

# **Regional Stormwater Management Plan for Troy Brook, Morris County, New Jersey**

## **Executive Summary**

Troy Brook is in the Whippany River watershed, which has the first TMDL in the State of New Jersey, for fecal coliform. The majority of the Troy Brook Watershed is highly impervious. The watershed is littered with commercial and industrial properties and contains major transportation arteries. Due to the urbanized nature of this watershed, increased volumes and rate of runoff have resulted in significant flooding in this watershed. In addition to the flooding problems, very few Best Management Practices (BMPs) appear to be in place to treat storm water runoff. This project will develop a Regional Stormwater Management Plan (RSMP) for Troy Brook by examining the watershed as a whole and fully understanding the interactions of each piece of this troubled system. The RSMP for Troy Brook will address mitigating increases in stream flows due to stormwater runoff, promote recharge to increase the baseflow of the stream, and implement BMPs to improve the water quality of the Troy Brook, and hence the water quality of the Whippany River. The RSMP will also address reducing erosion of the stream banks and enhancing the riparian corridor.

This project addresses water quality impairments identified through NJDEP's 1998 Identification and Setting of Priorities for Section 303(d) Water Quality Limited Waters in New Jersey (NJDEP, 1998). We will provide a significant in-kind match through the participation of our municipal members, and by working with community groups that already are deeply concerned and involved in water quality and/or quantity issues, e.g., Troy Hills Neighborhood Association. By actively assisting the professionals on the project team -- e.g., in collecting data for the characterization and assessment of Troy Brook, evaluating degraded stream sections, recommending strategies for pollution reduction and mitigation of flooding, and rolling the RSMP out to the community -- concerned citizens and local government officials will gain a broader perspective on the problems of Troy Brook and their role in solving them.

## **I. Priorities to be Addressed**

NJDEP has two ambient biomonitoring sampling stations located on Troy Brook: one immediately downstream from Mountain Lake (AN0000) and one near the confluence of Troy Brook and the Whippany River (AN0000). In 1993 and 1998, the NJDEP listed the sampling station immediately downstream of Mountain Lake as moderately impaired. In 1993, the NJDEP listed the second station near the confluence of the Whippany River as moderately impaired. In 1998, the same station was classified as non-impaired. One thought for the change at the downstream station is that the lake immediately upstream of the station was recently dredged. Since this lake is an impoundment on the Troy Brook, the newly dredged lake is serving as a sediment trap for the lower portion of the drainage area. This will improve water quality of the Whippany River where Troy Brook discharges, but it does little to improve the water quality of Troy Brook upstream of the newly dredged lake. Nor does it address the problem of ongoing sedimentation from Troy Brook. Based on the observations made during a preliminary site visit, the upstream portions of Troy Brook are obviously stressed due to nonpoint source pollution from the surrounding land use.

Due to the highly urbanized nature of the watershed, the Troy Brook in the vicinity of the downstream sampling site is in severe jeopardy of once again becoming moderately impaired. The stream receives uncontrolled runoff from highly impervious urbanized areas, including areas that send fecal coliform from geese and pets into waterways. The flashy nature of the stream causes severe erosion during storm events, depositing the eroded sediment and other NPS pollution downstream.

Flooding is a severe problem in the watershed. There is strong community support for this project for this reason. Although the municipalities are enforcing stricter storm water control requirements for new development, little is being done to address storm water control for existing development. This project addresses this need.

In the past, flood control projects typically only addressed controlling runoff volumes and accomplished little in the way of pollutant removal. The RSMP will incorporate management measures for controlling stormwater volumes and achieving high pollutant removal efficiencies. Through the regional planning of examining the Troy Brook as a whole, both water quality and water quantity issues can be addressed.

After Hurricane Floyd in 1999, Morris County set aside funding to construct storm water facilities to control flooding throughout the County. To assure that this funding is spent wisely, the County will only release funding to its municipalities if studies are performed to demonstrate the effectiveness of the stormwater control project. A RSMP needs to be developed for Troy Brook to identify where controls should be installed and what type of controls are needed to address not only flooding problems, but other issues of concern for this waterway. This project will develop that RSMP. The county will be one source of funding to begin the implementation of the plan developed by this project. This will relieve the municipalities from relying solely on NJDEP's 319(h) funding for implementing these types of projects.

