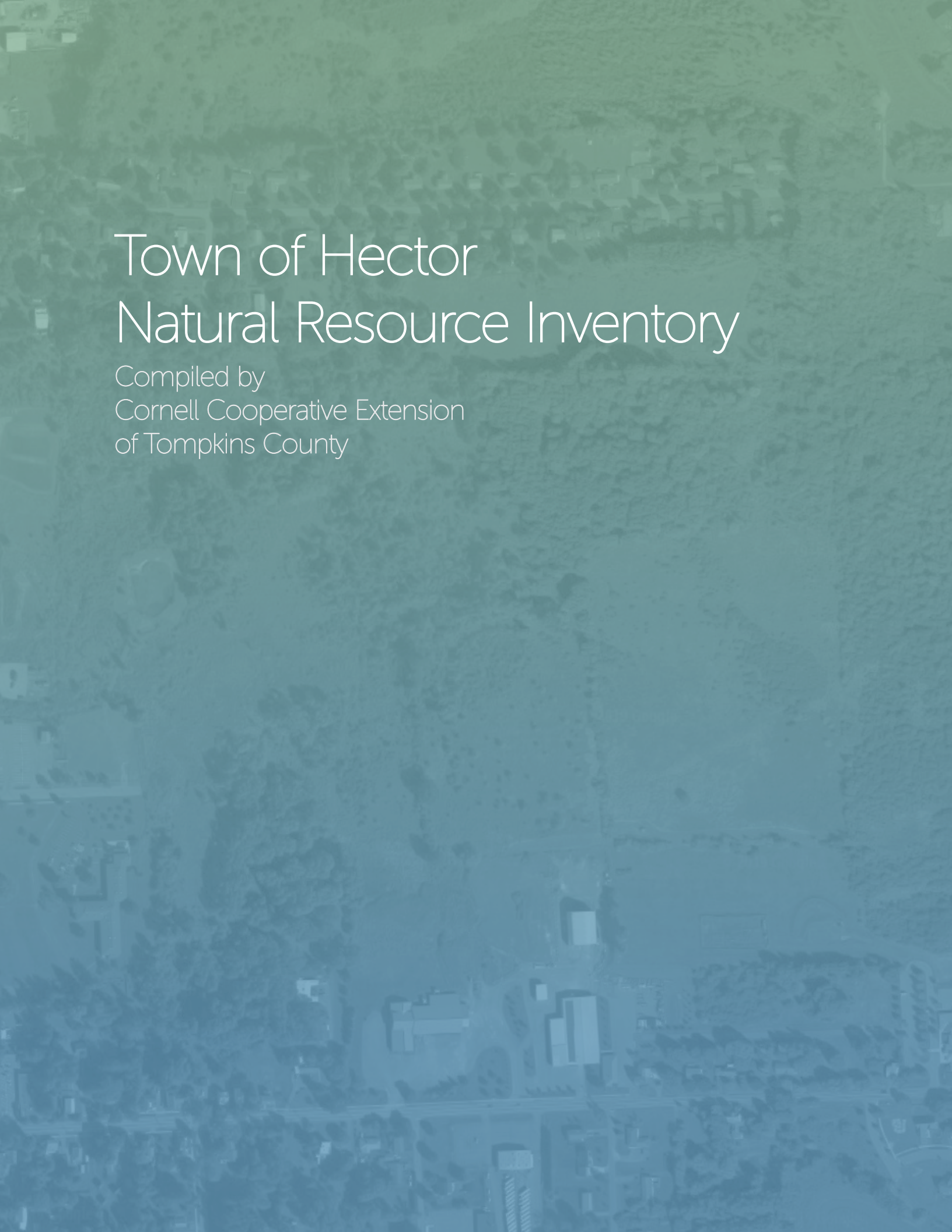


# Town of Hector
# Natural Resource Inventory

Compiled by
Cornell Cooperative Extension
of Tompkins County

# ACKNOWLEDGEMENTS

This natural resource inventory (NRI) is a Town of Hector-specific natural resource inventory that complements the Town of Hector's Comprehensive Plan. Department. The inventory was originally prepared by Osamu Tsuda (former Climate Resiliency and Adaptation Outreach Specialist), completed by Todd Knobbe (NYSERDA Southern Tier Clean Energy Communities Coordinator, Cornell Cooperative Extension of Schuyler County), and reviewed by Rachel Zevin, (current Climate Resiliency and Adaptation Outreach Specialist). The NRI template is based on the Natural Resource Inventory created by Skye Hart (former Clean Energy Communities Planning Assistant) for the Town of Ulysses, in conjunction with Kristen Hychka (Research Specialist, Syracuse University Center for Sustainable Community Solutions/Environmental Finance Center), Terry Carroll (Southern Tier NYSERDA Clean Energy Communities Coordinator, Cornell Cooperative Extension of Tompkins County), and Darby Kiley (Environmental Planner, Town of Ulysses). The original template of this document was created by Sky Hart from Cornell University. Feedback and proposed edits were provided by the Town of Hector and the Town of Hector Sustainability Committee. The data used in this natural resource inventory was the most up-to-date information available as of Spring of 2021 and much of it was provided by the State and Federal GIS databases. Maps were prepared by Osamu Tsuda and Todd Knobbe. The NRI was formatted by Theodora Weatherby (Environmental Educator, Cornell Cooperative Extension of Tompkins County).

# TABLE OF CONTENTS

# INTRODUCTION

## What are Natural Resources in the Town of Hector?

The Town of Hector is located in the northeast corner of Schuyler County and spans for 112.58 square miles. The Town contains 102.37 square miles of land and 10.21 square miles of water. There are several communities within the Town, including the incorporated Village of Burdett, and the Hamlets of: Bennetsburg, East Steamburg, Hector, Logan, Mecklenburg, Perry City, Reynoldsville, Searsburg, Valois and Smith Valley. Originally, under Iroquois dominion, the land where Hector is today was used as payment to soldiers of the American Revolution, as part of the Central New York Military Tract. This area is home to many important natural recourses. Protecting and maintaining natural resources is important not only because of the intrinsic value of these resources but also because of the varied ecological functions that support all life. For example, keeping water clean is valuable as it supports aquatic life as well as other life that accesses the water, including humans, and water bodies can influence important abiotic factors of ecosystems such as soils. Preserving the water quality is essential to not just the Town of Hector but also the other downstream neighboring communities. Natural resources also support a variety of recreational activities such as bird watching, hiking, fishing, boating, and simply enjoying the beauty of the town.

## What is a Natural Resource Inventory?

A natural resource inventory is a document that inventories the natural resources of an area, collects the data in a usable format and interprets the findings. The primary purpose of this natural resource inventory is to provide data that can form a basis for municipal planning in the preparation of plans, review of proposed development plans, and completion of environmental assessment forms. It also serves as an informational document for those looking to learn more about the natural environment of Hector, as it clarifies information such as the location of prime agricultural soils, watersheds that fall within the Town's jurisdiction, and where the Town's steepest slopes are. In the simplest form, a Natural Resource Inventory (NRI) is a compilation of existing natural/ ecological resources, according to the New York DEC and Hudson River Estuary Program. Depending on the community, a natural resource inventory could also include historic resources. Oftentimes, the scope and level of detail is determined by the community preparing the document. While the simplest version is just a list of existing resources, the more complex NRIs could include detailed analysis of each existing resource. As the primary purpose of an NRI is to act as an informational source to community members and municipal officials, the secondary purpose of the document is to provide the building blocks for natural resource awareness in the local and regional comprehensive plans as well as building and zoning regulations. In other words, the NRI acts as a regional atlas that could be used when updating or developing local regulations.

While a natural resource inventory is not a planning document per se, it can be used in conjunction with other existing documents for policy and development purposes. The natural resource inventory for the Town of Hector can complement local municipal documents such as the Town of Hector's Comprehensive Plan (release in 2015), the Town's Zoning and Planning Laws, and the County-wide Hazard Mitigation Plan. It can also serve as the foundation for future documents such as Climate Vulnerability Assessments or watershed management policies. In addition, this NRI has been developed in a way that could act as an advisory tool for future

development and land use changes, especially concerning the changing regional climate conditions, increases in observed flooding within the surrounding region (i.e. wetlands and runoff from the surrounding hills), and changes in land-use.

As the Town of Hector continues to become a more sustainable and resilient community, the resources this NRI provides can help the municipality plan to address potential and existing vulnerabilities within the community. This document aims to inform municipal officials and residents of the value of existing natural resources and their important role in helping create a sustainable and healthy community. This is especially important as the Town of Hector implements components of its Comprehensive Plan, continues to participate in the received planning grants such as the Local Waterfront Revitalization Planning grant, and continues to find a balance between growth in both the agriculture and tourism.

## Why Should Natural Resources Be Protected?

Protecting environmental quality is a matter of choices and tradeoffs. The Town of Hector continues to grow in the tourism industry while declining in agriculture. The Town is seeing a decrease in large-scale agriculture and farming, but an increase in the amount of small farms and vineyards. There may be negative consequences from this transition, including wildlife displacement, loss of recreation corridors and scenic vistas, surface and groundwater contamination, increased pervasiveness of invasive species, and increased erosion and flooding. The decisions to allow for development require the Hector to determine where development should take place, what the environmental impacts of this development will be, whether these impacts are worth the result, and whether there are less harmful ways to develop. The Town of Hector and its constituents wants to preserve and enhance the Town's unique composition of natural and scenic resources, fresh water, wineries, tourism, and agriculture. The Town also seek to encourage sustainable growth in these areas. This document can serve as a guide for the municipality and developers to consider the answers to these questions and to the goals of the Town.

Since much development is irreversible, planning is very important. Long-term planning is one way to minimize the short-term exploitation of the resource base that results from "quick fixes" to localized problems and from competition for resources. Planning at the local, regional, and state levels provides individual municipalities with a rational system for guiding development with respect to the distribution and value of natural resources.

## How Can Natural Resources Be Protected?

This natural resource inventory identifies many of the natural resources within the Town. This is the first step in protecting those resources. Private landowners, government agencies, and conservation organizations can use this knowledge to protect the most important of these resources.There are several major approaches to protecting natural resources. The following is a list of some of the types of options currently used in municipalities throughout municipalities in Upstate NY.

## Non-Regulatory Tools

**Acquisition:** Acquisition with the goal of resource preservation is the surest way of protecting natural resources.

**Informal Designations**: Planning efforts can raise local awareness of the value and location of important natural resources. Goals for protecting natural resources can be defined in a community's comprehensive plan. Natural resource protection can also be addressed in open space and recreation plans or in plans for a particular resource, such as a watershed protection plan. This will be discussed in further detail on page 20.

**Educational Programs**: Natural resource education programs are another way to help raise awareness of the importance of natural resources and interest in protecting those resources. The Schuyler County Soil and Water Conservation District for example has a number of programs and annual events that are aimed at educating the general public around climate change and the importance of land conservation and protection. The Cornell Cooperative Extension of Schuyler County also provides additional support and education regarding environmental education, especially when related to agriculture and climate change.

## Regulatory Tools

There are also many regulatory tools available to local municipalities to control land use. Details on these regulatory tools are provided below on page 68. Not all of these tools may match the Town's current goals or capacity. These specific regulatory techniques for protecting resources include:

- Zoning and Subdivision Ordinances – used to protect the public health, safety, and general welfare.
- Local Wetlands Ordinances – regulate disturbance of wetlands beyond those covered under state and federal laws, such as small or isolated wetlands, and can add additional requirements for activities adjacent to wetlands.
- Buffer Requirements – establish minimum distances between a development and a selected natural feature.
- Clustering Requirements – place residential units on a portion of a site to protect a contiguous area of open space or unique feature.
- Performance Zoning – unlike traditional zoning, performance zoning determines whether a land use is permitted based on an assessment of potential impacts.
- Preservation Overlay Zones – geographic areas where more restrictive development regulations are enforced to protect valued natural resources.
- Park Dedications – require developers to contribute land, or cash in lieu of land, to provide for the open space and recreation needs of the subdivision's residents.
- Transfer of Development Rights – landowners in designated preservation areas may sell development rights to allow increased density in other areas of the community.
- Purchase of Development Rights – landowners in designated preservation areas may sell development rights for cash to a government or appropriate organization.

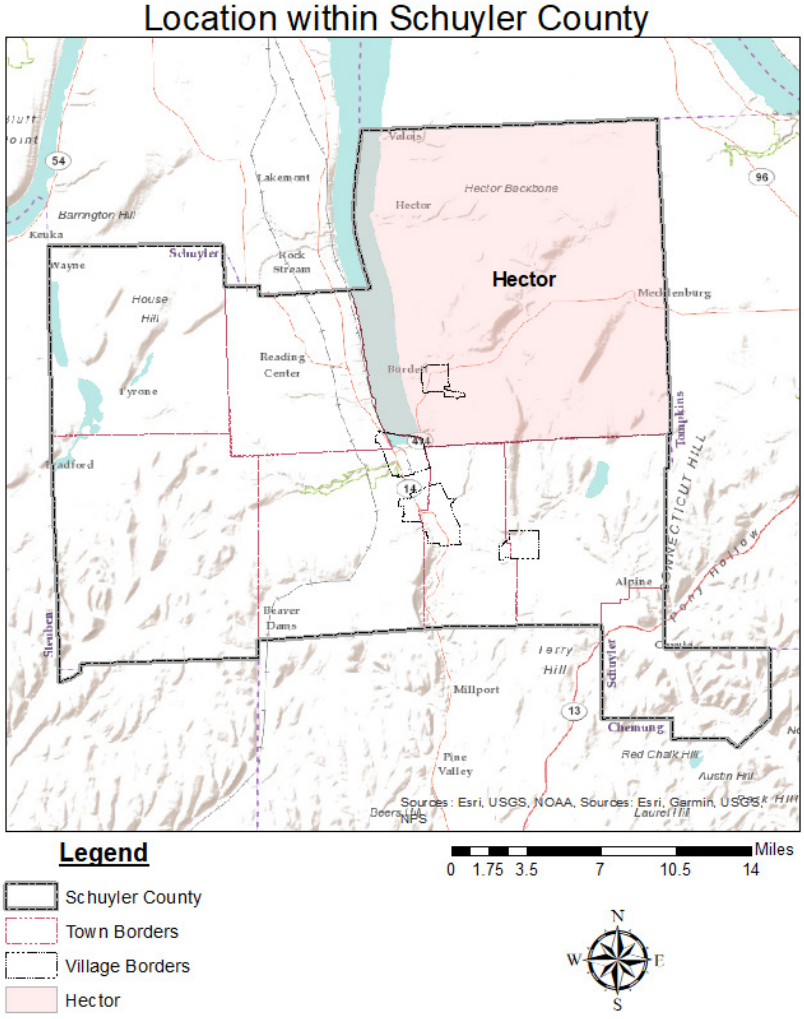
# About the Organization of this Natural Resources Inventory

The Town of Hector Natural Resource Inventory begins with a summary of climate conditions and projections for the Town. The rest of the inventory is organized into three resource categories: hydrology and aquatic ecosystems, geology and soils, and land use and protected lands. An addition has been made titled “Implementation Tools” which lists the potential methods on preserving existing resources.

# About the Data

Many of these data sets can be downloaded directly from the Cornell University Geographic Information Repository website (http://cugir.mannlib.cornell.edu/) and the New York State GIS Clearinghouse website (http://gis.ny.gov/). Some of these digital data sets can be purchased from the United States Geological Survey or the NYS Department of Environmental Conservation or downloaded from their websites. Some data sets have limitations and none of them are guaranteed by their originators to be free of errors. Many are not intended to be used to review individual parcels, but are appropriate for larger-scale planning efforts. All maps in this inventory are at a scale of 1:95,000 with a NAD_1983_UTM_Zone_18N projection.

Location within Schuyler County



# CLIMATE CONDITIONS AND PROJECTIONS

# What is Climate Change?

Climate change refers to a change in typical or average weather in a region. Climate change has always been naturally occurring. However, human actions can also influence climate change, and since the mid-20th century, climate change has been occurring globally at an accelerated pace because of anthropogenic causes. The burning of fossil fuels (e.g. coal, oil, natural gas) is largely responsible for rapidly changing climate conditions since these fuels emit greenhouse gases that trap heat in the Earth's atmosphere. This results in changes to the average temperature and precipitation of regional climates around the world.

# Why is Understanding Climate Change Important?

The changing climate is causing sea levels to rise as glaciers and polar ice melt, growing seasons to change as precipitation patterns and temperatures change, and an increase in extreme weather events including heat waves, droughts, and floods. This already impacts how and where we live, from farmers growing different crops to people leaving their no-longer-habitable homes. In addition, warmer temperatures can have adverse effects on health by increasing plants' pollen production and the formation of ground-level ozone, which in turn can worsen respiratory conditions such as asthma and allergies, and by creating a more hospitable environment for disease-carrying insects such as mosquitoes and ticks.

# Climate Conditions and Projections in The Town of Hector

New York State has a humid continental climate with an average temperature of 47.5°F and an average annual precipitation of 35 inches in the Southern Tier. The following table (Table 1) shows the range of predicted future changes in annual temperature, precipitation, and severe weather events in the Southern Tier.

*Table 1: Baseline & Projected Changes in Climate Conditions & Severe Weather Events in the Southern Tier*

| | Baseline | 2020s | 2050s | 2080s |
|---|---|---|---|---|
| Temperature | 47.5°F | +1.8 to 3.8°F | +3.6 to 7.1°F | +4.2 to 11.6°F |
| Precipitation | 35 inches | -4 to +9% | +2 to +15% | +3 to +16% |
| **# of days per year with maximum temperature exceeding** | | | | |
| 90°F | 10 | 15 to 23 | 22 to 47 | 28 to 79 |
| 95°F | 1 | 2 to 7 | 2 to 18 | 4 to 38 |
| Heatwaves | | | | |
| # per year | 1 | 2 to 3 | 3 to 6 | 3 to 9 |
| Average duration (days) | 4 | 4 to 5 | 5 | 5 to 7 |
| **# of days per year with temperatures at or below freezing (32°F)** | | | | |
| | 152 | 119 to 134 | 94 to 120 | 72 to 116 |
| **# of days per year with rainfall exceeding** | | | | |
| 1 inch | 6 | 6 to 7 | 6 to 8 | 6 to 8 |
| 2 inches | 0.6 | 0.6 to 1 | 0.7 to 1 | 0.7 to 1 |
| Source: NYSDEC, Observed and Projected Climate Change in New York State: An Overview (2015); baseline data is 1971-2000 NOAA data | | | | |

The State's changing climate will negatively impact human health, the economy, and the environment. Warmer temperatures could hurt local economies by adversely affecting the ability to create maple syrup, grow apples, produce dairy, and participate in other agricultural activities. Extremely warm temperatures that occur as heat waves (defined as three or more consecutive days with maximum temperatures above 90°F) are a potentially deadly health hazard. These hotter temperatures in the summertime could also impact ecotourism in the region. In addition, both more frequent droughts and increased precipitation are predicted. Droughts hinder agricultural production and impact overall water use, while long, heavy rains will increase the chances of flash flooding and erosion, which can damage buildings, infrastructure, agriculture, and undeveloped lands. Lastly, the changing climate will permit the expansion of parasites such as ticks, which can carry Lyme disease, and invasive species, some of which are harmful to native species, ecosystems, and people.

