

**Strategy for a Flood Resistant
Southern Tier Central Region**

**Implementation Strategy
for a Flood Resilient Future**

Recommendations for Southern Tier Central Communities



Prepared by Southern Tier Central
Regional Planning & Development Board

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I. Introduction

The Southern Tier Central Region is “flood alley.”

The Southern Tier of New York faces the ongoing risk of serious flood damage from intense storms of local and regional extent that cause flooding and flash flooding. The economic and personal costs of these floods are significant. Many of the businesses that sustain flood damage either do not reopen or relocate outside of the region, resulting in lost jobs and reduced services. Residents have difficulty recovering financially from uninsured flood losses. And the recovery and repair costs can be significant for financially-strapped local governments. Disaster assistance following a flood always falls far short of the local needs. And it is intrinsically unfair for the majority of taxpayers, who live and work outside of flood-prone areas, to bear the costs to restore the lives of the minority who locate in high risk areas.

Although floods are natural phenomena that cannot be prevented, their effects are amplified by human activities, such as encroachment on the floodplains and inadequate conservation practices. This strategy was developed to promote the vision of a region that is resistant to damage from future floods. With funding from the New York State Department of State Local Waterfront Revitalization Program (under Title 11 of the Environmental Protection Fund), Southern Tier Central Regional Planning and Development Board (STC) facilitated the development of this strategy in conjunction with Chemung, Schuyler, and Steuben Counties and the 42 municipalities that border the designated inland waterways within these counties.¹ Oversight was provided by a Project Advisory Committee and the NYS Department of State.

What is meant by flood resilience? A flood resilient community is one in which residents and institutions have the capacity to prepare for, respond to, and recover from flooding with minimal outside assistance. By becoming more resilient, communities are not just prepared to survive a major event, but are poised to adapt to ever-changing conditions and thrive.

This strategy proposes that flood risks be reduced through a combination of the following approaches:

- **Manage water where it falls.** Land use activities throughout a watershed should utilize good stormwater management practices that prevent rapid runoff into streams and rivers. This may be as simple as maintaining soil cover and vegetation to slow water down and allow it to soak into the ground. When the soil is covered with buildings, pavement, or other impervious surfaces, engineered stormwater management practices may be needed.

¹ The designated inland waterways located within Chemung, Schuyler, and Steuben Counties of New York are the Chemung River, Canisteo River, Cohocton River, Tioga River, Keuka Lake, and Seneca Lake. The municipalities bordering these waterways are:

- Chemung County: City of Elmira; Village of Wellsburg; Towns of Ashland, Big Flats, Chemung, Elmira, and Southport
- Schuyler County: Villages of Montour Falls and Watkins Glen; Towns of Dix, Hector, Montour, and Reading
- Steuben County: Cities of Corning and Hornell; Villages of Addison, Arkport, Avoca, Bath, Canisteo, Cohocton, Hammondsport, North Hornell, Painted Post, Riverside, Savona, and South Corning; Towns of Addison, Avoca, Bath, Campbell, Cameron, Canisteo, Cohocton, Corning, Erwin, Hornellsville, Lindley, Pulteney, Rathbone, Urbana, and Wayne

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- **Make room for water.** The highest risk areas near rivers, streams, wetlands, and lakes should be kept free from vulnerable development. The natural functions of these areas are to store and slow floodwaters, thus providing relief for other areas.
- **Live with floods.** In flood-prone areas with existing development and areas where future development will be permitted, measures can be taken to enhance safety and reduce the potential for damage.
- **Educate the public.** If residents and business owners are knowledgeable about potential flood risks, they can make informed decisions that balance those risks with other concerns.

II. Community Outreach and Education

Effective management of flood risks is a community-wide endeavor that requires support of citizens, businesses, government agencies, and other organizations. Well-informed people are able to make better decisions to protect themselves and their property from flooding.

To support better understanding of flooding and flood resiliency strategies, the project team conducted a variety of flood outreach activities for various audiences.² However, the following research findings suggest that greater regional coordination of flood education activities is needed:

- Public information efforts need to explain the problem and the solutions. It is not enough that people know there is a flood hazard; they also need to know what they can do to cut their losses. This information empowers people to take responsible actions.
- Key messages need to be repeated many times before people absorb their meaning.
- Messages are more likely to be accepted if they are delivered from different credible sources. These multiple messages should be clear and consistent.
- Messages should relate to what is important to the audience, be presented in a manner that is easily understood, and promote positive outcomes.

In order to improve the effectiveness of future public information programs, a “Flood Education Plan” was developed with input from the Project Advisory Committee. This Plan presents a long-term strategy for coordinated public education about flood risks in the Southern Tier Central region. It identifies messages and outreach activities to promote improved understanding of the region’s flood hazards and provide specific actions that can be taken to reduce risk. The objective is to promote additional public education about flooding and enhance the effectiveness of those efforts by identifying target audiences, key messages, outreach projects, and implementation partners. This plan is available at www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Education/FloodEducationPlan.pdf.

In order to facilitate wider distribution of the key flood education messages tailored for the Southern Tier Central region, they are presented in a shorter document called “Flood Education Messages: Key messages about flood risks for public outreach in the Southern Tier of New York,” which is available at www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Education/FloodEducationMessages.pdf.

² Public education activities conducted for this project included: a project website with resources and links (www.stcplanning.org/index.asp?pageId=213), student programs using a hands-on stormwater-floodplain model, training to support additional use of this tabletop model, development of fact sheets (about stream management, flood insurance, and residual risks behind levees), newsletter articles, presentations, and conference exhibits.

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Each message is presented as a short phrase or slogan, followed by bullets explaining why the person should act, what they should do, how those actions reduce losses, and where to learn more about how to proceed.

III. Local Plans

- **Good planning makes better places to live.**
- **Good planning protects the natural environment while enhancing economic well-being and the quality of life in general.**
- **Planning helps communities document their current conditions, visualize what their communities could be in the future, and develop strategies to meet those goals.**

In keeping with the duty to protect the health, safety, and welfare, local governments should address flood hazards whenever any type of plan is developed for areas with flood risks. Integrating flood safety into a community's plans provides a basis for addressing these issues through policies, practices, regulations, and investment decisions.

Do existing local plans in the Southern Tier Central Region effectively address flood hazards and community resilience? In order to answer this question, project staff reviewed existing municipal, county, regional and watershed plans that have (or could have) flood-related recommendations. This review included plans that exist for hazard mitigation, economic development, watershed management, infrastructure planning, or other purposes. In terms of flood risks, plans were reviewed for the following elements:

- **Recommendations that support flood resilience** such as keeping the floodplain free from development or expanding open space in the floodplain.
- **Recommendations that reduce flood resilience** such as promoting higher density in the floodplain.
- **Failure to mention flood issues** when addressing topics that could incorporate flood resilience actions.