## II. Project Objectives/Implementation Tasks

The ultimate goal of this project is to develop and roll out a Regional Stormwater Management Plan that, once implemented, will minimize flooding in the watershed and improve the water quality of the Troy Brook. A major step towards accomplishing this goal is to achieve the following objectives:

- a) Conduct a characterization and assessment of the drainage area to completely understand the watershed and its hydrology.
- b) Complete a search of previously completed studies of Troy Brook in order to build on, but not duplicate, earlier efforts. Information from these studies may be incorporated into the RSMP.
- c) Review all available engineering drawings that contain storm sewer systems for incorporation into the characterization and assessment.
- d) Incorporate all data collected in the characterization and assessment into a Geographic Information System (GIS).
- e) Develop mathematical models to describe the physical characteristics of the watershed. Both hydrologic and hydraulic modeling will be completed of the watershed to examine existing conditions and future “build out” scenarios.
- f) Evaluate Troy Brook and its tributaries to determine the current status and the potential for restoration of degraded stream sections.
- g) Involve local public officials in implementing the project.
- h) Involve the public and media through education and outreach to the community
- i) Involve the WMA 6 Technical Advisory Committee and Public Advisory Committee through scheduled communications.

The following tasks will be implemented to achieve these objectives:

- a) Assemble all existing data for Troy Brook and its watershed.
- b) Complete a characterization and assessment of the watershed including producing maps of drainage area boundaries; existing land use; projected land use (build out scenarios); topography; water bodies; freshwater wetlands; flood hazard areas; aquifer recharge areas; environmentally sensitive areas; man-made stormwater conveyances (storm sewer systems), storage and discharge systems; drinking water treatment plant intakes; significant or known obstructions within the flood plain; and areas of significant impairments including eroding stream beds or banks, failing structures, degraded habitats, and depleted/degraded riparian buffers.
- c) Develop mathematical models to describe the physical characteristics of the watershed including hydrologic and hydraulic models. Several models to be considered are HEC-1, HEC-HMS, TR20, PSRM, HSPF, SewerCAD, and HEC-RAS. Although the modeling will be mainly based on existing data, additional flow and stream characteristic may be collected including stream cross-section data, bridge data, and channel condition data.
- d) Evaluate the existing conditions of the stream and the potential for restoration of degraded sections of stream using the Federal Interagency Stream Restoration Working Group’s manual *Stream Corridor Restoration* as a guide. Too often

stream restoration projects are blindly implemented without any thought given to the potential negative impacts of the restoration. By following this guide, the unforeseen consequences of restoration attempts can be avoided.

- e) Prepare the RSMP, which will include management measures for new and existing land uses; management measures to enhance, protect and preserve watershed ecosystems; and recommended monitoring and evaluation techniques for determining the effectiveness of the management measures and the overall RSMP.
- f) Design, print, and widely disseminate a report that contains recommended “top line” strategies from the RSMP and actions residents, businesses, and local government officials who live and work in the watershed need to take in order to implement them.
- g) Conduct roll out events that involve stakeholders and draw attention to the need for water resources protection and improvement as stated in the WMA 6 draft mission, goals, and objectives, and the TMDL and Action Now Strategies for the Whippany River watershed.
- h) Conduct media outreach to increase public understanding and support for the Troy Brook RSMP in particular and water resources protection and improvement in general.
- i) Report the results of the project to NJDEP and the WMA 6 PAC and TAC through quarterly reports, and presentations at the six-month mark and after the completion of the project.

### **III. Water Quality Improvements**

This project will develop a plan for the Troy Brook Watershed that addresses the TMDL and Action Now Strategies for the Whippany River watershed, WMA 6’s draft mission, goals, and objectives, and New Jersey’s goals for remediation of impaired waters in the Whippany River watershed. The partnership between the municipalities and the Whippany River Watershed Action Committee will continue into the foreseeable future. This project will be a starting point to address serious storm water issues in the Troy Brook Watershed. The Regional Stormwater Management Plan will provide a comprehensive strategy for storm water management and contain specific measures and BMPs for NPS that can be implemented by the state, municipalities, and the county as funding becomes available.

