RONDOUT NEVERSINK STREAM PROGRAM

2021-2023 ACTION PLAN

2020 RESTORATION SITE: CLOTHES POOL, WEST BRANCH NEVERSINK

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TO: *Mark Vian, Project Manager, NYC DEP Stream Management Program*
FROM: *Stacie Howell, Sullivan County Soil & Water Conservation District*
DATE: *April 15, 2021*
RE: *Rondout Neversink Stream Program 2021-2023 Action Plan*

Sullivan County Soil & Water Conservation District (SCSWCD) and NYC Department of Environmental Protection (DEP) have developed the 2021-2023 Action Plan for your review. The purpose of the Action Plan is to identify the Rondout Neversink Stream Program's (RNSP) planned activities, goals to accomplish and next steps in support of recommendations derived from stream management plans and Committee/stakeholder input. The current plan was updated and reviewed by our staff team and Watershed Advisory Group including municipal stakeholders in March 2021.

The Action Plan is divided into key programmatic areas:

A. *Protecting and Enhancing Stream Stability and Water Quality*
B. *Floodplain Management and Planning*
C. *Highway and Infrastructure Management in Conjunction with Streams*
D. *Assisting Streamside Landowners (Public and Private)*
E. *Protecting and Enhancing Riparian and Aquatic Habitat*
F. *Stream Stewardship Education and Outreach*

This program does not address Enhancing Public Access to Streams as in other basin Action Plans because the watersheds are predominantly in the Catskill Forest Preserve with significant New York State DEC access points to the stream. Overuse issues are prevalent and RNSP and DEP staff teams coordinate with regional municipal and state partners to disseminate public information and raise awareness about conservation law and stream stewardship. This document lists the program's (RNSP staff-driven) and grant-driven Education and Outreach activities in Section F.

The Action Plan is updated annually. This proposed plan will be implemented from May 2021 through April 2023.

2021-2023 Action Plan
Rondout Neversink Stream Program

The Rondout Neversink Stream Program (RNSP) was established in a partnership among Ulster and Sullivan County Soil & Water Conservation Districts (UCSWCD & SCSWCD) and NYC Department of Environmental Protection (DEP) in 2009 as part of the Filtration Avoidance Determination (FAD) issue to DEP by the Environmental Protection Agency. For practical purposes, a field office was established in Grahamsville at Neversink Town Hall in 2010 when Sullivan County SWCD contracted with DEP to conduct Stream Management Planning in this unique area to serve the two remote towns in Rondout and Neversink basins: Town of Neversink (Sullivan County) and Town of Denning (Ulster County). Stream Management Plans (SMPs) were completed for the three

major river corridors in the basin: Chestnut Creek, Rondout Creek and East and West Branches and Main Stem of Neversink River.

The SMPs provide a road map for improved stream and floodplain management. Initiatives include the Stream Management Implementation Program (SMIP), Catskill Streams Buffer Initiative (CSBI), stream and floodplain restoration projects, stream and bank erosion watershed assessments, flood hazard analysis and mitigation, and education and outreach programs.

The following Action Plan summarizes the programs and projects that SCSWCD will be leading within the Rondout and Neversink Basins between May 2021 and April 2023, and includes updates on program activity through March 31, 2021. SCSWCD and its Watershed Advisory Group will lead the effort for each action item and work cooperatively with watershed partners including Denning, Neversink, Ulster and Sullivan Counties, NYC DEP, NYS DEC, and CWC. Funding sources for action items are provided by NYC DEP in contract CAT-495 through February 2025. This Action Plan identifies goals to address Stream Management Plan and Local Flood Analysis recommendations for implementation by Rondout Neversink Stream Program in the period 2021-2023. See the Projects tab at www.rondoutneversink.org for restoration activities by year from 2011-2020.