Some of the local plans do a great job of effectively incorporating flood risks and promoting improved resilience. Others fail to mention flood issues. The findings are summarized in Attachment A. Project staff participated in planning activities that were underway during project implementation and contributed flood-related recommendations.

To assist with future planning efforts, a guidance document was prepared, entitled "Municipal Land Use Strategies for Improving Flood Resilience: Guidance for Protecting Health, Safety, and Welfare." This guide includes chapters about planning, countywide hazard mitigation plans, comprehensive plans, emergency action plans, and recovery planning. It provides ideas and resources to help local governments meet the challenge of planning for appropriate development to occur while also protecting people and property from the impacts of flooding. This includes consideration of the relationship between landscape features and flooding, as well as strategies for protecting people, property, and facilities within already-developed floodplains. This guidance document is available at www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Flood%20Resistant%20Communities/LandUseStrategiesForFlooding.pdf.

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Planning starts with fact finding. Additional map-based data are often needed to implement plan recommendations for flood resilient development and natural resource protection. Information and data sources for integrating flood resilience into local plans are described in the Comprehensive Planning section of “Municipal Land Use Strategies for Improving Flood Resilience: Guidance for Protecting Health, Safety, and Welfare.” An online GIS Map Viewer (Planning Tool) was developed to assist with consideration of natural site features when planning and reviewing land use proposals (http://stcgis.org/flexviewers/planning_tool/). A How-To Guide for using this resource and understanding the data layers is included in Attachment B. An additional handout listing “Online Mappers for Natural Features (Central and Western New York)” was also developed and is in Attachment B.

IV. Municipal Land Use Regulations

**It is the civic duty of local governments
to protect the health, safety, and welfare of the people who are served.**

New York State municipal law gives cities, towns, and villages the authority to regulate land uses, and in so doing, explicitly states that regulations shall secure safety from flooding and other dangers. This is accomplished—in part—through Flood Damage Prevention Laws, which have been adopted by every municipality in the project area to enable participation in the National Flood Insurance Program. These local laws manage development in areas that have been mapped as high flood hazard areas. Improved flood resiliency can also be achieved by incorporating flood damage prevention and natural resource protection measures into other local regulations. Zoning is a tool for directing different kinds of development to appropriate areas within a community, and can be used to prevent flood damage and to protect natural resources by limiting uses in high-risk and environmentally-sensitive areas. Site plan and subdivision regulations present additional opportunities for promoting development patterns that are resilient to flood risks. Municipalities can also enact regulations related to stormwater management, timber harvesting, stream corridors, steep slopes, or other concerns in order to address flood risks.

Project staff provided training and technical assistance with enforcement and revision of flood-related provisions in their flood damage prevention laws and other local regulations. Recommendations were developed for incorporating additional flood resilience provisions.

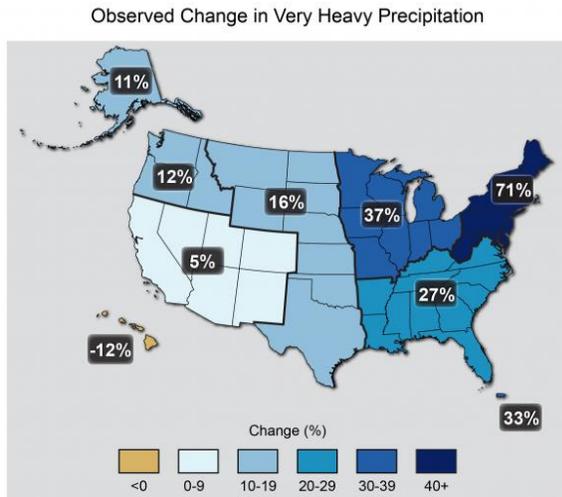
Guidance to assist with improving flood resilience in local regulations for floodplain management, zoning, site plan review, subdivisions, and other local codes is included in “Municipal Land Use Strategies for Improving Flood Resilience: Guidance for Protecting Health, Safety, and Welfare.” This guide focuses on the land use authorities of local governments in New York State, presenting recommendations and examples of techniques that can be used to reduce flood risks. These approaches are targeted primarily at protecting future development by preventing some types of development in flood-prone areas, directing growth to safer areas, and establishing standards for safer development. Land use tools can also be used to protect natural features that reduce flood risks. The guide is intended to provide inspiration, ideas, and assistance to enable communities to leverage municipal planning and land use tools to reduce the local impacts of flooding. This guidance document is available at www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Flood%20Resistant%20Communities/LandUseStrategiesForFlooding.pdf.

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V. Next Steps toward a Flood Resilient Future

The increasing frequency of heavy, intense rainfall events underscores the need for improving the flood resiliency of each community in the Southern Tier Central region of New York. The following recommendations are intended to support local communities as they address the challenges of present and future flood risks. These actions may be undertaken by municipalities, counties, or other organizations. Many of these recommendations are ongoing activities; others should be pursued when resources are available.



The northeast has experienced a 71% increase in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events) from 1958 to 2012. (Figure source: Global Change Information System, updated from Karl et al., 2009.)

Local Capacity for Managing Flood Risks

1. Enhance municipal capacity for flood risk management through training and technical assistance.

The municipal staff, officials, and volunteers who are responsible for floodplain management, planning, project review, drainage issues, and emergency response also have many other responsibilities. It is thus difficult to maintain technical expertise on topics pertaining to flood safety responsibilities. Ongoing professional development needs should be met by incorporating flood resiliency into training for building officials, planning and zoning boards, elected officials, highway departments, and others. Because of the complexity of these issues and the turnover of personnel, this content will need to be updated and repeated periodically. In order to ensure a level of competency and knowledge about topics related to floodplain management, Local Floodplain Administrators should be encouraged to become Certified Floodplain Managers or to consult with a Certified Floodplain Manager on floodplain management issues. Additional technical assistance should be available when needed from county and regional planning personnel.

2. Conduct public outreach to promote voluntary flood risk management actions.

People in general do not recognize that they may be contributing to a flooding problem or that they can help with a solution. Public education messages and outreach strategies for the Southern Tier Central region are presented in "Flood Education Plan" by Southern Tier Central Regional Planning and Development Board (December 2014,

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www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Education/FloodEducationPlan.pdf).

Sustained outreach efforts are needed to implement the recommendations of this plan.

3. Provide technical support to help residents, businesses, and community organizations improve flood resilience.

Public and private sector professionals need to work together to help individuals and businesses manage flood risks. This should include assistance with: floodplain development, mitigating at-risk structures, flood zone determinations, map revisions, flood insurance, managing drainage, stream management, natural resource protection, flood safety, flood recovery, and other assistance as needed. The public seeks information and assistance from government personnel (municipal, county, regional, state, and federal), private sector professionals (engineers, land surveyors, real estate agents, mortgage lenders, insurance agents, planners, building professionals, the media, etc.), and non-profit entities (conservation organizations, American Red Cross, etc.). All of these professionals should have the training needed effectively implement floodplain management responsibilities and be knowledgeable resources for their clients. Additional networking and collaboration among the various professionals could help to facilitate the delivery of consistent and mutually supportive information and assistance.

