

Flood Mitigation Action Plan

Schuyler County

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Schuyler County, New York

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Prepared with assistance from:

Southern Tier Central Regional Planning and Development Board
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BACKGROUND

Schuyler County is a small rural county located in the heart of New York's Finger Lakes Region. Schuyler County's hills, gorges, and marshes comprise the headwaters of Seneca Lake, the largest and deepest Finger Lake, which bisects the county. The County is comprised of eight towns and four villages. It is one of New York's smallest counties (330 square miles), with one of the lowest populations (18,662 in 1990). The most 'urban' areas of the County are the Villages of Watkins Glen and Montour Falls, which are situated in the Seneca inlet valley at either end of the 1.5 square-mile, state-protected Queen Catharine Marsh. The County experiences flooding along the developed shorelines of Seneca Lake and other lakes and along the County's many streams. Additional water problems result from erosion of streambanks and inadequacies of local drainage.

The most severe flooding in Schuyler County occurred during the "Finger Lakes Flood" in July 1935 and the Hurricane Agnes Flood in June 1972. The 1935 flood washed out numerous roads and bridges. It left extensive mud deposits in houses and other buildings in the Villages of Watkins Glen and Montour Falls. The Hurricane Agnes flood is flood of record for Seneca Lake at Watkins Glen and caused an estimated \$7.2 million in damages in Schuyler County. Extensive flood damages occurred along Seneca Lake following the spring snow melt in 1993, when prolonged high water levels in the lake were compounded by high winds. This event damaged 675 homes and affected 40 businesses in Schuyler County, causing an estimated \$8 million in damages. The County experienced two federally declared flood disasters in 1996 (snowmelt and heavy rain in January and heavy rain in November). In addition to these major floods, many additional heavy rainfall events have caused localized drainage problems, ponding, streambank erosion and other difficulties.

In the 1970s and 1980s, all municipalities in Schuyler County joined the Regular Phase of the National Flood Insurance Program. Since that time, development within the areas designated as the 100-year floodplain (on the Flood Insurance Rate Maps that were prepared for each municipality) has been regulated by a local ordinance. No Flood Insurance Rate Maps were prepared for the Town of Reading, because no Special Flood Hazard Areas were identified.

Flood insurance can be purchased for any building in Schuyler County. On March 3, 1999, there were 68 flood insurance policies in the County (38 in the 100-year floodplain). Flood insurance claims since 1978 have totaled \$199,938 (17 claims). This represents only a fraction of the total flood damages because many property owners do not carry flood insurance and many damages (particularly to basements and basement contents) are not covered. No properties in Schuyler County are classified by the National Flood Insurance Program as "repetitive loss properties" (indicating that none have experienced two or more flood insurance claims within any ten year period since 1978).

The Schuyler County Environmental Management Council formed a Storm Water Management subcommittee in 1994 to address drainage, stream stability, and flooding concerns. The actions that have been taken by this committee include promotion of a workshop on

Permitting and Management Practices (1994, in cooperation with Cornell Cooperative Extension) and developing a brochure and educational materials for the Schuyler County Stream Maintenance Program (initiated in 1997). This committee is currently trying to define the best way to encourage adoption of local laws regulating stormwater discharge from construction sites and considering completion of a roadside ditch survey.

In 1997, Schuyler County initiated the Stream Maintenance Program to assist landowners in addressing streambank erosion and to minimize flooding on their properties. Project costs are shared by the County, the municipality, and the landowner.

Ongoing efforts to resolve flooding and drainage problems in Schuyler County have been extensive. When road, shoulder, culvert, and road ditch repairs have been necessary, efforts have been made to address the problem rather than just repairing the damage. Many erosion sites have been rehabilitated with rock riprap. This Plan represents a serious effort on the part of the County and each municipality to identify and implement measures that will further reduce flood damages.

HOW THIS PLAN WAS PREPARED

This Plan was prepared by county personnel and representatives from many of the 12 municipalities in Schuyler County. Southern Tier Central Regional Planning and Development Board provided staff support. The following meetings were held:

- **6/18/98: Organizational meeting with key County participants:** Introduction to the flood mitigation planning process. Discuss the level of interest expressed by municipalities and devise a strategy for maximizing municipal involvement in this process. Develop a strategy for involving and coordinating with other agencies. Develop a strategy for involving the public. Identify individuals who will be asked to participate. Define the scope of the planning process.
- **Assess hazards and problems:** Flood hazard areas were obtained from Flood Insurance Rate Maps, which were digitizing as part of this planning process. Additional hazard areas are recognized along all streams and lakeshores. Information about flood problems was compiled through individual communications and meetings with county personnel and representatives from each municipality. Flood problem areas were marked on maps and digitized.
- **11/10/98: Set risk reduction goals:** Introduction to flood mitigation planning process. Review the maps indicating flood hazard and problem areas and provide additional information. Identify existing community goals. Discuss the vision of how flooding issues can be addressed and future damages prevented. Compile a list of flood damage reduction goals for Schuyler County.
- **12/4/98: Evaluate flood solutions:** Review text and maps of flood hazards and problems; provide additional information. Review and revise flood mitigation goals. Complete Flood Solutions Worksheet – a comprehensive list of possible activities for reducing flood damages. Identify and discuss the activities that are applicable to the resolution of flooding problems in Schuyler County.
- **1/8/99: Prepare an action plan:** Using the flood mitigation goals and the flood solutions worksheet, prepare a list of the action items needed to implement the proposed solutions. Recommend post-disaster mitigation policies and procedures. Develop a strategy for implementation, evaluation, and revision of the plan. Recommendation for public review of the draft Plan.

PUBLIC INVOLVEMENT

The Storm Water Management subcommittee of the Schuyler County Environmental Management Council was formed in 1994 to address drainage, stream stability, and flooding concerns. The Environmental Management Council is a citizen advisory committee appointed by the County Legislature. The Storm Water Management subcommittee is comprised of members of the public who are committed to the resolution of water management problems in Schuyler County. Members of this committee were actively involved in the preparation of this Flood

Mitigation Action Plan.

Additional public input was sought through contacts with the Planning Commission, the Schuyler County Partnership for Economic Development, the Schuyler County Farm Bureau, elected officials, and others. Several residents telephoned with questions and comments about the Plan when the public information meeting was announced in local newspapers.

A draft of this Plan was presented at a public information meeting on February 3, 1999. This meeting was publicized in several local newspapers and by a direct mailing. Approximately 30 citizens and local government representatives were in attendance. Notes of this public meeting are in Attachment D. The meeting began with a presentation of the planning process and the proposed action items. This was followed by a discussion of the Plan, the planning process, and flooding issues. Large-format copies of the Flood Hazard and Problem Maps (Attachment A) were displayed for review and discussion. Each participant was given a handout summarizing the flood mitigation planning process (included in Attachment D) and the Action Plan section of the draft document. Copies of the entire Plan were available for review. Those in attendance were supportive of the Plan. A newspaper journalist provided press coverage of the public information meeting (clipping in Attachment D). All information and comments received were incorporated into this Plan. Attachment C, Slopes and Erosion Control, was added in response to a recommendation that information about road ditch construction and maintenance be distributed with the Plan. Additional presentations of this Flood Mitigation Action Plan will be incorporated into the planned public meetings for the county comprehensive planning process.

COORDINATION WITH RELEVANT AGENCIES

This flood mitigation planning process was undertaken concurrently with a number of important county, municipal, and regional planning initiatives. Chief among these is the preparation of a county comprehensive plan by the Schuyler County Planning Commission, which was charged with preparing such a plan by the Schuyler County Legislature on July 13, 1998. The comprehensive planning process will be closely coordinated with other important planning programs including: economic development planning by the Schuyler County Partnership for Economic Development, Inc. (SCOPED), agricultural and farmland protection planning by the Schuyler County Agricultural and Farmland Protection Board, watershed management planning by the Seneca Lake Area Partners in Five Counties (SLAP-5), water quality planning by the Schuyler County Water Quality Coordinating Committee, public works planning by the County Legislature, and waterfront revitalization planning by the Watkins Glen Village Planning Board.

In order to insure that the flood mitigation planning process was consistent with these various initiatives, participation was solicited from numerous organizations and individuals. Active participants in the flood mitigation planning effort included key players in most of the related planning initiatives. Approximately half of the Schuyler County Legislators attended either planning meetings or the public information meeting. This involvement assured that this Plan is consistent with the stated and unwritten goals and objectives of various groups throughout

Schuyler County.

Participation in this planning process was solicited from County agencies, organizations, and each municipality in Schuyler County. Mailings included information about the flood mitigation planning process, meeting notices, minutes, and draft sections of this document. An effort was made to minimize the number of meetings in order to encourage participation from as many people as possible. Input from some of those unable to attend flood mitigation planning meetings was obtained through personal communications. Those apprised of this planning effort and invited to participate included:

- County Soil & Water Conservation District
- County Emergency Management Office
- County Planning and Community Development Office (Cornell Cooperative Extension)
- County Highway Department
- County Watershed Department
- County Legislators
- County Water Quality Coordinating Committee
- County Environmental Management Council
- County Planning Commission
- Schuyler County Partnership for Economic Development (SCOPED)
- Schuyler County Farm Bureau
- Mayors for each of the four Villages
- Supervisors for each of the eight Towns
- Superintendents of Highways or Public Works for each municipality
- Southern Tier Central Regional Planning and Development Board
- Upper Susquehanna Coalition
- New York State Emergency Management Office
- New York State Department of Environmental Conservation
- Finger Lakes State Parks

Personnel and volunteers from these organizations contributed to the planning process in a variety of ways: attending meetings, providing information, answering specific questions, reviewing minutes, and reviewing draft sections of this document.

A draft of this Flood Mitigation Action Plan was submitted to each of the above organizations for additional review and comment. It was also submitted to the Federal Emergency Management Agency. All recommendations received were incorporated into this Plan.

PROCEDURE FOR REVIEW AND REVISION OF THE PLAN

The Flood Mitigation Action Plan for Schuyler County will be reviewed and updated at an annual meeting of a coalition of County agencies, municipal officials, and interested members of the public. Participation will be solicited from all of those who were contacted about the present planning process (listed above).

FLOOD HAZARDS AND PROBLEMS

Flood hazards occur in areas that are prone to flooding, whether or not any development is affected. This Plan addresses the following hazards throughout Schuyler County: riverine flooding, lakeshore flooding, overland flooding and ponding, erosion of streambanks, and erosion of lakeshores. The Flood Insurance Rate Maps for each municipality (except the Town of Reading) indicate the areas expected to be inundated by 100-year flooding along the principle water bodies (Attachment A). The Flood Insurance Studies for the Villages of Watkins Glen and Montour Falls include detailed analyses of some of the flood hazards in the developed areas of these two Villages. Additional hazards due to flooding and bank erosion exist along every stream in the County and many unmapped drainage ways. The hazard areas for overland flooding and ponding are generally not recognized unless they contribute to flooding problems. The potential hazard areas are thus widespread.

Flood problems occur when development is adversely impacted by flood hazards. Numerous flood problem areas have been identified throughout Schuyler County. These problems are described below and indicated on the Maps of Flood Hazards and Problems (Attachment A). This information about flooding problems was assembled from previous documentation and the knowledge of municipal officials, residents, and agency personnel familiar with flooding in Schuyler County.

FLOODING AND BANK EROSION

Lakeshore flooding occurs when high water levels inundate the shoreline. The damage to docks and shoreline development can be compounded by waves that carry the water to even higher elevations and cause wave action damage. Debris is often left along the shore when the water recedes. The shorelines of Seneca Lake, Lamoka Lake, Waneta Lake, and Cayuta Lake are susceptible to lakeshore flooding. Development near wetlands may also experience flood damages.

Riverine flooding occurs when streams and rivers overflow their banks and inundate adjacent valleys. This occurs when heavy rainfall or rapid snowmelt produces water runoff that exceeds the carrying capacity of the channel. Riverine flood damages can be triggered or exacerbated by constriction or obstruction of stream and river channels. This blockage can result from undersized drainage structures, debris dams, ice jams, or accumulation of sediment within the channel. Backwater flooding occurs when a stream is unable to flow into a larger stream or lake due to high water in the downstream waterbody.

The Flood Insurance Rate Maps (FIRMs) for the Towns and Villages in Schuyler County identify the areas expected to be inundated by the 100-year flood for the principle drainage ways. No maps were prepared for the Town of Reading because no flood threats were identified. Detailed studies were conducted in the Villages of Montour Falls and Watkins Glen. The

FIRMs, Floodway Maps, and Flood Insurance Studies for these two villages provide information about the expected water elevations for the 100-year flood, 100-year flood boundaries, 500-year flood boundaries, floodway boundaries, flood profiles, and supporting documentation. Development within all designated 100-year floodplains is regulated by local laws adopted by each municipality.

The floodplain areas delineated on the FIRMs do not represent all of the areas threatened by flooding in Schuyler County. Most of the designated floodplains were delineated using approximate methods and are thus subject to inaccuracies. The detailed hydraulic analyses that were conducted for streams in Watkins Glen and Montour Fall were based on the assumption of unobstructed flow and are thus considered valid only if all channels and drainage structures remain unobstructed, operate properly, and do not fail. If these conditions do not exist, the impact of 100-year flooding could be greater. Likewise, the analysis of Seneca Lake water levels assumed that the lake would continue to be controlled as it was in the past. In addition, the potential for riverine flooding from the numerous smaller streams in the County was not evaluated when the Flood Insurance Rate Maps were prepared. Yet these streams have floodplains and pose flood hazards. Because there is no floodplain designated on the FIRMs, development along these streams is not regulated by the local laws for flood damage prevention. Yet development in these areas is at risk from both flooding and streambank erosion.

Erosion of lakeshores and streambanks are major concerns throughout Schuyler County. The severity of these problems is due, in part, to the widespread occurrence of poorly consolidated glacial deposits, which are particularly susceptible to erosive forces. In addition, the high gradients of streams flowing down steep slopes provide the energy needed for erosion and transport of bank materials. Natural erosional processes are accelerated during flood events.

Bank erosion leads to the loss of lawns and agricultural land and can undermine buildings, roads, and bridges. Severe erosion also degrades riparian and aquatic habitat. Accelerated erosion of banks loosens large volumes of material that are subsequently deposited within stream channels, limiting the capacity for carrying water. Sediment and debris accumulation can plug culverts and lodge under bridges, displacing the flow of water. Eroded material that is carried downstream contributes to increased deposition rates in downstream lakes, reservoirs, and the Chesapeake Bay. Although bank erosion and channel migration are natural processes, they can be accelerated by human activities. In 1997, Schuyler County initiated a program for maintenance and repair of streams on private land, with the costs shared by the county, the municipality, and landowner.

PROBLEMS:

1. **Streambank erosion** (Countywide): Channel instability poses serious problems for many streams throughout Schuyler County. Existing and potential streambank erosion problems threaten all types of development: buildings, farms, yards, roads, bridges, septic systems, pipelines, etc. Streambank erosion also leads to deposition of large volumes of sediment, trees, and debris within creek channels, seriously limiting their carrying capacity and increasing the risk of flooding.
2. **Debris accumulation** (Countywide): The accumulation of trees and other debris within stream channels contributes to flooding problems throughout Schuyler County. This

debris results from natural processes, streambank erosion (which undermines trees and other vegetation), timber harvesting operations, and dumping of material in the channel or floodplain. This material can form debris dams that impede the flow of water, particularly at culverts and bridges. When water bypasses impediments, it erodes streambanks, damages drainage structures, and floods adjacent areas. The impaired flow of water in debris-choked streams throughout the County contributes to significant amounts of damage every year.

3. **Sediment accumulation** (Countywide): The accumulation of sediment within the channels of Schuyler County streams limits the capacity to convey water and can contribute to flooding of floodplain areas and bridges. The majority of this sediment is eroded from stream banks or streambeds as a result of channel instabilities. Additional sediment results from the erosion of road banks, particularly on private roads. An inventory of road banks in the Seneca Lake watershed identified 182 road ditch erosion problems in Schuyler County (totaling 48 miles). Sediment loading also results from inappropriate erosion and sediment control practices at development sites, timber harvesting operations, and agricultural operations.

Chemung River Watershed

The western part of Schuyler County drains southward into the Cohocton and Chemung Rivers. The predicted areas of 100-year flooding have been delineated along the lakes (Waneta, Lamoka, Tobehanna, and Mill Pond), the sections of Mud Creek between the lakes, and the lower reaches of major streams (Tobehanna Creek, Meads Creek and its tributaries, and Post Creek).

Waneta Lake, Lamoka Lake, and Mill Pond (also called Bradford Pond) are a chain of connected lakes that naturally drain south into Mud Creek in the Chemung River watershed. Flow in these lakes is sometimes diverted through a canal at the north end of Waneta Lake to a hydroelectric generating station on the shore of Keuka Lake. Water levels in this system are presently controlled by the New York State Electric and Gas Company, which operates the power plant, canal, a dam at the northern end of Waneta Lake (in the Town of Wayne, Steuben County), and a dam at the southern end of Lamoka Lake (in the Town of Bradford, Steuben County). Past operation of the system has been effective in minimizing flood damages along the lakeshores. The power company currently plans to discontinue operation of the hydroelectric generating station. The future management responsibility for this system of lakes is uncertain.

