Greene County Soil & Water Conservation District
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To: David Burns, Project Manager, NYCDEP

From: Jeff Flack, Executive Director, GCSWCD

Date: May 12, 2014

Re: Schoharie Basin Action Plan

To Whom It May Concern,

The Greene County Soil and Water Conservation District (GCSWCD) and the NYC Department of Environmental Protection (DEP) have collaborated with the Schoharie Watershed Advisory Committee (SWAC) to develop the 2014– 2016 Action Plan. The Action Plan is one piece of a three-part package that includes:

- Section 1. Executive Summary: Schoharie Basin Stream Management Program Action Plan 2014-2016,
- Section 2. Schoharie Basin Stream Management Program Action Plan 2014-2016, including project/program updates through 5/1/2014
- Section 3. Completed Action Items May 2007 through May 2013

Enclosed you will find each of these documents.

The Action Plan provides summaries of the projects and programs that GCSWCD will be leading between May 2014 and May 2016, including updates through May 1, 2014. The completed projects synopsis provides summaries of the action items that have been completed from previous Action Plans (May 2007- May 2013). The executive summary provides a brief description and the current status of action plan items from the 2014 – 2016 Action Plan, as well as completed items from May 2009 to present. The complete action plan and completed project synopsis are updated annually and revised biannually. The executive summary is a working document that is updated more frequently for the SWAC.

Section 1. Executive Summary: Schoharie Basin Stream Management Program Action Plan 2014-2016 Updated May 15, 2014

NYCDEP Stream Management Program

71 Smith Ave, Kingston NY 12401

Dave Burns, Project Manager

Greene County Soil & Water Conservation District

907 County Office Building, Cairo NY 12413

Jeff Flack, Executive Director

2013 Action Plan Executive Summary, 2014-2016*

** - For more information, including projects completed prior to 2009, refer to the complete action plan available at http://catskillstreams.org/major-streams/schoharie-creek/*

2013 Action Plan Executive Summary, 2013-2015, Updated April 11, 2014

Introduction

The Schoharie Watershed Stream Management Program (SWSMP) was established in partnership with the Greene County Soil & Water Conservation District (GCSWCD) and NYC Department of Environmental Protection (DEP) in 1997 as part of the Filtration Avoidance Determination (FAD) issued to DEP by the Environmental Protection Agency. Stream Management Plans have been completed for each major river corridor in the Schoharie Watershed and each plan includes a set of general recommendations and project specific recommendations which provide a "road map" for improved stream and floodplain management. In addition to supporting the FAD, many SWSMP projects also target reductions to in-stream sources of suspended sediment to partially fulfill requirements set forth in DEP's Shandaken Tunnel State Pollution Discharge Elimination System (SPEDES) permit established in September 2006.

The following Action Plan Executive Summary summarizes the programs and projects that GCSWCD will be leading within the Schoharie Basin between May 2014 and May 2016, as well as programs and projects completed from May 2009 to present. The SWSMP seeks to advance state-of-the-art watershed management projects, policies and programs to improve and protect the Schoharie Watershed. Initiatives include the Stream Management Implementation Program (SMIP), the Catskill Streams Buffer Initiative (CSBI), Stream and Floodplain Restoration Projects, Stream and Watershed Assessments, and Education and Outreach programs. The funding source for each item is noted in the right column with "General" referring to the item as being a program or project of the GCSWCD/DEP Schoharie Watershed Stream Management Program.

^ - SMIP = Stream Management Implementation Grant Program, CSBI = Catskill Streams Buffer Initiative, WAP = Watershed Assistance Program, WRDA = Water Resources Development Act (ACOE), CWC = Catskill Watershed Corporation, General = DEP/GCSWCD SWSMP

2013 Action Plan Executive Summary, 2014-2016*

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Education on Watershed Protection

The Schoharie Watershed Stream Management Program will be administering four annual events focused on education and awareness and twelve Education and Outreach projects between 2011 and 2013. The GCSWCD will continue to work with a wide network of partners to enhance its education and outreach efforts related to stream and floodplain management, sediment and erosion control, and other topics critical to sound watershed management.

Annual Projects				
Project	*Progress*	*Notes*	*Year Added to AP*	*Program^*
Schoharie Watershed Month (formerly Week)	Annual	Annually plan and hold action-focused educational and recreational event for community involvement and awareness- held May 2010, 2011, 2012 and scheduled for 2013.	2009	SMIP Round 2/ General/WAP
Batavia Kill Stream Celebration	Annual	Annually plan and hold streamside educational celebratory event - held in August 2007, 2008, 2009, 2010 and 2011; celebration was not held in 2012 or 2013 due to local need to focus on recovery from the impacts of Hurricane Irene.	2009	General/Other/WAP
Schoharie Watershed Summit	Annual	Annually plan and hold seminar-based training and educational event for municipal officials - held in January 2007, 2008, 2009, 2010, 2011, 2012, and 2013.	2009	General/WAP
Schoharie Watershed Tour	Annual	Annually plan and hold Watershed Tour - held in June 2007, 2008, 2009, 2010. SWT put on hold for 2011, 2012, and 2013 due to flood recovery and limited staff availability.	2009	General/WAP

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2013-2015 Projects				
Project	*Progress*	*Notes*	*Year Added to AP*	*Program^*
Riparian Buffer Workshop	In-Process	GCSWCD's CSBI will host a workshop for streamside landowners that will highlight the importance of buffers and demonstrate management practices to maintain healthy stream buffers; planning will resume when an Education & Outreach Coordinator is on staff.	2011	CSBI/General
Schoharie Watershed Stream Crossing Workshop	Contracting	GCSWCD staff will develop and implement a culvert design workshop for local highway departments. Planning this workshop will resume when an Education & Outreach Coordinator is on staff.	2010	SMIP Round 3
Complete Kiosk Series	Near Complete	The kiosk series highlights the various restoration projects throughout the Schoharie Watershed. Three have been installed (Sugar Maples, Conesville, Ashland Connector Reach).	2009	General
Completed Projects				
Project	*Progress*	*Notes*	*Year Completed*	*Program^*
Post Flood Stream Intervention Training	Complete	GCSWCD presented and/or contributed to five Post Flood Stream Intervention Trainings, held in Ulster, Greene, and Dutchess counties. The training was tailored to local highway departments, excavation contractors, and other involved in stabilizing streams following flood events.	2012 & 2013	General
Post Flood Emergency Stream Work Training	Complete	The flooding and damage caused by Tropical Storms Irene and Lee led to the coordination and presentation of the emergency stream work training. Three sessions were held and over 200 attendees were trained in the basic considerations that should be addressed when planning an emergency intervention in a stream system.	2012	General
Mountain Top Arboretum Outdoor Classroom Construction	Complete	An outdoor classroom was designed and constructed at the arboretum. Design plans and bid specifications for the classroom construction were developed through SMIP Round 2. The classroom accommodates approximately 45 people for year-round outdoor programming on a range of ecological and natural history topics relating to the watershed.	2011	SMIP Round 4

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Environmental Film Series	Complete	Watershed Agricultural Council hosted an environmental film series, in 2011 & 2012, at the Doctorow Center in Hunter during Schoharie Watershed Month. The films highlighted watershed issues, pollution mitigation, and watershed, food shed, and view shed topics.	2011 & 2012	SMIP Round 4
Roadside Ditch Maintenance Workshop	Complete	GCSWCD held a workshop for highway departments and NYSDOT in 2011. The workshop covered water quality impacts from roadside ditches, ditch characteristics and conditions, and maintenance options, erosion control, and prioritization.	2011	SMIP Round 4
Water Quality at Home Workshops	Complete	Greene County Cornell Cooperative Extension held two action-based educational workshops to help raise awareness about stewardship of water quality. The workshops, building rain barrels and holistic pond management, were held during Schoharie Watershed Month 2011.	2011	SMIP Round 3
CD Lane Family Day	Complete	Community of Windham Foundation sponsored a Family Day as part of the 2011 Schoharie Watershed Month. Activities were intended to encourage responsible use of water and nearby land areas. Approximately 60 individuals participated along Main Street in Windham.	2011	SMIP Round 3
Manor Kill Information Kiosk	Complete	GCSWCD provided a kiosk for Conesville, and a general Schoharie Watershed and Schoharie County SWCD educational panel was produced in conjunction with GCSWCD's kiosk series.	2011	SMIP Round 2
Manor Kill Environmental Study Team	Complete	The Manor Kill Environmental Study Team program provided experientially based, hands on environmental education and stream monitoring program for youth (ages 13-18). The program served 20 youth from the Gilboa-Conesville School District and an additional 40 youth from Schoharie, Montgomery and Schenectady Counties from August 2009 – June 2011.	2011	SMIP Round 1
Identify Existing Resources	Complete	GCSWCD identified and cataloged existing resources that are currently available. The website was revamped in 2011, to provide web-based documentation of existing resources and links to additional resources.	2011	General/WAP
Floodplain Management and Wetland Protection Workshops	Complete	Trainings were conducted by DEC and EPA at the annual Watershed Summits in January 2008, 2009, 2010 and 2011.	2011	General/WAP
Japanese Knotweed Mailing	Complete	Distributed knotweed informational brochure to streamside landowners.	2010	General

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Riparian Buffer Workshop	Complete	CSBI sponsored workshop July 10, 2010 that showed participants the characteristics of healthy vs. degraded buffers and different management practices to maintain healthy stream buffers.	2010	CSBI
Erosion and Sediment Control Workshops	Complete	Trainings on sediment and erosion control for compliance with SPDES General Permit for construction activities were held in December 2008, January 2009 and March 2010.	2010	General
Mountain Top Arboretum Outdoor Classroom Design	Complete	Design plans and bid specifications for an accessible outdoor classroom were completed in 2010.	2010	SMIP Round 2
Rain Barrel Workshop	Complete	Cornell Cooperative Extension workshop took place during Schoharie Watershed Week May, 2010. Fifteen people took part in building their own rain barrels.	2010	SMIP Round 2
Mountaintop Arboretum Wet Meadow – Interpretive Kiosk, Signage and Brochures	Complete	A kiosk was installed and brochures were developed to describe the wet meadow including the historical background of the historic pump house, an explanation of the site's hydrology, and other information about wetland plants and wildlife.	2010	SMIP Round 1
SWAC and Schoharie Watershed Week Logos	Complete	Logos were developed for the Schoharie Advisory Committee and Watershed Week/Month.	2010	SMIP Round 1
Conduct Watershed Survey	Complete	Survey to determine educational needs and interests of stakeholders and watershed residents.	2009	
Websites	Complete	Schoharie pages have been created on www.catskillstreams.org and the revised www.gcswcd.com to guide information sharing.	2009	General

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Landowner Stream Assistance

The Schoharie Watershed Stream Management Program is currently administering twelve Landowner Stream Assistance projects of which four are funded through SMIP and seven through CSBI. Several Stream Restoration projects are a product of the Stream Restoration Program that GCSWCD that has been overseeing in the Schoharie Watershed since 1996. Landowner Stream Assistance projects are prioritized as those that improve and protect water quality by enhancing stream stability and establishing riparian buffers.

2013 – 2015 Projects				
Project	*Progress*	*Notes*	*Year Added to AP*	*Program^*
Catskill Streams Buffer Initiative Projects				
Manor Kill Dahlberg Property Planting	In-Process	CSBI planting project on the Manor Kill in Conesville.	2010	CSBI
Manor Kill Colangelo Riparian Planting	In-Process	CSBI planting project on the Manor Kill in Conesville - need to add willow clumps to previous planting.	2009	CSBI
Tompkins Riparian Project	In-Process	Riparian demonstration project in Ashland; delayed due to change of ownership. Purchased by town for well head protection. GCSWCD plans to proceed with Town of Ashland in 2014.	2009	CSBI
Benjamin Property Planting	In-Process	CSBI planting project on the East Kill in Jewett.	2012	CSBI
Windham Country Club Riparian Planting	In-Process	CSBI planting project on the Batavia Kill in Windham. Project on hold due to change of ownership.	2013	CSBI
Police Anchor Camp Riparian Project	In-Process	CSBI planting project along tributaries of the Batavia Kill in Windham.	2013	CSBI

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Prattsville Ball Field	In-Process	CSBI planting project along the Batavia Kill in Prattsville.	2014	CSBI
Former Kastanis Property Planting Phase 2	In-Process	CSBI planting project along the Batavia Kill in Ashland.	2014	CSBI
Chase Property Planting	In-Process	CSBI planting project along a tributary to the Batavia Kill in Hensonville.	2014	CSBI
Stream Restoration Projects				
Windham Country Club Repairs	In-process	Restoration of streambank along Batavia Kill at the Windham Country Club. Put on hold due to change in ownership.	2012	General/FEMA
Ashland Well Heads Protection Project	Near Complete	Repair of Ashland drinking water wells along the Batavia Kill.	2012	General/Ashland/ NRCS
Lanesville Project Repairs	In-process	Repair of the Lanesville Stream Restoration Project on the Stony Clove.	2012	General/FEMA
Long Road Project Repairs	In-process	Repair of the Long Road Stream Restoration Project on the West Kill in Lexington.	2012	General/FEMA
Big Hollow Project Repairs	In-process	Repair of the Big Hollow Stream Restoration Project on the Batavia Kill in Maple Crest.	2012	General/FEMA
Ashland Connector Reach Project Repairs	In-Process	Repair of the Ashland Connector Reach Stream Restoration Project on the Batavia Kill in Ashland.	2012	General/FEMA
Shoemaker Project Repairs	In-Process	Repair of the Shoemaker Stream Restoration Project on the West Kill in Lexington.	2012	General/ FEMA
Brandywine Project Repairs	In-Process	Repair and replace several rock structures and re-grade. Project located in Ashland.	2012	General/ACOE/FEMA
Kozak Streambank Stabilization and Riparian Planting	Assessment	Bank stabilization on the Schoharie Creek in Jewett.	2011	SMIP Round 4

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Completed Projects

Project	*Progress*	*Notes*	*Year Completed*	*Program^*
Catskill Streams Buffer Initiative Projects				
Dodson/McCloskey Property Planting Phase 2	Complete	CSBI re-planting project on the East Kill in Jewett.	2013	CSBI
Wilkie Riparian Project	Complete	CSBI planting project on a Schoharie Creek tributary in Prattsville.	2013	CSBI
Donnelly Riparian Project	Complete	CSBI planting project on a Schoharie Creek tributary in Prattsville.	2013	CSBI
Enochty Property Planting	Complete	CSBI planting project on the West Kill.	2013	CSBI
Mayo Property Planting	Complete	CSBI planting project on the Batavia Kill in Hensonville.	2013	CSBI
Higgins Property Planting	Complete	CSBI planting project on the Batavia Kill in Windham.	2013	CSBI
Cole Property Planting	Complete	CSBI planting project on the West Kill in Lexington.	2012	CSBI
Bardfield Property Planting	Complete	CSBI planting project on the East Kill in Jewett.	2011	CSBI
Rivera Property Planting	Complete	CSBI planting project on the East Kill in Jewett.	2011	CSBI

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Slutzky Property Planting	Complete	CSBI planting project on the Schoharie in Jewett.	2011	CSBI
Kelly Property Planting	Complete	CSBI planting project on the Schoharie in Hunter.	2011	CSBI
Cervini Property Planting	Complete	CSBI planting along North Settlement Creek.	2011	CSBI
Torsiello Property Planting	Complete	CSBI planting project along North Settlement Creek.	2011	CSBI
Hegner Property Planting	Complete	CSBI Planting project along North Settlement Creek.	2011	CSBI
Manor Kill Gentile Property Planting	Complete	CSBI planting project on the Manor Kill in Conesville.	2010	CSBI/WRDA
Manor Kill Brandow Property Planting	Complete	CSBI planting project on the Manor Kill in Conesville.	2010	CSBI/WRDA
Manor Kill Quinn Property Planting	Complete	CSBI planting project on the Manor Kill in Conesville.	2010	CSBI/WRDA
Dodson/McCloskey Property Planting	Complete	CSBI planting project on the East Kill in Jewett.	2010	CSBI
Rappleyea Property Planting	Complete	CSBI planting project on the East Kill in Jewett.	2010	CSBI
Avella Property Planting	Complete	CSBI planting project on the Batavia Kill in Windham.	2010	CSBI
Brunsden Property Planting	Complete	CSBI planting project on the Batavia Kill in Windham.	2010	CSBI
Grossman Property Planting	Complete	CSBI planting project on the Schoharie Creek in Hunter.	2010	CSBI
Silver Property Planting	Complete	CSBI planting project on the Schoharie Creek in Hunter.	2010	CSBI
Evergreen Planting	Complete	CSBI planting project in the Schoharie Creek in Hunter.	2009	CSBI

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Kastanis Property Planting	Complete	CSBI planting project on the Batavia Kill in Ashland.	2009	CSBI/WRDA
Kane Property Planting	Complete	CSBI planting project in the Batavia Kill in Ashland.	2009	CSBI/WRDA
Manor Kill Grogan Riparian Planting	Complete	CSBI planting project on the Manor Kill in Conesville.	2009	CSBI/WRDA
McRoberts Property Planting	Complete	CSBI planting project on the Batavia Kill in Windham.	2009	CSBI/WRDA
Catskill Streams Buffer Initiative (CSBI) Educational Materials	Complete	CRSR was contracted to develop educational materials. Marketing strategy, slogan, logo, introduction language, brochure and application for funding have been developed.	2009	CSBI/General
Additional Riparian Buffer Pilot Projects				
Carr Road	Complete	Riparian project on Schoharie Creek in the Town of Jewett.	2009	General
Deming Road Riparian Project	Complete	Addition of riparian component to a landowner project in Jewett.	2009	General/WRDA
Stream Restoration Projects				
Maier Farm Project Repairs	Complete	Repair of the Maier Farm Stream Restoration Project on the Batavia Kill in Ashland.	2013	General/FEMA
Conine Project Repairs	Complete	Repair of the Conine Stream Restoration Project on the Batavia Kill in Prattsville.	2013	General/FEMA
NYS Route 42 West Kill Slope Failure	Complete	Restoration of slope failure along the West Kill, below Pushman Bridge.	2013	General/Lexington/ NRCS
East Kill Restoration at Apple Hill	Complete	Stream restoration on the East Kill in Jewett.	2012	SMIP Round 4/ General
Nikolaidis Stream Restoration Project	Complete.	Stream restoration on the East Kill in Jewett, combined with Kirk/Rotella SMIP projects into the East Kill at Apple Hill Stream Restoration.	2012	SMIP Round 4

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Holden Stream Restoration Project	Complete	Full channel restoration of the Batavia Kill in Ashland in compliance with the Filtration Avoidance Determination (FAD) and the Shandaken Tunnel SPDES Permit.	2012	SMIP Round 1/General
Vista Ridge Stream Restoration	Complete	Stream restoration on the East Kill in Jewett in compliance with the FAD.	2011	SMIP Round 1/General
Wright Stream Bank Stabilization/Riparian Project	Complete	Stream restoration and planting along the Schoharie Creek; site of SCA service project.	2010	SMIP Round 4/CSBI
Prattsville Riparian Project (Wright)	Complete	Restoration and stabilization of approximately 3,000 feet of the Schoharie Creek.	2010	General/ CWC/WRDA
Sugar Maples Stream Restoration	Complete	Restoration of wetland and 700ft of a tributary of the Batavia Kill in Windham.	2010	General/ CWC/WRDA
Windham Golf Course Streambank Project	Complete	Bank Stabilization and riparian demonstration project for approximately 155 feet of stream.	2009	CWC/General
West Kill Restoration Project (Long Road)	Complete	Full channel restoration of approximately 3,000' of the West Kill in Lexington in compliance with the FAD and the Shandaken Tunnel SPDES Permit.	2009	General/WRDA
Oakwood Pistol Club	Complete	CWC streambank protection project in Prattsville.	2009	CWC/General
Schoharie Street Stabilization	Complete	Stabilization of high bank and plantings in the Village of Hunter.	2009	General/FEMA

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Creative Stormwater Practices and Critical Area Seeding

The Schoharie Watershed Stream Management Program is currently administering four Creative Stormwater Practices and Critical Area Seeding projects of which two are funded through SMIP. The GCSWCD will continue to work with multiple partners to implement stormwater projects that reduce runoff and protect groundwater resources within the Schoharie Watershed.