## Addressing Climate Change

To avoid facing the worst of these climate change projections, we can take measures to address climate change. These measures fall into two categories: mitigation and adaptation. Mitigation refers to the reduction of greenhouse gas emissions, while adaptation refers to changing our practices to match new or inevitable climate conditions (NASA). Examples of mitigation strategies include reducing energy use by taking actions such as turning off electronics when they are not in use or switching to energy efficient LED lightbulbs; switching to renewable energy sources such as solar or hydro power; reforestation to sustainably capture carbon dioxide emissions; and taking the bus, walking, biking, or carpooling instead of driving (NYS DEC). Examples of adaptation strategies include relocating facilities away from areas prone to flooding, creating cooling centers for people to take shelter in on extremely hot days, and reducing water use during droughts.

Using a combination of mitigation and adaptation strategies at the individual, institutional, and municipal levels is important. Climate change cannot be prevented entirely even if humans were to cease greenhouse gas emissions as the greenhouse gases currently in the atmosphere will remain there for decades or even centuries (NASA). Therefore, adaptation to a different climate is necessary. However, we can avoid experiencing the worst of the projections by reducing greenhouse gas emissions through mitigation strategies so that existing issues will not be exacerbated.

## Resources and References


National Aeronautics and Space Administration (NASA), What Are Climate and Climate Change? https://www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-climate-change-58.html

New York State Department of Environmental Conservation Observed and Projected Climate Change in New York State: An Overview (2015). http://www.dec.ny.gov/docs/administration_pdf/climbkgncrra.pdf

Climate Change, http://www.dec.ny.gov/energy/44992.html

# HYDROLOGY

# Waterbodies

## Why Are Water Bodies Important?

Significant water bodies (lakes, ponds, rivers, and streams) that are critical to public health and the economic and environmental wellbeing of this area dominate Schuyler County. In the Town of Hector, these water bodies include Seneca Lake, Taughannock Creek, and Bullhorn Creek and several perennial streams within the town boundaries. Not all streams in Hector flow into Seneca Lake, some feed into Cayuga Lake. Cayuga Lake does not directly border Hector but parts of the Town lie within the Lake's watershed.

Although water supply is abundant in Hector, certain activities can adversely affect the ecological balance within water bodies, impairing their current and potential economic and environmental functions. Threats to local water supplies include both point source pollution (originating from a single source, often as a pipe draining into a water body) and nonpoint source pollution (originating from multiple sources that include runoff from construction, agriculture, parking lots, streets, on-site wastewater systems, and commercial/residential activities.

## How Are Water Bodies Regulated?

Federal and state agencies, such as the New York State Department of Environmental Conservation (DEC) and United States Army Corps of Engineers (Army Corps), require permits for activities that might affect or disturb a water body and/or its banks. The stringency of these permits corresponds with the DEC classification assigned to the water body (see Table 2) and may range from a general, or unified, permit to a permit tailored to the specific site and type of work conducted. Regulated activities might include streambank maintenance, construction, flood protection and mitigation, dredging, placing fill, and certain agricultural practices.

Commercial, industrial, and agricultural activities that discharge to a water body require a State Pollution Discharge Elimination System (SPDES) permit. This permit is required for a broad range of activities, including the discharge of wastewater, storm water, or chemical and thermal emissions from municipal treatment plants, industrial plants, utilities, large subdivisions, apartment complexes, and confined animal feeding operations.

Prior to conducting stream-related work or discharging wastewater, the Region 7 Office of the DEC or the Army Corps Buffalo District should be contacted to obtain the necessary approvals and permits. Each of these agencies will automatically forward permit applications to the other and each agency will contact the applicant if additional permits and/or paperwork are needed.

## How Are Water Bodies Classified?

The DEC has assigned most water bodies within the state a letter based on their existing or expected "best use." The most pristine waters are assigned a classification of AA, while the most degraded waters are assigned a classification of D. Table 2 details these classifications.

*Table 2: NYSDEC Classifications of Fresh Surface Waters*

| Classification | Best Use |
|---|---|
| AA | Drinking (after chlorination) |
| A | Drinking (after chlorination and filtration) |
| B | Bathing |
| C (T) | Fishing (trout) |
| C | Fishing |
| D | Secondary contact recreation |
| Source: New York State Department of Environmental Conservation | |

Additional classifications of "T" or "TS" can be added if a water body has sufficient amounts of dissolved oxygen to support trout and trout spawning. Water bodies that are designated as "C (T)" or higher (i.e., "C (TS)", "B", or "A") are collectively referred to as "protected streams" and are subject to additional regulations.

## Water Bodies in Hector

Any stream classified as AA, A, or B, or C with a standard of T or TS is considered to be a protected stream. All streams and creeks in Hector are classified as C or better. A NYS Protection of Waters Permit is necessary for the disturbance of the bed or banks of a protected stream and for the excavation of or the placement of fill in protected streams and their adjacent and contiguous marshes and wetlands. Table 3 lists the classifications of some of the major creeks in Hector the Town of Hector is abundant in water resources, with several creeks and streams passing through the municipality. The Town also has access to Seneca Lake to the west.

*Table 3: Hector Water Bodies Classifications*

| | Classification |
|---|---|
| Bullhorn Creek | C |
| Hector Falls Creek | C (TS) |
| Hencoop Creek | C |
| Sawmill Creek | C |
| Taughannock Creek | C (TS) |
| Source: New York State Department of Environmental Conservation Environmental Resource Mapper | |

Fish resources are a key factor in determining water body classifications because they are high on the food chain in aquatic habitats. As such, fish can be used as an indicator of the overall quality of an aquatic ecosystem. Some fish are highly vulnerable, both directly and indirectly, to changes in their environment. They can be directly affected by physical and chemical changes in the water and indirectly affected when changes in the environment affect their food sources or the temperature and turbidity of their habitat.

## Reasons to Protect

There are many benefits to protecting waterbodies and their surrounding banks/ riparian buffers; with the constantly changing climate conditions, it is important to understand the critical role of natural water networks and how they can protect a community. The following is meant to be an incentive to encourage preservation and protection, and thus increase the community's resiliency to future climate related events.

As discussed above, waterbodies and their surroundings are fragile and can easily be affected by modifications to their structure. According to the Climate Impact Lab, the average temperature in New York State is projected to increase by 10 degrees (F) over the next 100 years. While Upstate New York might not have to worry much about sea level rise, the significant increase in temperature would not only trigger increasingly fluctuant weather patterns, but also precipitation at higher intensities. These more extreme weather patterns are already apparent throughout Upstate NY, as there has been a noticeable increase in precipitation between 5 - 10% every decade since 1960.

A study conducted by New York DEC and Delaware County Soil and Water Conservation District showed that stream disturbance or modification (such as stream bed sediment clearing, removal of vegetation along stream bank, man-made change in stream shape or size, etc.) can eventually lead to heavy erosion both upstream and downstream and cause flooding that could have otherwise been avoided. As communities expect increased flooding events in the near future, it is important to understand how flooding can overwhelm any natural infrastructure that has been disturbed by human activity. While updating and improving infrastructure can help increase a community's safety, preserving waterbodies and their surroundings can be one of the most effective ways to improve a community's resilience.

Such resources can be preserved through multiple methods which are detailed in the Implementation Tools section of this document.

## Maps and Data

The map on page 17 shows permanent streams – those that flow year-round - and their protection status in the Town of Hector. Other maps in this document show intermittent (or seasonal) streams as well, which only flow when they receive water from upstream, groundwater, and/or precipitation. The data for this map comes from the New York State GIS Clearinghouse dataset entitled "Water Quality Classifications - NYS," last revised in May 2017.

## Resources and References


Climate Impact Lab, http://www.impactlab.org/

Army Corps of Engineers, Buffalo District, http://www.lrb.usace.army.mil/

Climate Impact Lab http://www.impactlab.org/

Delaware County Post-Emergency Stream Intervention : https://www.dec.ny.gov/docs/administration_pdf/streammnll.pdf

New York State Department of Environmental Conservation DEC Regulations, Chapter X: Division

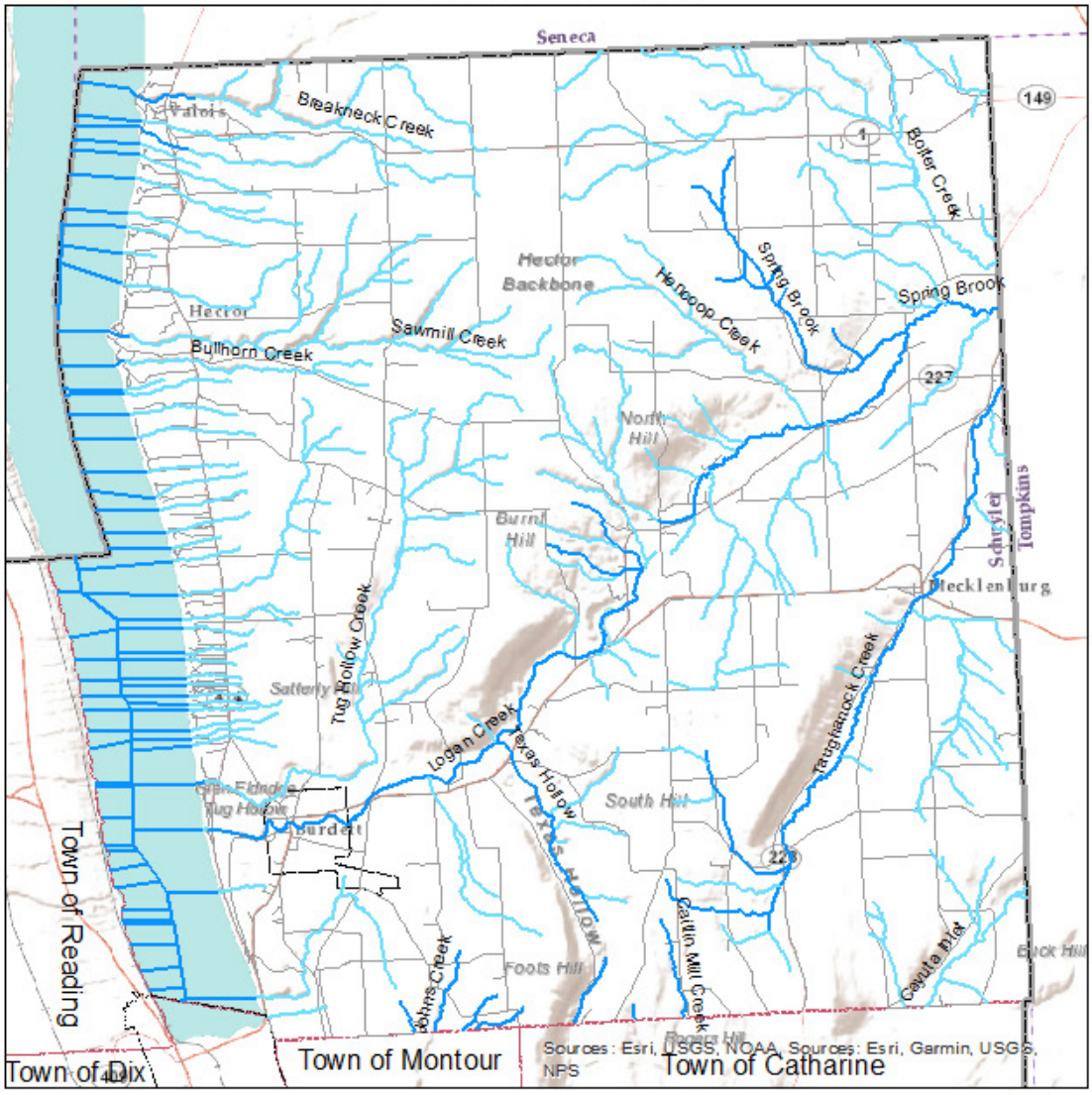
of Water, http://www.dec.ny.gov/regs/2485.html

Protection of Waters: Disturbance of the Bed or Banks of a Protected Stream or Other Watercourse, http://www.dec.ny.gov/permits/6554.html

New York State GIS Clearinghouse, http://gis.ny.gov/

United States Environmental Protection Agency, "Streams," https://archive.epa.gov/water/archive/web/html/streams.html

# Hector Streams




**Legend**

- Schuyler County
- Town Borders
- Village Borders
- Hector Streets

**DEC Class**

- Unprotected
- Protected

0 0.75 1.5 3 4.5 6 Miles

N W E S

2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/22/2021
Date Source: NYS Clearing house, CUGIR Projection: NAD_1983_UTM_Zone_18N

# Watersheds

## What Is a Watershed?

A watershed is the land area that contributes water to a given point, such as a stream or lake. Contributing sources of water for a watershed include (but are not limited to) springs, streams, seeps, ditches, culverts, marshes, wetlands, swamps, and ponds. Eventually, all surface water, some groundwater resources, and precipitation falling within a watershed drain into a single receiving water body such as a stream, river, lake, or wetland.

Watersheds exist at various scales within a hierarchical structure. Gullies and ravines trickle into streams, which in turn feed into larger streams or rivers. Each of these water bodies (gully, ravine, stream, etc.) drains its own particular watershed so that larger watersheds are comprised of several smaller watersheds. For example, two watersheds fall within Hector's borders: Seneca Lake to the west of the Town and Cayuga Lake to the east. While the term watershed is often used interchangeably with "drainage basin", the term drainage basin usually refers to a larger watershed such as the Susquehanna River Drainage Basin or the Lake Ontario Drainage Basin.

## Why Are Watersheds Important?

Land use throughout a watershed (or the commercial, industrial, agricultural, and/or residential activities a land area can support) and the availability of reliable water sources within a watershed are directly related. That is, the land use in a particular area is often determined by the availability of reliable water supplies, and land use is a key determinant of the quality, quantity, and availability of local water resources. Because of this dynamic relationship between water and land use, the characteristics of the entire watershed must be considered when addressing water quality and water quantity issues, including such factors as the amount of impervious surface and effectiveness of local land management practices.

Additionally, the critical influence and impact of water on important ecological and economic systems (such as provision of drinking water, flooding, recreation, and future economic growth) make watersheds increasingly common management and planning units. State and federal agencies utilize and look favorably on water-related management and planning processes that also utilize the principles and concepts of watershed management.

## How are Watersheds Regulated?

Though activities within a watershed can greatly influence the ecosystems they contain, many regulations apply to specific waterbodies or wetlands within a watershed and not the watershed itself.

## Watersheds in the Town of Hector

There are three watersheds in Hector, including Seneca Lake to the west, Cayuga Lake to the far north east and Taughannok Creek to the east, that all drain into the Seneca-Oneida-Owasco drainage basin.

*Table 4: Watersheds in Hector*

| | Acres | Sq. Miles (approx.) | Drainage Basin |
|---|---|---|---|
| Seneca Lake | 40,638 acres | 63 Sq. Miles | Seneca-Oneida-Owasco |
| Cayuga Lake | 607 acres | 1 sq. miles | Seneca-Oneida-Owasco |
| Taughannock Creek | 27, 991 acres | 44 sq. miles | Seneca-Oneida-Owasco |
| Source(s): United States Department of Agriculture | | | |

## Watershed Role with Changing Weather

As the temperature of Upstate New York increases and extreme weather patterns become more frequent, focusing on protecting and managing the watershed will not only increase resilience, but also protect community health from the harmful runoffs that are a result of increased high-volume precipitation. According to data from the Research Program on Climate Change, Agriculture, and Food Security, New York's southern-tier and Central region will likely see up to an 80mm increase in precipitation between 2015 and 2050. With the increase in impervious surfaces such as roads, parking lots, and industrial lands, runoff will increase and contaminate the local water networks of waterbodies, increasing the probability of harmful algal bloom (Cayuga Watershed Intermunicipal Organization).

While there are programs such as the Routine Monitoring Statewide Program, which monitors watersheds throughout the state, there are direct actions that local governments can take to protect watersheds in their municipality. According to the NYS Department of State Local Government Handbook, the following are potential actions a local government can take to preserve watersheds/ wetlands:

1. All wetlands that are smaller than 12.4 acres and that are not deemed of 'unusual importance,' are subject to the exclusive jurisdiction of the municipalities where the wetlands are located (ECL §24-0507).
2. Under ECL, §24-0501, a local government may enact a Freshwater Wetlands Protection Law to fully assume jurisdiction over all freshwater wetlands within its jurisdiction from DEC, provided its law is no less protective of wetlands than Article 24 of the ECL and provided that DEC certifies that the municipality is capable of administering the Act. There is also a limited opportunity for counties to assume wetlands jurisdiction if the local government declines.
3. Under ECL, § 24-0509, local governments can now adopt freshwater wetland regulations applying to wetlands already mapped and under the jurisdiction of DEC, provided that the local regulations are more protective of wetlands than the state regulations in effect. No pre-certification by DEC is required."

In addition to the above, communities can protect critical waterbodies, wetlands, and watersheds through the State Environmental Quality Review Act (SEQRA). Through SEQRA, waterbodies, wetlands, and watersheds are identified as unique natural areas and subject to Environmental Impact Statements. Municipalities can also adopt or pass local regulations for storm water control, ordinances for sediment and erosion control, building and sanitary codes, floodplain regulation, and timber harvesting guidelines or other vegetation removal standards.

## Map and Data

The map on page 17 shows the major watersheds in the Town of Hector. This map shows both permanent and intermittent streams. Data was obtained from the NYS GIS Clearinghouse.

