Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Rhode Island

Implementing Low Impact Development Practices at Bristol Town Beach Keeps the Beach Open and Improves Offshore Shellfishing Waters

Waterbody Improved

Urban runoff and wildlife waste contributed to high levels of bacteria at Rhode Island's Bristol Town Beach. As a result, the beach experienced a large number of closures. These pollution sources also contributed to elevated bacteria levels resulting in shellfish closures in Upper Narragansett Bay. The pathogen impairment of Upper Narragansett Bay was first listed as impaired for shellfishing by the Rhode Island Department of Environmental Management (RIDEM) on its 1998 Clean Water Act (CWA) section 303(d) list. Project partners implemented best management practices (BMPs) designed to control urban runoff and wildlife waste in the town of Bristol. Consequently, bacteria levels have decreased at Bristol Town Beach and water quality has improved in this portion of Upper Narragansett Bay.

Problem

Bristol Town Beach is on Narragansett Bay, adjacent to and directly north of Colt State Park in Bristol, Rhode Island (Figure 1). This town-owned recreation area contains many amenities, including a public bathing beach, picnic areas, ball fields, basketball courts, a playground, tennis courts and soccer fields. The beach provides access to saltwater swimming on Narragansett Bay and is a treasured resource of the town of Bristol.

Runoff from a 66-acre suburban neighborhood drained through two stormwater outfalls and discharged to a wetland on the town's beach property directly north of the swimming area. Neighborhood residents also used this wetland as a dumping area for leaves and yard waste.

The Rhode Island Department of Health (RIDOH) collected water samples and analyzed them for enterococci bacteria (indicator organisms used to detect the presence of fecal matter in the water column). Rhode Island's water quality standard states that saltwater bathing waters must not exceed a single-sample standard of 104 colony-forming units (cfu) enterococci per 100 milliliters (mL) of water. Both saltwater and freshwater beach facilities are required to conduct sampling to ensure safe swimming conditions as part of their recreational licenses. Between 2002 and 2010, the RIDOH had closed Bristol Town Beach an average of 8 days per season because of high bacteria counts following rainstorms.

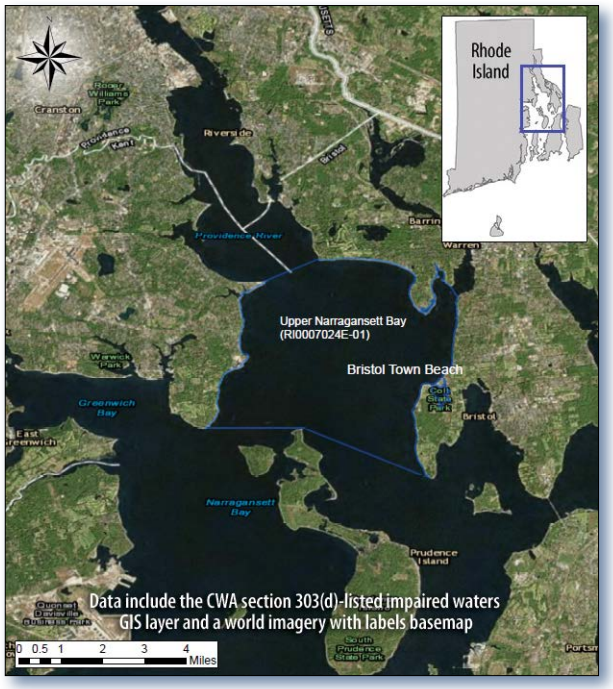

Figure 1. Bristol Town Beach is on Narragansett Bay in eastern Rhode Island.

