



A Comprehensive Plan to Restore Water Quality in Hundred Acre Cove

SAVE THE BAY®

NARRAGANSETT BAY

2021

A Comprehensive Plan to Restore
Water Quality in Hundred Acre Cove
Save The Bay, 2021

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Waterkeeper Dave Prescott attempts to find a passage down the Runnins River from Highland Avenue to Mink Street while in search of water quality testing sites.

Executive Summary

In 2018, the Southeastern New England Program (SNEP) of the Environmental Protection Agency awarded a grant to Save The Bay to address long-standing impairments to Hundred Acre Cove, an estuary in the northern reaches of Narragansett Bay. Save The Bay engaged bi-state and watershed partners in the project, including the Narragansett Bay Estuary Program and three municipalities that make up the vast majority of the Hundred Acre Cove Watershed: Seekonk, Massachusetts and Barrington and East Providence, Rhode Island.

Hundred Acre Cove was once a clean, healthy, thriving ecosystem that supported a recreational shellfishery and healthy salt marsh system. A century of commercial and residential development in its watershed has caused significant ecological stress and limited some recreational uses. For almost three decades it has been unsafe to eat shellfish harvested from its waters. Climate change impacts are damaging and threatening the Cove’s salt marshes. Despite years of monitoring and efforts to address pollution, these conditions persist.

This report reflects the work of its partners to understand current conditions in the watershed, why those conditions exist, what is being done to address them now, and, most importantly, to identify priority action steps to restore water quality. The report also presents strategies to restore buffers along the Runnins River and the salt marshes bordering Hundred Acre Cove—the nurseries of life in the Cove—while helping them adapt to increased precipitation events and accelerated sea level rise caused by climate change.

Prioritized Actions and Goals:

Save The Bay compiled a comprehensive list of water quality and habitat restoration and adaptation projects that had previously been identified but not yet completed. Additionally, new projects were identified by project partners in response to renewed focus on the Runnins River watershed, which is a major driver of water quality in Hundred Acre Cove. Projects and recommendations fall into three broad categories:

1. **Policies and programs to reduce pollution from wastewater and stormwater runoff.** Water impairments are from multiple sources: septic systems, cesspools, and stormwater runoff that washes pet and animal waste, petroleum, litter and other pollution into Hundred Acre Cove. Potential actions include more comprehensive management of wastewater through regular inspection and maintenance of state and municipal systems, and the implementation of priority projects to reduce stormwater pollution. Potential projects include redirecting stormwater runoff, allowing pollutants to be absorbed before they reach the waterways, and re-engineering outdated stormwater control systems.



Hundred Acre Cove is an important embayment bounded by Barrington and East Providence, RI, and Seekonk, MA. While the cove's waters are impaired by bacterial pollution, many of its users are unaware of the chronic water pollution problems.

2. **Projects to help habitats adapt to intensifying impacts of climate change.** This includes the creation of marsh migration corridors that will allow salt marshes to move upland and inland as water levels rise. It also includes the restoration of buffers along the Runnins River, and suggests the removal of structures that have restricted the natural flow of the river.

3. **Financing and funding to support priority actions.** Hundred Acre Cove communities need help building their capacity to plan and implement corrective actions. This report identifies new ways of financing the maintenance and upgrade of stormwater systems and lists potential sources of state and federal funding that can help.

Restoring Hundred Acre Cove's waters and helping its salt marshes adapt to climate change is an immense challenge, in part because it is a resource shared by two states and three municipalities with different governance structures, policies, and regulations. It also requires a commitment from the homeowners and communities upstream, particularly along the Runnins River. Common among all stakeholders, however, is a commitment to restoring this estuary, and building capacity to achieve the goal of restoration. Save The Bay stands ready to support the actions identified in this report.



Hundred Acre Cove is home to diverse species, including the osprey that inhabit the nest shown here.

The project partners are committed to continuing the collaborative effort of this project into the future. Together, we hope that the restoration of Hundred Acre Cove will be achieved and serve as a model for other communities in the SNEP region of Rhode Island and Southeastern Massachusetts. We are grateful to the Southeastern New England Program for funding the work that went into this report, and to all of the project partners who made it possible.



The Runnins River is a main tributary to Hundred Acre Cove.

1. Introduction

History

For more than two decades, Hundred Acre Cove has suffered from many of the common pollution problems that stem from urban and suburban development. As a result, numerous studies, reports, and monitoring programs have been created, leading to many recommendations for improving water quality to allow safe recreational shellfishing opportunities. Many projects have stalled, despite the best of intentions, due either to a lack of funding or to the complexities resulting from the interstate, multi-jurisdictional nature of the Hundred Acre Cove watershed. This project was designed to synthesize the past work done by countless agencies and organizations, reestablish partnerships and form new ones, and create a prioritized, actionable plan with the goal of lowering bacteria levels in Hundred Acre Cove and its watershed. The plan is intended to be the starting point for future work and projects throughout the watershed.