2013-2015 Projects				
Project	*Progress*	*Notes*	*Year added to AP*	*Program^*
Windham Mountain	Near-Complete	Pond expansion, parking lot terraces and stormwater conveyance improvements were installed 2010. Maintenance facility improvements will be scheduled once additional funding is attained.	2007	General/ WRDA/CWC
Hunter Foundation, Tannersville office	Near-Complete	Porous gravel parking area and bioswale were installed in 2009. Rain gardens and the creek walk will be installed in 2014.	2007	General/ WRDA/CWC
Completed Projects				
Project	*Progress*	*Notes*	*Year Completed*	*Program^*
Mountain Top Highway Ditch Re-vegetation Program	Complete	Program to encourage greater use of critical area seeding equipment that the GCSWCD has available for the highway departments by offsetting the cost of seed and mulch.	2011	SMIP Round 4
Mountain Top Library & Learning Center	Complete	Stormwater management demonstration project. Design has been completed, construction is scheduled for 2011.	2011	SMIP Round 1/ WRDA/CWC
Sugar Maples Stormwater Project	Complete	GCSWCD installed stormwater treatments including the installation of a permeable grass parking lot, rain gardens, wetland, porous walkways and riparian planting beds. Supplemental plantings performed in the rain gardens and wetland in spring 2011.	2010	General/ WRDA/CWC
Hunter Mountain	Complete	Following preliminary discussions, it was determined that Hunter Mt. already received funding through CWC and completed stormwater retrofits. No further action is expected.	2009	General
Community Stormwater Planning	Complete	Stormwater structure GIS information and Community Stormwater Management Plans are available for various communities.	2009	General/CWC

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Highway and Infrastructure Improvements

The Schoharie Watershed Stream Management Program is currently administering nine Highway and Infrastructure Improvement projects of which seven are funded through SMIP. Proper highway and infrastructure management are a vital component to managing streams for natural stability and ecologic integrity. It was observed that a number of recommended actions would provide water quality enhancement or protection such as properly sizing culverts to reduce flooding and increase stream stability both up and downstream, and minimizing the introduction of road abrasives. Culverts addressed through this program must pose a threat to water quality to be eligible for funding.

2013-2015 Projects				
Project	*Progress*	*Notes*	*Year added to AP*	*Program^*
Glen Avenue Culvert Upgrade	In-Process	GCSWCD will work with the Village of Hunter Highway Department to design a properly sized culvert with a buried bottom for improved conveyance, stream stability and habitat enhancement and oversee the installation.	2011	SMIP Round 4
County Route 6 Slope Failure	In-Process	Project involves the stabilization of a slope failure along CR6 and the West Kill in the Town of Lexington.	2011	SMIP Round 4
Cranberry Road Culvert Upgrade	In-Process	GCSWCD will work with the Town of Hunter Highway Department to design a properly sized culvert with a buried bottom for improved conveyance, stream stability and habitat enhancement and oversee the installation.	2011	SMIP Round 3
Schoharie Watershed Stream Crossing/Culvert Design	In-Process	$50,000 to be set aside for engineered design services on retainer to work with towns to ensure prioritized culverts are designed properly.	2010	SMIP Round 3
Mitchell Hollow Rd (CR 21) Stormwater Upgrade	In-Process	370’ of stormwater conveyance with catch basins and sumps will be installed along Mitchell Hollow Rd. to mitigate stormwater flooding in area along NYS Route 23 and will be treated for water quality by the creation of a filtering wetland.	2010	SMIP Round 3
Street Sweeper with Vacuum	Pending	CWC application submitted with SMIP funds providing the cost share match. On CWC wait list.	2009	SMIPRound1/ CWC
Completed Projects				
Project	*Progress*	*Notes*	*Year Completed*	*Program^*

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Griffin Road Culvert Replacement	Complete	A Critical Response Plan was developed for a culvert replacement along Griffin Road in the Town of Jewett. Three-sided concrete culvert was installed, which will pass flows above the 100-year runoff event.	2012	General
Partridge Road Culvert Replacement	Complete	GCSWCD worked with the Town of Ashland Highway Department to design and install a properly sized culvert.	2011	SMIP Round1/ FEMA
Village of Tannersville Highway Dept. Technical Assistance	Complete	GCSWCD assisted Tannersville in sizing a culvert under Spring Street.	2011	General
Driveway Specifications	Complete	Permit specifications from GC Highway Department were provided to watershed communities to use as a model.	2009	General/WAP

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Planning and Assessment

The Schoharie Watershed Stream Management Program is currently administering six Planning and Assessment projects of which three are funded through SMIP. Planning and Assessment projects range from land use planning, assessment of streams and their watersheds, and the survey and monitoring of various locations and project sites.

2013-2015 Projects				
Project	*Progress*	*Notes*	*Year added to AP*	*Program^*
Town of Hunter Land Use Regulation Review & Development Guidelines	In-Process	Community of Natural Resource Solutions will conduct a detailed review of current land use regulations with the intent of adopting revisions, new regulations &/or guidelines promoting low impact design, climate smart and smart growth principles. Town changed consultants and will begin the project in 2014.	2010	SMIP Round 2/ WAP
Water Temperature Impacts on Fisheries Study	Near Complete	Thermograph study to locate thermal refugia. Imagery collection flight conducted in 2012 and report expected in 2014.	2009	SMIP Round 1
Tributary Management Plans	In-Process	Complete simplified plans for three Batavia Kill tributaries.	2007	General
Fisheries Assessment & Improvements Strategy	Not Started	Assess fisheries and develop habitat improvement strategy.	2007	General
Annual Projects				
Project	*Progress*	*Notes*	*Year added to AP*	*Program^*
Vegetation Monitoring of Restored Stream Reaches	Annual	Riparian plantings on restored stream reaches were monitored in 2008, 2009, 2010, 2011, 2012 and 2013. Vegetation monitoring is scheduled for 2014.	2014	General
Vegetation Monitoring of CSBI Projects	Annual	Catskill Stream Buffer Initiative projects were monitored in 2010, 2011, 2012, and 2013. Vegetation monitoring is scheduled for 2014.	2014	CSBI

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Restoration Project Monitoring	Annual	Restored stream reaches were monitored in 2008, 2009 and 2010, 2011, 2012 and 2013. Project monitoring is scheduled for 2014.	2008	General
Completed Projects				
Project	*Progress*	*Notes*	*Year Completed*	*Program^*
Water Temperature Impacts on Fisheries Study	Complete	GCSWCD worked with the United States Geological Survey (USGS) and the Rochester Institute of Technology (RIT) to determine the location of thermal refugia within the Schoharie Creek and West Kill. In 2012, RIT submitted their report, *Aerial Thermal Imaging of Select Streams in Greene County.* In 2014, the USGS submitted their report *Variations in Water Temperature and Implications for Trout Populations in the Upper Schoharie Creek and West Kill, 2010-2012.*	2014	SMIP Round 1
Mountaintop Better Site Design Plan Workshops	Complete	Kendall Stormwater Services and Morris Associates guided each community through a comparison of the local codes against model development principles using a consensus building approach.	2011 & 2012	SMIP Round2/ CWC/WAP
Town of Hunter Corridor Study	Complete	Assessment of future development along State Route 23A corridor was completed in 2010.	2010	CWC/WAP
Dale Lane Survey and Hydraulic Analysis	Complete	Site survey was completed in 2009 and hydraulic analysis in 2010.	2010	General
Mauro Residence Bank Stabilization	Complete	Geotechnical assessment of a failing streambank in relation to a private residence completed in April 2010. Engineer's report was provided to the home owner and the bank was seeded and mulched.	2010	SMIP Round 1
Lexington Sill (Schoharie Creek)	Assessed	Upon assessment it was determined that removal of sill would have little impact on the stream. No further action is expected.	2010	General
Tributary Assessment and Planning Projects	Complete	Historical alignments, riparian mapping, watershed analysis, stream feature inventory and Geodatabases have been completed for 3 tributaries to the Batavia Kill.	2010	
Manor Kill SMP	Complete	Stream Management Plan for the Manor Kill.	2009	General
Mountaintop Recreation/Resource Master Plan	Complete	GCSWCD WAP worked with public and private partners to develop plan in 2009.	2009	NYS DOS /WAP
Greene County All Hazards Mitigation Plan	Complete	Tetra Tech completed plan for Greene County in 2009.	2009	General

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Survey of second SPDES site	Complete	Landowner is unwilling to allow access for survey work. No further action is expected.	2009	General
Japanese Knotweed Management Project	Complete	Hudsonia submitted report to GCSWCD in December of 2009.	2009	General
Restoration Project Wetland Mapping	Complete	Wetland mapping and reporting were completed in 2009.	2009	General
Catskill Riparian Reference Study	Complete	New York Natural Heritage Program completed a final report for the West Kill Watershed	2009	General

Recreation and Stream Habitat Improvements

The Schoharie Watershed Stream Management Program is administering five Recreation and Stream Habitat Improvement projects of which three are funded through SMIP. Recreation and Stream Habitat Improvement projects include enhanced public access to streams for recreational purposes on the basis that public access will promote an appreciation of the stream while increasing user awareness of proper stream management.

2013-2015 Projects				
Project	*Progress*	*Notes*	*Year added to AP*	*Program^*
Schoharie Creek Park (Town of Lexington)	Near-complete	Building was removed in 2007; demonstrative plantings and fencing installed in 2012. Working with town to add signage.	2010	SMIP Round 3
Promote Increased Recreational Use of Watershed Streams	In-Process	Work with SWAC Habitat and Recreation Subcommittee to identify and implement opportunities.	2009	General/WAP
Completed Projects				
Project	*Progress*	*Notes*	*Year Completed*	*Program^*
Organize Repository of Stream Ecosystem Data	Complete	The Stream Ecosystem Data Repository – Upper Schoharie Creek Watershed is complete and available at: http://dspace.gcswcd.com/	2013	General

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Windham Path (Police Anchor Camp)	Complete	GCSWCD is assisting the Town of Windham with installing a public, non-motorized, multi-use trail at a 65 acre town owned parcel along the Batavia Kill. Construction of boardwalk and foot bridges complete.	2013	SMIP Round 2
Ashland Fishing Access Enhancements	Complete	Parking area, stream access and kiosk are complete.	2010	General
Town of Windham (Police Anchor Camp)	Complete	Conceptual plans were competed and provided to the Town.	2010	General

Flood Hazard Mitigation

Flooding produces a variety of hazards and impacts to public safety, homes and businesses, infrastructure (roads, utilities, etc.) and the natural environment. It can have direct impacts on water quality, including contamination from dislodged fuel and chemical storage tanks, mobilization of household waste and toxic substances, excessive riverine erosion and massive hill slope failures. As such, flood hazard mitigation – the work of reducing the impacts from flooding - supports the social, economic and environmental interests of communities in the NYC watershed.

2013 – 2015 Projects				
Project	*Progress*	*Notes*	*Year added to AP*	*Program^*
Local Flood Analysis	In-Process	LFA is undertaken to determine the causes of flooding, investigate and analyze the overall potential of specific projects, and projects in combination, in an attempt to mitigate flood damages and hazards. It is anticipated this analysis will prioritize projects for further SMIP and CWC funding. LFA projects underway in Lexington and Windham. The Prattsville LFA is complete and can be found at http://catskillstreams.org/major-streams/schoharie-creek/.	2013	SMIP, General
Hazard Mitigation Grant Program Flood Buyout Program	In-Process	2013 – appraisals and preliminary soft costs (title report and insurance, environmental assessment, property survey) 2014 – demolition plan for properties which still have structures. For vacant properties, commence closings.	2013	FEMA/NYCDEP

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2013 Action Plan Executive Summary, 2014-2016*

** - For more information, including projects completed prior to 2009, refer to the complete action plan available at http://catskillstreams.org/major-streams/schoharie-creek/*

Completed Projects				
Manor Kill Acquisition (Town of Conesville)	Complete	The Town of Conesville is assisting a landowner by acquiring a floodplain parcel approved for FEMA Pre-Disaster Mitigation funding (75%) and demolishing and removing the home. The SMIP grant is being used to assist the Town in meeting the required 25% match.	2013	SMIP Round 6

Ongoing Activities

On-going action items began in 2007 and will continue through the duration of stream management plan implementation efforts. The following items do not have an end, but rather are ongoing throughout the program.

Project	*Progress*	*Notes*	*Year added to AP*	*Program^*
Program Administration	On-going	Maintain an effective and efficient process for implementation of the stream management plans for Schoharie Creek and its associated tributaries	2007	General
Schoharie Watershed Advisory Committee (SWAC)	On-going	SWAC established, assists with funding and programmatic decisions associated with the SMIP. SWAC met 3 times in 2013 and three subcommittees (Education and Outreach, Habitat and Recreation, Highway Superintendents) each met 2-3 times per year.	2007	General/WAP
Local Technical Assistance	On-going	GCSWCD has developed process for tracking and responding to stakeholders.	2007	General
NYSDEC/ACOE Permit Reviews	On-going	Technical review provided as needed.	2007	General
Catskill Streams Website	On-going	Site development complete and site continues to be maintained.	2007	General
Community Outreach	On-going	Basic outreach activities - newspaper articles, newsletters, brochures, media contacts.	2007	General
Critical Area Seeding Program	On-going	Program to help highway departments with vegetation management on critical areas.	2007	General
Plant Materials Program	On-going	Native seed program initiated - other components in place to annually provide native plant materials for CSBI and restoration projects.	2007	General

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West Of Hudson Education & Outreach Strategy	On-going	Covers topics universal to water quality initiatives and includes other counties and agencies (SWCD's, CCE, DEP.) in the WOH watershed.	2007	General

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Section 2. Schoharie Basin Stream Management Program Action Plan 2014-2016

Updated May 15, 2014

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TABLE OF CONTENTS

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Schoharie Basin Stream Management Program
Action Plan 2014 – 2016
Update May 15, 2014

The Schoharie Watershed Stream Management Program (SWSMP) was established in a partnership between the Greene County Soil & Water Conservation District (GCSWCD) and NYC Department of Environmental Protection (DEP) in 1997 as part of the Filtration Avoidance Determination (FAD) issued to DEP by the Environmental Protection Agency. Stream Management Plans have been completed for each major river corridor in the Schoharie Watershed and each plan includes a set of general recommendations, and project specific recommendations, which provide a "road map" for improved stream and floodplain management. In addition to supporting the FAD, many SWSMP projects also target reductions to in-stream sources of suspended sediments as part of DEP's Shandaken Tunnel State Pollution Discharge Elimination System (SPEDES) permit established in September 2006. The SWSMP seeks to advance state-of-the-art watershed management projects, policies and programs to improve and protect the Schoharie's water resources. Initiatives include the Stream Management Implementation Program (SMIP), the Catskill Streams Buffer Initiative (CSBI), Stream and Floodplain Restoration Projects, Stream and Watershed Assessments, Flood Hazard Analysis and Mitigation and Education and Outreach programs.

The following Action Plan summarizes the programs and projects that GCSWCD will be leading within the Schoharie Basin between May 2014 and May 2016, and includes action plan item updates through May 1, 2014. The GCSWCD will lead the efforts for each action item, and work cooperatively with watershed partners including, but not limited to, the Schoharie Watershed Advisory Committee (SWAC), NYCDEP, NYSDEC, CWC and watershed municipalities. The Action Plan is one piece of a three-part package that includes: this action plan, an executive summary and a completed projects synopsis. This is a dynamic document that is updated annually in May. Funding sources are presented with the following acronyms: Stream Management Implementation Grant Program (SMIP), Catskill Streams Buffer Initiative (CSBI), Watershed Assistance Program (WAP), Water Resources Development Act (WRDA), Catskill Watershed Corporation (CWC), DEP/GCSWCD Schoharie Watershed Stream Management Program (Contract), Federal Emergency Management Agency (FEMA), and Natural Resource Conservation Service Emergency Watershed Protection (EWP).

I. Education on Watershed Protection:

The GCSWCD works with a wide network of partners to enhance its education and outreach efforts related to stream and floodplain management, sediment and erosion control, and other topics critical to sound watershed management. A priority goal of this action plan is to increase education and outreach activities. Many of the following E/O initiatives were developed by the SWAC E/O Subcommittee. Education and Outreach action items include, but are not limited to:

A. Organize a Schoharie Watershed Month: Community involvement and awareness is important for promoting the protection of streams and their watersheds. Hosting a watershed-wide educational and recreational event (Schoharie Watershed Month) provides an opportunity for watershed residents, students, community groups, tourists, officials, etc. to get to know their stream and the resources available to help provide watershed protection.

GCSWCD Staff:	Yost
Project Partners:	Local schools and colleges, community organizations, Trout Unlimited Chapters, CWC (Youth Summit Committee), CCCD, WAC, GCCCE, DEC, NYCDEP, SWAC Education and Outreach Subcommittee
Project Funding:	NYCDEP/GCSWCD Schoharie SMP Contract, CWC, GCSWCD-WAP, local sponsors, chambers of commerce
Project Schedule:	Organize annually from January through May; event held annually in May.
SMP Recommendation:	Schoharie/East Kill – Education and Outreach 6.4.8; Manor Kill- Education and Outreach 5.4.8
Date Added to Action Plan:	2009
Progress:	Schoharie Watershed Month continues to engage watershed communities and organizations in learning about the watershed, its resources and taking part in hands-on activities. Various activities, workshops and family events are organized each May by host communities and organizations that promote awareness and protection of streams and their watersheds. In 2013, six events were organized including *Earth, Wind & Fire* Student Watershed Art Exhibit, Septic Workshop for Homeowners, Stream Clean up and Riparian Buffer Planting on Batavia Kill, Green

Infrastructure at Work and Home, and the Grand Opening of the Windham Path, a SMIP-supported project. Attendance varies based on the event/activity with average participation across the month numbering in the hundreds. The 2013 events culminated with the Opening of the Windham Path on May 27, 2013. Approximately 200 people attended the opening and participated in many activities occurring throughout the day including, a plant and tree identification walk, a Pat Meehan Scholarship Walk, a treasure hunt, and inaugural walks on the 1.5 mile Path with access to the Batavia Kill.

B. Schoharie Watershed Summit: The annual conference, which began in 2007, is organized for local municipal officials, county and non-profit agencies, highway departments, regulatory and engineering firms active in the Schoharie basin, and offers training in relevant water resources management, regulations, land use, and stormwater management. Credits for planning board members are provided.

GCSWCD Staff: Yost
Project Partners: NYCDEP, GCSWCD, SWAC
Project Funding: NYCDEP SMP Contract, GCSWCD
Project Schedule: Organize from September through January; event held annually in January.
SMP Recommendation: Schoharie -- Education and Outreach 6.4
Date Added to Action Plan: 2009
Progress: The annual Watershed Summit held in January continues to pprovide timely and important information to local officials, landowners, non-profit organizations, and consulting and engineering firms on watershed topics, initiatives and resources. The 2014 Summit, *Consequences of Inaction in a Changing Climate*, focused on meteorological factors that result in extreme rainfall for the Schoharie Watershed, state funding programs to help communities recover from floods, and how a local flood analysis can help communities minimize flood damage and leverage state and federal funds. Afternoon workshops provided planning credits for local officials in understanding benefit and cost analysis in project funding decisions, NFIP Reform Act and changes in flood insurance rates, Revised SEQRA forms, and installing a rain garden as a means to reduce onsite stormwater runoff. Due to inclement weather, attendance was lower than usual with approximately 105 participants.