Assessing Flood Risks

4. Develop updated Flood Insurance Rate Maps that are accepted by communities as accurately representing flood hazards.

- a) **Flood Insurance Rate Maps (FIRMs)**, which depict the flood zone boundaries and flood depth for the model flood that has a 1% or greater annual probability of occurring, are important tools for delineating flood hazards. Although the maps are developed for rating flood insurance policies, they are also important tools for promoting safe development within the community. FIRMs for communities in the Southern Tier Central region are in an old paper format that is difficult to use. More importantly, almost all of the data behind these maps was developed about 30 years ago and has not been subsequently verified or updated. The technology for delineating flood zones has changed since these maps were developed, particularly in areas with approximate studies (Zone A, also called unnumbered A). In addition, land use changes that alter the amount of runoff, changing climate conditions, and floodplain changes such as new bridges should all be incorporated into the models used for updated mapping of flood zones. There is thus a significant need for updating of the region's Flood Insurance Rate Maps.
- b) **Community acceptance of updated FIRMs could hinge on the resolution of levee mapping issues.** FEMA has initiated—but not completed—flood hazard mapping projects for Chemung County and the Chemung/Cohocton watersheds, but encountered significant local opposition due to differences of opinion about mapping priorities, levee mapping procedures, and likely flood zones for areas protected by levees. In order to continue to depict areas with levee protection as low flood hazard areas (Zone X or C), FEMA procedures require engineered certification of the integrity of these structures, which is expected to require significant local expenditures. In addition, the federally established development standards and flood insurance costs associated with mapped flood zones are not well suited for levee-protected areas. It is thus recommended that local representatives participate in federal policy development related to levee safety, mapping of flood zones associated with levees, development standards in leveed areas, and flood insurance costs. Communities with levee protection (Elmira area,

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Horseheads, Montour Falls, Corning area, Addison, Canisteo, Hornell, Bath, and Avoca) should also pursue funding for levee certification as warranted. Because many of the region's levees were overtopped by the 1972 Tropical Storm Agnes flood, community leaders recognize that levee-protected areas do have flood risks that may not be adequately represented on the current effective FIRMs.

5. Map riverine erosion hazards to delineate areas where active streams may move and erode streambanks.

The state of Vermont has mapped erosion hazard zones for the state's streams and incorporated development standards for these areas into a model floodplain development law. This approach could be replicated in the Southern Tier of New York, where active streams can cause significant erosion damage. Information to help develop such a program, including information about erosion hazard mapping programs across the country has been assembled by the Association of State Floodplain Managers in "ASFPM Riverine Erosion Hazards White Paper," February 2016, www.floods.org/ace-images/ASFPMRiverineErosionWhitePaperFeb2016.pdf.

6. Delineate dam failure inundation zones.

If there is an upstream dam, there is always some potential for failure or overtopping. Mapping how this might affect developed and developable land downstream would be important for managing areas of potential risk. Depending on the terrain and the size of a reservoir behind the dam, this risk could either be minor or quite significant, but it is worth considering. Dam failure inundation information can be used for emergency response and for regulating or avoiding new development within the risk area. The potential inundation areas below some dams have been assessed for development of dam Emergency Action Plans, but this is generally only required for dams with high hazard potential (Class C). It is recommended that dam failure inundation zones be determined for all dams with downstream development or development potential.

7. Develop flood inundation maps that are available online.

Flood inundation maps indicate the floodplain areas that are expected to be inundated as water levels reach progressively higher flood stages (water heights). Each map is tied to a particular stream or river gauge. These are valuable tools for emergency planning and response. Paper inundation mapping is available for some of the developed river corridors in the Southern Tier Central region. Improved and additional inundation maps that can be viewed in an interactive online format would significantly enhance emergency planning and response capabilities.

Planning

8. Incorporate municipal land use measures into countywide Hazard Mitigation Plans.

The countywide Hazard Mitigation Plans have generally not identified specific recommendations for improved land use. In many cases, municipal participation in the development process has been limited and has not included planning board members. Improved outreach to municipalities to increase the level of participation can enable increased integration of the hazard mitigation objectives and recommendations with municipal operations, comprehensive plans, and land use regulations.

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9. Provide planning assistance to municipalities developing new and updated comprehensive plans to incorporate increased consideration of flood hazards.

Existing comprehensive plans for many Southern Tier Central municipalities do not include maps showing flood hazard areas and do not discuss strategies for promoting flood-safe land use patterns. As communities update these plans, planning assistance should be provided to educate the planning committees about flood risks and strategies for improving flood resilience. Updated comprehensive plans should include information about local flooding and erosion risks, identification of natural features that reduce those risks, flood safety objectives, and recommendations for improving flood resilience.

10. Promote multi-objective planning by providing technical support for improved integration of flood hazards into community plans for economic development, infrastructure, and other purposes.

Flood hazards and community resilience are relevant to the objectives of most local planning efforts and should thus be incorporated into community plans for economic development, capital improvements, watershed management, waterfront revitalization, water quality, open space, etc. This can be facilitated by increased participation of floodplain managers, planners, and emergency managers on the committees that are engaged in these planning efforts.

11. Verify that each municipality has an Emergency Action Plan with updated contacts and other information. Provide technical assistance as needed to develop, enhance, or update plans.

Sometimes when a municipality looks for their Emergency Action Plan, they discover that it doesn't exist or that it is a cookie cutter plan that is not well adapted to the particular conditions within the community or that the names and contact information are out-of-date. County Emergency Management Offices provide assistance with these plans, but additional resources may be needed to verify that all municipalities have good plans and assist with those that need to be developed or improved.

12. Develop a post-disaster handbook to facilitate education, recovery, and recovery planning.

Compile resources and information to assist municipalities during and after a flood or other disaster. The objective is to provide resources that supplement the information in municipal Emergency Response Plans and facilitate education, recovery, and planning. The handbook may include forms, links to resources (such as FEMA's Substantial Damage Estimator), guidance for Disaster Recovery Planning, and informational handouts (that are ready to be copied and distributed).

Local Land Use Regulations

13. Provide support for municipal enforcement and updating of local floodplain management regulations.

All municipalities need to consistently enforce floodplain development standards. In addition to periodic training for building department staff and planning boards (see Recommendation #1), technical support is needed to assist municipalities, residents, and developers with individual development proposals. Municipalities should be encouraged to adopt the most recent Model Law for Flood Damage Prevention

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in order to eliminate inconsistencies with the freeboard requirement in the NY State Uniform Fire Prevention and Building Code (which requires flood protection to a level 2 feet above the base flood elevation). In addition, they should receive assistance to enable incorporation of optional language to improve clarity and incorporate higher standards for floodplain development.

