

Appendix M – Watershed Restoration Plan Summaries

THE PAKATING CREEK & CLOVE ACRES LAKE / CLOVE BROOK WATERSHED RESTORATION PLANS

Background Information:

The *New Jersey 2002, 2004, and 2006 Integrated Water Quality Monitoring and Assessment Reports* identified the Papakating Creek, the Clove Brook, and Clove Acres Lake as impaired waterways for non-attainment of total phosphorus. In 2003, the New Jersey Department of Environmental Protection (NJDEP) proposed and EPA approved five Total Maximum Daily loads (TMDLs) to address fecal coliform in the Papakating Creek Watershed. In April 2004, the New Jersey Department of Environmental Protection (NJDEP) proposed and U.S. Environmental Protection Agency (USEPA) approved two TMDLs to 1) address total phosphorus in the Papakating Creek Watershed (for six of the seven HUC 14 subwatersheds that comprise the entire Watershed) and 2) to address total phosphorus in the Clove Acres Lake / Lakeshed and Clove Brook streamshed (the seventh Papakating Creek HUC 14 subwatershed). In response to the NJDEP and USEPA actions, the Wallkill River Watershed Management Group (WRWVG), under the administrative auspices of the Sussex County Municipal Utilities Authority (SCMUA), received approval for two fiscal year 2005 319(h) Grants to address the development of separate, but intertwined Restoration and Protection Plans for the Papakating Creek² Watershed and the Clove Acres Lake / Lakeshed and the Clove Brook Streamshed. The approved TMDLs were to serve as the basis for the development of Restoration and Protection Plans aimed at identifying the sources of total phosphorus, setting goals for pollutant annual load reductions, and implementing private and community restoration measures, in order to attain the applicable Surface Water Quality Standards (SWQS).

Restoration Plan Goals: The total phosphorus (TP) reduction goals developed by the NJDEP, which were later modified by the WRWVG and approved by NJDEP, resulted in the following total phosphorus reduction goals for the Papakating Creek and Clove Brook Restoration Plans:

- Papakating Creek Watershed (six HUC 14 sub-basins): a reduction of 6,841 pounds / year of TP, which is a 43% reduction in the estimated 2004 total TP loading of 15,909 pounds/year (7,231 kilograms/year)
- Clove Brook sub-basin (the seventh sub-basin comprising the Papakating Creek Watershed): a reduction of 2,620 pounds / year of TP, which is a 44.5% reduction in the estimated 2004 total TP loading of 5,887 pounds/year (2,676 kilograms/year)
- Papakating Creek Watershed (all seven HUC 14 sub-basins): in combination with the Clove Brook Restoration Plan, a reduction of 9,459.5 pounds/year, which is a 43.4% reduction in the estimated 2004 total TP loading of 21,795

Water quality monitoring efforts and extensive pollutant source-tracking surveys conducted within the Papakating Creek and Clove Acres Lake / Clove Brook Watersheds during the Restoration Plan development phase have identified nonpoint pollution as the predominate issue of concern versus point source (end of pipeline). The key nonpoint sources of TP were identified as: streambank erosion, agricultural land erosion and drainage, undeveloped land erosion and drainage, improper /

overuse of both agricultural and residential fertilizers, stormwater runoff from developed and undeveloped lands and roads, typical urban area sources (one specific area) and, to a lesser extent, septic systems. In addition, major storm events (rainfall exceeding two to three inches/day) have been observed to be a key factor in the transport of TP to the surface waters of these Watersheds.

In August 2008, the WRWVG formally submitted complete Watershed Restoration Plans for the Papakating Creek and Clove Acres Lake Watersheds to NJDEP for review and approval. The Restoration Plan for the Clove Acres Lake Watershed also included a comprehensive Characterization Report and an independent but supportive Restoration Plan specifically for Clove Acres Lake. These components were prepared by Princeton Hydro, LLC. Together, these Plans offer a comprehensive strategy that includes the identification of numerous specific Watershed-based and in-lake management strategies, techniques, and projects that, if implemented, will serve to reduce the annual TP loads and restore the water quality of these Watersheds.