D. Schoharie Watershed Tour: The annual Watershed tours are organized to provide public officials, watershed managers and landowners an opportunity to view project sites to see the range and diversity of potential watershed projects. The Watershed tours offer training in relevant water resource issues and management. For more information: http://www.gcswcd.com/swp/eo/sw-tour.

GCSWCD Staff: Yost
Project Partners: NYCDEP, GCSWCD, SWAC
Project Funding: NYCDEP SMP Contract, GCSWCD
Project Schedule: Organize from February through June; event held annually in June.
SMP Recommendation: Schoharie -- Education and Outreach 6.4
Date Added to Action Plan: 2009
Progress: The Schoharie Watershed Tour has been a successful educational opportunity when previously held. Due to staffing limitations, the event has not been held annually. We will continue to provide this event when an Education and Outreach Coordinator is on staff to plan the event.

E. Riparian Buffer Workshop: Conduct workshop for streamside landowners that highlights the importance of riparian buffers and demonstrates management practices to maintain healthy stream buffers.

GCSWCD Staff: Weyeneth
Project Partners: CSBI
Project Funding: CSBI, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: 2015

SMP Recommendation: Schoharie -- Education and Outreach 6.4.8
Date Added to Action Plan: 2011
Progress: GCSWCD has not conducted a workshop for streamside landowners since Hurricane Irene. Instead, staff efforts have been focused on installing projects to increase riparian buffers in the watershed. An Education & Outreach Coordinator will be extremely valuable in planning for this event in the future.

F. Schoharie Watershed Stream Crossing Workshop: Develop, design and implement a culvert workshop for local highway departments that highlights the importance of proper design & installation of culverts for sediment transport, fish passage and incorporates principals using natural channel design for long term stability, protection of water quality and health of streams.

GCSWCD Staff: Weyeneth
Project Partners: Local highway departments, Greene County Highway Dept., NYCDEP, NYSDOT
Project Funding: SMIP Round 3
Project Schedule: 2016 organize one day workshop.
SMP Recommendation: Schoharie -- Education and Outreach 6.4
Date Added to Action Plan: 2011
Progress: Awarded SWAC SMIP funding in October 2010. A fall 2011 workshop was being planned, however, flood recovery efforts, following Tropical Storms Irene and Lee, took precedence. We will provide this workshop when an Education and Outreach Coordinator is on staff to plan the event.

G. Complete Kiosk Series: Kiosks will be based upon categories of water resource-related best management practices.

GCSWCD Staff: Flack
Project Partners: Organizations, property owners where kiosks will be located
Project Funding: NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Complete installation in 2014.
SMP Recommendation: Batavia Kill – Education and Outreach-08 (High, 2.27), 09 (Medium, 1.54), 06 (Medium, 1.15), 10 (Medium, 0);
Schoharie/East Kill – Education and Outreach-6.4.2, 6.4.3, 6.4.4, 6.4.5, 6.4.6, 6.4.7, 6.4.8; Flood Prevention-6.1.7
West Kill – Education and Outreach 6.4.3, 6.4.4, 6.4.5
Date Added to Action Plan: 2009
Progress: The kiosk series highlights the various restoration projects throughout the Schoharie Watershed; three kiosks were constructed and installed at three different locations, Sugar Maples, Manor Kill in Conesville, and at the Ashland Connector Stream Restoration Project and public access parking area. Due to continued construction at the Tannersville site, installation of the remaining kiosk and signage has been delayed, and is now scheduled for summer/fall 2014.

II. Landowner Stream Assistance

The GCSWCD and NYCDEP recognize the importance of providing assistance to local landowners, as most of the identified problem areas in the management plans are on private property. The NYCDEP, GCSWCD and SCSWCD have provided the necessary training for project staff to be able to provide state-of-the-art technical assistance throughout the watershed. Technical assistance from staff members will guide the restoration of stream system stability and help to maintain ecological integrity. Technical assistance can range from a landowner consultation to activities that will help to meet the priorities of protecting water quality and establishing riparian buffers. Protection and enhancement of water quality can benefit both the City of New York's water supply and the residents of the Schoharie basin. Landowner Stream Assistance action items include, but are not limited to:

A. Catskill Streams Buffer Initiative: An effective riparian buffer program can assist landowners with their efforts to protect and maintain healthy riparian buffers, address invasive species, and improve the condition of unstable or degraded riparian areas. In 2009, the Catskill Streams Buffer Initiative was developed to educate and assist streamside landowners in order to provide for improved stewardship of riparian areas. The GCSWCD and NYCDEP will work with landowners to protect, enhance, manage and restore riparian buffers within the WOH watershed. GCSWCD staff will conduct site visits to determine eligibility for funding through the CSBI. In addition to site visits, recruitment may also include outreach mechanisms such as press releases, targeted mailings, presentations to organizations, and Riparian Corridor Management Plan development.

Catskill Streams Buffer Initiative Projects:

Site 1. Manor Kill Dahlberg Property Planting: Catskill Streams Buffer Initiative - Obtain landowner agreement, create property management plan and restore approximately 3,750 square feet of streamside vegetation along the Manor Kill.

SCSWCD/GCSWCD Staff: Nichols, Weyeneth
Project Partners: NYCDEP, GCSWCD, SCSWCD, Landowner
Project Funding: NYCDEP CSBI
Project Schedule: Plant in 2014
SMP Recommendation: Manor Kill –Riparian Zone Management 5.7.1, 5.7.2, 5.7.4, 5.7.7
Date Added to Action Plan 2010
Progress: Riparian Corridor Management Plan is complete. Planting will include the installation of a 25' buffer along 150' of the Manor Kill. Project will include vertical bundles along the toe of the bank and minor bank grading along approximately 75' to accommodate additional plantings. Floods delayed the fall 2011 installation. Planting is being planned for 2014.

Site 2. Manor Kill Colangelo Riparian Planting:

SCSWCD/GCSWCD Staff: Nichols, Weyeneth
Project Partners: NYCDEP, GCSWCD, SCSWCD, Community Volunteers
Project Funding: NYCDEP CSBI
Project Schedule: Project started in 2011; additional plantings in 2014
SMP Recommendation: Manor Kill – Riparian Zone Management 5.7.1, 5.7.2, 5.7.4, 5.7.7
Date Added to Action Plan: 2009
Progress: Landowner has signed landowner agreement and applied for Floodplain Easement Program (NRCS). SCSWCD wrote a Riparian Corridor Management Plan for this property. In November 2009, 354 trees were planted and 150 willow stakes and 500 sedge plugs were installed along 546 feet of stream. In 2010, 340 additional trees and 200 stakes were installed. In 2012, potted stock was planted along 900 feet on the left streambank. An additional 319 ft. of willow clump planting at the first meander bend was planned; willow clumps will be installed in 2014.

Site 3. Tompkins Riparian Project: Replant a large section of Batavia Kill adjacent to Tompkins Quarry.

GCSWCD Staff: Weyeneth
Project Partners: GCSWCD, NYCDEP, Landowner
Project Funding: NYCDEP CSBI, GCSWCD, Landowner
Project Schedule: Scheduled to construct in 2014
SMP Recommendation: Batavia Kill – Riparian Buffer-03 (Very High, 3.46), 07 (Very High, 3.08), 11 (High, 2.69)
Date Added to Action Plan 2009
Progress: Project on hold due to a change in ownership from Tompkins Quarry to the Town of Ashland. A planting plan has been developed and GCSWCD plans to proceed with the Town of Ashland in 2014.

Site 4. Benjamin Property Planting: Catskill Streams Buffer Initiative - Restore approximately 300 linear feet of streamside vegetation along the East Kill.

GCSWCD Staff: Weyeneth
Project Partners: GCSWCD, NYCDEP, Landowner
Project Funding: NYCDEP CSBI, GCSWCD
Project Schedule: Constructed in 2012, Planting 2014
SMP Recommendation: East Kill Stream Management Plan 6.7.1, 6.7.4, 6.7.8 Riparian Zone Management
Date Added to Action Plan 2012
Progress: GCSWCD has a 5 year landowner agreement for this property. Stream channel was restored by county highway department. GCSWCD installed willow stakes along 300 ft. of streambank to reestablish vegetation that washed out in Irene flooding. Additional trees and shrubs will be planted on the site. Project site will be evaluated to determine vegetation needs in 2014.

Site 5. Windham Country Club Riparian Planting: Catskill Streams Buffer Initiative - Restore approximately 1,000 linear feet of streamside vegetation along the Batavia Kill in Windham.

GCSWCD Staff: Weyeneth
Project Partners: GCSWCD, NYCDEP, Landowner
Project Funding: NYCDEP CSBI, GCSWCD, Landowner
Project Schedule: Determination of Status in 2013
SMP Recommendation: Batavia Kill – Riparian Buffer-03 (Very High, 3.46), 07 (Very High, 3.08), 11 (High, 2.69)
Date Added to Action Plan 2013
Progress: GCSWCD will write a Riparian Corridor Management Plan for this property, develop the project design, and obtain a 5 year landowner agreement for this property. Installation of approximately 500 trees and shrubs was planned, however, the property was sold and riparian restoration plans were put on hold. The new landowner, Windham Mountain, has not responded with any interest in proceeding with installing native trees or shrubs along the streamside areas.

Site 6. Police Anchor Camp Riparian Project: Catskill Streams Buffer Initiative – riparian plantings totaling approximately 2,400 feet in length, with buffer widths varying from 45 feet to 100 feet, covering an area of 4.49 acres, at multiple locations along tributaries of the Batavia Kill in Windham. This planting project will enhance the riparian zone in six locations along the Windham Path.

GCSWCD Staff: Weyeneth
Project Partners: GCSWCD, NYCDEP, Town of Windham

Project Funding: NYCDEP CSBI, GCSWCD
Project Schedule: Plant in 2013 and 2014
SMP Recommendation: Batavia Kill – Riparian Buffer-03 (Very High, 3.46), 07 (Very High, 3.08), 11 (High, 2.69)
Date Added to Action Plan 2013
Progress: GCSWCD has completed a Riparian Corridor Management Plan for this property and has obtained a landowner agreement for this property. GCSWCD hosted a volunteer planting in the spring of 2013 and installed 1,028 native trees and shrubs along 1,375 feet of stream. 2.41 acres were restored at three planting locations. Phase 1 is complete. Phase two will include the remaining three locations at the Windham Path, removal of a berm and will be planted in 2014.

Site 7. Prattsville Ball Field: Catskill Streams Buffer Initiative - Restore approximately 300 linear feet of streamside vegetation along the Batavia Kill just upstream of the confluence with the Schoharie Creek in Prattsville at the Everett Conine Memorial Field. Plant an additional 550 linear feet of streamside vegetation along the Schoharie Creek at the same property.

GCSWCD Staff: Weyeneth
Project Partners: GCSWCD, NYCDEP, Town of Prattsville
Project Funding: NYCDEP CSBI, GCSWCD
Project Schedule: Construct in 2014
SMP Recommendation: Schoharie/East Kill – RZM-6.7.1, RZM-6.7.2, RZM-6.7.3, RZM-6.7.4, RZM-6.7.6, RZM-6.7.7, RZM 6.7.8, RZM-6.7.9, RZM-6.7.10, RZM-6.7.11, RZM-6.7.12, RZM-6.7.13, GSMA-6.8.2
Date Added to Action Plan 2014
Progress: GCSWCD will write a Riparian Corridor Management Plan for this property and obtain a landowner agreement with the town prior to project installation.

Site 8. Former Kastanis Property Planting Phase 2: Catskill Streams Buffer Initiative – Reestablish a forested riparian buffer 100 feet wide along 1,200 feet of the Batavia Kill was planted in 2009 as a Streamside Assistance Program Pilot Project to restore approximately 7.1 acres of streamside vegetation along the Batavia Kill.

GCSWCD Staff: Weyeneth
Project Partners: NYCDEP, GCSWCD, Landowner
Project Funding: NYCDEP, GCSWCD
Project Schedule: Build in 2014
SMP Recommendation: Batavia Kill – RB-03 (Very High, 3.46), RB-07 (Very High, 3.08), RB-11 (High, 2.69)
Date Added to Action Plan: 2014
Progress (2009): GCSWCD has applied for a land use permit with NYCDEP to plant approximately 5.25 acres in 2014.

Site 9. Chase Property Planting: Catskill Streams Buffer Initiative - Restore approximately 200 linear feet of streamside vegetation along a Batavia Kill tributary in Hensonville.

GCSWCD Staff: Weyeneth
Project Partners: GCSWCD, NYCDEP, Landowner
Project Funding: NYCDEP CSBI, GCSWCD
Project Schedule: Construct in 2014
SMP Recommendation: Batavia Kill – Riparian Buffer-03 (Very High, 3.46), 07 (Very High, 3.08), 11 (High, 2.69)
Date Added to Action Plan 2014

Progress: GCSWCD will write a Riparian Corridor Management Plan for this property and obtain a landowner agreement prior to project installation.

Site 10. Grossman Property Planting: Catskill Streams Buffer Initiative - Restore approximately 300 linear feet of streamside vegetation along a Schoharie Creek tributary in Hunter.

GCSWCD Staff:	Weyeneth
Project Partners:	GCSWCD, NYCDEP, Landowner
Project Funding:	NYCDEP CSBI, GCSWCD
Project Schedule:	Assess and Construct in 2014
SMP Recommendation:	Batavia Kill – Riparian Buffer-03 (Very High, 3.46), 07 (Very High, 3.08), 11 (High, 2.69)
Date Added to Action Plan	2014
Progress:	GCSWCD will plant 180 native trees and shrubs in 2014.

B. Stream Restoration Projects and Modifications: The GCSWCD and NYCDEP will complete the following stream restoration projects. The GCSWCD and NYCDEP will also work cooperatively with the Schoharie Watershed Advisory Committee (SWAC) and others to identify additional sites. Projects are contingent on available funding, proper design, landowner cooperation and appropriate environmental and weather conditions. Implementation of these projects includes assessment, design, permitting, contracting, and construction oversight.

Stream Restoration Projects:

Site 1. Kozak Streambank Stabilization and Riparian Planting: Located along the Schoharie Creek, this project involves addressing 500 linear feet of erosion with clay exposures by grading the bank and stabilizing the toe with rock. The proposal also includes creating a 50 foot wide riparian buffer by planting native tree and shrub species.

GCSWCD Staff:	DuBois, Weyeneth
Project Partners:	GCSWCD, NYCDEP, Landowner
Project Funding:	SMIP Round 4, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	Survey and Design 2015
SMP Recommendation:	Batavia Kill -- Stream Corridor 02; Schoharie – Flood Protection 6.1.11, 6.1.12; Water Quality 6.3.11
Date Added to Action Plan	2011
Progress:	Awarded SWAC SMIP funds March 2011. Site was surveyed in summer 2011. Due to Hurricane Irene (August 2011), the site will require additional assessment; survey of the project site is planned for fall, 2015.

Site 2. Brandywine Project Repairs: The GCSWCD/NYCDEP will rebuild the previously constructed Brandywine stream restoration project.

GCSWCD Staff:	Buchanan
Project Partners:	NYCDEP, ACOE, FEMA
Project Funding:	FEMA, WRDA, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	Survey 2012, Design 2013, Construct 2014
SMP Recommendation:	Schoharie -- Riparian Zone Management 6.7.4; General Stream Management 6.8.7
Date Added to Action Plan:	2012
Progress:	A site survey has been conducted to document changes in the topography resulting from flooding associated with Tropical Storm Irene. Planning, design and permitting are in progress and will be completed in the spring of 2014. Upon approval by regulatory agencies and landowners project construction is planned for summer of 2014.

Site 3. Shoemaker Project Repairs: Damages sustained on the Shoemaker project on the West Kill are scheduled for repair work in 2014. Topographic data has been collected to support cost, material and labor estimates for implementation of the repair work.

GCSWCD Staff: DuBois
Project Partners: GCSWCD, NYCDEP, Landowners, FEMA
Project Funding: FEMA, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Survey 2012, Design 2013, Construct 2014
SMP Recommendation: West Kill Stream Management Plan 6.8.7 Stream Stability Restoration
Date Added to Action Plan: 2012
Progress: Topographic survey is complete. Estimates and final design began in 2013. Project permitting and design finalization are underway, and construction is expected to begin in the summer of 2014.

Site 4. Ashland Connector Reach Project Repairs: Damages sustained on the Ashland Connector Reach project on the Batavia Kill are scheduled for repair work in the summer of 2014.

GCSWCD Staff: Buchanan
Project Partners: GCSWCD, NYCDEP, Landowners, FEMA
Project Funding: FEMA, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Survey 2012, Design 2012, Construct 2014
SMP Recommendation: Batavia Kill Stream Management Plan NO. SC -02, SC- 07
Date Added to Action Plan: 2012
Progress: A site survey has been conducted to document changes in the topography resulting from flooding associated with Tropical Storm Irene. Planning, estimates, design and permitting are in progress and will be completed in the spring of 2014. Upon approval by regulatory agencies and landowners project construction is planned for summer of 2014.

Site 5. Big Hollow Project Repairs: Damages sustained on the Big Hollow project on the Batavia Kill are scheduled for repair work in 2014.

GCSWCD Staff: Buchanan
Project Partners: GCSWCD, NYCDEP, Landowners, FEMA
Project Funding: FEMA, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Survey 2012, Design 2013, Construct 2014
SMP Recommendation: Batavia Kill Stream Management Plan NO. SC -02, SC- 07
Date Added to Action Plan: 2012
Progress: Design and permitting were complete in 2013 and construction is planned for summer of 2014.

Site 6. Long Road Project Repairs: Damages sustained on the Long Road project on the West Kill are scheduled for repair work in 2014. Topographic data has been collected to support cost, material and labor estimates for implementation of the repair work.

GCSWCD Staff: DuBois
Project Partners: GCSWCD, NYCDEP, Landowners, FEMA
Project Funding: FEMA, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Survey 2012, Design 2013, Construct 2014
SMP Recommendation: West Kill Stream Management Plan 6.8.7 Stream Stability Restoration

Date Added to Action Plan: 2012
Progress: Topographic survey is complete. Estimates and final design will be completed in 2014. Upon approval by regulatory agencies and landowners project construction is planned for summer of 2014.

Site 7. Lanesville Project Repairs: Damages sustained on the Lanesville project on the Stony Clove Creek are scheduled for repair work in 2014.

GCSWCD Staff: Buchanan
Project Partners: GCSWCD, NYCDEP, Landowners, FEMA
Project Funding: FEMA, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Survey 2012, Design 2013, Construct 2014
SMP Recommendation: Stony Clove Stream Management Plan 6.8.7 Stream Stability Restoration
Date Added to Action Plan: 2012
Progress: Design and permitting are in progress with construction planned for the summer of 2014.

Site 8. Ashland Well Heads Protection Project: Damages sustained to the Town of Ashland drinking water wells along the Batavia Kill were repaired in 2013 as part of the NRCS's EWP program.

GCSWCD Staff: DuBois
Project Partners: GCSWCD, NYCDEP, Town of Ashland, NRCS
Project Funding: NRCS EWP, NYSDEC, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Survey 2012, Design 2012, Construct 2013, Plant 2014
SMP Recommendation: Batavia Kill Stream Management Plan NO. WQ – 05 Water Quality Protection
Date Added to Action Plan: 2012
Progress: The GCSWCD and partners (NYCDEP, Town of Ashland, NRCS) completed construction of this stream restoration project in 2013. Damages sustained during flooding from Tropical Storm Irene left the project reach and the municipal drinking water wells located on the floodplain in the reach vulnerable to additional damages from future flood events. Instability was likely due to a combination of several factors including past management practices, poor riparian conditions and valley morphology. The restoration strategy recommended for this stream reach consisted of a geomorphically based full channel restoration. Project construction began in September 2013. The project included stream bank and channel excavation to achieve stable geometry, installation of in-stream stabilization structures such as rock vanes, cross vanes and rock rip rap. A variety of vegetative treatments were installed on the project site following construction including, live willow fascines, live willow stakes and seeding and mulching. Project construction was completed in 2013. As-built survey has been completed for the project and have been approved by NRCS. Installation of a mix of tree and shrub species that are adapted to stream-side conditions are expected to be planted along the project in 2014.