## Resources and References


Cayuga Lake Watershed Intermunicipal Organization, http://www.cayugawatershed.org/

Cayuga Lake Watershed Network, http://www.cayugalake.org/

Cornell Cooperative Extension of Dutchess County, Natural Resources, http://ccedutchess.org/environment/natural-resources

Cornell University Geospatial Information Repository (CUGIR), https://cugir.library.cornell.edu/

Dutchess County Department of Planning and Development, "Chapter 5: Water Resources of Dutchess County, NY," Natural Resources Inventory, 2010 (originally published in 1985), http://www.co.dutchess.ny.us/CountyGov/Departments/Planning/nrichapfive.pdf

NYS Local Government Handbook: https://www.dos.ny.gov/lg/publications/Local_Government_Handbook.pdf

Research Program on Climate Change, Agriculture, and Food Security: http://www.ccafs-climate.org/data/

State Wetland Managers Association: https://www.aswm.org/

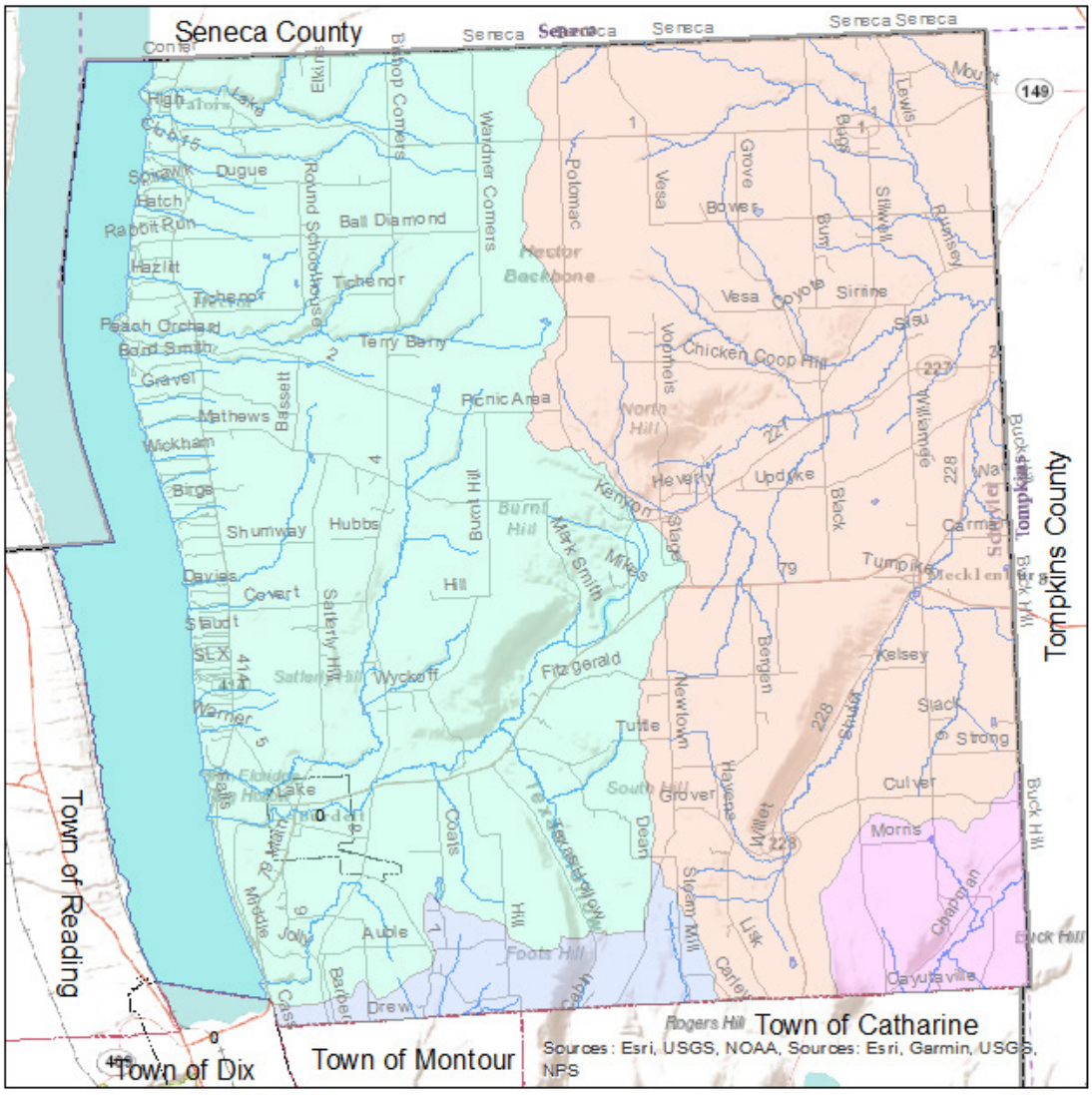
U.S. Department of Agriculture, Natural Resources Conservation Service, Hydrologic Unit Boundaries, https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/nri/?cid=nrcs143_013728

U.S. Environmental Protection Agency

Surf Your Watershed, https://cfpub.epa.gov/surf/locate/index.cfm

Healthy Watersheds Protection, https://www.epa.gov/hwp

# Hector Watersheds




2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/15/2021
Date Source: NYS Clearing house, CUGIR, USDA Projection: NAD_1983_UTM_Zone_18N

# Wetlands

## What Is a Wetland?

Wetlands, according to the United States Army Corps of Engineers (Army Corps), are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, wet meadows, and similar areas." According to the New York State Department of Environmental Conservation (DEC), "Freshwater wetlands are those areas of land and water that support a preponderance of characteristic wetlands plants that out-compete upland plants because of the presence of wetlands hydrology (such as prolonged flooding) or hydric (wet) soils. Freshwater wetlands commonly include marshes, swamps, bogs, and fens." Wetlands such as swamps and marshes are often easily recognizable, but some wetlands, such as forested wetlands and wet meadows, are not obvious because they are dry during part of the year or do not have standing water.

## Why Are Wetlands Important?

Wetlands are critical natural ecosystems and provide a variety of benefits such as:

- filtering harmful toxins, nutrients, and sediment from surface runoff;
- storing floodwaters and reducing the magnitude of flood events; and
- providing valuable habitat for a diverse array of flora and fauna, including many rare, threatened, or endangered species.

The recreational uses associated with wetlands are also very diverse and include birdwatching, hunting, and fishing, all of which provide direct economic benefits to local communities. Because wetlands are crucially important both economically and environmentally, they are highly regulated by the Army Corps and the DEC.

## How Are Wetlands Regulated?

The Army Corps regulates wetlands under Section 404 of the Clean Water Act and issues wetland permits for the placement of fill or dredge materials and the construction of certain structures in waterways (navigable and non-navigable) and wetlands. Disturbances to wetlands must be mitigated in accordance with Army Corps regulations. The Army Corps permit required for activities within a wetland, and the amount of wetlands mitigation required, vary depending on the type of project proposed and the area of wetland impacted.

The DEC primarily regulates wetlands that are 12.4 acres (5 hectares) or larger in size under the Freshwater Wetlands Act. It protects smaller wetlands if they are considered to have unusual local importance. For any work occurring within a wetland or within 100 feet of a wetland boundary, the DEC requires that a wetlands permit be obtained.

Prior to conducting work in or near a wetland, the Regional DEC office or the Army Corps district office should be contacted to obtain the necessary approvals and permits. Each of these agencies will automatically forward permit applications to the other, and each agency will contact the applicant if additional permits and/or paperwork are needed. If permits are not

obtained or wetlands are improperly altered, the Army Corps and the DEC have the authority to levy fines.

## How Are Wetlands Classified?

The DEC classifies and ranks wetlands according to their respective functions, values, and benefits. Of the four classes of wetlands, Class I wetlands are the most valuable and are subject to the most stringent standards. For regulatory purposes, the Army Corps only classifies wetlands as regulated or not regulated based on the presence of wetland hydrology, hydric soils, and hydrophilic vegetation (wetland plants).

## Wetlands' Role with Climate Change

During high rainfall, wetlands act as drainage and filtration areas for excess waters that overflowed from the neighboring waterbodies. While at the same time being wetlands serve a vital role as vital ecosystems and sanctuaries for wildlife, they also can help with reducing surface and groundwater contamination.

As noted above, wetlands act as a key component to the ecosystem, not just for the municipality, but also for the entire region and watersheds associated with that region. According to the United States Environmental Protection Agency (EPA), wetlands are one of the most productive ecosystems that act as a "natural supermarket" for native species, as well as often act as a natural sponge to slow down and distribute flood runoff waters. The importance of wetlands is especially true for much of the developed and or agricultural areas of Upstate NY where the topography is relatively hilly or mountainous and the runoff rates are relatively high. In terms of filtration, wetlands act as a vital resource to prevent contamination of drinking waters. While water treatment plants deal with direct waste from communities, most rural septic systems do not deal with ditch runoff waters which contain contaminants from roads, agriculture, and even landfills (NYS DEC). Unless this water enters a wetland, it will directly harm and pollute the local water system and resources. One direct effect of this contamination include algal bloom in waterbodies from heightened nutrient levels (such as phosphates). This ultimately leads to a chain of events triggering public health and environmental issues, as well as direct and indirect negative impacts on local and regional economies. As our climate changes and with increased precipitation, preserving these wetlands will foster protection of both natural and public health.

In addition to health concerns, wetlands are a crucial entity to local wildlife. While much of Upstate New York is fortunate to have a great deal of greenery throughout the state, wetlands are known to be the main habitat for the bottom of the food chain, which when affected or modified would create a domino effect for all other species that directly or indirectly rely on that food source (US EPA). This cycle involved dead leaves and other plant debris breaking down, becoming detritus which then feeds small aquatic insects, shellfish and small fish which ultimately are prey to larger aquatic and terrestrial animals. Rather than the high nutrient water directly entering and contaminating waterbodies, these resources are partially ingested by wildlife and the remainder enters the ground. Thus it is reasonable to say that wetlands are crucial for all wildlife survival.

Unlike waterbodies, wetland borders can be difficult to delineate. The wetland map below therefore can be a useful tool to determine what parcels should and or do not need to be preserved, especially when overlaid and compared with other maps such as the flood or land cover map depicted below on page 30 and 60, respectively. Because wetlands are fragile ecosystems, a 100-foot buffer is legally established by the state around each individual wetland.

The boundaries are determined based on three factors: existence of hydrophytic vegetation, hydric soil type, and standing water. In order to be designated as a wetland, usually two or more of the factors must exist. While the map below may represent existing wetlands, their existence and size can continually fluctuate., especially with climate change. In order to have up to date maps, it is necessary for communities to actively be aware of the changing landscape. If a municipal official or community member believes they know of a wetland that is not mapped, the following manual can be used to identify potential new wetlands: https://www.dec.ny.gov/docs/wildlife_pdf/fwdelman.pdf

## Mapped Wetlands in the Town of Hector

Hector contains both National Wetlands Inventory wetlands (as mapped by the U.S. Fish and Wildlife Service) and additional NYSDEC Freshwater Wetlands (as mapped by the DEC), detailed in Table 5. The wetlands in the Town of Hector are majority located in the south half of the municipality, with significant presence near Route 79. Some communities near the wetlands include Burnt Hill, North Hill, Slattery Hill and South Hill. The majority of wetlands are considered freshwater ponds followed by riverines and freshwater forested.

*Table 5: Wetlands in Hector*

| | Acres of Wetlands | Percent of Municipality |
|---|---|---|
| National Wetlands Inventory wetlands | 8780 | 12% |
| NYSDEC Freshwater Wetlands | 1061 | 1.4% |

The National Wetlands Inventory data (last updated in 2017) as the National Wetlands Inventory uses different remote sensing imagery to create their maps. However, the NYSDEC Freshwater Wetlands dataset has not been updated for over a decade and does not match up with the wetlands data released in 2015. Therefore, the NYSDEC Freshwater Wetlands dataset does not appear to be an accurate representation of Hector's The National Wetlands appear to be the most accurate and up-to-date representation.

## Maps and Data

The map on page 26 shows the NYSDEC Freshwater Wetlands, National Wetlands Inventory Wetlands found in the Town of Hector. These maps were made in 2021 in order to display a map with only the most up-to-date information. All subsequent maps in this document that display wetlands use the 2021 data. The NYSDEC wetlands data is available from the Cornell University Geospatial Information Repository at https://cugir.library.cornell.edu/catalog/cugir-008187.

Although the Army Corps and the DEC create and periodically update wetlands maps, these maps are developed for use at a very broad scale (1: 200,000) and are best used as an indicator

that wetlands are present, and that an on-ground, site-specific investigation by a qualified wetland specialist (Army Corps Engineer, County Soil and Water staff, or private consultant) is warranted. Many wetlands do not appear on wetland maps, so if land appears to be wet, or has typical wetland plants or soils, landowners should call the Army Corps or the DEC prior to altering the land to avoid wetland destruction and possible fines.

For questions about wetlands on active farmlands or the Wetlands Reserve Program (which makes payment to landowners for establishing wetland easements on their agricultural property), contact the USDA Natural Resources Conservation Service, Ithaca Office.

## Resources and References


Cornell University Geospatial Information Repository (CUGIR), https://cugir.library.cornell.edu/

Environmental Conservation Agency (EPA), Wetlands: https://www.epa.gov/wetlands/why-are-wetlands-important

Mitsch, W.J. and J.G. Gosselink (1986). Wetlands. New York: Van Nostrand Reinhold

New York State Department of Environmental Conservation

Freshwater Wetlands Permits, http://www.dec.ny.gov/permits/6058.html

Freshwater Wetlands Mapping, http://www.dec.ny.gov/lands/5124.html

Freshwater Wetlands Program, http://www.dec.ny.gov/lands/4937.html

U.S. Army Corps of Engineers

Regulatory Program and Permits, http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/

Buffalo District, http://www.lrb.usace.army.mil/

U.S. Department of Agriculture, Natural Resources Conservation Service

Ithaca Service Center, https://offices.sc.egov.usda.gov/locator/app?service=action/1/ServiceCenterSummary/4/agencyToOfficeLink

Wetlands, https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/wetlands/

Wetlands Reserve Program, https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands/

U.S. Fish and Wildlife Service, National Wetlands Inventory, https://www.fws.gov/wetlands/data/State-Downloads.html

# Hector Wetlands


2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/25/2021
Date Source: NYS Clearing House, CUGIR, FWS Projection: NAD_1983_UTM_Zone_18N

# Flood Hazard Area

## What Are Flood Hazard Areas?

Flood Hazard Areas (FHA) are areas that the Federal Emergency Management Association (FEMA) has determined to be vulnerable to flooding. See Table 6 for a description of flood event frequencies.

## Why Are Flood Hazard Areas Important?

Flood events are part of natural hydrological and seasonal cycles and may also occur more frequently as the global climate changes. The size and location of the areas, which are typically inundated during flood events, as well as the magnitude of the event, are significantly influenced by the total area of impervious surface (roads, parking lots, etc.) and wetlands within a watershed. Creation of or increases in impervious surfaces, diversion of water off the landscape (to ditches or nearby water bodies), and the loss of wetlands that help store and control floodwaters cause higher volumes and peak flows of storm water runoff. It should also be noted that while floods can cause damage to infrastructure, the economy, and the environment, periodic inundation can benefit the habitat of certain flora and fauna species and add nutrients to agricultural lands located in flood areas.

## Flood Hazard Areas in the Town of Hector

FEMA produces paper Flood Insurance Rate Maps (FIRMs) to show areas subject to flooding as determined by historic, meteorological, and hydrological data, as well as open space conditions, flood control structures, and land use in the watershed at the time the FEMA study is conducted. These maps delineate Special Flood Hazard Areas, which are areas that "will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year," commonly referred to as 100-year or base flood areas. These maps may also include the elevation of the base flood (100-year flood event), flood insurance risk zones, and areas subject to inundation by a 0.2%-annual-chance or 500-year flood event, all of which may be used to establish the National Flood Insurance Program's (NFIP) flood insurance premiums. 100 year flood zones are identified for the Town of Hector and a few surrounding jurisdictions on page 30.

## Climate Change in Flood Hazard Areas

As most would expect, flood hazard areas are prone to increased risks of flooding over the course of time as weather patterns become more extreme. While Flood Hazard Area maps provided by FEMA can depict a great deal of areas that are threatened by flooding, it is important to note that most these maps and data are outdated, as FEMA does not consider the forecasted changes of climate change. As a result, the maps do not depict all areas that are actually affected by flooding. According to the National Weather Service, with current and forecasted weather patterns in New York State and the region's relatively mountainous characteristics, streams that are only 6 inches deep could easily swell up to 10 feet deep in less than an hour. Additionally, with the fluctuating winter weather patterns, snowmelts can also contribute to serious flooding which could overwhelm streams, ditches and infrastructure that is not built to handle such high quantities of runoff. Such events could thus cause floods in unforeseen areas and lead to damage that is not covered by FEMA's Flood Insurance Program.

While there are multiple different approaches to mitigating these type of problems, it is up to individual communities to determine which areas might be most affected by extreme weather patterns.

According to the NYS DEC, flooding events in Upstate NY are expected to increase at a constant rate of 17% every decade. While this increase might sound modest for some, the implications of such increases not only means an overall increase in 100 and 500 year floods (maps depicted below), but also the geographical expansion of such flooding events. While avoiding such changes might not be possible, acquisition and preservation of these flood hazard areas determined by the community is highly encouraged. Additionally, forecasting how flooding could expand and affect land not currently designated as flood hazard areas using tools from the Army Corps of Engineers such as the Climate Impact Hydrology and HEC GeoHMS from ESRI could be extremely beneficial.
Additional tools and their descriptions can be found at the following links:

- Army Corps of Engineers (ACE): https://www.usace.army.mil/corpsclimate/Public_Tools_Dev_by_USACE/
- USACE Hydrology Tools: http://www.hec.usace.army.mil/software/
- ESRI Flood Planning: https://solutions.arcgis.com/local-government/help/flood-planning/

## Maps and Data

FEMA publishes the data from paper FIRMs and Letters of Map Revision (LOMRs) online as a digital database called the National Flood Hazard Layer (NFHL). FEMA also offers Flood Risk Maps (FRM), Flood Risk Reports (FRR), and Flood Risk Databases (FRD) online to help community officials and the general public assess and visualize flood risk. The flood hazard boundary has an effective date of 1985. The age of the base data should be considered when using these maps for planning purposes.

The measurement used to estimate the frequency of a flood event can be confusing because a 100-year flood event is not a flood event that is likely to occur once every 100 years. Rather, it has a one percent chance of occurring or being exceeded during a one-year period, a 10% chance of occurring during a 10-year period, an 18% chance of occurring in a 20-year period, and so on. The following table shows the likelihood of occurrence of flood events during specified intervals of time.

Table 6: Likelihood of Experiencing at Least One Flood Event

| Flood Event | In 1 year | In 10 years | In 20 years | In 25 years | In 30 years | In 50 years | In 100 years |
|---|---|---|---|---|---|---|---|
| 10-year | 10% | 65% | 88% | 93% | 96% | 99% | 99.99% |
| 25-year | 4% | 34% | 56% | 64% | 71% | 87% | 98% |
| 50-year | 2% | 18% | 33% | 40% | 45% | 64% | 87% |
| 100-year | 1% | 10% | 18% | 22% | 26% | 39% | 63% |
| 500-year | 0.2% | 2% | 4% | 5% | 6% | 10% | 18% |
| Source: Water Courses Vol. 5, Issue 1, Spring 1998. A Newsletter from Cornell Cooperative Extension and the Department of Soil, Crop and Atmospheric Sciences, Cornell University | | | | | | | |

FEMA publishes the data from paper FIRMs and Letters of Map Revision (LOMRs) online as a digital database called the National Flood Hazard Layer (NFHL). FEMA also offers Flood Risk Maps (FRM), Flood Risk Reports (FRR), and Flood Risk Databases (FRD) online to help community officials and the general public assess and visualize flood risk. The flood hazard boundary has an effective date of 1985. The age of the base data should be considered when using these maps for planning purposes.

The measurement used to estimate the frequency of a flood event can be confusing because a 100-year flood event is not a flood event that is likely to occur once every 100 years. Rather, it has a one percent chance of occurring or being exceeded during a one-year period, a 10% chance of occurring during a 10-year period, an 18% chance of occurring in a 20-year period, and so on. The following table shows the likelihood of occurrence of flood events during specified intervals of time. Overall, the west side of the Town is most at risk from flooding, given its location next to Seneca Lake and one of the identified 100 Year Flood Zones. Other areas are significant risk include along Taughannok Creek and parts of the Cayuta Inlet to the southeast.