*<u>How to read this document:</u> The Action Plan is organized around key program areas. For each topic area there is a list of recommendations, derived from Stream Management Plans and Local Flood Hazard Mitigation Plans in conjunction with Program stakeholders, in italicized text. Under the list of recommendations, tables list planned projects to be carried out by the staff team and through the Stream Management Implementation Program (SMIP). Within the tables, items and grants that are new or have been updated in 2021 are in **bolded** text. Summaries of new projects are found beneath each table.*

A. Protecting Stream Stability & Water Quality

These actions may include: stream corridor assessments, stream stabilization/restoration projects with a goal to restore stream stability and reduce targeted pollutants; monitoring and maintenance of stream projects; and outreach, education and technical assistance to encourage stream stewardship.

Stream Corridor Assessment and Monitoring Recommendations

1. *Complete a watershed assessment of tributaries in Rondout and Neversink watersheds that have yet to be assessed. Assessments identify and prioritize fine and coarse sediment sources, erosion hazards, and potential water quality impairments and associated treatment opportunities.*
2. *Review existing water quality data and identify, as far as is possible, the most significant water quality impairments.*
3. *Identify locations of potential water quality impairments including: sources of pollution from upland areas and within the stream channel such as significant glacial lake clay and till exposures and sources of contaminants from road runoff and households, and make prioritized recommendations for their treatment.*
4. *Identify, monument and survey selected sites of bank erosion, assess their relative stability, and make prioritized recommendations for their treatment.*
5. *Monitor constructed stream restoration sites to document the projects' status and performance. Monitoring includes measurements and analysis of geomorphic form, rock structures and vegetation. Data is collected to monitor project stability and vegetation establishment.*
6. *Establish Riparian Reference Reaches.*

Rondout and Neversink Watershed Stream Feature Inventory Assessment Projects		
Stream	**Location**	**Current Status**
Rondout Mainstem	Towns of Denning/Neversink	Complete
Stone Cabin Brook	Town of Denning	Complete
Bear Hole Brook	Town of Denning	Complete
East Branch, West Branch, Mainstem Neversink	Towns of Denning/Neversink	Summer 2021
Molls Brook	Town of Neversink	Summer 2022

With help from the Watershed Conservation Corp. of Ulster Community College and DEP, the Rondout Creek 10-year Stream Feature Inventory (SFI) was completed in 2019 and 2020. The report and recommendations will continue to be developed, after completion of a proposed research project to determine the best method to reach and engage stakeholders. Several of the Rondout tributaries that were anticipated for SFI for summer 2020 were cancelled due to not receiving landowner permissions.

During the 2021 field season, the East Branch, West Branch and Mainstem of the Neversink River will begin the 10-year update. Field work is anticipated to start in late summer, pending landowner permissions, with post-processing and data write-up throughout winter 2021-2022.

A schedule for future tributary SFIs will be evaluated after completion of the Neversink 10-year walkover. It is anticipated that this SFI will lead to additional Bank Erosion Monitoring and a shift in restoration prioritization based on new streambank failures and self-healing of other sites.

Stream Restoration and Stabilization Recommendations

1. *Identify locations, such as those included in Ulster County Multi-Jurisdictional Hazard Mitigation Plan, where roads, bridges, or culverts and water quality may be threatened by SMP-prioritized bank erosion, or are otherwise unstable or threatened, and make prioritized recommendations for their treatment.*
2. *Identify locations where water quality may be threatened by bank erosion, and make prioritized recommendations for their treatment.*
3. *Identify locations of stream instabilities contributing to water quality impairment and make prioritized recommendations for their mitigation or treatment.*
4. *Implement the following stream stability restoration projects that have been identified through field assessments or prioritized in management plans (additional details below table):*

   2022: Construction of Ladleton Restoration, East Branch Neversink
   2021-2022: Design of Spindel/East Valley Ranch, East Branch Neversink