III. Creative Stormwater Practices and Critical Area Seeding

In order to reduce runoff and protect groundwater resources in the basin, the GCSWCD and NYCDEP support promoting the infiltration of stormwater through erosion and sediment control techniques such as hydroseeding of open ditches, stormwater techniques to infiltrate water into the ground, wetland enhancement, filter strips, and creation of rain gardens and bioswales to manage stormwater. The GCSWCD will work with multiple partners to implement stormwater projects within the Schoharie Watershed. Creative Stormwater Practices and Critical Area Seeding action items include, but are not limited to:

A. Windham Mountain: (Town of Windham) The GCSWCD has been working with Windham Mountain ski center to evaluate stormwater impacts at the ski slope and adjacent high density development areas. A detailed assessment of impacts has been completed and a strategy for long term implementation of a series of

stormwater retrofit activities has been developed. The GCSWCD is working with Windham Mountain and others to design and implement stormwater management practices that will be installed.

GCSWCD Staff:	Buchanan
Project Partners:	NYCDEP, Windham Mountain, CWC, ACOE, NYSDEC
Project Funding:	CWC, ACOE-WRDA, NYCDEP
	Project Schedule: First set, of storm water management practices, was installed in 2010: Phase 2 will be constructed when funding becomes available.
SMP Recommendation:	Batavia Kill -- Water Quality-08 (Very High, 4.23)
	Schoharie – Water Quality 6.3.7
Date Added to Action Plan:	2007
Progress:	A design for the stormwater retrofit of the site has been completed. Funding, which is in place from the CWC and ACOE (through WRDA), were used to implement this stormwater retrofit in two phases. In phase one, the pond was converted to a storm water facility and expanded, and material was used to terrace the existing parking area, stormwater conveyance improvements were installed in order to route 27 acres of drainage area into the pond. In phase two, the maintenance facility will be equipped with gutters and an underground sand filter will be installed to treat runoff from this hotspot area. Phase one was completed in 2010 and 2011. Design and permitting for phase two are complete; the project will be constructed as funding is attained.

B. Hunter Foundation: (Village of Tannersville) The GCSWCD is working with the Hunter Foundation on a stormwater retrofit project that will be completed in conjunction with the Foundation's rehabilitation of a block of buildings in the Village of Tannersville. The Project will use innovative methods to meet water quality treatment standards for runoff from roofs and parking. The site presents space challenges and has served as a demonstration project for integrating stormwater management in an area with limited space. In addition, the project will include the design and construction of a "Creek walk" along a small tributary stream that will link with main street commercial businesses.

GCSWCD Staff:	Buchanan
Project Partners:	NYCDEP, Hunter Foundation, CWC, ACOE,
Project Funding:	CWC, ACOE-WRDA, NYCDEP
Project Schedule:	Completion of project construction, 2014.
SMP Recommendation:	Batavia Kill WQ-08 (Very High, 4.23); Schoharie – WQ-6.3.7, PR-6.2.3
Date Added to Action Plan:	2007
Progress:	The porous gravel parking area and bioswale were installed in 2009. Rain gardens and the creek walk will be installed in 2014.

IV. Highway and Infrastructure Improvements

During development of SMPs for the various sub-basins, the GCSWCD, NYCDEP, and the SWAC Highway and Infrastructure Subcommittee identified a number of recommended actions that would provide water quality protection. Maintaining high water quality in the Schoharie Creek and its associated tributaries will provide multiple benefits including, improved recreational use, supplying quality drinking water, and enhancing the ecological health of the stream systems. Water quality protection activities may be site-specific, community-wide, or basin-wide. Highway and Infrastructure Improvements action items include, but are not limited to:

A. Glen Avenue Culvert Upgrade: The existing culvert under Glen Avenue located near the entrance of Camp Loyaltown is undersized, contributing to damage of the roadway, erosion, and roadway flooding during high flows. Culverts upstream of this one are drastically larger further indicating this culvert is undersized.

The GCSWCD will work with the Village of Hunter Highway Department to design a properly sized culvert with a buried bottom for improved habitat, and oversee the installation of this culvert.

GCSWCD Staff: Buchanan
Project Partners: Village of Hunter Highway Department, NYCDEP, SWAC Highway/Infrastructure Subcommittee
Project Funding: SMIP Round 4
Project Schedule: Survey in 2011, design 2013, installation in early 2014
SMP Recommendation: Schoharie – Flood Protection 6.1.11
Date added to Action Plan: 2011
Progress: A SMIP grant was approved to offset costs of upgrading this culvert size and creating a buried culvert bottom. Culvert and roadway were damaged in Hurricane Irene, The Village of Hunter is working with FEMA to leverage SMIP funds to put toward larger replacement structure. Topographic surveys are complete. The design will be finalized in the spring of 2014 and construction is planned for the spring of 2014 or as funding is attained.

B. County Route 6 Slope Failure: Project involves stabilization of the slope failure along CR 6 and the West Kill in Lexington. Lacustrine clay deposits are exposed at the toe of the streambank along the entire 260 feet length of the failure. Stress cracks are evident in the pavement of CR 6, and this failure poses an imminent threat to the stability of the sole egress from the upper valley. Project design and construction will be coordinated through the Greene County Highway Department. GCSWCD will review the design.

GCSWCD Staff: Flack
Project Partners: Greene County Highway Department, GCSWCD, NYCDEP, NRCS
Project Funding: SMIP, Round 4, NRCS EWP
Project Schedule: Assessment and design in 2011; Construction 2013 and 2014
SMP Recommendation: Schoharie -- Flood Protection 6.1.11, Water Quality 6.3.11
Date added to Action Plan: 2011
Progress: This EWP project was constructed in 2013. Practices installed include the use of rock riffles and sheet piling to elevate the stream profile adjacent to the slope failure, to help buttress the failing slope and to provide grade control. The installation of rock revetment to protect the toe of the slope from erosion and stormwater drainage in the area of the slope failure to help maintain moisture levels in the soil profile. Additional practices included the establishment of flood plain bench and use of random boulder clusters. The in-stream portions of the project were completed in 2013. Much of the road stabilization work was also completed in 2013. The contractor is expected to return to the site in 2014 to complete roadside drainage work and to complete the road surfacing.

C. Cranberry Road Culvert Upgrade: The existing culvert under Cranberry Road is undersized, contributing to flooding of the roadway during high flows. The culvert is also substantially perched, which presents a barrier for fish passage. The GCSWCD will work with the Town of Hunter Highway Department to design a properly sized culvert and oversee the installation of this culvert.

GCSWCD Staff: Buchanan
Project Partners: Town of Hunter Highway Department, NYCDEP, SWAC Highway/Infrastructure Subcommittee
Project Funding: SMIP Round 3, Town of Hunter Highway Department
Project Schedule: Design in early 2012, installation in summer 2014
SMP Recommendation: Schoharie – Flood Protection 6.1.11
Date added to Action Plan: 2011
Progress: A grant was approved by the SWAC SMIP to offset costs of upgrading this culvert, and correcting its perched condition. Survey, design and permitting have commenced, with construction planned for the summer of 2014. It is anticipated that upstream and/or downstream grading will be required to meet slope requirements within the culvert and prevent the culvert from being perched.

D. Schoharie Watershed Stream Crossing/Culvert Design: A second component to the E/O workshop above (Schoharie Watershed Stream Crossing Workshop) is setting aside $50,000 for engineered design services on retainer to work with towns to ensure prioritized culverts are designed properly.

GCSWCD Staff:	Flack, Education & Outreach Coordinator
Project Partners:	Highway superintendents subcommittee, SWAC, NYCDEP
Project Funding:	SMIP Round 3, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	RFP in Fall 2011: funded design for the following culverts to be constructed: Griffin rd.(Jewett, 2012), Partridge Ridge (Ashland, 2011), Cranberry rd (Hunter, 2014) and Glen Ave (Village of Hunter, 2014).
SMP Recommendation:	Schoharie – Water Quality 6.3
Date added to Action Plan:	2011
Progress:	Currently the cranberry road and glen avenue culverts in the town and village of Hunter are being designed using these monies. Both culverts are being upgraded to allow for proper conveyance and passage of aquatic organisms, they are both scheduled for construction in 2014.

E. Mitchell Hollow Rd (CR 21) Stormwater Sewer Upgrade: Install water quality treatment components associated with 370' of stormwater sewer with catch basins along Mitchell Hollow Rd. to mitigate stormwater flooding in area along NYS Route 23.

GCSWCD Staff:	Flack
Project Partners:	County Highway Department, Town of Windham, SWAC, NYCDEP
Project Funding:	SMIP Round 3, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	Design in 2013, Construction 2014
SMP Recommendation:	Schoharie – Water Quality 6.3
Date added to Action Plan:	2010
Progress:	This project is currently under design by Delaware Engineering and is slated for construction in 2014.

F. Street Sweeper with Vacuum: After the winter season, highway crews sweep road abrasives (sand) using different machines. Some communities have their own outdated sweepers (Villages of Hunter and Tannersville), others brush the material aside with a broom. Greene County owns a sweeper with a vacuum that is effective at collecting leftover sand material and cleaning out stormwater structures. Given its limited availability during certain times of the year, purchasing another one for the mountaintop communities was recommended by the highway subcommittee which would allow more road miles to be cleaned and maintained across the Mountaintop, therefore reducing the amount of abrasives washing into ditches and waterways.

GCSWCD Staff:	Flack, Yost
Project Partners:	Highway departments, Cornell Local Roads Program, SWAC Highway/Infrastructure Subcommittee
Project Funding:	CWC, SMIP Round 1
Project Schedule:	1. Research the cost of purchasing a street sweeper with a vacuum. 2. Investigate the feasibility of providing, storing and coordinating shared access to the street sweeper.
SMP Recommendation:	Schoharie – Water Quality 6.3.5
Date added to Action Plan:	2009
Progress:	Application submitted to CWC stormwater retrofit program in August 2010 for majority of the cost, with SWAC SMIP funds covering the required match ($40,000). Greene County Highway will oversee and operate the unit, and store it at either the Ashland or Hunter facility (allowing the other unit to be shared with fewer municipalities). CWC is waiting on contract renewal for their Stormwater Program before allocating funds.

V. Planning and Assessment

During development of SMPs for the various sub-basins, the GCSWCD and NYCDEP identified a number of recommended actions that would require additional planning and assessment at various scales. Planning may be site-specific, community-wide, basin-wide or on the county level. Assessments may range from remote assessment of streams and their watersheds to site-specific streambank assessments, and will include survey and monitoring of various locations and project sites. Planning and Assessment action items include, but are not limited to:

A. Town of Hunter Land Use Regulation Review & Development Guidelines: Conduct detailed review of current land use regulations with intent of adopting revisions, new regulations &/or guidelines promoting low impact design, climate smart and smart growth principles. In the absence of zoning, the town is seeking to investigate, and adopt as appropriate, innovative land use practices which will be an incentive to achieve desirable future growth. The town is participating in proactive planning efforts (Climate Smart Action Plan, Hunter Regional Corridor Study, expansion of designated hamlets, Scenic Byways, Stream Management Plans), and this project would integrate the planning principles amongst the individual plans (low impact development, climate smart, & smart growth) and position the town to adopt changes to current regulations, propose new local rules and regulations as relevant and create detailed guidance resources for planning board and developers.

GCSWCD Staff:	Yost, Martin
Project Partners:	Greene County IDA, Town of Hunter
Project Funding:	SMIP Round 2
Project Schedule:	Approved for SMIP funding in March, 2010; Combined with MBSDW efforts 2012; Develop guidelines 2014-2015
SMP Recommendation:	Schoharie – Programmatic Approach 6.5.3
Date Added to Action Plan:	2010
Progress:	Awarded $35,000 SWAC SMIP funding in March 2010, contract and scope of work completed with the Town of Hunter. Project has not begun due to constraints of the original consultant (Greene IDA). Town of Hunter is now working with Delaware Engineering to begin the project. The contract has been extended. The scope is under review by Town and consultant to determine whether any changes in deliverables will be necessary.

B. Tributary Stream Inventory and Assessment: While existing SMPs cover the main stem of most major stream systems within the Schoharie Watershed, they do not address any tributaries to these systems. Therefore, less than 10% of total stream miles have been inventoried, assessed and planned. Inventory and assessment of tributaries is an on-going priority, although assessment of the tributaries and the subsequent planning efforts may not be at the same level as those efforts conducted along the main stems. In 2009-2010, the GCSWCD/NYCDEP worked to develop a condensed SMP planning process to include assessment of baseline conditions and an abbreviated SMP. This methodology should be applied to prioritized tributaries.

GCSWCD Staff:	Martin
Project Partners;	NYCDEP,
Project Funding:	NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	1. Developed protocol for inventory & assessment, spring 2009 2. 2009 – North Settlement, Furnace Creek, Mitchell Hollow Brook (Mad Brook) 3. 2014 – abbreviated SMPs (North Settlement, Furnace Creek, Mitchell Hollow (Mad) Brook 3. 2015 – Two small tributaries TBD
SMP Recommendation:	Schoharie – Water Quality 6.3.8, 6.3.11; West Kill – Water Quality 6.3.8
Date Added to Action Plan:	2007
Progress:	The GCSWCD and NYCDEP have identified three tributaries that were assessed during the 2009 field season; these include North Settlement Creek, Furnace Creek (along Dent Road) and Mad Brook (Mitchell Hollow Brook). Historical alignments, riparian vegetation mapping, watershed analysis and Geodatabases were completed in 2010. Abbreviated Stream Management Plans are expected to be completed in 2014.

C. Fisheries Assessment & Improvements Strategy: During development of SMPs for the various sub-basins, the GCSWCD and NYCDEP identified the need for further evaluation of fisheries and the importance of developing a comprehensive strategy to improve fish habitat. Improvements to fisheries would also provide economic and water quality benefits. In order to effectively evaluate basin fisheries, the GCSWCD and NYCDEP recognize the need for additional funding, increased coordination with potential project partners, and an understanding of the appropriate field methodologies.

GCSWCD Staff:	Martin
Project Partners:	NYCDEP, NYSDEC, Greene County Promotions, municipalities, Trout Unlimited, others
Project Funding:	TBD, NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	1. Research potential funding sources, 2014. 2. Identify appropriate field methodologies, 2014. 3. Coordinate fisheries assessment, 2014.
SMP Recommendation:	Batavia Kill – Public Enjoyment-04 (Medium, 0.38), Fisheries Habitat-03 (High, 2.31); Schoharie – Public Recreation 6.2.1, 6.2.2, 6.2.; Fisheries Habitat-6.6.1, 6.6.2, 6.6.3, 6.6.4, 6.6.5; General Stream Management Activities-6.8.8; West Kill – Fishery Habitat 6.6, 6.6.1, 6.6.2
Date Added to Action Plan:	2007
Progress:	Working through the SWAC Habitat and Recreation Subcommittee the GCSWCD will prioritize recommendations for fisheries improvements in 2014.

D. Project Monitoring: The GCSWCD will continue to monitor previously constructed stream restoration sites to document the projects status and performance. Monitoring will include measurements and analysis of geomorphic form, rock structures, and vegetation. Monitoring will be performed in accordance with ACOE permit requirements as well as GCSWCD/NYCDEP annual assessments of the need for additional monitoring. Data will be collected to monitor project stability and vegetation establishment.

1. **Monitoring of Restored Stream Reaches (2014):** Annual monitoring of restored stream reaches provides valuable information on the effectiveness of restoration practices in addition to fulfilling the permit requirements associated with these projects. Monitoring includes a visual inspection of the reach, photo documentation, pebble counts, and a survey of monumented cross sections and the longitudinal profile.

GCSWCD Staff:	Langworthy
Project Partners:	NYCDEP, GCSWCD
Project Funding:	NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	Monitor annually
SMP Recommendation:	Schoharie – Water Quality 6.3.11, Riparian Zone Management 6.7.2; West Kill – Management Unit Recommendations 4.10, 4.11
Date Added to Action Plan:	2009
Progress:	The East Kill Restoration at Vista Ridge project site was monitored in 2013. In spring 2013, groundwater monitoring wells will be installed at Conine, Ashland and Sugar Maples to meet wetland restoration requirements. Priority monitoring for 2014 includes five (5) sites on the Batavia Kill, two (2) sites on the West Kill, and two (2) sites on the East Kill. The Batavia Kill monitoring sites include Ashland Well Head, Maier Farm (2013 Repair), Conine (2013 Repair), Sugar Maples, and Holdens. The West Kill monitoring sites will include the County Route 6 and County Route 42 projects. East Kill monitoring sites will include the Vista Ridge and Apple Hill projects.

2. **Vegetation Monitoring of Restored Stream Reaches (2014):** Many riparian plantings have been completed within the West of Hudson New York City Watershed in conjunction with the installation of natural channel designed (NCD) stream restoration projects. Vegetation provides for increased stability as trees and shrubs continue to mature, and is a critical component to the long-term success of these types of projects. Annual monitoring of restored stream reaches provides valuable information on the effectiveness of restoration practices in addition to fulfilling the permit requirements associated with

these projects. Vegetative monitoring includes, photo-documentation, vegetative health observations and data is collected to determine vegetative cover, vigor, growth rates and survival of planted vegetation.

GCSWCD Staff: Weyeneth
Project Partners: NYCDEP, GCSWCD
Project Funding: NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Monitor annually
SMP Recommendation: Schoharie – Water Quality 6.3.11, Riparian Zone Management 6.7.2; West Kill – Management Unit Recommendations 4.10, 4.11
Date Added to Action Plan: 2014
Progress: In 2013, two project sites (Vista Ridge, Sugar Maples) were monitored. Priority monitoring for 2014 includes 11 project sites including Ashland, Maier, Conine, Sugar Maples, Holden, Windham Mountain, Long Road, CR 6, Vista Ridge, Apple Hill, Prattsville Riparian Planting.

3. **Vegetation Monitoring of Catskill Stream Buffer Initiative Projects (2014):** The Catskill Streams Buffer Initiative (CSBI) helps residential landowners protect their property and preserve natural habitat along stream banks in the West of Hudson New York City watershed by cultivating strong streamside buffers that use vegetation native to the Catskill region. Annual monitoring of CSBI projects provides valuable information on the effectiveness of riparian plantings. Vegetative monitoring includes, photo-documentation, vegetative health observations and data is collected to determine vegetative cover, vigor, growth rates and survival of planted vegetation.

GCSWCD Staff: Weyeneth
Project Partners: NYCDEP, GCSWCD
Project Funding: NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule: Monitor annually
SMP Recommendation: Schoharie – Water Quality 6.3.11, Riparian Zone Management 6.7.2; West Kill – Management Unit Recommendations 4.10, 4.11
Date Added to Action Plan: 2014
Progress: In 2013, 8 project sites were monitored including Kastanis, Hensonville, Slutzky, Cervini, Torciello/Hegner, Valenti, Cole, Mayo. Priority monitoring for 2014 includes 12 project sites including Hensonville, Mayo, Cervini, Torsiello/Hegner, Slutzky, Valenti, Cole, Windham Path, Enochty, Higgins, Wilkie, Donnelly.