14. Provide planning assistance to improve flood safety and green infrastructure provisions in local land use regulations.

Once a community incorporates flood resiliency into the goals and recommendations of a comprehensive plan, land use regulations should be updated to implement those recommendations. Existing municipal land use regulations should be assessed to identify opportunities for improving flood resilience. Planners should then work with municipalities to incorporate changes that improve flood safety, promote use of green infrastructure practices for stormwater management, and protect beneficial natural features. This may include techniques to limit development in hazardous areas, protect stream corridors, manage development on steep slopes, address drainage from timber harvesting, remove barriers to green infrastructure stormwater management techniques, prohibit stream dumping, improve driveway design, etc.

15. Manage development in riverine erosion hazard areas.

The delineation of riverine erosion hazard areas proposed in Recommendation #5 should be accompanied by implementation of strategies for managing development in these potentially hazardous areas. This may include public information, technical assistance, and enactment of municipal land use regulations.

16. Manage development in dam failure inundation zones.

Communities with developed and developable land downstream of dams should develop strategies for managing uses in potential inundation areas. Because the New York State Dam Safety Program (which enforces standards that reduce the risk of dam failure) lacks regulatory authority in downstream areas, this is a local government responsibility. The hazard classifications for dams are based on the potential for damage or loss of life in the event that the structure fails (not the likelihood of failure). If development occurs in the potential inundation zone for an existing structure, this can lead to re-classification as a higher hazard structure, which would require additional expense for the dam owner in order to manage the dam to a higher protection standard. Municipal regulation of development below existing dams could thus improve safety and prevent changes in the hazard potential classification. When actionable information is available regarding the dam failure inundation areas (Recommendation # 6), technical and planning assistance is needed to help municipalities enact development standards that are appropriate for the dam inundation zones.

Local Government Operations

17. Improve flood resilience of roads and re-plumb road drainage systems.

The primary mission of local highway departments is to serve the public by maintaining and improving the local road system. Constant efforts and incremental improvements to the flood resilience of roads are needed to enhance road safety, avoid flood damage to roads, achieve future savings (from damage avoided), and reduce the contributions to downstream flooding. Recommendations and suggested

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practices are in “Flood-Resistant Local Road Systems: A Report Based on Case Studies” (American Lifelines Alliance, January 2005, www.floods.org/PDF/ALA_Flood_Roads_January2005.pdf) and “Re-plumbing the Chesapeake Watershed: Improving roadside ditch management to meet TMDL water quality goals” (Schneider, R. and K. Boomer, 2016, STAC Publication Number 16-001, www.chesapeake.org/pubs/349_Boomer2016.pdf).

18. Improve flood resilience of bridges and culverts.

The bridges and culverts that carry roads across streams and rivers are often the most vulnerable parts of a transportation system—and also the most costly to repair or replace. Some bridges constrict the flow of the stream; others are prone to accumulating debris, which can block flow. Assessments of these road-stream crossings are needed to identify those that are most vulnerable to damage due to their shape, capacity, or condition. Funding is needed to repair or replace the highest priority structures. Repair or replacement projects should incorporate mitigation measures whenever possible in order to improve the resilience to high flow conditions.

19. Provide support for increased participation in the Community Rating System (CRS).

The National Flood Insurance Program provides incentives for more effective local floodplain management through the Community Rating System. Participation by communities is optional, but offers benefits in the form of reduced flood insurance premiums for residents. The 10 STC communities that currently participate are: Cities of Corning and Elmira; Towns of Ashland, Big Flats, Chemung, Erwin, Horseheads, Southport; and Villages of Horseheads and Wellsburg. The CRS activity and reporting requirements are challenging for small communities with limited financial and staff resources. Ongoing technical assistance is needed to help these communities and others implement effective CRS programs. Opportunities for more active county participation and support should be explored as a means of enabling CRS participation by additional communities.

20. Enhance flood warning capabilities.

In Chemung, Schuyler, and Steuben Counties, the data collection and flood warning operations of federal agencies (US Geological Survey and USDA National Weather Service) are supplemented by flood warning operations of the not-for-profit Environmental Emergency Services (EES). EES operates an automated gauge network that measures precipitation, weather conditions, and water levels in rivers, streams, and Keuka Lake. These existing data collection and data processing capabilities should be maintained and expanded. The state and federally funded gauges need to be protected from the repeated threats of budget cuts. Local government and private sector financial support for EES should be sustained. Additional gauges should be added to the system. Municipal staff should be trained on how to access and interpret gauge data and forecast information. In addition, ongoing volunteer recruitment and training for EES flood warning operations should continue.

21. Support implementation of mitigation recommendations in county Hazard Mitigation Plans.

Provide municipalities and other local entities with assistance to enable funding for and implementation of recommendations for flood mitigation projects identified in the county Hazard Mitigation Plans. This includes a wide range of activities, such as floodproofing, stream restoration, drainage improvements, stormwater management, riparian buffer restoration, recreational amenities in flood-prone areas,

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conservation easements, drainage system maintenance, improving flood resilience of public facilities, relocation of fire departments and other critical facilities to sites outside of the floodplain, etc.

ATTACHMENT A

REVIEW OF EXISTING PLANS

Communities undertake a variety of planning efforts, each focused on particular assets or concerns. Since the objective of each plan is to improve the community in some way, long-term resilience should be a consideration for any local plan. In the flood-prone Southern Tier Central region, planning for long-term resilience must include consideration of flood risks.

The following findings and recommendations are based on review of existing municipal, county, regional, and watershed plans.

Countywide Hazard Mitigation Plans

What is a Hazard Mitigation Plan? State and local governments develop Hazard Mitigation Plans to review the hazards facing a community and recommend long-term actions to reduce threats to safety health, and property. A local Hazard Mitigation Plan that is approved by the Federal Emergency Management Agency (FEMA) is a prerequisite to obtaining FEMA mitigation funding. New York State promotes development of Hazard Mitigation Plans at the county level.

Chemung, Schuyler, and Steuben Counties have each prepared countywide Hazard Mitigation Plans to facilitate coordinated implementation of activities that will reduce future damages from multiple hazards affecting the county. The hazard assessment conducted as part of this planning process identified flooding as the highest priority hazard in each county. The flood risks include the overflow of major waterways, flash flooding of tributary streams, washouts of road ditches and other drainageways, and inundation of poor drainage areas. In addition to water damage, erosion of streambanks and road ditches is also a major concern.

