
VIII-A: Flood Prevention

In the Batavia Kill watershed, flooding has been a concern since the initial settlement of the valley. Of course it is impossible to prevent flooding, but we can work to limit, or prevent, flood damage. Flooding plays an important role in the ecological health of the Batavia Kill, and flooding of the floodplain also reduces downstream flooding, so whenever possible floodplain area should remain undeveloped (or be restored).



As discussed in previous sections of this SMP, the Batavia Kill Watershed District has provided significant flood protection benefits by intercepting flood waters behind flood control structures, and this is the primary feature of the flood prevention strategy in the watershed. In addition to the flood control project, the Town of Windham has previously completed a flood mitigation plan. In the following sections, the GCSWCD sets forth a number of recommendations related to flood damage prevention in the Batavia Kill watershed. Some recommendations represent projects which are already underway, while others are new action items which could be implemented to reduce flooding damages. The recommendations are broken into four major categories.

- VIII-A.1 Flood Mapping & Regulation

- VIII-A.2 Batavia Kill Watershed District
 - 1. Sediment Management
 - 2. Physical Facilities
 - 3. Residential Flooding
 - 4. Management Plan
 - 5. Emergency Action Plan

- VIII-A.3 Flood Damage Prevention Outreach

- VIII-A.4 Miscellaneous Recommendations

VIII-A.1 Flood Mapping & Regulation

As discussed previously in this SMP, revised flood maps (Flood Insurance Rate maps, or FIRMs). Flood maps designate the expected area of inundation for the flood with a 1% chance of occurring in any given time, also known as the “100 year flood”. For the Batavia Kill, new FIRM maps have been initiated under the leadership of NYSDEC working in partnership with the NYCDEP, GCSWCD and the Army Corp of Engineers. The new flood hazard maps will integrate a number of technologies to produce highly accurate maps which are user-friendly. Digital flood maps will use high resolution LIDAR imagery to develop detailed elevation models, which in turn are integrated with hydrology and hydraulic models, GIS databases and aerial photographs to produce a final map.

While accurate flood maps are a valuable planning tool, they are only effective when used in conjunction with local regulations. In the Batavia Kill watershed, each municipality has local floodplain ordinances in place as a requirement for participation in the National Flood Insurance Program (NFIP). These local laws are generally close to 20 years old and would benefit from a comprehensive review and revision as deemed appropriate. All floodplain ordinances should be updated to reflect the new and improved maps and other technologies, as well as to better reflect local conditions and needs. Additionally, training and on-going technical support will be a major factor in the use of this new mapping tool. Since the local municipalities currently do not have the necessary hardware/software to use these maps at the local levels, in the initial stages the FIRMS will be maintained by the GCSWCD, with paper copies provided to the local towns. The use of the maps will require various levels of training for local and county planning boards, town boards, Code Enforcement Officers and other users.

NO. FP -01			
Recommendation	Watershed communities should support the development of digital flood maps for the Batavia Kill Watershed, and actively participate in review of draft maps. The GCSWCD recommends that each municipality adopt the new flood maps upon completion.		
Priority		Task Leader	NYSDEC - Flood Protection
Funding Sources	ACOE - WRDA Grant NYCDEP (project/in-kind) GCSWCD (in-kind)	Task Partners	GCSWCD NYCDEP Municipalities GC Planning Dept.
Estimated Cost	Undetermined	Schedule	dependent on map production schedule
Notes	GCSWCD and NYSDEC have coordinated data collection and surveying assistance. 1 st draft maps due late in 2003.		

NO. FP -02			
Recommendation	The GCSWCD should provide technical and logistical support to the NYSDEC mapping effort. The GCSWCD will provide support to local municipalities in the use of the new FIRM maps and maintain the flood mapping when completed.		
Priority		Task Leader	GCSWCD
Funding Sources	NYCDEP - BK Phase II GCSWCD Greene County Municipalities	Task Partners	NYCDEP NYSDEC Municipalities GC Planning Dept.
Estimated Cost	Not Determined	Schedule	On-going
Notes	GCSWCD and NYCDEP will review tasks and determine level of support appropriate from Batavia Kill Phase II program. Additional funds will be sought as needed.		