Rondout and Neversink Stream Restorations

Project Name	Stream	Status	Expected Completion	Project Description	Length (ft)	Designer	Cost
Blue Hill Lodge	East Branch Neversink River	Construction Complete 2018	Ongoing Vegetation Work	Full restoration with channel realignment and grade control	750	Barton & Logiudice	$510,825
Denning Town Hall	East Branch Neversink River	Construction Complete 2018	Ongoing Vegetation Work	Full restoration with channel realignment and grade control	700	Barton & Logiudice	$450,309
Frost Valley Road S-Turn	West Branch Neversink River	Construction Complete 2018	Ongoing Vegetation Work	Flood Hazard Mitigation Project	500	Milone & MacBroom	$500K (RNSP share)
Clothes Pool Restoration	West Branch Neversink River	**Damaged during Dec 25 flood**	**Summer 2021**	Turbidity Reduction Project, hillslope stabilization and bankfull bench	800	Stantec	**$672,397, plus repairs**
Ladleton Restoration	East Branch Neversink	Design	**2022**	Turbidity and Coarse Sediment Reduction Project	**1100**	Stantec	**Engineers Estimate $1.3M**
CR-47 at Lake Cole	**East Branch Neversink**	**Design**	**2021**	**Infrastructure Protection, Streambank Stabilization**	**450**	**Stantec**	**$265,994**
Spindel/East Valley Ranch	East Branch Neversink	Evaluation	**2023**	Turbidity Reduction, hillslope stabilization, flood mitigation	TBD	TBD	TBD

Clothes Pool (West Branch of the Neversink): Construction of Clothes Pool was completed in September 2020. Planting and willow staking continued through the fall. The high water event on December 25th resulted in some damage to the soil lifts because the project was so fresh and the vegetation had yet to

establish. Repairs are needed to the soil lifts and vegetation, planned for May-June 2021. Additionally, during the December flood, a site that was being monitored for future work on the West Branch Neversink near Lake Coleeroded laterally over 30' toward the road and lake in the single storm. This is putting CR-47 at risk of damage when another similar or larger high water event happens. RNSP tapped into DEP's engineering contract resources to fast-track a design with Stantec, Inc., with a goal of project completion before the commencement of Frost Valley's summer season and the associated heavy visitor use.

Due to the infrastructure priority of this site plus the repair work needed at Clothes Pool, it was decided to postpone Ladleton restoration until summer of 2022. Design of the Ladleton project is currently at about 60% and will continue to be developed through the summer.

The next large restoration project after Ladleton is Spindel/East Valley Ranch, unless the scheduled 2021 Neversink Stream Feature Inventory produces a higher priority streambank. Design will be initiated in Fall of 2021, with the intention of being ready for construction in summer 2023.

Restoration of these sites meets dual goals of reducing 1) fine sediment contributing to turbidity, and 2) coarse sediment contributing to aggradation and stream instability in downstream reaches nearby in population centers, which has both flood hazard mitigation and water quality benefit. A focus has been placed on state of the science soil restoration at past and future restorations and vegetation at all sites will take several years efforts to significantly establish.

B. Floodplain Management and Planning

Includes floodplain assessments; coordination with floodplain management effort in the watershed; and outreach, education and technical assistance for floodplain management.

LOCAL FLOOD ANALYSIS AND FLOODPLAIN ASSESSMENT RECOMMENDATIONS

1. *Identify locations where roads, bridges, or culverts may be threatened by flooding, and make prioritized recommendations for their treatment.*
2. *Identify locations where improved or residential areas may be threatened by flooding, and make prioritized recommendations for their treatment.*
3. *Support flood hazard mitigation efforts to reduce the impacts from flooding such as impacts to public safety, homes and businesses, critical facilities (i.e., Town Halls, Highway Depts.) infrastructure and the natural environment.*
4. *Through LFA, provide resources to help WOH municipalities: confirm that there is a significant flood hazard in the target area through engineering analysis; use engineering analysis to develop a range of hazard mitigation alternatives; 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.*

RONDOUT AND NEVERSINK LOCAL FLOOD HAZARD MITIGATION ANALYSIS		
STREAM	**LOCATION**	**CURRENT STATUS**
Neversink River	Claryville Towns of Denning, Neversink	Accepted 2014
Rondout Creek	Sundown, Town of Denning	Accepted 2017
Chestnut Creek	Town of Neversink	Summer 2021
Saw Mill Road Analysis	Town of Denning	Summer 2021

Chestnut Creek LFA is ongoing, with an expected completion of early summer 2021. After that, an analysis on Saw Mill Road in Denning will begin, which was a recommendation from the Claryville LFA and a localized area that experiences frequent flooding from poor drainage and extensive mountain runoff.