PROBLEMS:

4. **Waneta Lake** (T. Tyrone): Most of the cottages along the Waneta Lake shoreline in Schuyler County are elevated above the 100-year floodplain. About 10 homes located on the alluvial points where tributaries enter the lake are within the 100-year floodplain of Waneta Lake. These homes have not experienced flooding problems in recent years.
5. **Lamoka Lake** (T. Tyrone): Approximately 75 houses around Lamoka Lake are located within the 100-year floodplain. Many of these structures were flooded in 1935 and 1972. None have experienced serious flood damage in recent years. In 1996, access to Weller Island was cut off for about two days due to flooding of the road, but homes were not

- flooded. Flooding occurred on Barnards Point, at the mouth of Tobehanna Creek (see problem #10).
6. **Mud Creek: between Lamoka Lake and Mill Pond** (T. Tyrone, T. Orange): Mud Creek connects Lamoka Lake and Mill Pond (also referred to as Bradford Pond). Approximately 15 houses along this channel are located within the 100-year floodplain. They have not experienced serious flood damage in recent years.
 7. **Mud Creek: Waneta Dam and Bradford Dam** (T. Tyrone, T. Orange): Water levels in Waneta Lake, Lamoka Lake, and Mill Pond (Bradford Pond) are controlled by a dam in the hamlet of Bradford (Steuben County) and by releases to a hydroelectric generating station in the Keuka Lake Watershed. The present dam in Bradford was built after the previous dam washed out during the 1935 flood. Operational difficulties with the gate structures have been reported. A 1997 inspection of this dam by NY State Department of Environmental Conservation did not identify any structural deficiencies. The power company that presently maintains this dam and manages the lake levels is currently seeking an appropriate entity to assume responsibility for this system.
 8. **Little Tobehanna Creek: Lamoka Lake Road** (T. Tyrone): Streambank erosion near the mouth of Little Tobehanna Creek threatens lawns and Lamoka Lake Road.
 9. **Tobehanna Creek: Tobehanna Lake dam** (T. Tyrone): Tobehanna Lake is formed by a privately owned dam (about 12 feet high) on Tobehanna Creek (a northeastern tributary to Lamoka Lake). This structure impounds a significant area of water and its failure would impact residential development along about 1 mile of stream between the Tobehanna Lake dam and Lamoka Lake.
 10. **Tobehanna Creek: Hamlet of Tyrone** (T. Tyrone): Bank erosion and sediment accumulation threaten the stability of Tobehanna Creek downstream of Tobehanna Lake. Mill Street and property in the hamlet of Tyrone are threatened. The County Route 23 bridge over Tobehanna Creek is scheduled to be replaced.
 11. **Tobehanna Creek: Barnards Camp** (T. Tyrone): Barnards Camp is located on alluvial deposits that have accumulated where Tobehanna Creek enters Lamoka Lake. The stream channel is naturally unstable in this area. An old berm formerly protected development from flooding by the creek, but a portion of this structure was removed during the construction of additional homes. In 1996, about 15 properties in Barnards Camp flooded, with water surrounding houses and covering roads. The stream channel was subsequently cleaned and widened from Lamoka Lake to Lamoka Lake Road. The old berm was rebuilt.
 12. **Eastern tributary to Tobehanna Creek: County Route 22** (T. Tyrone): An unstable tributary to Tobehanna Creek originates near Sugar Hill and flows west (under Tower Hill Road, Aikens Road, and State Route 226), entering Tobehanna Creek near Mill Street. Flow in this stream has been repeatedly diverted by debris and sediment deposition. Three property owners on County Route 22 have experienced damage from bank erosion. Gravel was recently removed from the channel near these properties.
 13. **Meads Creek and tributaries** (T. Orange): Extensive streambank erosion is a problem along the entire length of Meads Creek and along many tributary streams. In 1997, data were collected along 8 miles of Meads Creek in Schuyler County as part of a stressed stream mapping project. Eroding streambanks were documented along about half of this

8-mile reach. Many areas of the channel were filled with gravel, brush, and trees, including one site where the channel was “completely blocked with rocks, trees, etc. about 7 feet high.” Streambank erosion threatens property and bridges and contributes to a high sediment load in Meads Creek. The accumulation of sediment at bridges and other areas of restricted flow contributes to flooding problems in these areas. Downstream in Steuben County, the problems associated with sedimentation and flooding of developed areas become more severe.

14. **Meads Creek: Monterey** (T. Orange): High water in Meads Creek has repeatedly flooded a farm field and come close to flooding houses in the hamlet of Monterey. The threatened structures are located outside of the designated 100-year floodplain.
15. **Meads Creek: Coon Hollow Road** (T. Orange): High water in Meads Creek damaged the bridge on Coon Hollow Road. The structure was not replaced and the road has been closed.
16. **Meads Creek tributary: Coon Hollow Road** (T. Orange): Severe bank erosion along the Coon Hollow tributary to Meads Creek threatens the road and residential property.
17. **Post Creek: Beaver Dams** (T. Dix): The hamlet of Beaver Dams is located near a wetland in the headwaters of Post Creek. About 25 houses are located within the 100-year floodplain. Some of these homes experienced flooding problems during the 1996 floods. Unstable streambanks and gravel deposits are also a problem along Post Creek.

Seneca Lake Watershed (excluding the Catharine Creek Watershed)

Seneca Lake has a surface area of 67.6 square miles and is the largest of the Finger Lakes. The southern end of Seneca Lake is located within Schuyler County and provides a valuable natural recreational resource. The Village of Watkins Glen is located on the southern shore of the lake. The steep eastern and western slopes of the Seneca Lake Valley are deeply cut by numerous small streams that flow from high hills to the lake. Erosion by these streams has produced spectacular waterfalls and gorges, as well as damage to adjacent development. The Catherine Creek watershed area of southern Schuyler County flows northward into Seneca Lake. The outflow from Keuka Lake flows into Seneca Lake from the west. The outlet of Seneca Lake is the Seneca River, which is located at the northern end of the lake.

Flood damages to the Seneca Lake shoreline result from high lake levels and accompanying wave action. In addition, the numerous tributaries are subject to flooding and bank erosion. The highest recorded elevation of Seneca Lake was 448.9 feet NGVD, which occurred in June 1972 during the tropical storm Agnes. Lake levels rose approximately three feet from June 20 to June 24. During the spring snow melt of 1993, the water was about as high as during the 1972 flood and flooding problems were compounded by 40-mile-per-hour winds from the north. The water and wave damage to docks and other low-lying structures was extensive. After the water receded, large amounts of floating debris made the lake unusable. The southern lakeshore and the points along the east and west shores were piled high with debris.

Seneca Lake is part of the Oswego River Basin, within which the natural drainage conditions were altered by construction of the Erie Canal in the early 1800's and the Barge Canal in the early 1900's. The design of this system raised the level of Seneca Lake to about 5 feet

above its natural level. A dam and lock on the Seneca River control water levels in Seneca Lake. This dam has three gates, two of which control water to a hydroelectric powerhouse and one is used as a floodgate.

The level of Seneca Lake is regulated by the New York State Thruway Authority (by virtue of its ownership of the New York State Barge Canal), which must balance the competing demands of various water uses throughout the Oswego River Basin. The steep slopes in the Seneca Lake watershed result in a rapid rise of water level in the lake following a rainfall or rapid snowmelt event. This contrasts with very low gradients in the canal system into which Seneca Lake drains (less than one foot per mile), which do not allow rapid release of this water from the lake. When the potential for flooding of downstream areas is taken into account, it is generally not possible to lower the water levels within Seneca Lake more rapidly than a few inches per day. Seasonal management of the system allows the lake level to be drawn down in the fall to allow storage capacity for the anticipated spring runoff. However, the amount of any draw down of the lake level prior to anticipated runoff must be balanced against numerous demands for high levels (for navigation, recreation, drinking water supplies, irrigation, dilution of sewage disposal discharges, and wildlife). These problems are compounded by development throughout the watershed, which increases the amount of surface runoff entering the lake.

Some areas of the Seneca Lake shoreline within Watkins Glen are protected by offshore sea walls or breakwaters. These structures provide minimal protection from wave run-up, while offering no actual flood protection. The structures are easily topped by high water from large magnitude floods.

Seneca Lake is fed by numerous high gradient tributary streams that flow down steep slopes to the east and west shores of the lake. Although many of these channels are frequently dry, when they carry water the velocities can be quite high. Geologic conditions result in very little infiltration of runoff in the areas drained by many of these tributary streams. The steep gradients and high velocities contribute to down cutting of the channels and can cause extensive erosion. Channel blockages frequently divert flow, causing additional flooding and erosion damage. Severe washouts of roads and bridges occurred along many of these high gradient tributary streams during the “Finger Lakes Flood” in July 1935. During that flood, Logan Creek was over the ballast on the railroad in the Village of Burdett (but not over the tracks).

Areas of predicted 100-year flooding have been delineated along Seneca Lake in the Village of Watkins Glen and in the Town of Hector, but not along the 6 miles of lakeshore in the Town of Reading. Floodplains were not delineated for the numerous tributary streams that descend the steep slopes on the east and west sides of the Lake, except for the short reaches of Logan Creek and Tug Hollow Creek located within the Village of Burdett.

PROBLEMS:

18. **Seneca Lake: Lake level management** (T. Reading, V. Watkins Glen, T. Hector; not shown on map): The management of lake levels in Seneca Lake is becoming an increasingly complex problem. The New York State Thruway Authority is currently evaluating the operational procedures for management of the entire canal system and has

hired a water management specialist to oversee this process. Increased precipitation and water level data throughout the Oswego River basin could improve the coordinated management of this system.

19. **Seneca Lake: Flooding of shoreline development** (T. Reading, V. Watkins Glen, T. Hector): The Seneca Lake shoreline is substantially developed with residential, recreational, and commercial facilities. Docks, boat houses, recreational facilities, and some buildings are located near lake level and are thus susceptible to flood damage from high water and waves on Seneca Lake. Of particular concern are houses located very close to the water along the west shore of the lake where approximately 50% of houses are right on the water. On the east side of the lake, 30 or more houses appear to be located within the 100-year floodplain. Most of the flooding problems occur on the points of alluvial deposits that have accumulated at the mouths of tributary streams. Problem areas include South Falls Point, Glen Eldridge Point, B&W Point, Peach Orchard Point, and Valois Point. Lake flooding in 1993 caused extensive damage to docks and cottages along both shores of Seneca Lake. In addition to the risk of water and wave damage, lakeshore development is threatened by shoreline erosion and the accumulation of debris.
20. **Seneca Lake tributaries** (T. Reading, T. Hector; not shown on map): Many of the steep eastern and western tributary streams have streambank erosion problems. These tributaries have caused repeated erosion damage to adjacent land, roads, and possibly to buildings in Bennettsburg. The access roads to lakeshore properties are primarily private drives, for which the extent and frequency of damages is not known.
21. **Rock Stream: Beach Road and Altay Road** (T. Reading): The upper reach of Rock Stream is a small, low gradient stream. Slow flow in this channel causes water to back up, creating flooding problems. One house on Altay Road has been repeatedly surrounded by water. The culvert at Altay Road was recently replaced and the banks reshaped. Following 1996 flooding, it was necessary to replace the Beach Road culvert.
22. **Buttonwood Brook: Spencer Road** (T. Reading): Debris has repeatedly plugged a culvert for Buttonwood Brook, diverting water toward a motel. During the January 1996 flood, the motel experienced flooding within the building.
23. **Seneca Lake: Watkins Glen sewage treatment plant** (V. Watkins Glen): The Watkins Glen sewage treatment plant is located on the southern shore of Seneca Lake. The waste treatment tanks are elevated and have not experienced flooding problems. Protection from wave damage is provided by a retaining wall and rock riprap. Flow within this facility backed up during the flooding caused by the 1993 snowmelt. At that time, the plant did not have back flow valves and high water in the lake flowed into the sewage treatment tanks. Residents in the Jefferson Village area were affected. This problem has been corrected.

Catharine Creek Watershed

Catharine Creek and its tributaries drain northward into Seneca Lake through the Barge Canal and the Seneca Lake Inlet. The flat-bottomed valley near the lake contains a large wetland area, as well as the Villages of Watkins Glen and Montour Falls. Upstream of Montour Falls, Catharine Creek is a renowned trout stream. The November 1996 flood caused considerable

damage along Catharine Creek, particularly in the Town of Montour. Approximately 7 tree jams formed, backed up water, and then ruptured, releasing torrents of water and debris.

The 100-year floodplain has been delineated along Catharine Creek, the Catharine Creek Diversion, the Barge Canal, the Seneca Lake Inlet, and Shequaga Creek. Floodplains have also been delineated along parts of Glen Creek (upstream and downstream of Watkins Glen State Park), McClure Creek (within the Village of Montour Falls), and Deckertown Creek (within the Villages of Montour Falls and Odessa).

The area around Glen Creek in the Village of Watkins Glen was developed in the early 1800's. The most devastating flood occurred in 1935, when debris lodged on a railroad trestle and then broke loose. A wall of water washed through the Village, destroying homes and businesses. The basement of the County Courthouse was filled with mud to within 6 inches of the floor joists. Following this event, the stream was relocated to its present course and concrete retaining walls were constructed. The walls that protect streamside development within the Village are currently in serious disrepair.

Three dams are located on Glen Creek upstream of the Village of Watkins Glen. The Whites Hollow Lake reservoir has been completely filled in with sediment. At present, the area is a gravel bed with no pooling of water. The lower reservoir, Punch Bowl Lake, was constructed in the mid 1930's. Heavy streambank erosion upstream of this structure has resulted in sedimentation within the reservoir and a 90% reduction in the lake's depth. The upper reservoir, Upper Dam Lake, was built in 1953 and has likewise experienced extensive sedimentation, resulting in a 50% reduction in impoundment depth. As a result of this sedimentation, the flood control value of these reservoirs has diminished.

A flood protection project was constructed in Montour Falls in 1953 to protect the central area of the Village from frequent and highly damaging floods (from Catharine Creek, Catlin Mill Creek, and Shequaga Creek). A Diversion Channel now conveys the main flow of Catharine Creek around the Village of Montour Falls. Levees along the west (left) bank of the Diversion Channel protect the Village from over bank flow. The Diversion Channel intercepts Catlin Mill Creek (which flows into the Village from the east) alleviating flooding from this source. Shequaga Creek (also called Falls Creek) comes off a steep escarpment to the west of the Village (at the spectacular Shequaga Falls) and was formerly a source of flooding problems. As a result of the 1953 flood control project, Shequaga Creek now falls into a stilling basin at the base of the falls, from which it is conveyed through a steep conduit and an open channel with a levee on the east (right) bank to its outlet into Catharine Creek. Both the original channel of Catharine Creek and the Diversion Channel join the Barge Canal at the northern side of the Village. The New York State Department of Environmental Conservation maintains this flood control system.

PROBLEMS:

24. **Glen Creek:** Upper Dam Lake, Whites Hollow Lake, and Punch Bowl Lake (T. Dix): The three reservoirs on Glen Creek provide minimal flood control value due to extensive filling with sediment. These dams are maintained by the State Parks Department, which

repaired concrete at the base of the Upper Dam a few years ago. During high water events, these structures are visually inspected and the Schuyler County Emergency Management Office is provided with information about the water level and the amount of water being discharged. Structural failure of one of these dams could send a wave of water and sediment down the Watkins Glen Gorge and into the Village of Watkins Glen. Routine inspection by the State Department of Environmental Conservation has not identified any problems with either structure. An Emergency Action Plan for these structures was prepared in the 1980's.

25. **Glen Creek: Franklin Street to Decatur Street** (V. Watkins Glen): The concrete walls along both banks of Glen Creek from Franklin Street to Decatur Street are in poor condition. These structures have been damaged and undermined in places. They are overgrown with vegetation, which is causing additional damage. If a section of wall collapses, it could block flow within Glen Creek and cause flooding of an extensive area of residential and commercial development. The Village is seeking funding to repair these walls.
26. **Glen Creek: sewer line at McGee Street** (V. Watkins Glen): A Village of Watkins Glen sewer line that passes under Glen Creek near the end of McGee Street has recently been protected with rock rip rap. This shallow line was exposed, raising concerns that rupture could result in the release of untreated sewage into Glen Creek and Seneca Lake.
27. **Glen Creek and Barge Canal: Shannon Street** (V. Watkins Glen): Five houses on Shannon Street are located near Glen Creek and the Barge Canal. Although this area is outside of the delineated 100-year floodplain, it has been necessary to evacuate these homes during recent high water events.
28. **Shequaga Creek (also called Falls Creek): Walt Gilbert Road area** (T. Dix): About three homes on State Route 414 and Walt Gilbert Road are located within the 100-year floodplain of Shequaga Creek. The Russell Hill Road Bridge over Shequaga Creek washed out in 1972.
29. **Catharine Creek: State Route 14 and Croton Road** (T. Montour): Three houses along State Route 14 (south of Rambling Brook Inn) and one house on Croton Road are located within the 100-year floodplain of Catharine Creek and experienced flooding in 1996. Flooding in the Croton Road area was attributed primarily to water from a western tributary. Catharine Creek experienced extensive bank erosion, debris accumulation, and sedimentation during two flood events in 1996. This damage threatened the Catharine Creek trout fishery and surrounding development. Extensive work was done to clear and restructure the channel following the November 1996 flood. Additional work is planned to stabilize the banks and restore in-stream habitat.
30. **Catharine Creek tributary: Fitzpatrick Hill Road** (T. Montour): A tributary to Catharine Creek has scoured the supports to a bridge on Fitzpatrick Hill Road (between Crans Road and Frost Hill Road).
31. **Catharine Creek: State Route 14 near electric substation** (T. Montour): An electric substation at State Route 14 and Dug Road (located outside of the designated 100-year floodplain) has experienced repeated flooding from Catharine Creek. In 1996, this flooding also inundated 3 houses and 3 businesses. In 1997, a berm was constructed

- along the east bank of the stream to protect the electric substation and adjacent development (from Rambling Brook Inn to Dug Road).
32. **Catharine Creek: State Route 14 between Dug Road and Diversion** (T. Montour, V. Montour Falls): Floodplain development along State Route 14 between Dug Road and the Catharine Creek Diversion Channel is not protected from flood damages. In 1996, 5 houses and 3 businesses were flooded.
 33. **Catherine Creek Diversion** (V. Montour Falls): A local flood protection project protects the Village of Montour Falls from the anticipated 100-year flood (the flood having a one percent chance of being equaled or exceeded in any given year). A flood event that exceeds the design capacity of this project could inundate a large area within the Village. During high water events, when water from developed areas cannot flow into the diversion, some ponding problems have occurred in the East Main Street area. A storage area was excavated in 1997 to address this problem.
 34. **Catharine Creek: Montour Street area** (V. Montour Falls): The culvert that conveys the original channel of Catherine Creek under South Street is undersized. The original design specified two 6-foot culverts, but only one was installed. When water backs up at this site, backwater in an unnamed tributary causes flooding of houses and Village facilities on Cook Street, Genesee Street, and Montour Street. The Village Department of Public Works maintenance shop, machinery and storage garage have been flooded. Ten homes have experienced water in basements causing damage to furnaces and water heaters. In addition, water has surrounded a doctor's office, preventing service to patients. This problem has recurred numerous times. In order to improve drainage in this area, the Village has replaced the culverts under Montour Street and the railroad tracks. The Village is seeking funding to increase the drainage capacity under South Street.
 35. **Catharine Creek: Montour Falls sewage treatment plant** (V. Montour Falls): The Montour Falls sewage treatment plant is located adjacent to the original channel of Catharine Creek near the end of the flood control levee along the Catharine Creek Diversion. This facility almost flooded during the January 1996 flood. A short berm was subsequently constructed to protect the plant from water from the Catharine Creek Diversion. This structure was overtopped by the November 1996 flood and sewage treatment tanks were flooded. After this event, the berm was elevated (almost to the height of State Highway 14), but has not yet been extended to tie into high ground. Flooding problems at this site have been compounded by large volumes of trees and other debris washing down Catharine Creek.
 36. **Chemung Barge Canal: Marinas** (V. Montour Falls, V. Watkins Glen): The Chemung Barge Canal extends from Seneca Lake to the Village of Montour Falls through Queen Catherine Marsh (formerly called Bad Indian Swamp). Although most of this area is undeveloped, marina-type development (in both Watkins Glen and Montour Falls) experiences flooding due to backwater from Seneca Lake. Docks were damaged by high water and debris during the January 1996 flood and the November 1996 flood. This canal requires dredging to keep it navigable.
 37. **McClure Creek (also called Havana Glen Creek): Mitchell Hollow Road** (T. Montour): The Mitchell Hollow Road bridge over McClure Creek has been threatened by bank erosion and large trees floating under the bridge. During the January 1996 flood,

- the stream washed behind the headwall on the north bank of the creek. In November 1996, the south headwall was washed out.
38. **Beardsley Hollow Creek: Brink Road** (T. Catharine): The McClure Creek tributary along Beardsley Hollow Road has washed out Brink Road. Closure of this road in 1996 cut off all access to several houses. High water at the Brink Road bridge scoured out the headwalls, pipe, road surface, and adjacent streambanks. Mitigation work completed at this site includes stream stabilization, elevation of the floodplain, and a new bridge.
 39. **Catlin Mill Creek: State Route 228** (T. Catherine): Catlin Mill Creek flows southwestward along State Route 228 east of the Village of Odessa. High water in Catlin Mill Creek has caused flooding of the highway.
 40. **Deckertown Creek: Odessa** (V. Odessa): Approximately 8 houses in the Village of Odessa are located within the 100-year floodplain of Deckertown Creek.

