An aerial photograph of a town, likely Lansing, showing a large, dense wooded area in the center. The town's buildings and streets are visible around the perimeter of the woods. The image is in grayscale.

# Town of Lansing Natural Resources Inventory

Compiled by  
Cornell Cooperative Extension  
of Tompkins County

# ACKNOWLEDGEMENTS

This document is a Town of Lansing-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 the Town of Lansing Conservation Advisory Council as well as the Cornell University Department of City and Regional Planning, and was coordinated by Osamu Tsuda, Climate Smart Communities Specialist at Cornell Cooperative Extension of Tompkins County under the advisement of Terry Carroll (Southern Tier NYSERDA Clean Energy Communities Coordinator, Cornell Cooperative Extension of Tompkins County). C.J. Randall, Lansing Town Planner, and the Tompkins County Planning Department provided additional assistance. Theodora Weatherby, Energy Educator at Cornell Cooperative Extension of Tompkins County created and edited the final graphics of this document.

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## Executive Summary

The Town of Lansing's Natural Resources Inventory (NRI) is designed as a source of information on the ecological and economic value of natural resource assets within the Town of Lansing, New York, to facilitate future planning, development, and conservation efforts. The NRI may guide community members and municipal officials toward a more sustainable and resilient future as they seek to balance economic development with protection of natural areas and resources.

The document is much more than a simple inventory; it provides detailed explanations of the ecosystem services provided by our natural areas and resources: sustainable food production; a clean water supply; flood control; soil conservation; habitat supporting wildlife and biodiversity; and safe and abundant outdoor recreation opportunities. Useful websites, resources, and scientific literature are cited throughout the text, and most sections include tables, graphs, and abundant maps to help clarify the text. The NRI also lays out explicit mechanisms for protecting natural resources, from non-regulatory tools such as land acquisition and education, to regulatory tools such as zoning designations, park dedications, and buffer requirements. Throughout the document the collaborations and boundaries between Town actions and those of county, state, and federal agencies are explained.

## Climate Change

An early section of the NRI focuses on climate change, which is recognized as an overarching environmental challenge to sustainable development and protection of natural resources within our region. This section provides detailed information on recent historical changes in our weather patterns, as well as future climate projections. In addition to an increased frequency of heat stress days, other key changes we are already experiencing include an increased frequency of high rainfall events and wetter springs and falls leading to flooding, as well as the threat of too little water in summer when most needed by crops and natural vegetation. Climate models project these challenges are likely to become more pronounced during the next few decades. The observed and projected impacts on natural areas, waterways, fisheries, and farms in our region are discussed. Most importantly, this section provides many specific "adaptation" strategies for both managed and natural ecosystems to cope with some inevitable climate change, as well as "mitigation" strategies for slowing the pace of climate change by reducing greenhouse gas emissions or capturing and storing carbon in vegetation and soils. The climate change topic is also woven throughout the other sections of the NRI where appropriate.

## Hydrology

The hydrology section of the NRI includes data and maps to describe and locate the Town in relation to the eastern Cayuga Lake watershed region, and the major water bodies (e.g., Cayuga Lake, Salmon Creek, and Gulf Creek), culverts, aquifers, wetlands, and flood hazard areas

within the Town boundaries. Each of these are discussed in terms of their importance for overall water management and flood control, meeting the safe drinking water needs of the population, recreational value, importance for supporting healthy and diverse wildlife and fishery populations, and vulnerability to climate change. The recent issue of Harmful Algal Blooms (HABs) in Cayuga Lake is discussed in relation to nutrient loading from land surfaces into the lake, and how climate change (heavy rain events) may be exacerbating this problem. Strategies for stormwater management and other specific adaptations for a changing climate are elucidated. The various agencies involved in regulation and monitoring of the Town's water resources are also discussed in terms of their role in decisions regarding development and protection of water resources.

## Geology and Soils

The geology and soils section of the NRI identifies and provides maps and a brief description of the dominant soil types in relation to drainage capacity, and optimal land use. The topography of the region is discussed in relation to erodibility of soils, as well as water, sediment, and nutrient flow into waterways during rain and snowmelt events. Bedrock geology and major land features such as gorges are also discussed.

