A Natural Resources Inventory

for the

Town of Dryden

May 2019

ACKNOWLEDGEMENTS

This natural resource inventory is a Town of Dryden -specific, adapted, revised, and updated version of the Tompkins County Natural Resources Inventory (2001) with new sections added, used with permission from the Tompkins County Planning Department. The inventory was prepared by Osamu Tsuda, Climate Smart Communities Specialist Cornell Cooperative Extension of Tompkins County in conjunction with Kristen Hychka (Research Specialist, Syracuse University Center for Sustainable Community Solutions/Environmental Finance Center) and Terry Carroll (Southern Tier NYSERDA Clean Energy Communities Coordinator, Cornell Cooperative Extension of Tompkins County). The original template of this document was created by Sky Hart, Nathan Revor, and Hassan Saleem (Clean Energy Communities Planning Interns, Cornell Cooperative Extension of Tompkins County). Feedback and proposed edits were provided by the Town of Dryden Conservation Board for the original template. The data used in this natural resource inventory was the most up-to-date information available as of Spring of 2019, and much of it was provided by the Tompkins County GIS Division. Maps were prepared by Osamu Tsuda, and the layout was created by Lois Nguyen (Graphic Design Intern, Cornell Cooperative Extension of Tompkins County).

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INTRODUCTION

What are Natural Resources in the Town of Dryden

The Town of Dryden is a municipality that is characterized by its overall rural landscape. However, compared to many of the surrounding municipalities such as Caroline, Groton and Lansing, the town is more urbanized, and contains areas that can almost be considered suburban. As the city of Ithaca continues to grow, suburbanization continues to spread throughout the Town of Dryden, especially along the route 13 corridor between Ithaca and the Village of Dryden. As a result of this rapid expansion, understanding the location and characteristics of existing natural resources is crucial to enable sustainable and climate smart development. Because a large portion of Dryden, especially the southeastern portion is vulnerable to flooding due to its rough terrain, understanding the behavior of flooding in the area as well as how to best prepare for future flooding events is not only important, but necessary in order to have a resilient and flood smart community.

What is a Natural Resource Inventory?

In its 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 or cultural 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, 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.

As previously mentioned, this NRI can be used as an informational source when developing municipal and regional plans or can complement and act as additional guidance to existing plans such as the comprehensive plan or Natural Resource Management Plan. As the Town of Dryden aims to become a sustainable and resilient community, the resources this NRI provides can help the municipality plan strategically to address the existing and potential vulnerabilities within the community. Therefore, while the primary goal is to enhance existing municipal plans and documents, it also 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.

Why Should Natural Resources be Protected?

Protecting environmental quality is a matter of choices and tradeoffs. As Dryden becomes more developed with the expansion of Ithaca and the Village of Dryden, the region will be seeing the elimination of forests, wetlands, and natural flooding infrastructure (such as riparian buffer zones). There may be negative consequences from this pressure, 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 Town of Dryden 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

alternate less harmful ways to develop. This document can serve as a guide for the municipality and developers to consider the answers to these questions.

Since much development is irreversible once implemented, 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 81.

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 Tompkins County Cooperative Extension office for example offers numerous educational programs that can be used to help make local residents aware of existing local climate conditions and the effects of these changes. Such programs include the Extension Disaster Education Network which informs and prepares communities for changing climate conditions (http://eden.cce.cornell.edu/Pages/default.aspx). Other programs include the New York Sea Grant Program which conducts research around climate change in the state and offers extension and educational services that can help communities better understand the state's marine and Great Lakes resources (https://seagrant.sunysb.edu/), and the Cornell Institute for Climate Smart Solutions which offers numerous educational and outreach opportunities to municipal officials and residents to learn more about the effects of climate change (http://climatechange.cornell.edu/events/)

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 81. 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 Dryden 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.

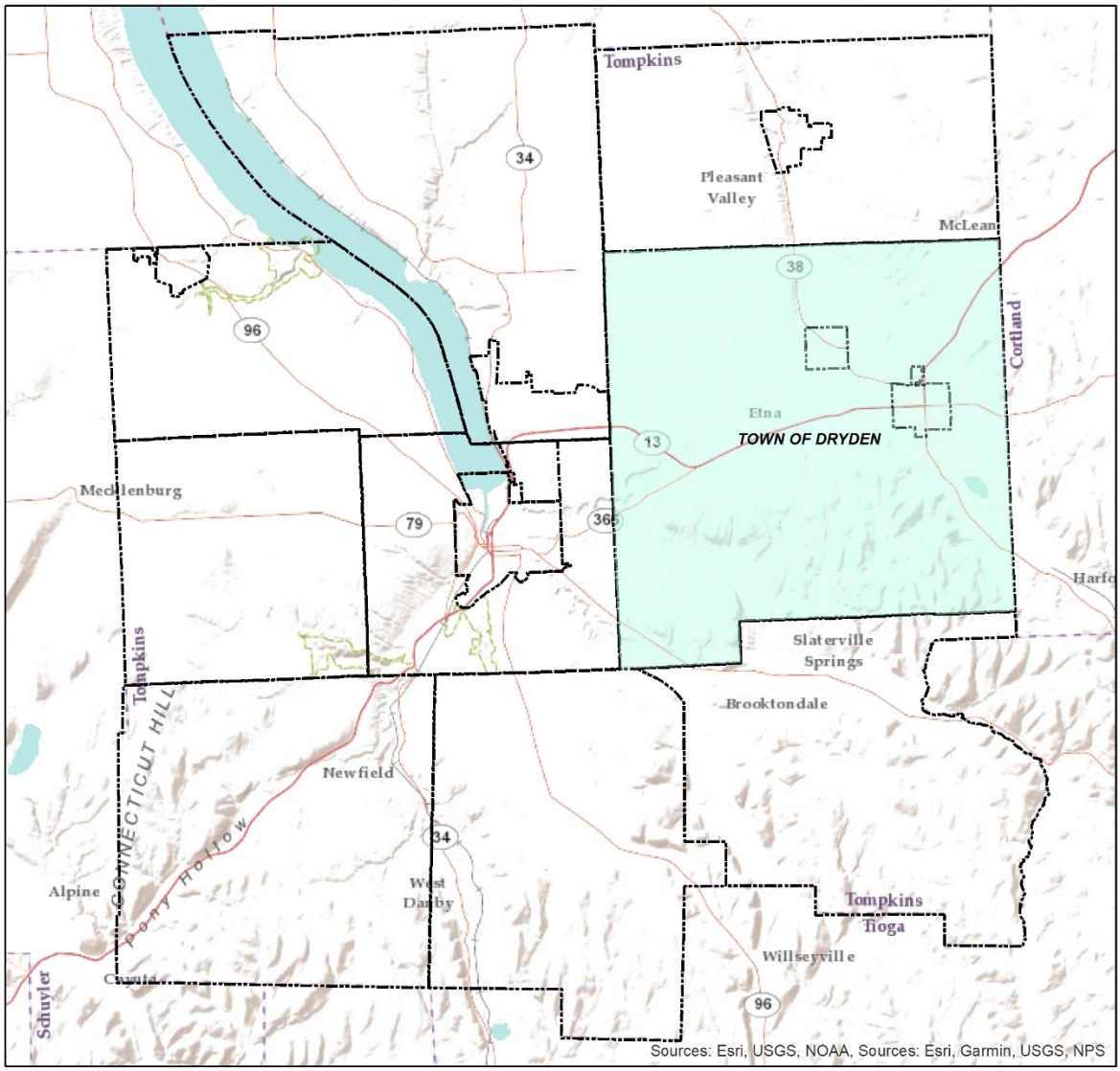
About the Data

Most of the data for this natural resource inventory was primarily compiled from Cornell University Geospatial Information Raspatory (https://cugir.library.cornell.edu/) as well as the Tompkins County GIS Division (http://tompkinscountyny.gov/gis) which both offer a large variety of GIS (Geographical Information System) spatial data from political boundaries from the US Census to detailed soil data develop by USDA and USGS. In addition to these sources, additional data was collected from the SSURGO Geospatial Data Gateway website which offers data from county to national level (https://gdg.sc.egov.usda.gov/) in multiple formats.

While this data can help us better understand the spatial relations within the Town of Dryden, it is worth mentioning that not all information might be up to date, which in turn could lead to inaccuracies. While this NRI utilizes the most up-to-date data available when published, many of these datasets range from 1 to 20 years old. Fortunately, datasets that are more than five years old are those that are static or slowly changing, such as Digital Elevation Models, Soil, and Land Cover.

Finally, as these maps provide a great level of detail and can be great resources to understand the characteristics of township, using these maps for individual parcels and their development feasibility analysis is highly discouraged. Rather these maps are intended to be used for more general characteristics of the municipality. As such, it is reasonable to use these maps to understand the characteristics of the surrounding environment of an individual parcel and how land use changes can affect the region on a macro-scale. The scale used for the township maps is consistent throughout this NRI, specifically 1:125,000. The only map that has a different scale is the introductory locational map of Dryden on page 10, that is 1:300,000. In addition to scale, each dataset/ shapefile has been re-projected to *NAD 1983 StatePlane New York* which is most commonly used for the Upstate Central New York region. For additional information on the data, scale, and projection, please refer to the individual sources provided above, or contact the individuals who developed these maps listed in the acknowledgements on page 1.

Location Within Tompkins County



0 2.5 5 10 Miles

N W E S

Tompkins County Municipal Boundaries

Dryden

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

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 Dryden

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 and Projected Changes in Climate Conditions and 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	7 to 8	8 to 8.5
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.

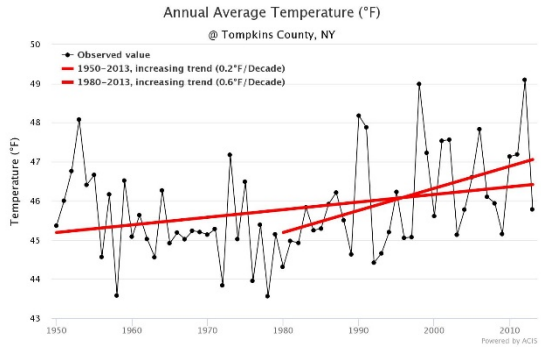


Chart 1 Historical Temperature Change

Similar to the national level, records have shown a significant increase in temperature over time. According to the adjacent chart 1, the average temperature has increased by 2 degrees (F) between the years 1980 and 2010. According to the second chart, if emissions were to continue at the current high level, the average temperature in Tompkins County is expected to increase by approximately 6 degrees (F), from 48F to 54F between the 50-year period between 2020 and 2070 (Source: Climate Smart Farming)

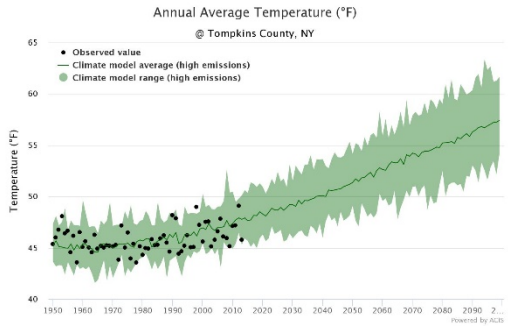


Chart 2 Tompkins Temperature Projection

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

Climate Smart Farming, Cornell University: http://climatesmartfarming.org/

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

Section 1: Hydrology

WATER BODIES

Why Are Water Bodies Important?

Waterbodies are resources that not only act as a habitat for aquatic animals, but also are necessary for other species' livelihood, including humans. While much of Upstate New York is gifted with abundant water supplies, it is important to properly maintain and protect these resources in order to maintain a healthy environment. The Town of Dryden, like most inland municipalities contain multiple creeks that flow throughout the town. While Fall Creek is the largest creek that flows through the town, there are other creeks such as Six Mile Creek and Cascadilla Creek which originate in the municipality. In addition to these creeks, the town also contains Dryden Lake which not only contains abundant wildlife but is also used for numerous recreational purposes by the community.

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, stormwater, 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	
Classes	**Best Uses**
D	Secondary contact recreation
C	Fishing
B	Bathing
A	Drinking (after chlorination and filtration)
AA	Drinking (after chlorination)
NOTE: (T) indicates that it may support a trout population, or (TS), that it may support trout spawning (TS)	
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 the Town of Dryden

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 Dryden are classified as C or better, and a few are classified highly enough to be designated as protected streams due to their importance as drinking water supplies or fish habitat. 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 Dryden.

Table 3: Dryden Water Bodies Classifications	**Classification**
Six Mile Creek	A(T)
Salmon Creek	C
Owego Creek	C(T)
Owasco Creek	C(T)
Fall Creek	A
Cascadilla Creek	C(T)
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 obvious 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 shows that any stream disturbance/ 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 thus cause flooding that could have otherwise been avoided. Thus, as communities can expect increased flooding events in the near future, it is important to understand how flooding can easily 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 18 shows permanent streams – those that flow year-round - and their protection status in the Town of Dryden. 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

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

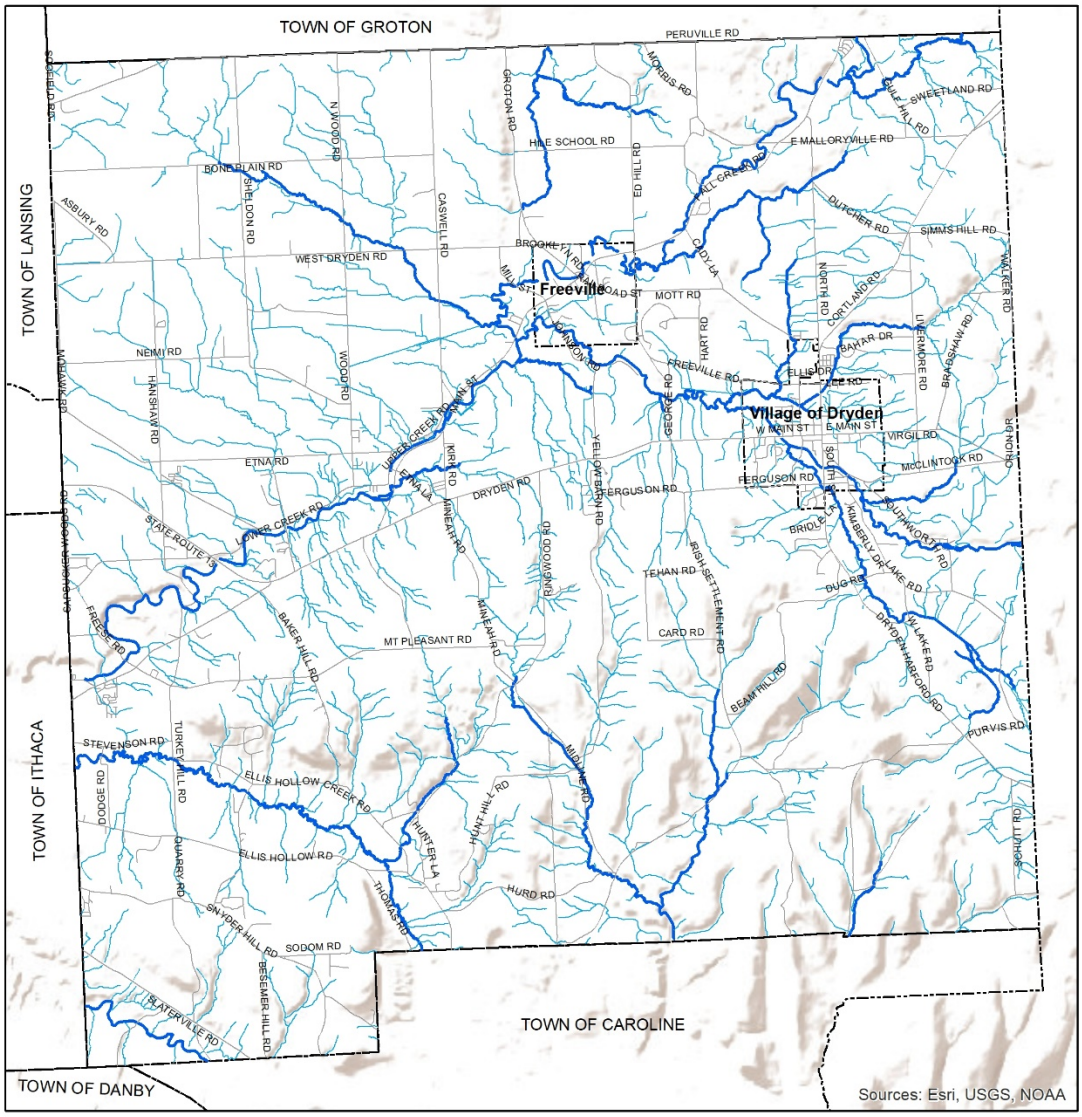
Climate Impact Lab http://www.impactlab.org/

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

Dryden Streams



Tompkins Co. Municipal Boundaries

DrydenRoads

Stream Classification

Not Protected

DEC Protected

0 1.25 2.5 5 Miles

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

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, the Cascadilla Watershed flows into the Cayuga Inlet Watershed which is contained within the Cayuga Lake Watershed. These smaller watersheds are sometimes termed sub-watersheds (the watershed map on page 23 better illustrates the concept of watersheds and sub-watersheds) . 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 Dryden

Dryden has three major watersheds within the municipality; the Fall Creek, Cascadilla Creek, and Six Mile Creek. In addition, there are four other watersheds that comprise of a smaller portion of the municipality; West Branch Owego Creek, Owasco Inlet, Salmon Creek, and East Cayuga Lakeshore South. All of these

watersheds drain into the Oswego River Basin, except for the West Branch Owego Creek which drains into the Susquehanna River Basin. Table 4 provides more information on the watersheds in Dryden.