Upper Susquehanna Watershed

Cayuta Creek and its tributaries in the southeastern part of Schuyler County drain into the Upper Susquehanna River. This watershed includes Cayuta Lake and several large wetlands. The area contains numerous beaver. Cayuta Creek and some of its tributaries are classified trout streams. Streambank erosion is a problem on the steep tributaries, particularly Jackson Creek.

The 100-year floodplains have been delineated around Cayuta Lake, along Cayuta Creek, along the lower reaches some of the tributaries (including Hendershot Gulf and Jackson Creek), and around several wetlands (including Hinman Swamp).

PROBLEMS:

41. **Cayuta Lake (also called Little Lake)** (T. Catharine): The shoreline of Cayuta Lake includes areas with dense residential development. Approximately 50 cottages are located within the 100-year floodplain of the lake, but have not experienced serious flooding problems in recent years.
42. **Cayuta Creek: Debris** (T. Catharine, T. Cayuta): Flow in Cayuta Creek is obstructed in many areas by the accumulation of brush, trees, tires, and other material in the channel. Numerous beaver dams compound this situation.
43. **Cayuta Creek: Alpine** (T. Catharine): High water in Cayuta Creek has repeatedly flooded Oak Hill Road north of Alpine, necessitating closure of the road. A couple of houses are located in the 100-year floodplain. One house has experienced water in the basement, but not on the main floor. Mitigation in this area includes a larger culvert under Oak Hill Road and a new bridge on Swan Hill Road.
44. **Hinman Swamp: Terry Hill Road** (T. Catharine): A couple of houses on Terry Hill Road are located within the 100-year floodplain of Hinman Swamp, but have not experienced recent flooding problems.
45. **Cayuta Creek: Alpine Junction** (T. Cayuta): Cayuta Creek has flooded State Route 224 near Alpine Junction, necessitating closure of the road. Water also comes up around the houses in a mobile home park. A couple of buildings in Alpine Junction may be within the 100-year floodplain of Cayuta Creek.

46. **Cayuta Creek: Varney Hill Road** (T. Cayuta): Cayuta Creek floods Varney Hill Road, necessitating closure.
47. **Hendershot Gulf: Hamlet of Cayuta** (T. Cayuta): About three buildings in the hamlet of Cayuta may be within the 100-year floodplain of Hendershot Gulf Creek.
48. **Cayuta Creek: State Route 224 at Burlingame Road** (T. Cayuta): Cayuta Creek floods State Route 224 near Burlingame Road, necessitating closure of the road. One house located near this intersection experiences water in the basement.
49. **Jackson Creek: Streambank erosion and debris** (T. Cayuta): Streambank erosion problems are extensive on Jackson Creek. Four hundred feet of bank have recently been stabilized with rock riprap. A 150 foot concrete wall was installed upstream of the Decker Hill Road bridge. Debris and gravel accumulation within the channel are quite severe. In 1998, an estimated 4,000 cubic yards of gravel were removed from the channel upstream of the Route 224 bridge. Gravel has also been removed upstream of the upstream County Route 13 bridge. Additional areas upstream and downstream of these locations are choked with debris.
50. **Jackson Creek: County Route 13 and Decker Hill Road** (T. Cayuta): One house located near the Arnot Forest on County Route 13 experiences flooding problems. The Decker Road bridge over Jackson Creek was replaced with a double steel culvert in 1995. The lower County Route 13 bridge over Jackson Creek was damaged by high water and is currently being replaced. Work at this site was halted in January 1998 after severe flooding in the area.
51. **Jackson Creek: State Route 224** (T. Cayuta): Two homes located near the intersection of County Route 13 and State Route 224 have experienced repeated flooding in recent years. Neither structure is located within the designated 100-year floodplain. Finished living space in one house has flooded three times in the last three years with as much as 2 ½ feet of water on the first floor. The most recent flooding occurred on July 7, 1998. A “Stream Team” with representatives from several federal agencies accompanied by local personnel visited this site on October 6, 1998. This team was unable to identify any single cause for the recent problems. The streambed at this site is filled with alluvial deposits. In 1998, the County removed gravel from 1300 feet of the stream adjacent to the affected properties. The Route 224 bridge (located downstream of the affected houses) was replaced in 1985 and the roadway was raised. The Town Highway Superintendent reports that the new bridge appears to have altered the pattern of high water flow and doesn’t handle the water as well as the old one. The stream path was straightened at the time of bridge construction, which may also contribute to altered flow characteristics. Additional upstream activities that may contribute to problems at this site include bridge replacement, bank stabilization (rip-rap and a cement wall), and gravel removal. The county is evaluating the possibility of seeking funding for a buyout of the most severely impacted home.

Cayuga Lake Watershed

Several streams in northeastern Schuyler County drain eastward into Cayuga Lake. The area of anticipated 100-year flood inundation has been delineated along Taughannock Creek.

PROBLEMS:

52. **Taughannock Creek: Mecklenburg** (T. Hector): Approximately 5 houses in the hamlet of Mecklenburg are located within the 100-year floodplain of Taughannock Creek. A few have experienced flooding problems. In 1997, a section of streambank in Mecklenburg was stabilized.
53. **Taughannock Creek: Perry City** (T. Hector): Three or four houses on County Route 3 in Perry City (located outside of the 100-year floodplain) experience flooding problems. The channel of Taughannock Creek contains numerous trees, which obstruct the flow of water. The Buck Hill Road bridge was damaged by a floating tree, necessitating repair of the piling.
54. **Hencoop Creek: State Route 227** (T. Hector): Sediment and debris accumulation in Hencoop Creek contributes to flooding of one house and a field. Debris has been routinely removed from beneath the Black Road Bridge.
55. **Bolter Creek: County Route 1** (T. Hector): Sedimentation threatens the stability of Bolter Creek. For many years, gravel was removed at the County Route 1 bridge, which is threatened by the creek. Gravel has also been mined from Bolter Creek west of Route 227. Termination of gravel mining adjacent to the stream is expected to reduce the sediment loading and thus the threat to surrounding property.

DRAINAGE PROBLEMS

Overland flooding occurs when excess runoff is not carried in a defined channel. It leads to flood damages when structures are improperly sited and stormwater runoff is not properly managed at development sites. Alteration of natural drainage patterns has contributed to drainage problems at many locations in Schuyler County.

The majority of the flooding problems experienced in Schuyler County during the January 1996 flood resulted from the overland flow of rain and snowmelt before it reached stream channels. This rapid runoff resulted in flooding and washouts at numerous sites throughout the County. Although buildings and houses were flooded, the majority of the damage from this overland flow was to roads, driveways, ditches, and culverts. The damage at many sites was compounded by the accumulation of debris, which blocked and diverted flow. Although this type of damage can be expected to recur, the specific damage sites will depend on the circumstances of each high runoff event.

PROBLEMS:

56. **Road ditches and culverts** (Countywide): Roadways throughout Schuyler County are susceptible to washout problems when the capacity of roadside ditches is exceeded. Problems tend to occur at sites where ditches and culverts are undersized or are obstructed by debris, sediment, or ice.
57. **Debris accumulation** (Countywide): The accumulation of plant materials and other debris can block the flow of water in swales, ditches, culverts, and streams. Water bypassing these impediments, causes flood damage and washouts in adjacent areas.

These damages can occur during modest runoff events as well as during major floods. The cumulative damage to roads, culverts, and bridges throughout the County results in significant expenditures of tax revenues for infrastructure repair. The blockage of culverts conveying runoff beneath elevated railroad tracks has caused ponding problems in the Town of Reading.

58. **Land use changes** (Countywide): There are areas throughout Schuyler County where land use changes have contributed to drainage problems where none previously existed. The removal of tree cover increases the amount of water that reaches the ground surface and may result in increased runoff into nearby drainage ways and streams. Pavement, roofs, and other impervious surfaces increase the amount of surface runoff and the speed with which that runoff reaches the streams. Roads, driveways, and skid trails can divert the flow of water. Although land use changes do not always create flooding problems, inadequate attention to the management of stormwater has contributed to problems at or near development or timber removal activities.
59. **Watkins Glen storm sewer system** (V. Watkins Glen; Seneca Lake Watershed): Storm sewers in the Village of Watkins Glen drain into Seneca Lake. Extremely high water levels in the lake could cause this system to back up, impacting much of the development in low areas of the Village (east of Franklin Street). This problem has never occurred.
60. **Cotton Hanlon Road** (T. Montour; Catharine Creek Watershed): At least three properties along Cotton Hanlon Road experience erosion problems due to the concentration of surface runoff. Some of these problems may be caused or compounded by diversion of water on adjacent properties.
61. **Hayes Road** (V. Montour Falls; Catharine Creek Watershed): A plugged pipe and excessive flows in the road ditch system has washed out a gully 15 feet deep along Hayes Road. This culvert has been replaced with a larger structure. The owner of property located downhill is concerned that this may increase flows at the culvert under L'Hommedieu Street, which might become plugged with debris.
62. **Auble Road** (T. Hector; Seneca Lake Watershed): The drainage pipes conveying water from agricultural diversion ditches near Auble Road are undersized. This problem has resulted in flooding of the road and washing out of the road ditch.
63. **Middle Road** (T. Hector; Seneca Lake Watershed): Middle Road on the east side of Seneca Lake is elevated well above the level of flooding from the lake. However, the road is frequently flooded from stormwater runoff from the hill. This occurred most recently during a relatively minor thunderstorm in June 1998.
64. **North Falls Road** (T. Hector; Seneca Lake Watershed): Severe runoff and erosion problems occur on North Falls Road on the east shore of Seneca Lake. The culverts under North Falls Road (privately owned) are inadequately sized to carry the volume of stormwater runoff that reaches this area. Private property below these culverts has been damaged. One house has been flooded and another is at risk.

FLOOD WARNING

Flood warnings are provided by the Schuyler County Emergency Management Office, which obtains flood warning information from the National Weather Service. These warnings are based on a network of automated rain and river-level gauges, supplemented by volunteer reporting and weather forecasts. The County also has computer access to real-time weather satellite data to assist in anticipating adverse conditions.

Lake levels in Seneca Lake are measured at the USGS Gauging Station located on the east bank of the Barge Canal (approximately 300 feet upstream of Seneca Lake) and a State Department of Transportation gauge on McAnarney's dock within the Village of Watkins Glen. This information is supplemented by readings of two gauges at the north end of the lake. Measured water levels can differ by as much as 1 foot between the north and south end of the lake due to wind conditions.

Because Schuyler County is located in headwater areas, flooding of streams occurs with little or no warning time (flash flooding). There are no stream level gauges on any of the streams in Schuyler County. Flood warnings are based on rain gauge data, weather radar information, and rainfall forecasts by the National Weather Service.

PROBLEMS:

65. **Flash flooding**: The short steep tributary streams in Schuyler County are highly susceptible to flash flooding, which can occur suddenly with little or no lead-time.
66. **Disaster plans**: Each municipality in Schuyler County should have an updated disaster plan with specific information that will enable municipal officials to respond appropriately to flood warnings and data from stream and rain gauges. Although a plan has been prepared for each municipality, many are not up to date.

DEVELOPMENT TRENDS

Schuyler County is a small, rural community. The County is currently pursuing economic development in order to generate tax revenue. Care is needed to insure that new development does not contribute to increased flooding problems. All municipalities in the county have adopted floodplain development regulations and are in good standing with the National Flood Insurance Program. However, most municipal building officials have had little training or experience with enforcement of the floodplain development regulations.

PROBLEMS:

67. **Floodplain development regulations** (Countywide): Consistent enforcement of existing floodplain development regulations is needed to insure that new construction in identified flood hazard areas is protected from anticipated flood conditions.
68. **Flood Insurance Rate Maps** (Countywide): The approximate methods used to delineate 100-year floodplains throughout most of Schuyler County are subject to inaccuracies and

the potential for flooding along numerous small streams was not evaluated. The effectiveness of local regulation of floodplain development could be enhanced by more accurate delineation of flood hazard areas.

69. **Flood Insurance Rate Maps: West shore of Seneca Lake** (T. Reading): The west shore of Seneca Lake in Schuyler County is in the Town of Reading, which does not have any Flood Insurance Rate Maps (FIRMs). There are no areas of predicted 100-year flooding within which floodplain development standards are enforced. Approximately half of the existing houses on the west shore are located very close to the water and many have experienced flood damages. The local regulations do not protect against the construction of additional buildings at low elevations along the shore.
70. **Flood Insurance Rate Maps: East shore of Seneca Lake** (T. Hector): The Flood Insurance Rate Maps for the Town of Hector show a narrow area of predicted 100-year flooding along the east shore of Seneca Lake. The resolution of the map makes it difficult to determine whether or not a building is located within the designated floodplain. No Base Flood Elevations were determined to aid with the siting and elevation of buildings. The floodplain is classified as an “unnumbered A Zone,” within which the first floor of any building must be elevated two feet above grade. With the potential for waves on the lake, this elevation requirement may not provide an adequate margin of safety to protect new development from flood damages along Seneca Lake.
71. **Stormwater management** (Countywide): The building regulations of Schuyler County municipalities do not adequately protect against increased runoff and altered drainage patterns from new development.
72. **Timber harvesting** (Countywide): There is no mechanism for insuring that appropriate stormwater management practices are implemented during timber harvesting operations in Schuyler County.

FLOOD MITIGATION GOALS

The comprehensive planning process for Schuyler County has not yet proceeded to the point of identifying goals. That planning process will build on the 1976 Schuyler County Land Use Plan, which, while out of date, states goals that are expected to be reflected in the new county comprehensive plan:

- Maintain the rural character of the county.
- Improve the economic base of the county.
- Make the most effective use of the county's natural resources.
- Provide public services in the most efficient and economic manner.

The Schuyler County Legislature has demonstrated its commitment to the resolution of flooding problems by establishing and funding the Schuyler County Stream Maintenance Program (initiated in 1997). The stated objective of this program is "to reduce future losses of public and private property from streambank erosion and reduce flooding within Schuyler County.

The following flood damage reduction goals were prepared by the participants in the flood mitigation planning process. These goals are based on an understanding of the County's flooding problems and the community objectives of the County, towns and villages.

The overall flood mitigation goal for Schuyler County is to reduce the cost of a 100-year flood to a fraction of the damages that would occur if that flood happened today. In order to accomplish this, a concerted effort is needed to simultaneously (1) prevent new development activities that can contribute to increased flood risks and (2) mitigate the current flood threats to existing development.

PREVENTIVE MEASURES

Planning and Development Restrictions:

- * No new buildings in flood-prone areas (including sites with known flooding problems that are located outside of the designated 100-year floodplain).
- * Discourage development near wetlands, streambanks, and lakeshores.

Stormwater Management:

- * No new runoff impacts from new development. Each municipality enacts and enforces stormwater management standards.
- * Reduce runoff and sedimentation from agriculture and timber harvesting operations.

Drainage System Maintenance:

- * Establish procedures for removing sediment and debris from drainage ways and stream channels in areas where it obstructs flow and causes problems to roads, buildings, or other development (including beavers/beaver dams when necessary).

NATURAL RESOURCE PROTECTION

- * Stabilize stream channels, streambanks, and roadside ditches in order to minimize ongoing maintenance expenses.
- * Stabilize areas adjacent to streams and ditches with seeding and vegetated buffer strips.
- * Promote the creation of wetlands.

PROPERTY PROTECTION

- * Replace bridges and culverts with adequately sized structures.
- * Protect roads from flood damages by implementing appropriate mitigation measures. Stabilize and maintain ditches. Modify drainage patterns where appropriate. Elevate roads above the flood level at sites where this can be accomplished without obstructing flow or contributing to problems elsewhere.

STRUCTURAL SOLUTIONS

- * Improve coordination of lake level control. Improve communication between municipalities and agencies throughout the watershed. Incorporate real-time rain gauge data into operating procedures for the canal system.
- * Create high flow channels to divert water during flood events.

EMERGENCY SERVICES

- * Organize a coalition of County agencies and municipal officials to coordinate flood preparedness and response activities (before, during, and after a flood).
- * Provide early warning of flood events (by monitoring National Weather Service index for flash flood guidance, improved rainfall monitoring, and improved stream/lake level monitoring).
- * Assemble the site-specific information needed for pre-emergency planning (locations of flood problems, order in which different areas become flooded, lake levels that correspond to specific problems, time elapsed between upstream and downstream peak flows, access routes, etc.)