VI. Recreation and Stream Habitat Improvements

In the general recommendations of all SMPs. enhanced public access to streams for recreational purposes was identified as a priority. The GCSWCD already has a number of these projects underway, and between 2011 and 2013 will continue to move forward with these projects. Assessing, protecting and improving fish habitat have also been recommended in the SMPs, and many of the following action items were developed by the SWAC Recreation and Habitat Improvement subcommittee. Recreation and Stream Habitat Improvements action items include, but are not limited to:

A. Schoharie Creek Park (Town of Lexington): The GCSWCD has been assisting the Town of Lexington with the development of a small "pocket park" to be located on the Schoharie Creek. Components of the project will include the permanent removal of a derelict house right on the streambank, cleaning up weedy growth, enhancement of riparian vegetation and installation of low impact improvements such as demonstrative plantings, informational signage and stream access.

GCSWCD Staff: Weyeneth
Project Partners: NYCDEP, Town of Lexington, Greene County, Trout Unlimited, SWAC others
Project Funding: SMIP Round 3, NYCDEP/GCSWCD Schoharie SMP Contract, Town of Lexington, ACOE-(WRDA)

Project Schedule: Install sign, 2014
SMP Recommendation: Batavia Kill – Riparian Buffer B-09 (High, 1.81), Education and Outreach-11 (Medium, 0.91); Schoharie – Public Recreation-6.2.2, 6.2.3; Riparian Zone Management 6.7.4, 6.7.7
Date Added to Action Plan: 2010
Progress: Building removal and cleanup was completed during the summer of 2007. Residents participated in riparian planting in October 2010. The Town of Lexington submitted a SWAC SMIP grant which was approved in August of 2010 for demonstrative plantings and signage. Due to storm impacts of Irene and Lee and subsequent recovery work, GCSWCD assisted the Town in reestablishing plantings in 2012 and installed split rail fencing to define the park and protect the plantings. Town is interested in creating a sign for the park.

B . Promote Increased Recreational Use of Watershed Streams: All stream management plans recommend enhancing public access of the streams for fishing. Along many of the streams within the Schoharie Watershed, there are public fishing access points. Some streams have limited or no public access. In order to enhance recreational use of the streams, existing access locations have been mapped and additional access points should be identified. Increasing recreational use of fisheries has also been identified as a priority by the SWAC Habitat and Recreation Subcommittee. Providing stocked fish in public still waters (lakes, ponds), in addition to stream stocking efforts, may improve fishing opportunities and provide for enhanced access to fisheries. Supporting and organizing community or basin-wide fishing events, and promoting interest in fishing for wild fish will help increase recreational use of watershed streams.

GCSWCD Staff: Weyeneth, Education & Outreach Coordinator
Project Partners: NYCDEP, Trout Unlimited, NYSDEC
Project Funding: To be determined
Project Schedule: 1. Conduct an inventory of access points and create a GIS map of existing locations, 2010.
2. Identify locations that may provide additional access, 2010.
3. Investigate the feasibility of increasing the locations of stocked fish to include public still waters (such as Rip Van Winkle Lake or Dolan's Lake, and others), 2011.
4. Coordinate, organize or support a basin-wide or localized fishing derbies along watershed streams, 2010.
SMP Recommendation: Batavia Kill – Public Enjoyment 01 (Very High, 3.08); West Kill- Public Recreation 6.2.2; Schoharie/East Kill- Public Recreation- 6.2.2; Manor Kill- Public Recreation-5.2.2
Date Added to Action Plan: 2009
Progress: Current projects noted above (Windham Path, Lexington Creek Park) will improve access to streams. In 2010 NYSDEC published *Public Fishing Rights Maps* that can be obtained on their website and public fishing access has been identified in the Mountaintop Community Resource/Recreation Plan. Streams will continue to be assessed where improving access would benefit both anglers and mountaintop communities (e.g., East Kill and along the Batavia Kill). Through the Habitat & Recreation Subcommittee, SMIP will work with NYSDEC to create a standard procedure that will assesses municipal properties for establishing public fishing rights on properties that are conducive for public access and may be supported with SMIP funds.

VII. Flood Hazard Mitigation

Flooding produces a variety of hazards and impacts to public safety, homes and businesses, infrastructure (roads, utilities, etc.) and the natural environment. It can have direct impacts on water quality, including contamination from dislodged fuel and chemical storage tanks, mobilization of household waste and toxic substances, excessive riverine erosion and massive hill slope failures. As such, flood hazard mitigation – the work of reducing the impacts from flooding - supports the social, economic and environmental interests of communities in the NYC watershed.

A. Local Flood Analysis (LFA): Previously called Local Flood Hazard Mitigation Analysis (LFHMA), now known as Local Flood Analysis (LFA) is undertaken to determine the causes of flooding, investigate and analyze the overall potential of specific projects, and projects in combination, in an attempt to mitigate flood damages and hazards. It is anticipated this analysis will prioritize projects for further SMIP and CWC funding.

GCSWCD Staff: Yost, Flack
Project Partners: Towns, NYCDEP, GCSWCD, CWC others
Project Funding: NYCDEP/GCSWCD Schoharie SMP Contract, CWC
Project Schedule: 1. Complete LFA for interested municipalities
2. Identify feasible alternatives
3. Complete projects
SMP Recommendation: Manor Kill – Section 5.1, Schoharie Creek West Kill and East Kill SMPs – Section 6.1, Batavia Kill SMP – Section 8(a)
Date Added to Action Plan: 2013
Progress: LFA projects are underway in Lexington (started February 2014) and Windham (March 2014). Hazard Mitigation Grant Program applications were submitted in October 2013 to NYS SEMO for conducting LFHMA's in the Village of Hunter and Tannersville. Decisions on these planning applications should be made in the summer of 2014. Prattsville's LFA is completed and the Town is prioritizing projects for implementation and funding programs.

B. Hazard Mitigation Grant Program Flood Buyout Program: The GCSWCD is facilitating a FEMA flood buyout program for nineteen eligible landowners in six towns following Hurricane Irene in Aug. 2011. NYCDEP is participating in the program by covering the 25% non-federal match for watershed properties. The program is expected to take 1.5 – 2 years to complete. For those that go through with a buyout, all structures are removed from the property and a deed restriction and conservation easement are issued maintaining the property in perpetuity as open floodplain space, therefore eliminating future flood damage to the parcel.

GCSWCD Staff: Yost, Flack
Project Partners: NYCDEP, SEMO, FEMA, Greene Co. Economic Devt, Tourism and Planning, Watershed Towns
Project Funding: FEMA/SEMO, NYCDEP
Project Schedule: 2013 – appraisals and preliminary soft costs (title report and insurance, environmental assessment, property survey)
2014 – demolition plan for properties which still have structures. For vacant properties, commence closings.
SMP Recommendation: Manor Kill – Section 5.1, Schoharie Creek West Kill and East Kill SMPs – Section 6.1, Batavia Kill SMP – Section 8(a)
Date Added to Action Plan: 2013
Progress: Sixteen property owners in the Watershed are in the Buyout Program (three dropped out in past year). State Agreements, Memorandums of Understanding with NYCDEP, the County and Towns and purchase contracts with landowners are being processed, as well as demolition and property management plans. Extensions are being requested from FEMA, as all steps will not be completed by the deadlines in the applications.

VIII. On-going Activities

This section includes the on-going action items that began in 2007 and will continue through the duration of stream management plan implementation efforts. This is a dynamic document that will be modified annually to include additional action items or to update existing items. Efforts were made to make each task measurable within the action plan. However, the following items do not have an end, but rather are ongoing throughout the program.

A. Program Administration and Implementation: The GCSWCD will continue to develop and maintain an effective and efficient process for implementation of the stream management plans for Schoharie Creek and its associated tributaries. This process will help to fulfill the NYCDEP FAD and Shandaken Tunnel SPDES permit obligations. Development and implementation of the program is an on-going process.

1. **Program Administration:** GCSWCD will provide overall project administration. Specific activities may include contract administration, book keeping, budgeting, schedule development and reporting.

GCSWCD Staff: Flack, Carl-Seebode, Treacy
Implementation Category: Program Administration and Implementation
Project Partners: NYCDEP, GCSWCD, MSMA, SWAC
Project Funding NYCDEP/GCSWCD Schoharie SMP Contract, Greene County Legislature, Grants, Other funding sources
Project Schedule On-going.
Date Added to Action Plan: 2007
Progress: On-going.

2. **Schoharie Watershed Advisory Committee (SWAC):** The GCSWCD and NYCDEP have worked cooperatively to develop a single, watershed-wide project Advisory team, the Schoharie Watershed Advisory Committee, to help guide SMP implementation. The process by which this committee will guide implementation and allocate funding continues to be developed.

GCSWCD Staff: Martin, Yost
Implementation Category: Program Administration and Implementation
Project Partners: NYCDEP, Towns, Villages, Counties, local, county, state and federal agencies, NGO's, landowners
Project Funding: NYCDEP Contract
Project Schedule: On-going review of applications August 1st and February 1st each year.
SMP Recommendation: Schoharie/East Kill – Programmatic Approach -6.5.8; West Kill – Programmatic Approach 6.5.2
Date Added to Action Plan: 2007
Progress: The Schoharie Watershed Advisory Committee (SWAC) meets between two to three times a year to assist with funding and programmatic decisions associated with the Stream Management Implementation Program. The SWAC was formed in 2008 and represents the collective interests of local government, property owners, watershed agencies, and non-profit organizations, and consists of appointed representatives from each Schoharie Basin municipality, representatives from three subcommittees (Highway Superintendents, Education and Outreach and Recreation and Habitat), a Greene County Legislator and other local, state and federal agencies. The SWAC participates in reviewing applications and has approved 38 projects since the first grant round in 2009.

B. Local Technical Assistance: The GCSWCD and NYCDEP will work cooperatively to develop program resources and policies to provide technical assistance for municipalities, planning boards, highway departments, developers, landowners and other interested parties. Technical assistance may include, but is not limited to, stormwater planning & retrofit, stream management activities and land use planning.

GCSWCD Staff: Flack, Langworthy
Implementation Category: Program Administration and Implementation
Project Partners: NYCDEP, Greene County Legislature, Local municipalities
Project Funding: NYCDEP/GCSWCD Schoharie SMP Contract, Greene County WAP Funding, Others
Project Schedule: On-going.
SMP Recommendation: Batavia Kill – Stream Corridor-01, Water Quality-08; Schoharie/East Kill – Flood Protection-6.1.2, Programmatic Approach-6.5.1, Riparian Zone Management-6.7.4, Stream Management Activities-6.8.2; West Kill – General Stream Management Activities 6.8.2
Date Added to Action Plan: 2007
Progress: The District and DEP have negotiated a new five year contract 2014-19, which should register by the end of 2014. The District continues to administer the county's FEMA buyout program, as well as traditional stream and stormwater programs.

C. Inter-Agency Coordination: Further coordination between the agencies with stream management responsibilities is a key component of SMP implementation. Specifically, GCSWCD will coordinate with NYSDEC to have all stream disturbance permits (Article 15) undergo an appropriate review by local

stream managers; this will help to ensure a high degree of consistency with SMP goals and objectives. To facilitate this process, it is important to provide streamside landowners with resources to help individuals with permit applications and to help develop better alternatives for addressing erosion sites.

1. NYSDEC/ACOE Permit Reviews: The GCSWCD/NYCDEP will continue to work with NYSDEC and the USACE to facilitate review of stream disturbance permits received by the agencies. The permits will be reviewed for their consistency with SMP goals and objectives and to evaluate stream channel morphology issues.

GCSWCD Staff:	DuBois, Buchanan
Implementation Category:	Program Administration and Implementation
Project Partners:	NYSDEC, NYCDEP, ACOE
Project Funding:	NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	On-going
SMP Recommendation:	Batavia Kill – Programmatic Resources-03 (High, 2.5); Schoharie – Programmatic Approach-6.5.1; West Kill – Programmatic Approach 6.5.4, Riparian Zone Management 6.7.1, 6.7.9
Date Added to Action Plan:	2007
Progress:	Permit applications will be reviewed as they come in.

D. Catskill Streams Website – The GCSWCD will continue to provide logistical support in the development and maintenance of the Catskill Streams Website (www.catskillstreams.org) as a valuable tool for sharing information with watershed stakeholders.

GCSWCD Staff:	Martin
Implementation Category:	Education on Watershed Protection
Project Partners:	NYCDEP
Project Funding:	NYCDEP/GCSWCD Schoharie SMP Contract
Project Schedule:	On-going maintenance and updates as appropriate
SMP Recommendation:	Schoharie/East Kill – Education and Outreach 6.4.3; West Kill – Education and Outreach 6.4.2
Date Added to Action Plan:	2007
Progress:	The website, Catskillstreams.org, is a comprehensive information source for streamside landowners in the Catskill Mountains. The website is updated regularly to include current resources and reports, and to provide a list of upcoming events. In 2013, CRSR Designs, Inc. updated the format, presentation style and content of the website. The new site went live in February 2014.

E. Community Outreach: Success of SMP implementation requires community awareness and involvement. In order to keep watershed communities and interested stakeholders informed of SMP implementation progress and activities, the GCSWCD and its partners may use a variety of outreach media including newspaper articles, an "e"-newsletter, program print newsletter, brochures, facts sheets, project announcements, media contacts, press releases and kiosks. In addition, in accordance with the MOU between the GCSWCD and local municipalities, GCSWCD is required to provide the municipalities with a detailed action plan of stream management activities in the beginning of each spring. Furthermore, the GCSWCD will regularly report on the status of the annual action plan, and be available at the request of the municipalities to attend meetings, workshops or similar events when the annual action plan or specific items contained therein, require a more detailed understanding by the municipality or its constituents.

GCSWCD Staff:	Yost
Implementation Category:	Education on Watershed Protection
Project Partners:	NYCDEP
Project Funding:	NYCDEP/GCSWCD Schoharie SMP Contract, CWC, GCSWCD-WAP, others
Project Schedule:	1. On-going production of educational and outreach materials for dissemination of information 2. Conduct 22 community reviews (One review per community per year) by 2012. 3. Re-appoint SWAC representatives in 2012.

SMP Recommendation: Batavia Kill – Education and Outreach 08, 09, 06, 10; Schoharie/East Kill – Education and Outreach 6.4.2, 6.4.3, 6.4.4, 6.4.5, 6.4.6, 6.4.7, 6.4.8; Flood Protection-6.1.7; West Kill – Education and Outreach 6.4.3, 6.4.4, 6.4.5
Date Added to Action Plan: 2007
Progress: Outreach is ongoing through the GCSWCD and its WAP and consists of newspaper articles, newsletters (print and electronic), and dissemination of educational material to property owners, contractors, and municipal officials. Attendance at municipal and planning board meetings allows WAP staff to provide project updates to municipal leaders and to obtain information on specific municipal needs and issues. In addition, municipal board meetings provide the opportunity to update the municipalities on the progress of stream management plan implementation. MOU reviews are conducted annually with participating municipalities involved in the SMIP. Throughout 2014, GCSWCD intends to renew the MOU with municipalities. The MOU has been revised to incorporate flood hazard mitigation supports; these changes are being presented to the municipalities during the renewal process. Project summaries are provided on the status of SMIP funded projects for each community. The Action Plan is also provided through the SWAC and Mountaintop Supervisors & Mayors Association.

F. Critical Area Seeding Program: All of the SMPs and the SWAC Highway and Infrastructure subcommittee recommend that local municipalities, county highway departments and NYSDOT should place priority on vegetation management on critical areas such as roadside ditches and steep slopes.

GCSWCD Staff: Flack, Terrill
Implementation Category: Creative Stormwater Practices and Critical Area Seeding
Project Partners: GCSWCD, NYCDEP, County and Municipal Highway Departments
Project Funding: SMIP Round 4, NYCDEP SMP Contract
Project Schedule: On-going - Provide personnel assistance with operation of the hydroseeder.
SMP Recommendation: Batavia Kill – Water Quality 03; West Kill- Water Quality 6.3.3; Schoharie/East Kill – Water Quality 6.3.3; Manor Kill- Water Quality 5.3.3
Date Added to Action Plan: 2009
Progress: The District continues to partner with all highway departments to provide critical area seeding for roadside ditches and slopes using the district's hydroseeder and power mulcher. In 2013, 9.5 acres were seeded and mulched; the program will be assessed for the 2014 season to determine if adjustments need to be made to meet highway department needs and watershed program goals.

G. Plant Materials Program: GCSWCD will continue to produce quality native plant materials for its stream restoration projects and riparian buffer plantings.

GCSWCD Staff: Weyeneth, Terrill
Implementation Category: Landowner Stream Assistance, CSBI
Project Partners: NYCDEP, GCSWCD, Community Volunteers
Project Funding: CSBI, NYCDEP/GCSWCD Schoharie SMP Contract, GCSWCD
Project Schedule: 1. Receive approximately 20,000 Greenbelt plants, 2014
2. Continue native seed program.
SMP Recommendation: West Kill – Riparian Zone Management 6.7.8
Date Added to Action Plan: 2007
Progress: Native seed program was initiated in 2008. GCSWCD arranged delivery of 20,000 herbaceous plugs grown from locally collected seeds by Staten Island Greenbelt Center in October 2009. Greene County received 9,800 plugs while the others were distributed to Ulster, Schoharie and Delaware counties. The GCSWCD Plant Material Center received another 10,000 herbaceous plugs and 5,000 Greenbelt tubelings in June 2010, 1,250 RPM trees and shrubs in September 2010, 2,256 Greenbelt tubelings and 1,212 gallon pots from the Greenbelt Center in October 2010. In 2011, GCSWCD will receive 5,000 2-gallon trees and shrubs, 10,000 herbaceous plugs, and 1,500 1-gallon trees and shrubs. In 2012 GCSWCD received 632 Greenbelt plants in the spring and 1,462 in the fall. GCSWCD received 1,811 Greenbelt plants in May 2013. There will be a 2014 spring delivery with approximately 20,000 plants which will need repotted to 2-gallons.

H. WOH Education & Outreach Strategy: The GCSWCD continues to work with NYCDEP and others on a detailed education and outreach strategy for the West of Hudson (WOH) watershed area, incorporating initiatives conducted in the Schoharie basin. The GCSWCD will help identify training needs and plan training activities for a wide range of audiences; training activities may be basin-wide or specific to individual sub-basins.

GCSWCD Staff:	Yost
Project Partners:	NYCDEP
Project Funding:	NYCDEP SMP Contracts, WAP, CWC
Project Schedule:	WOH E&O Strategy completed, Education efforts are on-going
SMP Recommendation:	Batavia Kill – Education and Outreach-01 (Medium, 1.66); Schoharie/East Kill – Education and Outreach-6.4.1; West Kill – Education and Outreach 6.4
Date Added to Action Plan:	2007

Progress: As a sub-set of the WOH Education & Outreach Strategy, the Schoharie Basin's education and outreach programs are guided by the Schoharie Watershed Advisory Committee (SWAC) and the Schoharie Watershed Assistance Program. E & O action items listed below offer watershed stakeholders (local decision-makers, agency regulators, county government, property owners) opportunities to network in small and large groups to learn about current practices, programs, and regulations governing watershed protection. The Schoharie Watershed Program includes E & O activities specific to particular audiences and their role in watershed protection (e.g., highway personnel, planning boards, code enforcement officials, property owners) and are supported by inter-basin and inter-county agencies (SWCD's, Cornell Cooperative Extension, Planning Departments). The GCSWCD also participates on the WOH E & O Committee, sharing information and suggestions on educational programs.

Section 3. Completed Action Items May 2007 through May 1, 2014

Updated May 15, 2014

NYCDEP Stream Management Program
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David Burns, Project Manager
845.340.7850
dburns@dep.nyc.gov

Greene County Soil & Water Conservation District
907 County Office Building, Cairo NY 12413
Jeff Flack, Executive Director
518.622.3620
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Schoharie Basin Stream Management Program
Action Plan - *Completed Action Items May 2007 through May 1, 2014*

The *Schoharie Basin Stream Management Program Action Plan* summarizes the programs and projects of the GCSWCD, NYCDEP and Schoharie Watershed Advisory Committee. Completion of these programs and projects leads to successful implementation of Schoharie Basin stream management plans. The first Action Plan was completed in May of 2007, and is updated annually. This document summarizes **completed** action items from the previous action plans (May, 2007 through May 1, 2014).