Countywide multi-hazard mitigation plans are updated on a 5-year cycle. The most recent plans are:

- “Chemung County Hazard Mitigation Plan” (May 2012),
www.chemungcounty.com/index.asp?pageId=522
- “Schuyler County Hazard Mitigation Plan 2015-2020,”
www.schuylercounty.us/documentcenter/view/5087/
- “Steuben County Hazard Mitigation Plan” (June 2009),
www.steubencony.org/pages.asp?PID=285.

The following recommendations are intended to improve the usefulness of future hazard mitigation planning efforts for municipalities by achieving additional buy-in and improved relevance to municipal operations:

- Develop strategies for increasing municipal participation in the planning process. Improve the quality of this participation by providing data, visualization tools, and individual assistance.
- Develop strategies for increasing public involvement that enable improved understanding of local hazards and increased input regarding mitigation strategies. This may include public

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meetings, improved media coverage, personal outreach to key stakeholders, involvement in community events, and other techniques.

- Expand coordination with other plans in order to improve the alignment of multiple objectives and avoid missing opportunities for others to implement hazard mitigation recommendations.
- Expand the focus of flood hazard sections to anticipate future conditions and the impacts of larger floods (beyond the currently-mapped 1% annual probability flood).
- Clearly articulate countywide goals and objectives that “aim high,” while also recognizing that realistic implementation actions will vary for different municipalities.
- Ensure that all participants (county planning committee, municipal participants, stakeholders, and the public) review a wide range of mitigation alternatives.
- Expand consideration and inclusion of alternative projects and activities, such as land use policies, public information programs, or ordinance revisions.
- Expand inclusion of ongoing mitigation actions that some or all communities are already doing, particularly related to effective code enforcement, training, technical assistance, intermunicipal assistance, and public education.
- Evaluate implementation progress more frequently than the 5-year update cycle.

Municipal Comprehensive Plans

What is a Comprehensive Plan? A comprehensive plan (or master plan) presents the long-term vision for a municipality, along with goals and policies to help achieve that vision. It is used as a strategic tool for guiding development and investment decisions to achieve a healthy and balanced community. A comprehensive plan serves three key functions:

- **Expression of a community’s desires:** Comprehensive plans can address a variety of issues, including land use, housing, community services, public safety, economic development, transportation, infrastructure, natural resources, and recreation.
- **Guide to decision-makers:** The comprehensive plan is the blueprint upon which municipal land use regulations are based.
- **Legal document:** Provides evidence of coordinated effort and rationale for adoption of specified actions. New York’s zoning enabling statutes (the state statutes which give cities, towns and villages the power to enact local zoning laws) require that zoning laws be adopted in accordance with a comprehensive plan.

Local comprehensive plans were reviewed to assess the degree to which they address flood resilience issues and identify opportunities for improving future plans. Twenty two plans were reviewed (1 countywide plan and 21 municipal plans covering 23 municipalities). Key findings are listed below. Recommendations for improved integration of flood resilience into future plans is included in “Municipal Land Use Strategies for Improving Flood Resilience: Guidance for Protecting Health, Safety, and Welfare.”

- **Safety:** Because safety is a basic role of government, comprehensive plans should promote safe land use practices. However, many of the plans reviewed do not address the relationship between development practices and the vulnerability to natural hazards. Others indicate that floodplains pose constraints for development, but failed to describe those constraints in terms of risks or safety concerns. It is recommended that comprehensive plans explicitly include “safe

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community” in their vision statements and include objectives related to reducing the impacts of flooding and other natural disasters.

- Flood problems: Some plans did an excellent job of including historic flood events and flood risks in the community descriptions. However, 36% of the plans reviewed failed to mention that flooding is a concern.
- Map of flood-prone areas: Only half of the plans reviewed included a map showing the regulated floodplain (with a 1% annual probability of flooding, also called the 100-year floodplain). Many plans included maps of other features, but failed to present this readily available information about flood risks. Two of the plans also showed the 500-year floodplain (with a 0.2% annual probability of flooding) and a couple included discussion of areas outside of the mapped flood zones that are subject to flood risks.
- Erosion hazards: Although much of the damage from flooding results from erosion of streambanks, shorelines, roadside drainage systems, and bridges, most of the plans failed to mention these risks. About a quarter of the plans mention the potential for streambank or lake shore erosion and a third note the vulnerability of roads, ditches, or bridges.
- Flood insurance data: Data about the number of flood insurance policies and claim histories provides information about the severity of prior flood damages and the extent to which flood losses may be covered by insurance. This information was included in four of the plans reviewed (18%). Five of the communities for which plans were reviewed participate in the Community Rating System of the National Flood Insurance Program (meaning that they undertake flood damage reduction activities to enable flood insurance discounts), but only two mention this program in their comprehensive plans.
- Natural features: 68% of the plans include maps of natural features, such as streams, lakes, wetlands, steep slopes, aquifers, and soils. Most of the plans promote protection of natural resources, but they often fail to state that one of the reasons for doing so is to protect the natural functions that provide protection from flooding and other benefits. About half of the plans mentioned the benefits of wetlands, but only 36% mention the beneficial functions of undeveloped floodplains, stream corridors, or other natural features. Other natural resource issues discussed include environmental stewardship, water quality, aquifer protection, open space preservation, protection of viewsheds, soil limitations for development, trails, and recreational use of rivers and streams.
- Stormwater management and erosion control: Most of the plans reviewed mention issues related to stormwater runoff or storm sewer systems. In many cases the primary concern is with protecting steep slopes from erosion. Some plans identify private driveways, timber harvesting, or agriculture as potential sources of runoff problems.
- Local floodplain management regulations: Although all municipalities in the region have laws regulating floodplain development (for participation in the National Flood Insurance Program), almost half of the comprehensive plans fail to mention these local regulations. One erroneously states that floodplain development may require a permit from New York State (failing to recognize the municipality’s responsibility for floodplain management).
- Flood control levees: Levees and floodwalls provide valuable protection for eight of the municipalities for which plans were reviewed, yet only five mention this flood protection. This implies that the communities may underestimate the value of these structures and assume that they will never be overtopped or fail.

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Watershed Plans

Watershed management plans present opportunities for addressing drainage, erosion, and flooding concerns in conjunction with other water resource issues, such as water quality and recreation.

Susquehanna-Chemung Action Plan (2012): This ecosystem-based management plan contains many useful and relevant recommendations regarding flood hazards, streams and rivers, land use, runoff, roads, and other topics.

