse coastal habitats occur in New York that provide critical habitat and feeding areas for animals as well as economic values. As previously mentioned, the DEC has identified and evaluated coastal habitats throughout the state's coastal regions, providing recommendations to the NYS Department of State so that the most important or "significant" habitats may be designated for protection in accordance with the Waterfront Revitalization and Coastal Resources Act. The Significant Coastal Fish and Wildlife Habitats are useful for planning at the local level because they describe the highest quality habitats on the Hudson, outlining fish and wildlife values and activities that may have large impacts on the habitats. State and federal law requires that some projects may be reviewed for consistency with coastal policies on significant fish and wildlife habitat. Contact the [NYS Department of State Office of Planning & Development](#) for more information on the protection and regulation of these habitats. Esopus has a [Local Waterfront Revitalization Program](#), adopted in 1987 with federal concurrence in 1988.

There are four designated Significant Coastal Fish and Wildlife Habitat areas in Esopus (Figures [2](#) and [3](#)). Detailed habitat assessments of the [Kingston-Poughkeepsie Deepwater](#), [Rondout Creek](#), [Esopus Meadows](#), and [Black Creek](#) sites discuss their value to fish and wildlife, and information on potential impacts to their habitat values. See [Table 1](#) for more information on the documented rare species associated with Esopus's coastal habitats.

The **Kingston-Poughkeepsie Deepwater** area encompasses a 25-mile stretch of nearly continuous deepwater habitat ranging in water depth from 20 feet to 50 feet or greater. It supports a diversity of freshwater and migratory species and is one of the largest and most well-known spawning areas for Atlantic

Sturgeon (NY-Endangered) and overwintering areas for Shortnose Sturgeon (NY-Endangered) in the Hudson River.

The **Rondout Creek** area encompasses a four-mile tidal segment of the tributary from the Hudson River to the Eddyville dam. It includes Sleightsburg Marsh at the mouth of the creek and habitats such as flats, tidal wetlands, and shallows, especially behind Gumaer Island. The warmwater stream has experienced considerable human disturbance but remains important for migratory and resident freshwater fish and is a major spawning area for Alewife and Striped Bass. Sleightsburg Marsh and other wetlands at the mouth of the creek are productive feeding areas during spring and fall migrations for a variety of species including mallard, black duck, and wood duck. Banks of the Rondout also provide habitat for Map Turtles and Common Snapping Turtles.

Esopus Meadows is a shoal of freshwater shallows (less than 10 feet deep at mean low water), and intertidal mudflats with extensive submerged aquatic vegetation beds, historically dominated by water celery. The shallow, subtidal beds provide spawning, nursery, and feeding habitats for migratory species such as Striped Bass and American Shad, as well as many resident freshwater species. Significant concentrations of waterfowl also occur in the Esopus Meadows area during spring and fall migrations, attracted to the valuable feeding areas. Invasive, non-native water chestnut has expanded in the habitat in recent years.

The mouth of **Black Creek** is flanked by forest and opens to freshwater tidal wetland and swamp with submerged aquatic vegetation beds where the creek meets the Hudson River. The creek has historically supported one of the largest river herring spawning runs in the Hudson Valley, most recently dominated by Alewives. American Eel are also present in the creek and Map Turtles are found along the banks at the creek mouth.

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

[Figure 3](#) shows areas where SAV has been found since 1997. DEC's most recent survey in 2014 found 58 acres of SAV in Esopus, about one quarter of the area documented with SAV in 2007. An additional 173 acres of water chestnut were found primarily in Esopus Meadows and Sleightsburg Marsh. A dramatic decline in SAV (90% loss) was seen throughout the Hudson River Estuary following Hurricanes Irene and Lee in 2011. The habitat loss was believed to be due to the large amount of sediment entering the estuary from the storms, which blocked light and prevented plant growth. Since 2016, signs of SAV recovery have been seen throughout the estuary. Even if SAV is not present today, the areas shown in [Figure 3](#) could support it in the future.

Tidal Hudson River Estuary Wetlands. The wetlands at the mouth of the Rondout Creek and Black Creek are both freshwater and tidal, a globally rare ecosystem type. Tidal wetlands serve a very important purpose in the river, providing habitat for rare plants and young fish and other benefits for people like wastewater dilution/purification and protecting shorelines from waves and strong storms. [Figure 3](#) shows tidal wetlands mapping from a 2007 inventory by DEC, which identified about 31 acres of tidal wetlands in Esopus at Sleightsburg Marsh and in the mouth of Black Creek. A variety of rare plant species have been documented from these coastal habitats and are listed in [Table 1](#).

Tidal Shoreline Status. Natural shorelines are an important transition zone between water and land and provide habitat for diverse plants, fish and wildlife. Tidal shorelines comprise lands directly on the Hudson River as well as the shorelines of tidal wetlands, tidal tributaries, and coves, including both naturally vegetated and hard engineered shoreline. Esopus has approximately 13.2 miles of tidal shoreline directly along the Hudson River, and an additional 4 miles along the tidal Rondout Creek. [Figure 3](#) shows general shoreline type according to a 2005 inventory of Hudson River shoreline status by NYSDEC and the Hudson River National Estuarine Research Reserve. The study identified 2.1 miles of hard engineered shoreline in Esopus, including bulkhead and rip-rap revetment. The remaining 11.1 miles of natural shoreline support primarily woody vegetation or unvegetated rock, sand, and gravel.

Towns can evaluate tidal shoreline status to identify places where natural shorelines can be conserved or where the ecology of engineered shorelines could be enhanced. There are opportunities to conserve, restore, and manage shoreline habitats throughout the Esopus 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](#) provides information and tools on enhancing the ecology of built shorelines as well as how to conserve natural shorelines.

Potential 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 3-6 feet due to SLR by 2100 (Horton et al. 2014). 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 (Tabak et al. 2016). The study shows that the location of Esopus's tidal wetlands will likely change by 2100.

The **Potential Tidal Wetland Pathways** in [Figure 3](#) show where tidal wetlands are likely to move by 2100 as sea level rises. Tidal wetlands are projected to expand in low lying areas along Rondout Creek and the mouth of Black Creek, while being lost from portions of Sleightsburg Marsh as water becomes too deep. Steep shorelines are a barrier to wetland movement in many areas; in others, existing roads, railroads, and development pose a physical barrier. The wetland pathways do not account for all of the barriers that may be present; for example, bulkheads and revetment may be a barrier to inland wetland migration along some stretches of Esopus's Hudson River shoreline. Tidal wetland pathway data may be viewed in more detail using the [Protecting the Pathways](#) interactive map

The most effective way for a municipality to conserve tidal wetlands in the face of these changes is to protect and manage the areas where wetlands may move. Minimizing future development in the 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](#) (Tabak and Spector 2016). Sea level rise projections for the town's waterfront can be viewed using Scenic Hudson's [Sea Level Rise Mapper](#).

Streams ([Figure 5](#))

[Streams](#), their floodplains, adjacent wetlands, and other "riparian" or streamside habitats that occur along their channel provide important ecosystem services to communities, including clean water, flood management, and recreational opportunities like fishing and kayaking. In addition, Hudson River tributary streams and their associated shoreline and floodplain areas provide some of the most productive wildlife

habitat in the region. The health of the Hudson River Estuary is closely linked to the health of its tributaries and their watersheds (Penhollow et al. 2006).

All of the land in Esopus ultimately drains to the Hudson River Estuary ([Figure 4](#)). Black Creek drains 13.7 square miles of land in the center and east of the town. To the west, 11.3 square miles of land drain via the Swarte Kill and the Walkkill River to Rondout Creek. An additional 8 square miles of land in northern Esopus drain directly to Rondout Creek, and a narrow area east of US Rt 9W drains directly to the estuary via minor streams along the town's Hudson River shoreline.

In addition to watershed boundaries, Figure 4 shows streams, waterbodies, floodplains, and riparian buffer areas. Streams and waterbodies in Figure 4 and other maps in this summary are from the USGS National Hydrography Dataset (NHD) and were digitized from air photos. Note the resulting maps have inherent inaccuracies and do not capture most intermittent streams. Intermittent streams are in fact widespread, accounting for an estimated 59% of total stream length in the United States. The US Environmental Protection Agency and has compiled extensive scientific reviews highlighting their essential role in maintaining water quality and overall watershed function or health (US EPA 2015). Intermittent streams also play a vital role in dissipating stream energy during storms and reducing erosion and downstream flood impacts. Visiting sites and creating more accurate maps are methods to pursue to ensure that intermittent streams are identified and considered during planning processes.