In January 2009, both Watershed Restoration plans were formally accepted and approved by NJDEP and as a result, NJDEP awarded additional grant funding to the WRWVG / SCMUA to begin the implementation of both Plans. This funding, which comes from the NJDEP's Non Point Source Pollution Control Grant Program, is currently allowing the WRWVG to serve as an implementation agent / entity providing the overall leadership and coordination of all the tasks related to successful planning and execution of the identified restoration projects and initiatives.

Since June 2009, the Wallkill River Watershed Management Group (WRWVG), under the fiscal guidance of the Sussex County Municipal Utilities Authority (SCMUA), has diligently worked to coordinate all of the efforts associated with the Grant Agreement entitled, "*Section 319(h) Non-point Source Pollution Control and Management Implementation Grant: Implementation of Clove Acres / Papakating Creek Watershed Plans.*" This has included facilitating the necessary tasks and efforts to build relationships and establish cooperative agreements with key project partners, coordinating required field surveying initiatives and design studies, developing bid packages, documenting construction activities, assisting with engineering design plans for agricultural BMPs, and seeking and securing outside funding resources for leverage with existing 319(h) grant funds.

The SCMUA-WRWVG has become known throughout all of Sussex County as a primary local resource for area stakeholders in matters relating to water quality and water resource management. With the development of the Watershed Restoration Plans for the Papakating Creek and Clove Acres Lake / Clove Brook Watersheds as well as the work that has already been accomplished implementing these Plans, the WRWVG has become intrinsically involved in the local watershed community and is continuously working to coordinate and drive "on-the-ground" implementation efforts designed to achieve the required pollutant load reductions in order to meet the State surface water quality standards.

Upper Paulins Kill Watershed Restoration Plan

In October of 2012, the Wallkill River Watershed Management Group, under the administrative auspices of the Sussex County Municipal Utilities Authority completed the development of a Watershed Restoration Plan for the Upper Paulins Kill Watershed. The Upper Paulins Kill Watershed is one of two U.S. Geological Survey (USGS) HUC 11 Watersheds that comprise the Paulins Kill Watershed, which covers approximately 113,184 acres (176.85 square miles) in Sussex and Warren Counties. The Upper Paulins Kill Watershed as defined in the Watershed Restoration Plan is comprised of five HUC 14 sub-basins in their entirety and a portion of a sixth HUC 14. The watershed area includes approximately 32,578 acres or 50.9 square miles of total area and encompasses all or portions of the following municipalities: Andover Township, Branchville Borough, Frankford Township, Fredon Township, Hampton Township, Lafayette Township, Sparta Township, the Town of Newton and approximately 24 acres within Sandyston Township.

The New Jersey Department of Environmental Protection's 2004, 2006, 2008, and 2010 *Integrated Water Quality Monitoring and Assessment Reports* identify the Paulins Kill within the targeted project area as an impaired waterway for non-attainment of *E.coli*, total phosphorus, dissolved oxygen, aquatic life, and arsenic at specific locations. In response to an identified impairment for *E.coli*, NJDEP developed a TMDL for *E.coli*, within the Upper Paulins Kill, which was adopted in September 2005. In 2007, the WRWMG was awarded a 319(h) non-point source pollution control grant from NJDEP to develop a watershed restoration plan for the Upper Paulins Kill Watershed targeting both the *E.coli* and total phosphorus impairments. As part of this effort, the WRWMG and various partners conducted chemical sampling, extensive field characterization and assessments, and performed related pollutant modeling analysis that resulted in the identification and development of the following pollutant reduction goals in order to meet the required NJDEP Surface Water Quality Standards (SWQS) for total phosphorus and fecal coliform / *E.coli*.