Seneca Lake Watershed Management Plan includes the following elements:

- Characterization and Subwatershed Evaluation (2012)
- Assessment of Local Laws, Programs and Practices Affecting Water Quality (2014)
- Identification and Description of Management Practices, Approaches and Strategies for Watershed Protection and Restoration and Implementation Strategy and Schedule (2014)

This large-scale watershed plan was developed with the 40 municipalities within the Seneca Lake Watershed to provide data and set priorities for the watershed. The ultimate goal of the project was to set the stage for the formal creation of an intermunicipal agreement between the 40 municipalities to create a formal watershed group. The plan stresses the importance of floodplain management and the valuable flood protection benefits of wetlands, riparian buffers, and stormwater management. It also addresses lake level management issues. Recommendations for municipalities include protecting riparian buffers, stormwater management, updating of floodplain management regulations, and incorporating higher floodplain management standards. The plan mentions that there may be floodplain management enforcement issues. This concern is borne out by the many municipalities that did not provide copies of their Local Laws for Flood Damage Prevention to the planning team for review, erroneously reporting that they do not have flood damage prevention laws.

Keuka Lake Watershed Planning is included in the following documents:

- Keuka Lake Looking Ahead (1996)
- Keuka Lake Watershed Farmland & Agricultural Protection Plan (2014)
- Keuka Lake Waterfront Revitalization and Scenic Viewshed Protection Plan (2014)
- Sustainable Keuka Lake Municipal Handbook (2016)

This Land Use Leadership Alliance (LULA) led project was designed to provide data, studies, and resources to the watershed communities to help improve their local laws and promote consistency in land use regulations around the lake. Further, the project aimed to educate elected officials in watershed communities about the land use tools available to protect the scenic viewsheds and agricultural lands with an ultimate goal of maintaining water quality. Although flooding issues were not an important objective of these planning efforts, the recommendations for water quality protection and watershed stewardship include flood damage prevention strategies. Municipal land use and infrastructure recommendations include floodplain management, riparian buffer/stream protection, steep slope protection, stormwater management/drainage, wetland protection, open space protection, vegetation retention, driveway standards, and road ditch maintenance.

“Meads Creek Watershed Strategic Action Plan” (2007): This small watershed plan integrates flooding and stream instability with other water resource issues. It includes recommendations for public education (about stream and watershed issues), stream remediation, stream corridor protection, floodplain management, flood warning, watershed stewardship, and other concerns.

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“Seeley Creek Watershed Strategic Plan” (2002): Flooding was the principle concern that led to development of this plan. It addresses multiple hazards, including flooding, streambank erosion, and dam failure. The plan identifies opportunities and presents recommendations for protecting citizens from flooding and other hazards along with water quality protection and watershed management.

“Comprehensive Plan for the Water Resources of the Susquehanna River Basin” (2016) was prepared by the Susquehanna River Basin Commission to plan for the immediate and long-range development and use of the water resources of the Susquehanna Basin. Flooding is one of the six “priority management areas” addressed by the plan, which presents desired results, goals, ongoing Commission activities, and the actions needed to meet the goals.

Economic Development Strategies

Because flooding can have devastating consequences for local economies, planning for economic development should include consideration of natural hazards and resilience strategies.

“Reducing Flood Damage in the Southern Tier Central Region: Flood Recovery/Mitigation Economic Adjustment Strategy” (1998): This plan was developed by Southern Tier Central Regional Planning and Development Board following recovery from flooding in 1996. It remains a valuable resource. The recommendations have been updated and incorporated into this strategy.

Comprehensive Economic Development Strategy (CEDS) Serving the Counties of Chemung, Schuylar, and Steuben, 2016 and 2017 update: Economic resilience was incorporated into the Southern Tier Central region’s CEDS in 2016, with an emphasis on the region’s vulnerability to flooding. It also includes an assessment of the flood mitigation needs for recommended projects.

“Village of Watkins Glen Local Waterfront Revitalization Plan” (2008), includes a recognition of flood hazards along the lakeshore and recommends that development should be discouraged or floodproofed in flood-prone locations. The plan recommends that nonstructural measures shall be used for shoreline erosion protection whenever possible: “Such nonstructural measures include, but are not limited to, and in order of priority: 1st) The use of minimum setback of buildings and structures from the flooding and erosion hazard area; 2nd) The planting of vegetation and installation of drainage systems; and 3rd) The reshaping of land forms.” The plan also recommends protection of wetlands and management of stormwater runoff.

Erwin/Painted Post/Riverside Brownfield Opportunity Area, Pre-Nomination Study (2009) and Nomination Study (2012): This economic development project produced a bridge feasibility study for better access to one of the prime developable lands in the area and also produced a list of actionable items such as trail improvements and priority sites in order to better plan for and direct incoming development into the three municipalities. Flood concerns were factored into site selection and recommendations for future improvements.

“I-86 Innovation Corridor—Strategic Action Plan,” 2015, identifies flooding as a weakness in the corridor, but does not include recommendations targeted at improving flood resilience. The recommendation to “develop model design guidelines for land use” can be leveraged to incorporate flood resilient land use practices.

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“Regional Economic Development Council of the Southern Tier, Strategic Economic Development Plan: 2011-2016” identifies flooding as a major barrier to economic development in the region. “The flooding resulting from Hurricane Irene and Tropical Storm Lee of 2011...damaged or destroyed nearly 1,500 businesses and some 11,000 homes.” “The total damage value is in excess of \$560 million.” The plan describes the flood impacts and identifies redevelopment needs and opportunities. It recommends “additional infrastructure such as dams and dikes, to protect communities from future devastation caused by flooding.” However, it does not identify non-structural strategies for improving the flood resilience of the regional economy. Mitigation of flood risks should be integrated into all projects implementing the recommendation to revitalize the region’s downtown centers.

Other Local Plans

Flood Mitigation Action Plans were developed by many municipalities and Schuyler County. Although these plans have been superseded by countywide all-hazard mitigation plans, they contain detail that is not included in the more recent plans and therefore continue to be useful references.

- Town of Ashland (1999)
- Town of Avoca, Town of Bath, and Village of Bath (2001)
- Town of Big Flats (1999)
- Town of Elmira (1999)
- Town of Erwin and Town of Campbell (1999)
- Hornell Area: City of Hornell, Village of North Hornell, Town of Hornellsville (2002)
- Town of Southport (1999)
- Village of Wellsburg (1999)
- Schuyler County (1999)

Hazard Mitigation Action Plans were developed by some municipalities prior to the first countywide hazard mitigation plans. Although these plans have been superseded by countywide all-hazard mitigation plans, they contain detail that is not included in the more recent countywide plans and therefore continue to be useful references.

- Town of Big Flats (2004)
- Town of Elmira (2004)
- Town of Erwin (2004)
- Town of Southport (2004)

FEMA Discovery Reports were prepared as the initial step for flood hazard mapping projects in the Chemung Watershed (HUC 02050105, 2012) and Finger Lakes Watershed (Seneca River Watershed, HUC 04140201, 2014). Although these reports contain valuable data related to flood risks, they are generally not useful for local governments.