## Resources and References

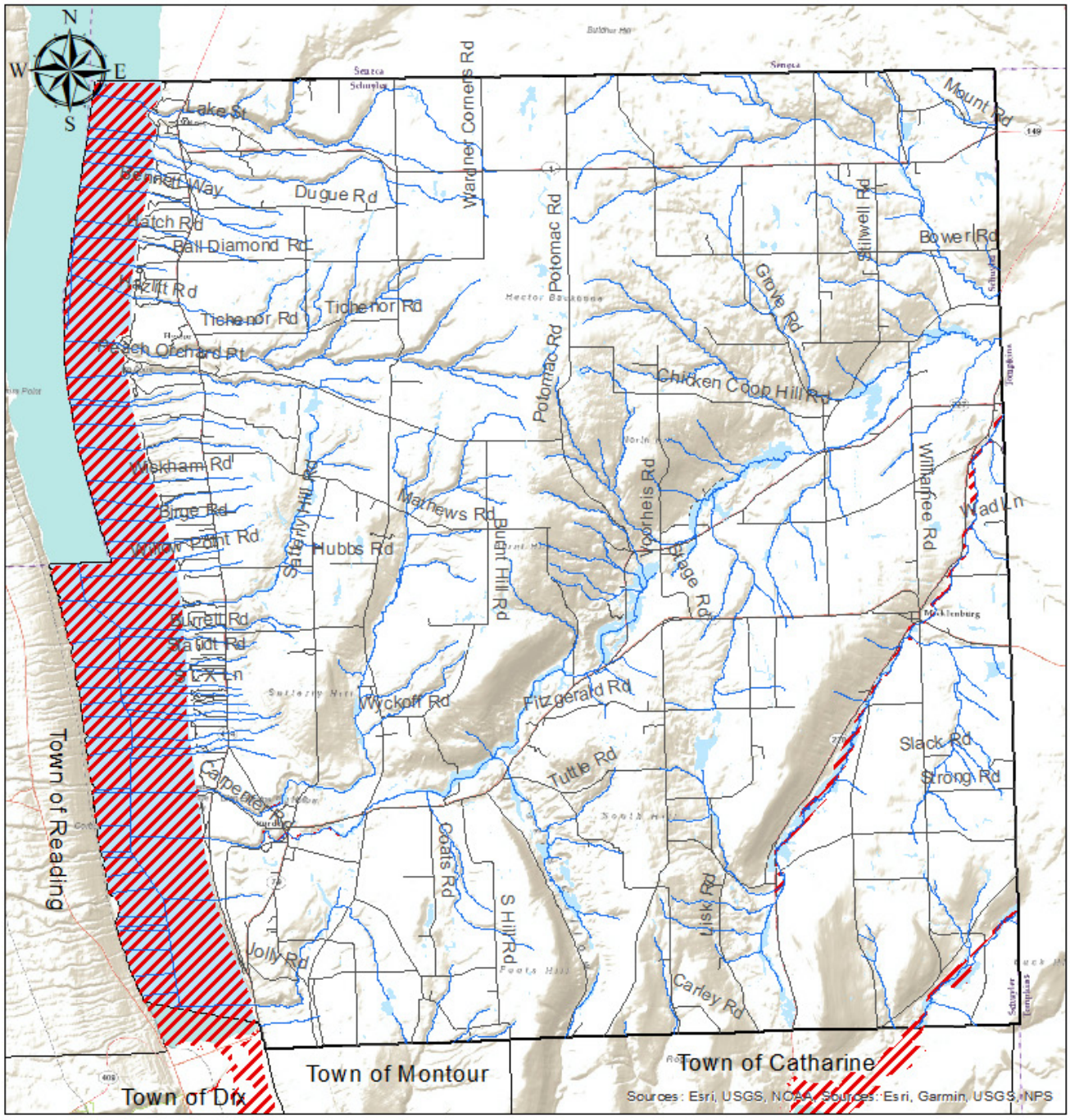

Federal Emergency Management Act (FEMA)

Town of Caroline, Flood Map Service Center, https://msc.fema.gov/portalsearch?AddressQuery=caroline%20ny#searchresultsanchor

National Flood Insurance Program, https://www.fema.gov/national-flood-insurance-program

National Weather Service Temperature Map: https://www.weather.gov/current

# 100-Year Flood Zones




2020 Hector NRI Created by: CCE- Tompkins Date Created: 7/23/2020
Data source: NYS Clearinghouse, CUGIR, USDA Projection:NAD 1983 UTM Zone 18N

# Aquifers

## What Is an Aquifer?

Aquifers are geologic formations beneath the Earth's surface that store and yield groundwater. One or more aquifers can lie beneath any given point on the Earth's surface; and the location, size, capacity, depth, and flow characteristics of an aquifer are directly related to the geology and hydrology of the particular aquifer and its recharge area. (See definition of recharge area below.)

Aquifers are usually described as confined or unconfined. Typically, confined aquifers are covered with, or consist of, less permeable substances such as clay or contiguous shale. Unconfined aquifers consist of unconsolidated materials such as sand and gravel, which allow substances to easily percolate from the surface to the aquifers below.

The uppermost boundary of surficial aquifers (those closest to the Earth's surface) is defined by the water table, which is where the spaces in unconsolidated sediments and the openings in bedrock are fully saturated. The spaces between soil and rock particles in the unsaturated zone, located above the water table, are only partially occupied by water. The water table rises and falls depending on the rates of groundwater recharge and discharge, the capacity of the aquifer, the rate of water use by plants on the surface (transpiration), and water withdrawals.

Aquifers can be replenished—or recharged—by the infiltration of precipitation and surface water runoff through soil, as well as by surface water resources such as streams, creeks, wetlands, and floodplains. The land area that contributes to this infiltration is called a recharge area. Recharge areas may replenish aquifers directly beneath them (as in the case of unconfined or surficial aquifers) or they may recharge aquifers far away (as in the case of confined aquifers).

## Why Are Aquifers Important?

Aquifers are an important source of water for residential, commercial, and industrial uses. In New York State, groundwater typically contributes more than half of the total annual flow to local streams and creeks.

Because aquifers are replenished by the infiltration of surface water, impervious surfaces (pavement from roads or parking lots, roofs, building footprints, etc.) decrease recharge areas and threaten aquifers by inhibiting infiltration of precipitation and surface water through the soil. Any contaminant contained in or near an aquifer and/or its recharge area may potentially contaminate the aquifer. Potential contaminants include bacteria and pathogens leaching from septic systems; gas, salt, and oil washed from parking lots; fertilizers; pesticides; hazardous or toxic waste spills; and petroleum or oil leaking from underground storage tanks.

Some groundwater migrates slowly and can take several years to decades or even centuries to move contaminants from the point of origin to the point of discharge. Once degraded, an aquifer can become unusable, and oftentimes remediation is not technologically or economically feasible. Moreover, because of groundwater and surface water interactions, contamination in an aquifer may eventually contaminate surface water as well.

The quantity of water contained within an aquifer and the aquifer's ability to serve as a reliable supply of water must also be considered. Generally, an aquifer's geology, retention, and recharge characteristics determine the quantity of water available. When water is withdrawn at a rate faster than it is recharged, the aquifer can be depleted. Generally, this occurs when too many wells withdraw water from an aquifer.

The map below depicting aquifers and also be seen as a map that depicts area of concern for contamination. While it can be difficult to track the behavior of aquafers, the locational information depicted on the map can be used to better understand what areas can be preserved and protected to mitigate future contamination of these valuable resources. This is especially important with continuously increasing amounts of runoff from agricultural lands and urban impermeable surfaces which carry contaminants that could be harmful to both the environment and human health.

## Aquifers in the Town of Hector

The Town of Hector contains principal aquifers located in unconsolidated glacial sediment (e.g., sand and/or gravel deposits) found in depressions and valleys throughout the town. These Principal Aquifers are no heavy utilized, but are capable of providing 10 to 100 or more gallons of water per minute. These aquifers may provide a valuable source of water to landowners overlying them. These aquifers are also an integral part to the operation of creating clean water for living organisms. The location of the aquifers are associated with ponds and protected streams. Due to the nature of the host material (i.e. glacial sediment), the aquifers can be affected by land use practices.

## Maps and Data

The map below depicts all the existing aquifers across municipal boundaries. The features depicted in light blue represent the principal aquifers found in the Town of Hector. The data was collected from the NYS GIS Clearinghouse under the name "Unconsolidated Aquifers at 1:250,000." This map is not intended to be used for detailed site evaluations as the determination of precise aquifer locations and characteristics requires additional evaluation.

## Resources and References

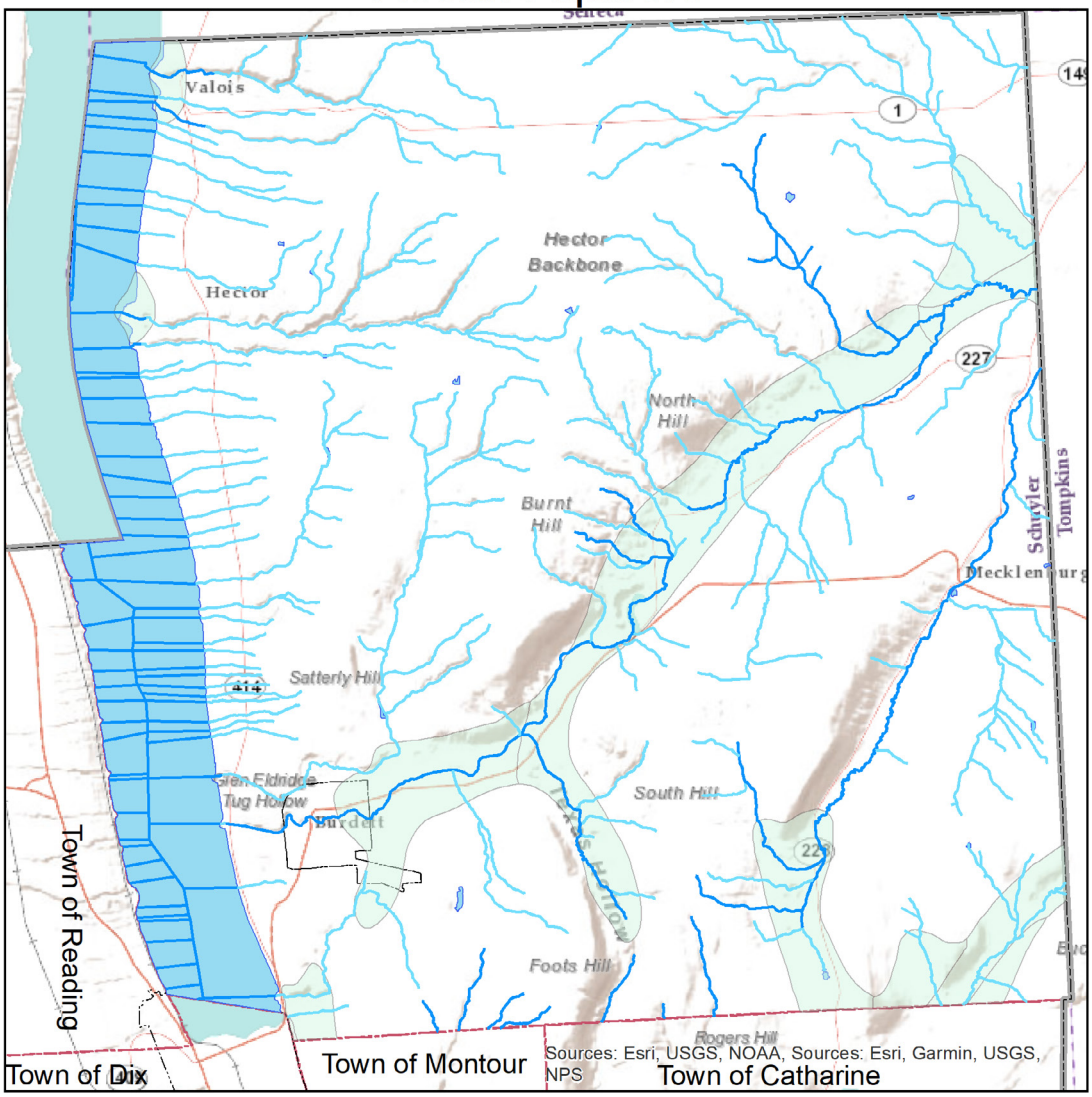

Miller, T.S. (1990). Sand and Gravel Aquifers of Schuyler County, New York. U.S. Department of Energy, U.S. Geological Survey, Water-Resources Investigations Report 90-4073.

New York State GIS Clearinghouse, http://gis.ny.gov/

U.S. Geological Survey, New York Water Science Center, Ithaca Program Office, https://ny.water.usgs.gov/about/officeithaca.html

Winter, T.C., J.W. Harvey, O.L. Franke and W.M. Malley (1998). Ground Water and Surface Water: A Single Resource. USGS Circular.

# Hector Aquifers




**Legend**

- Schuyler County
- Town Borders
- Burdett
- Unprotected Streams
- Protected Streams
- Ponds/Lakes
- Principal Aquifers

Miles
0 0.75 1.5 3 4.5 6

N
W E
S

2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 4/19/2021
Date Source: NYS Clearing house, CUGIR Projection: NAD_1983_UTM_Zone_18N

# GEOLOGY AND SOILS

# Slope and Topography

## What Are Slope and Topography?

Slope and topography describe the shape and relief of the land. Topography is a measurement of elevation, and slope is the change in that elevation over a certain distance. Topography may be measured with lines that connect points representing the same elevation; these are called topographic contours. Slope is measured by calculating the difference in the elevation from one point to another divided by the lateral distance between those points. Topographic data can also be used to create a model of the land's surface called a digital elevation model (DEM).

## Why Are Slope and Topography Important?

Topography and slope should be considered when drawing up site plans for any construction project and most agricultural activities. Consideration of the slope of the land is important to reduce construction costs, to minimize risks from natural hazards such as flooding and landslides, to reduce erosion, and to minimize the impacts of proposed development on natural resources such as soils, vegetation, and water systems.

As described in Flood Hazard Areas, topography can play a major role in the amount of runoff during flash flooding. While there are many different types of topographies throughout the state, much of the Southern-tier is mountainous. This can create extremely dangerous situations for communities located along hillsides or in ravine settings. Communities along hillsides can be at risk to hillslope failures such as landslides during intense precipitation events. Runoff water accumulates in low elevations and flash floods can easily occur in streams and rivers located in valleys/ ravines, even with moderate precipitation, putting low-lying communities at risk. As a result, communities located in low-lying areas are most likely to be affected by extreme weather patterns. Thus, it is important to consider topography when determining communities that are most vulnerable to flooding. The Map depicting slope and Hydrology on page 38 can be useful in helping determine the behavior of water during flooding and areas that might be prone to extreme runoff and potentially mudslides. Areas that are marked with dark blue and their surroundings are especially an area of concern, as water naturally flows downward and accumulates, thus triggering floods and mudslides.

## Slope and Topography in the Town of Hector

Located in a mountainous region, the Town of Hector has many peaks throughout the Town, particularly in the southern region. Although still at high elevations the northeastern region does not have as dramatic peaks as the rest of the Town. The majority of Hector is on a 3.1% - 8% slope, while its higher peaks can range from 15.1% to 25%. The Town also contains some low-lying, U-shaped valleys surrounded by steep slopes that have slope degrees of 8.1% to 15% and 15.1% to 25%. These valleys are concentrated in the Southeast quadrant of the Town's jurisdiction. Table 7 summarizes the development potential of land based on its degree of slope.

*Table 7: Development Potential Based on Degree of Slope*

| Degree of Slope | Development Potential |
|---|---|
| 0% to 1% | Suitable primarily for agriculture that uses flood irrigation unless extensive drainage infrastructure is installed |
| 1% to 3% | Suitable for most development |
| 3% to 8% | Suitable for medium-density development |
| 8% to 15% | Suitable for moderate to low-density residential development as well as pastures, forests, and vineyards |
| 15% to 25% | Suitable for low-density residential development as well as pastures, forests, vineyards, and recreational uses |
| Over 25% | Recreational uses and open space |
| Sources: Anderson, L.T. (2000). Planning the Built Environment. New York: Routledge, and Lehigh Valley Planning Commission, Steep Slopes: Guide and Model Regulations (2008). | |

## Maps and Data

A slope map categorizing steepness of slope is included on page 37. A map showing slope with wetlands overlaid is included on page 38. The slope dataset was derived from the Digital Elevation Model created by the U.S. Geological Survey at a scale of 1:24,000 with a NAD_1983_UTM_Zone_18N projection.

## Resources and References


Anderson, L.T. (2000). Planning the Built Environment. New York: Routledge.

Fakundiny, R. H., & Albanese, J. R. (2005). New York State Geological Survey (NYSGS). In P. Eisenstadt & L. E. Moss (Eds.), The Encyclopedia of New York State. Syracuse, NY: Syracuse University Press.

Lehigh Valley Planning Commission, Steep Slopes: Guide and Model Regulations (2008), http://www.lvpc.org/pdf/SteepSlopes.pdf

New York State GIS Clearinghouse, http://gis.ny.gov/

U.S. Geological Survey, New York Water Science Center, Ithaca Program Office, https://ny.water.usgs.gov/about/officeithaca.html

# Town of Hector Slope


2020 Hector NRI Created by: CCE- Tompkins Date Created: 7/23/2020 Data source: NYS Clearinghouse, CUGIR, FWS Projection:NAD_1983_UTM_Zone_18N

SLOPE WITH HYDROLOGY AND WETLANDS MAP

PLACEHOLDER

# Bedrock Geology

## What Is Bedrock Geology?

Bedrock geology describes the basic rock formations that underlie soils and unconsolidated materials (see Surficial Geology section). Bedrock occasionally protrudes through these materials or may be exposed alongside roads and creek beds. These rocks, formed millions of years ago, constitute the foundation of materials and topography in a region. Bedrock is found beneath the soils and may be buried beneath glacial till, composed of rock fragments of various sizes that were released from glaciers as they receded.

## Why Is Bedrock Geology Important?

In some part of New York, the depth to bedrock is relatively shallow, sometimes only 5 to 10 feet below the surface of the soil. Shallow depth to bedrock significantly impacts the location, development, maintenance, and cost of public services, such as sewers, water supply systems, and roads. Construction feasibility and costs for private investments, such as building foundations, septic tanks, and private roads, are partially dependent on the depth to bedrock. Shallow bedrock may also be subject to frost heaving and deformation. Determination of bedrock qualities must be made on a site-specific basis. For example, limestone can dissolve in water – leading to the formation of caves and void spaces in the rocks. Failure of void spaces in limestone can lead to the formation of sinkholes which can be dangerous for development.

## How Was Bedrock Formed?

Approximately 550 million years ago, the land that is now the Town of Hector and the surrounding region was submerged under an ancient sea. Over the course of 325 million years, layers of sediment (sand, mud, salt, and lime) were deposited on the sea bottom and slowly hardened into beds of sedimentary rocks that we now know as sandstone, shale, and limestone.

## Bedrock Geology in Hector

The major groupings of bedrock in the Town of Hector include West River Shale to the west and north east, Cashaqua Shale that spans all across the municipality and Beers Hill Shale, primarily located in the middle of Hector, spanning from North to South. The formations found within a group are shown in parentheses. The following are listed from oldest to youngest formations:

West River Shale (Dg): This grouping of limestone, shale, and siltstone is what makes up about 14% of the land in Hector, mostly in the West along Seneca Lake, and some presence in the east along the border with Tompkins County. It is found at lower elevations in valleys, where overlying bedrock has been eroded away.

Cashaqua Shale (Ds): These siltstones and shales can be found between 200 and 1,000 feet in elevation and makes up about 45% of the land in Hector. It is found in various locations throughout the municipality and overlies the West River Shale formation.

Beers Hill Shale (Dwm): These shales and siltstones can be found at elevations between 1,100 and 1,600 feet and makes up 31% of the municipality and can be found mostly in

central Hector. The Beers Hill Shale is found at the top of hills in Hector. It directly overlies the Cashaqua Shale.

## Maps and Data

The New York State Geological Survey has produced a geographic data set of bedrock geology. The Bedrock Geology map was created at a scale of 1:2,500,000, and depicts general locations of various rock formations; it should not be used for any site-specific analyses.

For more detail on New York State Bedrock formations, go to the following website: http://www.nysm.nysed.gov/data/bedrock.txt

## Resources and References


Fakundiny, R. H., & Albanese, J. R. (2005). New York State Geological Survey (NYSGS). In P. Eisenstadt & L. E. Moss (Eds.), The Encyclopedia of New York State. Syracuse, NY: Syracuse University Press.