Table 4: Watersheds in Dryden	Acres	Sq. Miles (approx.)	Drainage Basin
Cascadilla Creek	7599	11.9	Oswego River Basin
East Cayuga Lakeshore So.	1570	2.4	Oswego River Basin
Fall Creek	35471	55.4	Oswego River Basin
Owasco Inlet	2790	4.4	Oswego River Basin
Salmon Creek	193	0.3	Oswego River Basin
Six Mile Creek	10139	15.8	Oswego River Basin
West Branch Owego Creek	2612	4.1	Susquehanna River Basin
Source(s): Tompkins County Planning Department			

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 watersheds 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 watershed 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 thus watersheds though SEQURA by identifying them as unique natural areas; adopt local regulations in the comprehensive plan for stormwater control, ordinances for sediment and erosion control, building and sanitary codes, floodplain regulation, and timber harvesting guidelines or other vegetation removal standards; and frequently monitoring local project processes for regulatory compliance (US EPA).

Map and Data

The map depicted on page 22 depicts the watersheds located in the Town of Dryden. The data used for the following watershed maps was provided by the Tompkins County GIS Department as well as the New York State GIS Clearinghouse. In addition, the drainage basin information was retrieved from the DEC Watershed Map (https://www.dec.ny.gov/docs/water_pdf/drainagebasins.pdf) on page 23.

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

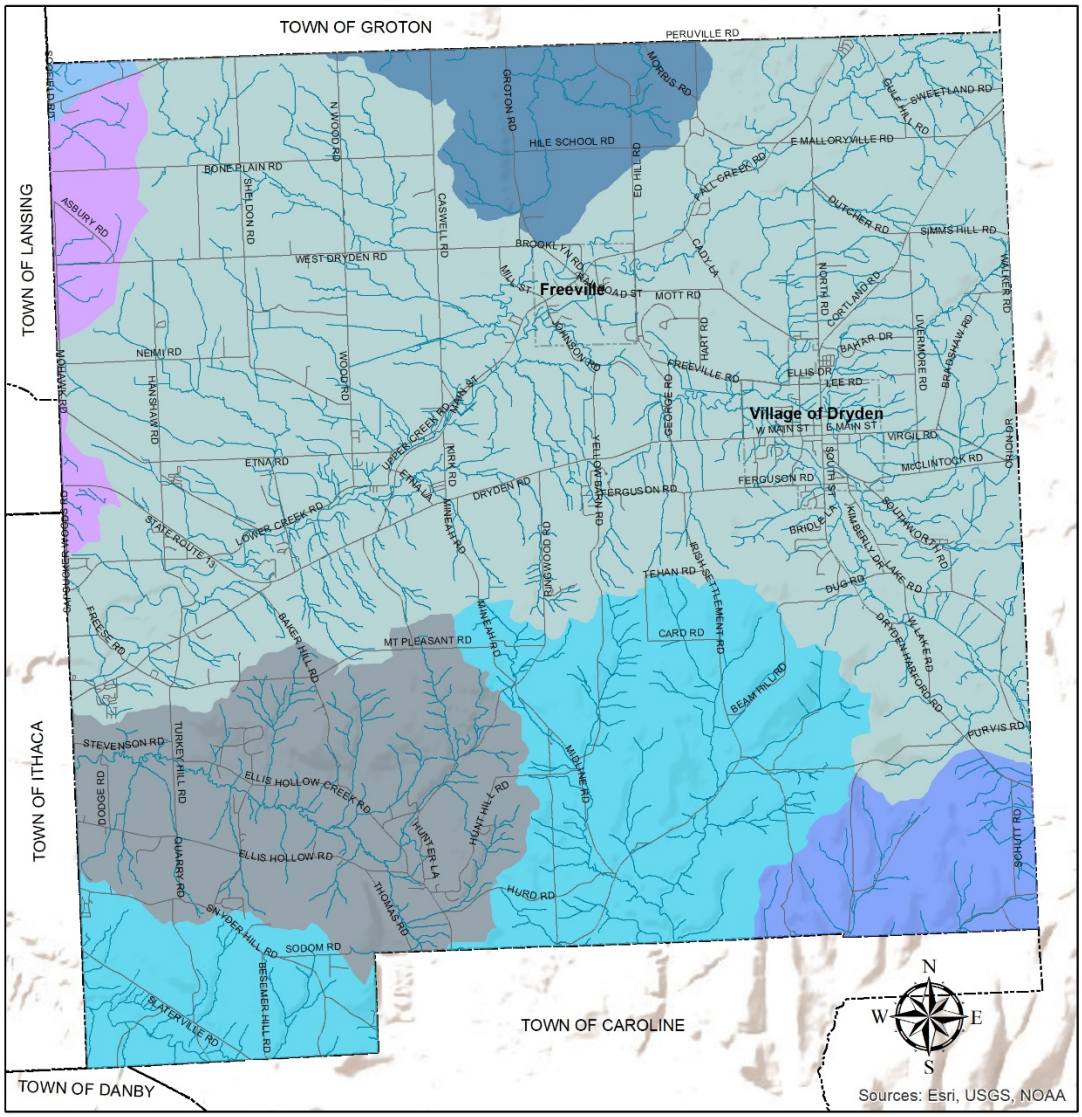
Research Program on Climate Change, Agriculture, and Food Security: http://www.ccafs-climate.org/data/

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

Dryden Watersheds



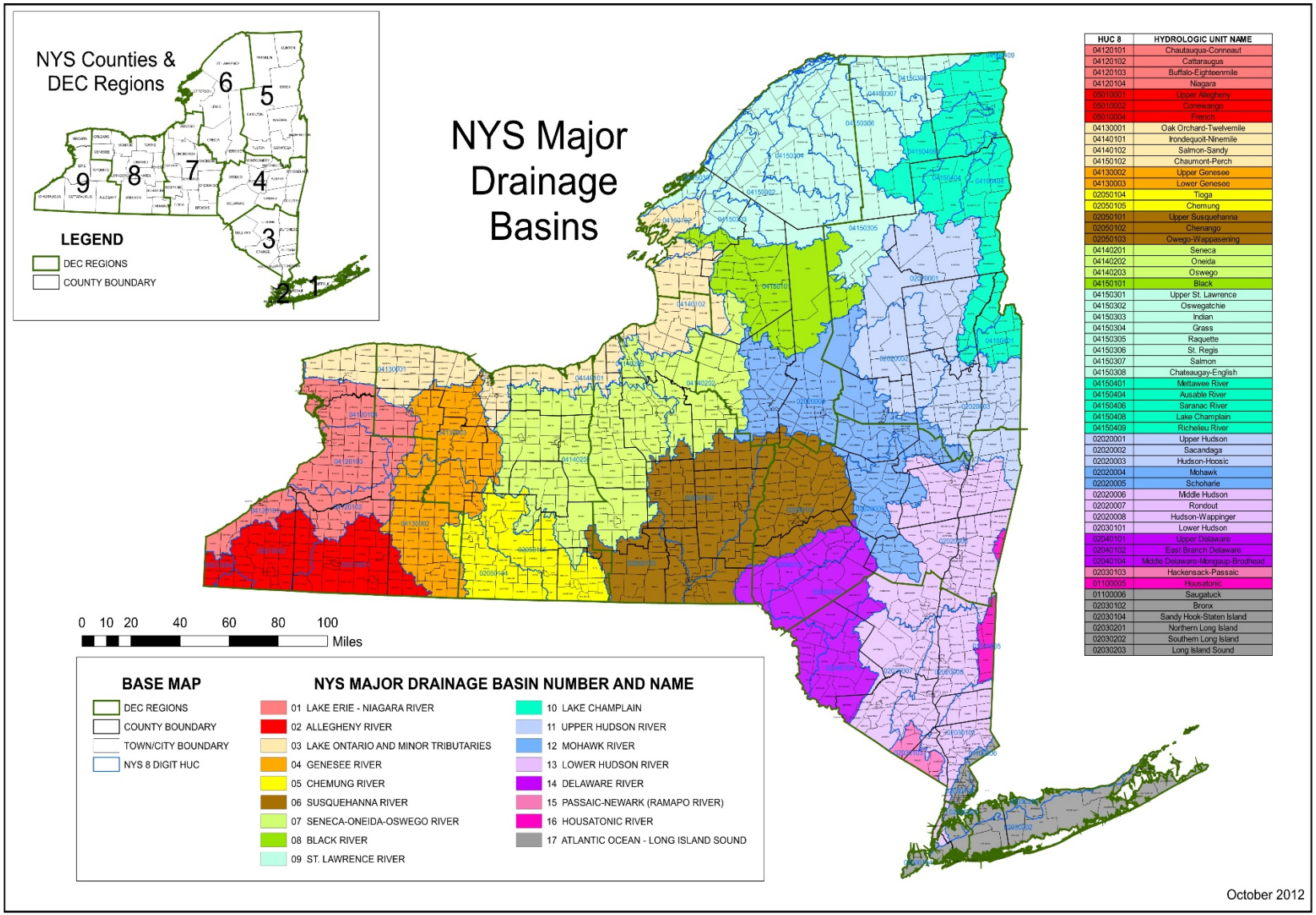
0 1.25 2.5 5 Miles

Tompkins Co. Municipal Boundaries
DrydenRoads
DrydenStreams

WATERSHED

Cascadilla Creek
East Cayuga Lakeshore So.
Fall Creek
Owasco Inlet
Salmon Creek
Six Mile Creek
West Branch Owego Creek

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS



HUC 8	HYDROLOGIC UNIT NAME
04120101	Chautauqua-Conneaut
04120102	Cattaraugus
04120103	Buffalo-Eighteenmile
04120104	Niagara
05010001	Upper Allegheny
05010002	Conewango
05010004	French
04130001	Oak Orchard-Twelvemile
04140101	Irondequoit-Ninemile
04140102	Salmon-Sandy
04150102	Chaumont-Perch
04130002	Upper Genesee
04130003	Lower Genesee
02050104	Tioga
02050105	Chemung
02050101	Upper Susquehanna
02050102	Chenango
02050103	Owego-Wappasening
04140201	Seneca
04140202	Oneida
04140203	Oswego
04150101	Black
04150301	Upper St. Lawrence
04150302	Oswegatchie
04150303	Indian
04150304	Grass
04150305	Raquette
04150306	St. Regis
04150307	Salmon
04150308	Chateaugay-English
04150401	Mettawee River
04150404	Ausable River
04150406	Saranac River
04150408	Lake Champlain
04150409	Richelieu River
02020001	Upper Hudson
02020002	Sacandaga
02020003	Hudson-Hoosic
02020004	Mohawk
02020005	Schoharie
02020006	Middle Hudson
02020007	Rondout
02020008	Hudson-Wappinger
02030101	Lower Hudson
02040101	Upper Delaware
02040102	East Branch Delaware
02040104	Middle Delaware-Mongaup-Brodhead
02030103	Hackensack-Passaic
01100005	Housatonic
01100006	Saugatuck
02030102	Bronx
02030104	Sandy Hook-Staten Island
02030201	Northern Long Island
02030202	Southern Long Island
02030203	Long Island Sound

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 hydrophytic vegetation (wetland plants).

Wetlands' Role with Climate Change

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 can directly harm and pollute the local water system and resources. One direct effect of this contamination includes 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 pages 29 and 62, 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. According to the Dryden Natural Resource Conservation Plan, unfortunately there are many small and minor wetlands that exist but are not recognized by the state and thus are not protected (6). Thus, in order to have up to date information, 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. Even though many wetlands might seem insignificant in size, it is worth considering its role within the environment, as the Dryden NRCP points out they are important natural resources that can easily be damaged by changes in land use and other human caused disturbance.

Mapped Wetlands in Dryden

While Dryden does not contain many waterbodies, the municipality does have many wetlands, especially in the northern part of the township. The map below depicts the Tompkins County Mapped Wetlands as well as those that are protected by the NYS DEC. According to the Dryden NRCP, due to climate change and increased precipitation, these wetlands are expected to grow and expand over the coming years. Thus, while wetlands tend to fluctuate in size and location, in general, areas that are low-lying can eventually become wetlands.

Additionally, as the Town of Dryden continues to develop, additional impervious surfaces will create more runoff, which ultimately can lead to the degradation of existing streams and wetlands (Dryden NRCS). Land use changes, elimination of natural infrastructure and vegetation will eventually lead to the degradation of wetlands. Hence in order to protect these fragile ecosystems, it is crucial to understand the characteristics of existing wetlands and guide land use changes that can protect and improve all wetlands, including those that are not recognized by the DEC.

Table 5: Wetlands in Dryden

	Acres of Wetlands	Percent of Municipality
2015 County-Mapped Wetlands	10533	17%
National Wetlands Inventory wetlands	10533	17%
NYSDEC Freshwater Wetlands	2195	3.6%

In 2015, a data analyst at the Cornell Wildlife Health Lab created more accurate wetlands maps for Tompkins County using 2012 LiDAR data. This data differs from 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 Dryden's wetlands. Because the 2015 County-mapped wetlands appear to be the most accurate and up-to-date representation of wetlands in Dryden, these wetlands are depicted in most maps throughout this inventory.

Maps and Data

The map on page 29 shows the NYSDEC Freshwater Wetlands, National Wetlands Inventory Wetlands, and 2015 County-mapped wetlands. The map on the following page shows Dryden's wetlands as mapped in 2017 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 2017 data. The NYSDEC wetlands data is available from the Cornell University Geospatial Information Respiratory (https://cugir.library.cornell.edu/).

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.