NO. FP -03			
Recommendation	Municipalities in the Batavia Kill Watershed should conduct a comprehensive review of current floodplain ordinance and adopt revisions as appropriate. Revisions should reflect current building trends, new technologies and compliance.		
Priority		Task Leader	Municipalities
Funding Sources	NYCDEP - BK Phase II GCSWCD Greene County Municipalities FEMA/SEMO	Task Partners	NYCDEP NYSDEC GC Planning Dept. GC Office Emergency Services FEMA/SEMO
Estimated Cost	Not Determined	Schedule	Start - Winter 2003 Complete Winter 2004
Notes	The GCSWCD will provide technical and administrative support to the review process. Additional partners such as NYSDEC and the Greene County Planning Department should be consulted as appropriate.		

NO. FP -04			
Recommendation	The Town of Windham should enact local regulations which require elevation certifications for any development proposed in the regulated floodplain. The Town should obtain assistance from GCSWCD to review floodplain located projects.		
Priority		Task Leader	GCSWCD
Funding Sources	NYCDEP - BK Phase II GCSWCD Greene County Municipalities	Task Partners	Municipalities GC Planning Dept. NYSDEC NYCDEP
Estimated Cost	Not Determined	Schedule	on-going
Notes	GCSWCD and NYCDEP will review tasks and determine level of support appropriate from Batavia Kill Phase II program. Additional funds will be sought as needed.		

NO. FP -05			
Recommendation	Watershed municipalities should evaluate participation in the FEMA Community Rating System.		
Priority		Task Leader	Local Municipalities
Funding Sources	FEMA SEMO Municipalities NYSDOS Greene County	Task Partners	GCSWCD GC Planning Dept. NYSDEC NYCDEP FEMA SEMO NYS Association FP Managers National Assoc. FP managers others
Estimated Cost	Not Determined	Schedule	on-going
Notes	Municipalities may be able to reduce flood insurance premium rates under the CRS. The Municipalities are strongly encouraged to adopt a "No Rise/Good Neighbor" clause in their revised floodplain ordinance.		

VIII-A.2 Batavia Kill Flood Control Structures

The Batavia Kill Watershed District (BKWD) is the primary flood protection resource in the Batavia Kill watershed. As the flood control structures have now reached or exceeded the halfway point in their design life span, it is appropriate to develop long range management plans for the facilities which would address an enhanced inspection schedule, as well as coordination and implementation of rehabilitation activities as necessary. While the flood control structures have been well maintained by the BKWD, there are several items which have been identified as needing immediate attention. At this time, the BKWD and GCSWCD are working with the USDA-NRCS to evaluate the structure. NRCS has identified the BKWD as a priority project under the new federal dam rehabilitation program, and in 2002 completed preliminary analysis of the C.D.Lane structure. Additional studies are scheduled for 2003, with the data to be used to develop and assess rehabilitation strategies. The GCSWCD will continue to participate in the assessment and management plan development.

Sedimentation

As designed, the structures have a 50 year life span for sediment accumulation. While it appears based on visual evidence that sedimentation of the Narvo Road and Mitchell Hollow structures is minimal, the C.D.Lane flood control facility appears to have experienced a faster rate of sediment accumulation from the watershed above it. In order to achieve and even extend the CD Lane Park's design life and maintain its capacity to mitigate floods, actions should be taken to reduce sedimentation of the structure. Future

dredging of the reservoir will be costly, require extensive environmental review, and may have detrimental impacts on the watershed. This emphasizes the need to take actions to reduce sedimentation and extend the period of time when dredging of the reservoir is needed far into the future.

NO. FP -06			
Recommendation	Conduct the necessary surveys and compare to as-built surveys of the structure to determine the rate of sedimentation and the remaining available capacity.		
Priority		Task Leader	BKWD
Funding Sources	NRCS - Rehabilitation Funds BKWD	Task Partners	NRCS GCSWCD Municipalities Greene County
Estimated Cost	Not Determined	Schedule	dependent on federal funding availability
Notes	NRCS has tentatively schedule assessment of sedimentation status in summer 2003. The GCSWCD will provide technical assistance as appropriate. The GCSWCD will continue to promote upstream stability in order to reduce sediment supply.		