## Land Use and Land Cover

This section provides current baseline land use and land cover maps for the Town, along with links to other sources of information that will be important when making decisions about proposed land uses, development suitability, and comprehensive planning. The section points out that both natural and managed land cover vegetation may gradually shift with climate change. Maintaining vegetation and minimizing soil disturbance will be increasingly important with climate change to avoid soil erosion, sedimentation and contamination of waterways, and flooding. Currently, the major land uses within the Town, based on percent of total land area are agriculture (39.1%), followed by natural vegetation (35.6%), and residential areas (12.6%) (Table 10).

## Unique Natural Areas

Unique Natural Areas (UNAs) are sites with outstanding environmental qualities, as defined by the Tompkins County Environmental Management Council (EMC), 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. At least one of five criteria must be met to classify an area as a UNA: (1) important natural community; (2) quality as a representative example; (3) rare or scarce plants or animals; (4) geological importance; (5) aesthetic/cultural qualities. (Each of these is described in more detail in the NRI).

The EMC feels strongly that the UNA inventory is an important tool for both planning and land owner education. Inclusion in the UNA inventory does not carry regulatory weight, but does serve to advise the Town Board, Planning Board, and Zoning Board of Appeals on matters related to environment. The EMC has a protocol for adding or delisting sites, based on changing conditions.

Within the Town of Lansing, nearly 4,400 acres are currently included in designated UNAs, corresponding to approximately 10% of the Town. All the UNAs within the Town are listed in Table 11 of the NRI, and several are briefly described. A few examples include:

- Salmon Creek Woods (UNA-2) is nearly 800 acres and one of the largest UNAs in Tompkins County. The large expanse of intact and biologically diverse mature forest provides important habitat for a wide variety of neotropical migratory songbirds. The creek is also an important fishery in the area.
- Ludlowville Woods (UNA-28) includes the beloved waterfall at Ludlowville Park, a feature that has cultural, historical, recreational, and geological significance. Rare and unusual plants and geological features are found among the numerous steep ravines that flow into Salmon Creek. A DEC fishing access spot is also part of this UNA.
- Esty's Glen (UNA-90) includes old-growth forest, unique geological features such as gorges, falls, and cliffs, and rare plants. Exceptional views also distinguish this UNA.

## Protected Open Space

Nature preserves, conservation easements, and state lands protect important landscapes from development and uses that may damage their natural features, such as key plant and animal species and their habitats, water bodies or waterways, and recreational value. They can also buffer the region from flood damage, and add economic value by providing recreation, enhancing tourism, and land values. Although municipal governments do not have direct control of these lands, they may be useful in planning for greenways, migratory corridors, and recreation trails. There are three conservation easements in the Town of Lansing that will protect an area near Cayuga Lake from future subdivision and development, and a 6+ acre wetland in the northeast protected through the Wetland Reserve Program. In addition, the Finger Lakes Land Trust manages the 33 acre Salmon Creek Bird Sanctuary with a diverse forest habitat.

## Land Evaluation

This section provides a brief overview of the main activities involved in evaluating land areas for possible protection. It also describes and provides the pros and cons of several options to move forward with preserving or protecting selected parcels: (1) transfer or purchase of development rights; (2) conservation easements (government, private, or conservation group acquisition); (3) Zoning; (4) Payment-in-lieu of or recreational fees.

## Concluding Remarks

This NRI highlights the Town of Lansing's rich natural resources, diverse land use, and conservation efforts to protect our farms, open spaces, and unique natural areas that provide important ecosystem services for the Lansing region and beyond. The NRI's usefulness for future planning decisions requires that it be treated as a "living" document, with periodic updates as new information and needs arise. Additions and supplements are already underway, such as an Open Space Index, and a Scenic Resources Inventory of the region that will include photos and GPS coordinates.



An aerial photograph of a residential area, showing a road, trees, and buildings. The image is in grayscale and serves as a background for the text.

# INTRODUCTION



## Background on the Town of Lansing

The Town of Lansing is located in Tompkins County along the southeastern side of Cayuga Lake. Although the municipality's general characteristics are relatively rural and sparsely populated, population density varies from North Lansing, which is relatively rural and undeveloped, to the south to the Village of Lansing, which is significantly more urbanized than the rest of the township. As a municipality that is also in close proximity to the City of Ithaca and Cornell University, the Town of Lansing has significantly changed over time with the development and expansion of the Ithaca Mall and continuous urban sprawl, particularly in the Village of Lansing and its surrounding regions.

With increasing extreme weather events, the Town has been susceptible to flash floods and other environmental hazards that have led to threatened natural resources in parts of the municipality. In an effort to help identify the Town's existing natural resources, the Lansing Conservation Advisory Council created this Natural Resource Inventory to better understand the existing natural resources within the Town of Lansing and to address some of the growing concerns around the effects of climate change.