- **Total Phosphorus (TP) - (Upper Paulins Kill Watershed - approximately six HUC 14s):** Reduction of 6,329 pounds/year of TP, which is a 33.4% reduction in the estimated 2011 total TP loading of 18,950 pounds/year (8,614 kilograms/year). The targeted NJDEP SWQS is not to exceed 0.1 mg/l concentrations.
- **Fecal Coliform / *E.coli* (Upper Paulins Kill Watershed – approximately six HUC 14s):** A TMDL developed by the NJDEP specifies a reduction in fecal coliform / *E.coli* loading of 98% in order to achieve the desired SWQS. The targeted NJDEP SWQS for fecal coliform is that fecal coliform shall not exceed a geometric average of 200 counts/100 ml, nor shall more than 10% of the total samples taken during any 30-day period exceed 400 counts/100 ml. The SWQS for *E.coli* states that *E.coli* shall not exceed a geometric mean of 126 counts/100 ml or a single sample maximum of 235 counts/100ml.

Throughout the Restoration Plan development process, the WRWMG conducted an extensive pollutant source-tracking survey to identify potential sources and causes for the TP and fecal coliform / *E.coli* impairments. Within the defined watershed boundaries, nonpoint pollution is the predominate issue of concern versus point source pollution. It was concluded that the genesis of key nonpoint sources of TP emanate as a result of erosion and sedimentation from stream banks, agricultural lands and undeveloped lands, improper/overuse of both agricultural and residential fertilizer applications, stormwater runoff from developed and undeveloped lands and roads, urban area sources (one specific area) and, to a lesser extent, septic systems. It was also concluded that the intensity of loading for a given period of time was strongly influenced by the severity of

precipitation/storm events, particularly when rainfall exceeds one to two inches/day. Sources of attribution of *E.coli* are wildlife, animal, and to a lesser extent, human.

Development of a holistic Management Plan that addresses the stated pollutant sources, mitigation of the impacts identified, and achievement of the desired goals is a complex and challenging undertaking that will require many years of concerted, targeted effort by the entire Watershed community. As part of the development process for the Upper Paulins Kill Watershed Restoration Plan, the WRWMG and various project partners conducted extensive stream sampling efforts, intensive pollutant source tracking studies, detailed field investigations, and comprehensive data analyses, all of which contributed to the identification of potential implementation projects for inclusion in the Restoration Plan. The data and information gathered as a result of these project efforts, combined with real-time field experiences and observations made during significant storm events, anecdotal stories from watershed stakeholders, and priority issues identified at local municipal and county public meetings have all played a significant role in the helping the WRWMG to identify numerous high priority implementation projects for inclusion into the Upper Paulins Kill Watershed Restoration Plan.

In September 2013, the NJDEP awarded the SCMUA-WRWMG a SFY2013 319(h) Non-Point Source Pollution Control Grant to begin implementing the ***Upper Paulins Kill Watershed Restoration Plan***. As part of the grant agreement funded by NJDEP, The SCMUA-WRWMG is now coordinating three priority watershed implementation programs as well as “on-the ground” restoration projects, aimed at reducing non-point source pollutant loadings, improving water quality, and promoting long-term watershed health.

PROGRAM 1: Agricultural Outreach and Assistance Program for the Upper Paulins Kill Watershed

Goal:

Identify and Coordinate Overall Efforts to Implement Agricultural Best Management Practices and Water Quality Improvement Projects

PROGRAM 2: WRWMG “Urban” Stormwater Management Outreach and Assistance Program

Goal:

Implementation of stormwater management programs and improvement projects including rain gardens, infiltration, and bio-infiltration projects along the Paulins Kill mainstem and associated tributaries with initial emphasis on the urban headwaters in the Town of Newton.

PROGRAM 3: Riparian Ecosystem Enhancement Program for the Upper Paulins Kill Watershed

Goal:

Implementation of vegetative streambank stabilization and riparian buffer enhancement projects along the Paulins Kill mainstem and its tributaries. (Note: Program #3 will build upon the success of multiple existing riparian buffer projects implemented during the course of development of the Upper Paulins Kill Watershed Restoration Plan).