NO. FP -07			
Recommendation	Develop a stream-friendly strategy for managing deposition of stream gravel (bedload) at the confluence of the Batavia Kill and C.D.Lane lake. Strategy should acknowledge this is a natural delta formation but seek to mitigate excessive aggradation, stream stability in an upstream direction and including the Big Hollow Restoration Project, fisheries passage and other stream impacts.		
Priority		Task Leader	GCSWCD
Funding Sources	NRCS - Rehabilitation Funds BKWD Grants	Task Partners	NRCS BKWD NYCDEP Municipalities Greene County
Estimated Cost	Not Determined	Schedule	dependent on federal funding availability
Notes	Traditional gravel removal activities are suspected of creating stream instability upstream of the removal area.		

NO. FP -08			
Recommendation	Work with NYCDEP, NYSDEC and others above the structure to reduce excess sediment loading from in-stream and upland sources of erosion.		
Priority		Task Leader	GCSWCD

Funding Sources	NYCDEP - BK Phase II Grants	Task Partners	NYCDEP NRCS BKWD Municipalities
Estimated Cost	Not Determined	Schedule	unknown
Notes	The GCSWCD completed restoration of 1 mile reach upstream of C.D.Lane. GCSWCD has identified additional stream stability problems in management reach 1b which is being monitored, and will require restoration.		

PHYSICAL FACILITIES

While the Batavia Kill flood structures have been well maintained, and are in good to excellent condition, the emergency spillways at the C.D.Lane structure require attention. While recent federal legislation has provided for the authorization of funds for rehabilitation of adequate flood control structures constructed in the past by the NRCS (formally the SCS), the legislation has not had funding appropriated.

South Emergency Spillway - On the South emergency spillway (closest to CR 56), there has been repeated flood damages due to the inability of the sod cover to withstand the velocities when the spillways are actively flowing. In April 1987 and September 1999, the spillway was activated, and in both instances the sod cover was breached and deep gullies were eroded in the spillway's surface. While the damage did not threaten the integrity of the dam itself, the erosion of the spillway has required emergency repairs and is a drain on local resources.

North Emergency Spillway - On the North emergency spillway, the watershed district and NRCS have been working for several years to address a stability problem with the steep slope on the face of the spillway. This slope has experienced repetitive damage associated with a shallow soil failure across a significant portion of the steep slope. NRCS is conducting the appropriate analysis to evaluate the impact on the function of the spillway. It does not appear that the slope is in imminent danger of catastrophic failure.

NO. FP -09			
Recommendation	Design and implement mitigation strategy to prevent future failure of South spillway.		
Priority		Task Leader	BKWD
Funding Sources	NRCS - Rehabilitation Funds BKWD Grants	Task Partners	NRCS GCSWCD
Estimated Cost	Not Determined	Schedule	Dependent on federal funding
Notes	NRCS has collected detailed survey data on spillway to facilitate mitigation design		

NO. FP-10			
Recommendation	Design and implement strategy to stabilize North spillway on C.D.Lane Facility		
Priority		Task Leader	BKWD
Funding Sources	NRCS - Rehabilitation Funds BKWD Grants	Task Partners	NRCS GCSWCD
Estimated Cost	Not Determined	Schedule	dependent on federal funding availability
Notes	Previous repair efforts focused on subsurface drainage and re-countouring of the slope. NRCS is currently proposing a bioengineering solution to stabilize the slope.		

RESIDENTIAL STRUCTURAL FLOODING

After the flood of September 1999, the GCSWCD discovered that a residence just above the C.D.Lane facility had been flooded. Upon investigation, it was determined that this was a repetitive problem, with the home flooded in 1987. The flooding is a direct result of the flood pool behind the C.D.Lane dam backing up into the home. When the flood event is of a great enough magnitude to cause the emergency spillways to flow, the home is flooded. The GCSWCD is aware of the problem, and has given it high priority under the District's flood mitigation program. Site visits have been made by the NRCS and GCSWCD and a strategy has been developed by which the GCSWCD will locate funding, conduct design surveys and coordinate the project, while NRCS will provide the design and specifications for the work. In September 2000, the GCSWCD prepared an application for funding of this mitigation under the FEMA Flood Hazard Mitigation Grant Program (HMGP) but was unsuccessful.

NO. FP -11			
Recommendation	Assess flooding condition and design/implement strategy to protect structure from repetitive flooding.		
Priority		Task Leader	GCSWCD
Funding Sources	NRCS - Rehabilitation Funds BKWD Grants	Task Partners	NRCS/BKWD Town of Windham Greene County Landowners
Estimated Cost	Not Determined	Schedule	Dependent on funding.
Notes	GCSWCD has completed topo survey of the project area, NRCS has agreed to provide mitigation design. GCSWCD is seeking funds and will be assisted by Town of Windham in implementation of final project.		