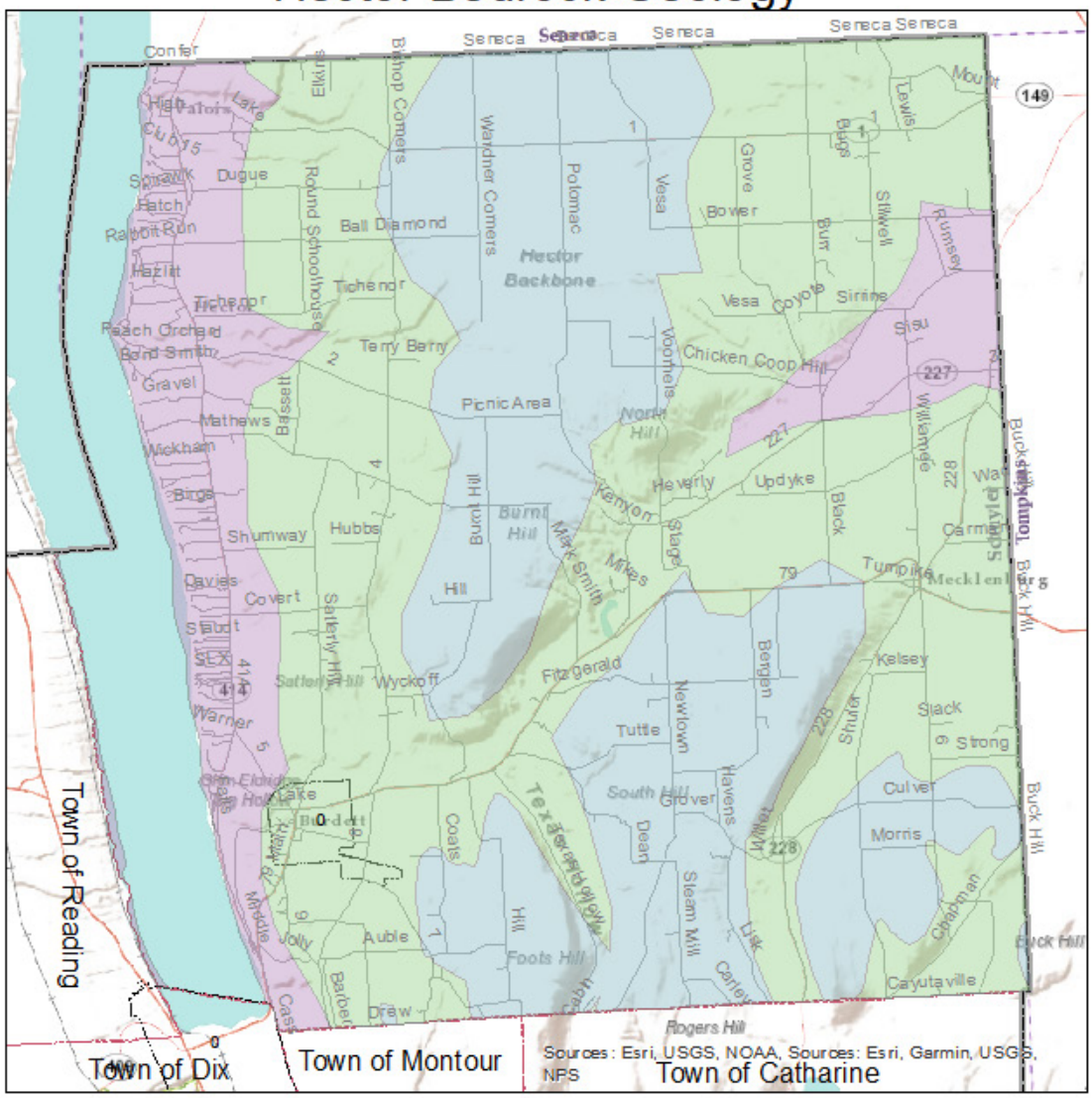
U.S. Geological Survey

National Geologic Map Database, https://ngmdb.usgs.gov/Geolex/search

New York Water Science Center, Ithaca Program Office, https://ny.water.usgs.gov/about/officeithaca.html

Von Englen, O.D. (1961). The Finger Lakes Region: Its Origin and Nature. Ithaca, NY: Cornell University Press.

# Hector Bedrock Geology




2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/15/2021
Date Source: NYS Clearing house, CUGIR, NYSM Projection: NAD_1983_UTM_Zone_18N

# Surficial Geology

## What Is Surficial Geology?

Surficial geology describes the rocks and unconsolidated materials that lie between bedrock and the surface of the land. In the Finger Lakes region, glaciers that receded 12,000 to 25,000 years ago deposited these materials. When the glaciers receded, the rock and debris frozen within the ice were left behind in various formation depending upon how fast or slow the glacier receded. These formations contain various sized particles and are classified by the shape of formation, the thickness, and the type and size of particles found. As a result, kame deposits, lacustrine sand, lacustrine silty and clay, outwash sand and gravel, till and till moraine

## Why Is Surficial Geology Important?

Surficial geology is important because the characteristics of materials below the earth's surface influence the feasibility of constructing buildings and roads. Surficial deposits commonly determine soil composition and therefore may affect agricultural viability. This information can also be used to better understand the runoff, as permeability can vary depending on geologic composition and soil type (discussed in further detail below on page 45).

Additionally, while it is important to consider how the geological characteristics can handle flooding, it is also important to consider how different surfaces can be affected by droughts. While Upstate New York is fortunate to not be threatened by water scarcity, that does not mean that the ground is consistently saturated. Thus, as the community develops it is important to preserve and protect as many surfaces that are more permeable and can handle variant weather patterns. The map that depicts soil drainage (page 51) can be a useful tool to determine future land uses.

## Surficial Geology Deposits in the Town of Hector

There are five types of surficial geology deposits in Hector:

1. Lacustrine Sands are well sorted (particles are of similar size) and stratified sand deposits that settled out when lakes were formed by the melting glaciers. Deposits found today range from 6 to 60 feet in thickness.
2. Outwash Sand and Gravel is coarse to fine gravel mixed with sand. Location is restricted to valley bottoms and stream terraces. These deposits are of variable thickness of five to 65 feet.
3. Till deposits are poorly sorted (particles of varying sizes) material of variable texture such as clay, silt-clay, or boulder clay that were deposited beneath the glacial ice. Permeability of these deposits vary with the amount of compaction. Thicknesses vary from 3 to 160 feet.
4. Kame Moraines are glacial deposits that range in size from boulders to sand deposited during glacial retreat. These deposits are found in thicknesses of 30 to 100 feet.

Table 8 summarizes the surficial geology of Hector.

*Table 8: Surficial Geology of Hector*

| Type of Surficial Geology Deposit | Percent of Municipality |
|---|---|
| Bedrock | .06% |
| Kame deposits | 25% |
| Lacustrine sand | 0.9% |
| Lacustrine silt and clay | 4.0% |
| Outwash sand and gravel | 0.8% |
| Till | 72% |
| Till moraine | 0.3% |

## Maps and Data

The following map shows the surficial geography of the Town of Hector. The dataset is available from the New York State Museum.

## Resources and References

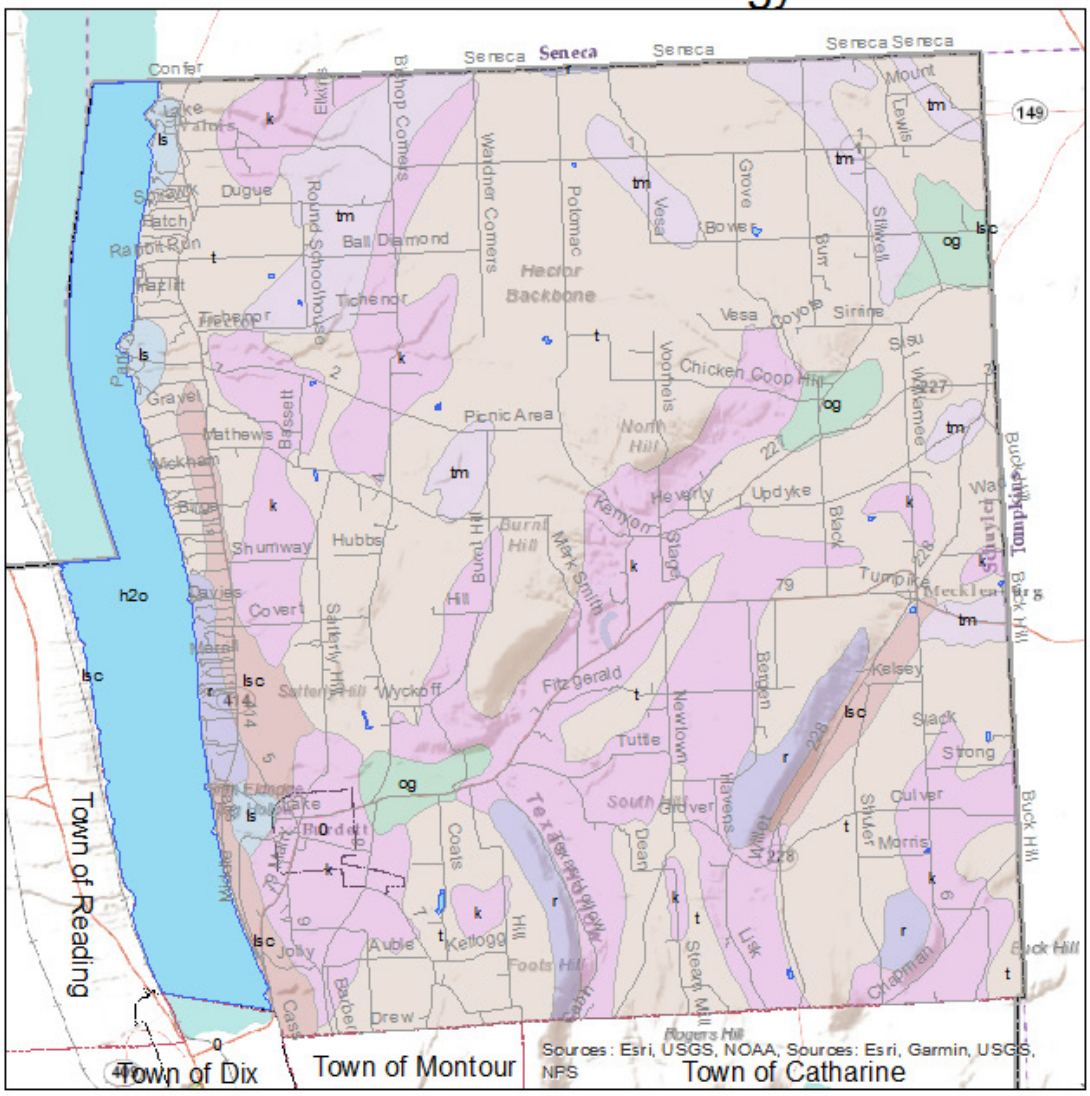

Fakundiny, R. H., & Albanese, J. R. (2005). New York State Geological Survey (NYSGS). In P. Eisenstadt & L. E. Moss (Eds.), The Encyclopedia of New York State. Syracuse, NY: Syracuse University Press.

U.S. Geological Survey

National Geologic Map Database, https://ngmdb.usgs.gov/Geolex/search

New York Water Science Center, Ithaca Program Office, https://ny.water.usgs.gov/about/officeithaca.html

# Hector Surficial Geology




**Legend**

Schuyler County
Village Borders
Town Borders
Hector Streets

Miles
0 0.75 1.5 3 4.5 6

N
W E
S

**Surficial Geology**

- Kame deposits (k)
- Lacustrine sand (ls)
- Lacustrine silt and clay (lsc)
- Outwash sand and gravel (og)
- Bedrock (r)
- Till (t)
- Till moraine (tm)
- Water

2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/15/2021
Date Source: NYS Clearing house, CUGIR, NYSM Projection: NAD_1983_UTM_Zone_18N

# Soils

## What Are Soils?

Soil is a mixture of mineral particles, organic matter, water, and air. Soils are characterized primarily by their texture and constituents (e.g., sand, silt, clay, percent organic matter, etc.).

## Why Are Soils Important?

Soils affect a variety of human activities from agriculture to the engineering and construction of roads, buildings, and sewage disposal systems. They are critical in determining the productivity and viability of agricultural operations. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) evaluates soils in terms of their capability to support agriculture. These range from Class I soils, which are productive and easy to work, to Class VIII soils, which are not suitable for growing crops, pasture, or trees for profit.

Planning boards, elected officials, zoning officers, developers, etc., can use soil maps to identify areas suitable for future development of homes, industry, agriculture, and recreation. For example, a soil map may indicate poorly drained areas, which should not be used for residential development because of the need for costly drainage facilities and because they may be sites of existing or potentially restored wetlands. Soil maps can also be used to assess the likelihood of finding suitable sites for individual, on-site, sewage disposal systems. To quickly determine the type of soil and its characteristics, the USDA-NRCS web soil survey tool can be used: nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/.

## Classification of Soils

NRCS (and its predecessor, the Soil Conservation Service) is the agency responsible for preparation  maps showing soil series containing soils that share common profiles. Soil series are further divided into soil types that share common physical and chemical properties. These properties affect the land use potential of the soil, and can limit the suitability for cultivation.

Wayland-Teel-Herkimer soil series are soils that consist of very deep, poorly drained, nearly level soils that have formed in recent alluvium. These soils are typically found in low-lying areas on flood plains. These soils are mainly found in or bordering areas of Wisconsin glaciation. These soils support native vegetation such as red maple, alder, willow, and other trees tolerant of wet sites. Areas containing these soils have also been cleared and drained and are used for growing pasture or crops.

Valois-Howard-Bath soil series are distributed throughout glaciated areas of the Allegheny Plateau of New York and Pennsylvania and can be found in the Hudson Valley and Mohawk Valley of New York. These soils consist of very deep, well-drained soils on nearly level to steep lateral moraines along lower valley sides. The Valois series typically forms in till dominated by sandstone, siltstone, or shale, common rock types found in the Finger Lakes Region. Surface runoff is negligible to very high, as permeability is moderate to rapid. The plant rooting zone is rarely saturated during the growing season. The Valois soil series is commonly cleared and used for growing hay, pasture, corn or small grains. Woodlots on the soil include sugar maple, American beech, red oak, and similar hardwoods.

Volusia-Mardin-Lordstown soil series are distributed throughout glaciated areas of the Allegheny Plateau of New York and Pennsylvania. These soils tend to be found on concave to planar landscape in glaciated upland areas. The Volusia soils occupy long uniform slopes and are usually on lower valley sides of glaciated plateaus. The Volusia series tends to develop in till derived from siltstone, sandstone, and brittle shale or slate. These soils are poorly drained and have a low to high potential for surface runoff. These soils contain a Fragipan layer – a dense, cemented layer, with a high clay content - approximately 10 to 22 inches below the soil surface. Fragipan layers can obstruct root growth in soils and can inhibit air and water movement – leading to water saturation of layers above the Fragipan. Cleared areas on this soil are used for pasture or for growing hay, oats and corn for silage. Woodlots contain sugar maple, red maple, American beech, hemlock and associated species.

Ontario-Lima-Lansing-Honeoye-Conesus soil series are found in typically in the Ontario plain of western New York and in the Mohawk Valley. These soils formed in loamy till, strongly influenced by limestone and sandstone. They are typically found on undulating to rolling till plains and drumlins. The Ontario soil series are well-drained and surface runoff is low to very high. Most areas containing this soil have been cleared for farming. Crops typically grown in this soil include hay, corn, oats, wheat, and some vegetables and deciduous fruit. Red and white oaks, sugar maple, hickory, black cherry and associated species are commonly found in woodlots on this soil.

Nunda-Darien-Cazenovia soil series are found on the northern portion of the glaciated Allegheny Plateau and in the Mohawk Valley in New York. This soils series consists of well-drained soils that form in silty layers that overlie glacial till derived from clay rich shale. These soils are gently sloping to steep soils on glaciated uplands. The Nunda soil series is moderately well-drained and surface runoff ranges from low to high. Areas containing these soils are cleared and used to grow corn, oats, hay and pasture in support of dairy farming. Vegetation typically found on these soils are sugar maple, white ash, red oak, hickory, and other northern hardwoods.

Wayland-Palmyra-Howard-Chenango soil series are found in southern and western New York, northern Pennsylvannia and north-eastern Ohio. The Wayland soil series consists of very deep, poorly drained and very poorly drained, nearly level soils. These soils form in recent alluvium and are in low areas or depresses areas of flood plains. They are mainly in or bordering areas of Wisconsin glaciation. The apparent water table for these soils is at the surface or at an approximate depth of 0.5 ft. These soils experience occasional ponding and are subject to flooding. Native vegetation found on this soil is red maple, alder, willow and other trees tolerant of wet sites. Some areas have been cleared and drained to be used as pasture to grow crops.

Rhinbeck-Niagara-Hudson-Dunkrik-Collamer soil series are found in the Erie and Ontario Lake plains, and the Hudson, Mohawk, St. Lawrence Valleys, and the Allegheny Plateau of New York. These soils are somewhat poorly drained, and formed in clayey lacustrine (lake) sediments. Rhinebeck soil series are generally found on glacial lake plains and uplands mantled with lake sediments. These soils that can support hay, oats, corn, small grains, small fruits, and some vegetables. These soils can also be used as pasture. Trees that grow well with this soil include sugar maples, red oaks, black cherries, basswood, hickories, and hemlocks.

In addition to being evaluated in terms of agricultural viability, soil types have been assessed by the NRCS in terms of their suitability for various types of development. Soil characteristics that are considered in this assessment are depth to seasonal high water table, depth to bedrock, flood potential, and permeability. Depth to seasonal high water table affects both building foundation and septic system siting. A seasonal high water table can cause flooding in basements or cause a septic system to malfunction. A high water table can also affect the ability of a soil to support weighty structures.

## Permeability and soil types

As described above in Surficial Geology, all surficial characteristics, including soil types can have a major impact on determining the characteristics of flooding as well as the structural stability of the surrounding lands. Soil types also determine land use such as agricultural, urbanized, and conserved lands, which also have major effects on the volume of runoff and thus the contamination of local and regional aquafers, wetlands, and waterbodies.

Soils can be broken down into four Hydric Soil Categories (HSC) based on their permeability. The list below was originally retrieved from the Engineering Division of the Natural Resource Conservation Service, United States Department of Agriculture, Technical Release–55 and can be a useful description in determining the characteristics of local soils:

Group A is sand, loamy sand or sandy loam types of soils. It has low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission.

Group B is silt loam or loam. It has a moderate infiltration rate when thoroughly wetted and consists chiefly or moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures.

Group C soils are sandy clay loam. They have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure.

Group D soils are clay loam, silty clay loam, sandy clay, silty clay or clay. This HSG has the highest runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

As for the soil types that exist in the Town of Hector, the table below shows which soils belong to which Hydrologic Soil Groups:

| Soil Name | Hydrologic Soil Group |
|---|---|
| Nunda-Darien-Cazenovia | B |
| Ontario-Lima-Lansing-Honeoye-Conesus | B |
| Rhinbeck-Niagara-Hudson-Dunkrik-Collamer | C |
| Valois-Howard-Bath | B |
| Volusia-Mardin-Lordstown | C |
| Wayland-Palmyra-Howard-Chenango* | C/D |
| Wayland-Teel-Herkimer* | C/D |

*NOTE for Dual Category: The first letter applies to the drained condition/ and the second to the undrained condition.