OTHER GOALS

- * Hire a County Drainage Officer to work with local officials on monitoring, mitigating, and preventing drainage problems.
- * Document the ongoing costs associated with flooding and evaluate the cost effectiveness of preventive measures.

- * Continue the informal cooperation between municipalities for use of equipment for maintenance and flood response activities.

FLOOD MITIGATION SOLUTIONS

The participants in the Schuyler County flood mitigation planning process reviewed and evaluated the measures on a comprehensive list of possible activities for reducing flood damages. They selected techniques applicable to the problems and goals that had been previously identified. A copy of the worksheet incorporating the collective ideas and recommendations for Schuyler County is provided in Attachment B. All of the measures listed on this worksheet were reviewed and evaluated. The techniques that committee members recommend initiating or expanding in Schuyler County are indicated in Attachment B.

ACTION PLAN

The following activities are recommended to minimize the effects of flooding in Schuyler County. These are action items that can be accomplished with existing staff and volunteer resources within the next couple of years. These actions will not achieve the goals set forth in this Plan, but represent the next steps that need to be taken. Additional activities will be required in future years to meet the county's flood mitigation goals. The timetable and source of funding for each activity is given in Table 1.

PUBLIC INFORMATION

1. Display maps of flood hazards and problems: The maps showing floodplains and flood problem areas that were prepared for this Plan will be posted in municipal offices. A color plot of each map will be provided by the Southern Tier Central Regional Planning and Development Board. The Schuyler County Environmental Management Council will distribute a map to each municipality when this Plan is presented for municipal approval. This Plan will be referenced on each map and will be readily available.
2. Provide real estate agents with maps of flood hazards and problems: The Schuyler County Watershed Protection Department will compile a mailing list of real estate agents located in Schuyler County. A color copy of each flood problem map prepared for this Plan will be sent to each real estate agent. The cover letter will request that this information be shared with potential buyers of property in flood-prone areas of Schuyler County.
3. Post Flood Mitigation Action Plan on County Web Site: This Plan and the associated maps of flood hazard and problem areas will be posted on the County Planning Web Site.
4. Provide flood information to public libraries: A copy of this Flood Mitigation Action Plan will be provided to each public library in Schuyler County. The availability of other relevant flood information will be evaluated and additional material will be donated to the libraries if appropriate.
5. Articles in Soil and Water Conservation District News: The County Soil and Water Conservation District (S&WCD) plans to publish a series of short articles about streams in its newsletter, which is published two times each year. These articles will discuss the behavior of streams, stream remediation techniques, and stream stabilization demonstration projects (Action Item #19).
6. Articles in County Planning and Community Development Newsletter: The County Planning and Community Development Office will include articles about flood damage prevention measures in its newsletter. It is anticipated that material relevant to the resolution of flooding problems will be included about once each year.
7. Display flood information in County and municipal offices: The County Environmental Management Council and Regional Flood Specialist will review available brochures about flood risks, emergency preparedness, and floodproofing techniques. Copies of

appropriate brochures will be displayed at County offices for the Soil and Water Conservation District, Cornell Cooperative Extension, and Emergency Management. Brochures will be provided to each municipality for display at Town and Village Halls.

8. Incorporate flooding issues into environmental education programs: The County Soil and Water Conservation District will evaluate the existing environmental education programs in light of the information provided about flooding issues. Efforts will be made to incorporate stream dynamics, flooding, drainage, and water cycle issues into each of these programs, including the annual Envirothon competition, Field Days, and Environmental Expo.

PREVENTIVE ACTIVITIES

9. Evaluate possibility of County Code Enforcement and/or Drainage Officer: Schuyler County will evaluate the feasibility of increasing the County's role in code enforcement and drainage activities. It has been proposed that a County Code Enforcement Officer and/or a County Drainage Officer would enable a level of expertise that is not currently available to the municipalities, thus improving the enforcement of floodplain development regulations and implementation of stormwater management practices. This suggestion will be presented to the County Planning Commission for consideration.
10. Provide Code Enforcement Officers with information about floodplain development regulations: Each municipality in Schuyler County has enacted a local law regulating development within identified flood plain areas, consistent with requirements of the National Flood Insurance Program. The County Emergency Management Office will continue to assist Code Enforcement Officers with implementation of local floodplain development regulations. The Regional Flood Specialist will be invited to an informal meeting between Code Enforcement Officers and the County Watershed Protection Department, which is held each spring. Local regulations for floodplain development and Flood Insurance Rate Maps (referenced in these regulations) will be discussed.
11. Establish vegetated buffers along streams: The Schuyler County Soil and Water Conservation District encourages property owners to maintain vegetated buffer zones along stream corridors. The Natural Resources Conservation Service (NRCS) District Conservationist will identify potential projects for funding through the NRCS Riparian Buffer Initiative.
12. Establish new Agricultural Districts: The Schuyler County Agricultural and Farmland Protection Board is in the process of forming two new Agricultural Districts. This will preserve open space by discouraging non-farm development on prime farm lands. When the process is complete (1999-2000), Schuyler County will have three Agricultural Districts encompassing the rural areas of the County.
13. Include stream buffer and drainage issues in Agricultural & Farmland Protection Plan: The Schuyler County Agricultural and Farmland Protection Board has begun the process of preparing a County Agricultural and Farmland Protection Plan. Representatives from the Soil and Water Conservation District and the Planning and Community Development

Office will insure that this plan includes consideration of stream corridor management and other drainage issues.

14. Recommend strategy for improving stormwater management practices: The Storm Water Management subcommittee of the Schuyler County Environmental Management Council is currently evaluating ways to improve stormwater management practices in Schuyler County. They are reviewing the current requirements of the State Pollutant Discharge Elimination System (SPDES), anticipated changes to these SPDES requirements, information published by the NY State Department of Environmental Conservation, and the *Stormwater Management and Erosion Control Draft Model Ordinance* prepared by the Regional Flood Specialist. It is anticipated that the subcommittee will encourage adoption of local laws regulating stormwater discharges from construction sites. Technical assistance for implementing the committee's recommendations will be provided by the Environmental Management Council, Soil and Water Conservation District, and Regional Flood Specialist.
15. Contractor workshop on stormwater management: The County Environmental Management Council is planning to sponsor a contractor workshop on erosion and sediment control and stormwater management.
16. Inspect streams: The County Soil and Water Conservation District has submitted a grant application to the Great Lakes Commission to enable the County to hire interns to walk streams and document problem areas. When problems are identified, the Soil and Water Conservation District will work with the Towns to address them. The Soil and Water Conservation District is currently evaluating the level of detail desired from this survey and prioritizing streams.

NATURAL RESOURCE PROTECTION

17. Support efforts to restore and construct wetlands: Schuyler County will continue to support efforts of various agencies to establish and reclaim wetlands. Possible funding partners include the Natural Resources Conservation Service (through the Wetland Reserve Program) and the U.S. Fish and Wildlife Service. Soil and Water Conservation District staff will review the wetland information provided by the U.S. Army Corps of Engineers as part of their reconnaissance studies of the Chemung Basin and the Upper Susquehanna Basin.
18. Continue Stream Maintenance Program: Schuyler County has made a commitment to continue funding the County Stream Maintenance Program. This program was started in 1997 to provide landowners with technical and financial assistance for maintaining and repairing damage to streambanks. The cost for stream projects is shared by the property owner, the municipality, and the County. The County has allocated \$25,000 in funding for 1999. Under the 1/3 - 1/3 - 1/3 formula, this will allow implementation of as much as \$75,000 for stream projects.
19. Stream stabilization demonstration projects: The Schuyler County Soil and Water Conservation District plans to construct several demonstration projects using applied fluvial geomorphology techniques for stream stabilization. Potential sites are currently

being identified and evaluated. The County has allocated \$5,000 from the 1999 budget of the Schuyler County Stream Maintenance Program for these projects. This funding may be matched by Towns, Villages, and private property owners. The County is applying for grant funding to supplement this appropriation. It is anticipated that 2 or 3 demonstration projects will be implemented in 1999. These project sites will be used to educate municipal officials, property owners, and others about the about stream dynamics and the application of stream stabilization techniques.

20. Road bank and road ditch stabilization: The five counties in the Seneca Lake Watershed have received Bond Act funding for road ditch stabilization. Implementation of this project is ongoing and is expected to be completed in 2000. It includes funding for road ditch stabilization projects at approximately 50 sites within the Seneca Lake Watershed in Schuyler County. In conjunction with this program, the Soil and Water Conservation District is engaged in ongoing efforts to provide municipal Highway Departments with information about road ditch stabilization techniques. Education is provided during project design and implementation and at quarterly meetings of the Highway Superintendents. Relevant information about slopes and erosion control is included in Attachment C.

PROPERTY PROTECTION

21. Inform railroad company of drainage problems associated with tracks: The Conrail railroad line through Schuyler County is undergoing a change in ownership. When this purchase is complete, the Town of Reading will write a letter to the new owner alerting them to drainage problems resulting from blocked drainage beneath the elevated tracks (Problem #57). The letter will express the Town's desire to work with the railroad company to identify and resolve any future problems.
22. Evaluate acquisition of flood-prone properties: The owners of a flood-prone house on Jackson Creek (Problem #51) have expressed an interest in applying for funds for a federal buyout program, with the understanding that they will be responsible for the 25% local match if grant funds are received. Both the Town and the County have been asked to evaluate the possibility of sponsoring a grant application to either the Flood Mitigation Assistance Program or the Hazard Mitigation Grant Program. Concerns have been expressed about legal issues, the cost to the Town or County, and the precedent that would be set by purchasing flood-prone property. These issues will be investigated.

STRUCTURAL SOLUTIONS

23. Evaluate Glen Creek reservoirs: The County Water Quality Coordinating Committee will obtain and review available information about the dams on Glen Creek that form Upper Dam Lake and Punchbowl Lake (Problem #24). They will evaluate the safety of these structures and consider the feasibility of dredging the reservoirs to increase the flood control benefits. The need and cost for a technical evaluation will be evaluated.

24. Improve Catharine Creek drainage under South Street, Montour Falls: The Village of Montour Falls has applied for funding (through the Federal Emergency Management Agency Hazard Mitigation Grant Program) to replace the culvert that conveys Catharine Creek under South Street with double culverts (Problem #34). This project will be implemented when funding is available.
25. Repair Glen Creek walls in Watkins Glen: The Village of Watkins Glen is attempting to procure funding to repair the damaged walls along Glen Creek (Problem #25). This critical project will be implemented as soon as funding is available.

EMERGENCY SERVICES

26. Review and update municipal Emergency Plans: Each municipality in Schuyler County has an Emergency Plan that was written several years ago. The County Coordinator of Emergency Services will contact each municipality about the need to review and update these plans. Assistance will be provided as necessary.
27. Improve communication and coordination concerning lake levels: The County Coordinator of Emergency Services will maintain ongoing communication with the NY State Thruway Authority concerning the need for improved coordination and communication relative to the management of lake levels in the Oswego River Basin.

POST-DISASTER MITIGATION POLICIES AND PROCEDURES

The majority of the decisions concerning reconstruction after a flood incident will be made by individual property owners. County and municipal officials will provide property owners with information and technical assistance. The Schuyler County Coordinator of Emergency Services will encourage Code Enforcement Officers to distribute information about floodproofing to the owners of damaged property. Each municipality will be encouraged to examine the damage areas, evaluate the suitability of rebuilding damaged structures, and make appropriate recommendations to property owners.

Code Enforcement Officers will be provided with technical assistance for implementing the requirements of local floodplain development regulations for reconstruction of damaged buildings located within the 100-year floodplain. These regulations specify that structures that are substantially damaged (cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred) will only be rebuilt if they are brought into compliance with current floodplain development standards.

Table 1. Flood Mitigation Action Items (page 1 of 4)

PUBLIC INFORMATION			
Task	Responsible Person	Time Table	Financing
1. Display maps of flood hazards and problems	County Environmental Management Council	1999	none required
2. Provide real estate agents with maps of flood hazards and problems	County Watershed Inspector	1999	copying/postage expense
3. Post Flood Mitigation Action Plan on County Web Site	County Director of Planning & Community Development	1999 or 2000	utilize existing web site; staff time
4. Provide flood information to public libraries	County S&WCD	1999	copy expense; staff time
5. Articles in Soil & Water Conservation District News	County S&WCD	begin 1999	S&WCD newsletter expense; staff time
6. Articles in County Planning & Community Development Newsletter	County Director of Planning & Community Development	begin 1999	newsletter expense; staff time
7. Display flood information in County and municipal offices	County Environmental Management Council	1999	copy expenses; staff and volunteer time
8. Incorporate flooding issues into environmental education programs	County S&WCD	begin 1999	staff and volunteer time

Table 1. Flood Mitigation Action Items (page 2 of 4)

PREVENTIVE ACTIVITIES			
Task	Responsible Person	Time Table	Financing
9. Evaluate possibility of County Code Enforcement and/or Drainage Officer	County Watershed Inspector	begin evaluation in 1999	none required at this time
10. Provide Code Enforcement Officers with information about floodplain development regulations	County Coordinator of Emergency Services; Regional Flood Specialist	ongoing	staff time
11. Establish vegetated buffers along streams	NRCS District Conservationist	when funding is available	Riparian Buffer Initiative program
12. Establish new Agricultural Districts	County Agricultural & Farmland Protection Board	ongoing; complete in 1999-2000	staff and volunteer time
13. Include stream buffer and drainage issues in Agricultural & Farmland Protection Plan	County Agricultural & Farmland Protection Board	ongoing; complete in 1999	staff and volunteer time
14. Recommend strategy for improving stormwater management practices	County Environmental Management Council	ongoing	staff and volunteer time
15. Contractor workshop on stormwater management	County Environmental Management Council	1999 or 2000	to be determined
16. Inspect streams	County S&WCD	when funding is available	grant; S&WCD

Table 1. Flood Mitigation Action Items (page 3 of 4)

NATURAL RESOURCES PROTECTION			
Task	Responsible Person	Time Table	Financing
17. Support efforts to restore and construct wetlands	County S&WCD	ongoing	seek funding
18. Continue Stream Maintenance Program	County Stream Maintenance Program Committee	ongoing	\$25,000 County Funds in 1999; matched by municipalities & property owners
19. Stream stabilization demonstration projects	County S&WCD	2-3 sites in 1999 if funding is available	\$5,000 from County Stream Budget; seeking grant funding
20. Road bank and road ditch stabilization	County S&WCD (working with municipal Highway Departments)	ongoing; complete in 2000	Bond Act; matched by County and municipalities

PROPERTY PROTECTION			
Task	Responsible Person	Time Table	Financing
21. Inform railroad company of drainage problems associated with tracks	Town of Reading Highway Superintendent	1999 (when sale is finalized)	staff time
22. Evaluate acquisition of flood-prone properties	County Coordinator of Emergency Services	ongoing	staff time

Table 1. Flood Mitigation Action Items (page 4 of 4)

STRUCTURAL SOLUTIONS			
Task	Responsible Person	Time Table	Financing
23. Evaluate Glen Creek reservoirs	County Water Quality Coordinating Committee	1999	staff time
24. Improve Catharine Creek drainage under South Street, Montour Falls	Montour Falls Highway Superintendent	when funding is available	approx. \$150,000; seek funding
25. Repair Glen Creek walls in Watkins Glen	Watkins Glen Superintendent of Public Works	when funding is available	approx. \$100,000; seek funding

EMERGENCY SERVICES			
Task	Responsible Person	Time Table	Financing
26. Review and update municipal Emergency Plans	County Coordinator of Emergency Services; each municipality	1999	staff and volunteer time
27. Improve communication and coordination concerning lake levels	County Coordinator of Emergency Services	ongoing	staff time

ATTACHMENT A

Maps of Flood Hazards and Problems

Summary of Flooding Problems

ATTACHMENT A

Maps of Flood Hazards and Problems

Summary of Flooding Problems

Town of Cayuta : Flood Hazards and Problems

Legend

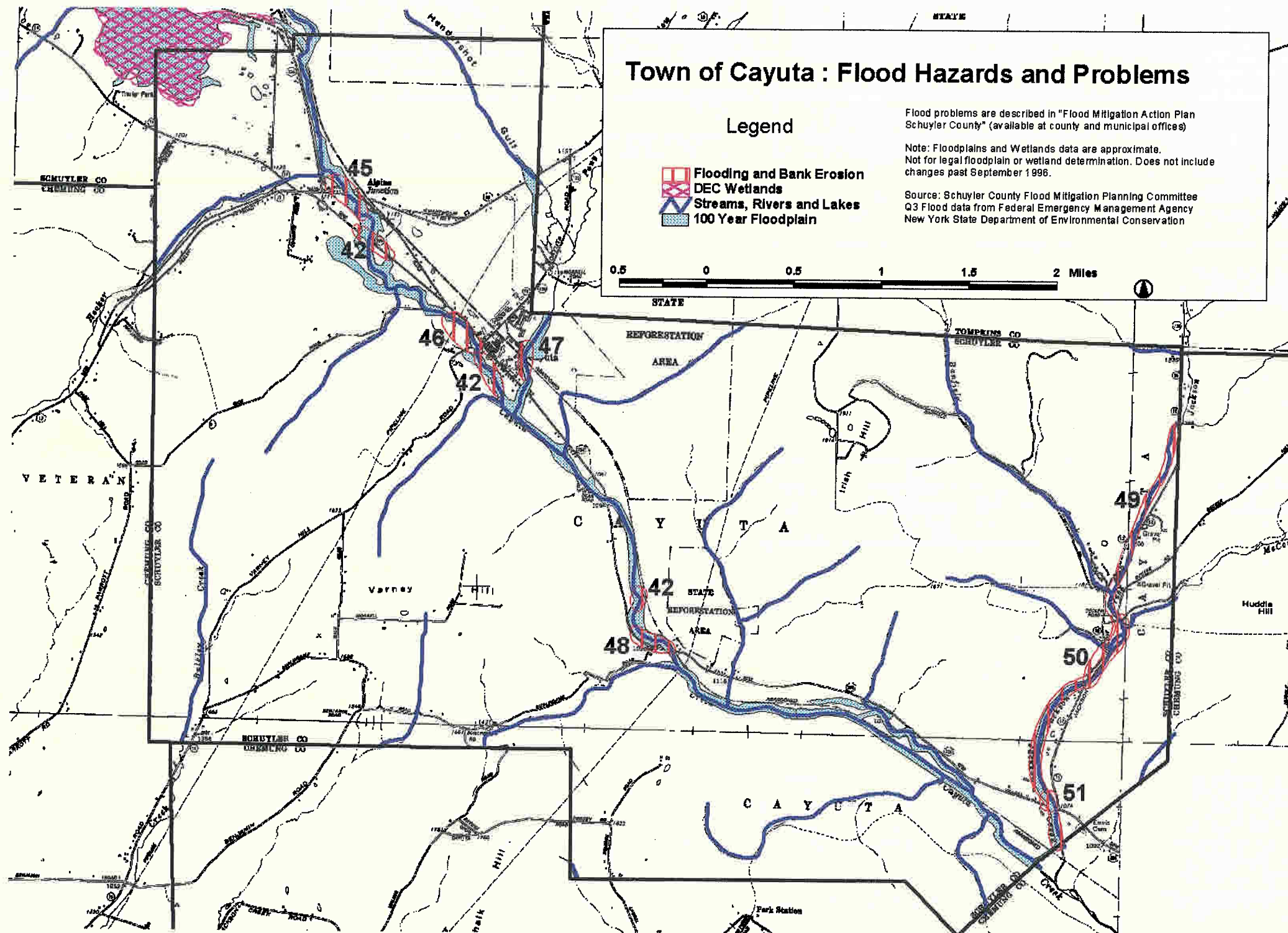
-  Flooding and Bank Erosion
-  DEC Wetlands
-  Streams, Rivers and Lakes
-  100 Year Floodplain

Flood problems are described in "Flood Mitigation Action Plan Schuyler County" (available at county and municipal offices)

Note: Floodplains and Wetlands data are approximate.
Not for legal floodplain or wetland determination. Does not include changes past September 1996.





