NONPOINT SOURCE SUCCESS STORY

New Jersey

Ramanessin Brook Restoration Projects Improve the Navesink River

Waterbody Improved

Highly erodible soils along a popular recreational area led to the 2006 impairment of Ramanessin Brook for total suspended solids (TSS) and phosphorus, and to the 2006 impairment of the downstream Navesink River for turbidity. Best management restoration projects implemented in the Ramanessin Brook watershed reduced erosion and resulted in the Navesink River being removed from the 2014 Clean Water Act (CWA) section 303(d) list for turbidity by the New Jersey Department of Environmental Protection (NJDEP).

Problem

Ramanessin Brook flows through Holmdel Township in Monmouth County. It is a 5-mile-long tributary to the Navesink River (Hydrologic Unit Code 12 [HUC 12] 020301040303), an important recreation area along the Jersey Shore (Figure 1). Ramanessin Brook is classified as FW2-Trout Maintenance by the NJDEP. The soils of the 6.4-square-mile Ramanessin watershed contain a relatively high amount of glauconite, a mineral deposit of marine origin. The glauconitic soils are highly erodible and are in part the cause of severely eroded stream banks in the watershed.

In 2005 a CWA section 319(h)-funded study, entitled "Ramanessin Brook Nonpoint Source Pollution Source Assessment and Stormwater Impact Study," was prepared. The study noted that the erosion of glauconitic soils and instream erosion are major sources of phosphorus and suspended sediment in the watershed. The study also quantified and mapped subwatersheds according to their vulnerability to erosion of glauconitic soils and specific pollutants. Specific subwatersheds having the greatest potential benefit from stormwater management and stream restoration practices were identified. Field surveys were conducted to identify specific projects that would improve water quality.

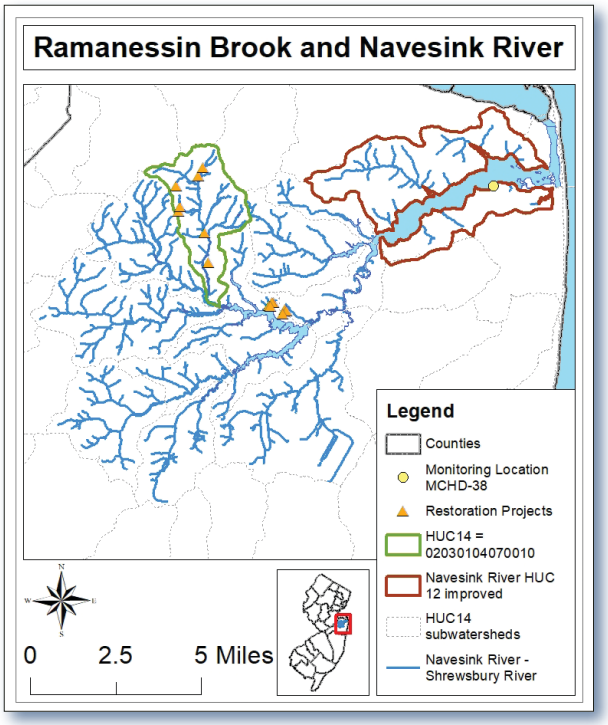

Figure 1. Ramanessin Brook (HUC 02030104070010) is in the headwaters of the Navesink River watershed on New Jersey's coast.

Project Highlights

Project sites were identified and prioritized, and the projects were divided into two phases to coincide with funding and the time needed to obtain permits. Key projects included:

(1) Village Elementary School courtyard rain gardens. Rain gardens were installed in 2010 to replace an underused asphalt courtyard at the school's center. Roof runoff is sent to four functional rain gardens. Teachers incorporated the rain gardens into the curriculum and hold outdoor classes monthly to promote environmental stewardship.

(2) Holmdel High School bioretention basin. Holmdel High School and an intermediate school are on an 83-acre parcel bordered by Ramanessin Brook to the east and by a smaller tributary to the west. A large bioretention basin was constructed to replace stormwater drainage pipes that had carried runoff from parking lots and rooftops directly into Ramanessin Brook at an eroding outfall.