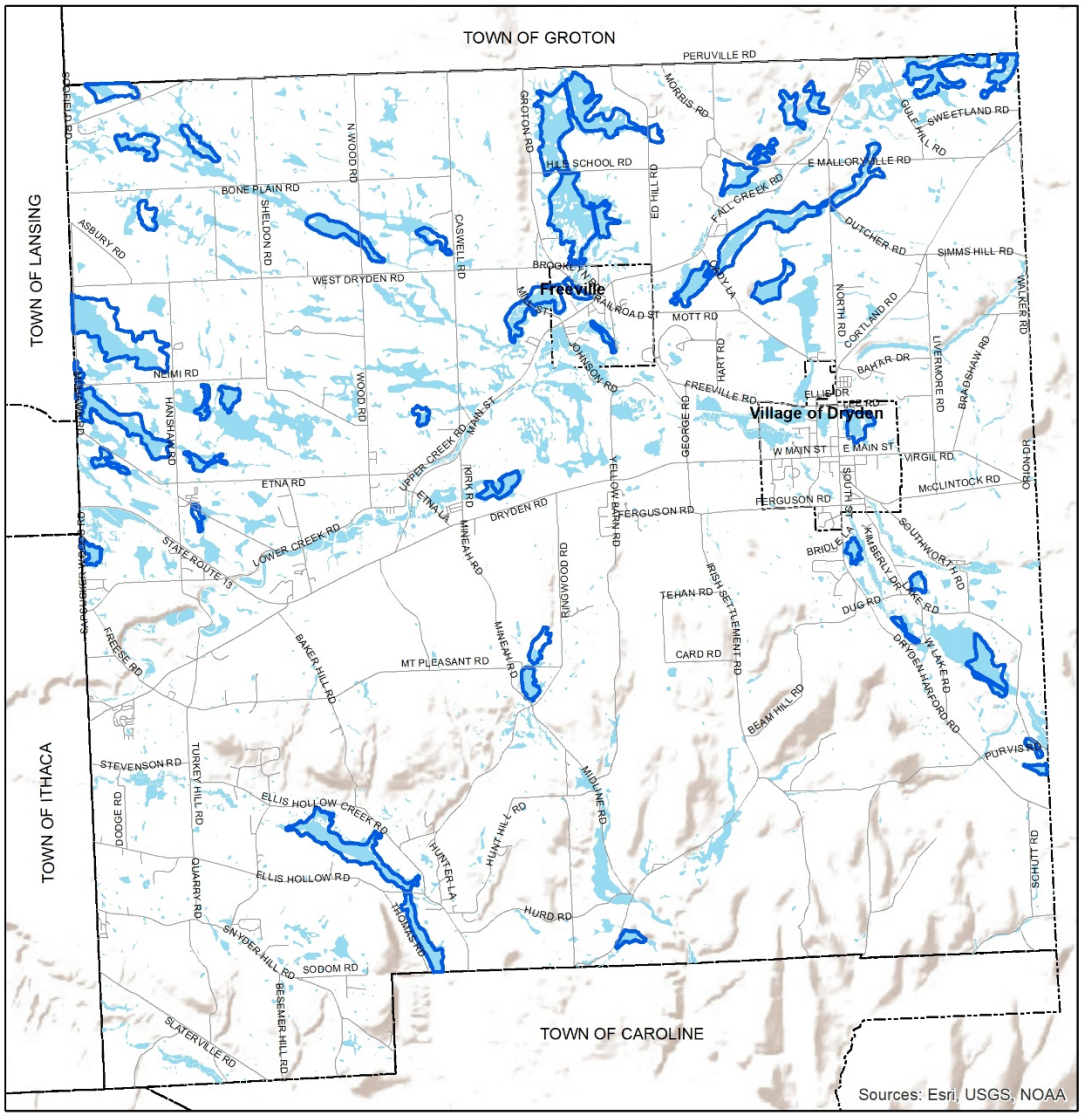
New York State Department of Environmental Conservation
Freshwater Wetlands Permits, http://www.dec.ny.gov/permits/6058.html
Freshwater Wetlands Mapping, http://www.dec.ny.gov/lands/5124.html
Freshwater Wetlands Program, http://www.dec.ny.gov/lands/4937.html

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

Dryden Wetlands



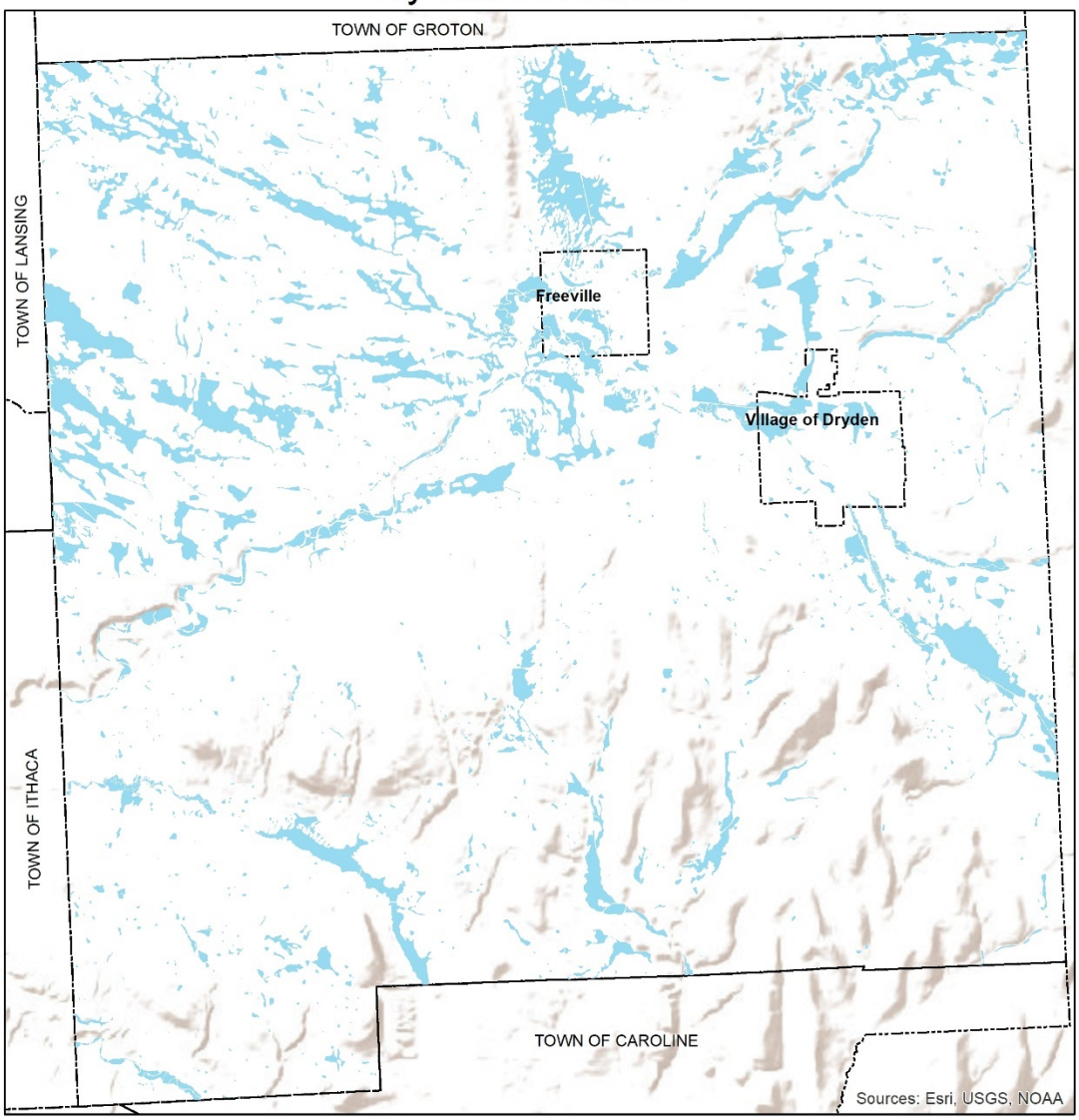
0 1.25 2.5 5 Miles

DrydenRoads
DEC Wetlands
National Wetland Inventory/ TC Wetlands
Tompkins Co. Municipal Boundaries

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Dryden Wetlands



0 1.25 2.5 5 Miles

National Wetland Inventory/ TC Wetlands

Tompkins Co. Municipal Boundaries

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

FLOOD HAZARD AREAS

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 Dryden

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.

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 (as listed on page 80), it is up to individual communities to determine which areas might be most affected by extreme weather patterns. The Dryden Natural Resource Conservation Plan also provides methods on how to mitigate flooding on page 7.

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. As mentioned in the Dryden NRCP, it is worth considering the removal of engineered barriers and avoiding development along floodplains. Finally, 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							

In the Town of Dryden, there is a significant risk of flooding in the village of Dryden and Freeville, as depicted in the map below. As also mentioned on page 7 of the Dryden NRCS, much of the risk of flooding comes from

Fall Creek, and roads such as Lower Creek Road will not be accessible during floods. At the same time, parts of Cascadilla Creek are also prone to flooding and can worsen over time with additional development and higher runoff levels from increased impermeable surfaces.

While flood zones are determined based on the probability of the area flooding, it is important to note that with climate change, these 100- and 500-year floods are expected to increase exponentially over time. According to results published from a study conducted by researchers from Harvard and MIT, after conducting hundreds of simulated experiments, the group of researchers concluded that floods that are currently categorized as 100-year floods could, with climate change occur as frequent as every 3 years, while the 500 year floods could occur as frequent as every 25 years, based on data extrapolations between the years 2081 and 2100. These storms which could be as high as a 3-meter serge flood could easily top current flood walls which are built to withhold up to 1.5 meters. With this in mind, it is important to understand how development will need to change over time to accommodate for the drastic increase in flooding.

The flood map data was originally collected from the Cornell University Geospatial Information Respiratory with additional references from the NYS DEC Environmental Resource Mapper. The flood data, according to FEMA, has been updated as of 2015.

Resources and References

Federal Emergency Management Act (FEMA)

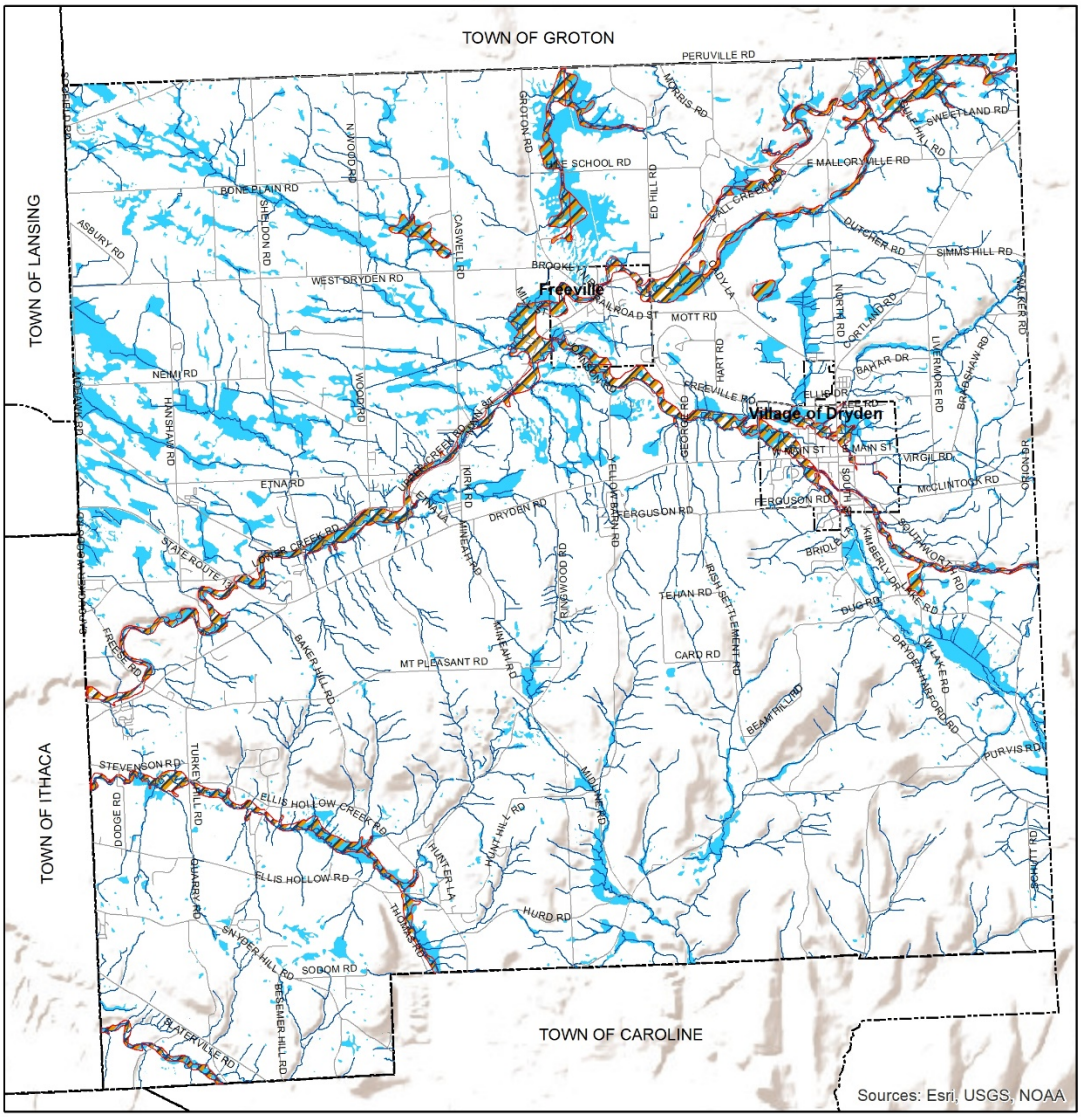
Town of Caroline, Flood Map Service Center, https://msc.fema.gov/portal/search?AddressQuery=caroline%20ny#searchresultsanchor

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

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

With climate change, today's '100-year floods' may happen every three to 20 years: Article https://phys.org/news/2012-02-climate-today-year-years.html

Tompkins County 100 Yr. Flood Zones



0 1.25 2.5 5 Miles

Dryden Streams

Dryden Roads

100 Year Flood Zone

National Wetland Inventory/ TC Wetlands

Tompkins Co. Municipal Boundaries

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

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 (Dryden Open Space Inventory).

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 aquafers and abandoned landfills can 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 Dryden

The process of glaciation and the subsequent deposition of coarse sand and gravel deposits heavily influenced the location, size, and capacity of aquifers in Tompkins County. As a result, several small discontinuous local aquifers in Tompkins County were created that support limited numbers of wells while others supply vast quantities of water. The Town of Dryden is mostly comprised of till and bedrock while there are spans of sand and gravel in the central and southwestern portion of the municipality. There are also other types of aquifers that span throughout the southeastern and northeastern portion of the municipality. There is a major landfill located within the northern portion of the town and some other minor landfills scattered throughout the municipality.
Bedrock aquifers (interlayered sandstones, siltstones, and limestones) typically yield much less water than sand and gravel aquifers. Although bedrock aquifers may be sufficient to supply individual residential units and small farms, the water may be heavily mineralized and relatively unreliable.

Maps and Data

The following surficial aquifer map indicates the general location of aquifers in Dryden as well as abandoned landfills. The data for this map was provided by the Tompkins County GIS Division. Similar datasets containing aquifer data are available from the NYS GIS Clearinghouse under the names "Primary Aquifers - 1:24,000," "New York State Aquifers," and "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

Dryden Open Space Inventory (2003—Town of Dryden) http://dryden.ny.us/wp-content/uploads/2019/02/Open-Space-Inventory-2003.pdf
Kraig D. & Miller, T. Geohydrology of the Stratified-Drift Aquifer System in the Lower Sixmile Creek and Willseyville Creek Trough, Tompkins County, New York https://pubs.usgs.gov/sir/2010/5230/pdf/sir2010-5230_508_05052011.pdf

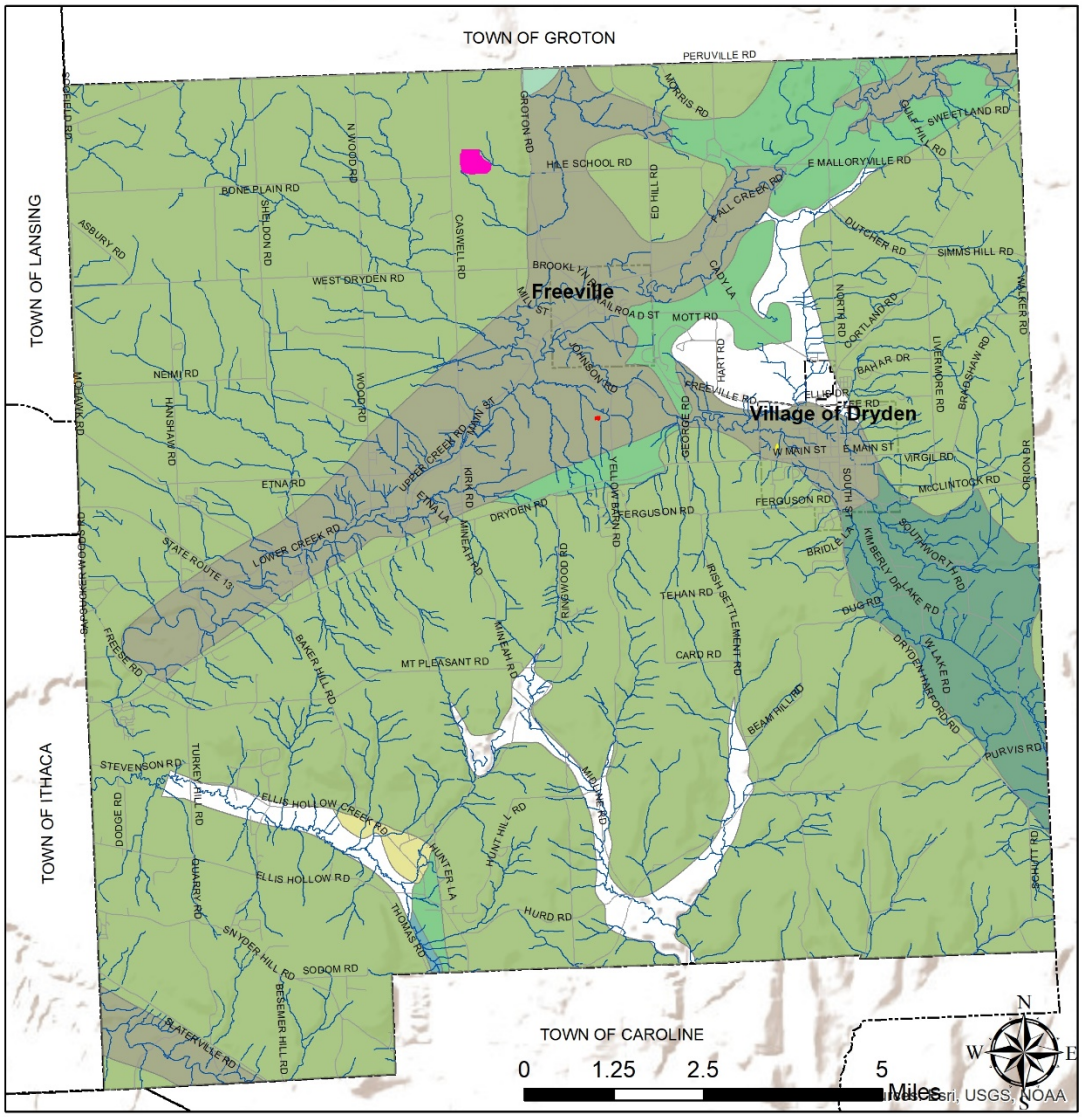
Miller, T.S. (1990). *Sand and Gravel Aquifers of Schuyler County, New York.* U.S. Department of Energy, U.S. Geological Survey, Water-Resources Investigations Report 90-4073.