Source: Schuyler County Flood Mitigation Planning Committee
Q3 Flood data from Federal Emergency Management Agency
New York State Department of Environmental Conservation

0.5 0 0.5 1 1.5 2 Miles



Town of Tyrone : Flood Hazards and Problems

Legend

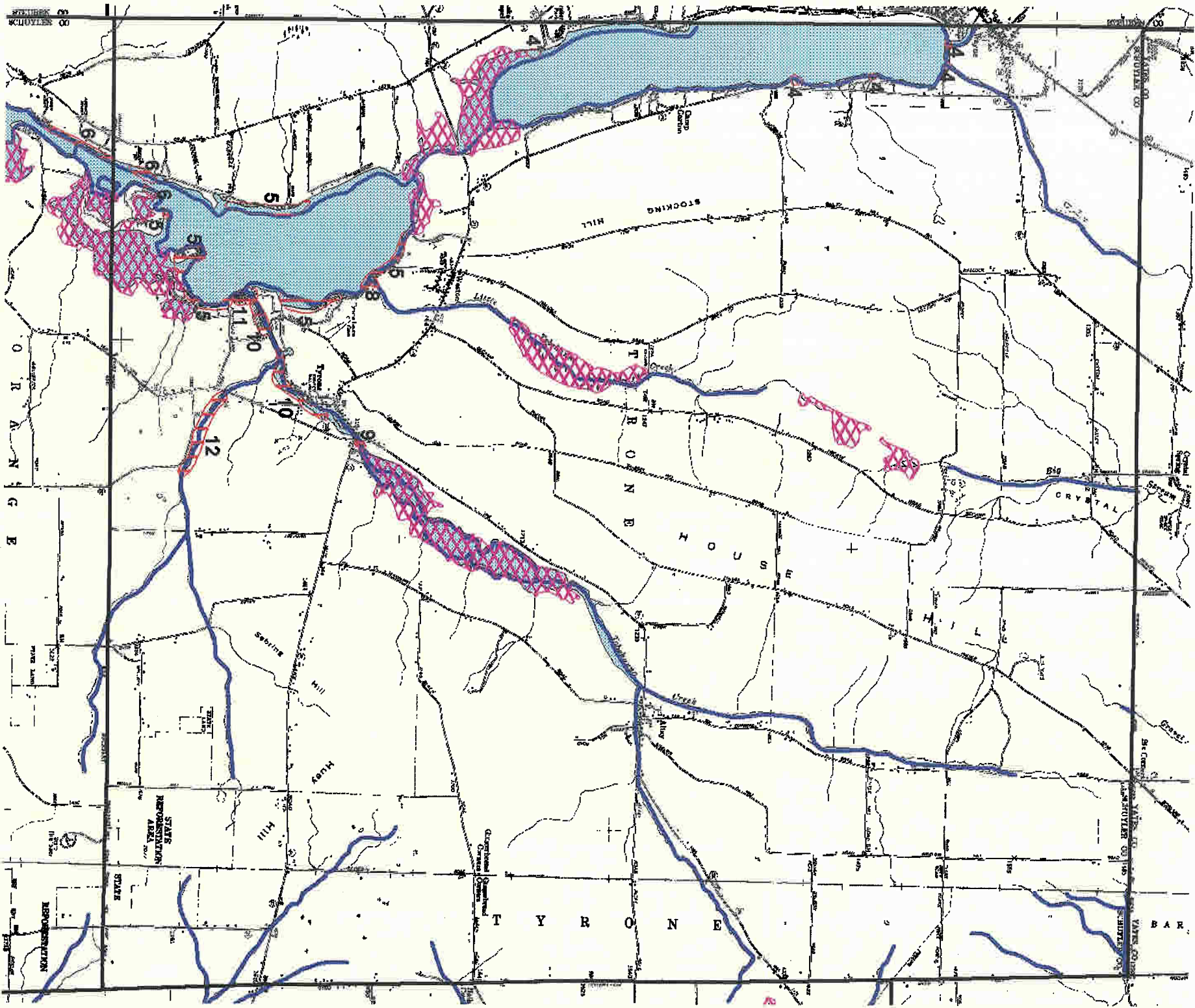
-  Flooding and Bank Erosion
-  DEC Wetlands
-  Streams, Rivers and Lakes
-  100 Year Floodplain



Flood problems are described in "Flood Mitigation Action Plan Schuyler County" (available at county and municipal offices)

Note: Floodplains and Wetlands data are approximate. Not for legal floodplain or wetland determination. Does not include changes past September 1996.

Source: Schuyler County Flood Mitigation Planning Committee
Q3 Flood data from Federal Emergency Management Agency
New York State Department of Environmental Conservation



Village of Watkins Glen and Village of Montour Falls Flood Hazards and Problems

Legend

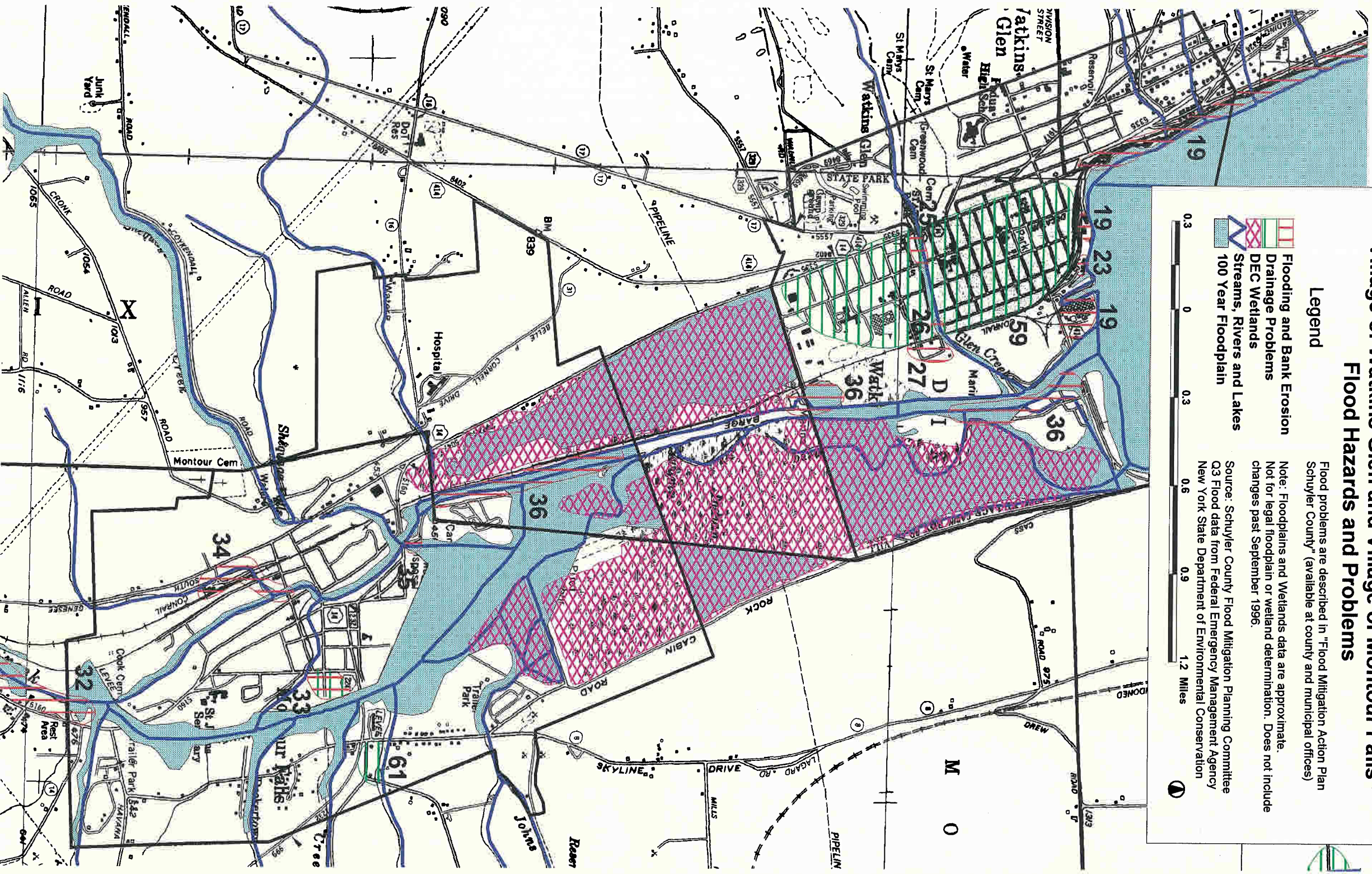
- Flooding and Bank Erosion
- Drainage Problems
- DEC Wetlands
- Streams, Rivers and Lakes
- 100 Year Floodplain



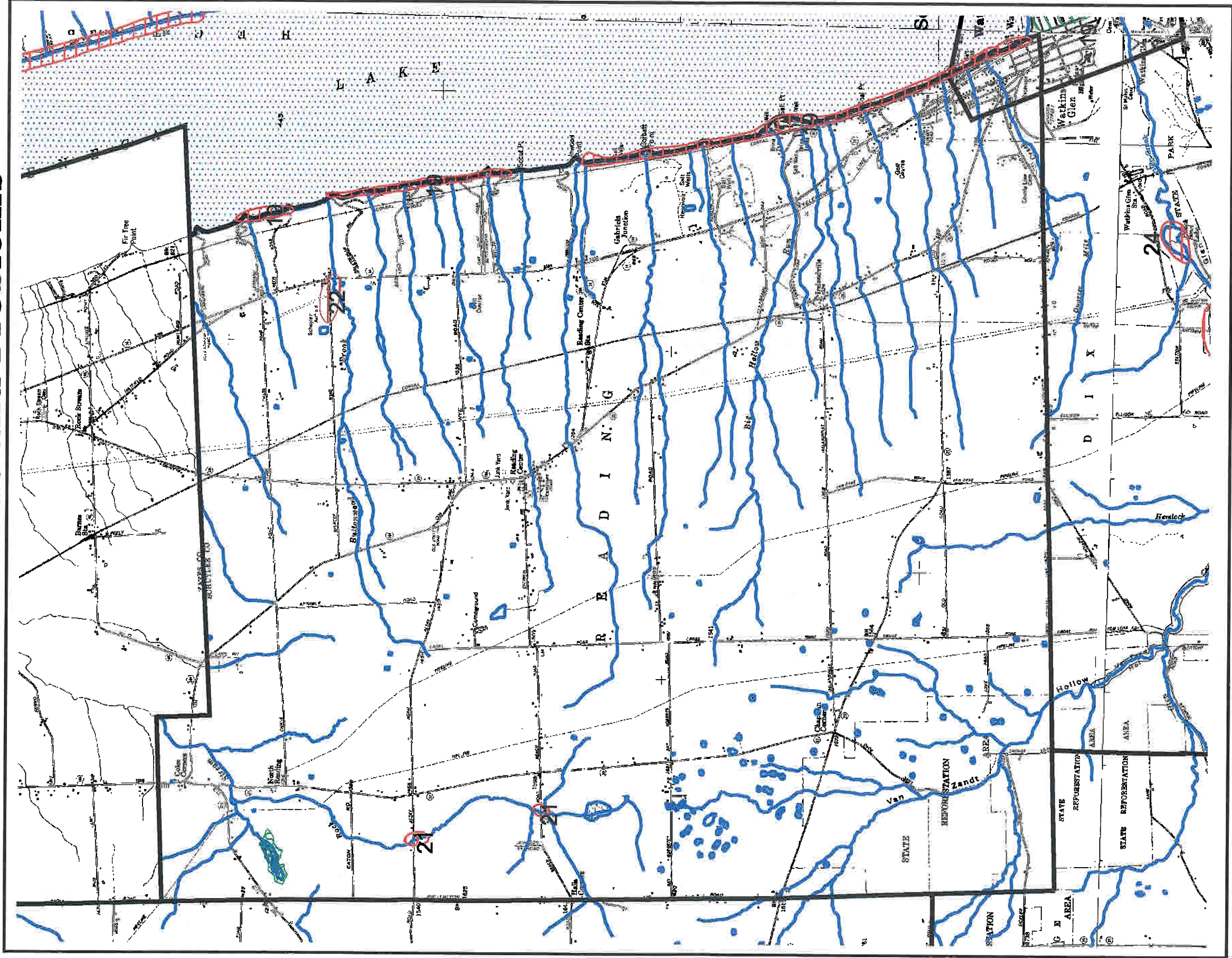
Flood problems are described in "Flood Mitigation Action Plan Schuyler County" (available at county and municipal offices)

Note: Floodplains and Wetlands data are approximate. Not for legal floodplain or wetland determination. Does not include changes past September 1996.

Source: Schuyler County Flood Mitigation Planning Committee
Q3 Flood data from Federal Emergency Management Agency
New York State Department of Environmental Conservation



Town of Reading Flood Hazards and Problems



- Flood Problem Areas
- Flooding and Bank Erosion
 - Drainage Problems
 - Wetlands
 - Streams
 - Rivers and Lakes
 - Municipal Boundaries
 - Floodplains
 - 100 Year Floodplain

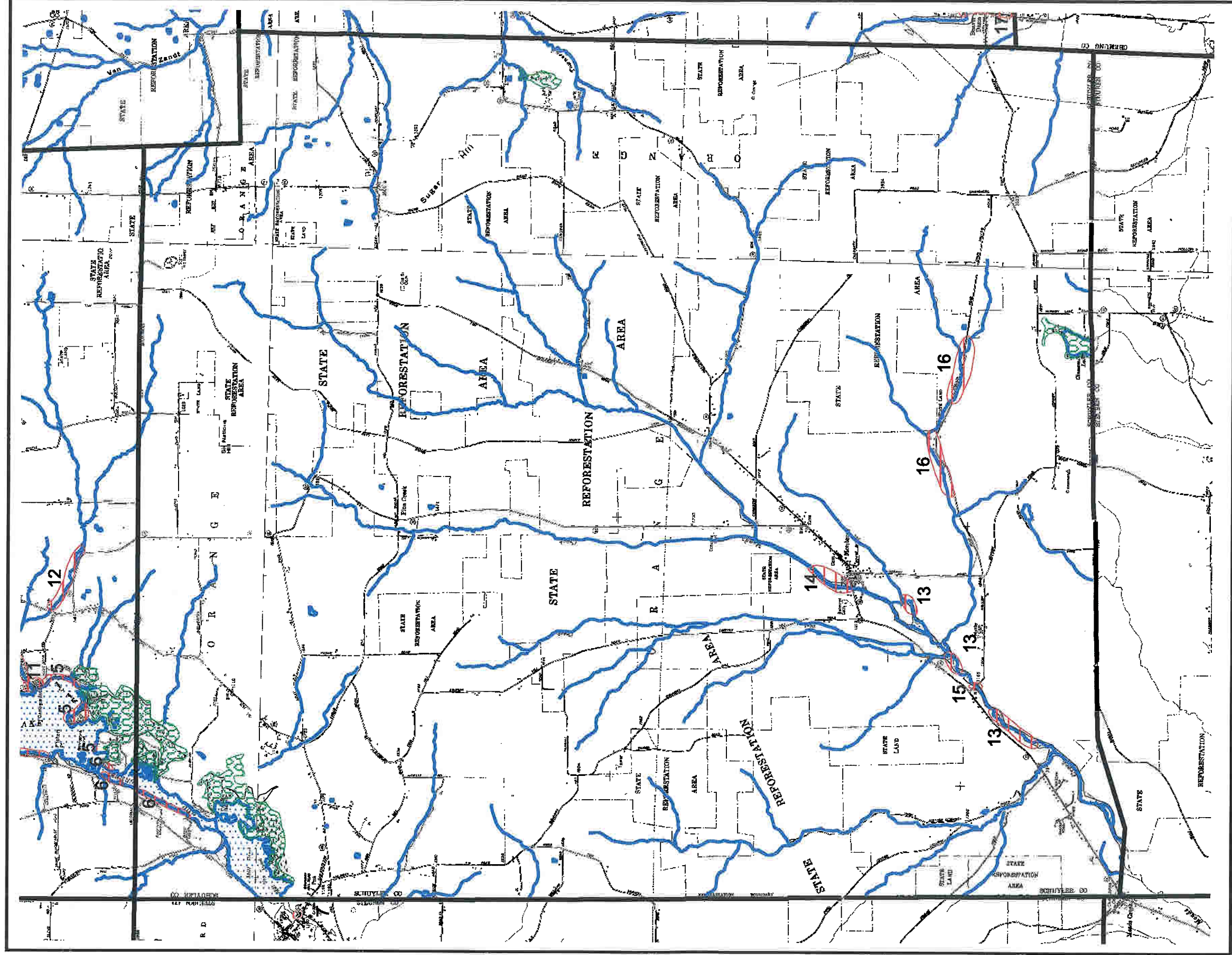
Flood Problems are described in "Flood Mitigation Action Plan, Schuyler County" (available at county and municipal offices).