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

The largely intact forested landscape and riparian corridors surrounding Black Creek and the Swarte Kill support unusually pristine stream habitats and water quality for this region of the Hudson Valley. Black Creek is one of the few low-elevation coldwater streams the region, with ability to support Brown Trout and other coldwater-dependent species. In addition to important habitat for migratory fishes shown in Figure 2, streams in Esopus provide important habitat areas for NY-Special Concern Wood Turtle.

Effective stream conservation and restoration occurs beyond stream channels and banks. [Figure 4](#) shows riparian areas, which were mapped by the New York Natural Heritage Program (Conley et. al. 2018) using the Riparian Buffer Delineation Model (Abood et al. 2012). The riparian areas highlight important streamside areas that influence stream dynamics and health. Riparian buffers intercept stormwater runoff, filter sediment and nutrients, and help attenuate flooding. Forested buffers provide organic matter that supports the in-stream food web and shade that helps maintain cool water temperatures. They also support unique and diverse habitats, and serve as wildlife travel corridors (Knab-Vispo and Vispo 2010). The riparian areas were mapped around streams based on digital elevation data, known wetlands, and modeling for the 50-year flood zone. The riparian areas overlap with FEMA floodplain data in the map and will soon be available for viewing in greater detail using the [Hudson Valley Natural Resource Mapper](#). Note that the riparian buffers were developed through modeling and have not been field verified. They may not capture all of the areas important to stream health and habitat values; nevertheless, they can provide a starting point to inform land use strategies and stream protection efforts. The Hudson River Estuary Program's "[Trees for Tribs](#)" initiative offers free consultation and native trees and shrubs for qualifying streamside buffer planting projects in the estuary watershed.

Floodplains are a particularly important component of riparian areas, especially where forested or undeveloped. Natural floodplains provide space streams need to expand, contract, and sometimes change course, and they promote groundwater recharge. Furthermore, they safeguard human settlement from the damaging impacts of flood events. Floodplain information included in [Figure 4](#) comes from the [Federal Emergency Management Agency](#) (FEMA) Digital Flood Insurance Rate Map (DFIRM) Database. Areas estimated by FEMA to have a 1% chance or greater probability of being inundated in any given year (often

referred to as the “100-year flood”), include low-lying areas along Rondout Creek and the Walkkill River, Esopus and Mirror Lakes, and the Black Creek and Swarte Kill wetlands. Some narrow additional areas are mapped by FEMA with a 0.2% chance or greater probability of flooding in any given year (referred to as the “500-year flood”). It is important to note that the FEMA-mapped floodplains and their statistical flooding intervals are estimations based on the data and technology available at the time of mapping. Due to many variables, such as the unpredictable nature of some kinds of floods, local drainage problems, and the variable intensity of land development in watersheds, some flood-prone areas may not appear on the maps. Nonetheless, the mapped floodplains provide a starting point for proactive conservation planning.

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

There are a number of initiatives directed at watershed protection in Esopus’s watersheds. The [Rondout Creek Watershed Council](#) published [An Interim Watershed Management Plan for the Lower, Non-Tidal Portion of the Rondout Creek, Ulster County, New York](#) (2010), which address watershed protection upstream from Eddyville Dam; and the [Tidal Rondout Creek Watershed Management Plan](#) (2015), which addresses the 11.25 square mile watershed of the tidal portion of the Rondout that flows along Esopus’s northern border. Since 2015, the [Walkkill River Watershed Alliance](#) has been actively working to restore the Walkkill River and improve opportunities for recreation. Their actions are guided by a [Science-Based Action Plan](#) (2018), which prioritizes projects to improve water quality, public access and engagement, and capacity building. This work also builds off of previous planning efforts, including the [Walkkill River Watershed Conservation and Management Plan](#) (2007), which continues to serve as a valuable reference.

Wetlands (Figure 5)

There are many types of wetlands in the Hudson River Estuary watershed, including wet meadows, emergent marsh, forested and shrub swamps, vernal pools, floating and submerged vegetation, and open water, as well as the variety of tidal wetland types in the estuary discussed in the [Coastal and Shoreline Habitat](#) section (Figure 3). In addition to providing critical habitat for many plants and animals, wetlands help to control flooding and reduce damage from storm surge, recharge groundwater, filter and purify surface water, and provide recreation opportunities. The upland area surrounding a wetland is essential to its survival and function; both may diminish when a wetland is surrounded by pavement, buildings, and pollution-generating or other incompatible land uses ([Environmental Law Institute 2008](#)).

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

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

In [Figure 5](#), “known wetlands” are shown from the U.S. Fish and Wildlife Service’s (USFWS) [National Wetlands Inventory \(NWI\)](#). DEC’s [Freshwater Wetlands Program](#) maps (which only include wetlands larger than 12.4 acres, unless designated “of unusual local importance”) are shown as a hatched overlay. Open water habitats including the Hudson River are symbolized in blue as “waterbodies.” NWI data and NYS freshwater wetland maps can be viewed using the [Environmental Resource Mapper](#). County soil maps are also a good source for predicting the location of potential wetlands. “Probable wetland areas” are soils classified as very poorly drained or poorly drained, and “possible wetland areas” are soils classified as somewhat poorly drained (after Kiviat and Stevens 2001). Note that the probable and possible wetland areas cover a greater area than NWI and DEC wetland layers. NWI maps often underestimate wetland area and

omit smaller and drier wetlands (Zucker and Lau, unpublished report). In particular, vernal pools, wet meadows, and swamps are often under-represented on maps. Many of DEC's regulatory maps are outdated and have similar inaccuracies (Huffman and Associates 2000). Likewise, note that soil units are only mapped to an approximate area of about two acres, and that soils within the unit may not be homogeneous. Areas shown as supporting probable or possible wetlands should always be verified in the field for the purposes of environmental review.

In addition to significant coastal wetlands described in Figure 3, the Esopus/Lloyd Wetlands and Ridges Significant Biodiversity Area supports outstanding wetland resources unique in the Hudson Valley region. The intricate topography of ridges and valleys in this area coupled with relatively low development intensity has enabled the persistence of a rich complex of upland and wetland habitats. Below the dramatic talus and rock outcrops of Hussey Hill and Shaupeneak Ridge the valleys and lowlands abound with wetlands, many of which form sizeable assemblages. Large [Red Maple-Hardwood Swamps](#) in this area are often calcareous (calcium-rich), and some have been identified as exemplary from a statewide perspective. One such swamp is home to one of the healthiest populations of NY-Endangered [Large Twayblade](#) orchid in the northeast. A variety of other rare wetland plants in Esopus are listed in [Table 1](#). Uncommon wetland community types also occur here: [Circumneutral Bog Lakes](#) and [Dwarf Shrub Bogs](#) are notable for supporting a rich array of plants and animals, including rare and uncommon species. Several populations of the NY-Endangered [Cricket Frog](#) persist in this area, relying on calcareous vegetated wetlands as well as the intervening upland forest areas for overwintering. Ongoing research is still documenting the Cricket Frog's particular habitat needs, and in recent years has found that it can disperse farther into uplands than previously thought. Local planning to maintain large, connected wetland and forest ecosystems and reduce polluted runoff near wetlands will help to conserve these valuable resources. A variety of other High Priority Species of Greatest Conservation Need are known to occur in Esopus's wetlands and are listed in [Table 1](#), including [Red-headed Woodpecker](#), the Stinkpot turtle, and Four-toed Salamander, among others.

Numerous [vernal pools](#) are embedded within forested areas throughout much of Esopus, although they have only been formally mapped on Scenic Hudson properties (e.g. Black Creek Preserve, Shaupeneak Ridge, and Esopus Meadows Preserve). Vernal pools are small, isolated wetlands that are often dry in summer. They provide habitat for many animals, including forest amphibians documented in Esopus like NY-Special Concern Marbled Salamander and Jefferson Complex Salamander, as well as common species such as Spotted Salamander and Wood Frog. These pool-breeding amphibians depend on vernal pools to breed and later disperse to the surrounding forested uplands as adults. Vernal pools often go undetected in the forest due to their small size and seasonal drawdown. Vernal pools and other small, isolated wetlands are also vulnerable due to limited regulatory protection (see [Conserving Small Wetlands in the Hudson Valley](#) for more information). Knowing there are unmapped vernal pools in Esopus, outreach to landowners with potential habitat may help promote stewardship and land-use decisions that protect the pools, surrounding forest habitat, and associated wildlife. Specific management recommendations can be found in [Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Development in the Northeastern United States](#) (Calhoun and Klemens 2002) and [Maine Municipal Guide to Mapping and Conserving Vernal Pool Resources](#) (Morgan and Calhoun 2012). Biodiversity assessment may reveal additional wetland habitat types in the town and provide detail on quality and habitat use.