Project Highlights

In April 2008, local, state and federal stakeholders met at Bristol Town Beach to brainstorm ways to improve offshore water quality. The group decided on a series of restoration measures, which the

Figure 2. Project partners installed vegetated bioinfiltration swales in this parking lot near the beach.

town and its partners then implemented between 2010 and 2012. Measures included (1) renovating a parking lot to incorporate bioinfiltration vegetated swales (Figure 2) and piping overflow via sub-drains to bioretention cells, (2) installing permeable pavement around the offices and beach restroom facility, (3) reducing the width of beachfront trails and planting trees along the beach property to interrupt the flight path of Canadian geese (whose waste was causing fecal coliform contamination in the water), and (4) constructing a wet vegetated treatment system to collect and treat the stormwater flowing from the neighborhood to the area north of the beach.

Results

This combination of BMPs has drastically reduced the amount of both fecal coliform and enterococcus, two indicator species of bacteria that come from the intestines of warm blooded animals. Rhode Island uses fecal coliform as the indicator species for its shellfishing standards and enterococcus as the indicator species for its recreational use (bathing) standard. Because both fecal coliform and enterococcus bacteria come from similar sources (i.e., warm blooded animals and humans), when the presence of one indicator organism is reduced, it can be inferred that the presence of the other is also reduced. Data from 2011 reflect the first project BMP implementation, and data from 2013 reflect the first year of full implementation of all BMPs at Bristol Town Beach (Figure 3). The incidence of bacteria levels exceeding the swimming standard reduced significantly from pre- to post- BMP implementation. There was a single closure for four beach days in 2011, and there were two closures for six beach days in 2012. There were no closures at all during the 2013 season, despite a ten-year high rainfall rate, and a single

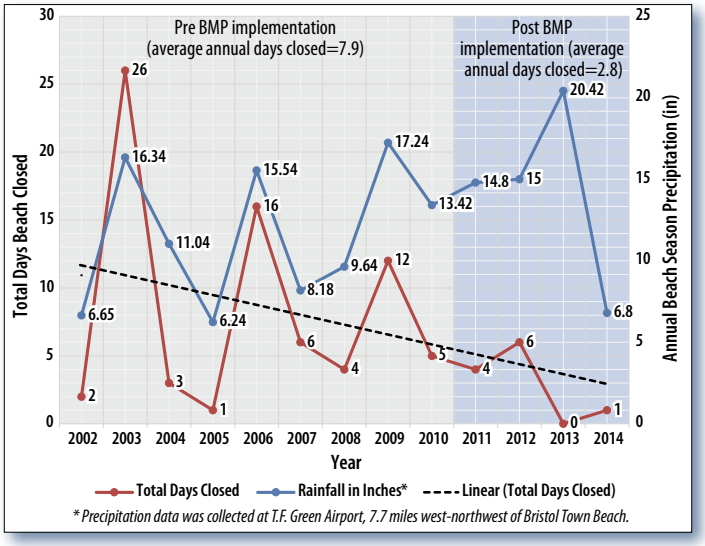

Figure 3. The number of beach closures at Bristol Town Beach declined, despite an increasing trend in area precipitation.

closure day in 2014. The enterococci data collected at Bristol Town Beach reflect that BMP implementation has contributed to near-shore water quality improvements—resulting in a dramatic reduction in the number of beach closures (from an average of eight days per season before the restoration efforts to none during the summer after restoration) and an incremental improvement in the water quality of the shellfish beds immediately offshore.

Partners and Funding

Water quality improvement at Bristol Beach and Upper Narragansett Bay was the result of a collaborative effort. The town of Bristol, RIDEM, RIDOH, EPA Region I, the Rhode Island Coastal Resources Management Council, and Bristol's environmental engineering consultant worked together to plan the restoration approach. The town of Bristol secured a variety of funding sources to install the restoration projects. They included (1) two CWA section 319 grants ($234,620 total) from the RIDEM Nonpoint Source Program for a wet vegetated treatment system to treat neighborhood stormwater runoff; (2) $1,000,000 loan from the Rhode Island State Revolving Fund for parking lot improvements, tree planting to prevent geese on the beach, and permeable pavement around restroom facilities; and (3) a $100,000 RIDEM Planning and Development Trails Grant to reduce the width of paved paths from 20 feet to 10 feet. The town of Bristol also contributed $70,000 to support the parking lot improvements.

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