The above can help determine not just the permeability of the soil, but also the characteristics of erosion due to precipitation. Volumes of silt and sand can determine the soil's erosion factor; higher volume of silt and sand means higher erosion, and thus higher possibilities of landslides. With this information, the soil types map on pages 50 and 51 can be useful when determining what areas are most suitable for development and or conservation.

## Maps and Data

Soils are mapped at various levels of detail, the two most common being general soil maps and soil surveys.

General soil maps show soil associations that share a characteristic landscape and pattern of soils. The soils within any one association may be somewhat similar, but they commonly differ in many important characteristics. These maps are suitable for planning large areas such as multi-county regions and large drainage basins. The data used to create this map comes from the U.S. Department of Agriculture's Natural Resources Conservation Service's Soils Division's U.S. General Soil Map, downloaded in 2015. A summary of soil types in Town of Hector is included in Table 9.

*Table 9: Soil Types in Town of Hector*

| Soil Type | Percent of Land in Municipality |
|---|---|
| Nunda-Darien-Cazenovia | 0.007 |
| Ontario-Lima-Lansing-Honeoye-Conesus | 20.5 |
| Rhinebeck-Niagara-Hudson-Dunkrik-Collamer | 0.124 |
| Valois-Howard-Bath | 1.03 |
| Volusia-Mardin-Lordstown | 67.07 |
| Wayland-Palmyra-Howard-Chenango | 8.23 |
| Wayland-Teel-Herkimer | 3.01 |

Soil survey maps are more detailed. The area of soil delineated on these maps can be as small as one or two acres. These maps can be used for planning at the county or municipal level. This soil data is available via the U.S. Department of Agriculture's Natural Resources Conservation Service's Soils Division.

Also included are a map of drainage based on soil type page 51, and a map of hydric soils (PAGE##). A map of Prime Agricultural Land can be found in the Town of Hector Comprehensive Plan. The soil drainage map is derived from the U.S. General Soil Map. The data for hydric soils were provided by the SOURCE

Soil drainage refers to a soil's ability to retain water and is influenced by soil texture and organic content. The soil drainage map classifies Nunda-Darien-Cazenovia, Ontario-Lima-Lansing-Honeoye-Conesus, and Valois-Howard-Bath as moderate to well-drained soils; Rhinebeck-Niagara-Hudson-Dunkirk-Collamer and Volusia-Mardin-Lordstown as somewhat poorly drained to poorly drained soils; Wayland-Palmyra-Howard-Chenango and Wayland-Teel-Herkimer as poorly drained to very poorly drained soils that experience frequent surface ponding.

According to the USDA, prime agricultural land "is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses." This land is determined based on soil quality, the length of the growing season, and moisture supply. In the Town of Hector, prime agricultural land generally coincides with the Ontario-Lima-Lansing-Honeoye-Conesus soil series and parts of the Volusia-Mardin-Lordstown soil series

Lastly, hydric soils are soils that lack oxygen for an extended period of time due to saturation or flooding, such as soils in wetlands. Hydric soils can be naturally or artificially produced.

## Resources and References


Cornell Cooperative Extension, Cornell Small Farms Program, Soil Drainage, http://smallfarms.cornell.edu/plan-your-farm/accessing-evaluating-land/evaluating-land-tutorial/know-your-soils/soil-drainage/

U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Division

Hydric Soils – Introduction, https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053961

Official Soil Series Descriptions (OSDs), https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/data/?cid=nrcs142p2_053587

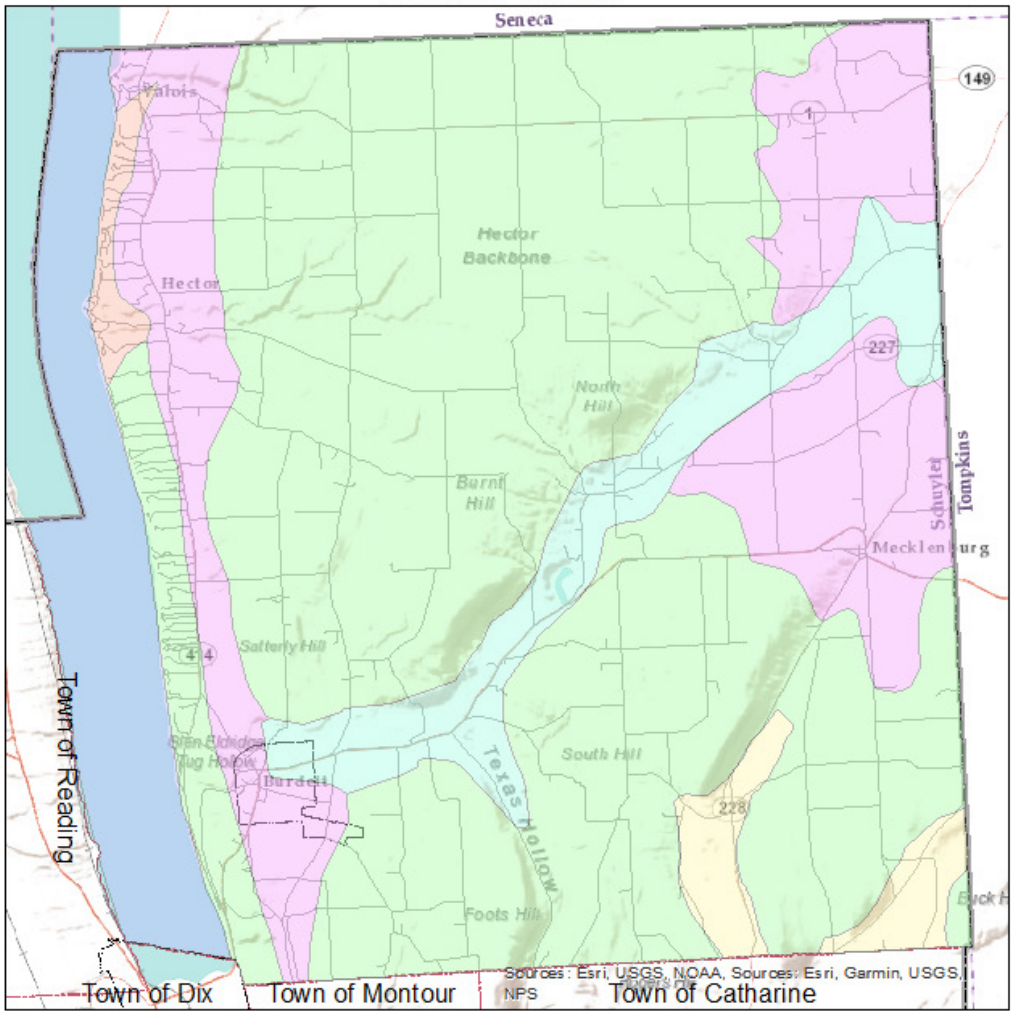
U.S. General Soils Map, https://gdg.sc.egov.usda.gov/GDGOrder.aspx?order=QuickState

U.S. Department of Agriculture, Soil Conservation Service, & Cornell University Agricultural Experiment Station. (1965). Soil Survey: Tompkins County, New York (1961 No. 25). Washington, D.C.: U.S. Government Printing Office.

US Department of Agriculture National Engineering Handbook Par 630 Chapter 7: https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba

USDA Web Soil Survey: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

# Hector Soils

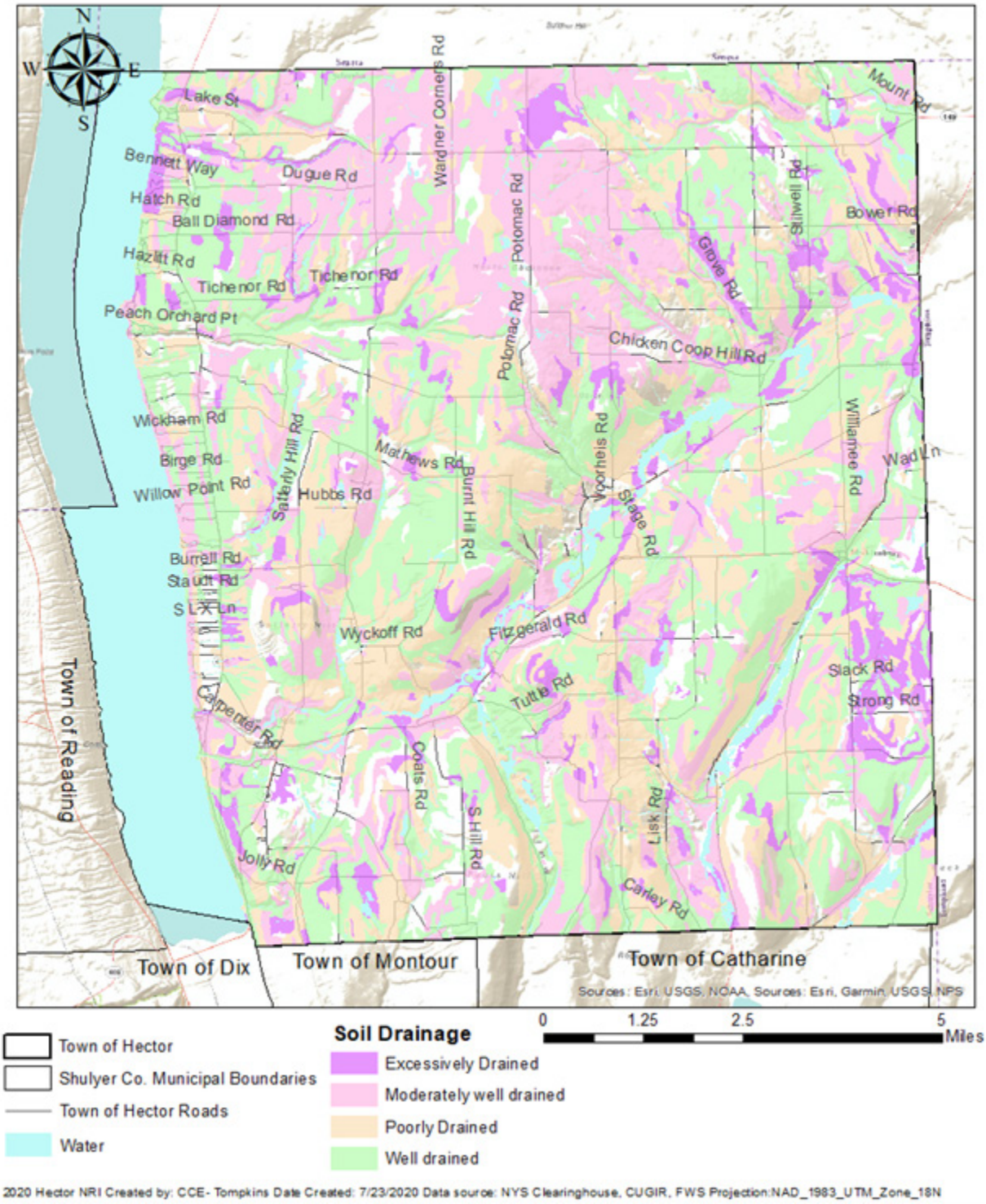



**Legend**

- Schuyler County
- Town Borders
- Village Borders
- Hector Streets
- Wayland-Teel-Herkimer
- Valois-Howard-Bath
- Volusia-Mardin-Lordstown
- Ontario-Lima-Lansing-Honeoye-Conesus
- Nunda-Darien-Cazenovia
- Wayland-Palmyra-Howard-Chenango
- Rhinebeck-Niagara-Hudson-Dunkirk-Collamer
- Water

2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 3/10/2021
Date Source: NYS Clearing house, CUGIR, USDA Projection: NAD_1983_UTM_Zone_18N

# Town of Hector Soil Drainage




2020 Hector NRI Created by: CCE- Tompkins Date Created: 7/23/2020 Data source: NYS Clearinghouse, CUGIR, FWS Projection:NAD_1983_UTM_Zone_18N

****INSERT HYDRIC SOILS MAP****

# LAND USE AND PROTECTED LANDS

# Land Use and Land Cover

## What Are Land Use and Land Cover?

Land use refers to how humans use the landscape and includes categories such as residential development and agriculture. Land cover refers to the physical cover of the land, whether natural or manmade. These categories range from forests and wetlands to impervious surfaces and cleared fields. In conjunction to the Land Use and Land Cover maps here, the Town of Hector's Comprehensive Plan also contains Land Use and Land Cover maps as well as additional information on land use and zoning.

## Why Are Land Use and Land Cover Important?

The current land use and land cover information enables communities to identify existing land use patterns, and, consequently, make better informed decisions concerning proposed land uses, development suitability analyses, and comprehensive planning. These data provide a static picture of development patterns and may be used as a benchmark for future land use and land cover analyses. In addition to future development patterns, this data may also be used for historical analyses when old data becomes available in Geographic Information System (GIS) format.

As previously discussed, due to increasing extreme weather patterns, it is important for a community to carefully plan development and future land use to prevent any unnecessary disturbance to the area. It is also helpful to consider how the land cover will change with the increasing temperatures and how, as a result, land use and development can be affected. According to the USDA, native tree species such as the Sugar Maple are projected to migrate north between now and 2100. In addition to changing species, the density of forests is expected to thin-out over time, causing less ground stability and thus increased potential for landslides. Between 2000 and 2050, the northeast is expected to have an overall decline in forest and cropland by 7 and 6% respectively. While it is not possible to predict exactly how the land cover will change over time, it is possible to forecast change by referring to and cross-comparing current with historical land cover maps.

Because land use and land cover can directly be controlled by government, updating land use and zoning laws according to current projections can have a drastic positive impact on both the well-being of the community and environment. Historical Land cover data can be retrieved from the USDA website (https://datagateway.nrcs.usda.gov/). The maps below are also useful as they depict the present land uses. As developed and agricultural land uses increase, it is vital to fully understand current land cover characteristics and agricultural lands and identify the changing trends of the municipality.

By comparing current land covers and FEMA flood maps, it is possible to see how changing land cover has influenced the behavior of flooding. Also, by overlaying soil types with land cover, it is possible to determine the parcels that should be protected versus those that can potentially be developed without causing disturbance to current wildlife corridors or floodplains.

## Land Use and Land Cover in the Town of Hector

Land use and land cover data have been mapped into a single GIS coverage, Land Use and Land Cover (LULC), which form a basis for comprehensive study of the land surface of the Town of Hector. Individual classes are grouped into main categories. In the Town of Hector, the majority of the land is designated as deciduous forest or pasture. The data was gathered from the United States Department of Agriculture and is from 2011.

The land in the Town of Hector is classified into 15 different land use categories (Table 10). Excluding water, land use is predominantly classified as deciduous forest (30.51%) and land classified as pasture/hay (26.69%). Cultivated crops (13.98%) and mixed forest (10.88%) are the next abundant categories of land. The classification of Hector's land into the two dominant categories of forests and open land show the Town's willingness to be known as a farming community, and, also, as a Town that protects their natural resources.

## Agricultural Districts

Agricultural Districts provide the framework to limit unreasonable local regulation on farm practices, to limit public agencies' ability to acquire farmland by eminent domain and to limit the use of public funds to construct facilities that encourage development of farmland. Also, benefit assessments, special ad valorem levies, or other rates and fees for financing of improvements such as water, sewer or non-farm drainage may not be imposed upon land used in agricultural production and within an New York State Certified Agricultural District. The Town of Hector is listed as an agricultural district.

A complete map, and write up detailing Hector's agricultural district can be found in the Town of Hector's Comprehensive Plan. To summarize, the Town consists of 3 main agricultural components: farms, forestry, and vineyards. Large-scale farms are becoming scarcer and an increase in multiple small-scale farms is occurring. Development poses the most significant challenge to agricultural areas. A complete economic breakdown of the agricultural industry in Hector can be found in the Comprehensive Plan.

## Maps and Data

The map on page 57 shows land use/land cover in Hector. Data for this map was provided by the Cornell University Geospatial Information Repository and was last updated in 2019.

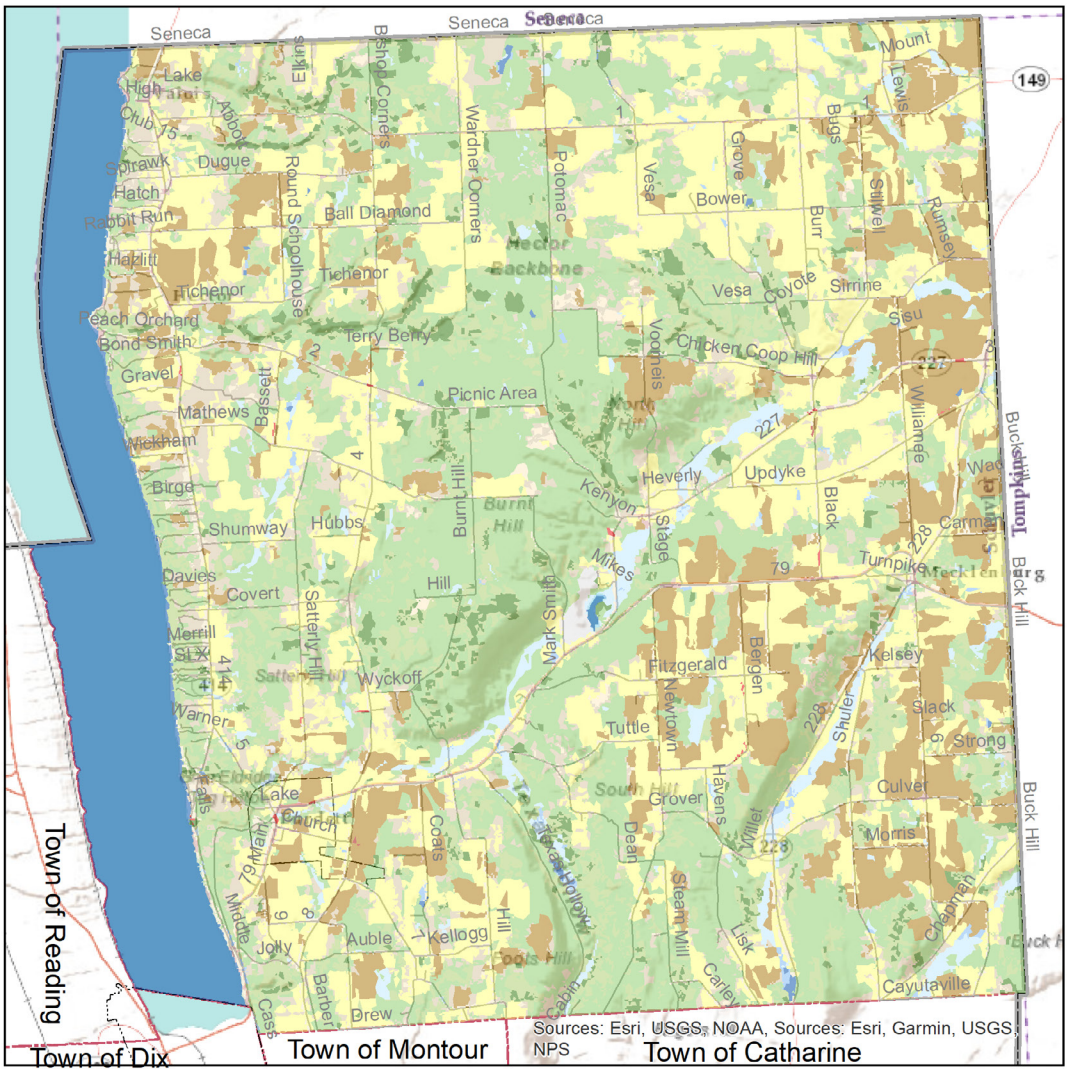
## Resources and References

Cornell Cooperative Extension, ulster.cce.cornell.edu/agriculture/farmland-access-protection/agricultural-districts
Cornell University Geospatial Information Repository (CUGIR), https://cugir.library.cornell.edu/
Cornell University Institute for Resource Information Systems (IRIS), http://iris.css.cornell.edu/index.html
US Department of Agriculture, https://www.fs.usda.gov/ccrc/topics/species-distribution-models
Town of Hector Comprehensive Plan, hectorny.us/comprehensive_plan