I. Program Administration

1. **General Contracting Specification (2009):** The GCSWCD went through an RFP process to develop a list of "pre-qualified" contractors for miscellaneous contract work, including installing stormwater management practices, drainage improvements, and stream projects. Having the four pre-qualified contractors will shorten the contracting process in times of emergency, such as following floods.

2. **Inter-Agency Coordination:** Further coordination between the agencies with stream management responsibilities is a key component of SMP implementation. Although this is an on-going activity in Schoharie basin action plans, and everyday interactions among agencies are difficult to account for, the following measurable items have been completed:

    a. Riparian Buffer General Permit (2009): To successfully implement a multi-year riparian buffer program it was necessary to work with NYSDEC, USACOE and NYCDEP to develop a general permit to allow for rapid planning and installation of riparian buffers. The general permit applies to minor (less than 300-ft), short-term impacts such as bank preparation and planting. For more information on the general permit contact GCSWCD.

    b. Restoration Project Permits (turbidity controls) (2007): The GCSWCD and NYCDEP worked with NYSDEC to evaluate alternatives and to offer training to address the complexity of achieving turbidity control during construction. The GCSWCD had two staff members trained as Certified Professional Erosion and Sediment Control specialists, one trained as a Certified Professional in Stormwater Quality and the majority of staff were trained as part of the NYSDEC 4-hour erosion and sediment control certification. In addition, the GCSWCD is qualified to teach the 4-hour E/S control certification. Finally, through DEP, GCSWCD purchased dewatering equipment for stream projects and routinely prepares stormwater pollution prevention plans for all size projects.

3. **Local Adoption of SMPs (April 2009)** - All Greene County municipalities within the Schoharie Basin and sub-basins (Batavia Kill, East Kill, and West Kill watersheds) and the Town of Conesville (Manor Kill) have adopted the relevant SMPs and signed Memoranda of Understanding (MOU) with GCSWCD and SCSWCD, respectively. Annual reviews occur with the municipalities per the MOU and provide an update on current action items within the municipality as well as seek input from municipal officials in identifying potential future projects based on local needs.

4. **Schoharie Watershed Advisory Committee (Organized, May 2008)**: The organizational structure of the Schoharie Watershed Advisory Committee (SWAC) was developed in early 2008. After the kick off meeting in May 2008, the SWAC has met regularly throughout the year, developed program materials to initiate a stream management plan implementation funding application process, and identified initial projects for implementation. Although administrative support for the SWAC remains on ongoing activity, the effort to establish local representation and implementation of the SMP, coupled with technical agency support, has been accomplished. For more information: http://www.catskillstreams.org/SWAC.html.

5. **Program Office (April 2008):** The GCSWCD and NYCDEP collaborated to establish a project office within the Schoharie watershed. The GCSWCD and WAP identified and secured a Mountaintop project office in Tannersville which is being used by various local, regional, and state committees working on watershed protection (e.g., Schoharie Watershed Advisory Committee, subcommittees of the SWAC, Mountaintop Supervisor & Mayors Association, WOH Education & Outreach committee, Stream Restoration Committee for NJ Chapter of AWRA, to name a few). For directions to the office contact Michelle Yost at michelle@gcswcd.com or 518.589.6871.

6. **Program Administration, Staffing Plan (2007):** To manage the many projects and priorities in the action plan, the GCSWCD needs staffing and resources to provide overall project administration. In 2007, a staffing plan was developed along with a new intergovernmental agreement between the GCSWCD and NYCDEP that began in January of 2009 and will fund watershed activities through January, 2014.

II. Education on Watershed Protection

The GCSWCD continues to work with a wide network of partners to enhance its education and outreach efforts related to stream management, floodplain management, sediment and erosion control and other topics critical to sound watershed management. A number of successful educational projects were completed between May 2007 and May 2013:

1. **Post Flood Stream Intervention Training (2012 & 2013):** GCSWCD presented and/or contributed to five Post Flood Stream Intervention Trainings, held in Ulster, Greene, and Dutchess counties. The training was tailored to local highway departments, excavation contractors, and other involved in stabilizing streams following flood events. The training focused on the basics of stream process and the limits of what should be targeted for repair in the immediate days following destructive flooding.

2. **CD Lane Family Day (2011):** The Community of Windham Foundation (COWF) sponsored a Family Day as part of the 2011 Schoharie Watershed Month (May 2011). The Family Day activities included Trout Unlimited fly fishing demonstrations, water quality testing activities with the Schoharie River Center, nature hikes, kayak demonstrations, and a water-focused craft activity. The Family Day activities were intended to encourage responsible use of water and nearby land areas. Approximately 60 individuals participated in the 2011 Family Day, which was held along Main Street in Windham. This location was chosen (instead of CD Lane Park) in order to increase attendance at, and public participation in, Family Day.

3. **Manor Kill Information Kiosk (2011):** GCSWCD provided a Kiosk for Conesville, and a general Schoharie Watershed/ Schoharie Soil and Water Conservation District educational panel was produced in conjunction with GCSWCD's kiosk series. The kiosk was installed in December 2011.

4. **Identify Existing Resources (2011):** GCSWCD identified and cataloged existing resources that are currently available. The website was revamped in 2011, to provide web-based documentation of existing resources and links to additional resources.

5. **Environmental Film Series (2011 & 2012):** The film series was held at the Doctorow Center in Hunter during the Schoharie Watershed Month. The films highlighted watershed issues, pollution mitigation, and watershed, foodshed, and viewshed topics.

6. **Mountain Top Arboretum Outdoor Classroom Construction (2011):** An outdoor classroom was designed and constructed at the arboretum. The classroom accommodates approximately

45 people for year-round outdoor programming on a range of ecological and natural history topics relating to the watershed.

7. **Schoharie Watershed Months (2011 & 2012):** Schoharie Watershed Week was expanded to one month in 2011. The 2011 Schoharie Watershed Month involved hands-on workshops, stream clean ups, riparian buffer plantings, an Environmental Film Series, and other fun, educational, hands-on activities.

8. **Schoharie Watershed Week (2010):** The first Annual Schoharie Watershed Week was held May 17-23rd, 2010. A number of events were scheduled during the week to educate and engage local community members in watershed programs and stewardship activities.

9. **Batavia Kill Stream Celebration (Aug. 2007, 2008, 2009, 2010 & 2011):** recommended in the BK SMP and organized through a strong partnership of local communities, watershed agencies, non-profit organizations, educators and businesses, the BKSC has become a premier annual environmental event. At its core, the BKSC is about celebrating and promoting the wise use of our natural resources as they relate to water quality and ecosystem functions. Designed to engage people of all ages, especially children, the Celebration offers interactive exhibits, educational displays, and activities promoting understanding of the environment. For more information: http://gcswcd.com/swp/eo/bksc.html.

10. **Manor Kill Environmental Study Team/Stream Management Implementation (August 2009 – June 2011):** The Manor Kill Environmental Study Team (EST) Program was an experientially based, hands on environmental education and stream monitoring program. Through this program, youth EST members (ages 13 - 18) learn specific skills, and develop and master abilities in environmental assessments, field research projects and community education activities. The EST also participated in a riparian planting along the Manor Kill in 2011. The program served 20 youth from the Gilboa-Conesville School District and an additional 40 youth from Schoharie, Montgomery and Schenectady Counties.

11. **Watershed Summits (January 2007, 2008, 2009, 2010, 2011, 2012 & 2013):** initiated under the Schoharie Watershed Strategy noted below, watershed conferences were held in January '07, '08, '09, '10 and '11 to provide local decision makers and officials educational classes and networking opportunities around watershed protection. Interest in the Summits is evident by the number and diversity of attendees, with all eleven communities in the basin being represented.

12. **Watershed Tours (2007 through 2010):** Watershed tours were organized in June '07, '08, '09 and '10 as a follow up to the successful Watershed Summits. Recommended by local officials to continue educational outreach on a basin-scale, the tours are designed to demonstrate best management practices to foster an improved understanding of stewardship practices.

13. **Educational Workshops (2007 through May 2013):** although listed as a separate category, educational workshops are built into the Summits and Tours. Targeted audiences included elected and appointed officials, planning boards, code enforcement officers, highway department staff and streamside property owners.

    a. Post Flood Emergency Stream Work Training (2012): The flooding and damage caused by Tropical Storms Irene and Lee led to the coordination and presentation of the emergency stream work training. The training content was developed by a team of contributors from DEP, UCSWCD, GCSWCD,CCE Ulster, Trout Unlimited, and Shandaken Highway Department In the first quarter of 2012. One session of the training was presented in Ulster County on March 20, 2012. Two sessions of the training were presented in Greene County on March 26 and 27, 2012. Over 200 attendees were trained in the basic considerations that should be addressed when planning an emergency intervention in a stream system.

b. Water Quality at Home Workshops (2011): Two action-based educational workshops were held during Schoharie Watershed Month to help raise awareness about stewardship of water quality. The Holistic Pond Management Workshop provided tools and strategies to address pond problems without the use of chemical treatments. The rain barrel workshop discussed the impacts of stormwater runoff on water quality and taught participants how to build a rain barrel.

c. Roadside Ditch Maintenance Workshop (2011): NYSDOT, Greene County Highway and most municipalities in Greene County and the Schoharie Watershed attended the Workshop which covered 1) Impacts from roadside ditches on water quality and municipal budgets, 2) General ditch maintenance and importance of proper erosion control, 3) Distinctions with topography, soils, slopes, and drainage; 4) Cost factors, different applications and lifespan; and 5) Selective ditching, how to prioritize to save money and minimize water quality impacts.

d. State and City Stormwater Regulations (2011): Workshop participants were informed about what triggers a permit and what are permit requirements of NYSDEC, NYCDEP.

e. What to do After the Flood (2011): Floodplain administrators' and community officials' guide to surviving a flood. NYSDEC.

f. Mountaintop Mapping (2011): workshop participants learned how environmental mapping software can assist local communities in site planning and subdivision reviews.

g. Low Impact Development Made Local (2010): how improved site planning can achieve multi objectives for Schoharie basin communities

h. Implementing SEQRA, basics and determinations (2008, 2009, 2010)

i. DEP and DEC Stormwater Regulations & Updates (2008, 2009, 2010): Presentation of NYSDEC and NYCDEP stormwater regulations.

j. Basics of implementing low impact development practices, what communities need

k. National Flood Insurance Program (2009, 2010): Introductory course on floodplain management NYSDEC

l. National Flood Insurance Program: Intermediate Course (2009): NYSDEC, course focused on flood insurance maps and elevation certificates; DOS accredited course

m. Low-Impact Development (2009): an overview of an alternative approach to site planning, design and building that minimizes landscape impacts and preserves the natural hydrological cycle.

n. Dream Homes & Ditch Nightmares (2009) A skit involving landowners learning about permit requirements when building their dream home - volunteer role playing by audience NYSDEC, DOS approved course

o. Where Infrastructure & Streams Collide: How to Manage Both Responsibly (2008): how infrastructure and streams are influenced by each and what potential strategies exist for prevention and mitigation of problems where stream instability has impacted infrastructure and vice-versa.

p. Federal & NYS Wetland Protection & Regulation (2008)

q. 2008 FEMA Flood Maps: What Every Planner Needs to Know (2008)

r. What is Turbidity & Why is it Important (2007): an overview of what turbidity is, and the impact it has in the Schoharie Basin.

s. Impacts from Road Ditch Erosion (2007): results of a field study on the impact of road ditch instability on erosion and sedimentation.

14. **Japanese Knotweed Mailing (2010):** GCSWCD printed 1000 copies of a revised JKW prevention brochure for distribution to landowners in knotweed prevention areas identified by stream feature inventories. The brochures were mailed to 286 streamside landowners and distributed to 11 municipal town halls (15 copies each).

15. **Riparian Buffer Workshop (2010):** GCSWCD CSBI sponsored Healthy Buffers, Healthy Streams: A Landowner Workshop July 10, 2010. The interactive workshop was held at the Spruceton Community Center in West Kill and showed participants the characteristics of healthy vs. degraded buffers and different management practices to maintain healthy buffers.

16. **ESC Workshops (2008 through 2010):** sponsored three Construction Erosion and Sediment Control Training Courses that were attended by approximately 230 people from the Schoharie basin. Participants included watershed developers, planners, code enforcement officers, regulators and contractors. This course focused on the review of new state construction permit, the requirements of stormwater pollution prevention plans, and the proper installation of erosion and sediment control practices.

17. **Mountain Top Arboretum Outdoor Classroom Design (2010):** Design plans and bid specifications for an accessible outdoor classroom were completed in 2010. Visit http://www.catskillstreams.org/grants for project materials.

18. **Rain Barrel Workshop (2010):** Workshop took place during Schoharie Watershed Week May, 2010. Fifteen people took part in building their own rain barrels**.**

19. **Mountaintop Arboretum Wet Meadow – Interpretive Kiosk, Brochures, & Historic Pump House Repair (2010):** A kiosk was installed and brochures were developed to describe the wet meadow including the historical background of the historic pump house, an explanation of the site's hydrology, and other information about wetland plants and wildlife. Visit http://www.catskillstreams.org/grants for project materials.

20. **SWAC and Schoharie Watershed Week Logos (2010):** Logos were developed for the Schoharie Advisory Committee and Watershed Week. Visit http://www.catskillstreams.org/grants for project materials.

21. **Conduct Watershed Survey (2009):** It was decided by the SWAC E/O subcommittee to focus surveys on events; that enough watershed surveys have already been done. No larger survey is expected.

22. **Websites (2007 & 2010):** although websites require continuous updating, the www.catskillstreams.org and www.gcswcd.com are established sites that are used to promote project updates and share information on watershed protection issues.

III. Landowner Stream Assistance

The GCSWCD and NYCDEP recognize the importance of providing assistance to local landowners. The NYCDEP, GCSWCD and SCSWCD have provided necessary training for project staff to be able to provide state-of-the-art technical assistance throughout the watershed. Technical assistance from staff

members guide restoration of stream system stability and help to maintain ecological integrity. The technical assistance can range from a landowner consultation to activities that will help to meet the priorities of protecting water quality and establishing riparian buffers. Protection and enhancement of water quality can benefit both the City of New York's water supply and the residents of the Schoharie basin. Completed Landowner Stream Assistance action items include:

1. **Catskill Streams Buffer Initiative Educational Materials (2009):** CRSR, Inc. was awarded a contract in February 2009 to conduct a needs assessment, develop a marketing strategy, and develop initial program roll-out with above mentioned educational materials. Based on a needs assessment conducted by CRSR, the Streamside Assistance Program has been renamed the Catskill Streams Buffer Initiative (CSBI). The Marketing Strategy, Program Slogan, Program Logo, Introduction Language, Program Brochure and Application for funding have all been developed.

2. **Riparian Program Development (2008):** In 2007-08, the Catskill Streams Buffer Initiative (CSBI) was developed to educate and assist streamside landowners in order to provide for improved stewardship of riparian areas. The GCSWCD worked closely with NYCDEP and others to establish program guidelines, policies, protocols and other items required to offer a riparian buffer program to watershed landowners. GCSWCD developed a protocol that utilizes stream feature inventory and vegetation mapping to identify potential riparian planting sites. In addition, GCSWCD, NYCDEP and other agencies and organizations worked together to guide development of the CSBI, develop CSBI Guidelines and GCSWCD hired a program coordinator to guide riparian projects. For more information visit: http://www.catskillstreams.org/CSBI/

3. **Plant Materials Program (Progress – 2007 through 2010):** GCSWCD and NYCDEP staff planted RPM trees at the majority of stream restoration projects and are monitoring 10% of the trees at each site. During the fall of 2007, 202 RPM trees were planted on 8 different sites. Sedges were planted in beds during the spring of 2007 and were over-wintered to establish better root growth. The project team also potted 7950 trees during the spring of 2007 and planted the following project sites: 3200 trees at Conine, Prattsville; 124 trees on the two sites of Shadow Mt. Bridge, Jewett and Holden, Ashland; 1000 trees at Accardi, Jewett; and 400 trees at Ashland Connector, Ashland. The GCSWCD over wintered approximately 3000 trees each year for spring plantings. In addition, the project team utilized balled and burlaped trees that were obtained from the Plant Materials Center. The native seed program was initiated in 2008. GCSWCD arranged delivery of 20,000 herbaceous plugs grown from locally collected seeds by Staten Island Greenbelt Center in October 2009. In 2009, approximately 9,000 trees and shrubs were over-wintered, and 13 planting sites were planted with 4,135 trees and shrubs. Over 1,500 trees were ordered in the spring of 2010. The GCSWCD Plant Material Center received another 10,000 herbaceous plugs and 5,000 Greenbelt tubelings in June 2010, 1,250 RPM trees and shrubs in September 2010, 2,256 Greenbelt tubelings and 1,212 gallon pots from the Greenbelt Center in October 2010.

4. **Catskill Stream Buffer Initiative Projects:** For additional information and project reports visit http://www.catskillstreams.org/projectmaps/

    a. Dodson/McCloskey Property Planting Phase 2 (2013): GCSWCD re-installed a 100 ft. wide riparian buffer along 300 feet of stream including, 250 native trees and shrubs and 25 willow stakes, in the fall of 2013.

    b. Wilkie Riparian Project (2013); GCSWCD has a 5 year landowner agreement for this property. GCSWCD installed 75 willow stakes and 15 native trees and shrubs along 150 feet of stream in the fall of 2013.

    c. Donnelly Riparian Project (2013): GCSWCD has a 5 year landowner agreement for this property. GCSWCD installed 125 willow stakes and 117 native trees and shrubs along 250 feet of stream in the fall of 2013.

d. Enochty Property Planting (2013): GCSWCD has a 5 year landowner agreement for this property. GCSWCD installed 30 willow stakes and 25 native trees and shrubs along 100 feet of stream in the fall of 2013.

e. Mayo Property Planting (2013): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 300 willow stakes were installed along 200 ft. of streambank; 94 native trees and shrubs were installed; 0.23 acres of streamside habitat was seeded.

f. Higgins Property Planting (2013): GCSWCD has completed a Riparian Corridor Management Plan for this property and obtained a 10 year landowner agreement for this property. 60 willow stakes and 49 trees and shrubs were installed in the fall of 2013.

g. Cole Property Planting (2012): GCSWCD has a 5 year landowner agreement for this property. The Riparian Corridor Management Plan is complete. A subcontractor was hired to grade 300 ft. of streambank along the West Kill prior to planting. GCSWCD planted 225 trees and shrubs and, 200 willow stakes and 300ft of fascines were installed along 350 ft of the right streambank.

h. Bardfield Property Planting (2011): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. Project planned for the installation of 465 trees, shrubs and willow stakes to create a 35ft. wide riparian buffer along approximately 850 feet of the East Kill in the spring of 2011. Installed 432 trees and shrubs with 20 NYC students on May 5th, 2011. Planting area was 700 feet long and 35 feet wide. Many of the trees were lost to post-flood management activities in the fall of 2011.

i. Rivera Property Planting (2011): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. Project planned for the installation of 514 trees and shrubs in the spring of 2011 in two separate planting areas along the East Kill. One planting area is 200ft by 50ft. The other is 250ft by 90 ft. In addition, another 500 feet of streambank will be seeded with a riparian buffer mix and staked with willows. GCSWCD installed 506 trees and shrubs, 500 willow stakes, and 50 lbs. of seed. Most trees were lost to post-flood management activities in the fall of 2011.

j. Slutzky Property Planting (2011): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. Project planned for the installation of 1,484 trees and shrubs in the spring of 2011 next to a parcel that was planted by GCSWCD in 2009. Installed 793 trees and shrubs on May 13th, 2011 with 15 high school students from Gilboa-Conesville CSD. Planting area was 950 ft. long and 50 ft. wide.

k. Kelly Property Planting (2011): GCSWCD has a 10 year landowner agreement for this property. Riparian Corridor Management Plan is complete. Project planned for the installation of 97 trees and shrubs along 250 ft. to create a 25 ft. riparian buffer in the spring of 2011. Installed 94 trees and shrubs.

l. Cervini Property Planting (2011): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. Installed 275 trees and shrubs.

m. Torsiello Property Planting (2011): Flooding, due to Tropical Storm Irene, caused woody debris jam on property. Stream channel was repaired by town highway department.