## What is a Natural Resource Inventory?

In the simplest form, a Natural Resource Inventory (NRI) is a compilation of existing natural/ ecological resources, according to the New York State Department of Environmental Conservation's Hudson River Estuary Program. Depending on the community, an NRI could also include historic resources. Often, the scope and level of detail is determined by the community preparing the document. While the simplest version is just a list of existing resources, the more complex NRIs could include detailed analysis of each existing resource. 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 the Town of Lansing continues to experience population growth and the resulting urban sprawl, the municipality will need to prioritize regions that are identified or designated as valuable assets and resources in this inventory, and then plan development in a way that would mitigate any negative effect on those specific areas. The Town is looking to make its community more resilient and sustainable long term, and this natural resource inventory can provide fact-based information on ecologically and environmentally valuable assets and facilitate future planning, development, and conservation efforts. This inventory can also supplement existing plans, such as the Town's 2018 Comprehensive Plan, as well as larger regional plans, such as the Cayuga Lake Watershed Plan and the Tompkins County All Hazard Mitigation Plan. Finally, the inventory can act as a stepping-stone for the Town to develop additional planning tools and technical resources that can help guide the community to a more sustainable and resilient future.

## Why Should Natural Resources be Protected?

Protecting environmental quality is a matter of choices and tradeoffs. Continued development in the midst of climate change poses higher risks and threats to existing ecological and environmental resources. There may be unintended 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 Town of Lansing must 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 alternative and less harmful ways to develop. This document can serve as a fact-based guide for the municipality and developers to consider the answers to these questions. Because most development and land use change is irreversible, detailed planning is very important. Long-term planning is one way to minimize the short-term exploitation of resources resulting 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 existing natural resources within the Town. This identification process is the first step in protecting these 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 options that municipalities in Upstate New York currently use.

### 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.

#### **Educational Programs**

Environmental education programs are another way to help raise awareness around the importance of natural resources and interest in protecting these valuable community treasures. The Tompkins County Cooperative Extension Primitive Pursuits program, for example, educates children of all ages about nature, the importance of conservation, and living with the natural world. The Cornell Lab of Ornithology is another institution that offers educational programs about wildlife in Tompkins County and the Finger Lakes region. Being in close proximity to Cornell and



Ithaca gives Lansing the ability to take advantage of such programs that can help spread awareness about the value of local natural resources and the importance of conservation and smart planning.

## Regulatory Tools

There are also many regulatory tools available to local municipalities to control land use. Details about these tools are provided on page 91. (Not all of them 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 Resource Inventory