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.

Dryden Aquifers and Abandoned Landfills



Tompkins Co. Municipal Boundaries

Dryden Streams

Dryden Roads

Dump NAME

- Collins Dump
- Johnson Road Dump
- Tompkins County Landfill (West Dryden Road)
- Village of Dryden Dump

Aquifer Type

- 1 Alluvial S&G- unconfined
- 3 Outwash S&G- unconfined
- 4 Kame S&G- unconfined
- 5 Sand and gravel- confined
- 6 S&G- unconfined/confined
- 7 Moraine
- 9 Till and/or bedrock

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Section 2: 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, as runoff water accumulates in low elevations. As described above, flash floods can easily occur in streams and rivers located in valleys/ ravines, even with moderate precipitation. As a result, communities located in these 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 44 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 Dryden

Tompkins County is characterized by diverse topography. Within the county, Dryden also provides diverse topography, mountainous in the south and flat and or rolling in the north. Most of the mountainous regions in the south have streams and or other waterbodies flowing through the crevasse, while the northern portion of the town can be characterized as suitable topography for agriculture. 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 hillshade map, which visualizes topography, is included on page 42, and a map categorizing steepness of slope is included on page 43. A map showing slope with wetlands overlaid is included on page 34. The hillshade map was produced by Esri, the USGS, and NOAA at a scale of 1:70,000. The slope dataset was derived from the Digital Elevation Model created by the U.S. Geological Survey at a scale of 1:24,000.

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

Dryden Hillshade Map

0 1.25 2.5 5 Miles

N W E S

Tompkins Co. Municipal Boundaries

Dryden Roads

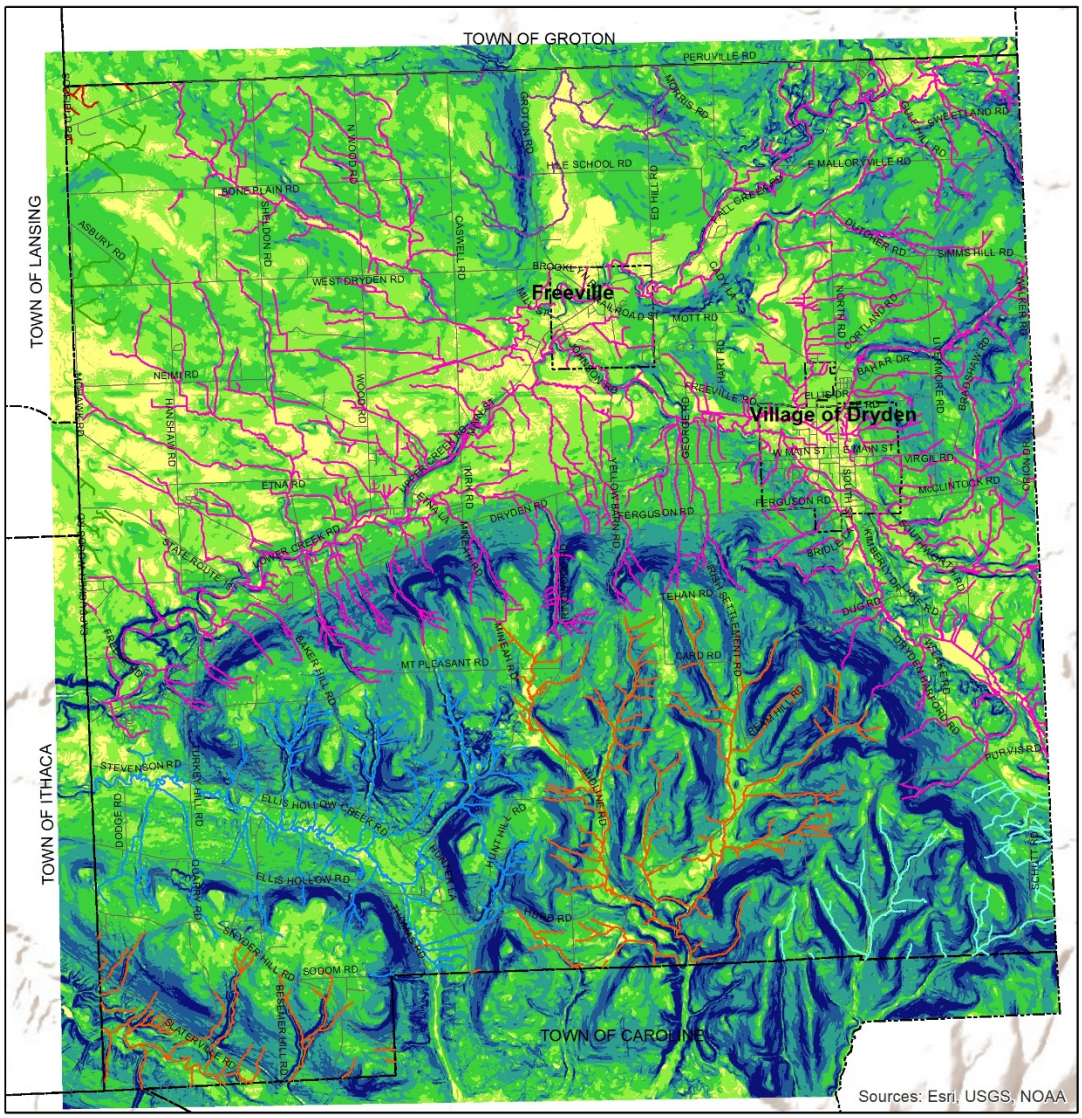
Value

High : 249

Low : 0

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Dryden Slope Map



0 1.25 2.5 5 Miles

Tompkins Co. Municipal Boundaries

Streams

- Cascadilla Creek
- East Cayuga Lakeshore South
- Fall Creek
- Owasco Inlet
- Owego Creek
- Salmon Creek
- Sixmile Creek
- Dryden Roads

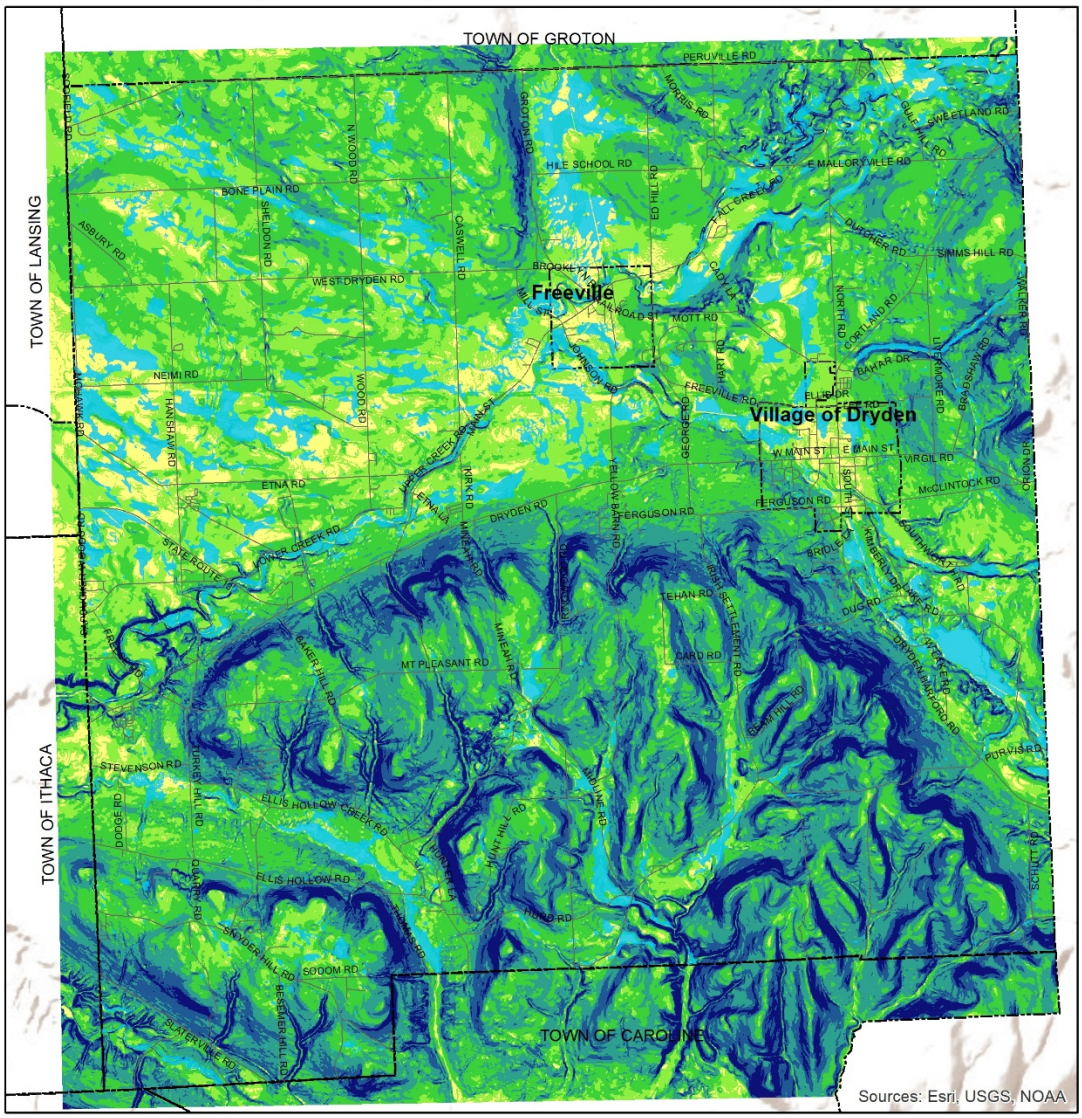
Dryden slope

- 0% - 1%
- 1.1% - 3%
- 3.1% - 8%
- 8.1% - 15%
- 15.1% - 25%
- 25.1% - 130%

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Dryden Slope with Wetlands Map



0 1.25 2.5 5 Miles

Tompkins Co. Municipal Boundaries

Dryden Roads

National Wetland Inventory/ TC Wetlands

Dryden slope

- 0% - 1%
- 1.1% - 3%
- 3.1% - 8%
- 8.1% - 15%
- 15.1% - 25%
- 25.1% - 130%

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

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.

How Was Bedrock Formed?

Approximately 550 million years ago, the land that is now the Town of Dryden 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 lake bottom and slowly hardened into beds of sedimentary rocks that we now know as sandstone, shale, and limestone.

Bedrock Geology in the Town of Dryden

There are three major groupings of bedrock in the Town of Dryden. The formations found within a group are shown in parentheses. The following are listed from oldest to youngest formations:

Beers Hill Shale (Dwm): These shale and siltstone are found between 1100 and 1600 feet and is mostly found in the central portion of the town and accounts for around 2% of the land.

Cashaqua Shale (Ds): These siltstones and shales can be found between 200 and 1,000 feet in elevation and is the second most common bedrock in Dryden, making up about 42% of the land.

Ithaca Formation (Dg): This grouping of limestone, shale, and siltstone is what makes up over half of the land in Dryden, approximately 57%.

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.

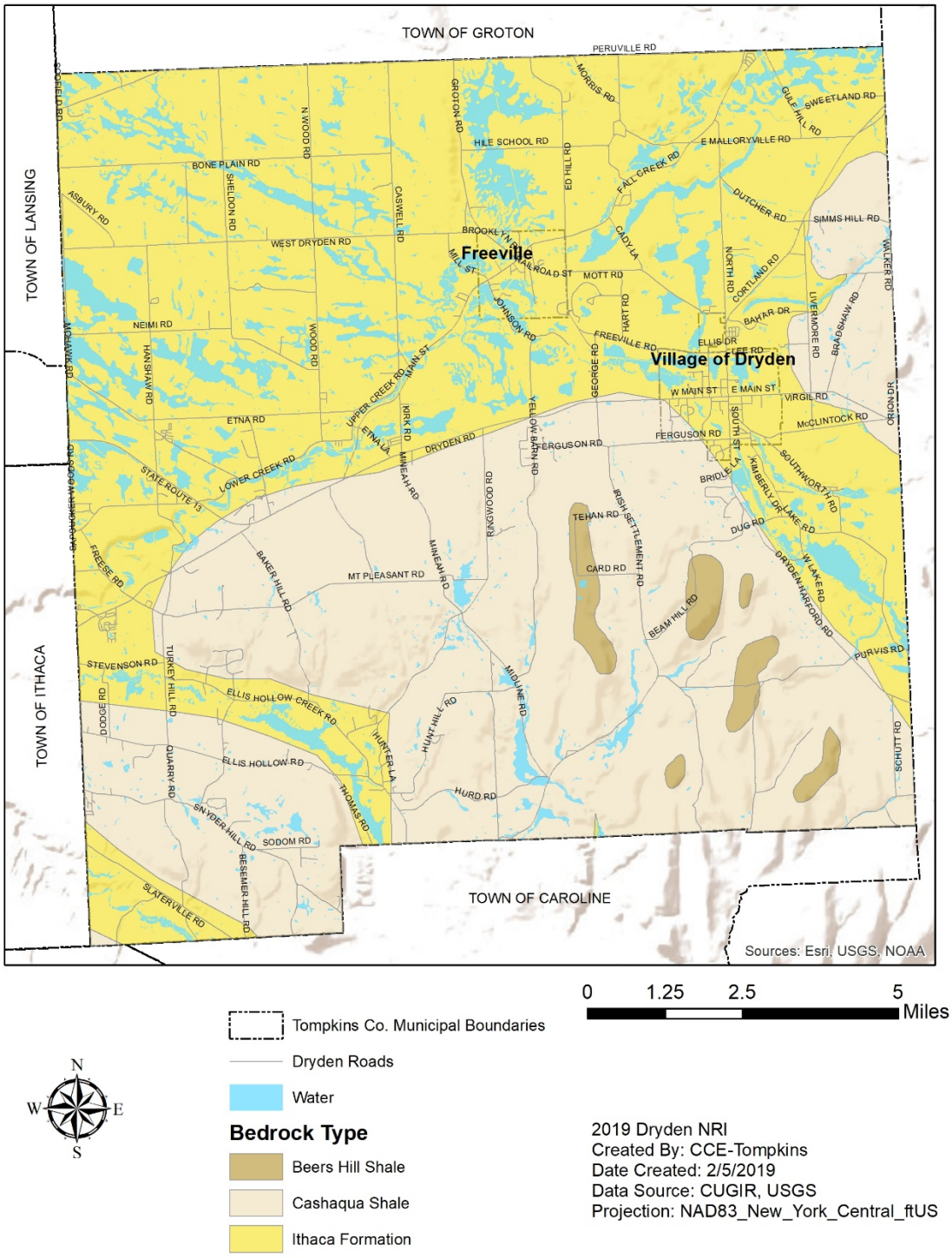
U.S. Geological Survey

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.

Dryden Bedrock



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 formations 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.

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 geological composition and soil type (discussed in further detail below on page 51).

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 56) can be a useful tool to determine future land uses.

Surficial Geology Deposits in Dryden

There are six types of surficial geology deposits in Dryden:

Kame Deposits are usually small and irregular in sizes deposited by glaciers and are usually found in valleys. They are usually a mixture of coarse and fine gravel in layers that are usually between 30 and 100 feet thick.

Kame Moraines are glacial deposits that can vary in size and are laden with calcareous cement with a thickness between 30 and 100 feet.

Lacustrine Sands are composed of particles of similar size. They were stratified when waterbodies were formed from glacial melting. The thickness can vary between 6 and 60 feet in thickness

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 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 5 to 65 feet.

Lacustrine Silt and Clay is generally laminated (layered) silt and clay, deposited in proglacial lakes, generally calcareous, low permeability, potential land instability, with a variable thickness of up to 160 feet.

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 varies with the amount of compaction. Thicknesses vary from 3 to 160 feet.