Hundred Acre Cove is part of the Barrington River Estuary, a shallow embayment that is a Special Resource Protection Water located in the Town of Barrington, Rhode Island. The cove's name comes from a rough estimate of its surface area. It is bordered by farmland, suburban development, protected open space, and a state highway. A salt marsh peninsula known as The Tongue cuts the cove roughly in half from the northeast. Hundred Acre Cove has significant recreational and ecological value, and provides critical habitat for rare or endangered species, including the diamondback terrapin.

The Runnins River, the main tributary to Hundred Acre Cove, is approximately 7.5 miles long, beginning in the red maple swamps east of Prospect Street in Seekonk, Massachusetts, and flowing in a southwesterly direction toward East Providence, Rhode



Hundred Acre Cove has significant recreational and ecological value, and provides critical habitat for rare or endangered species, including the diamondback terrapin.

Island. The river then forms the boundary between Massachusetts and Rhode Island. It continues flowing along the state line to its end at Mobil Dam, where tidal brackish water occasionally overtops the dam. Below Mobil Dam, the river empties into the Barrington River and Hundred Acre Cove, which eventually flow into Narragansett Bay.

Problem Statement

Based on a consistent trend of high bacteria levels, the Rhode Island Department of Environmental Management closed Hundred Acre Cove to shellfishing in 1998. Water

quality bacteria testing has been ongoing prior to and for several decades after the shellfish closure, in an effort to identify sources of contamination. Some direct sources were identified and remedied, while others were never identified and remain.

High bacteria concentrations in waterbodies often occur after heavy rainstorms in urbanized areas, typically dissipating after about three days. This is what's known as "wet weather" contamination, and the source can be any contaminant that is picked up by stormwater in the watershed. However, fecal coliform concentrations are higher than expected in Hundred Acre Cove during dry weather, as well. This points to a larger systemic problem.

Sources of "wet weather contamination" include...

- Plastic and other trash
- Road sand and salt
- Oil and soap
- Roadway contaminants

As well as less visible pollutants, like:

- Nitrogen from lawns and agriculture
- Bacteria from animal waste

Partnerships

Narragansett Bay Estuary Program (NBEP)

The stated vision of the NBEP is for "Clean water and habitat to sustain all who live, work, and play in the Narragansett Bay Region." They bring change through research and collective action to protect and restore quality of life, wildlife, and water quality.