Note:
Floodplains and Wetlands data are approximate. Not for legal floodplain or wetland determination.

Source:
Flood Mitigation Planning Committee,
New York State 7.5 Minute Quadrangle Images, NYS Department of Environmental Conservation, May 1992.
New York State Department of Transportation, February 1993.
Flood Insurance Rate Map, July 7, 1978 and September 15, 1984

Prepared by Genesee\Finger Lakes Regional Planning Council, October 1998

Town of Orange : Flood Hazards and Problems



Flood Problem Areas

- Flooding and Bank Erosion
- Drainage Problems
- Wetlands
- Streams
- Rivers and Lakes
- Municipal Boundaries
- Floodplains
- 100 Year Floodplain

Flood Problems are described in "Flood Mitigation Action Plan, Schuylker County" (available at county and municipal offices).

Note:

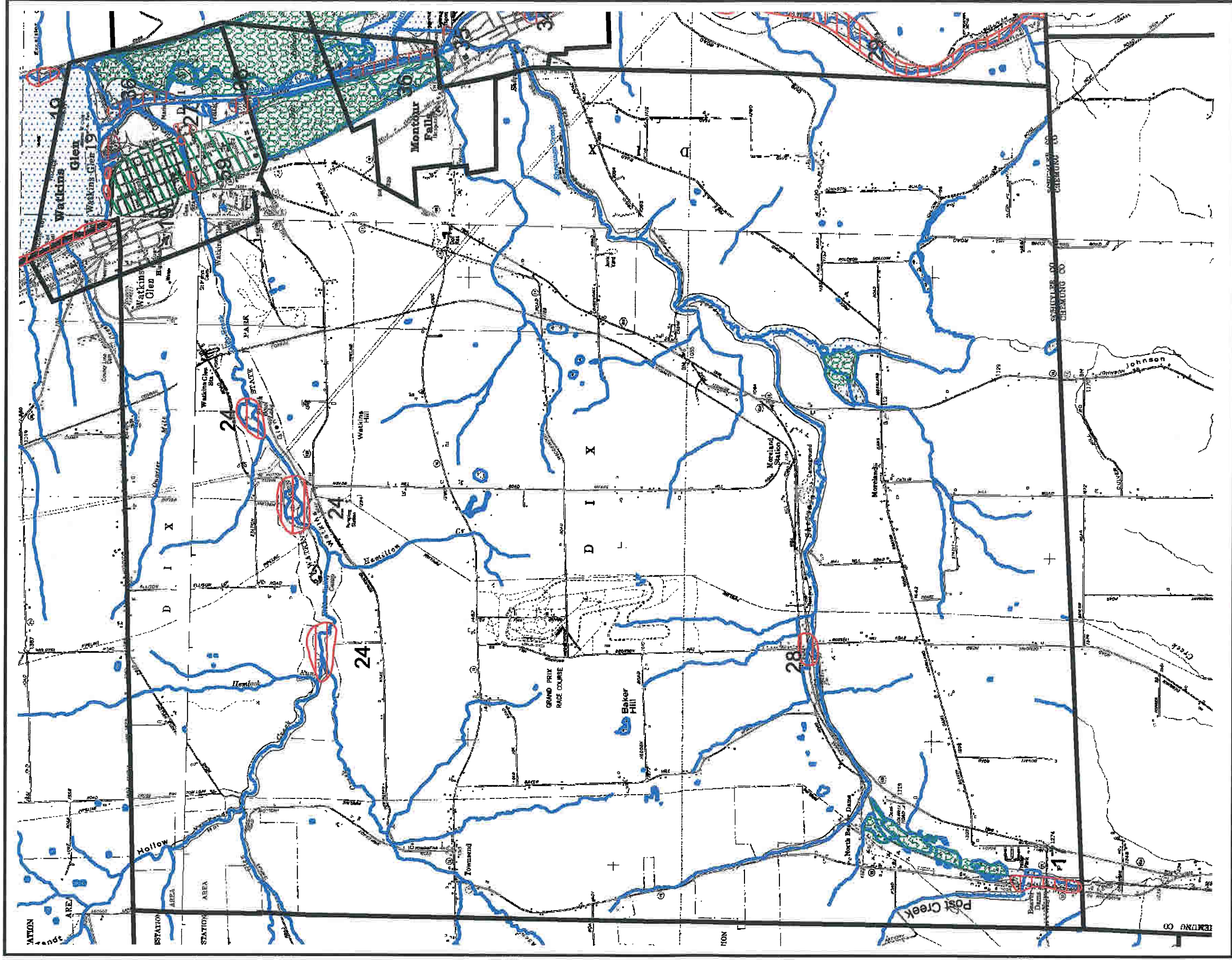
Floodplains and Wetlands data are approximate. Not for legal floodplain or wetland determination. Does not include changes past September 1996.

Source:

Flood Mitigation Planning Committee.
Q3 Flood Data, Disc 19 (West), Federal Emergency Management Agency, National Flood Insurance Program, September 1996.
New York State 7.5 Minute Quadrangle Images, NYS Department of Environmental Conservation, May 1992.
New York State Department of Transportation, February 1993.
Flood Insurance Rate Map, April 20, 1984

Prepared by Genesee\Pinger Lakes Regional Planning Council, October 1998

Town of Dix Flood Hazards and Problems



Flood Problem Areas

- ▬ Flooding and Bank Erosion
- ▬ Drainage Problems
- ▬ Wetlands
- ▬ Streams
- ▬ Rivers and Lakes
- ▬ Municipal Boundaries
- ▬ Floodplains
- ▬ 100 Year Floodplain

Flood Problems are described in "Flood Mitigation Action Plan, Schuyler County" (available at county and municipal offices).

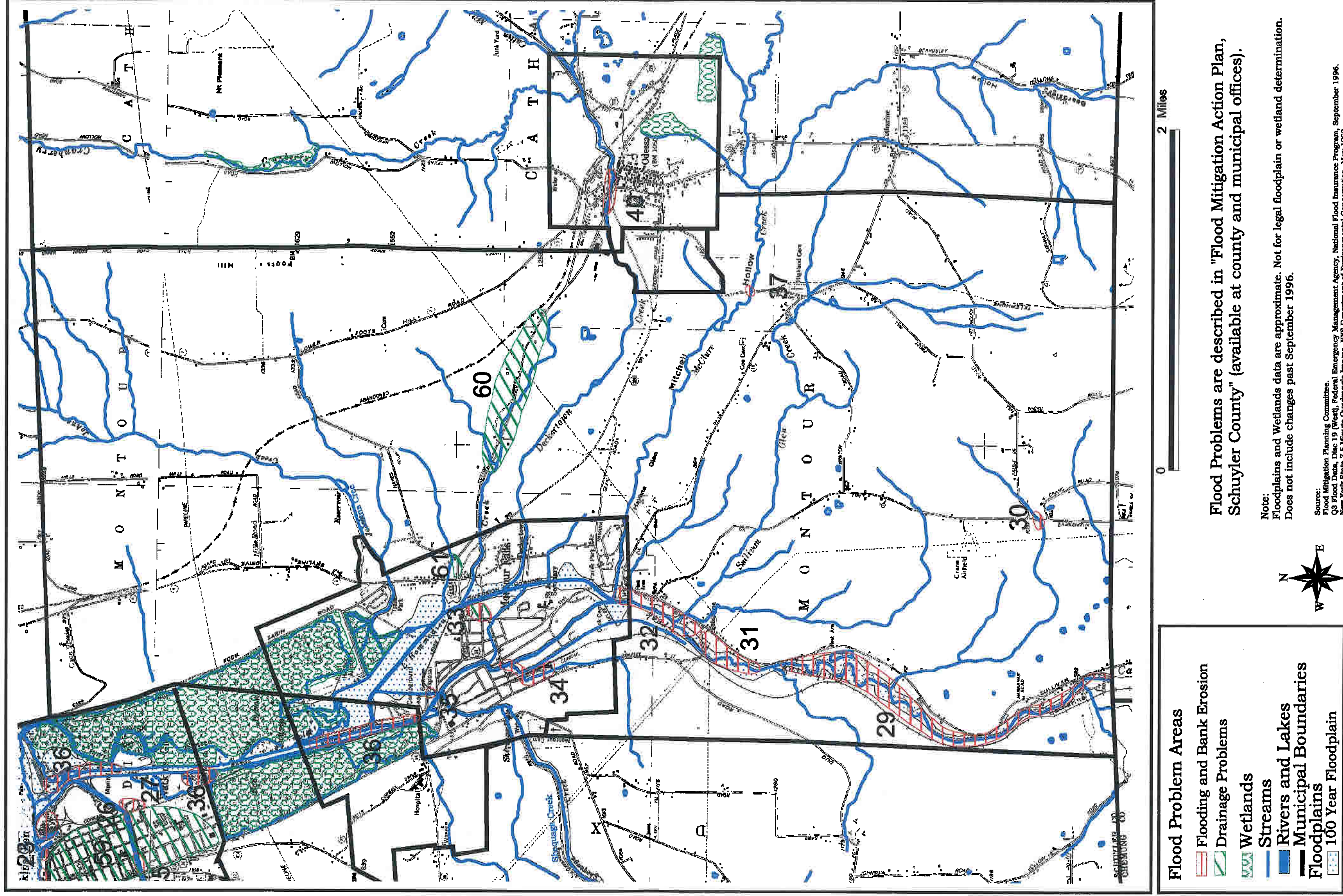
Note:

Floodplains and Wetlands data are approximate. Not for legal floodplain or wetland determination.

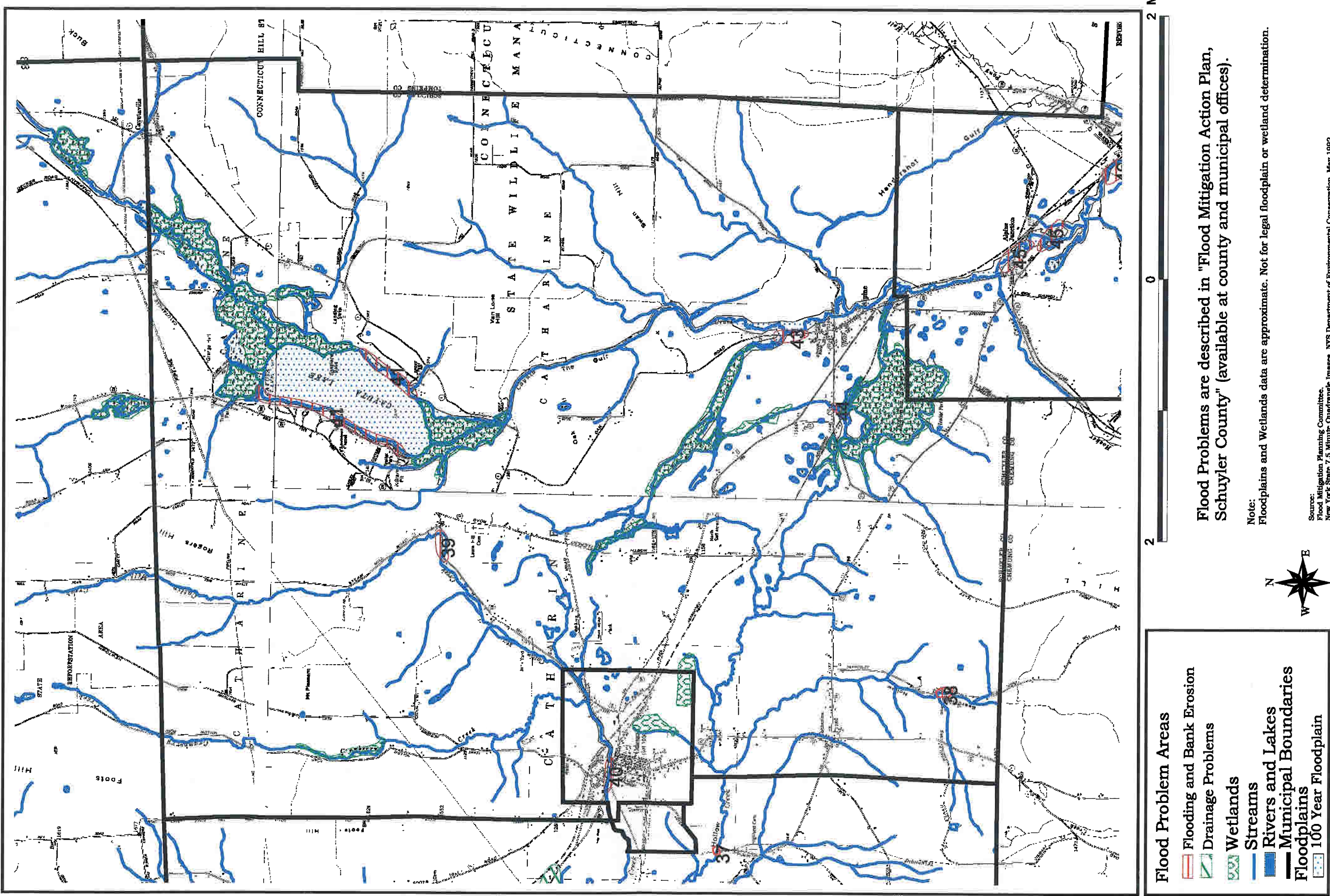
Source:
Flood Mitigation Planning Committee,
New York State 7.5 Minute Quadrangle Images, NYS Department of Environmental Conservation, May 1992.
New York State Department of Transportation, February 1993.
Flood Insurance Rate Map, July 7, 1978 and September 15, 1984

Prepared by Genesee\Finger Lakes Regional Planning Council, October 1998

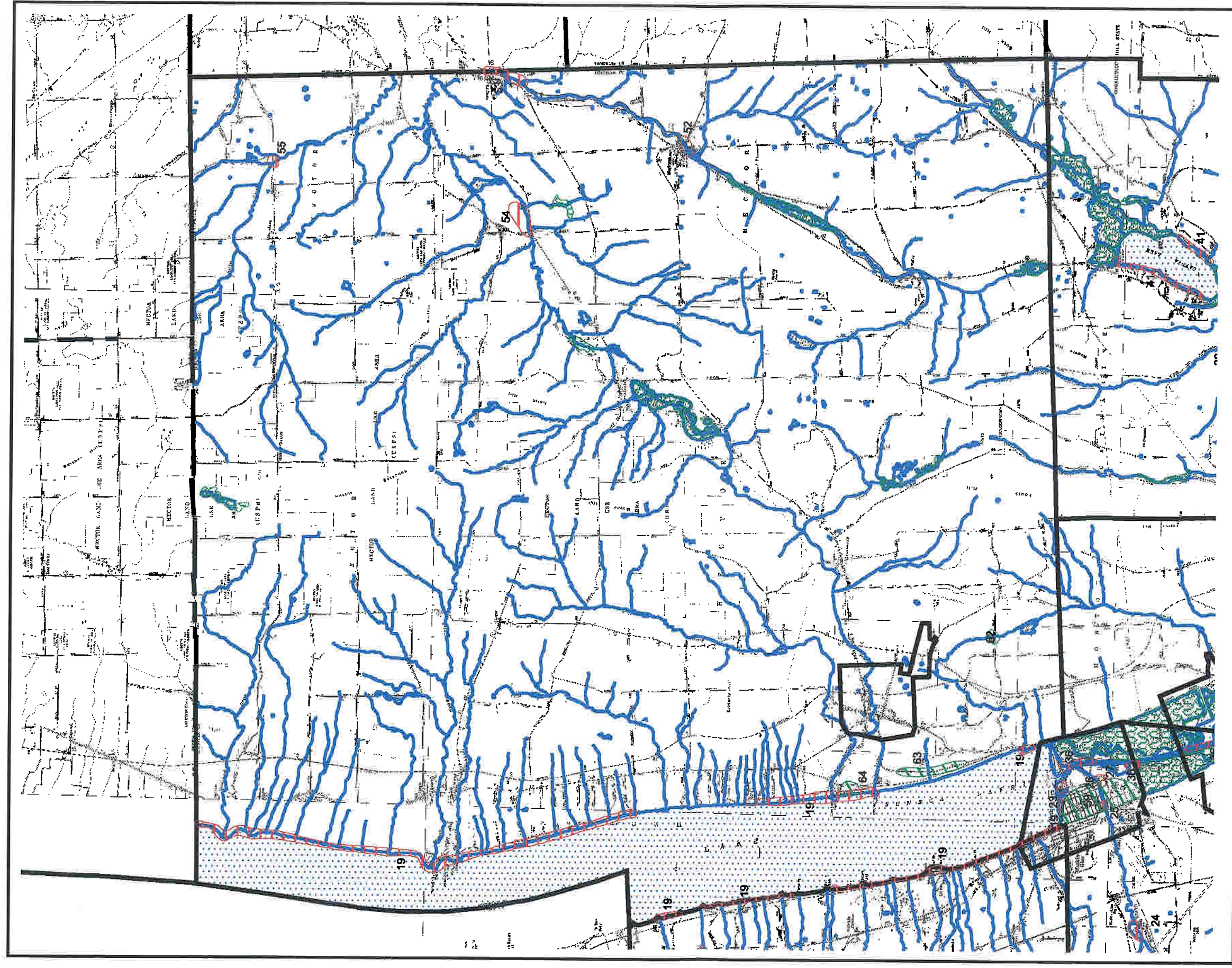
Town of Montour: Flood Hazards and Problems



Town of Catharine Flood Hazards and Problems



Town of Hector : Flood Hazards and Problems



Flood Problem Areas

- Flooding and Bank Erosion
- Drainage Problems
- Wetlands
- Streams
- Rivers and Lakes
- Municipal Boundaries
- Floodplains
- 100 Year Floodplain

Flood Problems are described in "Flood Mitigation Action Plan, Schuyler County" (available at county and municipal offices).

Note:

Floodplains and Wetlands data are approximate. Not for legal floodplain or wetland determination. Does not include changes past September 1996.

Source:

Flood Mitigation Planning Committee.
Q3 Flood Data, Dec 19 (West), Federal Emergency Management Agency, National Flood Insurance Program, September 1996.
New York State 7.5 Minute Quadrangle Images, NYS Department of Environmental Conservation, May 1992.
Flood Insurance Rate Map, July 20, 1994.