Large Forests ([Figure 6](#))

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

Esopus lies in one of the most intact forested regions of New York State. Significant forest areas of Shaupeneak Ridge and the Black Creek Corridor have been protected by state and non-profit organizations, but most forest land in the town remains in private ownership. There are opportunities to support and promote forest stewardship throughout the town, and to guide future land use in ways that maintain large forest tracts and minimize impacts to interior forest habitat.

[Figure 6](#) shows large forest patches in Esopus. The map was created from 2010 land cover data developed for the National Oceanic and Atmospheric Administration's Coastal Change Analysis Program. Land cover categories considered 'forest' for this analysis included deciduous forest, evergreen forest, mixed forest, and palustrine forested wetland. Roads were buffered and removed from forest patches to show results of development-related fragmentation. Interstate roads were buffered by a total of 300 feet and state and county roads by 66 feet. Forest patch size classifications follow the Orange County Open Space Plan (Orange County Planning Department 2004) as cited in Strong (2008).

The largest contiguous forest block in Esopus extends from Old Post Road south into neighboring Towns of New Paltz and Lloyd and is mapped as "globally significant." Forests of this size are considered large enough to withstand catastrophic natural disturbances, such as hurricanes or wildfires, and to maintain important ecological processes, such as nutrient and water cycling. Such forests are also big enough to support breeding populations of forest-interior species, including numerous forest songbirds, raptors, and far-ranging mammals like black bear, fisher, and bobcat. These characteristics will likely contribute to resilience in a changing climate. Conserving large, high quality forest areas such as these and natural connections between them will also allow plants and animals to move northward and higher in elevation as the climate warms.

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

Two additional major forest areas are mapped to the north: the Shaupeneak Ridge forest block, measuring over 5,200 acres; and the Hussey Hill forest block, measuring over 3,000 acres. Forest-dependent birds often require a least 2,500 acres of intact interior forest habitat to maintain viable populations. Though classified as "locally significant," they comprise important sections of the "matrix forest" of statewide and global significance shown in Figures 1 and 2 and should be considered of high significance based on low density of development and the presence of extensive exemplary forest communities described previously. Two additional "stepping stone" forest blocks are mapped east of US Rt 9W and are in fact rare occurrences of forests greater than 500 acres along the Hudson River, and important components of regional forest linkage zones connecting matrix forests of the Catskills, Hudson Highlands, and Taconic Mountains. The 200-acre threshold is often considered a minimum size for intact forest ecosystems able to support some but not all forest interior-nesting bird species. Smaller forests have limited habitat value for sensitive forest species and suffer greater impacts from development. Forest edge disturbances dominate small forests, such as invasive species, increased predation levels, and micro-climatic differences. Regardless of size or habitat values, all forests and trees in the town help to manage stormwater, moderate temperature, and improve air quality, among other ecosystem benefits.

It's important to note that the large forest blocks are mapped from a regional perspective and do not capture fragmentation by local roads, driveways, or low-density residential development. Figure 6 also shows "High" to "Outstanding" Intact Habitat Cores for Ulster County, which identify the most intact areas of undisturbed habitats and highlight valuable interior forest habitat present in Esopus. The habitat cores were identified through a study by the Green Infrastructure Center (Firehock 2013) in collaboration with Ulster County and NYSDEC staff. Cores are ranked based on habitat size and shape, species diversity, and water quality and

quantity values. These areas represent significant natural “green infrastructure” on the landscape providing clean air and water and valuable ecological functions that are otherwise costly to replicate through engineering. They can be used to inform local planning and prioritization for conservation.

Wildlife records confirm the availability of high-quality forest habitat in Esopus. The [2000-2005 NYS Breeding Bird Atlas](#) documented numerous forest-interior bird species of conservation concern in the town, including many NY-Species of Greatest Conservation Need such as Scarlet Tanager, Worm-eating Warbler, and Wood Thrush ([Table 1](#)). Two NY-Special Concern raptors were also documented in Esopus: Red-shouldered Hawk and Sharp-shinned Hawk. Audubon New York’s website has specific information on [managing habitat for forest birds](#). Esopus forests also provide important summer foraging habitat for NY-Endangered [Indiana Bat](#) and mostly likely for other bat species of conservation concern. Rare forest and open woodland plants have been documented in Esopus including the NY-Endangered [Side-oats Grama](#); see [Table 1](#) for a complete list.

One of the greatest threats to forests in Esopus today is the introduction of tree diseases, forest pests, and other invasive species inadvertently brought in by people through landscaping and international commerce. Hemlock woolly adelgid and emerald ash borer have already done much damage in the town, and are expected to eventually kill most large trees of these common species in the region. The [Lower Hudson Partnership for Regional Invasive Species Management](#) (PRISM) works to promote education, prevention, early detection and control of invasive species and is helping communities to prepare for and respond to this threat. Guiding future development to minimize forest fragmentation and loss will help minimize the spread of invasive species into interior forests and conserve important habitats in the town.

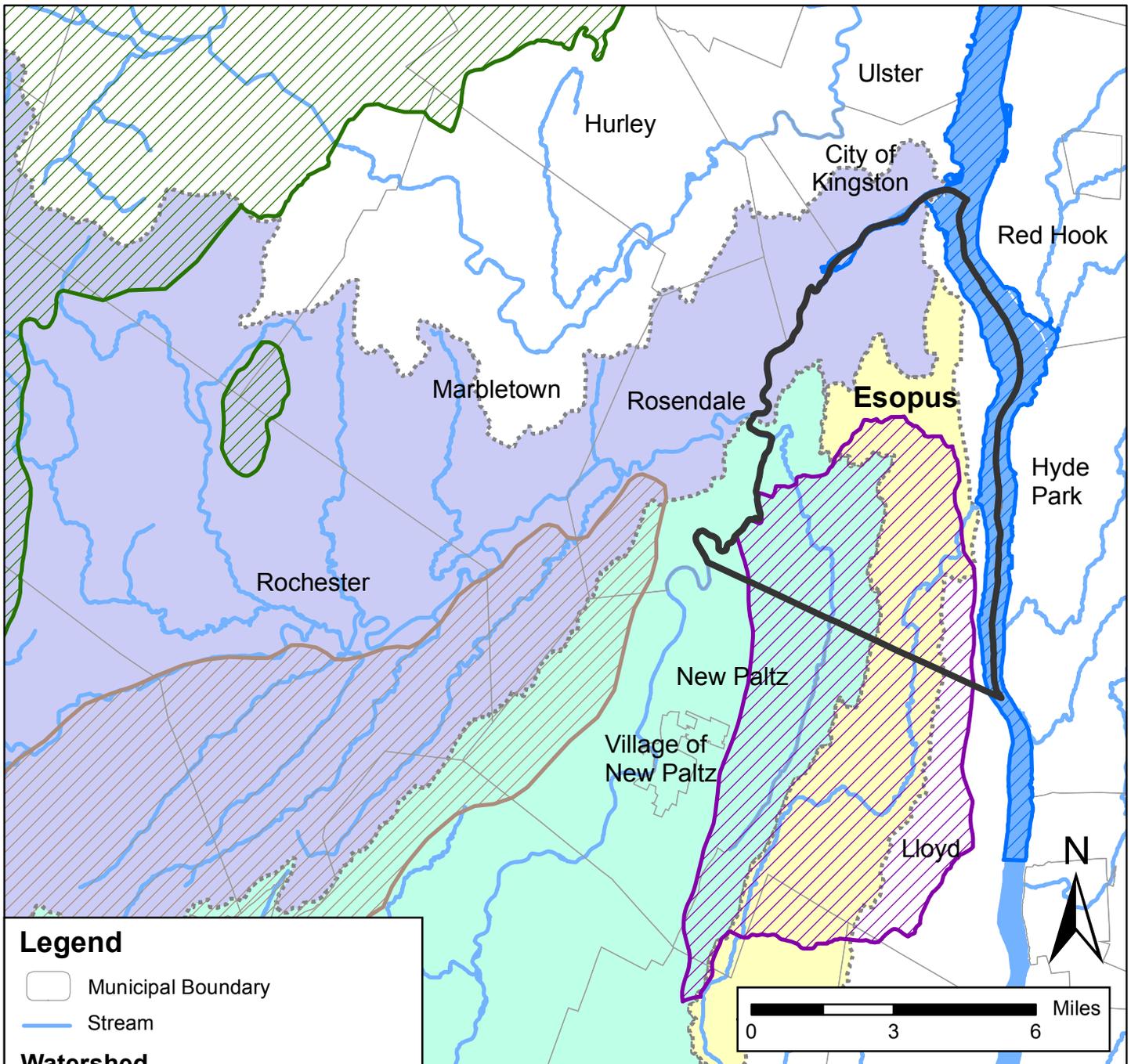
Grasslands, Shrublands, and Young Forests (not mapped)

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

Grassland or [meadow](#) habitat can support a variety of life, including rare plants, butterflies, reptiles, and birds, in addition to providing agricultural uses and scenic values. The quantity and quality of grasslands for wildlife have rapidly decreased in the Northeast during the last century due to increased human population, changes in agricultural technology, and abandonment of family farms. This continuing trend threatens populations of grassland birds that have adapted to the agricultural landscape. Esopus is largely forested today, and the [2000-2005 NYS Breeding Bird Atlas](#) documented just one grassland bird species of conservation concern in the Esopus area: Barn Owl. Small grassland and meadow habitats nevertheless are known to occur in the Town, and enhance habitat and species diversity. Audubon New York offers guidance on [managing habitat for grassland birds](#).