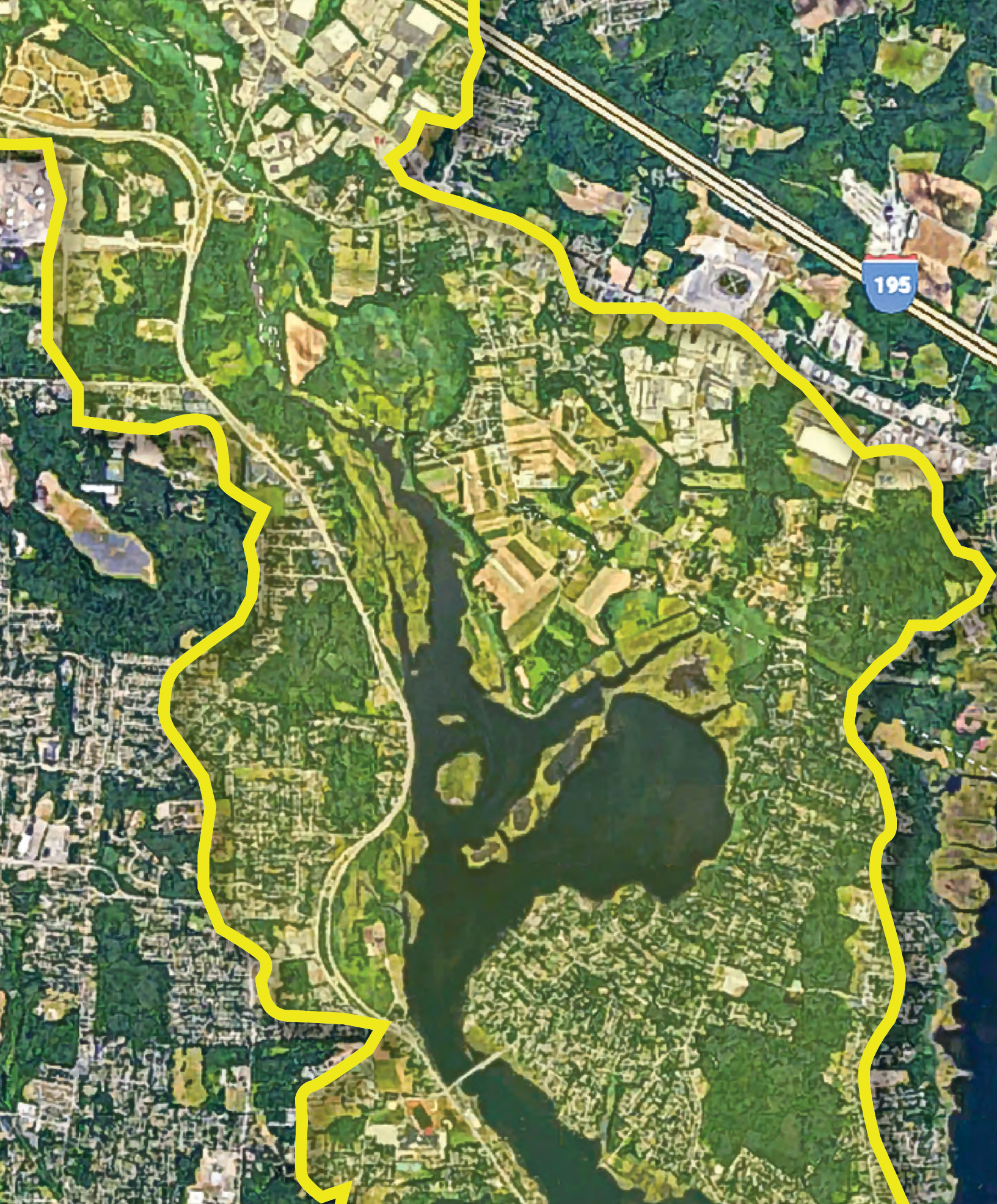
NBEP helped collect data for updated watershed maps, created the maps, and assisted Save The Bay with developing proposed projects based on the new information collected under this grant.

Runnins River Watershed Alliance

The RRWA is a newly formed non-profit committed to the health of the Runnins River in East Providence, Rhode Island and Seekonk, Massachusetts. The group focuses on watershed cleanups and spreading awareness about the Runnins River's natural resources.

Seekonk Stormwater Action Committee

This committee was re-invigorated in early 2018 and includes the town of Seekonk's Health Agent, Department of Public Works staff and Town Planner; Save The Bay's Riverkeeper; and Seekonk's stormwater permit consultant. The group meets monthly to discuss mapping, a sampling plan, problem areas, and proposed projects.



The Barrington and Warren Rivers watershed crosses two states and multiple municipalities.

2. The Watershed

Hundred Acre Cove's watershed is located within the southeastern Massachusetts towns of Seekonk and Swansea, and the northeastern Rhode Island towns of East Providence and Barrington. The Runnins River and Hundred Acre Cove watershed is a subwatershed contained within the Barrington-Palmer-Warren Rivers watershed that ultimately discharges to Upper Narragansett Bay. This watershed underwent an official EPA-approved watershed plan authored by RIDEM in 2012. The land use within the watershed is highly varied, including residential and commercially developed, forested, agriculture, and wetlands.

An embayment in northern Narragansett Bay, Hundred Acre Cove is an important natural area and recreational resource for surrounding communities and contains valuable salt marsh and intertidal habitat for fish, shellfish, crustaceans, birds, turtles, and other animals.

Save The Bay partnered with the Narragansett Bay Estuary Program (NBEP) to create updated watershed maps of the Runnins River and Hundred Acre Cove. Instead of recreating the existing detailed land use maps that were produced for the Barrington-Palmer-Warren Rivers watershed plan, the focus was given to stormwater and wastewater.

Project research found that there was no one map showing all of the stormwater catch basins (the inlet structure where stormwater enters underground pipes to get it off roadways) and all of the outfalls (the places where that stormwater flows into wetlands, streams, rivers and coves) for the entire watershed. Combining known data about the locations of these features maintained by the municipalities, as well as the stormwater systems maintained by the Rhode Island Department of Transportation and the Mas-

Municipalities of the Hundred Acre Cove Watershed

Barrington, RI – A suburban, residential community with a population of over 16,000 that consists of two peninsulas in the center of town divided by the Barrington and Palmer Rivers that join together to form the Warren River and Narragansett Bay to the south and west. One of the lowest lying towns in the state, Barrington boasts 7 square miles of water and nearly 20 miles of coastline. Barrington lies on a low, mostly flat plain with its coastline consisting of a series of coves and estuaries. Its homes and businesses are largely serviced by sewer. Population density 1,941.7/square mile.