RONDOUT AND NEVERSINK LOCAL FLOOD HAZARD MITIGATION PROJECTS		
PROJECT	LOCATION	CURRENT STATUS
Hunter Road Flood Model Detail	Claryville Town of Neversink	Complete
Denning Culvert Assessment	Town of Denning	Complete
Sugarloaf Road Culvert Assessment	Town of Neversink	Complete
Chestnut Creek Vacant Lot Implementation	Town of Neversink	Analysis in Progress

While the Chestnut Creek LFA is still underway, SLR was able to look at a vacant lot adjacent to the Neversink Town Hall for potential flood reduction options. Results are pending. RNSP plans to assist with implementation costs, if any, in addition to a native buffer planting extending the Town Hall's buffer.

FLOODPLAIN MANAGEMENT COORDINATION, EDUCATION AND OUTREACH RECOMMENDATIONS

1. *The SCSWCD can support local municipalities in the use of FIRM maps.*
2. *Municipalities in the watershed can conduct a review of current floodplain ordinances and adopt revisions as appropriate. Revisions should reflect current building trends, new technologies, compliance and integrated broader community plans as appropriate.*
3. *Support municipal exploration of Community Rating System as a feasible activity.*
4. *Access to flood prevention/protection information can be established and supported throughout the basins.*
5. *Watershed municipalities, working with local and state agencies, can support periodic training sessions on flood related issues. Audiences can include municipal leaders, code enforcement staff, planning boards, landowners, realtors, lending institutions and others.*
6. *Watershed municipalities can facilitate development of a flood damage reporting system to track types of flooding, their location and the costs associated with flood damage.*
7. *Stream and floodplain management guidelines, which integrate stream form and function, can be developed for use during post flood response.*

POST-FLOOD TECHNICAL ASSISTANCE	
STAKEHOLDER/AUDIENCE	EXPECTED COMPLETION
Establish a staff operator/partnership for post-flood emergency response at Frost Valley YMCA	Ongoing
Establish Town operator/partnership for post-flood emergency response in Claryville	Ongoing
Town of Neversink person assigned	Ongoing
Town of Denning person assigned	Ongoing
Ulster County DPW person assigned	Ongoing

C. Highway and Infrastructure Management in Conjunction with Streams

Outreach, training and financial assistance to highway departments (two Counties and two Towns) to encourage the adoption of best management practices. Early detection and rapid response to control and eradicate invasive species.

Highway Infrastructure and Stormwater Management Recommendations

1. *Provide support for County and Town Highway Departments for vegetation management on critical areas such as roadside ditches and steep slopes.*
2. *Watershed municipalities can evaluate winter road abrasive procedures to address abrasive quality, application methods and spring sweeping.*
3. *The Town and County Highway Departments and NYSDOT can integrate geomorphology principles in all new projects and routine maintenance activities related to the streams and tributaries.*
4. *Work with local highway departments to minimize the negative effects of bank armor through the use of vegetation within and above the armor. Replant existing rip rap. This will increase the effectiveness and strength of the rip rap and cool water temperatures through shading and reducing the thermal effects of heated rock.*
5. *Work with the Denning and Neversink Highway Departments to identify opportunities to address infrastructure that is leading to stream instability and water quality degradation.*
6. *Study potential for science-based criteria for selective stream gravel management and decisions about impacts of Large Wood.*

Rondout and Neversink Highways & Infrastructure Projects		
Stream	**Locations**	**Current Status**
East Branch Neversink Critical Area Seeding	Denning Road	Ongoing [Proganics Pilot]
Little Hollow Road Erosion Site	Town of Neversink	Complete 2017
Road Ditch Mapping/Assessment	Town of Denning	Completed 2019
Peekamoose Road Critical Area Seeding	Town of Denning	Ongoing, annual as requested
Swale @ WB Stn 20200	Town of Denning	Planning

RNSP plans to work with Ulster County Highway Department to address a drainage swale adjacent to West Branch Neversink at Station 20200 that is eroding. The proposed treatment consist of redirecting road drainage and repairing the streambank with coir logs and planting. This work will likely be timed with Clothes Pool repairs.