*Table 10: Land Use and Land Cover by Category*

| Category | Percentage of Total Area Including Water Bodies | Percentage of Total Land Area | Examples of Individual Classes |
|---|---|---|---|
| Open Water | 9.14 | NA | Natural lakes, ponds |
| Developed, Open Space | 2.87 | 3.16 | Large-lot single-family housing units, parks, planted vegetation for recreational or aesthetic purposes, or erosion cover |
| Developed, Low Intensity | 0.29 | 0.32 | Intensity = Density |
| Developed, Medium Intensity | 0.04 | 0.04 | Intensity = Density |
| Developed, High Intensity | 0.01 | 0.01 | Intensity = Density |
| Barren Land (Rock/ Sand/Clay) | 0.16 | 0.17 | Vegetation has been cleared but no developed, exposed bedrock |
| Deciduous Forest | 27.72 | 30.51 | Trees with falling leaves in the Fall |
| Evergreen Forest | 2.67 | 2.94 | Trees maintain their leaves all year and are greater than 5 meters tall |
| Mixed Forest | 9.88 | 10.88 | Mixture of deciduous or evergreen species covering more than 20% of land ara |
| Shrub/Scrub | 6.96 | 7.66 | Woody vegetation less than 6 m (20 feet) tall |
| Grassland/ Herbaceous | 0.50 | 0.55 | Areas dominated with 80% or greater herbaceous vegetation |
| Pasture/Hay | 24.25 | 26.69 | Areas of grass or legume planted for livestock grazing or seed/hay production |
| Cultivated Crops | 12.70 | 13.98 | Annual crop production |
| Woody Wetlands | 2.51 | 2.76 | Forest or shrubs accounts for more than 20% of vegetative cover |
| Emergent Herbaceous Wetlands | 0.30 | 0.33 | Perennial herbaceous vegetation accounting for greater than 80% of vegetative cover |

# Hector Land Use and Land Cover




## Legend

Schuyler County | Town Borders | Village Borders | Hector Streets

### Land Use & Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land (Rock/Sand/Clay)
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herabceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/22/2021
Date Source: NYS Clearing house, CUGIR, FWS Projection: NAD_1983_UTM_Zone_18N

# Protected Open Space

## What Is Protected Open Space?

Open space can be understood as land that is undeveloped and publicly accessible. Typically, open space can be used for recreation, as well as work to increase the overall beauty of the community. In the Town of Hector, Texas Hollow State Park, located in the southern half of Hector, is protected under the NYS Department of Environmental Conservation. This area spans for 937 acres and is open year round. In Schuyler County, some open space is protected by public and private organizations, namely the Finger Lakes National Forest – New York State's only national forest. Reasons for protecting land range from protection of species and natural resources to preserving land for research. New York State also protects land as State Forests, Parks, and Wildlife Management Areas.

## New York State Parks and Forests in Hector

New York State owns public lands throughout the state. Because they are owned by the State, all citizens have access to the lands. These lands include state forests, state parks, and wildlife management areas. State forests are managed by the DEC and include reforestation areas, multiple-use areas, unique areas, and state nature and historic preserves. State forests can be used for recreational purposes or for managing ecosystem health and protecting rare, threatened, and endangered species. State parks serve similar purposes but are not limited to forest ecosystems.

Parks are managed by the New York State Office of Parks, Recreation, and Historic Preservation, primarily for recreation and tourism. These lands often contain outstanding natural or historic resources. Permitted uses, such as hunting, fishing, biking, camping, ATV, and snowmobile and horseback riding, vary from park to park.

In Hector, there is one state forest, and one National forest:

Texas Hollow State Forest is a 937-acre space that includes hiking, hunting, camping, fishing and snowmobiling. In terms of wildlife, Texas Hollow is home to black bears, trout, wild turkey and several bird species, including the endangered Henslow's sparrows and black-throated blue warblers. It is also the host of severe natural habitat areas, including grasslands, wetlands and hills. Texas Hollow State Forest protects about 1.4 % of land in the Town of Hector.

Finger Lakes National Forest is New York State's only public, federally managed national forest. The Finger Lakes National Forest is 16,212 acres and lies on the backbone-between Seneca and Cayuga Lakes. The Finger Lakes National Forest comprises about 25% of the land in Hector. The forest contains over 30 miles of interconnecting trails pass through gorges, ravines, pastures, and woodlands. The national forest includes opportunities to hike, cross-country ski and snowshoe, fish, hunt, ride horses, bike, snowmobile, and camping. The national forest is home plenty of wildlife, such as grassland birds, shrubland birds, forest birds, white-tailed deer, wood ducks, eastern wild turkey, beavers, bobcats, red foxes and more.

## What Are the Regional Land Trust Preserves and Conservation Easements?

The Finger Lakes Land Trust Preserves and Conservation Easements are tracts of land protected by a private, non-profit organization, the Finger Lakes Land Trust (FLLT). Each of the FLLT's preserves and conservation easements is monitored by volunteers. Preserves are areas of significant natural resources that are owned outright by the FLLT, while conservation easements are voluntary agreements that allow a landowner to limit the type or amount of development on their property while retaining private ownership of the land. The easement is signed by the landowner, who is the easement donor, and the FLLT, who is the party receiving the easement. Both preserves and easements are managed by the FLLT to help preserve the natural integrity of the Finger Lakes Region, and, in the case of its nature preserves, for education, research, and quiet forms of recreation, such as hiking and bird watching.

## Land Trust Preserves and Conservation Easements in Hector

To date, the Finger Lakes Land Trust has acquired 6 parcels of land near the national forest. This land is eventually sold to the U.S. Forest Service to help protect and expand the forest. In June, 2020, the FLLT completed two conservation easement agreements, protected 518 acres, off County Route 8 in the towns of Hector and Montour, Schuyler County.

## Why Are These Preserves, Conservation Easements, Natural Areas, and State Lands Important?

Nature preserves, conservation easements, natural areas, and state lands protect important landscapes from development and uses that may damage their natural features. These lands protect key plant and animal species and their habitats, protect watersheds and the quality of water in the area, and provide recreational opportunities to everyone. Most importantly, open space can act as a retention and relief zone for excess water during flood events. They also add economic value to their surrounding areas by providing areas for recreation, enhancing tourism and increasing land values. In addition, they provide important educational opportunities for teaching about botany, natural history, entomology and cultural history. Although municipal governments do not have direct control of these lands, they may be able to use them in their planning efforts to create greenways, biological corridors, and recreational trails.

New York State WMAs and Forests are also utilized for logging. Logging in State Forests are monitored by the DEC to ensure that trees of varying sizes and ages are left for future generations. The focus of logging activities in WMAs is to manage habitat and provide a diversity of vegetation types and wildlife species.

## Maps and Data

The map on page 61 shows the locations of Texas Hollow State Forest, and the Finger Lakes National Forest. This data is available from U.S. Forest Service and NYS GIS Clearinghouse.

More information about the protected open space the Town of Hector, can be found in the town's comprehensive plan.

## Resources and References

Finger Lakes Land Trust

Find a Preserve, http://www.fllt.org/learntheland/preserves/

About the Finger Lakes Land Trust, http://www.fllt.org/about/

Finger Lakes National Forest https://www.fs.usda.gov/main/gmfl/home

https://www.dec.ny.gov/outdoor/66666.html

The Nature Conservancy, Places and Preserves, Central & Western New York, https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/newyork/places-preserves/central-western-new-york-preserves.xml

New York State Department of Environmental Conservation

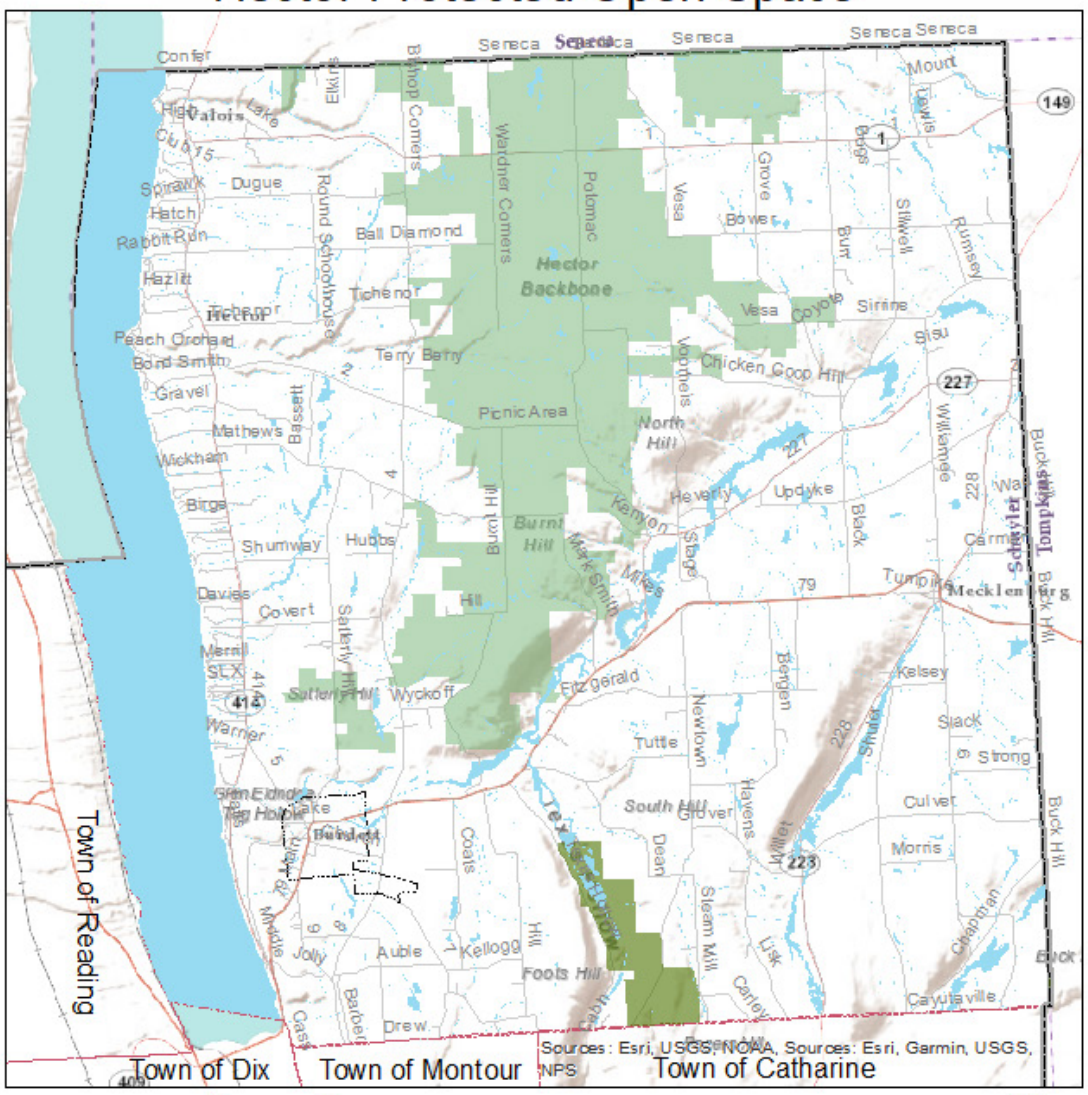
State Forests, http://www.dec.ny.gov/lands/40672.html

Wildlife Management Areas, http://www.dec.ny.gov/outdoor/7768.html

New York State Department of Parks, Recreation and Historic Preservation, https://parks.ny.gov/

Town of Hector Comprehensive Plan https://www.hectorny.us/sites/g/files/vyhlif696/f/uploads/hector_comprehensive_plan.pdf#:~:text=WHAT%20IS%20THE%20TOWN%20OF,municipalities%20and%20New%20York%20State.

# Hector Protected Open Space




**Legend**

- Schuyler County
- Town Borders
- Village Borders
- Hector Streets
- National Forest
- State Forest
- Wetlands

0 0.75 1.5 3 4.5 6 Miles

N W E S

2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/25/2021
Date Source: NYS Clearing House, CUGIR, ArcGIS Projection: NAD_1983_UTM_Zone_18N

# Cultural Heritage Sites

## What is a Cultural Heritage Site?

Cultural heritage sites often reflect the local history of an area. They provide insight about an area's natural resources and the resulting economic activities and way of life. Historic districts and individual sites such mills, farms, grazing areas, infrastructure and many more, are important connections to an area's history, providing a community with an identity. Some of these historic districts and features are still central to a community's economy today, but, sometimes, with a new role.

## Cultural Heritage Sites in Hector

To catalogue and honor the history of Hector, the Town of Hector Sustainability Committee wanted to create Natural Resource Inventory. This started out as Committee members and volunteers worked with the Town Historian to identify and locate areas of cultural significance to Hector. Eventually, their work turned into this Natural Resource Inventory. A focus of the Sustainability Committee was to detail all the public spaces, historic landmarks, districts, and sites. The Committee also sought to provide the evolving economic landscape of Hector, and detail its thriving tourist industry and bustling wine, brewery, and distillery districts, that have become centerpiece of the Town's economy.

The Town of Hector has documented XXXX areas deemed worthy of cultural significance. In Appendix XX, a complete list and description of cultural heritage sites can be found. While this list may not contain every site, it provides a foundation to build from and can easily be updated. Maps depicting the location of cultural heritage sites can be found on page XXXX to XXXX. Maps that are included are: a map of wineries, breweries, and distilleries and a map of historic districts, sites, and public spaces. Specific details about the significance of these sites can be found in Appendix I.

## Why are Scenic Resources Important?

Cultural heritage sites contribute to the day-to-day quality of life of Hector residents, as well as attract visitors to the area. They are a large part of what makes this region such a beautiful and desirable place to live, work, and visit. Documenting where these resources are makes it easier to protect and manage them. Cultural heritage sites views can be protected through measures such as zoning ordinances.

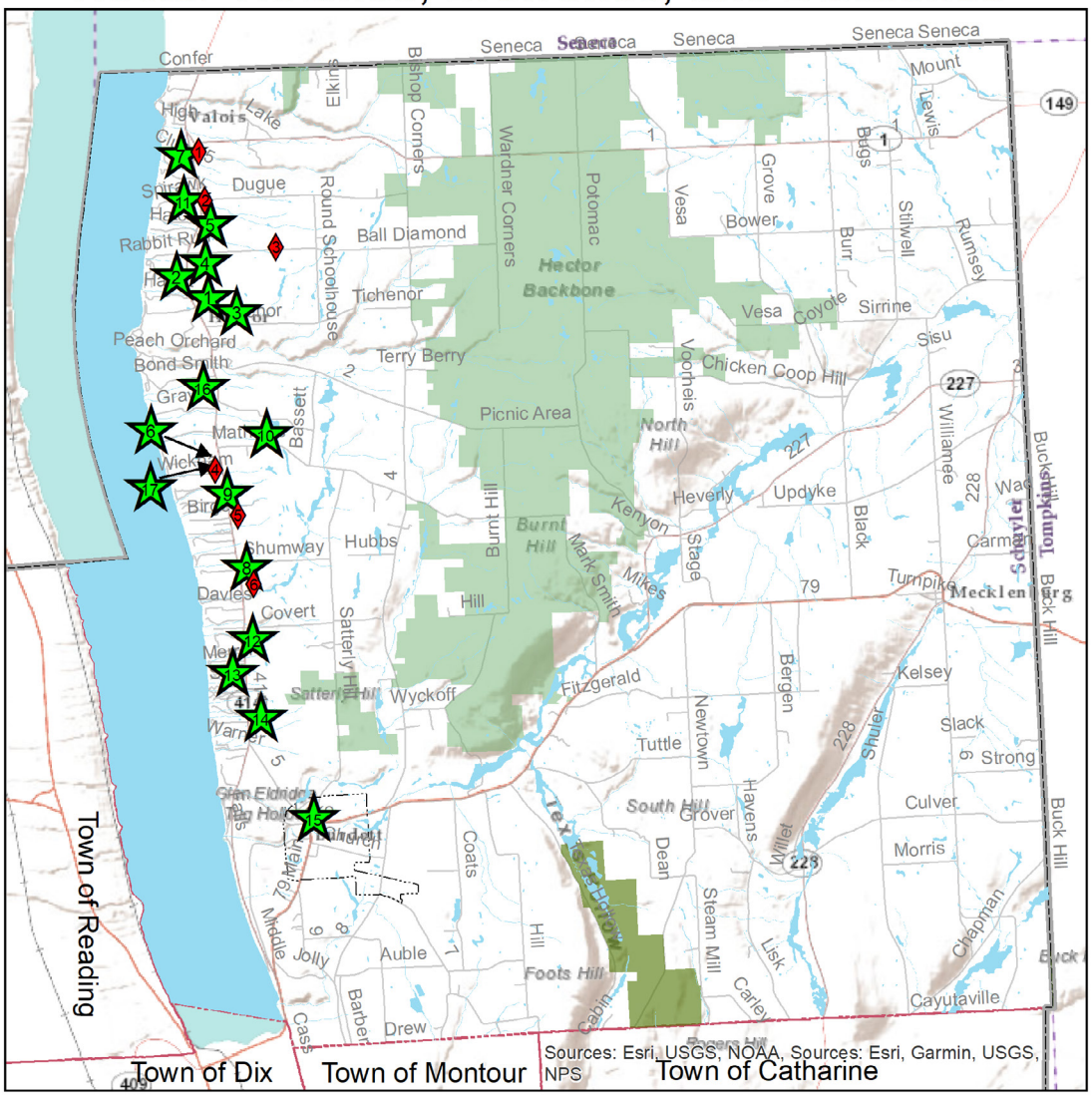
## Maps and Data

The maps on pages 63-64 show the locations of cultural heritage sites in the Town of Hector. Cultural heritage sites are separated into two maps. The map on page 66 shows the locations of wineries, breweries, and distilleries within the Town's jurisdiction. The map on page 67 shows the locations of historically significant sites. Appendix A contains pictures and descriptions of each location identified on the following maps. Site information and data was provided by the Town of Hector Sustainability Committee.