East Providence, RI – The fifth largest city in the state, East Providence has a population of over 47,000 and is located between the Providence and Seekonk Rivers to the west, and the Town of Seekonk, Massachusetts to the east. The city boasts over 3.2 square miles of water and over 14 miles of coastline along the Seekonk River, Providence River, and Narragansett Bay. Its homes and businesses are largely serviced by sewer. Population density 3,584.61/square mile.

Seekonk, MA – With a population of over 15,000, Seekonk is a largely suburban community with much of the community's former farmland being turned into housing developments and retail complexes. While having under 1 square mile of water, the town contributes over 18 square miles of largely developed land to the Hundred Acre Cove and Narragansett Bay watersheds. Seekonk's homes and businesses are serviced by individual sewage disposal systems. Population density 782/square mile.

Swansea, MA – A small portion of Swansea, approximately 300 acres, falls within the Hundred Acre Cove watershed just north of the cove. This portion of the watershed is characterized by agriculture including pasture and row crops, as well as residential development and forest. Swansea homes and businesses are serviced by individual sewage disposal systems. Population density 620/square mile.

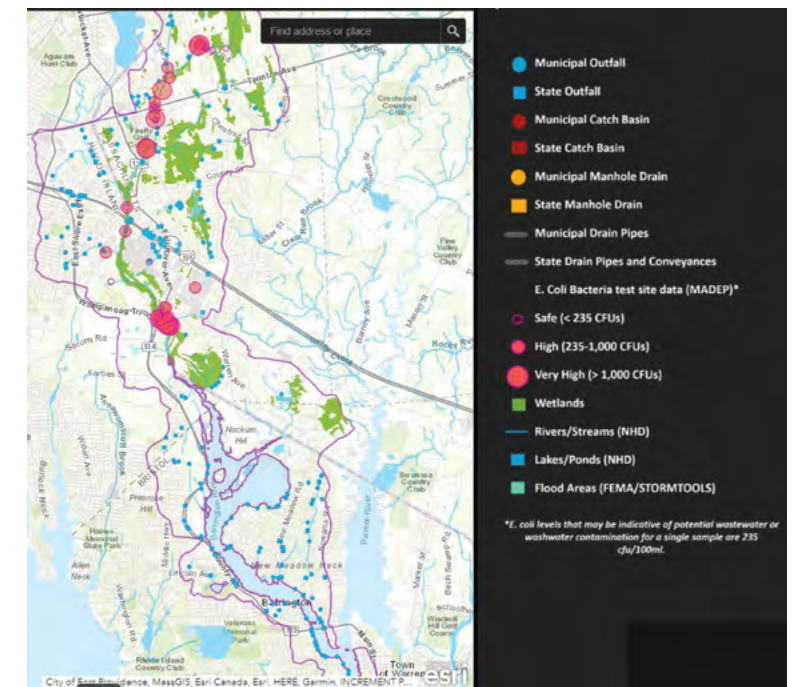
sachusetts Department of Transportation, the Narragansett Bay Estuary Program created a new watershed-based map.

To better understand the connection between stormwater and E. coli source tracking data collected since 2008, NBEP included locations and general concentrations of testing sites. Note that MADEP uses E. coli to assess for recreational use in freshwater, while RIDEM uses enterococci. Both states use enterococci in saltwaters. The RIDEM water quality regulations allow RIDEM to use fecal coliform, the previous bacteria indicator for recreational use when sufficient enterococci data is not available. Shellfish harvesting use is assessed using fecal coliform.