County Water Quality Strategies developed by county Water Quality Coordinating Committees include information and recommendations related to flood and erosion hazards. Each plan addresses land use and stream management issues that contribute to flooding problems in addition to water quality threats. The Schuyler County committee calls their plan a Water Resource Strategy due to the extent to which they address water quantity issues, in addition to water quality. Schuyler and Steuben Counties have also developed strategies for highway operations that address drainage and flooding issues.

- Chemung County Water Quality Strategy Plan Update (2007)
- Schuyler County Water Resource Strategy (2007)
- Water Quality Strategy for Highway Operations, Schuyler County (2007)

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- Water Quality Strategy for Steuben County (2009)
- Water Quality Strategy for Highway Operations, Steuben County (2007)

“Conservation Focus Areas in the Upper Susquehanna Watershed within the Finger Lakes Land Trust’s Service Area” (2012): The watershed assessment for this conservation plan includes recognition of flood risks and potential adverse impacts of some flood control strategies (which “may, in fact, set the stage for more intense flooding in the future”). Wetlands, rivers, and streams are described as regionally important natural resources and the stormwater retention benefits of wetlands are noted. The recommended conservation focus areas include the Upper Cohocton River Wetlands, Canisteo River Valley, and Chemung River Valley, as well as wetland, riparian, and forest areas that can provide flood mitigation benefits.

“Lakes, Farms, & Forests Forever” (2016) by Finger Lakes Land Trust: This report calls for investment to address threats to land and water resources in the Finger Lakes Region. Recommendations for stream buffers, new wetlands, and creation of a Chemung River Greenbelt would mitigate flood risks. The priority conservation strategies also include a recommendation for increased technical assistance to towns for maintaining rural character through stronger land use planning, which can support flood resilience objectives.

“Chemung River Trail: River Trail Assessment & Comprehensive Master Plan” (2008) notes that flood control structures limit recreational opportunities and physical access to much of the waterfront along the Chemung River in the Elmira area. The plan presents recommendations for improved access to the river and development of a continuous waterfront trail. The need for flood resistance and protection of flood control structures is included in the recommendations. Recreational amenities are generally a desirable use of floodplain areas because they usually enable protection of natural floodplain functions and sustain less damage from flooding than other types of development.

“River Trail Assessment & Visioning Process for the Southeast Steuben River Vision Project in Southeast Steuben County, NY” (2011): Although there have been difficulties implementing this plan, the desire for increased recreational use of the Chemung River corridor (without adversely impacting the levee system) is consistent with flood mitigation objectives.

U.S. Army Corps of Engineers, Chemung River Reconnaissance Study reports evaluate the types and extent of water resource problems in the Chemung Watershed, based primarily on an assessment of four subwatersheds (Seeley Creek, Sing Sing Creek, Meads creek, and Bentley Creek). The issues associated with flooding include: debris and debris jams; access impairment due to water levels, erosion, or debris; erosion and vegetation loss; and water damage to public infrastructure, structures, and personal belongings. General guidance is provided for developing projects to manage human activities and natural processes that contribute to flood damages. However, specific recommendations were not developed.

- Chemung River Reconnaissance Study Biological, Hydrologic, and Hydraulics Field Investigation (1999)
- Preliminary Watershed Evaluation; Seeley Creek, Sing Sing Creek, Meads Creek, and Bentley Creek (1999)
- Planning Guide for Protection, Restoration and Enhancement Projects in the Chemung River Basin, New York and Pennsylvania (1999)

ATTACHMENT B

MAP BASED DATA
TO SUPPORT FLOOD RESILIENT LAND USE DECISIONS

How-To Guide for Online Map Viewer—Planning Tool

Online Mappers for Natural Features

MAP VIEWER CAN BE FOUND AT: http://stcgis.org/flexviewers/planning_tool/

What is it?

The Planning Tool is an online map viewer for municipalities in Chemung, Schuyler, and Steuben Counties of NY. It enables access to data about the community and on a parcel level. Information has been included about natural resources, geographic characteristics, parcel data, and local infrastructure.

What can you use the mapper for?

Data are valuable in the decision making process for new development and town or region-wide decisions. While a landowner or developer provides a site plan or site map for the planning and zoning board processes, this does not always show or encapsulate all of the surrounding conditions and contexts that might be important in making a decision. This mapping tool can be used both before and during municipal board meetings to help provide information for the decision makers or other interested parties, as well as to have a visual resource during meetings when questions or discussions arise about a property.

Different views

The mapper will open showing the entire region. From there you can zoom in to an area or municipality. This view can show, for example, all of the roads or streams in a town. You can also zoom up close to individual parcels. You can use this in a meeting or discussion, such as a planning board meeting, about specific developments and important site conditions.



Zoom in using the wheel on your mouse or the navigation buttons on the left side of the screen. Use your mouse and the hand icon to pan to the area of interest.



Choose a basemap

Using the Basemap button in the top right hand corner, you can choose a variety of map views to look at, including imagery, streets, and topographic maps.



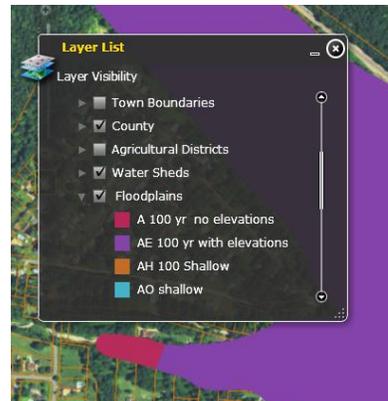
Layers

You can turn “layers” off and on to get a full picture of the area or parcel you are looking in to.



Measurements

You can take measurements of areas and distances directly on the map. This function lets you check dimensions such as the size of a lot, existing or proposed setbacks, lot width, lot coverage, or building size.

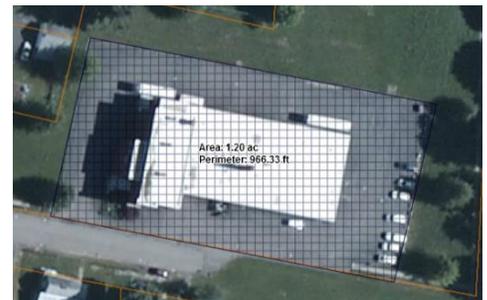


In the Layer List, clicking on the arrow to the left of an entry either opens a sub-menu or shows the legend for that menu item. Check the box to turn a layer on or off. Some layers are only shown when you zoom in.



The corner of this house is about 25 feet from the top to the riverbank, as measured with the Draw and Measure tool to “Draw Line” and “Show Measurements.”

The “Draw Polygon” option was used to determine that this building and parking area cover 1.2 acres with impervious surfaces.



System requirements

Uses Adobe Flash Player (free download). Must allow popups for this site (browser security setting).

MAP VIEWER CAN BE FOUND AT: http://stcgis.org/flexviewers/planning_tool/

What do the data layers mean?