## Resources and References

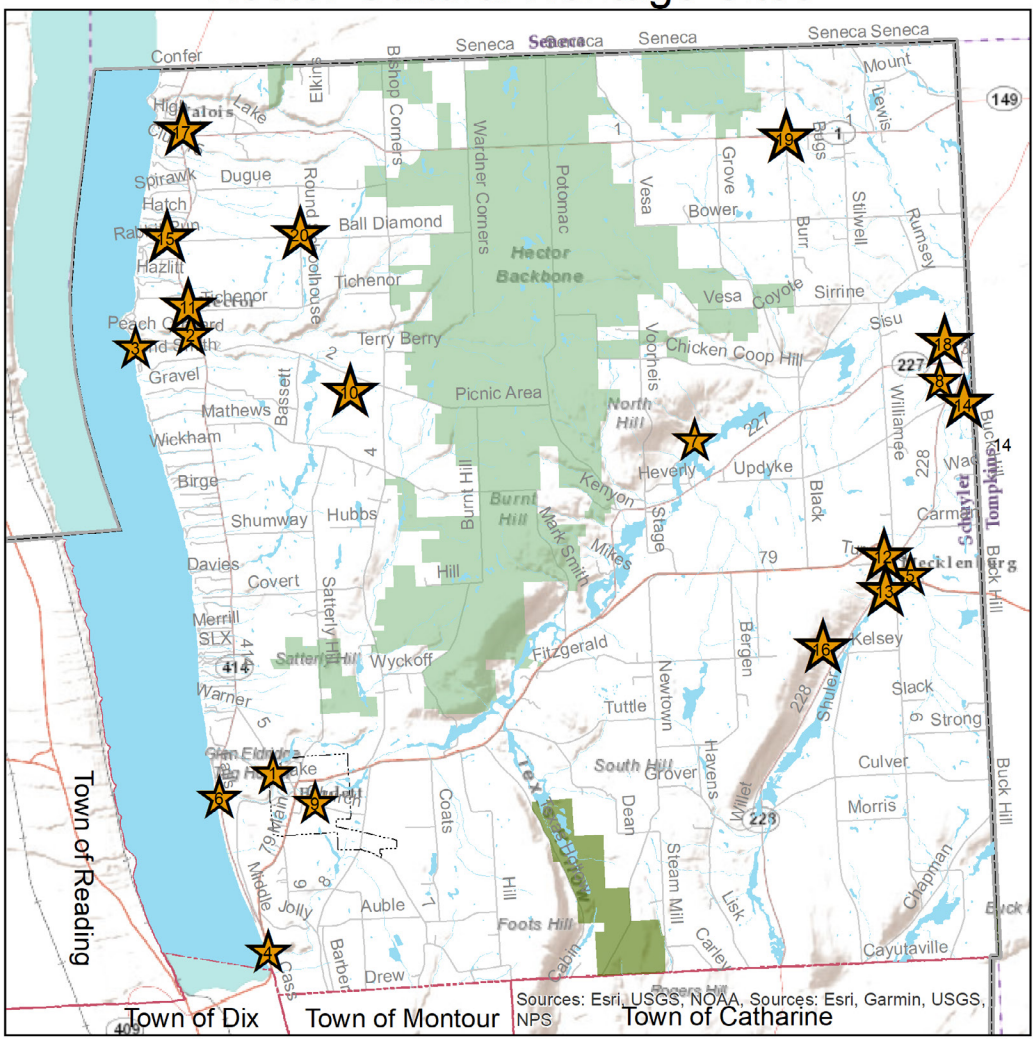
Town of Hector Sustainability Committe
Town of Hector Comprehensive Plan

# Hector Wineries, Breweries, and Distilleries




2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 4/2/2021
Date Source: NYS Clearing House, CUGIR, ArcGIS Projection: NAD_1983_UTM_Zone_18N
Map does necessarily reflect all wineries, vineyards, breweries, and distilleries in Hector.
Symbols represent approximate locations. GPS coordinates and addresses can be found in the appendix.

# Hector Cultural Heritage Sites




2021 Hector NRI Created by: CCE - Tompkins and Schuyler County Date Created: 1/25/2021
Date Source: NYS Clearing House, CUGIR, ArcGIS Projection: NAD_1983_UTM_Zone_18N

# IMPLEMENTATION TOOLS

Once parcels have been identified, the following tools are meant to help municipal officials implement actions that they believe are necessary to protect the community and environment to prepare for the effects of climate change. While the primary goal of this document is meant to help communities identify potential areas of interest within municipal boundaries, this section is meant to provide supplemental assistance to guide communities towards a more sustainable future.
As this NRI is intended and designed for a specific municipality, it is possible to consider parcels on an individual basis. While there is no specific method to identifying specific parcels, having an overview of the general process can of land evaluation can be useful before proceeding.
The main activities in a land evaluation are as follows:

1. Initial consultations, concerned with the objectives of the evaluation, and the data and assumptions on which it is to be based
2. Description of the kinds of land use to be considered, and establishment of their requirements
3. Description of land mapping units, and derivation of land qualities
4. Comparison of kinds of land use with the types of land present
5. Economic and social analysis
6. Land suitability classification (qualitative or quantitative)
7. Presentation of the results of the evaluation.

List from A Framework for Land Evaluation, 4.2
Assuming that the economic and social analysis is conducted separately, there are many ways to conduct a land suitability analysis. This can be done using the evaluation instruction manual provided by the Food and Agricultural Organization of the United Nations: http://www.fao.org/docrep/x5310e/x5310e00.htm#Contents

Once parcels have been evaluated and selected, the following methods could be used to preserve or protect the parcels.

- Transfer or Purchase of Development Rights

When development rights are transferred, the development potential of a site becomes its own good that can be bought and sold by the owner and sold to an individual land owner or developer who wishes to build on another property at higher density that the zoning allows.
A transfer of development rights for multiple parcels can also be coupled with cluster zoning ordinance. This would allow for property owners to earn back some of the value of their land that they will forego by not developing it, and will accommodate residential or commercial growth without sprawling into properties with ecological or historic significance.
Source: https://www.dos.ny.gov/lg/publications/Transfer_of_Development_Rights.pdf

o Advantages:
- Properties remain on tax rolls
- The program does not create a financial shortfall for the landowner

- No direct expenditure of municipal funds to purchase property.

o Disadvantages:

- A transfer of development rights program necessitates ongoing administration and careful oversight

• Conservation Easement

Conservation easements are used to protect wildlife, ecosystems, natural habitats, wetlands, and other valuable ecological resources while maintaining a property's private ownership. As a result, the properties do not have to be purchased outright by a public organization in order to preserve the parcel.

Easements would be permanent, legally binding, and would prevent of strictly regulate future development that would occur on the property. This assessment would thus be the compensation to the landowner who would have the monetary loss by conserving his/ her land. If the two parties (land owner and governmental agency) agree upon a price for the easement, the governmental agency would then purchase these rights which would subsequently enforce the agreement made in the easement.

Source: http://www.dec.ny.gov/lands/41156.html

o Advantages:

- Straight forward
- Future modifications that enhance quality or public use do not require the consent of a private owner.
- Ultimate ownership control of property

o Disadvantages:

- Local government must take direct expenditure
- Property is removed from tax rolls
- Acquisition is likely to be subject to public debate

• Private Acquisition by Non-Profit Conservation Groups

Non-profit conservation groups, such as land trusts, can be a vital resource for preserving scenic, historic, and ecological resources. In New York State, 90 land trusts are at work preserving land throughout the state, in both rural and urban areas. Mission based organizations often have extensive experience writing grants, and if their sole mission is acquisition and maintenance, they may be able to expedite the acquisition process through sharp negotiation skills and legal expertise. It will be important for the municipality to be vigilant in vetting the mission of each organization to ensure that the ecological resource will be treated in a way to enhance its quality.

Less than fee-simple acquisition is a more common technique used to protect natural resources. The acquisition of conservation easements (through purchase or donation from a willing seller) is used by land trusts and municipalities to restrict the type and amount of development permitted on a particular parcel of land. The Purchase of Development Rights on agricultural lands is an example of a conservation easement program.

o Advantages:

- No direct acquisition expense for the municipality.
- No direct maintenance expense for the municipality.

o Disadvantages:

- Private Ownership
- Property removed from tax rolls.

- Zoning:

Zoning is another useful tool that can be directly used at a municipal level to control development. While much of Upstate New York is underdeveloped, that is likely to change with the increasing population and changing climate. Therefore, utilizing and updating municipal zoning will not only increase resiliency but will lead to more sustainable growth within the region.

o Advantages:

Property owners maintain the value of their property
Properties maintain their historic and ecological significance

- Disadvantages:

Some developers may be forgo development due to stringent review requirements

- Performance Zoning:

Performance zoning is an alternate technique to conventional zoning. While conventional zoning has static standards for designated areas, performance zoning regulates the design and location of development based on land's suitability and geographical orientation. Once the criteria for performance is developed, a municipality can use this as a tool to guide development and protect important natural resources. At the same time, land owners and developers would have greater flexibility to meet their zoning requirements.

- Advantages
  - Utilizes existing characteristics of property and conserves energy use.
  - Can be customized based on each property.
  - Can be controlled by municipality to protect specific lands.
  - Encourages mixed use development and in general more variety in use
  - Does not need to be consistently modified
- Districts
  - Eliminates districts and a sense of uniformity which can be difficult for a community to handle
  - Could give developer too much authority and power which might create conflicting situations within the community
  - Could potentially be a complex system to manage, especially for municipalities with limited resources and staff.
- Impact Fee

An impact fee is imposed by the municipal government. The fee is for developers who want to build or modify the local land use and thus permanently change the existing landscape. While this can be extremely useful in urban settings, this could also be used in rural communities to protect natural resources. The fees received from the developer could be then used to fix or mitigate any damage caused by the development.

- Advantages
  - No cost to municipalities
  - Can be controlled to protect certain areas
- Disadvantages
  - Discourages development and investment

Sources:
Food and Agricultural Organization of the United Nations: http://www.fao.org/docrep/x5310e/x5310e05.htm#4.3%20kinds%20of%20land%20use%20and%20their%20requirements%20and%20limitations
New York State Division of Local governmental Services: https://www.dos.ny.gov/lg/publications/Transfer_of_Development_Rights.pdf
New York State Department of Environmental Conservation: http://www.dec.ny.gov/lands/41156.html

# APPENDIX

# Section I – Wineries, Breweries, and Distilleries

The Town of Hector has a budding tourist industry that is focused around the east Seneca Wine trail. Along this trail, primarily centered on Rte. 414, are approximately 15 wineries and 6 breweries/distilleries. A complete list of the wineries, breweries, and distilleries are listed below along with their address. The numbers correspond to the numbers on the maps on page XX and XX of the NRI.

**Wineries:**

1. Hector Wine Company - 5610 NY-414, Hector, NY 14841 - (607) 387-1045 - www.hectorwinecompany.com
2. Leidenfrost Vineyards - 5677 NY-414, Hector, NY 14841 - (607) 546-2800 - www.leidenfrostwine.com
3. Red Newt Cellars Winery and Bistro - 3675 Tichenor Rd, Hector, NY 14841 - (607) 546-4100 - www.rednewt.com
4. Hazlitt 1852 Vineyards - 5712 NY-414, Hector, NY 14841 - (607) 546-9463 – www.hazlitt1852.com
5. Bloomer Creek Vineyard - 5301 NY-414, Hector, NY 14841 - 5301 NY-414, Hector, NY 14841 – www.bloomercreek.com
6. Rasta Ranch Vineyards - 5882 NY-414, Hector, NY 14841 - (607) 546-2974 – www.rastaranchvineyards.com
7. Chateau LaFayette Reneau - 5081 NY-414, Hector, NY 14841 - (607) 546-2062 – www.clrwine.com
8. Penquin Bay Winery - 6075 NY-414, Hector, NY 14841 - (607) 546-5115 – www.penguinbaywinery.com
9. Damiani Wine Cellars - 4704 NY-414, Burdett, NY 14818 - (607) 546-5557 – www.damianiwinecellars.com
10. Atwater Estate Vineyards, LLC - 5055 NY-414, Burdett, NY 14818 - (607) 546-8463 – www.atwatervineyards.com
11. J.R. Dill Winery - 4922 NY-414, Burdett, NY 14818 - (607) 546-5757 – www.jrdillwinery.com
12. Forge Cellars - 3775 Mathews Rd, Burdett, NY 14818 - (607) 622-8020 – www.forgecellars.com
13. Flatt Rock Wine Cellars - 5835 Spirawk Rd, Valois, NY 14841 - (716) 622-2820 www.flattrockcellars.com
14. Silver Springs - 4408 NY-414, Burdett, NY 14818 - (607) 351-8019 – www.silverspringswinery.com
15. Catharine Valley Winery - 4201 NY-414, Burdett, NY 14818 - (607) 546-5300 – www.catharinevalley.com
16. Ryan William Vineyard - 4156 NY-414, Burdett, NY 14818 - (607) 882-9098 – www.thetastingbarn.com
17. Barry Family Cellars - 3821 Main St, Burdett, NY 14818 - (607) 569-2352 – www.barryfamilywines.com

**Breweries and Distilleries**

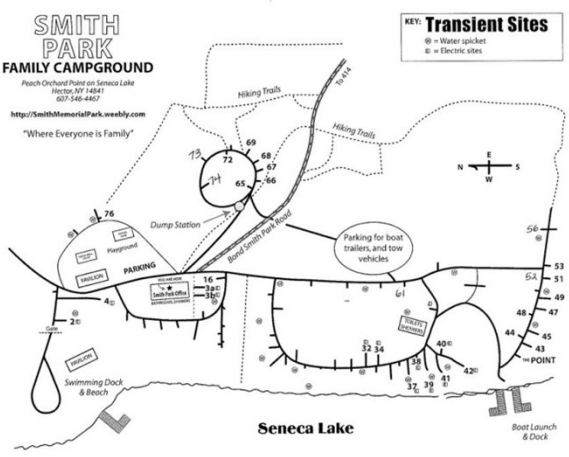
1. Lucky Hare Brewing Company - 6085 Beckhorn Rd, Hector, NY 14841 - (607) 546-2036 – luckyharebrewing.com
2. Scale House Brewery - 5930 NY-414, Hector, NY 14841 - (607) 546-2030 – scalehousebrews.com
3. Pantomime Mixtures - 3839 Ball Diamond Rd, Hector, NY 14841 - pantomimemixtures.com
4. Two Goats Brewing - 5027 NY-414, Burdett, NY 14818 – twogoatsbrewing.com
5. Grist Iron Brewing Company - 4880 NY-414, Burdett, NY 14818 - (607) 882-2739 – gristironbrewing.com
6. Finger Lakes Distilling - 4676 NY-414, Burdett, NY 14818 - (607) 546-5510 – fingerlakesdistilling.com

## Section II – Historically Significant Sites

1. Willow Grove Mills, Burdett - Willow Grove Mills, one of the largest in the county, was built in 1825. Some of the stone works can still be seen. Adjoins Village Park in Burdett where Main Street extension crosses Logan Creek. Follow creek towards Seneca Lake for about 100yrs.

2. Sullivan Campaign Monument - Sullivan's military campaign in 1779 destroyed all the Iroquois villages in the area, effectively breaking the alliance between the British and the Iroquois tribes, during the Revolutionary War. The Monument is located at the corner of SR 414 and Peach Orchard Rd. In the surrounding area are many Historical Markers showing were Sullivan's troops were camped while they were in the area.

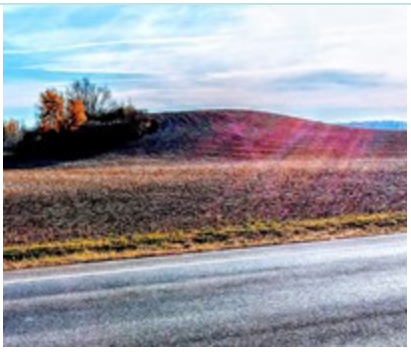

3. Smith Memorial Park – Located at 5303 Park Avenue, Hector NY 14841. Smith Memorial Park offers visitors 92 acres of camping, hiking, swimming, picnicking, and boating on the shoreline of Seneca Lake. Originally a fruit farm, in 1963, the land's owner, Leon Smith, turned down a generous offer to sell his orchard to a developer, and instead, sold it to the Town of Hector at a significantly reduced price. It was Smith's desire the land be used "for the enjoyment of many."




4. Excelsior Glen – Excelsior Glen is located on Route 79, 0.5 miles north of Watkins Glen. Trail access to the Glen is by voluntary agreement with the owners.

5. Fish Home in Mecklenburg – The Honorable Henry Fish Homestead built originally as a Masonic Lodge (1815-1820) and acquired by Dr. Fish in the 1830's. He was the first assemble man from Schuyler County in 1858 and chairman of the first Board of Supervisors in 1854 when the Town of Hector was formed. It is located in Mecklenburg on Route 79, across from the Post Office.

6. Hector Falls - Hector Falls is a dramatic165 ft. waterfall located a few miles north of Watkins Glen on SR 414. You can park on the side of the road before or after the bridge to get a great view of the first set of falls. The second and third sets of falls are below the bridge and located on private property.
7. Reynoldsville "Town Home" and Pauper's Burial Grounds – The small hamlet of Reynoldsville once housed a poorhouse, a working farm, living quarters and pauper's cemetery located at the end of Mott Evans Road. Established circa 1873.
8. Drumlins, Ice Age in Perry City - The Ice Age Drumlins are located on Route 227 ½ mile west of the Perry City junction of Routes 228 and 227 on the left hand side of the road.



9. Lehigh Valley Railroad Station, Burdett - This station is located in Burdett on Route 79 a ½ mile east of the center of town.

10. Logan Community Center – The Logan Methodist Church built in 1832 and closed sometime in the mid 1970s. The Logan Community Center Association formed in 1985 and purchased the building from the United Methodist Conference in 1986. In 2001 the building was listed on the National Register of Historic places. It is used today for community functions, weddings, dances, benefits, family or social gatherings.


11. First Presbyterian Church of Hector - This historic Presbyterian Church located on 5511 State Route 414 in Hector was built in 1818. It was listed on the National Register of Historic Places in 2001 and is still active today.


12. Mecklenburg Mill 3 - The Treman Grist Mill was erected in the Town of Mecklenburg about 1836 and was operational until after WW11. The Mill is located at the corner of SR 79/228. The original grindstone is located in the Park Pond on County Route 6 just east of Mecklenburg.

13. Mecklenburg Pond Park 2 - This 16.89 acre pond was created in early 1800's as a source of water for the Mecklenburg Mill. The original millstone from the mill stands in this park.


14. Underground Railroad Home - This house was built in about 1828. During the Civil War it was owed by a Quaker family and was a stop on the "Underground Railroad". It was restored by Mississippi-born, Peggy Billings in 1976-77. A private home today, it is located on Buck Hill Rd. just off Rt. 228 in Perry City.

15. Wisdom's Goldenrod, Center for Philosophic Studies - The "Center" was founded in 1972 by Anthony Damiani for the comparative studies of Western and Eastern philosophies. His Holiness the 14th Dalai Lama has visited the "Center" twice, once in 1979 and again in 1991. The "Center" is located at the junction of Route 414 and Ball Diamond Rd.
16. Wixson 1895 Barn - This historic barn located 1 mile south of Mecklenburg on Rt. 228 was reportedly built in one day.

17. Sears-Roebuck Kit House, Valois, NY – The Sears-Roebuck Kit House was ordered from a catalog, brought to Valois by train and bilt from a kit in 1930. It can be seen on State Route 414, Valois, NY.

18. Society of Friends Quaker Meeting House, Perry City, NY – Located on State Route 227, just north of Perry City. The Friends Society began meeting in 1814 and the first meeting house was built in 1835 in Mecklenburg. It was moved by horse and wagon to its present site in 1990.

19. Searsburg Grange – ****Awaiting Description****
20. Hector School #1, Hector, NY – Hector School #1 was built in 1857 on the corner of Ball Diamond Rd. and Round Schoolhouse Rd. The last class graduated in 1952 when a new elementary school was built in Watkins Glen. The old schoolhouse is now a rental unit.