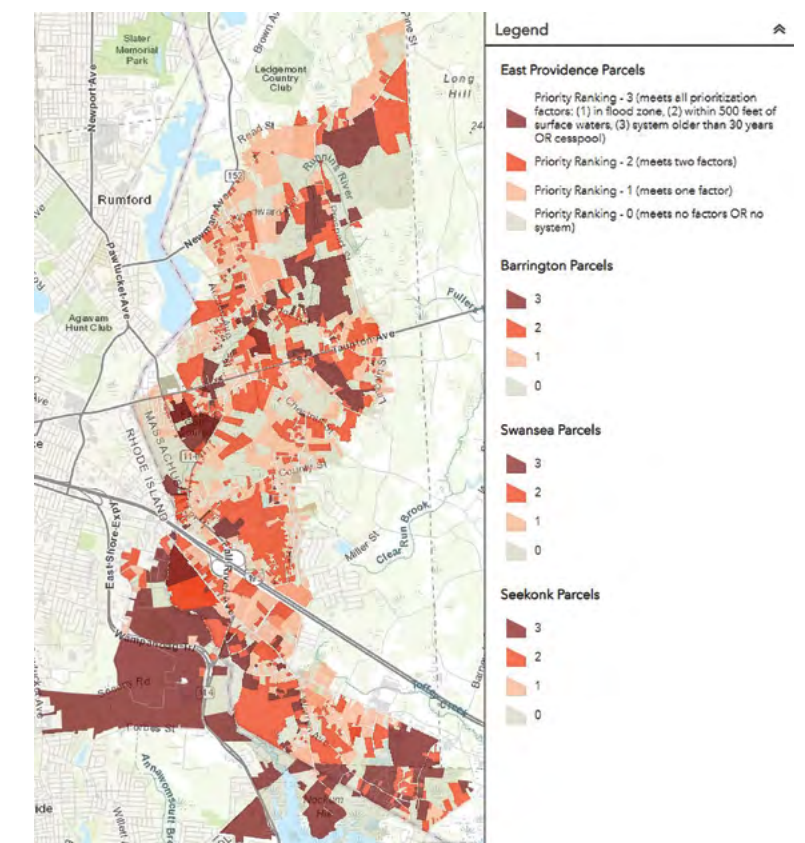
Operating with the knowledge that cesspools or failed septic systems could also be large sources of bacteria in the watershed, NBEP also created a second map to assist with onsite wastewater treatment system analysis. This map collected information from cities and towns to prioritize parcels based on system age, proximity to surface waters, or location in a flood zone. The map is intended to assist project partners with future projects and outreach.

Both of these maps are available online at:

- <https://bit.ly/HAC-Stormwater>
- <https://bit.ly/HAC-Septic>



The NBEP map above illustrates watershed-wide information related to stormwater catch basins and outflows. The map below captures important information about cesspools and septic systems.





Volunteers taking bacteria samples to see if bacterial pollution in the Runnins River is still an issue in 2019.

3. Water Quality & Other Data

Water Quality Standards

Water quality standards are provisions of state law approved by the Environmental Protection Agency (EPA). They describe the desired condition of a water body and the means by which that condition will be protected or achieved. Rhode Island has classified the waters of Hundred Acre Cove as water quality standard SA, the classification of estuarine and marine waters designated for direct shellfish harvesting. The SA designation is defined by the most sensitive use of shellfish harvesting for direct consumption and should be preserved. According to RIDEM Water Quality Regulations, most recently revised in 2018, "Class SA waters shall be of such quality that they are suitable for the designated uses of shellfish harvesting for direct human consumption, primary [aka swimming] and secondary [aka boating] contact recreational activities, and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value." Hundred Acre Cove is currently not meeting standards for shellfishing, and data is not available from water quality monitoring efforts to know if the cove is meeting habitat standards. The Barrington River currently has a Total Maximum Daily Load (TMDL) for fecal coliform for impairments to the shellfish harvesting use.

What is a TMDL?

A Total Maximum Daily Load study, or TMDL, establishes the maximum amount of a pollutant that can be allowed into a waterbody, while still allowing said waterbody to meet water quality standards. The study itself serves as a resource and starting point for water quality restoration.

Rhode Island has designated the Runnins River and its tributaries from the Massachusetts-Rhode Island border to the Mobil Dam in East Providence as water quality standard B. Massachusetts has also designated the Runnins River as Class B. Since Rhode Island has designated Hundred Acre Cove and the Barrington River as SA waters, Massachusetts Class SA criteria apply to the Runnins River segment from the Mobil Dam to the state border.

Warren River Pond (MA53-06) is Class SA and designated for shellfishing. This segment adjoins a Class SA segment in Rhode Island. As a result, the Class SA shellfishing criteria are applicable to the Warren River Pond segment in Massachusetts. Applying the water quality target associated with the most sensitive designated use downstream is protective of Rhode Island water quality objectives. Massachusetts targets are comparable to the targets applied by RIDEM in the development of the TMDLs for restoration of segments in Rhode Island and are therefore protective of downstream waters.

In both Rhode Island and Massachusetts, Class B waters are designated for fish and wildlife habitat and primary and secondary contact recreational activities. They “shall be suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters shall have good aesthetic value.” Currently, Rhode Island classifies the Runnins River as Impairment Category 5, which means the river is impaired or threatened for one or more of the above designated uses by pollutants, and requires a TMDL. This category includes waters impaired or threatened by pollutants for which one or more TMDLs are needed. The Runnins River currently has a TMDL for fecal coliform, which is impairing contact recreational uses. The river is also impaired by lead and inadequate dissolved oxygen, which is impairing fish and wildlife habitat.