Recommendations for Outreach and Technical Support to Highway Departments, Stormwater Managers and Contractors

1. *Provide municipal highway departments and local contractors with hands-on training in various stream management activities. Conduct field days, workshops and demonstration projects to meet this goal.*
2. *Educate and train municipal highway departments in stream process, and provide them with information about how maintenance of road systems and other public infrastructure may impact local waterways.*
3. *Provide education and outreach to municipal highway departments, stormwater managers and contractors to improve their ability to recognize changes in stream stability and impacts to water quality that may be associated with infrastructure management activities and to understand the impact of management actions.*

Rondout and Neversink Highway Dept and Stakeholders Training		
Subject	**Audience**	**Current Status**
NYS DEC Erosion & Sediment Control Certification	Land/Operation Managers	Completed 2019
Rosgen Level 1 Basic Stream Process Training	Land Managers/ Highways/DPW	Searching for candidate(s)
Japanese Knotweed Early Detection	Highway Departments	Ongoing

D. Assisting Streamside Landowners (Public and Private)

Provide access to training and technical assistance to increase the knowledge, skills and capabilities of landowners in the watershed. Also provide support for riparian buffer restoration.

Catskill Streams Buffer Initiative Recommendations

1. *Preserve and protect existing riparian buffers and provide for improved stewardship.*
2. *Protect/enhance the stream corridor through the establishment of effective forested buffers. Stream buffers will offer some measure of protection against encroaching land uses and act to protect public and private property.*
3. *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.*
4. *Provide assistance with managing and preventing the spread of Japanese knotweed and other invasive species.*
5. *Provide assistance for streamside landowners to maintain diverse and healthy riparian buffers of at least 35-100 feet using native shrubs, trees and other woody vegetation.*

Rondout and Neversink Buffer Projects							
Project Name	**Waterbody**	**Status**	**Expected Completion**	**Project Description**	**Length (ft)**	**Designer**	**Cost**
State Route 55	Chestnut Creek	Complete	2020	Erosion control hillslope stabilization/revegetation	110	SCSWCD	$31,202.08
Ballfield	Rondout Creek	Invasives Control	TBD	Demo site for sustainable landscape design	550	Phyto Studio	TBD
Chestnut Creek Buffer	Chestnut Creek	Ongoing Invasive	Fall 2021	Invasive removal and replanting with Sullivan County Renaissance	300	Restaino Designs	$0
Time and Valley Museum	NA	Ongoing Maintenance	Summer 2022	Native garden display	NA	SCSWCD	$600
Plant Material Center	NA	Ongoing	Ongoing	Repotting stock to larger pots	NA	NA	TBD
One Nature Contract Extension	NA	Executed	Active through 2024	Contract extension with One Nature to grow plants from tubelings	NA	NA	~$240K/4 years
Molls Brook	Tributary to Rondout Creek	Planning and Design	TBD	Bank stabilization project	200	SCSWCD	TBD
Vegetation Monitoring	Multiple	Ongoing	Annually in August	Vegetation monitoring at past project sites	NA	NA	NA

Wintoon RipRap Retro Planting	West Branch Neversink	Complete	Completed Fall 2020	Retrofitting riprap along West Branch Neversink with soil and willow/shrub plantings	302	SCSWCD	$24,906
Frank-Kerrigan	Rondout Creek	Complete	Completed Fall 2020	Riparian planting	164	SCSWCD	$1,300.00
Kelly	Red Brook	Complete	Completed Fall 2020	Streambank stabilization and riparian planting	103	SCSWCD	$6,849.95
Eighmey	Rondout Creek	Complete	Completed Fall 2020	Riparian planting	715	SCSWCD	$8,276.50
Stanley	Rondout Creek	Complete	Completed Fall 2020	Riparian planting	746	SCSWCD	$12,689
Wintoon Waters HWA	West Branch Neversink	Complete	Completed Fall 2020	Hemlock Wooley Adelgid Treatment	TBD	SCSWCD	$9,000
Rodriguez	Chestnut Creek	Planning	Spring 2021	Riparian Planting	TBD	SCSWCD	TBD

2020 was a very productive year for CSBI with a record number of plants installed and stream length vegetated. One new CSBI planting is being planned for Spring 2021 with repairs and maintenance also needed at several projects after the December flood event.