Table 8 summarizes the surficial geology of Dryden,

Table 8: Surficial Geology of Dryden	
Type of Surficial Geology Deposit	*Percent of Municipality*
Kame Moraines	14.5%
Till	77.2%
Lacutrine Silt and Clay	5%
Outwash sand and gravel	0.25%
Kame Deposits	2%
Lacutrine Sand	1.4%

Maps and Data

The following map shows the surficial geography of the Town of Dryden. The dataset is available from the Tompkins County Open Data Portal under the name "Surficial Geology."

Resources and References

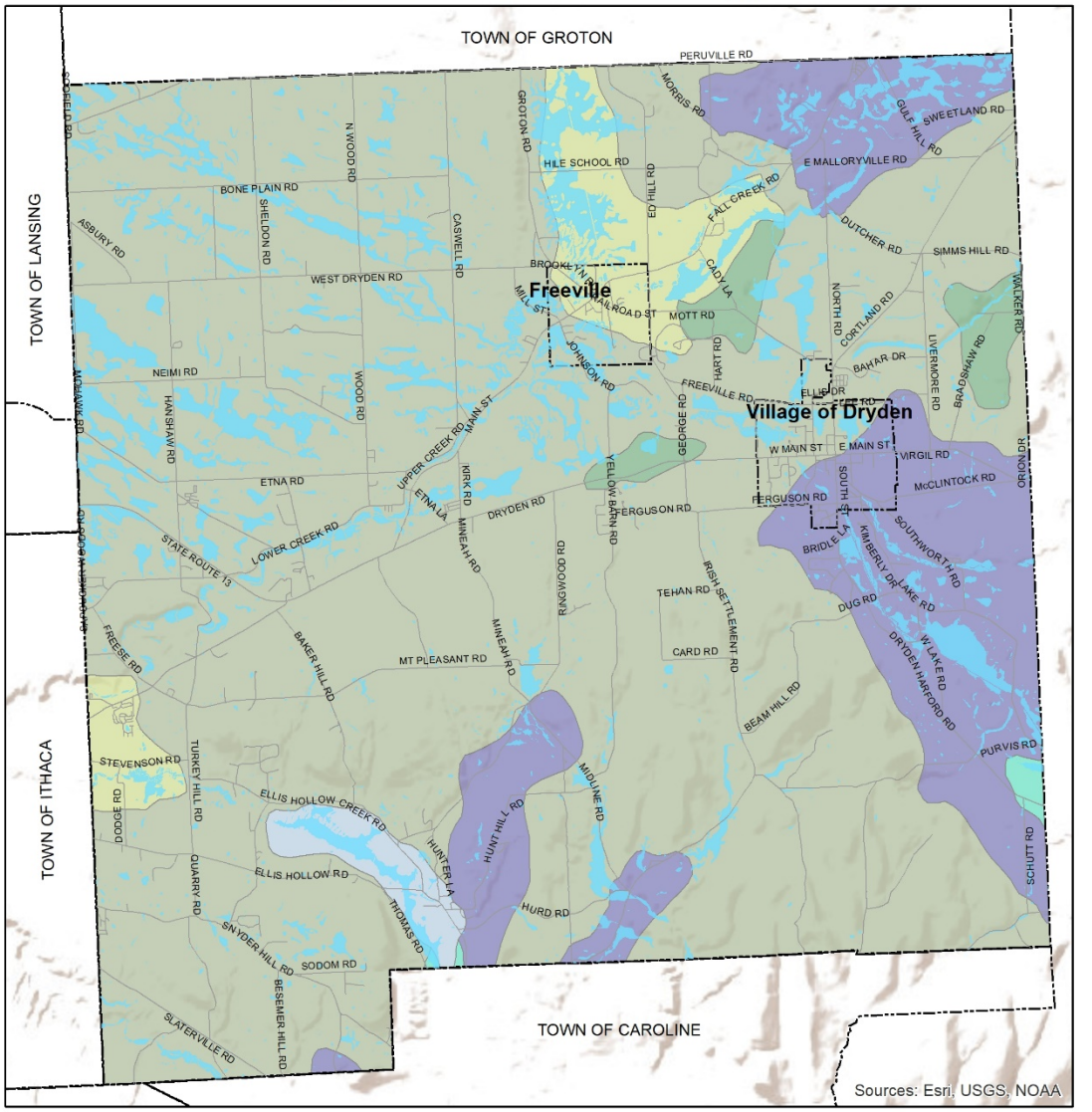
Fakundiny, R. H., & Albanese, J. R. (2005). New York State Geological Survey (NYSGS). In P. Eisenstadt & L. E. Moss (Eds.), The Encyclopedia of New York State. Syracuse, NY: Syracuse University Press.

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

Dryden Surfacial Geology



Dryden Roads

Water

Tompkins Co. Municipal Boundaries

Surfacial Geology Type

Kame Deposits

Kame Moraine

Lacutrine Sand

Lacutrine Silt and Clay

Outwash sand and gravel

Till

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

SOILS

What Are Soils?

Soil is a mixture of mineral particles, organic matter, water, and air. Soils are often described in terms of their primary texture (e.g., sand, silt, and clay).

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.

Classification of Soils

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

Ontario, Lima, Lansing, Honeoye, and Conesus series soils are frequently used for farming hay, corn, oats, wheat, soy beans, dry beans, some vegetables, and deciduous fruit. Conesus series soils can also be used as dairy pasture and for growing grapes. Wooded areas on these soils support sugar maple, red oak, white oak, American beech, white ash, and black cherry, among other types of trees.

Rhinebeck, Niagara, Hudson, Dunkirk, and Collamer series soils 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.

Volusia, Mardin, and Lordstown series soils are often cleared but idle. Much of these soils are reverting to brush and trees. These soils can be used to support silage corn, small grains, hay, and pasture. Some farmers have grown potatoes in this soil on sloping areas. Wooded areas on these soils support sugar maple, beech, white ash, black cherry, and hemlock.

Wayland, Palmyra, Howard, and Chenango series soils can support hay, corn, small grains, vegetables, fruits, and nursery stock. Chenango series soils can also be used for growing grapes. All of these soils make good

pasturelands. Woodlots on these soils often have sugar maples, red maples, American beech, eastern hemlocks, white pines, and black cherries.

Valois Howard Bath series soils are well drained and do not get saturated easily, thus usually used for growing hay, pasture, corn or small grains, that is when the land is level or rolling. Woodlands that are located on this soil series usually have sugar maple, American Beech, red oak, and similar hardwoods.

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:

NOTE:

The following four soil permeability categories are sequential; in other words: permeability = A > B > C > D

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 Dryden, the table below shows which soils belong to which Hydrologic Soil Groups:

Soil Name	**Hydrologic Soil Group**
Ontario-Lima-Lansing-Honeoye-Conesus	A
Valois-Howard-Bath	B
Volusia-Mardin-Lordstown	C
Wayland-Palmyra-Howard-Chenango	A
Rhinebeck-Niagara-Hudson-Dunkirk-Collamer	C

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 page 55 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 Dryden is included in Table 9.

Table 9: Soil Types in Dryden	
Soil Type	Percent of Land in Municipality
Ontario-Lima-Lansing-Honeoye-Conesus	0.04%
Valois-Howard-Bath	3.5%
Volusia-Mardin-Lordstown	69.62%
Wayland-Palmyra-Howard-Chenango	25.02%
Rhinebeck-Niagara-Hudson-Dunkirk-Collamer	1.8%

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 (see page 56), a map of prime agricultural soils (see page 57), and a map of hydric soils. The soil drainage map is derived from the U.S. General Soil Map. The data for the prime agricultural soils and hydric soils were provided by the USDA

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 Wayland-Palmyra-Howard-Chenango and Ontario-Lima-Lansing-Honeoye-Conesus as soils that drain well; Valois-Howard-Bath as soils that drain moderately well; and Volusia-Mardin-Lordstown and Rhinebeck-Niagara-Hudson-Dunkirk-Collamer as somewhat poorly drained. Water and urban land are categorized as "somewhat excessively drained." Most of Dryden consists of Volusia-Mardin-Lordstown soil and is thus mostly categorized as somewhat poorly drained.

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. The map of page 57 consists of prime farmland as well as potential prime farm land if drained. As depicted in the map, most prime agricultural lands are located along the creek/ flood zones, and thus can also be a risk to flooding.
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

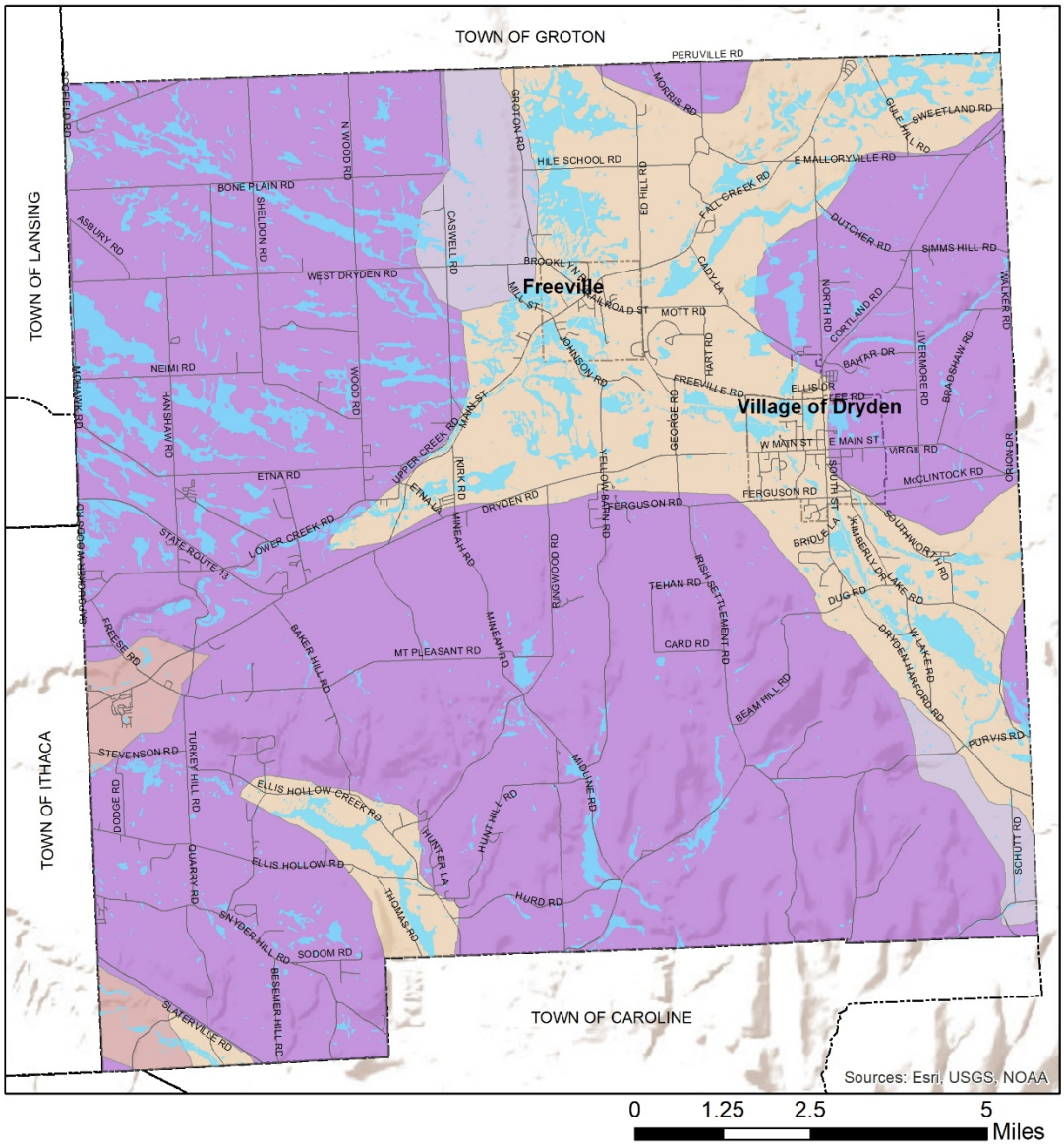
Hydric Soils – Introduction,
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053961
Official Soil Series Descriptions (OSDs),
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/data/?cid=nrcs142p2_053587
U.S. General Soils Map, https://gdg.sc.egov.usda.gov/GDGOrder.aspx?order=QuickState

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

Dryden General Soil Map



Soil Type

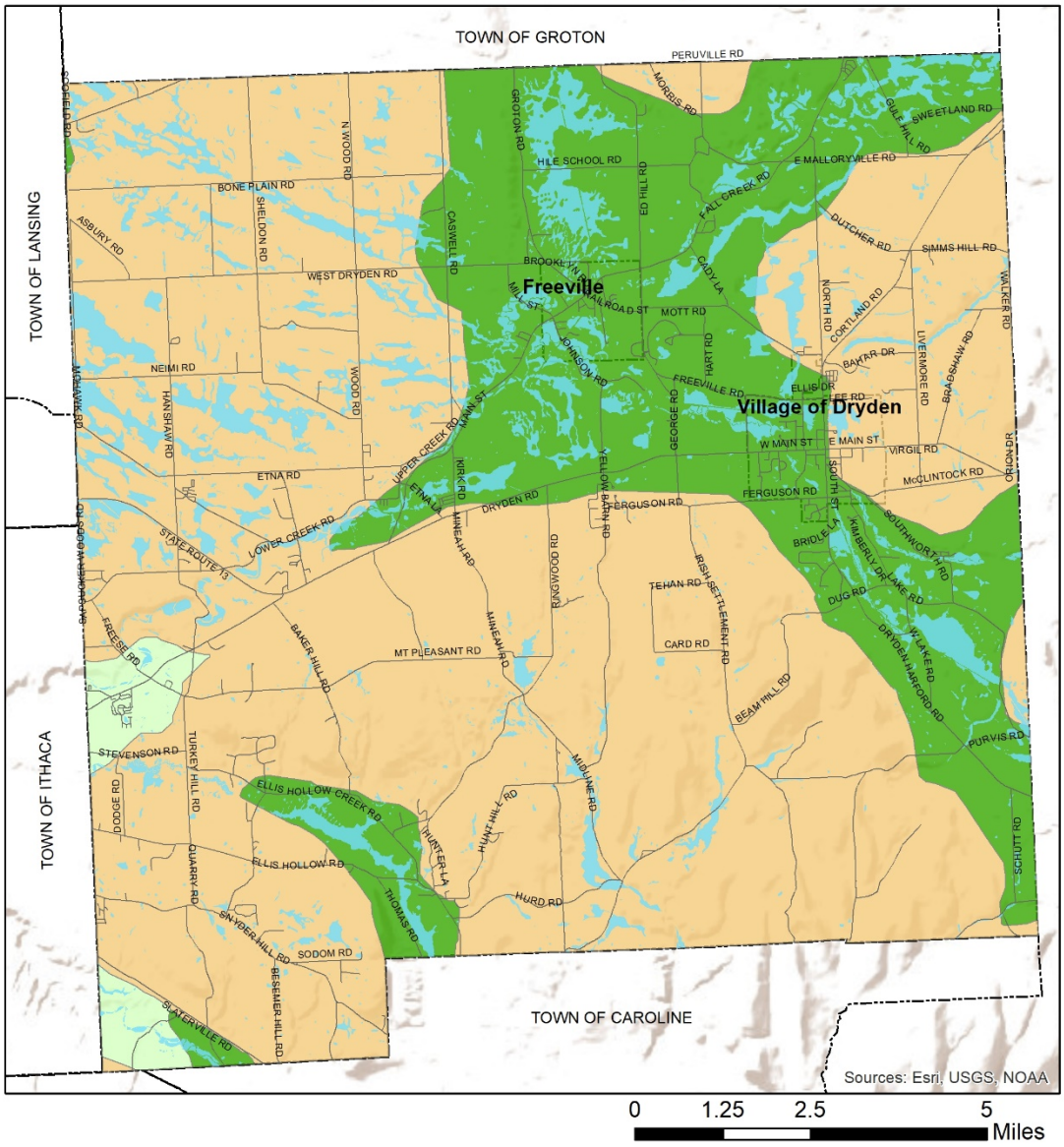
- Ontario-Lima-Lansing-Honeoye-Conesus (s5977)
- Rhinebeck-Niagara-Hudson-Dunkirk-Collamer (s5987)
- Valois-Howard-Bath (s5974)
- Volusia-Mardin-Lordstown (s5975)
- Wayland-Palmyra-Howard-Chenango (s5983)