Watershed: A watershed is the area of land that drains to a common waterway. Two watershed layers in the Planning Tool show the divides between the larger rivers and the finer breakdown for the region’s streams.

Floodplains: Accurate determination of flood zones must be based on the municipality’s paper Flood Insurance Rate Maps (FIRMs) published by FEMA. Floodplain information in the Planning Tool is approximate and in some places outdated (most notably near Newtown Creek in the City of Elmira). The municipality must regulate any development within a flood zone that begins with A (the area with a 1% or greater probability of flooding in any year; also called the 100-year floodplain). The regulatory floodway (portion of the floodplain that should generally be kept free of development) is only digitized for a few towns, so the Planning Tool layer is incomplete.

Wetlands: A wetland is an area where the soil is wet or covered by water part or all of the year. A permit from New York State is required for disturbance of a protected wetland or adjacent area. These state-regulated wetlands are mapped and can be viewed using the Planning Tool. Federally-regulated wetlands must be delineated in the field and are not mapped. The National Wetland Inventory layer shows open water and areas that “may be” wetlands.

Stream and lake priorities: The New York State Department of Environmental Conservation (DEC) assessment of water quality in streams and lakes is indicated on the Priority Waterbodies List. Descriptions of the assessment categories and data sheets for individual waterbodies are available on the DEC website (<http://www.dec.ny.gov/chemical/36730.html>).

Stream and lake classifications: New York State classifies waterbodies based on the best use. Class AA and A waters are used as drinking water sources; Class B waters are used for swimming or other contact recreation; Class C waters support fisheries and non-contact activities; and Class D is the lowest classification. In addition, (T) is added for waters that may support a trout population and (TS) for waters that may support trout spawning. A classification of C(T) or higher (everything except C and D) indicates a “protected” waterbody that is subject to state regulations and permit requirements.

Slopes: Steep slopes pose challenges for development. Some municipalities impose additional requirements or restrictions on slopes greater than 10% or 15%. The Planning Tool includes several Basemaps with topographic contours that show the lay of the land. Steep slopes (where topographic contour lines are close) are also highlighted with the Slope Percentage layer. The slope percentages calculated for this layer are approximate.

Soils: Detailed information about mapped soils is available through the Natural Resources Conservation Service website (<http://websoilsurvey.nrcs.usda.gov>) or from county Soil and Water Conservation District offices. The Planning Tool includes layers that provide information about the drainage characteristics of mapped soil units, but only in the Chemung and Susquehanna River Watersheds. In areas with hydric (wet) soils and soils subject to “frequent” or “occasional” flooding, the possibility of flooding should be taken into account. The Hydrologic Soil Group of a soil indicates its runoff potential, which is important for managing stormwater runoff. Group A soils have very low runoff potential because water soaks in, while Group D soils don’t absorb much water so most runs off.

Agricultural districts: New York State certifies agricultural districts for the purpose of encouraging agricultural activity and protecting farmland. Local governments “shall not unreasonably restrict or regulate farm operations” within agricultural districts.

Mines: The mine locations in the Planning Tool are from the NYS mine permit database.

Urbanized areas: The City of Elmira and surrounding areas are designated as “urbanized areas” based on census data. These municipalities are required to have Municipal Separate Storm Sewer System (MS4) stormwater management programs.

Online Mappers for Natural Features

Central and Western New York

Bedrock and Surficial Geology

New York State Museum and NYS Geological Survey: Bedrock and surficial geology maps and GIS data
<http://www.nysm.nysed.gov/research-collections/geology/gis>

NYSDEC Environmental Navigator: Mineral Resources
<http://www.dec.ny.gov/imsmaps/minerals/viewer.htm>

United States Geological Survey: Geologic Maps
<https://www.usgs.gov/products/maps/geologic-maps>

Soils

Natural Resources Conservation Service
<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Slopes

NYS Orthos Online
<http://www.orthos.dhSES.ny.gov/>

Groundwater and Aquifers

United States Geological Survey: Upstate New York Aquifer Viewer
<https://ny.water.usgs.gov/maps/aquifer/>

Watersheds

United States Geological Survey: Hydrography Viewer
<https://viewer.nationalmap.gov/viewer/nhd.html?p=nhd>

Wetlands

US Fish and Wildlife Service: Wetlands Mapper
<https://www.fws.gov/wetlands/Data/Mapper.html>

Habitats and Wildlife

NYSDEC Environmental Resource Mapper
<http://www.dec.ny.gov/animals/38801.html>

Currently included on the maps are locations of:

- Freshwater wetlands regulated by the State of New York (outside the Adirondack Park).
- Federally regulated wetlands from the National Wetlands Inventory.
- New York's streams, rivers, lakes, and ponds; water quality classifications are also displayed.
- Animals and plants that are rare in New York, including those listed as Endangered or Threatened (generalized locations).
- Significant natural communities, such as rare or high-quality forests, wetlands, and other habitat types.

NYSDEC Google Maps and Earth

Natural Resources and Environmental Protection Maps

<http://www.dec.ny.gov/pubs/103459.html>

Chemical and Pollution Control Maps

- Bulk Storage Facilities
- Combined Sewer Overflow (CSO) Outfalls
- Environmental Remediation Sites
- Estimated Populations within Urbanized Areas for MS4s
- Impaired Waterbodies Applicable to MSGP
- Priority Waterbodies List (PWL)
- Priorities Waterbody List (PWL) Applicable to Municipal Separate Stormwater Sewer Systems (MS4s)

Natural Communities and Ecological Zone Maps

- Significant Natural Communities: Western & Central New York
- Ecological Zones

Wildlife Maps

- Bird Conservation Areas
- Breeding Bird Atlas: Western & Central NY
- Breeding Bird Atlas: Species Distributions

Miscellaneous Environmental Maps

- DEC Lands
- DEC Roads
- DEC Region Boundaries and Office Locations
- Potential Environmental Justice Areas
- Water Wells
- Water Withdrawals
- Citizens Statewide Lake Assessment Program (CSLAP)
- New York State Dams Inventory
- Water Assessments by Volunteer Evaluators (WAVE) Project
- NYS Medication Drop Box Locations

Forest Health Aerial Survey

- Region 8 Flights

NYSDEC Interactive Online Maps

<http://www.dec.ny.gov/pubs/42937.html>

- State Lands Interactive Mapper
<http://www.dec.ny.gov/outdoor/45415.html>
- New York Nature Explorer
<http://www.dec.ny.gov/natureexplorer/app/;jsessionid=8CBF94545424ACDB52EA.+p15>
- Environmental Facilities Navigator
<http://www.dec.ny.gov/imsmaps/facilities/viewer.htm>
- Stormwater Interactive Map
<http://www.dec.ny.gov/imsmaps/stormwater/viewer.htm>