Prepared by Genesee\Finger Lakes Regional Planning Council, October 1998

**SUMMARY OF FLOODING PROBLEMS
SCHUYLER COUNTY, NEW YORK**

Problem #	Stream/Drainage Basin	Problem Name	Municipality	Houses Affected	Roads/Culverts/Bridges?	Streambank/Lakeshore Erosion	Riverine/ Lakeshore Flooding?	Stormwater Flooding?	Groundwater Flooding?	Potential Development?
FLOODING AND BANK EROSION										
1	All	Streambank Erosion	Countywide, Schuyler County	x	x	x				
2	All	Debris Accumulation	Countywide, Schuyler County	x	x	x				
3	All	Sediment Accumulation	Countywide, Schuyler County	x	x	x				
CHEMUNG RIVER WATERSHED										
4	Waneta Lake	Shoreline	T. Tyrone	10			x			
5	Lamoka Lake	Shoreline	T. Tyrone	75	x		x			
6	Mud Creek	Between Lamoka Lake and Mill Pond	T. Tyrone, T. Orange	15			x			
7	Mud Creek	Waneta Dam and Bradford Dam	T. Tyrone, T. Orange, T. Bradford	x			x			
8	Little Tobehanna Creek	Lamoka Lake Road	T. Tyrone	0	x	x				
9	Tobehanna Creek	Tobehanna Lake Dam	T. Tyrone	x	x	x	x			
10	Tobehanna Creek	Hamlet of Tyrone	T. Tyrone	0	x	x				
11	Tobehanna Creek	Barnards Camp	T. Tyrone	15	x	x				
12	Eastern Tributary to Tobehanna Creek	County Route 22	T. Tyrone	0	x	x	x			
13	Meads Creek and Tributaries	Bank Erosion, Sedimentation and Debris	T. Orange	0	x	x				
14	Meads Creek	Monterey	T. Orange	0	x	x	x			
15	Meads Creek	Coon Hollow Road	T. Orange	0	x	x				
16	Meads Creek Tributary	Coon Hollow Road	T. Orange	0	x	x				
17	Post Creek	Beaver Dams	T. Dix	25		x	x			
SENECA LAKE WATERSHED (excluding the Catharine Creek Watershed)										
18	Seneca Lake	Lake Level Management	T. Reading, V. Watkins Glen, T. Hector	x		x	x			
19	Seneca Lake	Flooding of Shoreline Development	T. Reading, V. Watkins Glen, T. Hector	x		x	x			
20	Seneca Lake Tributaries	Erosion	T. Reading, T. Hector	x	x	x				
21	Rock Stream	Beach Road and Allay Road	T. Reading	1	x	x	x			
22	Buttonwood Brook	Spencer Road	T. Reading	0	x		x			

**SUMMARY OF FLOODING PROBLEMS
SCHUYLER COUNTY, NEW YORK**

Problem #	Stream/Drainage Basin	Problem Name	Municipality	Houses Affected	Roads/Culverts/Bridges?	Streambank/Lakeshore Erosion	Riverine/ Lakeshore Flooding?	Stormwater Flooding?	Groundwater Flooding?	Potential Development?
23	Seneca Lake	Watkins Glen Sewage Treatment Plant	V. Watkins Glen	0						
CATHARINE CREEK WATERSHED										
24	Glen Creek	Upper Dam Lake and Punch Bowl Lake	T. Dix	x	x	x	x			
25	Glen Creek	Franklin Street to Decatur Street	V. Watkins Glen	x	x	x	x			
26	Glen Creek	Sewer Line at McGee Street	V. Watkins Glen	0		x				
27	Glen Creek and Chemung Barge Canal	Shannon Street	V. Watkins Glen	5			x			
28	Shequaga Creek (also called Falls Ck.)	Walt Gilbert Road Area	T. Dix	3	x	x	x			
29	Catharine Creek	State Rt. 14 and Croton Road	T. Montour	4	x	x	x			
30	Catharine Creek Tributary	Fitzpatrick Hill Road	T. Montour	0	x	x				
31	Catharine Creek	State Route 14 near Electric Substation	T. Montour	3	x	x	x			
32	Catharine Creek	State Rt. 14 between Dug Rd. and Diversion	T. Montour, V. Montour Falls	5	x	x	x			
33	Catharine Creek Diversion	Montour Street Area	V. Montour Falls	x	x			x		
34	Catharine Creek	Montour Falls Sewage Treatment Plant	V. Montour Falls	10	x					
35	Catharine Creek	Marinas	V. Montour Falls	0			x			
36	Chemung Barge Canal	Mitchell Hollow Road	V. Montour Falls, V. Watkins Glen	0			x			
37	McClure Creek (also called Havana Glen Ck)	Brink Road	T. Montour	0	x	x				
38	Beardsley Hollow Creek	State Route 228	T. Catharine	2	x	x	x			
39	Cattlin Mill Creek	Odessa	T. Catharine	0	x		x			
40	Deckertown Creek		V. Odessa	8			x			
UPPER SUSQUEHANNA WATERSHED										
41	Cayuta Lake (also called Little Lake)		T. Catharine	50			x			
42	Cayuta Creek	Debris	T. Catharine, T. Cayuta	0	x	x	x			
43	Cayuta Creek	Alpine	T. Catharine	2	x		x			
44	Hinman Swamp	Terry Hill Road	T. Catharine	2			x			
45	Cayuta Creek	Alpine Junction	T. Cayuta	2	x		x			

**SUMMARY OF FLOODING PROBLEMS
SCHUYLER COUNTY, NEW YORK**

Problem #	Stream/Drainage Basin	Problem Name	Municipality	Houses Affected	Roads/Culverts/Bridges?	Streambank/Lakeshore Erosion	Riverine/ Lakeshore Flooding?	Stormwater Flooding?	Groundwater Flooding?	Potential Development?
46	Cayuta Creek	Varney Hill Road	T. Cayuta	0	x		x			
47	Hendershot Gulf	Hamlet of Cayuta	T. Cayuta	3			x			
48	Cayuta Creek	State Route 224 at Burlingame Road	T. Cayuta	1	x		x			
49	Jackson Creek	Streambank Erosion and Debris	T. Cayuta	0	x	x	x			
50	Jackson Creek	County Route 13 and Decker Hill Road	T. Cayuta	1	x	x	x			
51	Jackson Creek	State Route 224	T. Cayuta	2	x	x	x			
CAYUGA LAKE WATERSHED										
52	Taughannock Creek	Mecklenburg	T. Hector	5		x	x			
53	Taughannock Creek	Perry City	T. Hector	4	x		x			
54	Hancoop Creek	State Route 227	T. Hector	1	x		x			
55	Boller Creek	County Route 1	T. Hector	0	x	x				
DRAINAGE PROBLEMS										
56	All	Road Ditches and Culverts	Countywide	x	x			x		
57	All	Debris Accumulation	Countywide	x	x			x		
58	All	Land Use Changes	Countywide	x	x			x		
59	Seneca Lake	Watkins Glen Storm Sewer System	V. Watkins Glen	x	x			x		
60	Catharine Creek	Cotton Hanlon Road	T. Montour	0				x		
61	Catharine Creek	Hayes Road	V. Montour Falls	0	x			x		
62	Seneca Lake	Auble Road	T. Hector	0	x			x		
63	Seneca Lake	Middle Road	T. Hector	0	x			x		
64	Seneca Lake	North Falls Road	T. Hector	2	x			x		
FLOOD WARNING										
65	All	Flash Flooding	Countywide, Schuyler County	x	x		x			
66	All	Disaster Plans	Countywide, Schuyler County	x	x		x			
DEVELOPMENT TRENDS										
67	All	Floodplain Development Regulations	Countywide, Schuyler County	x			x			x

SUMMARY OF FLOODING PROBLEMS
SCHUYLER COUNTY, NEW YORK

Problem #	Stream/Drainage Basin	Problem Name	Municipality	Houses Affected	Roads/Culverts/Bridges?	Streambank/Lakeshore Erosion	Riverine/ Lakeshore Flooding?	Stormwater Flooding?	Groundwater Flooding?	Potential Development?
68	All	Flood Insurance Rate Maps	Countywide, Schuyler County	x			x			x
69	Seneca Lake	Flood Insurance Rate Maps, West Shore	T. Reading	x			x			x
70	Seneca Lake	Flood Ins. Rate Maps, E. Shore of Seneca Lake	T. Hector	x			x			x
71	All	Stormwater Management	Countywide, Schuyler County	x	x			x		x
72	All	Timber Harvesting	Countywide, Schuyler County	x	x			x		

ATTACHMENT B

Flood Solutions Worksheet

Attached is a completed copy of the worksheet used to evaluate flood mitigation measures. All of the measures listed on this worksheet were reviewed and evaluated by the Schuyler County Flood Mitigation Planning Committee. Recommended techniques for Schuyler County are marked in the left column of the worksheet. The number of Xs is proportional to the level of interest in each idea, with 4 Xs indicating 100% support. Comments applicable to Schuyler County are indicated in italics.

Name: Flood Mitigation Planning Committee Municipality: Schuyler County

FLOOD SOLUTIONS WORKSHEET

As you listen to and participate in discussions of alternative techniques for reducing flood damages, record your ideas and thoughts on this worksheet. Check those ideas that might work in your community. Specify the geographic areas for applying these solutions.

Alternative Flood Damage Reduction Techniques

PUBLIC INFORMATION

Information About Flood Insurance Rate Maps

XXXX Post floodplain maps in municipal buildings *with flood problem areas identified*

XX Map determinations (flood zone for a particular property or structure)

XXX Provide information about additional locations with known flood problems (riverine flooding, shallow water table, bank erosion, etc.)

Other: _____

Flood Information Outreach Projects

XXX Newsletter article in *SWCD, CCE, Town of Hector, Watkins Review, and Planning & Community Development newsletters, and local papers*

Enclosure in utility bills _____

XXX Direct mailing to *flood-prone areas, officials, realtors, stream properties*

X Special outreach project _____

Other: _____

Real Estate Disclosure

XXXX Education of potential property buyers *distribute brochure*

XXX Education of real estate agents *and brokers – provide flood problem maps*

XXX Mandatory disclosure of flood history by real estate agents *or broker*

Other: _____

Provide References to Public Library and on the Internet (County Planning Website)

XX Current Flood Insurance Rate Maps

XX Flood insurance information

X Information about protecting buildings from flooding

X Documents on community floodplain management and flood hazard mitigation

XX Information about the natural and beneficial functions of floodplains

XXX Local accounts of past flood events

X Directory of sources for additional information on these topics

XX Other: Flood Mitigation Action Plan

Provide Technical Assistance

- XX Site-specific information about historic flood events
- X Names of contractors and consultants knowledgeable or experienced in retrofitting techniques and construction
- XX Material on how to select a qualified contractor and what recourse people have if they are dissatisfied with a contractor's performance
- XX Site visits to review flooding, drainage, and sewer problems or provide advice on contemplated development
- X Advice and assistance on retrofitting techniques
- Other: _____

Environmental Education

- XXX Education programs for children – *Envirothon, Field Days, Environmental Expo*
- XXX Education programs for adults
- XX Other: Information in school libraries
- X Other: Supervisors, legislators, highway superintendents

PREVENTIVE ACTIVITIES**Floodplain Regulations**

- XXXX Training for local officials (Code Enforcement Officer, Planning Board, etc.)
- X Adopt updated NYS Model Law
- X Revise law to require building elevation 2 feet above base flood elevation
- X Revise law to include additional flood-prone areas
- XX Update Flood Insurance Rate Maps (restudy, amend, or revise)
- XXX Require that all new buildings in and out of the designated floodplain be elevated above historic high water levels
- X Other: Provide real estate agents and potential buyers with information about building requirements

Conventional Zoning / Design Standards

- X Low density zoning
- X Depth restrictions for basements at _____
- XXX Standards for private bridges *in zoning or local law*
- XXX Standards for driveways and driveway culverts *in zoning or local law*
- X Maximum lot coverage for impervious surfaces
- XX Other: Require Highway Superintendent approval for roads, drainage structures, culvert sizing, and culvert installation

Subdivision Regulations

- XXX Require that each lot includes a safe building site at an elevation above selected flood heights (either by a lot layout that enables out-of-the-floodplain construction or by filling a portion of each lot)
- XX Require placement of streets above selected flood protection elevations
- XX Require placement of public utilities above selected flood protection elevations
- XX Prohibit encroachment of floodway

Subdivision Regulations (continued)

XXX Require that flood hazard areas be shown on plat

XX Require adequate drainage facilities

_____ Other: _____

Cluster Development

X Cluster development provisions

_____ in zoning ordinance

X in subdivision ordinance

_____ as a separate ordinance

X Other: Provide incentives (rather than requirements)

Open Space Preservation

XXX Stream setback requirement/performance standard (minimum of 50 feet)

XX Lake shore ~~setback~~ elevation requirement/performance standard

XX Vegetated buffer strips along road ditches, streams, diversion ditches, highways, parking lots, holding ponds

X Conservation District or other restrictive development regulations _____

X Agricultural districts

X Parks, preserves, or recreation areas _____

X Transferable development rights

X Land use easements _____

X Apply floodway development standards to wider area along streams

X Other: Land trusts

Stormwater Management

X Stormwater management plan for all/some _____ watershed(s)

XX Stormwater management regulations

XX in zoning ordinance (*municipalities with zoning*)

XX in subdivision ordinance (*municipalities with subdivision regulations*)

XX as a separate ordinance (*municipalities without zoning/subdivision regs.*)

XX Stormwater management regulations for timber harvesting

XX Education and technical assistance

X Design and construction of regional stormwater management facilities

X to address existing problems at _____

X in anticipation of future development at _____

XX Inspection and maintenance of stormwater management facilities

X Other: Computer modeling using DEC digital elevation maps

Drainage System Maintenance

XX Line item in budget for drainage system maintenance – *continue County Stream Program*

XX Debris removal when problems occur

XX Routine inspection and removal of debris one times per year – *hire interns to walk the streams and document problem areas*

Drainage System Maintenance (continued)

- X Written drainage system maintenance plan (specifying maintenance needs and responsibilities)
- X Establish a drainage district – *countywide*
- X Channel/bank stabilization on Glen Creek, etc.
- X Debris basin(s) on _____
- X Other: Repair and maintain road ditches, emphasizing sites identified in survey

NATURAL RESOURCE PROTECTION

Wetlands

- XX Protect existing wetlands at _____
- X Enlarge existing wetlands wherever feasible and financially viable
- X Create new wetlands wherever feasible and financially viable
- X Other: Educate the public about the benefits of wetlands; identify wetlands on road signs; educate property owners about wetland regulations
- X Other: Remove abandoned house by wetland east of Reynoldsville

Erosion and Sediment Control

- XX Channel/bank stabilization of all problem areas (Sawmill Creek at Co. Rt. 4)
- XXX Erosion and sediment control at new development
 - XX through regulation
 - XX through education and technical assistance
- X Other: Educate Highway Superintendents, Code Enforcement Officers, private road owners, loggers, etc. about road ditch stabilization (mulching and seeding)

Best Management Practices

- XXX Agriculture
 - XX education and technical assistance
 - X financial incentives
- XXX Timber harvesting
 - X regulations
 - XX education and technical assistance
- Other: _____

PROPERTY PROTECTION

Relocation

- X Relocation of building(s) from most hazardous areas if cost effective
- Other: _____

Acquisition *only if supported by cost/benefit analysis*

- X Acquisition of undeveloped flood-prone property at _____
- X Acquisition and demolition of buildings at _____
- X Acquisition of development rights or easements at _____
- X Other: There is concern about setting a precedent. There are no clear solutions.

Building Elevation

- X Elevate existing building(s) at _____
____ Other: _____

Floodproofing of Buildings and Sewer Backup Protection

- X Distribute information about floodproofing techniques
XX Technical assistance
X Financial assistance _____
____ Other: _____

Infrastructure Protection

- XX Design standards for new or replaced bridges and culverts *already done*
XX Mitigation of existing problems at Decker Road at Jackson Creek
XXX Debris removal when problems occur (*and preferably before problems occur*)
XXX Routine inspection and maintenance *to prevent problems from developing*
____ Other: _____

Insurance

- XX Education of property owners
XX Education of insurance agents, mortgage lenders, and real estate agents
XX Community Rating System (to reduce insurance premiums)
____ Other: _____

STRUCTURAL PROJECTS as necessary and appropriate**Reservoirs**

- XX New water retention structures in Meads Creek, Glen Creek watershed
X Identify and maintain existing ponds and retention structures
____ Other: _____

Levees and Floodwalls

- X New levee along known flood areas
X Increased protection of existing levee along _____
X Maintain existing dike system
____ Other: _____

Diversions

- X High flow diversion channel at Old Catharine Creek N of Diversion Channel
____ Other: _____

Channel Modifications

- XX Removal of sand bars or islands from Punch Bowl Lake, Catharine Creek, streams near culverts and bridges
X Straightening, widening, or deepening of problem streams
____ Channel paving of _____
____ Other: _____

Storm Sewers

- ☒ Storm sewer installation at _____
- ☒ Increased storm sewer capacity at North Falls Road, Glen Eldridge
- ☒ Inspection and maintenance of existing storm sewer at _____
- Other: _____

EMERGENCY SERVICES

Flood Warning

- ☒ Rain gauges
 - ☒ Automated gauges at _____
 - ☒ Volunteer reporting by schools, property owners, community associations
- ☒ Stream/river/lake level gauges
 - ☒ Automated gauges at Seneca Lake
 - ☒ Staff gauges at Catharine Creek in Chemung County
 - ☒ Historic information for _____
 - ☒ Stage relation information for _____
- ☒ Local flood forecast center
- ☒ Other: Improve communication with Thruway Authority & Keuka Lake operator.

Flood Response

- ☒ Flood stage forecast maps for _____
- ☒ Emergency plan for municipality (command structure, communication procedures, emergency flood proofing measures, evacuation procedures, etc.)
- ☒ Other: Use improved topographic data for emergency operations around lakes.

Critical Facilities Protection

- ☒ Protection or relocation of critical facilities (sites with toxic materials, medical facilities, emergency operation centers, utilities) _____
- ☒ Emergency plan for critical facilities _____
- Other: _____

ATTACHMENT C

Slopes and Erosion Control

9 SLOPES AND EROSION CONTROL

9.1 HOW TO STOP EROSION

Stopping erosion is difficult. Keeping erosion from occurring in the first place is usually more successful. Many of the maintenance activities performed on roads and streets would be unnecessary if erosion was controlled. As an example, stopping erosion from occurring at the top of a hill will reduce the ditching at the bottom of the hill. Approximately 30 tons of material can be eroded from a mile of ditches before you can see the damage! To remove and replace 30 tons of material is a lot of work.