Outreach, Education and Technical Assistance to Streamside Landowners

1. *Provide streamside landowners detailed technical information on the establishment and maintenance of riparian buffers.*
2. *Provide stakeholders technical assistance that will guide restoration of stream system stability and help to maintain ecological integrity. Technical assistance can range from a landowner consultation to activities that will help meet the priorities of protecting water quality and establishing riparian buffers.*
3. *Provide long-term access to technical assistance to landowners and municipalities for assessment of their stream-related problems, and development of effective management strategies and to supervise stream project implementation.*
4. *Educate streamside landowners by providing a basic understanding of fluvial process, factors impacting streambank stability and water quality, and management decisions for the promotion of a healthy stream.*
5. *Characterize current riparian vegetation management in the watershed and make prioritized recommendations for changes that can improve ecosystem integrity.*
6. *Educate municipal leaders by providing a basic understanding of fluvial process, with an emphasis on how local decision makers can support stream health through their leadership and provide information on the multiple benefits which can be realized by protecting stream and watershed health.*

Rondout and Neversink Outreach Events		
Subject	**Audience**	**Current Status**
Annual Tree & Shrub Sale	Streamside Landowners	April 23-24, 2021
Fly-Tying Workshop	General Public	TBD
Forest to Frying Pan Cultivating Mushroom Buffer Workshop	Streamside Landowners	Postponed, New date TBD
Neversink Paddling Tour	General Public	June and August 2021
Peek in the Creek Family Stream Exploration	Neversink Parks & Recreation	August 2022 Tentative
River Geology Walk and Talk	General Public	Digital

All in-person events were postponed during 2020. A River Geology Walk and Talk was switched to digital format, a Japanese Knotweed educational video was also produced. A Glacial History webinar was also given in collaboration with Time and the Valleys museum. It is hoped that in-person events can resume in 2021 in a limited capacity. A reservoir kayaking day and fly-tying workshop are currently being planned for this summer. Peek-in-the-Creek, a kids' snorkeling event, will return in summer 2022.

E. Protecting and Enhancing Riparian and Aquatic Habitat

Support for research and education programs that encourage protection of aquatic and riparian ecosystems.

RECOMMENDATIONS FOR RIPARIAN AREAS

1. *Preserve and protect existing riparian buffers and provide for improved stewardship.*
2. *Protect/enhance the stream corridor through the establishment of effective forested buffers. Stream buffers will offer some measure of protection against encroaching land uses and act to protect public and private property.*
3. *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.*
4. *Provide assistance with managing and preventing the spread of Japanese knotweed and other invasive species.*
5. *Provide assistance for streamside landowners to maintain diverse and healthy riparian buffers of at least 35- 100 feet using native shrubs, trees and other woody vegetation.*

RONDOUT AND NEVERSINK JAPANESE KNOTWEED CONTROL SITES		
STREAM	**LOCATION**	**CURRENT STATUS**
Chestnut Creek	Multiple sites	2010 - Ongoing
Rondout Creek	Multiple sites	2010 - Ongoing
West Branch Neversink	County Road 47	Complete 2016

RECOMMENDATIONS FOR HEALTHY AQUATIC HABITAT

1. *Conduct a detailed assessment of current and potential fisheries conditions.*
2. *Provide technical support for post-construction monitoring of fisheries habitat conditions at restoration project sites to confirm benefits to fisheries.*

RONDOUT AND NEVERSINK RESEARCH GRANTS		
PARTNER	**SMIP GRANT FUNDING**	**CURRENT STATUS**
US Geological Survey 3-Year Fish Population Study	$174,584	Peer reviewed study published in 2020
Colorado State University 2-Year Large Wood Sediment Study	$99,086	Completed 2018
Cary Institute for Ecosystem Studies Research Fellowships	$37,761	Completed 2019
USGS Fish Populations Pre and Post Restoration	$59,400	2nd Year
FV support person for USGS study	TBD	In Progress, pending WAG approval
Cary Institute for Ecosystem Studies Research Fellowships	$25,619	In Progress, pending WAG approval

USGS fish study will focus on capturing population data before and after restoration projects to determine the effects that construction and restoration have on fish species over a 3-year period. Some sites already have several years of data pre-construction from the previous grant. A second grant will be

made to Frost Valley, for a staff support by a crew member, if needed. SCSWCD will also provide intern support to USGS.