All waters of the Barrington, Palmer and Warren Rivers, including Hundred Acre Cove, known by RIDEM as Growing Area 2, are currently classified as prohibited to shellfishing. Monitoring of prohibited areas is not required, but, as resources allow, RIDEM Shellfish Program staff complete limited monitoring of the area. The 2020 review has demonstrated that the fecal coliform water quality does not meet criteria for Approved or Conditionally Approved waters. The area is classified as Prohibited, and RIDEM’s 2020 Shellfish Program Classification Report recommends no change in classification.

Water Quality Monitoring

A tremendous amount of historical water quality data is available for the Runnins River. Dating from at least 1990 until 2006, members of the Pokanoket Watershed Alliance (PWA), led by Doug Rayner, a citizen scientist, collected water quality data. This data, along with data from the Massachusetts Department of Environmental Protection (MADEP), the National Park Service (NPS), the New England Interstate Water Pollution Control Commission (NEIWPCC), the US Environmental Protection Agency (EPA), the Massachusetts Riverways Program, Mobil Oil Corporation, and the Rhode Island Department of Environmental Management (RIDEM) was used to develop the bacteria TMDL in 2002 for the Runnins River. However, these datasets are older, and the PWA is no longer in existence. To better understand the more recent trend of water quality in the Runnins River and Hundred Acre Cove, Save The Bay examined water quality tests that were done since 2008.

Rhode Island Department of Environmental Management: Fecal Coliform Data

Fecal coliform is used as an indicator of possible sewage contamination because it is commonly found in human and animal feces. Fecal coliform indicates the possible presence of pathogenic microorganisms. Elevated levels of fecal coliform can pose a health risk to swimming and eating shellfish because of the potential presence of harmful pathogens. Sources of fecal contamination to surface waters include on-site septic systems, cesspools, domestic and wild animal manure, and stormwater runoff.

In Rhode Island, the RIDEM Office of Water Resources (OWR) tests fecal coliform in the Barrington River and Hundred Acre Cove as part of its shellfish program. We compiled all of RIDEM's testing data since 2007 and found that each station is typically tested between two and five times annually. During the grant period, the cove was tested four times in 2018, two times in 2019, and not at all in 2020.

Rhode Island's water quality standard for fecal coliform concentrations in class SA waters, which Hundred Acre Cove is classified as, is not to exceed a geometric mean MPN or MF (mTEC) value of 14 per 100ml, and not more than either 10% of the estimated 90th percentile of the samples shall exceed an MPN value of 49 per 100ml for a three-tube decimal dilution or 31 cfu per 100ml for MF (mTEC). RIDEM's OWR tests Hundred Acre Cove intermittently to determine whether water quality improvements might permit shellfishing or warrant further investigation. Results continue to show that fecal coliform levels routinely exceed standards. Some of the highest bacteria levels are found at sites closest to the Runnins River, suggesting that the river is a primary source of bacterial pollution to Hundred Acre Cove and the Barrington River. This is consistent with the information that was presented in the RIDEM Barrington River and Runnins River TMDL documents.



RIDEM Shellfish Harvest Restrictions map indicating that shellfishing is prohibited in Hundred Acre Cove and surrounding waters