Shrublands and young forests are transitional habitats characterized by few or no mature trees, with a diverse mix of shrubs and/or tree saplings, along with openings where grasses and wildflowers grow. They can occur in recently cleared areas and abandoned farmland and are sometimes maintained along utility corridors by cutting or herbicides. These habitats are important for many wildlife species declining throughout the region because former agricultural areas have grown into forests, and natural forest disturbances that trigger young forest growth, such as fires, have been suppressed. Records from the *NYS Breeding Bird Atlas* support the presence of 11 species of conservation concern in Esopus that prefer young forest and shrubland habitat, including Blue-winged Warbler, Prairie Warbler, and Ruffed Grouse (see [Table 1](#)). For more information, see Audubon’s guidance on [managing habitat for shrubland birds](#).

Figure 1: Regional Context of Esopus, NY



Legend

- Municipal Boundary
- Stream

Watershed

- Black Creek
- Wallkill River
- Rondout Creek

Significant Biodiversity Areas

- Upper Hudson River Estuary
- Esopus/Lloyd Wetlands and Ridges
- Shawngunk Ridge
- Catskill Mountains

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

Data Sources:

- NYSDEC and US Geological Survey: streams (2008)
 - USDA Natural Resources Conservation Service: watersheds (2009)
 - NYS Department of Environmental Conservation: significant biodiversity areas (2006)
 - NYS Office of Information Technology Services: municipal boundaries (2018)
- Map Created 2018



Cornell University

Figure 2: Significant Ecological Features in Esopus, NY

This map shows the most significant *known* ecological features in the Town of Esopus, Ulster County based on limited information. This map was produced as part of a habitat summary for the Town. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at (845)256-3829 or at ingrid.haeckel@dec.ny.gov. <http://www.dec.ny.gov/lands/5094.html> Data are available for interactive viewing at <http://www.dec.ny.gov/gis/hre>

Legend

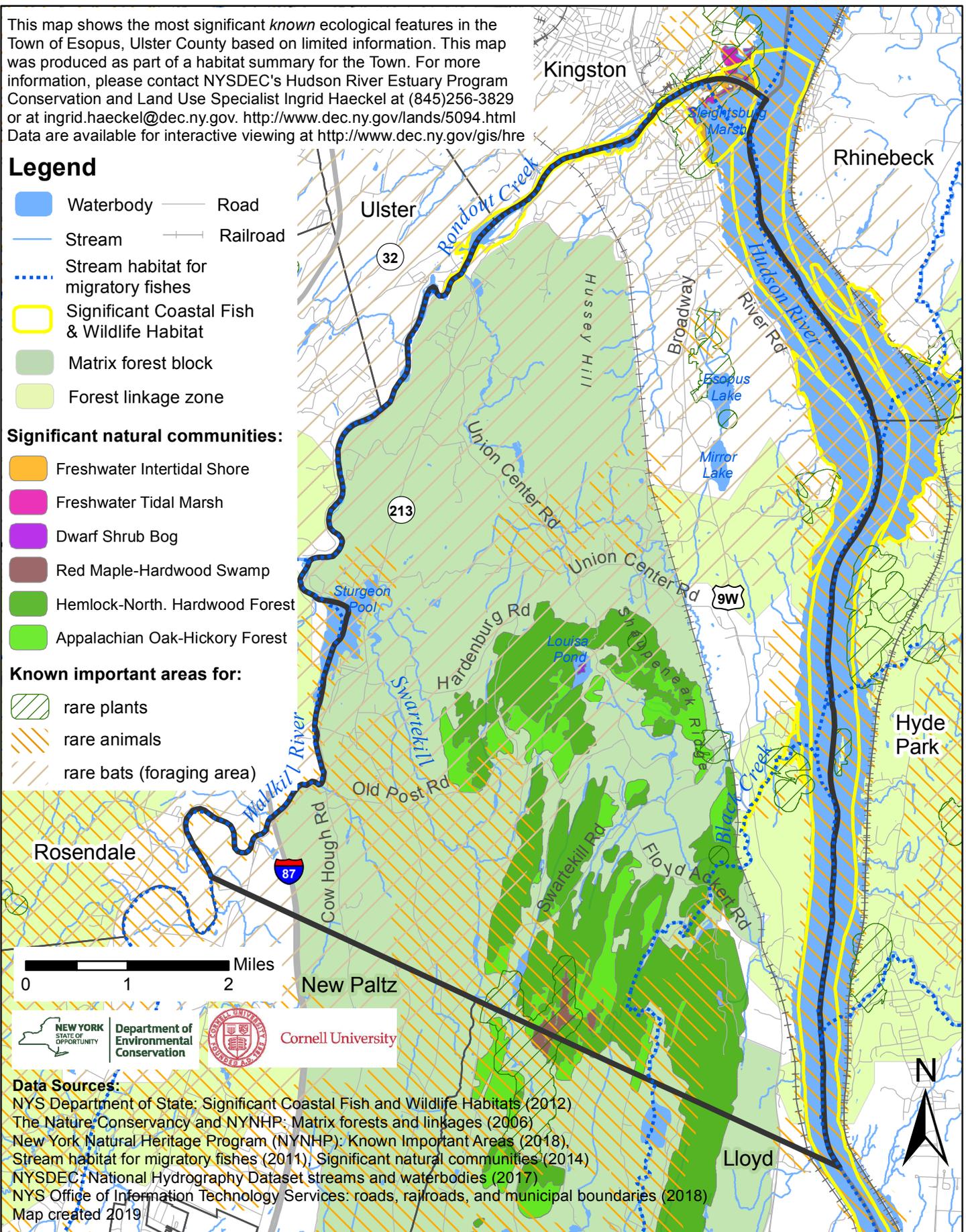
- Waterbody
- Stream
- Stream habitat for migratory fishes
- Significant Coastal Fish & Wildlife Habitat
- Matrix forest block
- Forest linkage zone
- Road
- Railroad

Significant natural communities:

- Freshwater Intertidal Shore
- Freshwater Tidal Marsh
- Dwarf Shrub Bog
- Red Maple-Hardwood Swamp
- Hemlock-North. Hardwood Forest
- Appalachian Oak-Hickory Forest

Known important areas for:

- rare plants
- rare animals
- rare bats (foraging area)



Data Sources:
 NYS Department of State: Significant Coastal Fish and Wildlife Habitats (2012)
 The Nature Conservancy and NYNHP: Matrix forests and linkages (2006)
 New York Natural Heritage Program (NYNHP): Known Important Areas (2018), Stream habitat for migratory fishes (2011), Significant natural communities (2014)
 NYSDEC: National Hydrography Dataset streams and waterbodies (2017)
 NYS Office of Information Technology Services: roads, railroads, and municipal boundaries (2018)
 Map created 2019