A research proposal is being developed by a Binghamton University student as part of the Cary Institute for Ecosystem Studies' Student Research Fellowship program, which will oversee the student researcher and administration of the grant funds. The proposal is to 1) determine the most effective method(s) of reaching the landowners and stakeholders and increasing participation, potentially reaching different subsections in different ways (mail, e-mail, social media, etc.). 2) Solicit input from stakeholders regarding concerns to update management plan recommendations. 3) Raise awareness of Rondout Neversink Stream Program and its services. In an effort to support our 10-year update of the Rondout Creek Management Plan and the upcoming update of the Neversink River Management Plan, this study would look at changing demographics in the watershed, how effective previous outreach efforts have been, and which types of communication return the most stakeholder response.

G. Stream Stewardship Education and Outreach

Support for projects that engage the community through targeting diverse stakeholders/audience ages on stream health and stewardship. Includes honoring local knowledge, illuminating land use history and providing context for future use of best management practices; includes partnership with three major educational institutions: Frost Valley YMCA, Tri Valley Central School and Time and the Valleys Museum.

STREAM STEWARDSHIP EDUCATION AND OUTREACH RECOMMENDATIONS

1. *Collaborate with local and regional partners to enhance education and outreach efforts related to stream and floodplain management, sediment and erosion control, and other topics critical to sound watershed management.*
2. *Maintain a watershed website to provide information to all stakeholders.*
3. *Develop publications focused on stream management which can be provided to watershed stakeholders and/or used in training workshops.*
4. *Host an annual watershed conference for the community to promote stream management and stewardship awareness.*
5. *Increase public and technical awareness about the importance of the Rondout and Neversink watersheds and ecosystems by providing educational workshops for a variety of stakeholders including riparian landowners, municipal leaders, planning boards, code enforcement personnel, highway departments, local businesses, contractors, developers and educators.*
6. *Increase technical awareness about stream science, water quality protection and best management practices by providing educational workshops for a variety of stakeholders including riparian landowners, municipal leaders, planning boards, code enforcement personnel, highway departments, local businesses, contractors, developers and educators.*
7. *Develop detailed science-based guidelines for stream management and natural channel design which are readily available to those entities responsible for stream activities in Rondout and Neversink watershed.*

RONDOUT AND NEVERSINK STAKEHOLDER OUTREACH PROJECTS		
TITLE	**AUDIENCE**	**STATUS**
Streamside Landowner Participation Guide	Project Site Landowners	**Completed 2019**
Getting to Know Your SMP	New Municipal Officials	Ongoing, as-needed
Floodplain Management	New Municipal Officials	Ongoing, as-needed
Stream Process 101	New Municipal Officials	Ongoing, as-needed
The Source E-News	Partners and Participants	Ongoing, biannual
www.rondoutneversink.org	Partners and Participants	Ongoing
Instagram @nycheadwaters	Partners and Participants	Ongoing, weekly
Facebook	Partners and Participants	Ongoing, weekly
Anglers Symposium Podcast	General Public	Ongoing/Annual
Catskill Waters Video Clips and Podcast	General Public	**Completed 2019**
Hemlock Conservation Prioritization Planning	Frost Valley and Wintoon Waters	2019-2021
Catskill Stream Geology	**General Public**	**Completed 2020**
Know Your Nature: Japanese Knotweed	**General Public**	**Completed 2020**