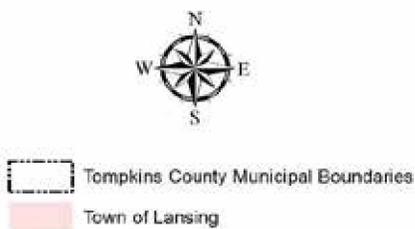
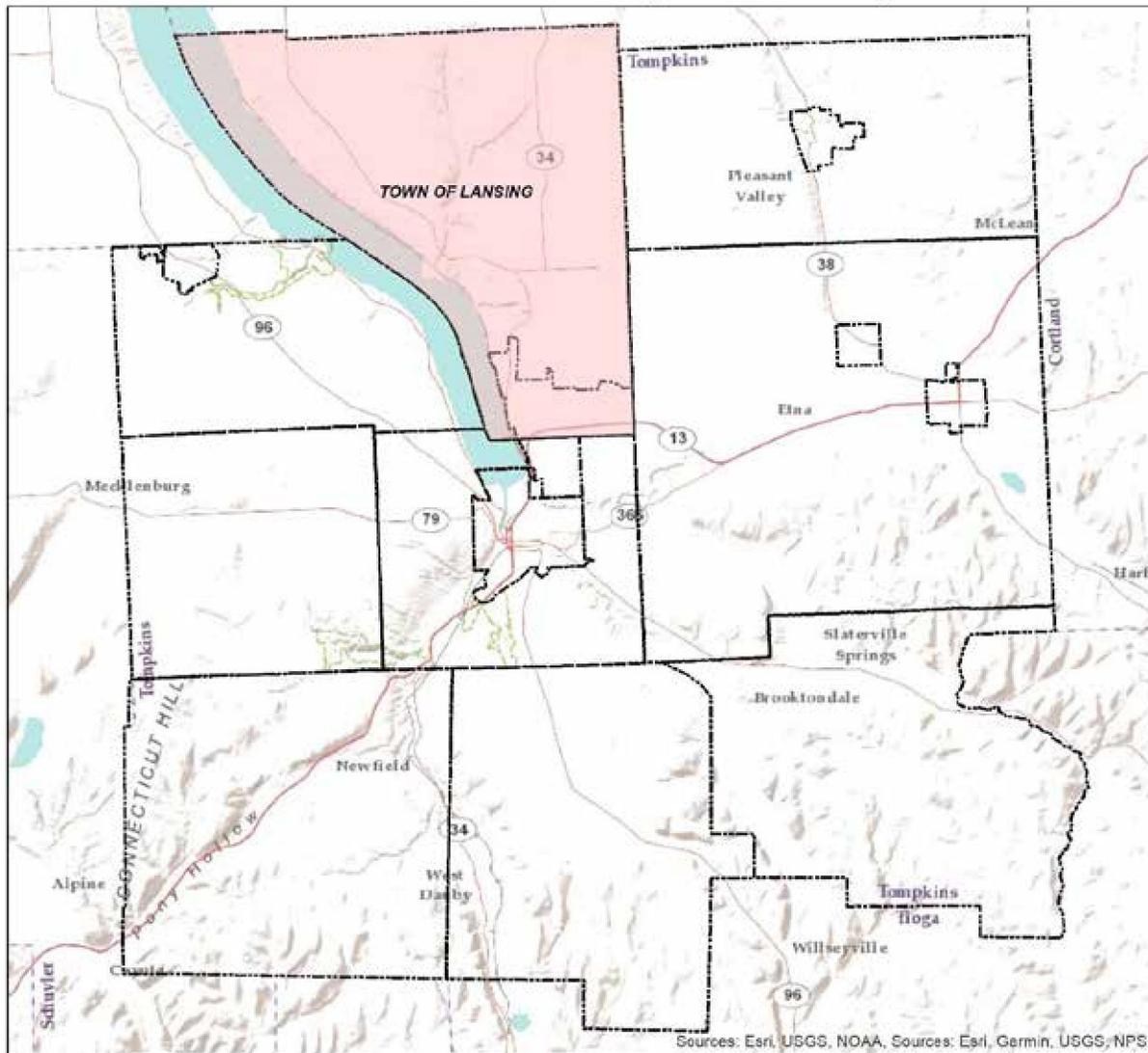
The Town of Lansing Natural Resource Inventory begins with a summary of climate conditions and projections for the Town and Tompkins County. The rest of the inventory is organized into three resource categories: hydrology and aquatic ecosystems, geology and soils, and land use and protected lands. An addition, titled "Implementation Tools," lists potential methods for preserving existing resources.

## About the Data

The data used in this natural resource inventory are primarily from the Tompkins County Planning Department, Town of Lansing Planning Department, Cornell University Geospatial Information Repository (CUGIR), and the New York State GIS Clearinghouse. The Tompkins County Soil and Water Conservation District (SWCD) developed and provided data on stormwater mapping. Other resources used throughout this document are from the US Geological Survey, US Depart-

ment of Agriculture Geospatial Data Clearinghouse, as well as the US Army Corps of Engineers. Cornell University's Department of City and Regional Planning, the Lansing Conservation Advisory Council, and Cornell Cooperative Extension of Tompkins County analyzed the data. Questions or concerns regarding the content of this document can be directed to any of these three entities.

## Location Within Tompkins County



2020 Town of Lansing NRI  
 Created By: CCE-Tompkins  
 Date Created: 4/10/2020  
 Data Source: CUGIR, USGS  
 Projection: NAD83\_New\_York\_Central\_ftUS

Map 1: Boundaries of the Town of Lansing within Tompkins County.



An aerial photograph of a residential neighborhood, showing a mix of houses, trees, and roads. The houses are scattered throughout the area, with some larger buildings and parking lots visible. The trees are dense in some areas and more sparse in others. The overall scene is a typical suburban or rural residential area.