**Massachusetts Department of Environmental Protection:
Bacteria Source Tracking (E. coli)**

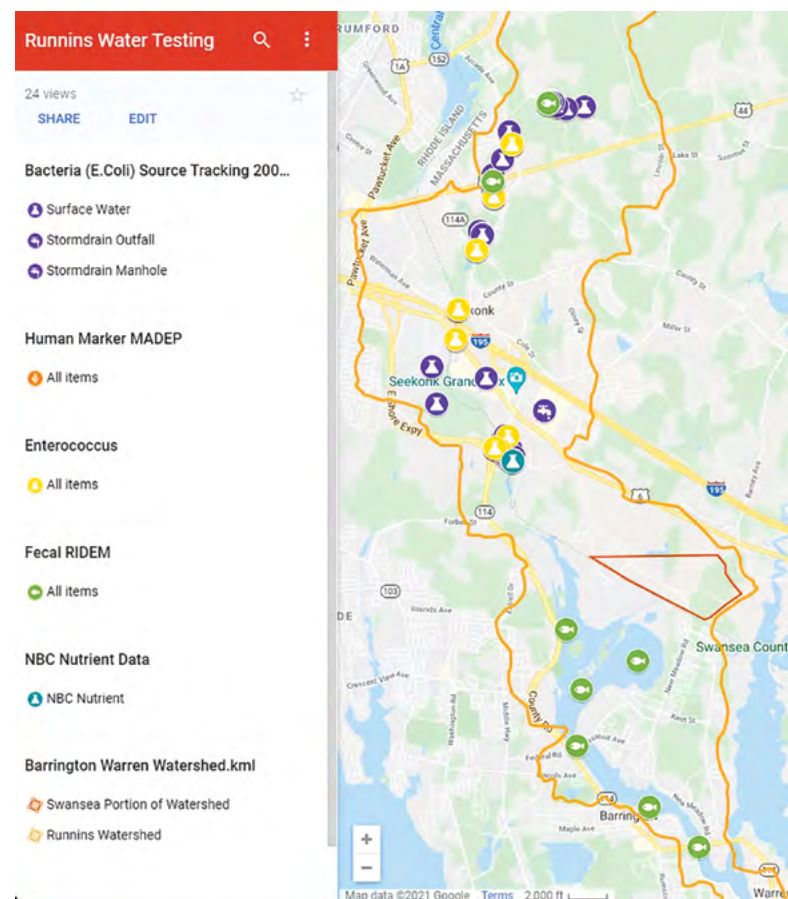
Save The Bay organized and mapped bacterial source tracking data collected by MADEP Environmental Analyst Jennifer Sheppard from 2008 to 2019. The purpose of this testing was to find a potential human source of bacterial pollution in the Runnins River. Elevated E. coli levels in freshwater may be indicative of potential wastewater or washwater contamination. In its Illicit Discharge Detection & Elimination Guidance

Manual, the EPA recommends flagging dry-weather E. coli samples higher than 1,000 MPN/100 ml for further investigation. Five specific areas of the river tested were found to have E. coli levels higher than 1,000 MPN/100 ml:

- *Ledge Road, Seekonk*
Eight testing stations located near Ledge Road were tested between 2008 and 2015 where MADEP was attempting to pinpoint the source of two very high samples. Station RR28 upstream of Ledge Road was tested four times and the worst sample was over 7 times the single sample standard for Class B waters/primary recreation. Station RR01 just downstream of Ledge Road was tested 10 times and the worst sample was almost 31 times the single sample standard for Class B waters/primary recreation. Two of the other testing stations tested high, and the other three were within safe ranges over the time period that they were tested.
- *Shady Lane, Seekonk*
Station RR20 was tested twice, in 2010 and 2012, and the worst sample was 7 times the single sample standard for Class B waters/primary recreation.
- *Pleasant Street, Seekonk*
Station RR03 was tested 8 times between 2008 and 2012, and the worst sample was over 4 times the single sample standard for Class B waters/primary recreation.
- *Old Grist Mill Pond, Seekonk*
Two testing stations located at the northern end of the pond were created in 2014. Both were tested once, on the same day, and those samples were each 6.6 times and 5.5 times the single sample standard for Class B waters/primary recreation. This location clearly illustrates the extreme variability of bacterial water quality testing. The samples were taken on the same day, about 40 feet apart, and had a difference of 253 cfu/100ml.
- *The Triangle, East Providence/Seekonk*
The stretch of river between Mink Street (Route 114A) and River Road/School Street has 9 testing stations that have been tested between 1 to 11 times each between 2008 and 2017 in an effort to find

the source of the pollution. Station RR05 is the most frequently sampled spot in the river, and the highest sample was almost 33 times the single sample standard for Class B waters/primary recreation. From station RR05 moving downstream to River Road/School Street, the worst samples have been significantly higher than the single sample standard for Class B waters/primary recreation. South of River Road, using E. coli as an indicator of human contamination no longer remains viable due to tidal influence and intrusion of brackish water.

MADEP's bacteria source tracking data includes 38 stations that sampled surface water samples, and nine stations that sampled water from storm drain outfalls. One storm drain manhole was sampled near the area known as "the triangle." For a visual representation of this data as well as data tables, Save The Bay created an interactive Google Map, available at <https://bit.ly/RunninsWater>.



Save The Bay compiled collected water quality data into an interactive Google Map that can be accessed online at <https://bit.ly/RunninsWater>.

Massachusetts Department of Environmental Protection: Human Marker

In an effort to determine if the extremely high E. coli counts were possibly coming from a human source, MADEP Environmental Analyst, Jennifer Sheppard, also conducted Human Marker sampling between 2008 and 2018. The sampling tests for Bacteroides that are found in human waste, caffeine and optical brighteners (chemicals added to laundry detergent to make clothing appear brighter). The results of these Human Marker samples were inconclusive, with no strong evidence of a human source.