Figure 3: Hudson River Coastal Habitats in the Town of Esopus, NY

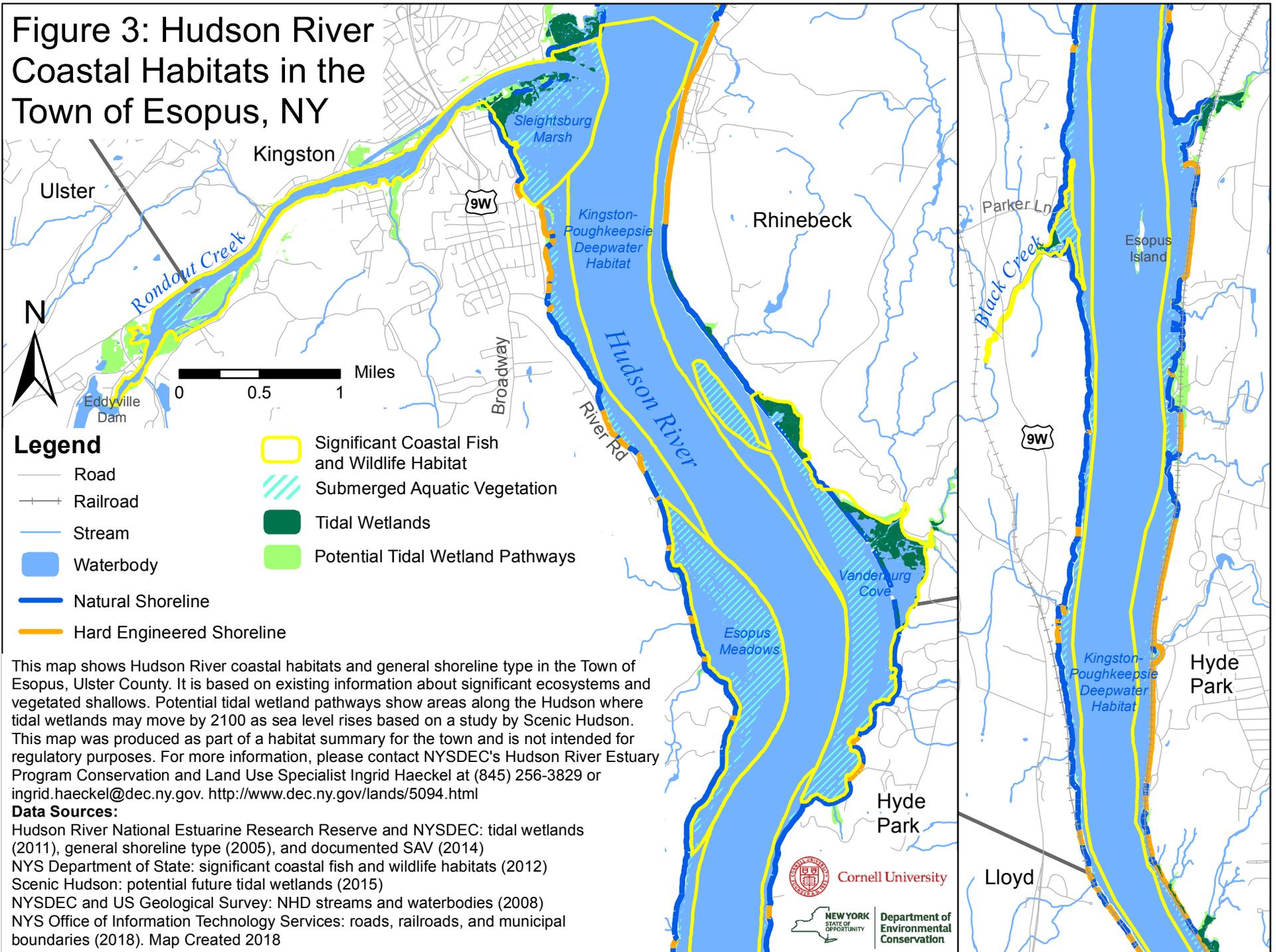


Figure 4: Streams and Watersheds in Esopus, NY

This map shows streams, flood hazard areas, riparian buffers, waterbodies, and watersheds in the Town of Esopus, Ulster County. This map was produced as part of a habitat summary for the town and is not intended for regulatory purposes. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at (845)256-3829 or ingrid.haeckel@dec.ny.gov.
<http://www.dec.ny.gov/lands/5094.html>
 Data are available for interactive viewing at <http://www.dec.ny.gov/gis/hre>

Legend

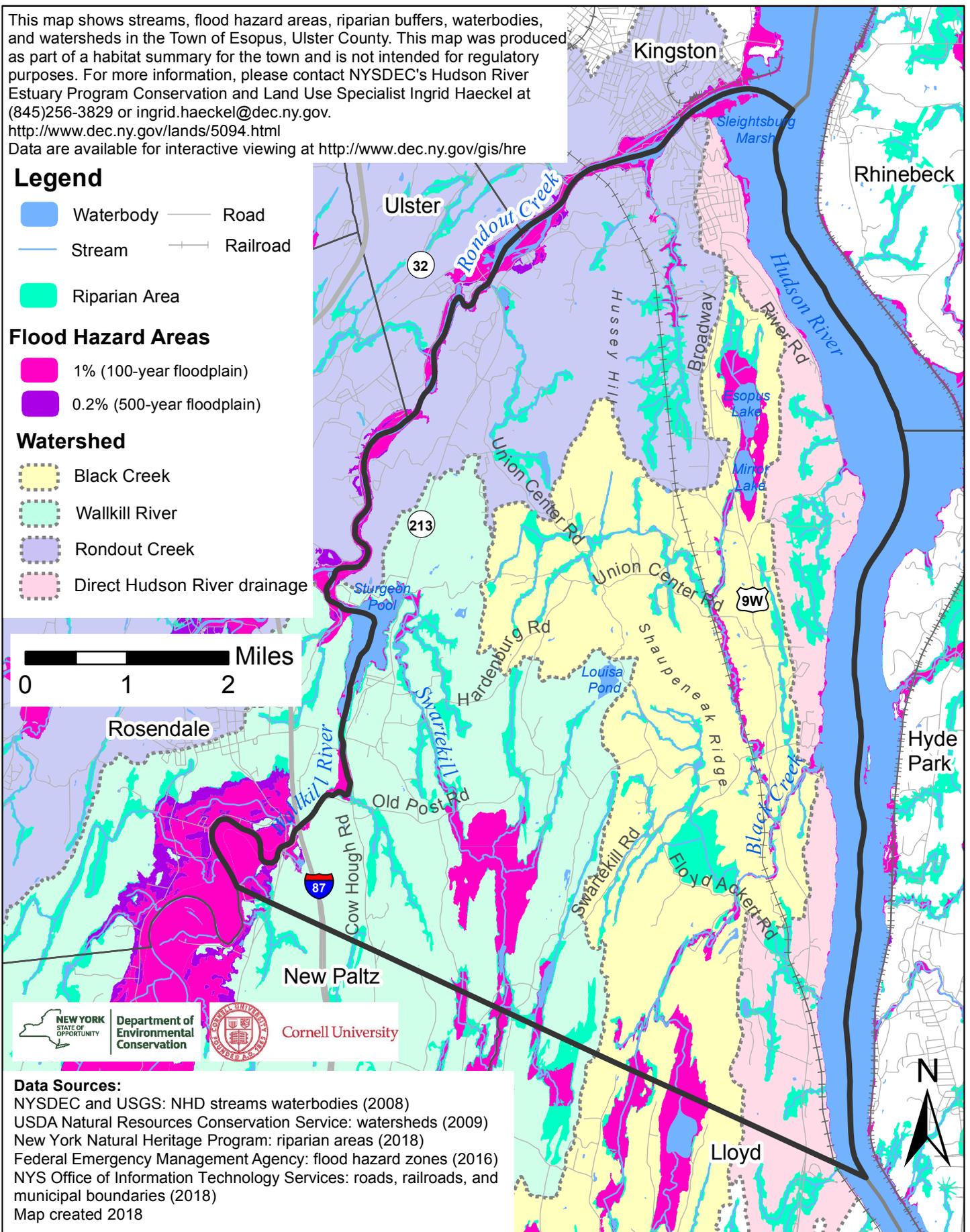
- Waterbody
- Stream
- Riparian Area
- Road
- Railroad

Flood Hazard Areas

- 1% (100-year floodplain)
- 0.2% (500-year floodplain)

Watershed

- Black Creek
- Walkkill River
- Rondout Creek
- Direct Hudson River drainage



Data Sources:
 NYSDEC and USGS: NHD streams waterbodies (2008)
 USDA Natural Resources Conservation Service: watersheds (2009)
 New York Natural Heritage Program: riparian areas (2018)
 Federal Emergency Management Agency: flood hazard zones (2016)
 NYS Office of Information Technology Services: roads, railroads, and municipal boundaries (2018)
 Map created 2018