GCSWCD has a 5 year landowner agreement for this property. CSBI installed 275 trees and shrubs.

n. Hegner Property Planting (2011): This property is adjacent to Torsiello, where stream channel was repaired by the town highway department. GCSWCD has a 5 year landowner agreement for this property. Installed 175 trees and shrubs.

o. Manor Kill Gentile Property Planting (2010): Catskill Streams Buffer Initiative Pilot. SCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 292 trees, 50 willow stakes, and 500 sedge plugs were installed in November 2009. 100 additional willow stakes were installed spring (2010).

p. Manor Kill Brandow Property Planting (2010): SCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 50 trees, 100 willow stakes/tubes, and sedge plugs were installed spring (2010).

q. Manor Kill Quinn Property Planting (2010): SCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 100 trees, 80 willow stakes/tubes, and 100 sedge plugs were installed spring (2010). Approximately 50 – 100 Japanese knotweed plants were removed from the site.

r. Dodson/McCloskey Property Planting (2010): GCSWCD has a 10 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 300 Trees, shrubs, and weed mats were installed on 6/11/2010 to create a 100 ft. wide riparian buffer along 300 ft. of the East Kill. GCSWCD contracted Bevan Forestry to control a patch of Japanese knotweed. 25 JKW stems were injected with Aqua Master. Some follow up will be required to monitor JKW.

s. Rappleyea Property Planting (2010)**:** GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 150 trees and shrubs were installed on 6/10 and 6/11 2010.

t. Avella Property Planting (2010): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 26 trees and shrubs were installed 6/24/2010.

u. Brunsden Property Planting (2010): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 54 herbaceous plugs, 22 willow stakes, 5 shrubs, and 2 trees installed on 8/18/2010.

v. Grossman Property Planting (2010): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. Installed a 50 ft. riparian buffer. 198 trees and shrubs were planted 5/27/2010 along 300 ft.

w. Silver Property Planting (2010): GCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. GCSWCD removed fence, graded 60 ft. of streambank, planted 25 trees and shrubs, and installed 30 willow stakes on 5/27/2010.

x. Evergreen Planting (2009): Town of Hunter: The GCSWCD/NYCDEP worked with the landowner to develop a planting plan and to obtain a landowner agreement for the property. The Catskill Streams Buffer Initiative (CSBI) riparian planting project was completed in April 2009.

y. Kastanis Property Planting (2009): Catskill Streams Buffer Initiative Pilot - Obtained 5-year landowner agreement, completed a riparian corridor management plan and restored

approximately 7.1 acres of streamside vegetation along the Batavia Kill, including hosting school groups in the effort and planting ~1,500 trees and shrubs.

z. Kane Property Planting (2009): GCSWCD has a 10 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 116 trees and 250 willow stakes were installed in November 2009.

aa. Manor Kill Grogan Property Planting (2009): SCSWCD has a 5 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 54 trees and 500 sedge plugs were installed in November 2009.

bb. McRoberts Property Planting (2009): GCSWCD has a 10 year landowner agreement for this property. Riparian Corridor Management Plan is complete. 50 trees and shrubs and 125 willow stakes were installed in November 2009.

5. **Additional Riparian Buffer Pilot Projects**

a. Carr Road Project (2007-2009): Town of Jewett- Schoharie Creek: The Carr Road riparian project extends over 2,300 feet of the Schoharie Creek in the Town of Jewett. Initiated in 2007, the project had three strategic components: stem injection treatment of Japanese knotweed (Polygonum cuspidatum) with glyphosate (Glypro) to prepare the locations for replanting with native vegetation, planting of a 100 foot wide buffer strip from the top of the streambank establishing approximately 2.4 acres of buffer, and enhancing the existing buffer on the immediate streambank by tapering the bank and planting willow tublings and stakes. In 2009, improvements were made to the DEC fishing access parking area and a walking path was improved to the stream.

b. Deming Road Riparian Project (2009): A stream disturbance permit application has been prepared and submitted to NYSDEC for review and approval. Grading work on an eroded bank was funded jointly by two neighboring landowners and was completed by C&C Excavating in June 2009. During completion of the original project scope, a third landowner approached GCSWCD interested in planting a riparian buffer in open fields adjacent to the original project area. GCSWCD was able to accommodate the additional landowner's request. 723 trees and shrubs and 120 willow stakes were installed on three contiguous parcels.

c. County Route 6 (2008): Town of Lexington-West Kill: The GCSWCD and the Greene County Highway Dept worked together to implement vegetation stabilization methodologies at a site on the West Kill that was previously scheduled for all rip-rap. Along this site, a short section of Vegetation Reinforced Slope Stabilization (VRSS) was installed, and trees and shrubs were planted on the upper bank; willows were inter-planted with the rip rap.

d. Vegetation Enhancements (2008): Batavia Kill, West Kill, Schoharie Creek and Manor Kill: Root Production Method (RPM) trees were planted at Big Hollow, Brandywine and Ashland Connector. A certified herbicide applicator treated Japanese knotweed at Big Hollow, Carr Rd., Schoharie Ave. and Long Rd. project sites. DEP conducted monitoring of vegetative techniques on a majority of these projects. Vegetation was installed as an enhancement to a Greene County Highway project in the West Kill (County Route 6) and at a FEMA project along the mainstem of the Schoharie Creek (Faulkeys). Sedges were added to the County Route 13 culvert project that was completed in 2007. Sedges are excellent at holding soil. Finally, a volunteer planting was conducted in the Manor Kill behind the Conesville town hall.

e. Sugar Maples Riparian Buffer Project (2008): Town of Windham (Batavia Kill). The GCSWCD has received funding from the ACOE (WRDA) for a project to treat invasive Japanese knotweed and then replant ~ 800' for riparian vegetation along the Batavia Kill.

f. Riparian Buffer Implementation pilot (2007): The GCSWCD/NYCDEP researched a protocol for identifying potential planting sites based upon stream management planning research. In addition, the GCSWCD approached five of the identified parcel owners and moved forward with the Carr Road riparian restoration project.

g. Shadow Mountain (2007): Town of Jewett-East Kill: The GCSWCD planted 124 trees and shrubs, hydroseeded and interplanted the rip rap at the Greene County Highway Department bridge replacement in Jewett over the East Kill.

6. **Stream Restoration Projects:** For additional information and project reports visit http://www.catskillstreams.org/projectmaps/

a. NYS Route 42 West Kill Slope Failure (2013): The GCSWCD/NYCDEP and partners (NRCS, Town of Lexington) completed this stream restoration project in 2013. This EWP project was constructed in 2013. The project addresses a large slope failure along a 1400' reach of the West Kill, just downstream of the Pushman Bridge on NYS 42. The project included stream bank and channel excavation, and the installation of in-stream stabilization structures to achieve stable geometry. Practices include rock riffles, to provide grade control throughout the reach, random boulder clusters, which provide channel roughness, as well as the use of log boulder revetment and dry rock rip rap with willow stakes to establish an armored flood plain bench at the toe of the slope to prevent future erosion along the toe. Upper portions of the slope were hydroseeded and staked to establish vegetation on the eroded barren hillside. Construction was completed in 2013. As-built survey and plans have been prepared for the project and they have been approved by NRCS.

b. East Kill Restoration at Apple Hill (2012): The GCSWCD/NYCDEP completed this stream restoration project in 2012; project components included the realignment and resizing of 3,500 feet of channel, the installation of 23 rock structures, and installation of extensive bioengineering treatments and riparian plantings over the 11 acre site. These efforts will improve water quality, reduce risk to humans and property, reduce erosion and excessive sediment loading, restore floodplain function, and improve aquatic and terrestrial habitat. The site included two large active mass failures, measuring approximately 300 feet long, and several hundred feet of exposed streambank. Historic channel instability, caused from ineffective land use management and flooding, started both mass failures and accelerated stream instability in the reach. Historic efforts to control the reach included berming, stream dredging and bank armament. Soil borings confirmed the upstream mass failure generated serious risk to two homes, a barn and septic system, causing risk to humans, property and water quality. This project mitigated the hazard to the homes by realigning the channel away from the slope and providing armament of the toe of the slope. Due to the extensive damage to the barns foundation, the homeowner demolished and removed the structure from the slope and a new septic system was installed on the newly stabilized slope. The lower high bank failure was also stabilized by re-grading the bank to a lower stable slope, realignment of the channel away from the toe of the slope, and the installation of slope drains to remove excessive water in the slope. Several rock structures and bioengineering treatments were also installed to provide long term stability to the bank. Project combined two SMIP projects: Nikolaidis and Kirk/Rotella landowner assistance projects.

c. Windham Country Club Repairs (2012): Windham – Batavia Kill: Damages sustained at the Windham Country Club along the Batavia Kill are scheduled for repair work in 2012. Topographic data is being collected to support cost, material and labor estimates for

implementation of the repair work. GCSWCD will be providing technical support to this project due to the extensive damage that occurred along the stream corridor.

d. Holden Stream Restoration Project (2011 - 2013): The GCSWCD/NYCDEP completed Phase 1 of the project in 2011, continued construction was postponed due to Hurricane Irene. Project construction was completed in 2012. The project included streambank and channel excavation to achieve stable geometry, installation of in-stream stabilizations structures and a variety of bioengineering techniques along 3,500 feet of stream channel; over 6,000 trees were planted along the restored stream channel.

e. Vista Ridge Floodplain Restoration (2011): The GCSWCD/NYCDEP completed construction of this stream restoration project in 2011. This project improved the immediate project area and the aggraded reach upstream, by reducing a backwater condition at the Vista Ridge bridge. The project also enhanced the riparian buffer, reduced the risk of failure of Vista Ridge and Colgate Lake Roads, reduces erosion of silts and clays and provides for improvement of the habitat value of the reach.

b. Wright Stream Bank Stabilization/Riparian Project Enhancement (2011): In 2011, the GCSWCD/NYCDEP modified and enhanced the previously constructed project with additional vegetative treatments. Monitoring will be initiated in 2012.

c. Wright Stream Bank Stabilization/Riparian Project (2010): The GCSWCD/NYCDEP constructed a bankfull bench (~1,200') and re-vegetated approximately 3,127 feet of streambank. Rock installation was completed by the project contractor, while plantings were installed by GCSWCD staff and SCA Members during an SCA service project hosted by GCSWCD.

d. Sugar Maples Stream Restoration (2010): Batavia Kill Tributary, Town of Windham: The GCSWCD/NYCDEP removed mortared stone walls that confined a Batavia Kill tributary and restored the stream to a natural shape and meander pattern. Floodplain grading was performed and the entire site was seeded with wetland and riparian seed mixes. GCSWCD hosted a student planting with three schools to install 1584 herbaceous plugs, 340 willow stakes, 250 trees and shrubs, and 7 willow fascines. This project was designed to restore wetland functions and approximately 700 feet of stream that was historically channelized and confined by mortared stone walls.

e. Windham Golf Course Streambank Project (2009): This was primarily a CWC Stream Corridor project with GCSWCD assistance. The project provided for the removal of failed sheet piling, armoring of the toe and sloping of the bank, and planting of approximately 155 feet of streambank.

f. West Kill Restoration Project, Long Road (2009): Town of Lexington: The GCSWCD/NYCDEP has completed a full geomorphic restoration of approximately 2,400 linear feet of stream on the West Kill in Spruceton valley. The site was characterized by significant bank failure and clay exposures in the banks and stream bed. This was implemented in 2009. Wetland delineation, archaeological investigation and final survey of the site were conducted. Project design work is complete and construction was finished in October 2009.

g. Oakwood Pistol Club (2009): GCSWCD led the CWC Stream Program streambank protection project in the Town of Prattsville. A CWC Stream Corridor Protection Grant had been applied for in the amount of $99,200 and was awarded by CWC. Engineering services were contracted for this project; design plans and specifications are complete and have been submitted for permit. Construction of this project was completed in Summer 2009.

h. Schoharie Street Stabilization (2009): Village of Hunter: Stabilization of approximately 120 feet of high stream bank to protect infrastructure and private property. Project includes stacked and pinned rock riprap as well as vegetated beds. The GCSWCD and NYCDEP also added additional riparian buffer plantings on the opposite bank. Project construction is complete. Additional plantings were installed in the fall of 2009. The new plantings were balled and burlapped River Birch trees.

i. Conine Farm Stream Restoration (2008): Town of Prattsville -Batavia Kill: The GCSWCD/NYCDEP completed a full geomorphic based restoration of a +/-1800 foot reach on the lower Batavia Kill. The project addressed severe slope instability, reduced sediment loading and protected private property.

j. County Route 13a Culvert Upgrade (2007): Town of Lexington: The GCSWCD/NYCDEP worked with the Greene County Highway Department to upgrade a significantly undersized culvert that was the source of repetitive flooding in the Hamlet of Lexington. The project had excellent community and landowner support and demonstrated floodplain drainage concepts, proper conveyance sizing to allow fish migration and a riparian buffer component.

k. Holden Stream Restoration (2007): Windham - Batavia Kill: In 2007, a NYS DOT Article 15 stream disturbance permit was flagged by DEC Region 4 for potential inclusion of a natural channel design approach. NYS DOT welcomed the design and implementation assistance of GCSWCD for this sensitive reach. The project established a geomorphically appropriate channel and floodplain bench and included riparian plantings which restored floodplain function in an area that would have simply been armored with rock.

7. **Completed Modifications of Existing Projects:** The Schoharie Stream Management Program routinely inspects and monitors previously completed projects for 10 years post-construction. . Inspections often lead to adjustments to structures. , replace vegetation, and/or control invasive species. For additional information and project reports visit http://www.catskillstreams.org/projectmaps/ Tasks completed under this action item include:

a. Conine Project Repairs (2013): The GCSWCD/NYCDEP completed this stream restoration project in 2013. Brief Description: The Conine Stream Restoration Project is located in the lower Batavia Kill along NYS Route 23 in Prattsville, NY. The purpose of this work was to repair a project, originally constructed in 2007, that experienced extensive damage during tropical storm Irene in 2011. Evidence suggests that the magnitude of Irene, and failure of an upstream culvert and section of NYS Route 23, were primary contributors to the damages and excessive sedimentation that occurred at the site. The repair project commenced in August of 2013, and measured approximately 2,200 linear feet in length, with a disturbance area of approximately 11 acres. The proposed earthwork required the stream channel to be dewatered throughout construction; this was achieved by diverting flow through a passive dewatering channel and pumping. Extensive earthwork was required to restore the reach to original grades, and included excavation and placement of over 52K cubic yards of material. To provide channel grade control, stabilize stream banks, and enhance habitat, the project included the repair and reconstruction of five rock j-hook vane structures, two cross vane structures and a constructed riffle. To improve stream bank stability through the reach, additional biotechnical measures were installed including, 6,100 live stakes and posts and 6,000 feet of live fascines. Vegetative restoration included seeding of native riparian and wetland seed mixes and establishing a 7.10 acre riparian zone planted with 5,560 potted trees and shrubs. The work impacted approximately one acre of existing impacted low quality scrub shrub wetland that was mitigated with over 2.5 acres of native scrub shrub wetland in the northern floodplain. The project, completed in October 2013, cost

approximately 872 K; funding was provided by FEMA and NYCDEP. Bioengineering measures and riparian vegetation were installed to achieve revegetation and provide long term stability goals, objectives and permit requirements.

b. Maier Farm Project Repairs (2013): The GCSWCD/NYCDEP completed this stream restoration project in 2013. The Maier Farm Stream Restoration Project is located in the middle Batavia Kill along NYS Route 23 in Ashland, NY and measured approximately 800 linear feet in length. The purpose of this work was to repair a portion of a project that was originally constructed in 1999 and sustained damages during tropical storm Irene in 2011. Damages included streambank erosion, structural damage to rock structures, channel migration and land loss, and excess sedimentation. These impacts left the reach prone to future erosion which may affect water quality and habitat. An objective of the repair was to recreate the appropriate channel dimension, pattern and profile through the reach. This earthwork required dewatering of the stream channel throughout construction; stream flow and turbid water were collected from within the work area and pumped to temporary settling areas. Extensive earthwork was necessary to restore the reach to original grades, and included the excavation and the placement of 6K cubic yards of material. To provide channel grade control, stabilize stream banks, and enhance habitat, work included the reconstruction of two rock j-hook vane structures and repair of one cross vane structure. To substitute the loss of two rock vanes, and to provide additional resistance to erosion and channel migration into an adjacent agricultural field in the lower meander, a 400 foot long section of live stone revetment was installed; this was an enhancement to the original design. Additional bioengineering measures were installed to strengthen streambanks including, 1,000 live stakes and posts, and 1,000 feet of live fascines. To establish a one acre riparian zone, vegetative restoration included seeding of native riparian grasses and the installation of 1,000 tree and shrub saplings. The project, completed in October 2013, cost approximately 273K; funding was provided by FEMA and NYCDEP. Bioengineering measures and plantings and vegetation were installed to achieve revegetation and provide long term stability goals, objectives and permit requirements.

c. Ashland Connector Reach (2008): (Town of Ashland (Batavia Kill): The GCSWCD completed planting on the streambanks and floodplains at the lower end of the project reach. Additionally, compensatory wetland areas were planted with appropriate species. Limited site cleanup work on access/staging areas was also completed, and the project was surveyed as part of the routine project monitoring schedule.

b Farber Farm Stream Restoration (2008): (Town of Jewett (East Kill): Following flooding in 2005 and 2006, excessive erosion resulted in damage to the Farber farm project grading and rock structures. Several rock structures experienced damage as a result of the flood flows which peaked at over 3000 cfs. The damaged structures include 4 rock vanes and 2 cross vanes. The site was originally revegetated through the Conservation Reserve Enhancement Program (CREP). The CREP seedlings never became established, which limited project success and, the lack of vegetation may have contributed to the overall project damages. This project included: removal or modification of damaged rock and cross vanes; treatment of the back channel area to reduce frequency of flows in the back channel and to promote the use of the primary channel; bank grading and vegetative stabilization to reduce erosion; and establishment of a riparian buffer along the restored reach. In addition to the vane retrofits, a bankfull bench was added, 1,179 larger trees were planted, willow stakes and approximately 1000 feet of willow fascines were installed, and numerous shrubs, sedges and herbaceous seed were planted throughout the site.

c Broadstreet Hollow Stream (BSH) Restoration Project Repairs (2008): (Town of Hunter, (Esopus Basin): The January 1996 flood caused excessive erosion along a 1,100' section of BSH. The initial restorative action by the USDA Natural Resource

Conservation Service (NRCS) resulted in considerably more damage to this unstable reach. In addition to the damage to streamside residential property, extensive exposures of glacial lake clays and a "mudboil" caused chronic turbidity in BSH from continually entrained suspended sediment. The "mudboil" is a "relief valve" for artesian groundwater conditions, originating in the adjacent failing hillslope. In 2000, the GCSWCD restored the project reach again. There were two main components to the project: (1) stream channel restoration using natural channel design techniques to address erosion and channel instabilities; and (2) a geotechnical investigation of the adjacent hillslope with installation of dewatering wells to reduce the potentiometric pressure driving the artesian conditions. The April 2-3, 2005 flood caused damage to both project components. Two of the three dewatering wells were damaged and now fail to relieve the artesian conditions. Consequently the mudboil has returned and has been present off and on since then. In 2008, the GCSWCD modified the damaged rock structures, and hired a well drilling subcontractor to attempt to rehabilitate the dewatering wells. The subcontractor found the well heads had been broken and that they couldn't be rehabilitated. After reviewing options, the decision was made to abandon the wells and monitor the project's stability. Installing new wells would have required a large disturbance to the existing forest and continual maintenance; this wasn't the most palatable option for the landowners. The GCSWCD and DEP will continue to monitor the project's stability.

d Lanesville Stream Restoration Project Repairs (2008) (Town of Hunter (Esopus Basin): In 2008, repairs were made on the Lanesville Demonstration Stream Restoration Project. Most adjustments were associated with gullying on a high slope failure caused by poor drainage on the terrace above the slope, which had not been addressed as part of the restoration project. Some adjustments were made in the elevation of rock vanes protecting the base of this slope, and additional bioengineering was added to mitigate the gullying.