- Tompkins Co. Municipal Boundaries
- Dryden Roads
- Water

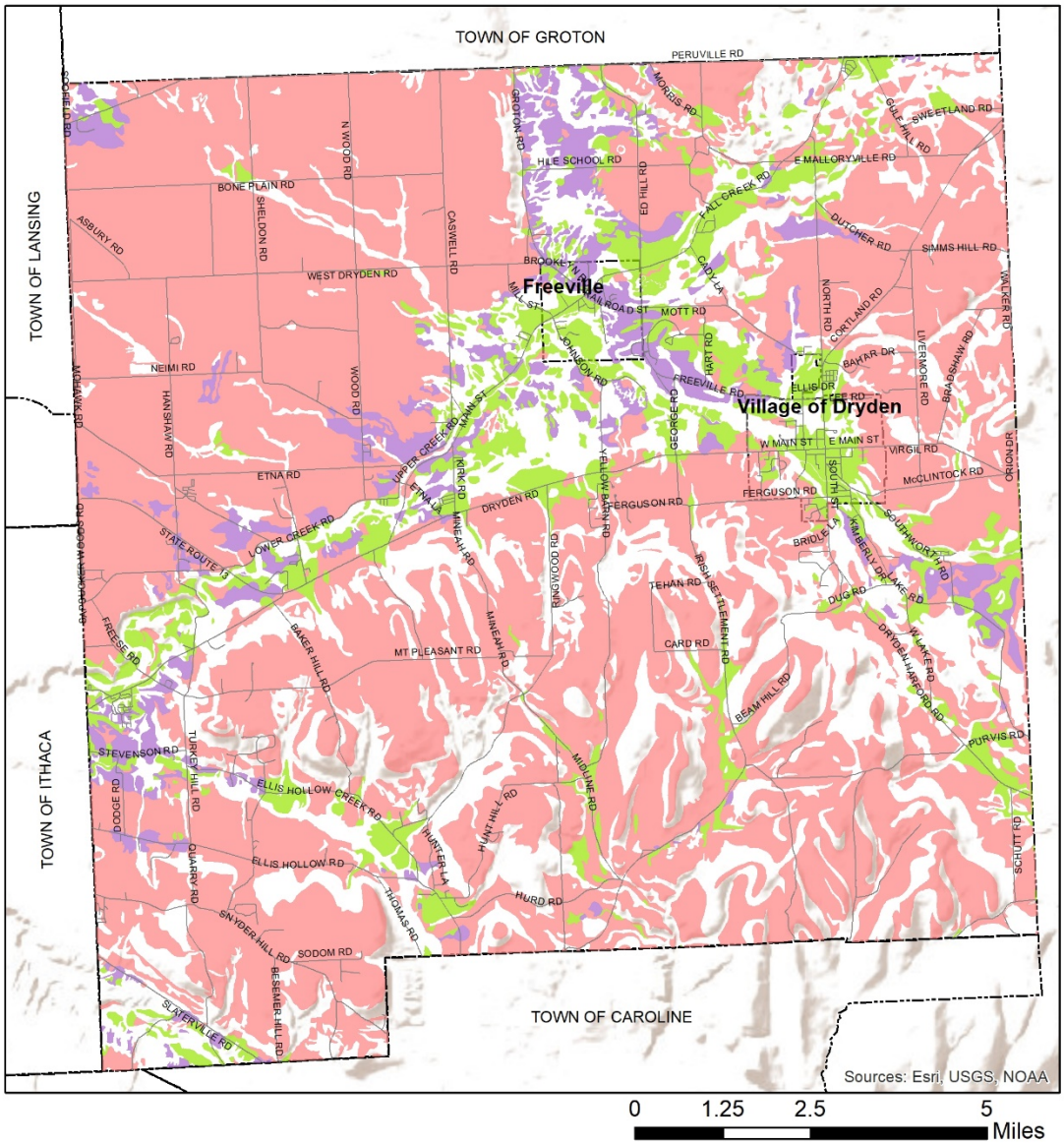
N
W E
S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Dryden Soil Drainage



Dryden Prime Farm Land



Dryden Roads

Tompkins Co. Municipal Boundaries

Farmland Importance

Prime farmland

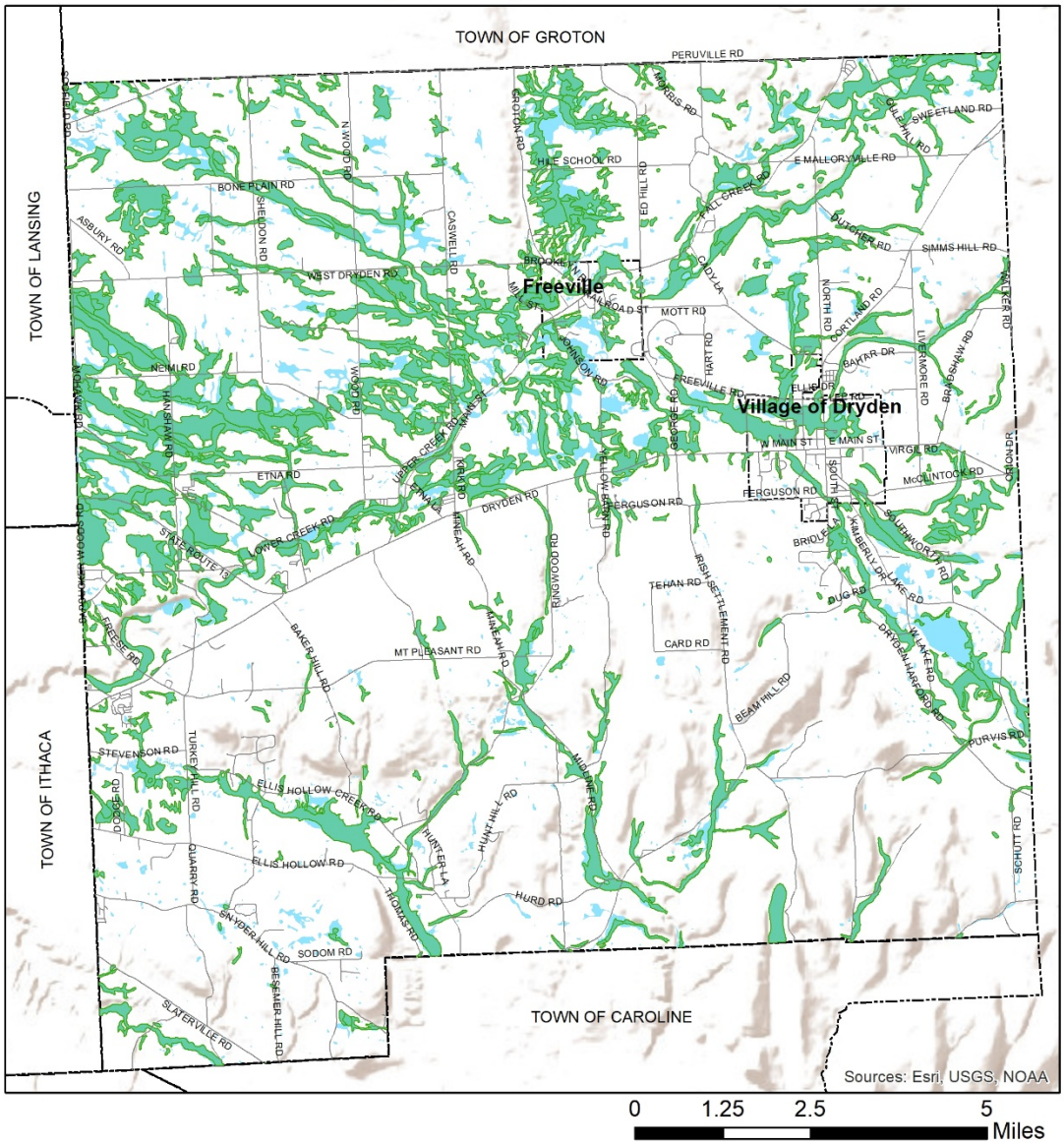
Farmland of statewide importance

Prime farmland if drained

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Dryden Hydric Soils



2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Section 3: 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 (Dryden Open Space Inventory).

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 Dryden

Land use and land cover data from 2015 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 in Tompkins County. Individual classes are grouped into main categories. The data for the Town of Dryden is as follows:

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 (Dryden Open Space Inventory). Participation in this program is voluntary. Much of the eastern side of Dryden is designated as an agricultural district by New York State.

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
Agriculture	15.3%	15.5%	Cropland, pastures
Barren or Disturbed	0.3%	0.3%	Vegetation has been cleared but no development
Commercial	0.7%	0.7%	Retail stores, offices
Inactive Agriculture	2.8%	3%	Agricultural land not in use
Industrial, Transportation, and Transmission	1%	1%	Utilities, pipelines, highways, railroads
Public/Institutional	0.5%	0.5%	Educational facilities, cemeteries, public works
Recreation	0.3%	0.4%	Golf courses, ball fields, parks
Residential	9.3%	9.3%	High, medium, and low density residential
Water	2.6%	--	Natural lakes, ponds
Wetlands	8.5%	8.6%	NYSDEC or national wetlands
Vegetative Cover	58.3%	58.5%	Forests, brush

Maps and Data

The map on page 63 shows land use/land cover in Dryden. Data for this map was provided by the Tompkins County GIS Division and was last updated in 2015. Although the 2015 data is not available online, the 2012 data is available from CUGIR under the name "Land Use and Land Cover, Tompkins County NY 2012." For more information on the Land Use Land Cover Project methodology, contact the Tompkins County Planning Department.

Resources and References

Cornell Cooperative Extension, ulster.cce.cornell.edu/agriculture/farmland-access-protection/agricultural-districts

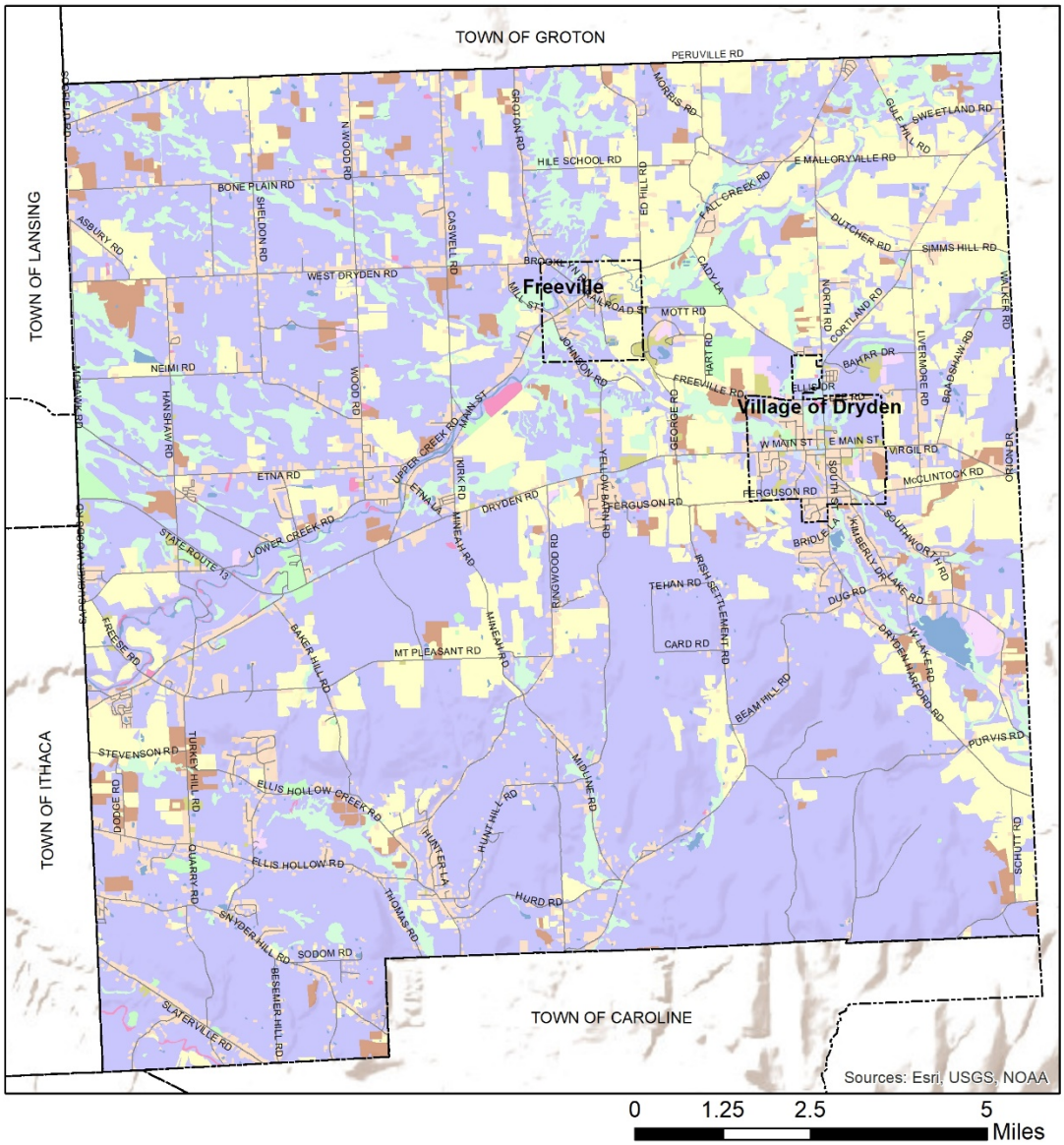
Cornell University Geospatial Information Repository (CUGIR), https://cugir.library.cornell.edu/

Cornell University Institute for Resource Information Systems (IRIS), http://iris.css.cornell.edu/index.html

Dryden Open Space Inventory (Town of Dryden) http://dryden.ny.us/wp-content/uploads/2019/02/Open-Space-Inventory-2003.pdf

US Department of Agriculture, https://www.fs.usda.gov/ccrc/topics/species-distribution-models

Dryden Land Use Land Cover



Tompkins Co. Municipal Boundaries

Dryden Roads

Land Cover Type

- Agriculture
- Barren or Disturbed
- Commercial
- Inactive Agriculture
- Industrial, Transportation, Transmission
- Public/Institutional
- Recreation
- Residential
- Vegetative Cover
- Water
- Wetlands

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2019 Dryden NRI
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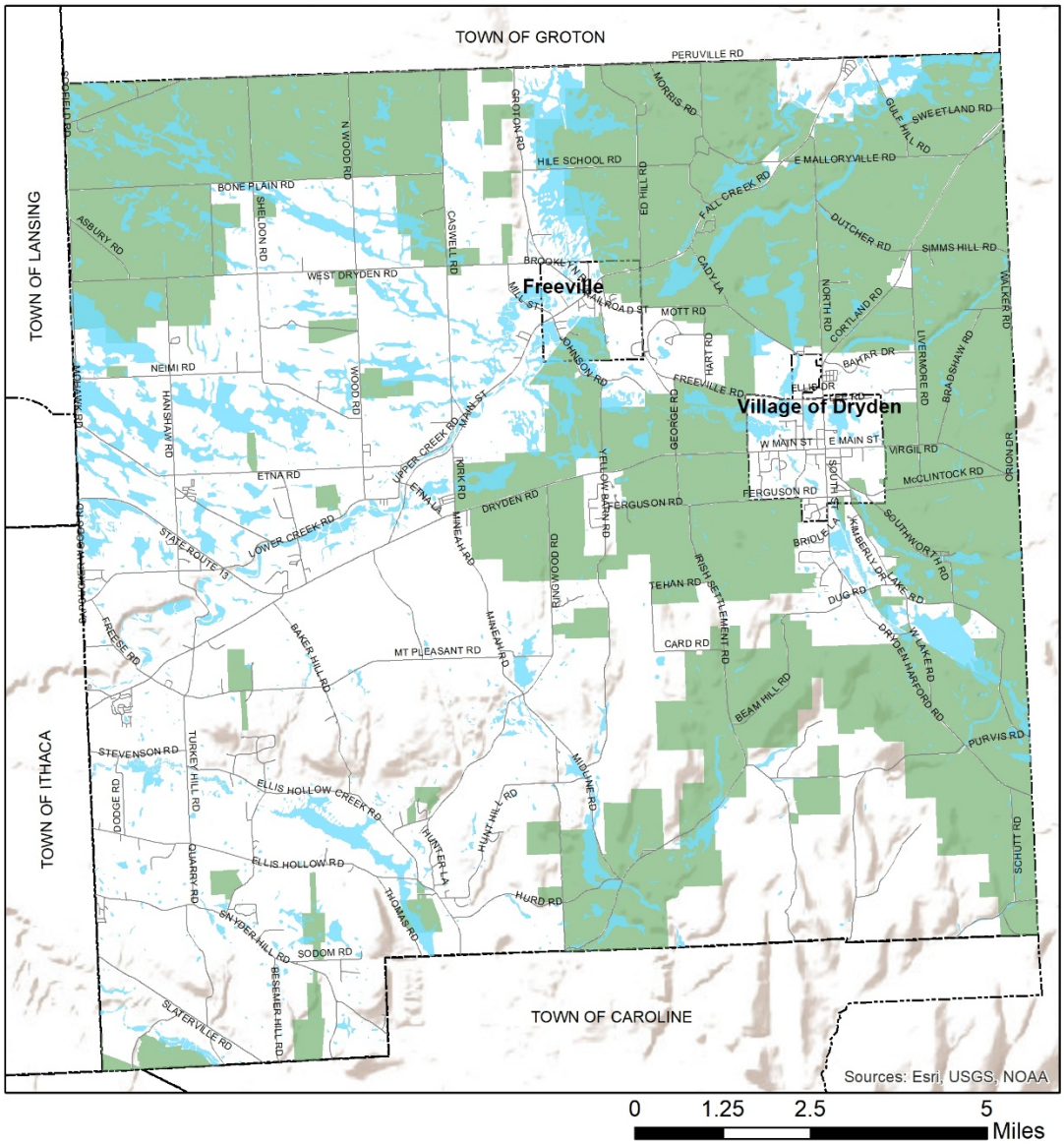
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

Dryden Agricultural Districts



2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

NATURAL HERITAGE SITES

What Is a Natural Heritage Site?