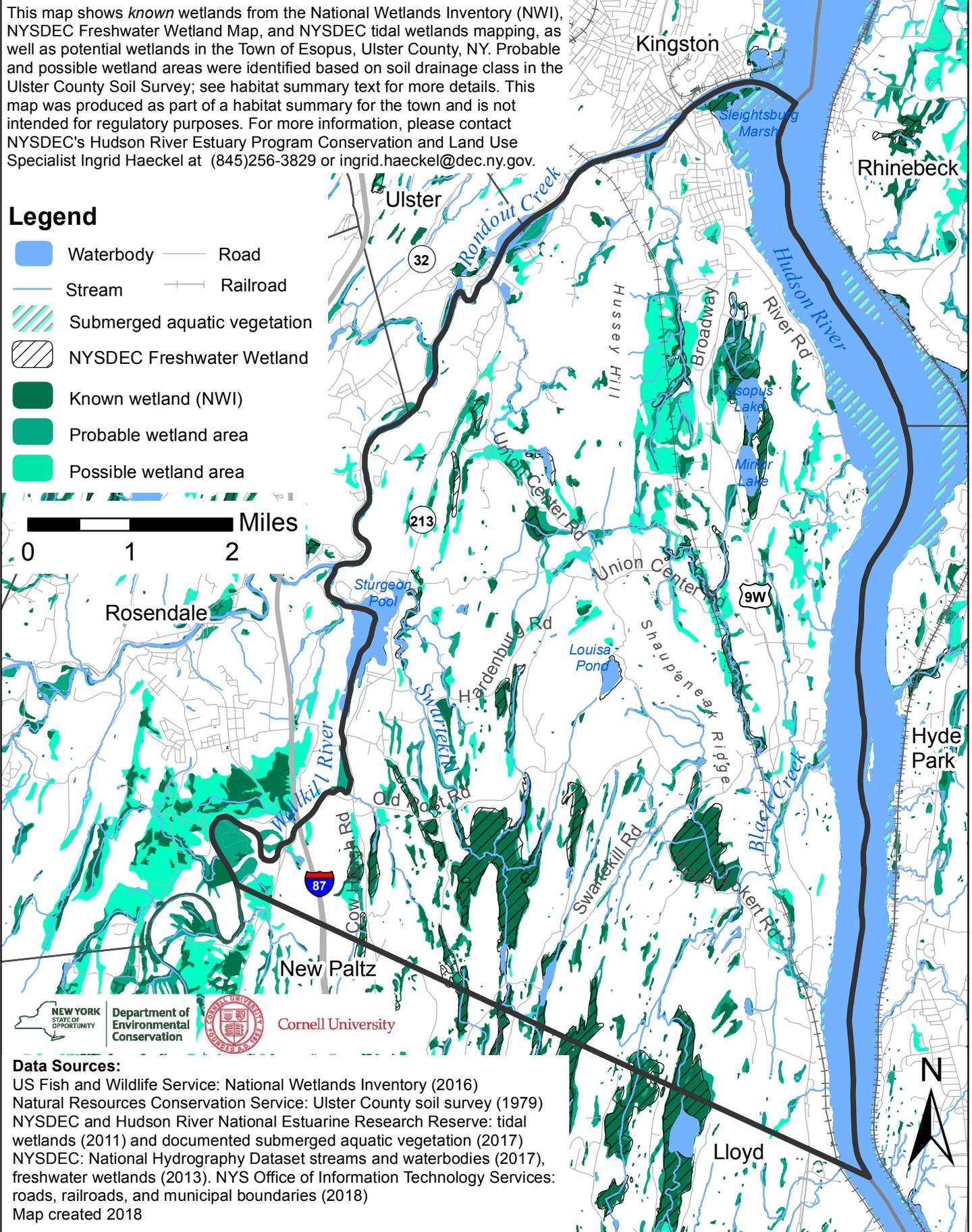


Figure 5: Wetlands in Esopus, NY

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

Legend

-  Waterbody
-  Stream
-  Submerged aquatic vegetation
-  NYSDEC Freshwater Wetland
-  Known wetland (NWI)
-  Probable wetland area
-  Possible wetland area
-  Road
-  Railroad



Data Sources:
 US Fish and Wildlife Service: National Wetlands Inventory (2016)
 Natural Resources Conservation Service: Ulster County soil survey (1979)
 NYSDEC and Hudson River National Estuarine Research Reserve: tidal wetlands (2011) and documented submerged aquatic vegetation (2017)
 NYSDEC: National Hydrography Dataset streams and waterbodies (2017), freshwater wetlands (2013). NYS Office of Information Technology Services: roads, railroads, and municipal boundaries (2018)
 Map created 2018



Figure 6: Large Forests in Esopus, NY

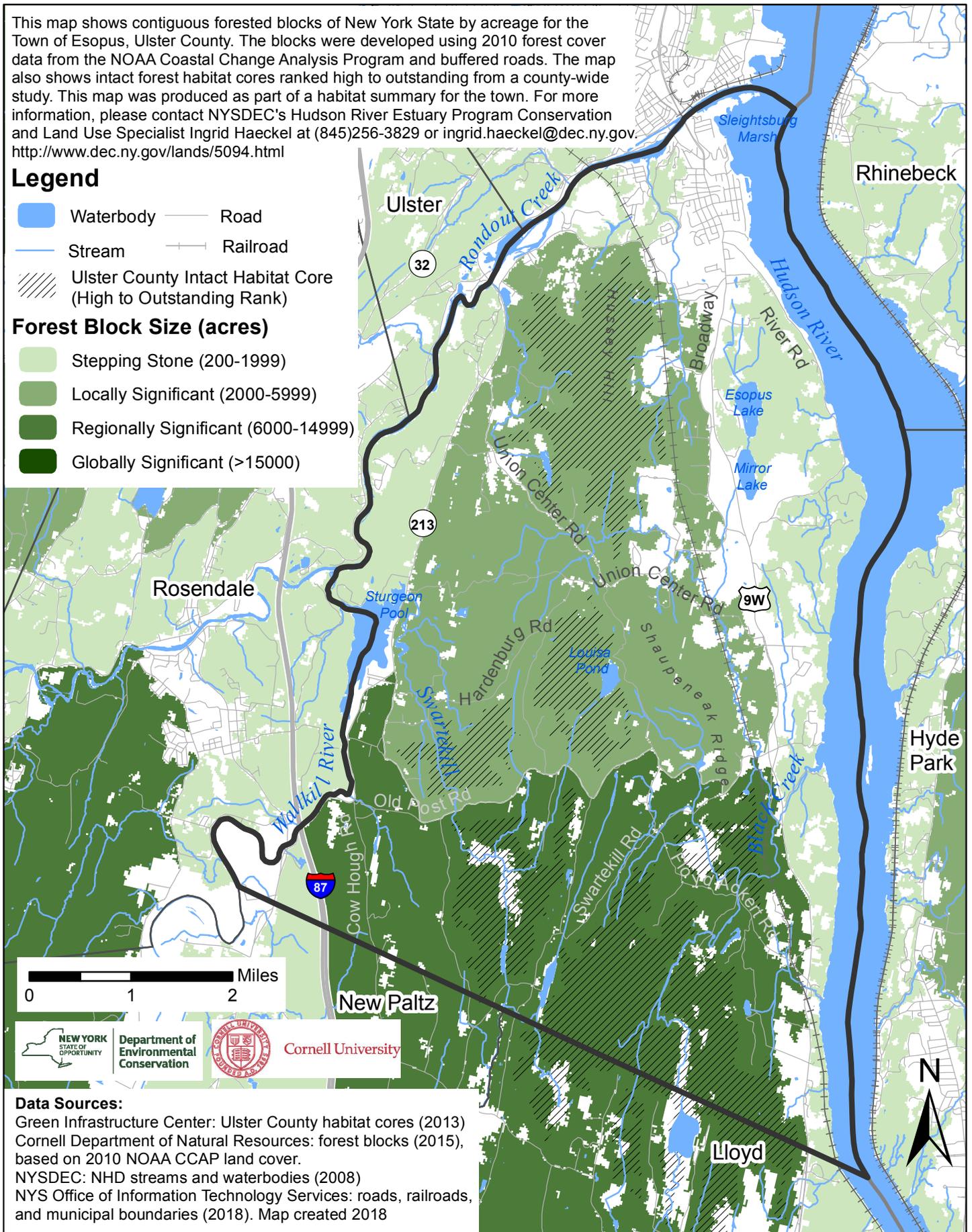
This map shows contiguous forested blocks of New York State by acreage for the Town of Esopus, Ulster County. The blocks were developed using 2010 forest cover data from the NOAA Coastal Change Analysis Program and buffered roads. The map also shows intact forest habitat cores ranked high to outstanding from a county-wide study. This map was produced as part of a habitat summary for the town. For more information, please contact NYSDEC's Hudson River Estuary Program Conservation and Land Use Specialist Ingrid Haeckel at (845)256-3829 or ingrid.haeckel@dec.ny.gov. <http://www.dec.ny.gov/lands/5094.html>

Legend

-  Waterbody
-  Stream
-  Ulster County Intact Habitat Core (High to Outstanding Rank)
-  Road
-  Railroad

Forest Block Size (acres)