Rondout and Neversink Education and Outreach SMIP Grant Projects					
Project Name	**Recipient**	**Status**	**Expected Completion**	**Project Description**	**Award**
Watershed Project	Tri-Valley School	Completed	November 2017	Interdisciplinary multi-media storytelling with high schoolers	$15,000
School Trip Scholarships	Time and the Valleys Museum	Completed	2018	Funding for transportation/museum visits	$5,000
Catskill Waters	Keiko Sono/ Fractured Atlas	Completed	2019	Film stories of stream stewardship	$24,241
Watershed Model	Sullivan BOCES	Completed	2018	An augmented reality topographical model using gaming and projection software to create an interactive sandbox that shows how water flows over the surface of the earth.	$2,000
Water Power & Streams Exhibit	Time and the Valleys Museum	Completed	2018	With the assistance of Tri Valley Central School 8th graders, the Museum is building a properly buffered streamside area feeding a mill pond in a new exhibit to teach visitors about the history of water powered tools on a 1930s farm and the impacts manufacturing land uses had on local rivers.	$12,500
Augmented Reality Watershed Model	Time and the Valleys Museum	Completed	2019	An augmented reality topographical model using gaming and projection software to create an interactive sandbox that shows how water flows over the surface of the earth.	$2,585
Peekamoose Blue Hole Stewards	Catskill Center for Conservation & Development	Completed	2018	In partnership with NYS DEC and Catskill Center, funding provides for two full-time outreach workers to present Blue Hole visitors with Leave No Trace principles of outdoor recreation on-site five days during peak use time (summer).	$31,568
Wild About Water	Tri-Valley School	Completed	May 2018	Wild About Water in-school presentation for elementary science students	$1,000
USGS Fish Study Support	Frost Valley YMCA	Completed	2018	Staff support for USGS Fish Population Study	$2,500
USGS Fish Study Support	Frost Valley YMCA	Completed	2019	Staff support for USGS Fish Population Study	$2,500
Peekamoose Blue Hole Stewards	Catskill Center for Conservation & Development	Completed	2019	Extension of successful program from 2018 for which NYS DEC has increased its match.	$15,000
Stream History Kiosks	Town of Neversink	Completed	2019	First in series of three. Partnership project with Town of Neversink, NYS DEC and NYC DEP for three kiosks one on each main river.	TBD
Bedloader Curriculum	Syzygy Science	Completed	2019	NYS approved model lesson plan introducing students to stream science.	$3,000
Peekamoose Blue Hole Stewards	Catskill Center for Conservation & Development	Completed	2020	Extension of successful program from 2018 for which NYS DEC has increased its match.	$10,000

Catskill Rivers	In Progress	Active	Phase 1- 2020	Develop initial story boards for a new theatrical piece describing historical changes in Catskill forests and rivers from early Colonial period to the present including anthropomorphic influences on hemlock population decline.	$12,500
Peekamoose Blue Hole Stewards	Catskill Center for Conservation & Development	Active	2021	Fourth year extension of successful program to provide stream stewards at Blue Hole swimming "hot spot".	$8,000
USGS Fish Study Support	Frost Valley YMCA	Active	2021	Staff support for USGS Fish Population Study	$4,000
Stream History e-Book	Town of Neversink	Active	2019-2020	The third in the series, on the Neversink River History was originally proposed as a kiosk but was switched to an e-book format.	$3,400
Soil Barn Quilt	Town of Neversink	On Hold	TBD	Working with Cornell artist to use local riverine soils to create a Neversink Barn Quilt, with participation from local landowners through one or more workshops	TBD
Time and the Valleys Museum	Town of Neversink	In development	2021	Providing funding for a stream table at the museum and enhancements to the waterwheel exhibit.	TBD

Arm of the Sea, a local not-for-profit theatre group focused on environmental education has been developing a new production, and is about 40% complete with the storyboards. It is anticipated that they'll be ready to begin performances by fall.

The Catskill Center Stream Stewards will continue outreach efforts and Leave No Trace education at an over-used site, Blue Hole, along the Rondout Creek. Over the past three years there has been a measurable improvement to the issues as a direct result of the Stewards presence and a use-permit system.

The kiosk that was planned for the recreation history of Rondout Creek was switched to an e-book format and the third in the series (Neversink River) is being considered for that format as well. The e-book is scheduled for completion in April, at which time work on the Neversink focused one will begin.