A Natural Heritage Site is a point or area representing specific natural resource information documented by the New York Natural Heritage Program. The goal of this program, a joint venture of the New York State Department of Environmental Conservation (DEC) and The Nature Conservancy (TNC) since 1985, is to compile and maintain an up-to-date inventory of the location and status of New York State's rarest animal and plant species and its ecological communities. As of 2017, the Natural Heritage Program monitors the status of 802 rare plant species, 466 rare animal species, and 179 ecological community types in New York State.

Why Are Natural Heritage Sites Important?

The databases maintained by the New York Natural Heritage Program can assist in identifying threatened or endangered species and ecological communities in Dryden. This knowledge can be incorporated into planning, conservation, and natural resources management to help conserve the plants, animals, and ecological communities that represent the County's natural heritage. Though not a requirement of the State Environmental Quality Review Act (SEQRA), the Natural Heritage Program will search its databases upon request for proposed actions subject to SEQRA review.

Natural Heritage Sites in Dryden

Currently, the Natural Heritage Program database lists one significant ecological community within the town of Dryden. For information concerning the data, or to request site specific information, contact the New York Natural Heritage Program.

Maps and Data

The map on page 66 shows significant natural communities and rare plants and animals in the Town of Dryden. This data was provided by the following source: New York Natural Heritage Program, SUNY College of Environmental Science and Forestry. January 2018. Element Occurrence Spatial Data Set. Albany, New York.

Information on the status and distribution of rare and endangered animals and plants, and the best examples of New York State's ecological communities, is collected, stored, and analyzed in databases maintained by the Natural Heritage Program. This information has been assembled from historical records and collections maintained by scientific institutions such as the New York State Museum, and from field surveys by staff from the New York Natural Heritage Program and other scientific groups.

Neither site-specific nor comprehensive surveys for rare species and significant natural communities have been conducted for the entire state. Therefore, these data cannot be relied on as a definitive statement of the presence or absence of rare species or significant ecological communities and cannot be substituted for on-site surveys that may be required for environmental assessment.

Resources and References

New York Natural Heritage Program, SUNY College of Environmental Science and Forestry. January 2018. Element Occurrence Spatial Data Set. Albany, New York.

New York State Department of Environmental Conservation

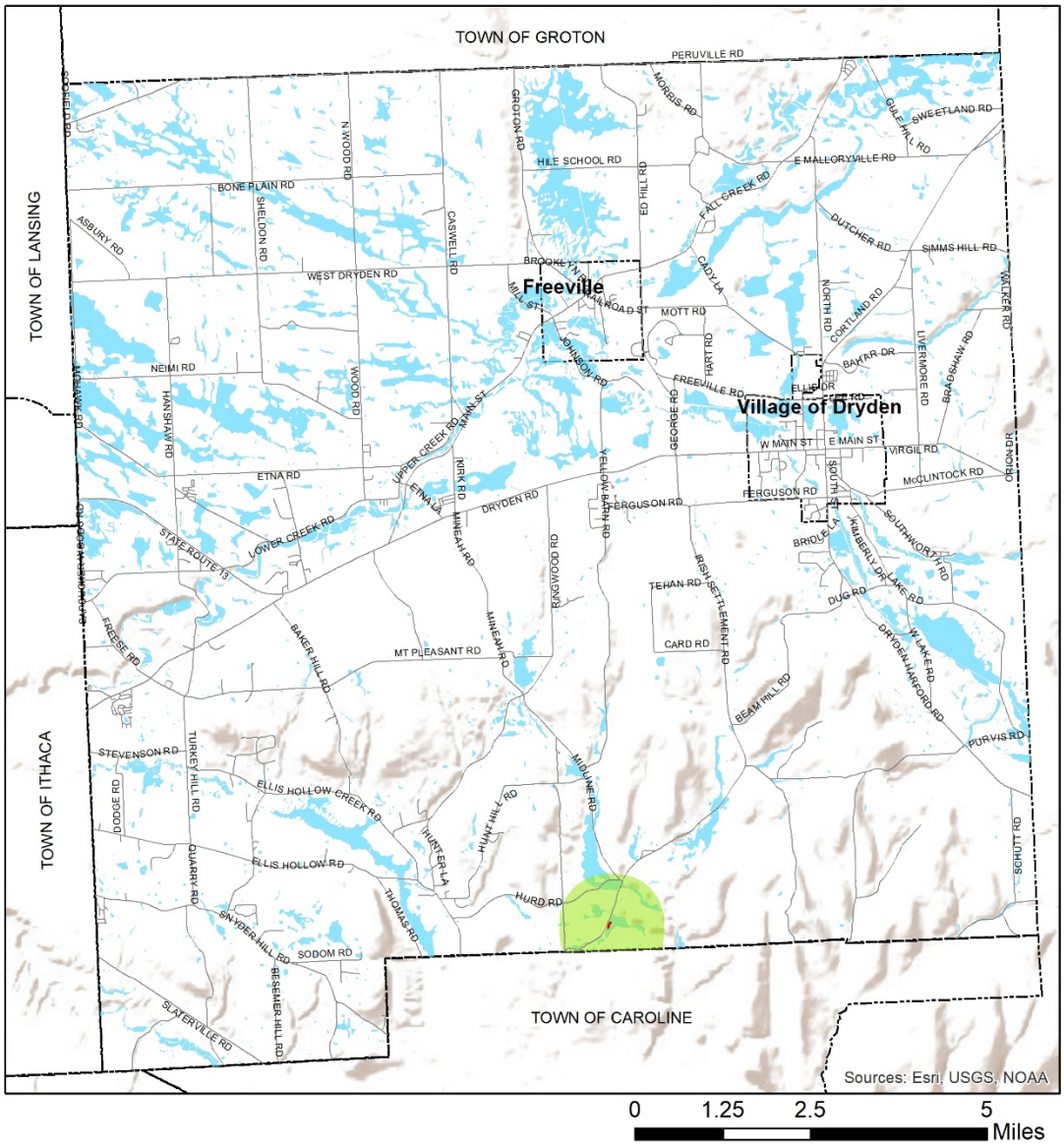
Division of Fish and Wildlife, http://www.dec.ny.gov/about/634.html

Division of Marine Resources, http://www.dec.ny.gov/about/796.html

List of Endangered, Threatened and Special Concern Fish & Wildlife, Species of New York State, http://www.dec.ny.gov/animals/7494.html

New York Natural Heritage Program, http://www.dec.ny.gov/animals/29338.html

Dryden Natural Heritage Sites



2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

UNIQUE NATURAL AREAS

What Is a Unique Natural Area?

Unique Natural Areas (UNAs) are sites with outstanding environmental qualities, as defined by the Tompkins County Environmental Management Council, that are deserving of special attention for preservation and protection UNAs include such natural features as gorges, woods, swamps, fens, cliffs, and streams. They lie on both publicly and privately-owned lands, and anyone wishing to visit a site on private land must obtain permission from the owner or owners.

Why Are Unique Natural Areas Important?

Unique Natural Areas are recognized because of the outstanding qualities that render them "unique" within Dryden. Often, the characteristics that make a site unique are extremely vulnerable to a wide range of both direct and indirect impacts and may be compromised by disturbing the site. For this reason, the UNA Inventory incorporates an array of data that can be utilized in planning efforts to help identify and mitigate potential impacts to a UNA.

What Are the Criteria for a Unique Natural Area?

At least one of five criteria must be met to classify an area as a UNA:

1. **Important Natural Community:** the site includes a state-designated wetland, a designated natural area/preserve, historical botanical/zoological characteristics, important teaching characteristics, an old-growth forest, a plant or animal community type that is rare or scarce in the County, diverse flora or fauna, a birding site, and/or a wilderness character.

2. **Quality of Example:** the site is considered the best representative, for example, of an ecosystem, plant community, or animal community of high quality within the County. These sites typically contain especially large individuals, dense populations, and/or a particularly diverse mixture of species.

3. **Rare or Scarce Plants or Animals:** the site contains plant or animal species that have been recognized as rare or scarce at a national, state, or local level; has critical migration, reproductive, or feeding habitat for rare or scarce animal species; and/or has reports of large mammals.

4. **Geological Importance:** the site includes a rare or outstanding example of geological features or processes and/or a paleontological site.

5. **Aesthetic/Cultural Qualities:** the site contains acknowledged outstanding natural or scenic beauty as viewed from within or from a distance, has recreational value, is designated as urban greenspace, and/or has cultural/historic/archeological significance.

Unique Natural Areas in Dryden

The Town of Dryden contains 51 UNAs amounting to 11412 acres or approximately 18.95% of the total municipal land area. Table 11 provides more information about the UNAs in Dryden.

Table 11: Unique Natural Areas in Dryden

UNA Name	Acres	% of municipality
Beaver Brook Fens	70.45788	0.116635
Beaver Brook Springs	17.560485	0.029069
Beaver Brook Swamp	140.947872	0.233323
Caswell Road Swamp	88.347131	0.146248
Cooks Corner Gully	163.92361	0.271356
DEC Mapped Wetland (Code DR3)	15.505824	0.025668
DEC Mapped Wetland (Code GR17)	11.435374	0.01893
DEC Mapped Wetland (Code TA4)	33.287385	0.055103
DEC Mapped Wetland (Code TA5)	177.636555	0.294056
DEC Mapped Wetland (Code TA9)	56.792359	0.094013
DEC Mapped Wetland (Code WG19)	82.639202	0.136799
DEC Mapped Wetland (Codes TA2 and TA3)	226.626623	0.375154
Dryden-Slaterville Fir Tree Swamp	33.695033	0.055778
Dryden Firehouse Wetland	49.45266	0.081863
Dryden Lake Outlet Swamp	43.725532	0.072383
Dryden Lake, Marshes and Swamp	378.853212	0.627147
Durland Bird Preserve	437.943631	0.724964
East Malloryville Tamarack Swamp and Fen	14.825915	0.024543
Ellis Hollow Swamp	351.74139	0.582267
Etna Bird Sanctuary (Etna Marsh)	36.332459	0.060144
Etna Swamp	81.385054	0.134723
Fall Creek Road, Moss Seep	2.312618	0.003828
Fall Creek Valley, Ithaca	254.71063	0.421644
Freeville Fir Tree Swamp	406.67981	0.673211
Fringed Gentian Meadow	77.514696	0.128316

Frost Ravine	126.4696	0.209356
Hurd Road Woods	189.524743	0.313736
Malloryville Bog, Swamp, Fens and Esker	60.775593	0.100607
Malloryville Fen	33.969104	0.056232
McLean Preserve and Adjacent Wetlands	244.135019	0.404137
McLean Woods	61.123509	0.101183
Monkey Run	543.703291	0.900037
Mud Creek Swamp	168.709208	0.279278
Mud Creek Woods	40.522371	0.066583
North Malloryville	326.011169	0.539673
Peruton Swamp and Fens	460.630031	0.762519
Pine Woods	466.191971	0.771726
Pleasant Hollow Swamp, North	49.915228	0.082629
Pleasant Hollow Swamp, South	40.3313	0.066764
Polson Preserve and Snyder Hill	646.053556	1.06947
Ringwood Ponds	628.791099	1.04089
Sheldon Road Wetland	120.358457	0.199239
Six Mile Creek Valley, Ithaca	1468.900192	2.43159
Slaterville Wildflower Preserve (old 600)	1109.145943	1.83606
Star Stanton Hill	408.341339	0.675961
Thomas Road Wetlands	186.694792	0.309051
Townley Swamp, East	197.361139	0.326708
Townley Swamp, West	196.48636	0.32526
Wood Road Swamp	213.217802	0.352957
Woodwardia Bog	40.079977	0.066348
Wyckoff Swamp	130.738485	0.216422
Total	**11412.606666**	**18.892231**

Maps and Data

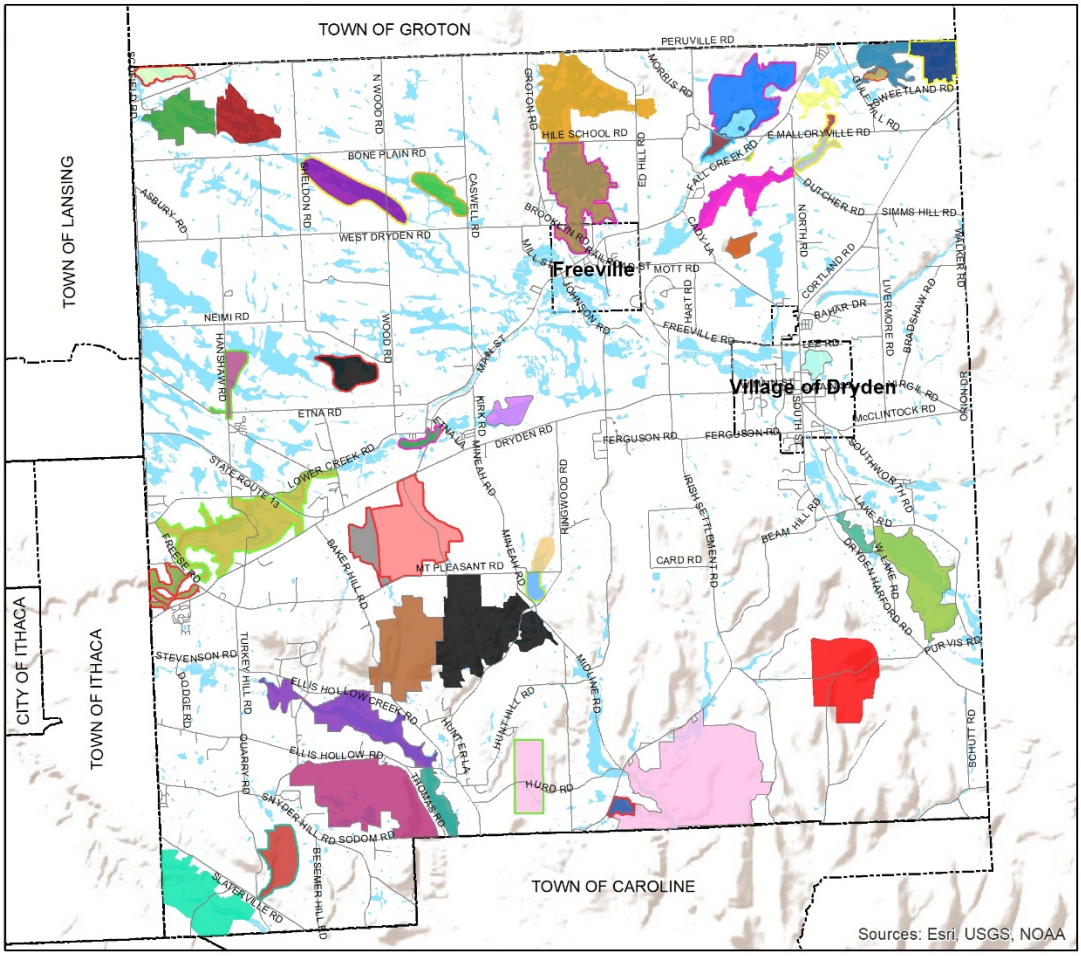
The following map shows the location and names of the 51 UNAs in Dryden. The data for this map was provided by the Tompkins County GIS Division and was last updated in 2017. Information available for each UNA includes the reason for selecting the site, special land use information, adjacent land use data, vulnerability of the site, vegetation cover types, ecological communities, rare, threatened or endangered species, geologic and water features, slope, and soils. This information is available from the Town of Dryden and the Tompkins County Planning Department.