(3) Ramanessin Conservation Area #1 (Chase Tract) stream restoration. Ramanessin Brook had severely eroded streambanks and a deeply incised stream channel within property jointly owned by NJDEP and Monmouth County. A series of streambank structures constructed of natural materials refocused erosive flows toward the brook's center.

(4) Numerous Holmdel Park projects.

- Hilltop rain gardens, where runoff from a parking lot had flowed directly into two erosion-producing stormwater systems. The runoff now discharges into one of two rain gardens at both ends of the parking lot.
- Bioretention basin, where runoff from a parking lot and a steep access road had been conveyed to a pipe system directly connected to a tributary to Ramanessin Brook. The project rerouted the runoff into a new bioretention basin planted with native vegetation. The majority of the runoff from the 5.7-acre drainage area is now treated and infiltrated in the bioretention basin.
- Outfall restoration, where a stormwater outfall from a residential neighborhood was causing gully erosion in a tributary that flowed into a pond. The outfall was redesigned to dissipate energy and alleviate erosion. The eroding ditch was restored and planted with native vegetation.
- Streambank enhancement, where (with the use of remaining grant funding) approximately 1,400 native plants ranging in size from small plugs to 3 feet in height were planted at the lower end of the Holmdel Park pond. The additional vegetation provided a wider buffer around the lower end of the pond to deter waterfowl and reduce nutrient loading.

Results

The project's goal to improve the water quality of Ramanessin Brook was achieved by installing stormwater management and stream restoration BMPs that were designed to reduce nonpoint source pollutant loading to the stream from erosion. The latest data from Station MCHD-38 show no turbidity exceedances (14 samples), and multiple other stations within the watershed are also all fully attaining water quality standards (Figure 2). As a result, the NJDEP removed the downstream Navesink River HUC 12 (0203010403030) for turbidity from the 2014 CWA section 303(d) list.

Partners and Funding

NJDEP awarded Monmouth County a total of $1,383,900 in CWA section 319(h) funding for project design and implementation. The grant was administered by the Monmouth County Division of Engineering and the Monmouth County Park System. Additional partners within Monmouth County included the Finance, Purchasing, Planning and Shade Tree Commission offices. Other project partners included the Holmdel Township Board of Education, the Holmdel Township Environmental Commission, and Rutgers Cooperative Extension Water Resources Program, numerous students and volunteers. The New Jersey AmeriCorps Watershed Ambassadors also participated in project implementation. Omni Environmental provided design, construction documents and construction oversight.

In 2010 the New Jersey American Water Resources Association (NJAWRA) recognized the Village Elementary School Courtyard Rain Gardens as an Exceptional Stormwater Management Project. In addition, remaining projects received the NJAWRA 2014 Excellence in Water Resources Protection and Planning Award.

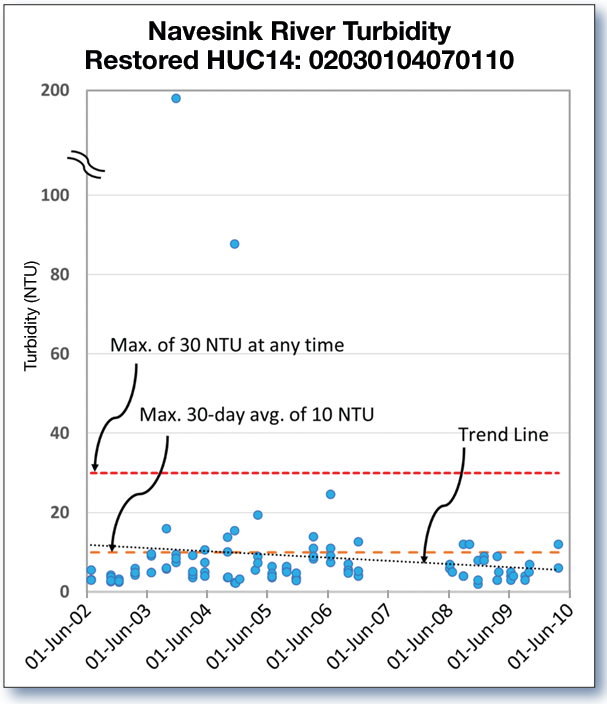

Figure 2. Turbidity levels have fallen steadily.

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