### **IV. Organizational Capacity of Partners/Commitment**

An excellent team has been assembled to complete this project. Rutgers University is taking a more active role in providing technical support to help New Jersey better manage their water resources. To lead this effort, Dr. Christopher Obropta has joined Rutgers Cooperative Extension as their new Specialist in Water Resources. Dr. Obropta worked as an environmental consultant for 13 years at Omni Environmental Corporation in Princeton, New Jersey. He has successfully implemented numerous 319(h) projects throughout New Jersey and continues to develop strong partnership to foster these efforts.

With its proven record of success, the Whippany River Watershed Action Committee will continue its successful efforts to address the Whippany's TMDL and other nonpoint sources of pollution and educate local citizens and governments about watershed management in the Whippany River Watershed through this project. The Action Committee has implemented several previous 319(h) projects in WMA 6, including a project that is upgrading municipal codes -- including in Hanover Township, which is implementing a new stormwater ordinance, similar to the 10 Towns' -- for clean water protection, and a shoreline restoration and goose damage management project at Burnham Park in Morristown that has resulted in water quality improvement, enhanced habitat, increased biodiversity, reduction in algae growth, reduced use of shoreline habitat by Canada geese, and enhanced aesthetics in a public park, BMP technology transfer to municipal officials, volunteers, and local corporations, and enhanced public awareness of and participation in watershed management.

Parsippany-Troy Hills Township, Hanover Township and Mountain Lakes Borough are all active partners in this project. This will help assure the quick and efficient implementation of the recommendations in the RSMP.

## **V. Project Implementation**

Rutgers Cooperative Extension will take the lead in this project. Rutgers has access to a large base of undergraduate and graduate students to assist with the fieldwork. The municipal engineers will assist the Whippany River Watershed Action Committee in assembling data and provide input during the development of the final regional stormwater management plan. In addition to working with the municipal engineers, the Whippany River Watershed Action Committee will assist in collecting new data and preparing the final plan.

The project will be completed within 24 months of receiving an official contract from NJDEP.

## **VI. Conclusions**

The Troy Brook Watershed consists of a complex system of tributaries, impoundments, urban drainage systems, and on-line obstructions (such as bridges) that cause the stream flow to back up, thereby causing upstream flooding. The only way to successfully address the storm water issues in this watershed is through the development of a Regional Stormwater Management Plan. This project will address both water quality and water quantity issues during a one-year project timeframe. The project partners have the experience needed to develop and roll out a Regional Stormwater Management Plan for Troy Brook and the political clout and community organizing savvy to involve stakeholders in plan development and implementation.

**ATTACHMENT A**  
**Timeline**

<b>Description</b>	<b>Responsible Parties</b>	<b>Timeline</b>
Search for available data and review of existing engineering drawings of storm sewer systems	<ul style="list-style-type: none"> <li>• Rutgers</li> <li>• Action Committee</li> <li>• TRC Omni</li> </ul>	Months 1-4
Preparation of characterization and assessment and mapping	<ul style="list-style-type: none"> <li>• Rutgers</li> <li>• Action Committee</li> <li>• TRC Omni</li> </ul>	Months 4-6
Collection of additional data for model development including biomonitoring, dry and wet weather sampling	<ul style="list-style-type: none"> <li>• Rutgers</li> <li>• Action Committee</li> <li>• Municipal Engineers</li> <li>• TRC Omni</li> </ul>	Months 6-18
Hydrologic and hydraulic model development; water quality model development	<ul style="list-style-type: none"> <li>• Rutgers</li> <li>• TRC Omni</li> </ul>	Months 6-21
Evaluate existing stream conditions and potential stream segments for restoration	<ul style="list-style-type: none"> <li>• Rutgers</li> <li>• Action Committee</li> </ul>	Months 6-21
Prepare the Regional Stormwater Management Plan	<ul style="list-style-type: none"> <li>• Rutgers</li> <li>• Action Committee</li> <li>• Municipal Engineers</li> <li>• TRC Omni</li> </ul>	Months 21-24
Progress reports (NJDEP)	<ul style="list-style-type: none"> <li>• Rutgers</li> </ul>	Months 3 – 24 (quarterly)