MANAGEMENT PLAN

The flood control structures in the Batavia Kill watershed have now exceeded the half way point in their design life span. While the structures can be expected to function for many years to come, components of the infrastructure will eventually require rehabilitation or replacement. The GCSWCD supports the efforts of the BKWD to develop a long range management strategy which would address inspection, operation and management of the structures. In 1999, changes to NYS Environmental Conservation Law provided NYSDEC with authorization to promulgate rules and regulations for the development of Emergency Action Plans (EAP) for high hazard dams. Emergency action plans require communities to consider emergencies related to the failure of the dams, and will focus on response and emergency warning. In the Batavia Kill watershed, all three flood control structures are classified as high hazard. The GCSWCD strongly recommends that all future management activities carefully evaluate any potential impacts to stream corridor stability.

NO. FP -12			
Recommendation	Develop a Long Range Management Plan to address operation, maintenance and rehabilitation needs of watershed flood control structures.		
Priority		Task Leader	BKWD
Funding Sources	NRCS BKWD Grants	Task Partners	NRCS GCSWCD NYCDEP Municipalities Greene County
Estimated Cost	Not Determined	Schedule	dependent on federal funding availability
Notes	The USDA-NRCS has identified the BKWD as a priority under the national dam rehabilitation program. Assessments of current conditions are on-going, and will be central to development of the final plan. The GCSWCD strongly recommends that the Management Plan address long range stream stability to the maximum extent possible.		

NO. FP -13			
Recommendation	Develop comprehensive Emergency Action Plans (EAP) for all Batavia Kill Watershed District Structures.		
Priority	High	Task Leader	BKWD
Funding Sources	FEMA - HMGP NRCS - Rehabilitation BKWD Local In-kind (GCSWCD)	Task Partners	GCSWCD NYSDEC - Dam Safety SEMO/FEMA GC Office Emergency Services GC Planning Law enforcement, various

Estimated Cost	\$25,000 Est.	Schedule	2002 - 2003
Notes	GCSWCD has been awarded \$15,000 FEMA/SEMO planing grant to develop an All Hazards Mitigation Plan. The Batavia Kill ERP will be initiated under this process. Advanced components (i.e. inundation studies) will be delayed until NYSDEC completes new digital FIRM project.		

VIII-A.3 Education & Outreach

Note: Additional education based recommendations can be found in VIII-B: Education & Outreach.

In general, there is a need to provide landowners, municipal officials, planners, developers and other stakeholders in the watershed with information regarding floodplain locations, floodplain function, flood mapping and the impact of floodplain development on stream conditions.

Flood Damage Prevention Library

FEMA, the National Association of Floodplain Managers and others have developed extensive materials to assist watershed stakeholders in making sound development decisions related to flooding and flood damage prevention. These materials can be only be effective if they are readily available to a wide audience and that audience understands the importance of their information to managing their land and to their safety. The GCSWCD recommends that a local repository for these types of publications be developed in several locations in the watershed. The GCSWCD will request the local libraries in the watershed to provide shelf space for publications in accordance with NFIP standards. Annually, a notice should be publish in local newspapers a providing notification on the availability of the flood damage prevention library.

NO. FP - 14			
Recommendation	The GCSWCD should develop a technical library on flood protection that is readily available to all watershed stakeholders		
Priority		Task Leader	GCSWCD
Funding Sources	FEMA - HMGP FEMA - FMAP NYC DEP	Task Partners	Municipalities Greene County Planning Dept
Estimated Cost	\$1,500	Schedule	2003-2004
Notes			

FP-17 Special Flood Hazard Zone Notification

In many instances, landowners are uncertain as to the presence and location of Special Flood Hazard Areas (SFHA) (designated on FIRM Maps) on their property. Knowledge of flood prone areas can help landowners make informed decisions regarding flood risk when considering development and use of their property. Landowners also require accurate knowledge of SFHA when seeking financing from lending institutions. Recent digitization of the real property tax parcels in the NYC watershed, and the development of digital flood maps by NYSDEC can be integrated into a database which would allow for notification of landowners regarding the presence of SFHA on or near their property or business. The database can be used to develop a mailing list of properties with a SFHA present, and periodically a direct mailing can be made to each property owner. The mailings should include notification of the SFHA presence, as well as information on the importance of floodplains. To provide for further notification to property owners, the GCSWCD will work with the watershed towns and the Greene County Real Property Tax Office to determine if a code for SFHA can be incorporated in the property description maintained in the real property office, and integrated with the landowner's tax bill.