Also, you need to be concerned about erosion during construction and maintenance work. The work can cause additional erosion.

9.2 TYPES OF EROSION

Three types of erosion are common; surface, rill, and galley. Different soils erode differently. For most highway materials you can be sure of two things. One, unprotected materials will erode and cause sedimentation. Two, the flatter the slope the fewer erosion problems occur.

- **Surface**

Surface or sheet erosion occurs when rainfall dislodges soil on the surface of material, and the water plus soil flows in sheets. The washing of shoulders is often started by this process.

- **Rill**

Rill erosion occurs when the velocity of the flow is great enough to dislodge soil in addition to that dislodged by rainfall. Rill erosion is typified by the narrow little channels which form in banks and slopes that are not protected from erosion.

- **Gully**

Gully erosion occurs when rill erosion combines and concentrates the flow of runoff into gullies. Washouts between pavement and shoulders are usually gully erosion.

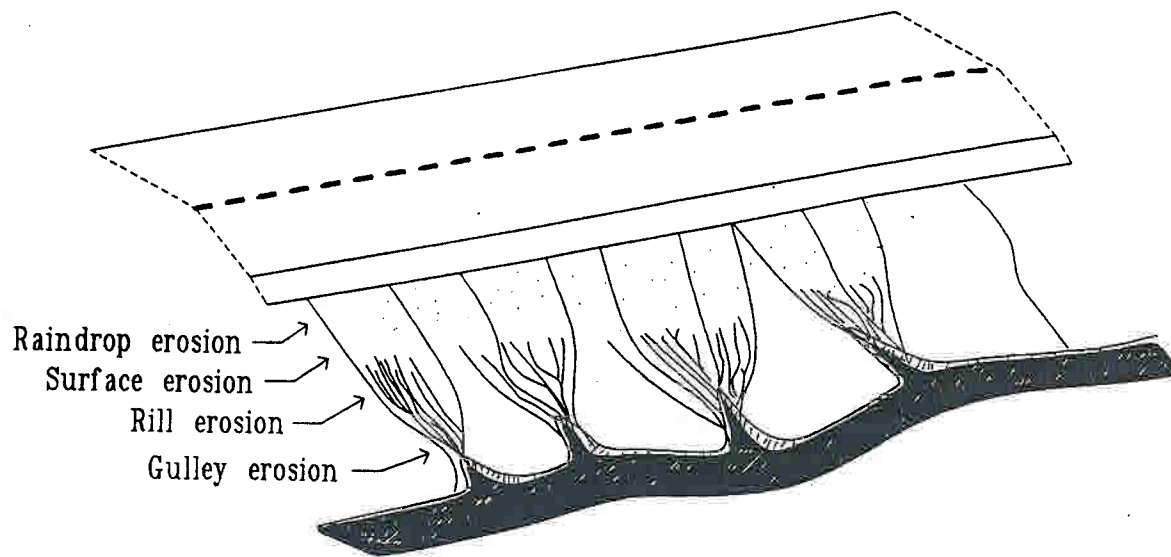


Figure 52 Types of erosion

9.3 SEDIMENTATION

All of the material removed by erosion is deposited at some location downstream from the erosion. This process of sedimentation usually occurs where a change in the speed of the flow occurs. Filling of culverts, ditches, streambeds, and even lakes is a result of sedimentation. Stopping erosion will eliminate or reduce many of the problems associated with poor drainage.

9.4 SLOPES

Even very flat ground erodes. The reason you do not notice the erosion is that sedimentation occurs at the same location as the erosion. Steep terrain erodes very quickly. You need to reduce erosion problems. In addition, for slopes you have to be concerned about three factors; stability, safety, and maintenance.

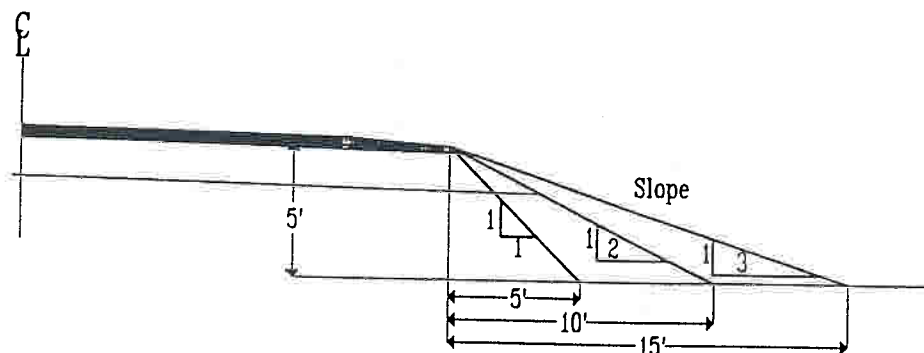


Figure 53 Slopes

9.4.1 Stability

Most highway materials are stable at slopes of 1:2 or flatter. Slopes steeper than 1:2 are more prone to erosion and washouts. If saturated, the entire slope may fail.

9.4.2 Safety

Slopes along the edge of roads, including ditches and banks, need to be kept fairly flat to allow errant vehicles a safe place to drive. Slopes of 1:3 or flatter are considered safe. If the slope is less than 3 feet high a 1:2 slope is acceptable.

9.4.3 Maintenance

Mowing slopes is the most common maintenance technique. If slopes are 1:2 or flatter, the mowing crews can easily mow the slope. Minor repairs may be needed to fix small washouts and erosion.

9.4.4 Options

If a slope is too steep, several items need to be examined to repair the problem.

- **Stabilize**

Unstable slopes can be stabilized by use of geotextiles or other earth reinforcement materials. If you have a high steep slope that is showing signs of distress, GET HELP.

- **Retaining walls**

Use of gabions, concrete, and block retaining walls may be needed on very steep slopes or to help stabilize the toe of an existing slope. If a slope is so steep the erosion mitigations listed below will not work, a retaining wall may be needed. GET HELP to determine the best course of action.

- **Signing**

Slopes steeper than 1:3 (1:2 for 3 or fewer feet in height) need to be protected. As a minimum, signs should be used to delineate the slope and warn motorists of the hazard. See the *Manual of Uniform Traffic Control Devices* for future information.

- **Guiderail**

Guiderail should be used on steep slopes. It needs to be installed and used correctly as part of an overall plan to upgrade the roads. The NYS DOT publication *Guiderail III* has valuable information about the use of guiderail to protect slopes.

9.5 EROSION MITIGATION

To protect the exposed surfaces after construction or due to minor failures, mitigation should be performed. The objective of the repairs is to eliminate the start of erosion caused by rainfall and melting snow.

Several different materials can be used to reduce or eliminate erosion problems. The most common are discussed below. The erosion material works by absorbing the energy of a falling drop of water. Erosion due to steep slopes (steeper than 1:2) is difficult to stop. The velocity of the water flowing over the protective material can start erosion.

9.5.1 Earth

Earth erodes easily and is not stable. It should not be left exposed for even a short period of time.

9.5.2 Vegetation

Vegetation including grass, bushes, and trees can be planted to reduce erosion. The Soil and Water Conservation District (SWCD) and Natural Resources Conservation Service (NRCS) have information and can provide assistance to place the best vegetation for a given problem. A general rule of thumb is use vegetation if possible. It is cheaper than other methods and is more pleasing to the eye.

9.5.3 Stones/Rip-Rap

Fairly common to protect high and steep banks, stones, or rip-rap can eliminate many erosion problems. A separation geotextile should be installed on the slope prior to placing of the stone or the stone will shift and settle and eventually fail to protect the slope. The size of the material does not have to be large (angular gabion stone is very effective) unless a large volume of water is expected. Then the blanket of stones should be made with larger size rock.

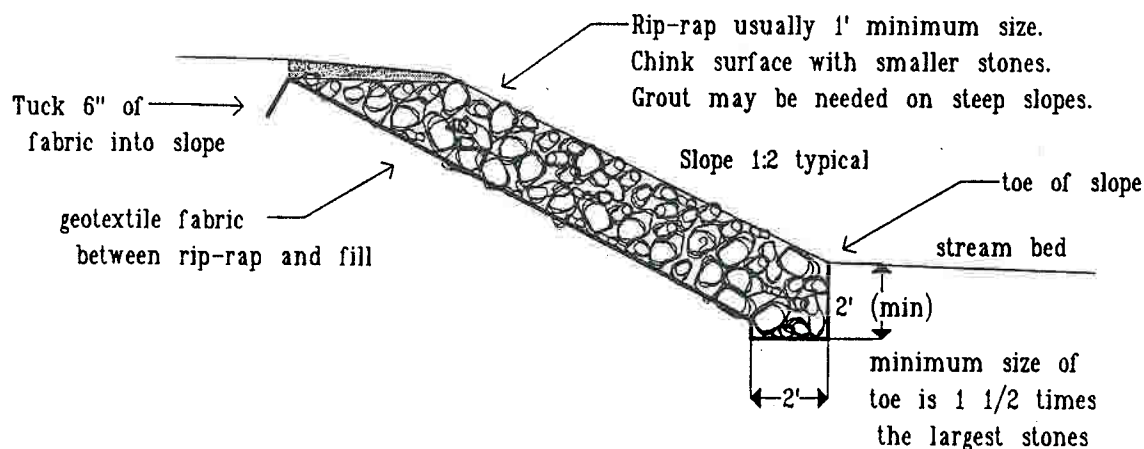


Figure 54 Placement of rip-rap on a slope

9.5.4 Fabrics

Use of special fabrics to protect slopes has become more popular in recent years. They are easy to place in difficult to reach locations and can handle more water runoff than some stone blankets. The slope needs to be prepared, seeded, and the fabric placed over the seed. Some fabrics come with seeds already in the mat. The fabrics are made of various materials including jute, straw, coconut fibers, and plastic. Most are biodegradable. The two most critical steps are stapling the fabric, and placement of the upper end of the fabric in a trench to keep surface water on the top of the fabric. Consult the manufacturer of the product for information about stapling patterns and construction techniques.

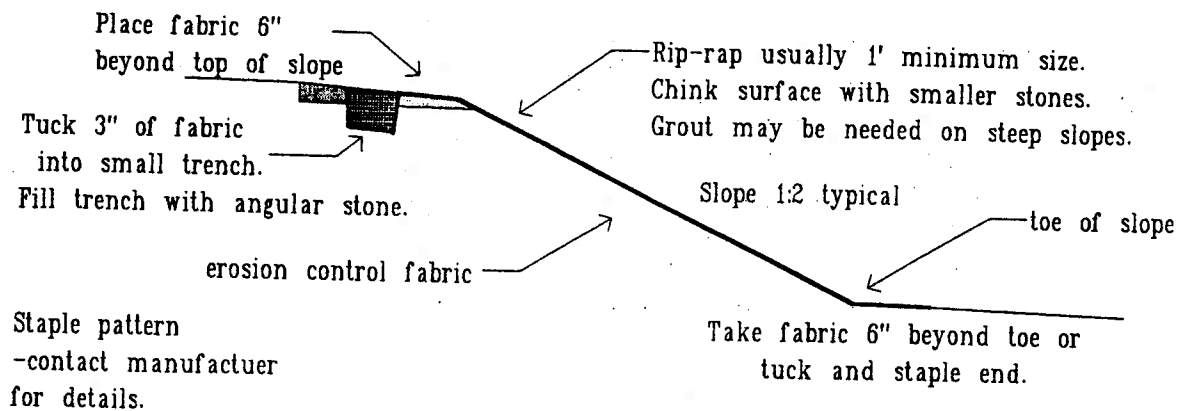


Figure 55 Placement of an erosion fabric to protect a slope

9.6 MAINTENANCE

When maintenance or construction work is done to protect slopes or reduce erosion several things should be kept in mind.

- Keep disturbed areas small
- Stabilize or protect disturbed areas as soon as possible
- Keep water velocities low, especially on unprotected areas
- Keep sediment in the work area
- Follow-up and inspect all work
- Fix damaged areas as soon as possible
- Silt fences and straw bales are *temporary* measures only

ATTACHMENT D

Documentation of Public Information Meeting:

Meeting Notes

Handout Summarizing the Flood Mitigation Action Plan
(distributed at public information meeting)

Press Coverage

**Schuyler County
Public Meeting on Draft Flood Mitigation Plan
February 3, 1999**

**Environmental Management Council/
Southern Tier Central Regional Planning & Development Board**

Meeting Notes

Janet Thigpen welcomed the 30-plus people in attendance at the public meeting. She explained that the reason for the meeting was to seek public comment on the draft Flood Mitigation Plan. The plan has been drafted by the Southern Tier Central Regional Planning & Development Board (STCRP&DB), under a grant from the State Emergency Management Office and the Federal Emergency Management Agency. Janet went through the process for developing the plan.

Everyone was encouraged to view the posted maps of flood areas identified in the county.

To complete the plan, all potential flooding problems in the county should be listed, along with ongoing costs of past flooding, and estimated costs for flooding if a big storm occurs. Such costs have not been well-documented in the past, due to much of the damage occurring on private property.

Towns and villages who adopt the final plan will be eligible to apply for funding through the Flood Mitigation Assistance Program. Monies are being made available through the National Flood Insurance Program, for insurable buildings or other structures. An adopted plan may also help in applying for other grants.

The plan is intended to be updated annually. New municipal projects can be added with these updates.

The draft plan will be submitted to the State Emergency Management Office and the Federal Emergency Management Agency for review within the next week. Public comments on the plan should be submitted to the STCRP&DB within the next 2-3 weeks, and will be incorporated into comments received from the state and federal offices. The final plan will then be submitted to towns and villages for adoption.

Lower priced projects are included in the preliminary plan, to help make it more easily adoptable.

The program is a new one, and will take time to work the "bugs" out.

Copies of the draft plan were sent to all county legislators, municipalities, and highway superintendents.

Paul Schmied of the NYS DEC-Avon spoke about flood insurance, how rates are set, and the origins of this program.

Public comments:

- The washed out area of Catharine Creek behind Gary's Cycle and Auto in Montour Falls needs to be addressed.
- Concern were expressed regarding costs of the program beyond current staff and resources.
- Proper road ditch construction and maintenance is integral to proper flood mitigation, and should be part of highway superintendent training.
- The dam near the 4-H Camp in Watkins Glen needs to be addressed.
- There was a question of whether areas are covered if they are not directly addressed in the plan.
- Regarding competition for grants, someone asked whether plans are being adopted only locally, or state-wide.
- Insurance rates were questioned, noting that they are especially high for properties in existing flood plains.
- Clarification on the timeframe for adopting the plan was requested.

Respectfully submitted,

Michelle LaDue Benjamin
Planning Assistant
Cornell Cooperative Extension

Flood Mitigation Planning

Schuyler County

County and municipal officials have held a series of meetings to assess Schuyler County's flooding problems and evaluate potential solutions. They have prepared a Draft Flood Mitigation Action Plan, which recommends a program of activities that the County can undertake to tackle these problems.

WHY?

- Planning is a critical step toward coordinated implementation of activities that will reduce flood damages.
- This planning process fulfills the planning requirements for state or federal assistance programs (particularly the newly established Flood Mitigation Assistance Program).

ASSESS THE FLOOD HAZARDS AND PROBLEMS

The Flood Mitigation Planning Committee identified and documented 72 flooding problems or potential flooding problems throughout Schuyler County. Some of these problems occur countywide; others are site-specific problem areas that were marked on maps.

SET RISK REDUCTION GOALS

Long range goals for reducing future flood damages in Schuyler County were proposed. The overall flood mitigation goal is to reduce the cost of a 100-year flood to a fraction of the damages that would occur if that flood happened today. In order to accomplish this, a concerted effort is needed to simultaneously (1) prevent new development activities that can contribute to increased flood risks and (2) mitigate the current flood threats to existing development.

ASSESS POSSIBLE MITIGATION MEASURES

Participants reviewed a comprehensive list of possible measures for resolving flooding problems. They identified those solutions that are most applicable to the flooding problems and community needs in Schuyler County.

DEVELOP AN ACTION PLAN

An Action Plan was prepared, describing 25 activities for implementation in Schuyler County. The proposed action items are realistic measures that can be undertaken by the County and municipalities. The plan is intended to be updated annually to incorporate subsequent steps for implementing the flood damage reduction goals.

REVIEW AND ADOPTION OF THE PLAN

Schuyler County is now soliciting comments and input to the Draft Flood Mitigation Action Plan. Once local input has been incorporated, the Plan will be submitted to the State Emergency Management Office and Federal Emergency Management Agency for approval. It will then be presented to each municipal board for adoption. Adoption of this plan will enable a town or village to qualify for grant funding through the Flood Mitigation Assistance program.

REGION

The Leader

Friday, February 5, 1999

Schuylers unveils flood plan

By PATRICK BUCHNOWSKI
Staff writer

MONTGOMERY FALLS — Schuylers officials are looking to fix the county's flooding problems before they get worse and costs become exorbitant. Other communities are also taking on the challenge.

A Flood Mitigation Action Plan targeting 72 flooding hot spots was revealed this week to 25 residents and county officials at the Rural Urban Center.

"We want to take a look at where we are and implement the best solutions," said

Janet L. Thigpen, flood recovery specialist for the Southern Tier Central Regional Planning and Development Board.

The study of potential flooding areas in eight towns in Schuylers County was financed by the state Emergency Management Office, she said.

It is similar to the plan under way in Campbell that has targeted 106 flooding areas.

In Chemung County, Town of Ashland officials will present their Flood Mitigation Plan to the public at 7 p.m. Monday. They have targeted 44 potential problem areas for disasters,

including flooding and wild fires, Thigpen said. Several other municipalities in Schuylers, Chemung and Steuben counties are creating similar plans.

Some of the most severe flooding in Schuylers County occurs along Catharine Creek in Montour Falls, where in November 1996, fallen trees and gravel caused flooding that has occurred repeatedly since that time. The Department of Environmental Conservation is planning channel stabilization work at the creek. No dollar amount on the project is yet available.

Legislator Jerold Marvel, R-Montour, one of several legislators who attended the meeting, asked for the next step in the process.

The flood mitigation plan will be submitted to the State Emergency Management Office and Federal Emergency Management Agency for approval before being submitted to the municipalities for adoption, Thigpen said. The plan will enable towns and villages to qualify for grant money through the Flood Mitigation Assistance program, she said.