-  Stepping Stone (200-1999)
-  Locally Significant (2000-5999)
-  Regionally Significant (6000-14999)
-  Globally Significant (>15000)



Data Sources:

- Green Infrastructure Center: Ulster County habitat cores (2013)
- Cornell Department of Natural Resources: forest blocks (2015), based on 2010 NOAA CCAP land cover.
- NYSDEC: NHD streams and waterbodies (2008)
- NYS Office of Information Technology Services: roads, railroads, and municipal boundaries (2018). Map created 2018



Species and Ecosystems of Conservation Concern in the Town of Esopus

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

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

Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			Hudson River Valley Priority Bird	Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered	
Mammals								
Indiana Bat	<i>Myotis sodalis</i>	cave, forest		xx			US NY	NYNHP
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	cave, forest		xx		NY US		NYNHP
Birds								
Acadian Flycatcher	<i>Empidonax virescens</i>	forest	x					NYBBA
American Black Duck	<i>Anas rubripes</i>	wetlands	x	xx				NYBBA
American Goldfinch	<i>Spinus tristis</i>	young forest, shrubland	x					NYBBA
American Redstart	<i>Setophaga ruticilla</i>	forest	x					NYBBA
Bald Eagle	<i>Haliaeetus leucocephalus</i>	open water/ coastal	x	x		NY		NYNHP
Baltimore Oriole	<i>Icterus galbula</i>	forest	x					NYBBA
Barn Owl	<i>Tyto alba</i>	grassland	x	xx				NYBBA
Belted Kingfisher	<i>Megaceryle alcyon</i>	open water	x					NYBBA
Black-and-white Warbler	<i>Mniotilta varia</i>	forest	x					NYBBA
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	young forest, shrubland	x	x				NYBBA
Blue-Winged Warbler	<i>Vermivora pinus</i>	young forest, shrubland	x	x				NYBBA
Broad-winged Hawk	<i>Buteo platypterus</i>	forest	x					NYBBA

NYS Conservation Status								
Common Name	Scientific Name	General Habitat	Hudson River Valley Priority Bird	Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered	Data Source
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	young forest, shrubland	x					NYBBA
Chimney Swift	<i>Chaetura pelagica</i>	urban	x					NYBBA
Downy Woodpecker	<i>Picoides pubescens</i>	forest	x					NYBBA
Eastern Kingbird	<i>Tyrannus tyrannus</i>	young forest, shrubland	x					NYBBA
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	young forest, shrubland	x					NYBBA
Eastern Wood-Pewee	<i>Contopus virens</i>	forest	x					NYBBA
Field Sparrow	<i>Spizella pusilla</i>	young forest, shrubland	x					NYBBA
Kentucky Warbler	<i>Geothlypis formosa</i>	forest	x	xx				NYNHP
Louisiana Waterthrush	<i>Seiurus motacilla</i>	forest	x	x				NYBBA
Northern Flicker	<i>Colaptes auratus</i>	forest	x					NYBBA
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	forest	x					NYBBA
Prairie Warbler	<i>Dendroica discolor</i>	young forest, shrubland	x	x				NYBBA
Purple Martin	<i>Progne subis</i>	wetlands	x					NYBBA
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	forest	x	xx	x			NYBBA
Red-shouldered Hawk	<i>Buteo lineatus</i>	forest	x	x	x			NYBBA
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	forest	x					NYBBA
Ruffed Grouse	<i>Bonasa umbellus</i>	young forest, shrubland	x	x				NYBBA
Scarlet Tanager	<i>Piranga olivacea</i>	forest	x	x				NYBBA
Sharp-shinned Hawk	<i>Accipiter striatus</i>	forest	x	x	x			NYBBA
Veery	<i>Catharus fuscescens</i>	forest	x					NYBBA
Willow Flycatcher	<i>Empidonax traillii</i>	young forest, shrubland	x					NYBBA
Wood Thrush	<i>Hylocichla mustelina</i>	forest	x	x				NYBBA
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	forest	x	x				NYBBA
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	young forest, shrubland	x					NYBBA
Yellow-throated Vireo	<i>Vireo flavifrons</i>	forest	x					NYBBA

Reptiles

Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			Hudson River Valley Priority Bird	Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered	
Common Snapping Turtle	<i>Chelydra s. serpentina</i>	wetlands, coastal		x				NYARA
Northern Map Turtle	<i>Graptemys geographica</i>	coastal		x				NYARA
Stinkpot	<i>Sternotherus odoratus</i>	wetlands, stream		xx				NYARA
Wood Turtle	<i>Clemmys insculpta</i>	stream		xx	x			NYARA

Amphibians								
Four-toed Salamander	<i>Hemidactylum scutatum</i>	wetlands		xx				NYARA
Jefferson Salamander Complex	<i>Ambystoma jeffersonianum x laterale</i>	vernal pool, forest			x			Scenic Hudson
Marbled Salamander	<i>Ambystoma opacum</i>	vernal pool, forest		x	x			NYARA
Northern Cricket Frog	<i>Acris crepitans</i>	wetlands		xx			NY	NYARA

Fish								
Alewife	<i>Alosa pseudoharengus</i>	coastal		x				NYSDEC
American Eel	<i>Anguilla rostrata</i>	stream		xx				NYSDEC
American Shad	<i>Alosa sapidissima</i>	coastal		xx				NYSDEC
Atlantic Sturgeon	<i>Acipenser oxyrinchus</i>	coastal		xx			US	NYNHP
Blueback Herring	<i>Alosa aestivalis</i>	coastal		x				NYSDEC
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	coastal		x			US, NY	NYNHP

Insects								
Comet Darner	<i>Anax longipes</i>	wetlands		x				NYNHP
Lyre-tipped Spreadwing	<i>Lestes unguiculatus</i>	wetlands, vernal pool		x				NYNHP

Plants								
Buttonbush Dodder	<i>Cuscuta cephalanthi</i>	wetlands					NY	NYNHP
Cat-tail Sedge	<i>Carex typhina</i>	wetlands					NY	NYNHP
Delmarva Beggar-ticks*	<i>Bidens bidentoides</i>	coastal						NYNHP
False Hop Sedge	<i>Carex lupuliformis</i>	wetlands				NY		NYNHP
Frank's Sedge	<i>Carex frankii</i>	coastal					NY	NYNHP

Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			Hudson River Valley Priority Bird	Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered	
Globe-fruited Ludwigia	<i>Podilymbus podiceps</i>	wetlands				NY		NYNHP
Golden Club	<i>Orontium aquaticum</i>	coastal				NY		NYNHP
Large Twayblade	<i>Liparis liliifolia</i>	wetlands, forest					NY	NYNHP
Provancher's Fleabane	<i>Erigeron philadelphicus</i> <i>var. provancheri</i>	coastal					NY	NYNHP
Reflexed Sedge	<i>Carex retroflexa</i>	forest				NY		NYNHP
Side-oats Grama	<i>Bouteloua curtipendula</i> <i>var. curtipendula</i>	forest					NY	NYNHP
Spongy Arrowhead	<i>Sagittaria montevidensis</i> ssp. <i>spongiosa</i>	coastal				NY		NYNHP
Swamp Cottonwood	<i>Populus heterophylla</i>	wetlands				NY		NYNHP
Swamp Lousewort	<i>Pedicularis lanceolata</i>	wetlands				NY		NYNHP
Sweet Coltsfoot	<i>Petasites frigidus</i> var. <i>palmatius</i>	forest, wetlands					NY	NYNHP

*Rare plants in New York State

Natural Communities								
Appalachian Oak-Hickory Forest								NYNHP
Calcareous Cliff Community								NYNHP
Dwarf shrub bog								NYNHP
Freshwater Intertidal Shore								NYNHP
Freshwater Tidal Marsh								NYNHP
Hemlock-Northern Hardwood Forest								NYNHP
Limestone Woodland								NYNHP
Maple-Basswood Rich Mesic Forest								NYNHP
Red maple-hardwood swamp								NYNHP
Tidal River								NYNHP
Vernal Pool								NYNHP

Common Name	Scientific Name	General Habitat	NYS Conservation Status					Data Source
			Hudson River Valley Priority Bird	Species of Greatest Conservation Need xx = high priority	Special Concern	Threatened	Endangered	
Historical Records								
Least Bittern	<i>Ixobrychus exilis</i>	wetlands	x	x		NY		NYNHP
Pied-billed Grebe	<i>Podilymbus podiceps</i>	wetlands	x	x		NY		NYNHP
American Bumble Bee	<i>Bombus (Thoracobombus) pennsylvanicus</i>			xx				NYNHP
American Waterwort	<i>Elatine americana</i>	coastal					NY	NYNHP
Angled Spike Rush	<i>Eleocharis quadrangulata</i>	wetlands					NY	NYNHP
Cut-leaved Evening Primrose	<i>Oenothera laciniata</i>	grasslands					NY	NYNHP
Douglas' Knotweed	<i>Polygonum douglasii</i>	forest, rocky uplands				NY		NYNHP
Estuary Hatpins	<i>Eriocaulon parkeri</i>	coastal						NYNHP
Fernald's Sedge	<i>Carex merritt-fernaldii</i>	forest, rocky uplands				NY		NYNHP
Heart-leaved Plantain*	<i>Plantago cordata</i>	coastal						NYNHP
Hudson River Water Nymph	<i>Najas muenscheri</i>	coastal					NY	NYNHP
Northern Quillwort	<i>Isoetes septentrionalis</i>	wetlands					NY	NYNHP
Puttyroot	<i>Aplectrum hyemale</i>	forest					NY	NYNHP
*Rare plants in New York State								

General Conservation Measures for Protecting Natural Areas and Wildlife



Hudsonia Ltd.