Resources and References

Dryden Open Space Inventory (2003 – Town of Dryden) http://dryden.ny.us/wp-content/uploads/2019/02/Open-Space-Inventory-2003.pdf

Tompkins County Unique Natural Areas, http://www.tompkinscountyny.gov/emc/educational-materials

Dryden Natural Heritage Sites



Note: This map's scale is 1:150,000

0 1.25 2.5 5 Miles

- Tompkins Co. Municipal Boundaries
- Water
- Dryden Roads

NAME

- Beaver Brook Fens
- Beaver Brook Springs
- Beaver Brook Swamp
- Caswell Road Swamp
- Cooks Corner Gully
- Dryden Firehouse Wetland
- Dryden Lake Outlet Swamp
- Dryden Lake, Marshes and Swamp
- Dryden-Slaterville Fir Tree Swamp
- Durland Bird Preserve
- East Malloryville Tamarack Swamp and Fen
- Ellis Hollow Swamp
- Etna Bird Sanctuary (Etna Marsh)
- Etna Swamp
- Fall Creek Road, Moss Seep
- Fall Creek Valley, Ithaca
- Freeville Fir Tree Swamp
- Fringed Gentian Meadow
- Frost Ravine
- Hurd Road Woods
- Malloryville Bog, Swamp, Fens and Esker
- Malloryville Fen
- McLean Preserve and Adjacent Wetlands
- McLean Woods
- Monkey Run
- Mud Creek Swamp
- Mud Creek Woods
- North Malloryville
- Peruton Swamp and Fens
- Pine Woods
- Pleasant Hollow Swamp, North
- Pleasant Hollow Swamp, South
- Polson Preserve and Snyder Hill
- Ringwood Ponds
- Sheldon Road Wetland
- Six Mile Creek Valley, Ithaca
- Slaterville Wildflower Preserve (old 600)
- Star Stanton Hill
- Thomas Road Wetlands
- Townley Swamp, East
- Townley Swamp, West
- Wood Road Swamp
- Woodwardia Bog
- Wyckoff Swamp

N W E S

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PROTECTED OPEN SPACE

What Is Protected Open Space?

In Tompkins County, some open space is protected by various public and private organizations, namely the Finger Lakes Land Trust, the Nature Conservancy, Cornell University, the National Audubon Society, and the Cayuga Nature Center. 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. Over the years, the Town of Dryden has been quite successful in conserving and protecting open space despite active development and the town's growing population. In total, there are over 10,000 acres of designated protected open space, or 16 private preserves, according to the Dryden NRCS, that are owned and maintained by Cornell University, Cayuga Nature Center, Finger Lakes Land Trust, and the Nature Conservancy.

New York State Parks in Dryden

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 the Town of Dryden, there are two major state forests, one state park, and one wildlife management area.

Yellow Barn State Forest is a 1289-acre space that acts as a wildlife sanctuary and recreational land to the local community. The forest is often used by campers, hunters, fishers, and winter recreational vehicles.
Hammond Hill State Forest is a 3618-acre space that is actively used for outdoor recreation. The park is often used by hikers, but is also known for skiing, camping, hunting, fishing, and mountain biking. The park is a significant site for wildlife.

Dryden Lake Park is a 106-acre park that is known for its scenic views and offers bird watching, hiking, boating, and golfing. While the park is relatively small, it provides sanctuary to local wildlife and offers an array of activities to the local community.

What Are the Finger Lakes Land Trust/ Nature Conservancy Preserves and Conservation Easements?

The Finger Lakes Land Trust and Nature Conservancy 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 or Nature Conservancy, 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 or Nature Conservancy, who is the party receiving the easement. Both preserves and easements are managed by the FLLT to or Nature Conservancy 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.

Preserves and Conservation Easements in Dryden

As mentioned above, there are many preserves that exist within the Town of Dryden. According to the Dryden NRCS, the most important and major preserves that exist in the municipality are the following:

- **Jim Schug Trail (Dryden Lake Trail):** NYS DEC Lands
- **O.D. Von Engeln Preserve at Malloryville:** The Nature Conservancy Lands
- **Genung Nature Preserve:** Municipal Conservation Lands
- **Etna Nature Preserve:** FLTT Nature Preserve
- **Sapsucker Woods Sanctuary (Eastern half):** CU Conserved Lands
- **Monkey Run Natural Area:** CU Conserved Lands
- **Ellis Hollow Nature Preserve:** FLLT Nature Preserve
- **Roy H. Park Nature Preserve:** FLLT Nature Preserve

Other conserved/ protected open spaces can be found on the map below on page 75 of this document.

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 75 shows state parks, nature preserves, archaeological sites, community parks, trails, and municipal parks. This data is available from the Tompkins County Open Data Portal under the name "GenForestPark."

For a map of this information, in paper or digital format, contact the Tompkins County Planning Department. For information on Finger Lakes Land Trust Preserves and Conservation Easements, contact the Finger Lakes Land Trust. For information on the Nature Conservancy Preserves, contact the Nature Conservancy. For information on Cornell Natural Areas, contact the Cornell Botanic Gardens

Resources and References

Cornell University, Cornell Botanic Gardens, Natural Areas, http://www.cornellbotanicgardens.org/our-gardens/natural-areas

Dryden Open Space Inventory (2003 – Town of Dryden) http://dryden.ny.us/wp-content/uploads/2019/02/Open-Space-Inventory-2003.pdf

Finger Lakes Land Trust

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

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

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

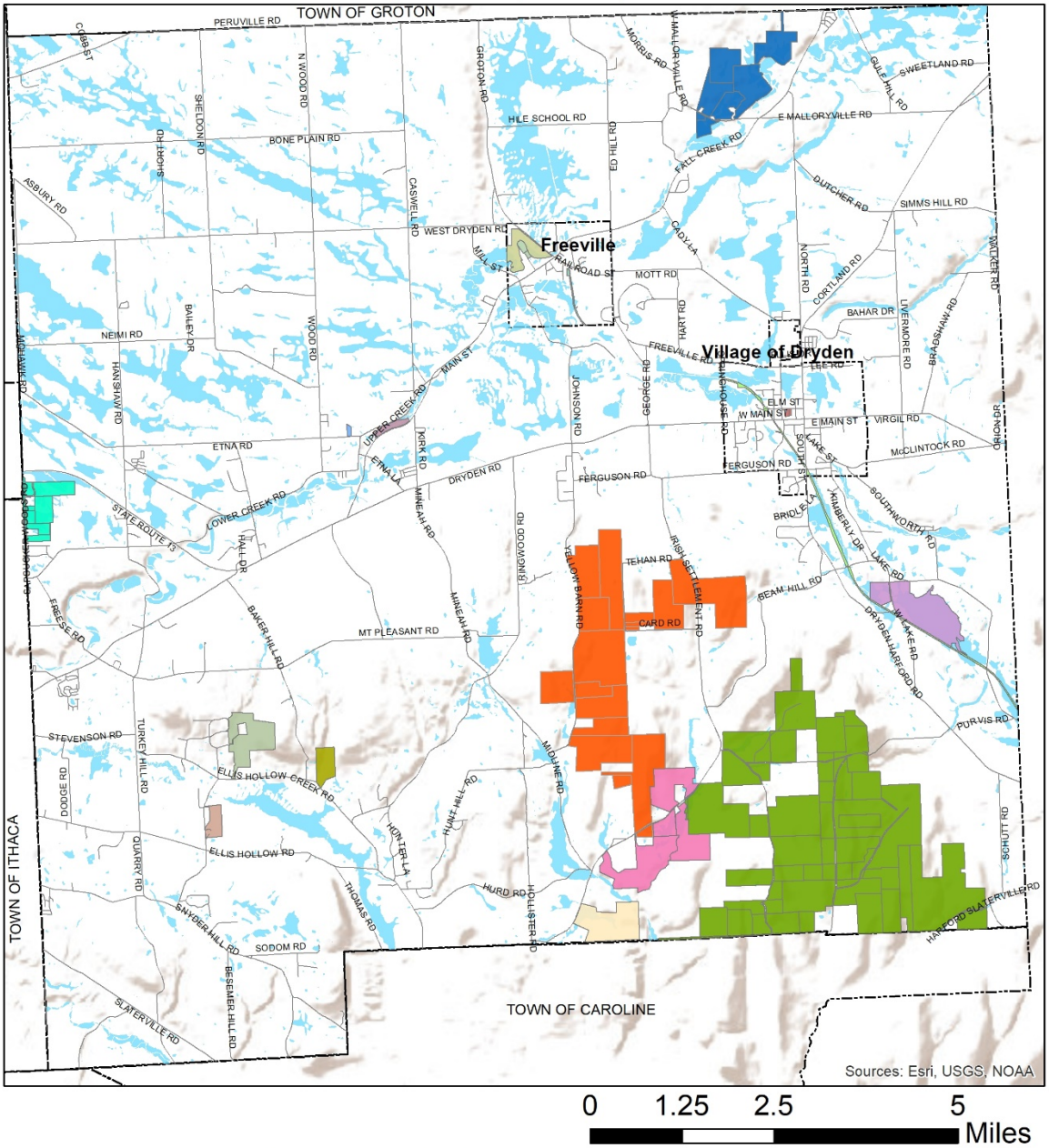
New York State Department of Environmental Conservation

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/

Dryden Open Space



SCENIC RESOURCES

What is a Scenic Resource?

A scenic resource is an "area of intense visual appeal," both natural and human made. In 2007, Tompkins County created an inventory of scenic resources based on public input. This process resulted in categorization of scenic resources into three categories: Distinctive Views, Noteworthy Views, and Characteristic Views. Distinctive views are those that "make a clear, unmistakable impression;" noteworthy views are those that "are worthy of attracting attention and are better than many of the scenic views in the County;" and characteristic views are scenic views that are seen frequently that are characteristic of the County. For further information on these definitions, please refer to the Tompkins County Scenic Resource Inventory which can be found in the resources and information section below.

Scenic Resources in Dryden

In total, the Town of Dryden contains 111 views which covers 18.7% of the total number of views in the county. Out of those 111 views, the town contains a total of 11 distinctive views and 5 noteworthy views. As noted above, distinctive and noteworthy views are determined to "make a clear, unmistakable impression" on the viewer, and are supposed to be the best views within the Town of Dryden. The featured views are listed below:

View D10 is found on the Monkey Run Trail in the Town of Dryden. The photograph is looking SSW and the view is approximately 180˚ wide.

View N12 is found on Turkey Hill Road approximately 0.2 miles from its intersection with Stevenson Road in the Town of Dryden. The photograph is looking WSW and the view is approximately 135˚ wide.

View N15 is found on Route 13 approximately 0.2 miles from its intersection with Gulf Hill Road in the Town of Dryden. The photograph is looking NW and the view is 360˚ wide.

View N14 of Dryden Lake is found on West Lake Road approximately 0.2 miles from its intersection with Lake Road in the Town of Dryden. The photograph is looking E and the view is approximately 180˚ wide.

View N13 is found on the Monkey Run Trail in the Town of Dryden. The photograph is looking SSW and the view is approximately 180˚ wide.

The information and pictures have been retrieved from the Tompkins County Scenic Resource Inventory. For more information on the Scenic Resources and the evaluation methods used, please refer to the document which can be accessed below:

http://tompkinscountyny.gov/files2/planning/Natural_Agriculture/TCSR%20report%20Jan%2017.pdf

Why are Scenic Resources Important?

Scenic resources contribute to the day-to-day quality of life of Dryden 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. Scenic views can be protected through measures such as zoning ordinances.

Maps and Data

The map on page 80 shows the locations of Distinctive, Noteworthy, and Characteristic Views in the Town of Dryden, as well as views that were inventoried but did not fall under any of these three categories. Data was provided by the Tompkins County GIS Division

Resources and References

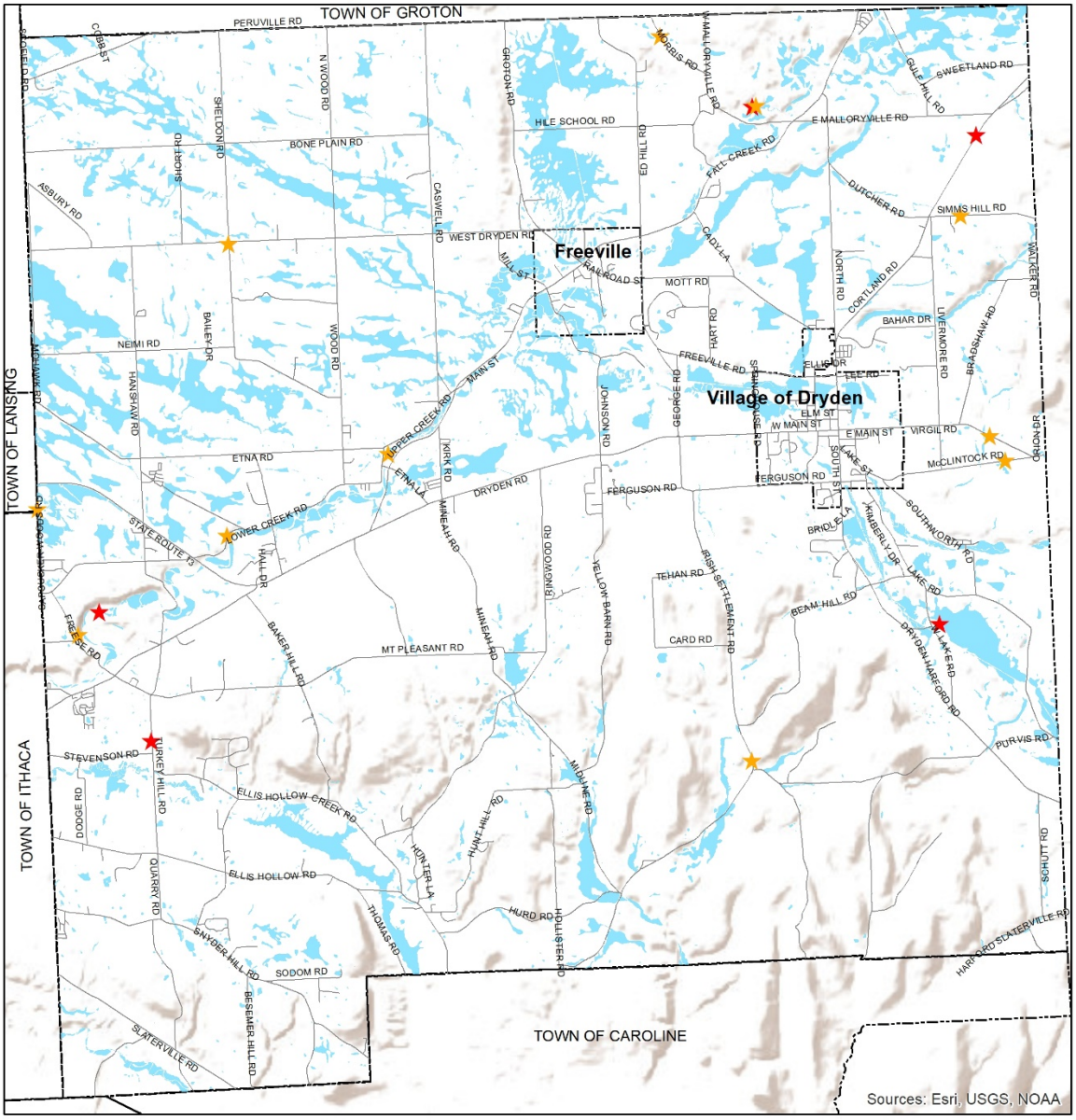
Tompkins County

Protecting Our Scenic Resources (2010), http://www.tompkinscountyny.gov/files2/planning/nri/documents/ScenicResourcesProtectionDec2010_000.pdf

Scenic Resources, http://www.tompkinscountyny.gov/planning/nri-scenic_resources

Tompkins County Scenic Resources Inventory (2007), prepared by Peter J. Smith & Company, Inc., http://www.tompkinscountyny.gov/files2/planning/nri/documents/TCSRreportJan17.pdf

Dryden Scenic Resources



0 1.25 2.5 5 Miles

View Type

- Distinctive View
- Noteworthy View
- Dryden Roads
- Tompkins Co. Municipal Boundaries
- Water

N W E S

2019 Dryden NRI
Created By: CCE-Tompkins
Date Created: 2/5/2019
Data Source: CUGIR, USGS
Projection: NAD83_New_York_Central_ftUS

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 of a 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 analyses are 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

- *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.
- *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 or 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

  - *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
  - *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.

  - *Advantages:*
    - No direct acquisition expense for the municipality.
    - No direct maintenance expense for the municipality.
  - *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.

  - *Advantages:*

    Property owners maintain the value of their property

    Properties maintain their historic and ecological significance

  - *Disadvantages:*

    Some developers may 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