IV. Creative Stormwater Practices and Critical Area Seeding

In order to reduce runoff and protect groundwater resources in the basin, the GCSWCD and NYCDEP support promoting the infiltration of stormwater through state-of-the-art erosion and sediment control techniques such as hydroseeding of open ditches, stormwater techniques to infiltrate water into the ground, wetland enhancement, filter strips, and creation of rain gardens and bioswales to manage stormwater. Completed stormwater and critical area seeding projects include:

1. **Mountain Top Highway Ditch Re-vegetation Program (2011):** Program to encourage greater use of critical area seeding equipment that the GCSWCD has available for highway departments by offsetting the cost of seed and mulch. In 2011, GCSWCD worked with highway departments, seeding 3 miles of roadway ditches.

2. **Mountain Top Library & Learning Center (2011):** (Town of Hunter, Village of Tannersville) The GCSWCD worked with the Mountain Top Library Capital Campaign on a stormwater retrofit project. Located in the Village of Tannersville, this project was initiated in conjunction with the rehabilitation of a building that will be used as a Mountain Top Library and Learning Center. The project used innovative methods to meet water quality treatment standards for runoff from roofs and parking. The site presented space challenges and serves as an excellent demonstration project for integrating stormwater management in an area with limited space. In addition, the project offers substantial educational opportunities on stormwater impacts and integrating stormwater management practices during the redevelopment project.

3. **Sugar Maples Stormwater Project (2010):** GCSWCD installed stormwater treatments to serve approximately 4.7 acres of relatively high-density commercial buildings and residential homes in the hamlet of Maplecrest in the town of Windham. The components were initiated with an upgraded conveyance system and demolition of a single building to reduce

impervious surfaces and to allow for construction of the pervious grass parking area. The project was completed with the installation of a permeable grass parking lot (~2,400 sq. ft.), rain gardens (7 total), wetland (treats 4.7 acres of runoff), porous walkways and riparian planting beds. Supplemental plantings performed in the rain gardens and wetland in spring 2011. For additional information and project reports visit http://www.catskillstreams.org/projectmaps/

4. **Hunter Mountain: (Village of Hunter) (2009):** Following discussions between the GCSWCD and Hunter Mountain it was determined that Hunter Mountain had already received funding through the CWC Stormwater Program and completed stormwater retrofits for their parking areas.

5. **Community Stormwater Planning (2009):** The GCSWCD has initiated a series of projects which to help develop Community Stormwater Management Plans for various Towns and Villages within the Schoharie Basin. The GCSWCD has detailed information on stormwater structures in a GIS format for the Towns of Ashland and Prattsville. GCSWCD has also obtained copies of Community Stormwater Management Plans which have been completed for the Village of Tannersville, Town of Hunter, and Town of Windham.

6. **Hunter Highway (2008):** Provided Operation and Maintenance Plan and implemented stormwater maintenance and cleaning of the stormwater controls at the Hunter Highway Garage. Annual maintenance in 2008 captured 6.3 tons (3.6 cubic yards) of sand and salt from entering the downstream Schoharie Creek.

7. **Critical Area Seeding (2007-2010):** GCSWCD provided seeding assistance in the Towns of Hunter, Ashland, Tannersville, Jewett, and Lexington in 2007; the Towns of Windham, Ashland, Jewett, and Hunter in 2008; the Towns of Windham, Hunter, Ashland, Hunter and Lexington in 2009; the Towns of Lexington, Windham, Tannersville and Hunter in 2010.

V. Highway and Infrastructure Improvements

During development of Stream Management Plans for the various sub-basins, the GCSWCD, NYCDEP, and the SWAC Highway and Infrastructure Subcommittee identified a number of recommended actions that would provide water quality protection. The following were completed between 2007 and 2013:

1. **Griffin Road Culvert Replacement (2012):** The existing culvert conveyed Halsey Brook under Griffin Road in the Town of Jewett was undersized (<10 year capacity) and washed out during the flooding caused by Hurricane Irene. The culvert historically has caused flooding and repetitive damage to nearby homes and significant risk to the community. GCSWCD and Delaware Engineering provided design plans, permits, specifications and contract documents for bidding, funding, construction management and administration for the culvert replacement for the Town of Jewett Highway Department. The new culvert was designed to convey the 100-year runoff event and included a habitat friendly three-sided precast concrete structure with wing walls at the inlet and outlet. Road improvements to provide a stable surface for Griffin Rd over the culvert were installed and stream enhancements to the adjacent reaches included the installation of an upstream cross vane to improve alignment and conveyance of water and sediment through the opening. A grant was approved by FEMA to offset the costs of upgrading the culvert to a larger size and funding from NYCDEP provided the engineering, oversight and other incidentals for the project. Design, permitting and construction were completed in the fall of 2012.

2. **Flood Response (2012):** A site visit was conducted in April 2010 to an East Kill tributary that is frequently dredged under Griffin Road in the Town of Jewett. Hurricane Irene completely destroyed the crossing and GCSWCD staff assisted the Town in constructing a temporary crossing. The new three sided structure is durable, made of concrete, will pass flows above the 100-year runoff event, and will have limited impact on upstream and downstream reaches and aquatic habitat. Design, permitting and construction were completed in 2012.

3. **Partridge Road Culvert Replacement (2011):** The culvert under B.G. Partridge Road, in the Town of Ashland, was undersized which contributed to roadway flooding during high flows. The culvert was also perched, which presented a barrier for fish passage. The GCSWCD worked with the Town of Ashland Highway Department to design a properly sized culvert and oversee the installation of this culvert. A grant was approved by the SWAC/SMIP to offset the costs of upgrading the culvert to a larger size. Design, permitting and construction were completed in the summer of 2011.

4. **Village of Tannersville Highway Department Technical Assistance (2011):** The Village of Tannersville requested assistance on sizing a culvert under Spring Street in the Village of Tannersville. The GCSWCD inspected the existing culverts under the road and provided the village with a variety of culvert sizing options which would increase the flow capacity of the culvert system. The information forwarded to the Village of Hunter Highway Department in March 2011.

5. **Road Abrasives Program (2009):** Upon further review with local and county highway departments, cost sharing for road abrasives was determined to be unfeasible due to limited funding available to support offsetting costs over time.

6. **Driveway/Curb Cut Specifications (2009):** Permit specifications were obtained from the Greene County Highway Department and given to the Highway Subcommittee in December 2009 in order to provide watershed communities with a model to consider when issuing permits. Each community will follow up based on their level of comfort. Some communities do not use driveway regulations, preferring to assess on sight and guide landowners. Communities and landowners may obtain additional assistance by contacting the GCSWCD WAP office if they are interested in updating curb and driveway standards.

7. **Hydraulic Analysis (2008):** Provided technical assistance including hydrology and hydraulic assessment to better size culverts for Greene County Highway Department.

VI. Planning and Assessment

Assessment of previous projects and programs and land use planning are key components to a watershed program. Planning and assessment conducted through the stream management program ranged from land use planning, assessment of streams and their watersheds, and the survey and monitoring of various locations and project sites. Completed Planning and Assessment action items include:

1. **Water Temperature Impacts on Fisheries Study (2014):** The Greene County Soil & Water Conservation District and NYC Department of Environmental Protection worked with the United States Geological Survey (USGS) and the Rochester Institute of Technology (RIT) to determine the location of thermal refugia, which are important to cold water fish communities during the summer months. The study was conducted to inform and guide entities whose activities may impact cold water inputs. In 2012, RIT conducted the imagery collection flight and submitted their report, *Aerial Thermal Imaging of Select Streams In Greene County.* In 2013, the USGS analyzed and summarized the imagery data. In 2014, the USGS submitted their final report *Variations in Water Temperature and Implications for Trout Populations in the Upper Schoharie Creek and West Kill, 2010-2012.*

2. **Mountaintop Better Site Design Plan Workshops (2011 & 2012):** The Greene County Soil & Water Conservation District's Watershed Assistance Program, Kendall Stormwater Services, and Morris Associates worked with the following mountaintop communities, Towns of Ashland, Jewett, Lexington, Windham and Hunter, and the Village of Tannersville. For each community, consultants conducted a comprehensive code review against model development principles; helped to identify which principles to address for local improvement; developed a Low Impact

Development Manual for communities to use in site planning, and to share with landowners and developers; and developed an education packet for easier reference. Final reports were provided to the communities highlighting code recommendations specific to that community, as identified by those community participants. Communities are expected to review recommendations and adopt supported changes at the local municipal level. More information can be found at http://www.gcswcd.com/swp/wap/mbsd.

3. **Town of Hunter Corridor Regional Planning Study (formerly called Generic Environmental Impact Statement) (2010):** The GCSWCD worked with the Town of Hunter and the Villages of Tannersville and Hunter to undertake a Corridor Study that entailed a comprehensive assessment of potential future development along the state route 23A corridor. The Corridor Study is a cooperative, multi-municipality effort to evaluate foreseeable development and environmental mitigation associated with future development. The full report with appendices can be found at http://gcswcd.com/swp/wap.html.

4. **Dale Lane Survey and Hydraulic Analysis (2010):** Site survey was completed in 2009. Hydraulic analysis using HEC RAS was completed in spring 2010. A report was prepared detailing the results of the hydraulic model.

5. **Mauro Residence Bank Stabilization (2010):** This project involved a geotechnical assessment of a failing streambank in relation to a private residence. A site visit with an engineer was completed April 27, 2010. The engineers report stated that the residential structure was not currently threatened by the slope condition. A copy of the report was provided to the home owner and the bank was seeded and mulched.

6. **Lexington Sill (Schoharie Creek) (2010):** Upon assessment, it was determined that the removal of the sill would have little impact on the stream. No further action is expected.

7. **Tributary Assessment and Planning Projects (2010):** Historical alignments, riparian vegetation mapping, watershed analysis, stream feature inventory and Geodatabases have been completed for Batavia Kill Tributaries North Settlement Creek, Furnace/Red Falls Creek and Mad Brook. Management Plans are scheduled to be completed in 2013.

8. **Manor Kill Stream Management Plan (2009):** In 2008, a stream feature inventory, riparian vegetation mapping and significant portions of a stream management plan were completed. The Manor Kill Management Plan was completed in early 2009, and the Town of Conesville adopted it and signed an MOU for implementation with the Schoharie County SWCD. This project also offered an opportunity to expand partnerships, and planning area, to include the Schoharie County Planning Department and Soil and Water Conservation District. For complete plan visit: http://www.catskillstreams.org/Stream_Management_Plans.html

9. **Mountaintop Recreation Master Plan (2009):** Report available at: http://gcswcd.com/swp/wap.html The GCSWCD WAP worked with numerous public and private sector partners to develop a comprehensive master plan that focuses on recreation, and also includes open space, scenic quality and cultural resources. Two implementation subcommittees are working on marketing and coordinating projects and outdoor resource improvements that promote access to, and appreciation of, the mountaintop's natural environment including stream systems.

10. **Greene County All Hazards Mitigation Plan (2009):** In the past, access to federal Hazard Mitigation Grant funds has helped the GCSWCD to mitigate significant flood related problems in Greene County. Since 1996, the GCSWCD has accessed over $1,000,000 in funds from this program for major projects in the Village of Hunter (Melody wood condominiums) and Town of Lexington (West Kill Stream restoration). New FEMA program rules prohibit access to these funds unless a community has a FEMA approved All Hazards Mitigation Plan in place. The Greene County Planning Department, GCSWCD and NYCDEP interviewed potential

subcontractors and awarded the development of the hazard mitigation plan to Tetra Tech, Inc. Tetra tech worked with the various municipalities and partners to gather input for the plan, which was completed in 2009 and can be accessed at http://www.greenegovernment.com/draft.htm.\

11. **Survey of potential SPDES stream restoration site (2009):** A site on the East Kill was selected as a potential SPDES stream restoration site due to its high contribution of fine sediments. One landowner was unwilling to grant GSCWCD permission for the required pre-design survey work. Survey is no longer planned for this site.

12. **Japanese Knotweed Management Project (2009)**: Hudsonia sampled Japanese knotweed management plots for several years. The results of their research are shown in the final report "Experimental Management of Japanese Knotweed on the Batavia Kill, Greene County, New York", which was submitted to GCSWCD in December 2009 and can be viewed online at: http://www.catskillstreams.org/pdfs/Hudsonia_knotweed.pdf.

13. **Restoration Project Wetland Mapping (2009)**: C.T. Male Associates was hired to remap the wetlands on the Ashland and Conine restoration sites to assure ACOE's wetland mitigation requirements are being met. Wetland mapping and reporting was completed by C.T. Male Associates in 2009.

14. **Catskill Riparian Reference Study (2009):** New York Natural Heritage Program completed a final report "Inventory, Classification, and Description of Riparian Natural Community Reference Types for West Kill Watershed, New York" and appendix "West Kill Restoration Guide to Planting". Report available at: http://www.catskillstreams.org/stewardship_streamside_rb.html

15. **Schoharie Watershed Strategy (2008):** Engaged multiple watershed partners and agencies, municipal officials, and departments (highway, planning, and code enforcement) in the strategy's development which focused on landscape sources that contribute to water quality impairments. Some recommendations have been identified as implementation activities within the 2009 - 2011 action plan and the Schoharie Watershed Advisory Committee will review proposals in September 2009 to allocate implementation funding to support those activities. Copy of report can be found here: http://gcswcd.com/swp/wap.html

16. **Monitoring of Restored Stream Reaches:**
    a. **2008:** Restoration project performance monitoring was completed at five sites in 2008.
    b. **2009:** Monitoring has been performed and reports compiled for the priority monitoring sites, Conine Stream Restoration Project and the Ashland Connector Stream Restoration Project. Additionally the Brandywine Stream Restoration Project and the Farber Farm Stream Restoration Project sites were also monitored and reports compiled.
    c. **2010:** Monitoring has been performed for priority monitoring sites: Conine, Ashland Connector Reach, Shoemaker, Lanesville, Sugar Maples and Long Road Stream Restoration Sites.
    d. **2011:** Monitoring has been performed for priority monitoring sites: Long Road and Sugar Maples.
    e. **2012:** Monitoring has been performed for priority monitoring sites: Ashland Connector Reach, Conine, Sugar Maples, Schoharie Street, and Long Road.
    f. **2013:** Monitoring has been performed for priority monitoring site: East Kill Restoration at Vista Ridge.

VII. Recreation and Stream Habitat Improvements

In the general recommendations of all stream management plans enhanced public access to streams for recreational purposes was identified as a priority. The GCSWCD already has a number of these projects underway through partnerships with the members of the SWAC Habitat and Recreation Subcommittee. Completed Recreation and Stream Habitat Improvements action items include:

1. **Windham Path (2013):** GCSWCD and NYCDEP assisted the Town of Windham with installation of a public, non-motorized, multi-use trail along a 65 acre parcel located along the Batavia Kill. SWAC/SMIP funds were used to cover the cost of materials for a boardwalk and footbridges. Contracting, scope of work, permitting and construction have been completed. The Town and Windham Area Recreation Foundation (WARF) held the Grand Opening of the Windham Path on May 27th, 2013, which was well attended. The Windham Path is used almost daily by local residents and visitors to Windham. WARF is planning Phase 2, which plans to include a pedestrian bridge over the Batavia Kill to link to the business district on South Street and Route 296.

2. **Organize Repository of Stream Ecosystem Data (2013):** Stream management plans included a recommendation to characterize the current health of stream ecosystems. In order to determine the health of streams, a variety of data may be useful including food web dynamics, the presence or absence of indicator species and primary producers, and the status of fish populations, among others. Various studies have been conducted by different agencies and colleges over the years (e.g., USGS, NYSDEC, NYCDEP, ESF, Stroud Resource Center, GCSWCD). Under the guidance of the Habitat/Recreation Subcommittee, the GCSWCD has organized a master repository which integrates existing data and published documents and may help determine where additional field studies are warranted. Project is complete. The Stream Ecosystem Data Repository – Upper Schoharie Creek Watershed is available at: http://dspace.gcswcd.com/

3. **Prattsville Stream Access Parking (2012):** The Town of Prattsville was approved for SMIP funding October 2009; this grant was closed in August 2012, due to site constraints and significant flood damage throughout Prattsville during Hurricane Irene in 2011.

4. **Ashland Fishing Access Enhancements (2010):** GCSWCD and NYCDEP completed a parking area and access to an existing public fishing area on the Batavia Kill at the Ashland Connector Reach Restoration Project. The access includes and informational kiosk.

5. **Town of Windham (Police Anchor Camp) (2010):** GCSWCD provided conceptual plans to the Town of Windham to assist with assessment and planning for public use of a 65 acre parcel located in the Batavia Kill watershed. Long term plans have not been established. A multi-use trail will be installed in 2011 to allow for recreation and stream access. See Windham Path in the Action Plan for more details.

6. **Windham Creamery Pond (2008)**: The GCSWCD assisted the Town of Windham with the development of a public access area on a NYCDEP owned parcel in the hamlet of Windham. The GCSWCD completed a site design, Stormwater Pollution Prevention Plan and other documents. The design included the construction of parking area and athletic fields and was left to the town to complete.

7. **Prattsville Conine Park (2008):** The GCSWCD worked with the Town of Prattsville on a master plan for redevelopment of Conine Field. Key conservation issues under consideration included fishing access point, knotweed management, a riparian buffer planting and a conservation easement on sections of the property adjoining the Batavia Kill and Schoharie Creek, and a stormwater pollution prevention plan retrofitting the site to meet current standards for new construction. Preliminary designs were completed for the park by GCSWCD and provided to the Town of Prattsville for completion.

VIII. Flood Hazard Mitigation

Flooding produces a variety of hazards and impacts to public safety, homes and businesses, infrastructure (roads, utilities, etc.) and the natural environment. It can have direct impacts on water quality, including contamination from dislodged fuel and chemical storage tanks, mobilization of household waste and toxic substances, excessive riverine erosion and massive hill slope failures. As

such, flood hazard mitigation – the work of reducing the impacts from flooding - supports the social, economic and environmental interests of communities in the NYC watershed.

1. **Manor Kill Acquisition (Town of Conesville) (2013):** The Town of Conesville assisted a landowner by acquiring a floodplain parcel approved for FEMA Pre-Disaster Mitigation funding (75%) and demolishing and removing the home. The SMIP grant was used to assist the Town in meeting the required 25% match. The project, which involved demolition and site restoration, was completed with demolition and site restoration occurring in June, 2013.

2. **Prattsville Local Flood Analysis (2013):** The intent of the LFA was to use engineering analysis to develop a range of flood hazard mitigation alternatives; the primary focus of the analysis was to identify the potential for reducing flood elevations through channel and floodplain restoration, as the first alternative to other hazard mitigation solutions and to evaluate both the technical effectiveness and the benefit/cost effectiveness of each solution, and compare different solutions to each other for the most practical, sustainable outcome. The LFA can be found at: http://catskillstreams.org/major-streams/schoharie-creek/