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

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

References

- Abood, S., A. Maclean, and L. Mason. 2012. Modeling Riparian Zones Utilizing DEMS and Flood Height Data. *Photogrammetric Engineering & Remote Sensing* 78:259–269.
- Conley, A., T. Howard, and E. White. 2018. New York State Riparian Opportunity Assessment. New York Natural Heritage Program, State University of New York College of Environmental Science and Forestry, Albany, NY. Available at http://nynhp.org/files/TreesForTribes2017/Statewide_riparian_assessment_final_jan2018.pdf
- Audubon NY. 2009. Bird Conservation in the Hudson River Valley [website]. <http://ny.audubon.org/conservation/udson-river-valley-conservation>. Ithaca, NY.
- Calhoun, A. and M. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York. <http://maineaudubon.org/wp-content/uploads/2012/08/Best-Development-Practices-Conserving-Pool-breeding-Amph.pdf>
- Daniels, K.H. 2005. A Municipal Official's Guide to Forestry. A joint publication of the New York Planning Federation, Department of Environmental Conservation, and Empire State Forest Products Association. Albany, NY. Available at http://www.dec.ny.gov/docs/lands_forests_pdf/guidetoforestry.pdf
- Eakin, W., R. Adams, and K. Hattala. 2014. The Use of an In-stream Fish Counter to Measure Absolute Abundance and Identify Parameters Influencing Migration Patterns of River Herring in Black Creek, a Small Tributary to the Hudson River. Hudson River Fisheries Unit and Hudson River Estuary Program, New York State Department of Environmental Conservation. Poster. Available at https://www.dec.ny.gov/docs/fish_marine_pdf/blkcreekposter.pdf
- Ecological Society of America. 1990. Ecosystem Services Fact Sheet. Washington, DC. Available at <http://www.esa.org/ecoservices/comm/body.comm.fact.ecos.html>
- Environmental Law Institute. 2008. Planner's Guide to Wetland Buffers for Local Governments. Washington, DC. Available at www.eli.org/sites/default/files/eli-pubs/d18_01.pdf
- Firehock, K. 2013. Evaluating and Conserving Green Infrastructure Across the Landscape: A Practitioner's Guide for New York. Green Infrastructure Center, Charlottesville, VA. Ulster County case study available at <http://www.gicinc.org/PDFs/GIC%20NY-Practitioners%20Guide-Chapter%205-reduced.pdf>
- Haeckel, I. and L. Heady. 2014. Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed. Department of Natural Resources, Cornell University, and New York State Department of Environmental Conservation, Hudson River Estuary Program, Ithaca, NY. Available at www.dec.ny.gov/lands/100925.html
- Heady, L. and G. Stevens. 2015. Guidebook for Biodiversity Assessment: A Companion to the Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia Ltd., Annandale, NY.
- Horton, R., D. Bader, C. Rosenzweig, A. DeGaetano, and W. Solecki. 2014. Climate Change in New York State: Updating the 2011 ClimAID Climate Risk Information. New York State Energy Research and Development Authority (NYSERDA), Albany, NY. Available at www.nyserda.ny.gov/climaid
- Huffman & Associates, Inc. 2000. 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, California. Available at http://www.dec.ny.gov/docs/wildlife_pdf/wetstattrend2.pdf
- Kiviat, E. and G. Stevens. 2001. Biodiversity Assessment Manual for the Hudson River Estuary Corridor. NYS Department of Environmental Conservation, Albany, NY.

Knab-Vispo, C. and C. Vispo. 2010. Floodplain Forests of Columbia and Dutchess Counties, NY: Distribution, Biodiversity, Classification, and Conservation. Farmscape Ecology Program, Hawthorne Valley Farm, Ghent, NY. Available at http://hvfarmscape.org/sites/default/files/fep_floodplain_forest_report_nov_2010.pdf

Morgan, D. and A. Calhoun. 2012. The Maine Municipal Guide to Mapping and Conserving Vernal Pools. University of Maine, Sustainability Solutions Initiative, Orono, ME. Available at <http://maineaudubon.org/wp-content/uploads/2012/08/MeAud-ME-Municipal-Guide-to-Mapping-and-Conserving-Vernal-Pool.pdf>

New York Amphibian and Reptile Atlas. 1990-1999. New York State Department of Environmental Conservation, Albany, NY. Website: <http://www.dec.ny.gov/animals/7140.html>

New York State Breeding Bird Atlas 2000. 2000 - 2005. Release 1.0. [updated 2007]. New York State Department of Environmental Conservation, Albany, NY. Available at <http://www.dec.ny.gov/animals/7312.html>

New York State Wildlife Action Plan. 2015. New York State Department of Environmental Conservation, Albany, NY. Available at <http://www.dec.ny.gov/animals/7179.html>

New York State Department of Environmental Conservation and New York Cooperative Fish and Wildlife Research Unit at Cornell University. 2015. Species of Greatest Conservation Need List. Available at http://www.dec.ny.gov/docs/wildlife_pdf/sgnc2015list.pdf

New York Natural Heritage Program, New York State Department of Environmental Conservation. [data retrieved June 2018]. Biodiversity Databases, Element Occurrence Record Digital Data Set. Albany, NY. www.nynhp.org

New York Natural Heritage Program, New York State Department of Environmental Conservation. Biodiversity Databases, Important Areas Digital Data Set. [2013 update]. Albany, NY. www.nynhp.org

National Oceanic and Atmospheric Administration. 2010. Land Cover data for the Coastal Change Analysis Program. NOAA Coastal Service Center, Charleston, SC. Website: <https://coast.noaa.gov/dataregistry/search/collection/info/ccapregional>

Orange County (NY) Planning Department. 2004. Orange County Open Space Plan. Goshen, NY. Available at http://www.orangecountygov.com/filestorage/124/1362/1460/10182/Supplement_1_Open_Space_Plan.pdf

Orange County Soil and Water Conservation District. 2007. Wallkill Watershed Conservation and Management Plan. Available at http://waterauthority.orangecountygov.com/PROJECTS/WALLKILL_RIVER/Wallkill_Watershed_Management_Plan.pdf

Penhollow, M., P. Jensen, and L. Zucker. 2006. Wildlife and Habitat Conservation Framework: An Approach for Conserving Biodiversity in the Hudson River Estuary Corridor. New York Cooperative Fish and Wildlife Research Unit, Cornell University and New York State Department of Environmental Conservation, Hudson River Estuary Program, Ithaca, NY. Available at <http://www.dec.ny.gov/lands/5096.html>

Strong, K. 2008. Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York's Hudson River Valley. New York Cooperative Fish and Wildlife Research Unit, Cornell University, and New York State Department of Environmental Conservation, Hudson River Estuary Program, Ithaca, NY. <http://www.dec.ny.gov/lands/50083.html>

Tabak, N. and S. Spector. 2016. Protecting the Pathways: A Climate Change Adaptation Framework for Hudson River Estuary Tidal Wetlands. Scenic Hudson, Poughkeepsie, NY. <http://www.scenichudson.org/sites/default/files/protecting-the-pathways.pdf>

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

U.S. EPA. 2015. *Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence (Final Report)*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-14/475F. Available at <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=296414>

Wallkill River Watershed Alliance. 2018. Science-Based Action Plan. Available at <http://www.wallkillalliance.org/wp-content/uploads/2016/04/Alliance-Action-Plan-2017-2019.pdf>

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

Zucker, L. and L. Lau. 2009. An analysis of the size and distribution of geographically isolated, small wetlands in the Hudson River Estuary watershed. Cornell University, Ithaca, NY. Unpublished report.