# CLIMATE CHANGE

## What is Climate Change?

Climate change refers to the fundamental long-term meteorological characteristics defining where we live, including seasonal weather patterns that determine the species composition of our natural landscapes and waterways, and what plants we can grow on our farms and gardens. Although humans have always had to cope with day to day ups and downs in the weather, we have for the most part been able to consider the climate relatively stable. Most examples of climate change that have occurred during the long 4.5-billion-year history of our planet have taken place over tens of thousands or millions of years. Since the mid-20th century, however, the planet has been warming and rainfall patterns changing at an unprecedented pace, and within our lifetime. This has largely been attributed to the burning of fossil fuels (e.g., coal, oil, and natural gas) and other human activities that have increased the level of carbon dioxide and other heat-trapping gases in the atmosphere. The climate has become a moving target, and the “new normal” is undefined. Unlike previous generations, we cannot rely on historical weather patterns of the past to inform our management decisions today.

## Why is Understanding Climate Change Important?

The rapid change in climate we are experiencing today adds new uncertainty and complexity to decisions regarding natural resource management and farming. It is important that we identify and adopt climate change adaptation and mitigation strategies so that essential “ecosystem services” are maintained, such as: sustainable food production; a clean water supply; flood control; soil conservation; control of invasive species; preservation of biodiversity in our natural areas; and safe and abundant outdoor recreation opportunities.

## Recent and Projected Future Climate Change

Today, the evidence that climate change is already upon us is well documented, and is based in part on local and global data from networks of temperature and rainfall sensors, satellite imagery, and instruments that monitor the atmospheric concentration of heat-trapping greenhouse gases, including carbon dioxide, methane, and nitrous oxide.

### **Temperature, heat stress, and frost-free period**

The annual average warming across New York State since 1900 has been +2.7° F, which is greater than the global average temperature increase of about +1.8° F (Horton et al. 2014). Of more importance to the living world than average temperatures is the frequency of temperatures exceeding or falling below thresholds important to biological processes. For example, across New York, as well as much of the Northeastern U.S., since the 1960s there has been a trend for an increase in the frequency of days above 90° or 95° F. As indicated in Table 1, this trend for increased frequency of heat stress days and heat waves is projected to increase substantially throughout this century. Another threshold temperature trend of interest is a decline in the frequency of days at or below 32° F (Table 1), indicating a longer frost-free period and earlier springs, which is important for cold-sensitive plant, insect, and animal species.

### **Flooding, drought, and snow cover days**

Unlike some regions that have experienced significant declines in annual rainfall in the past



Table 1: Baseline and projected changes in climate conditions and severe weather events in the Southern Tier of New York. Table excerpted from: NYSDEC (2015). *Observed and Projected Climate Change in New York State: An Overview*

	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%
<b># of days per year with maximum temperature exceeding</b>				
90°F	10	15 to 23	22 to 47	28 to 79
95°F	1	2 to 7	2 to 18	4 to 38
<b>Heatwaves</b>				
# per year	1	2 to 3	3 to 6	3 to 9
Average duration (days)	4	4 to 5	5	5 to 7
<b># of days per year with temperatures at or below freezing (32°F)</b>				
	152	119 to 134	94 to 120	72 to 116
<b># of days per year with rainfall exceeding</b>				
1 inch	6	6 to 7	6 to 8	6 to 8
2 inches	0.6	0.6 to 1	0.7 to 1	0.7 to 1

thrive, while others are out-competed, migrate to other regions, or do not survive. For example, climate change will favor the continued northward expansion of some invasive species into our region, such as the notorious aggressive weed, kudzu, and the aphid-like insect pest, hemlock wooly adelgid, which has already devastated hemlock stands to the south. White-tailed deer will benefit from warmer winters and more vegetation exposed and consumed during winter because of less snow cover, with potential negative effects on natural plant communities, urban landscapes, and croplands. Warm-adapted fish species such as bass may benefit, while cold-adapted species such as trout will have a shrinking habitat within deeper cooler waters. (For more information, see the Ecosystems chapter of the NYS ClimAID report [Wolfe et al. 2011a]).

The emerging threat of harmful algal blooms (HABs) in Cayuga Lake may be exacerbated by increasing lake water temperatures, and increased nutrient loading into the lake by increased frequency of high rainfall events.

An overarching concern is that while ecosystems are dis-assembling and re-assembling in new ways, aggressive invasives that thrive in the changing climate dominate, and thereby reduce biodiversity and some important ecosystem services. The vegetation and root systems of forests and grasslands play an important role in stabilizing soils, and so degradation of these natural areas could lead to significant increases in soil erosion and runoff into waterways and water quality.

**Several key adaptation strategies (from Wolfe et al. 2011a):**

- Maintain healthy ecosystems more tolerant or better able to adapt to climate change by minimizing other stressors (e.g., invasive species, habitat fragmentation)