NO. FP - 15			
Recommendation	The GCSWCD should facilitate periodic notification to landowners who have special flood hazard areas located on their property and provide information sessions to address property owner questions about them.		
Priority		Task Leader	GCSWCD
Funding Sources	NRCS - Rehabilitation Funds BKWD Grants NYCDEP Batavia Kill funds	Task Partners	NRCS BKWD NYCDEP Municipalities Greene County
Estimated Cost	Not Determined	Schedule	dependent on funding availability
Notes	Recommendation cannot move forward until digital flood maps are completed.		

Recommendation VIII-A.4 Miscellaneous Flood Protection Items

Flood Damage Data Base

Documenting flood damages costs can provide multiple benefits to a community. Areas that demonstrate repetitive damage can be prioritized for mitigation because this cumulative cost damage data provides justification for mitigation grant program funding. Often, funding is based on a cost/benefit analysis which requires extensive documentation of past damages. The GCSWCD could develop a simple reporting form to be used by municipalities, as well as private landowners, for reporting flood damages.

NO. FP - 16			
Recommendation	The GCSWCD should facilitate development of a flood damage reporting system to track types of flooding, their location and the costs associated with flood damage.		
Priority		Task Leader	GCSWCD
Funding Sources	Greene County Municipalities FEMA-HMGP FEMA-FMAP NYCDEP Bat. Kill funds	Task Partners	Municipalities GC Planning Department GC Highway Department GC Emergency Services Office Landowners
Estimated Cost	Not Determined	Schedule	Dependent on funding availability
Notes	Database development should attempt to collect records on past floods to get started, all flooding damages should be reported even if localized. Program will require training, and administrative support to insure success.		

Flood Mitigation Planning

In 2000, the Disaster Mitigation Act (DMA) resulted in significant changes in the mitigation programs offered by FEMA. Under the 2000 DMA, local communities seeking funding under the Hazard Mitigation Grant Program and Flood Mitigation Assistance Program will be required to have an All Hazards Mitigation Plan approved by FEMA to be eligible for these funds. At the present time, the Town of Windham has a Flood Mitigation Plan developed in 2000 by the GCSWCD under the Flood Mitigation Assistance Program. The GCSWCD has received confirmation that it has received a \$15,200 grant from FEMA/SEMO for development of a county wide All Hazard Mitigation Plan. This Plan will meet the requirement of the DMA and watershed communities are recommended to participate.

NO. FP -17			
Recommendation	Batavia Kill watershed communities are encouraged to participate in the development of a county wide All Hazards Mitigation Plan.		
Priority		Task Leader	
Funding Sources	FEMA - HMGP In-kind (GCSWCD) In-kind GC Planning In-kind GC Emergency Svc	Task Partners	GCSWCD NYSDEC - Dam Safety SEMO/FEMA NYCDEP GC Office Emergency Services GC Planning Law enforcement, various Landowners Others

Estimated Cost	\$25,000 Est.	Schedule	2002 - 2003
Notes	1. GCSWCD has been awarded \$15,200 FEMA/SEMO planning grant. 2. Flooding is a primary risk in Greene County, 3. The GCSWCD will insure that sound stream management practices are primary in the AHMP.		

Flood Mitigation Grant Programs

Since 1996, the GCSWCD has been able to secure \$1.1 million for flood mitigation projects in the NYC watershed area. On-going efforts to develop an All Hazard Mitigation Plan, will maintain funding eligibility for all Batavia Kill watershed communities. The GCSWCD has identified several projects in the Batavia Kill watershed which should be further evaluated for possible mitigation funding, and will work with local partners to develop competitive grant applications. Potential projects would include, but are not limited to;

1. Starr Residence Residential flooding of home above the C.D.Lane Flood Control structures (see Management Segment 1)
2. GNH Lumber Flooding of commercial business in Windham hamlet (See Management Segment 3)
3. Miscellaneous Several of the recommendations in this section may be eligible for mitigation funding.