Existing Reports & Data Sources

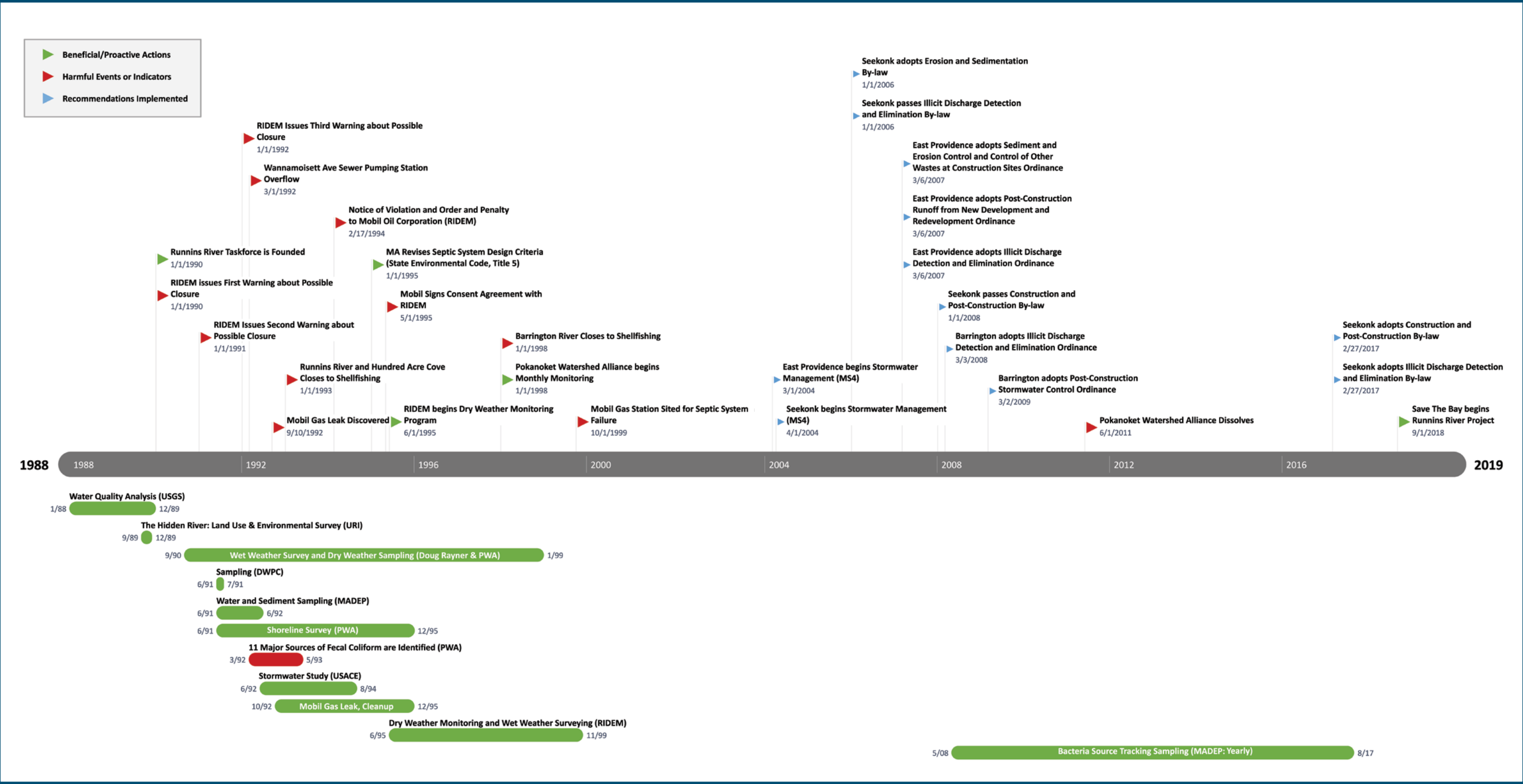
Save The Bay has searched for, catalogued, and reviewed all known studies and reports pertaining to water quality in the watershed that drains to Hundred Acre Cove. We collected reports and studies documenting the water quality of Hundred Acre Cove and the Runnins River dating back to 1989. They include professional reports and studies conducted by water quality volunteers over the years.

The Pokanoket Watershed Alliance was active in studying Hundred Acre Cove and the Runnins River in the 1990s. They published 8 reports, including water quality data and shoreline surveys of the Runnins River, between 1992 and 1995.

RIDEM and MADEP have contributed to several documents, including several TMDLs, Southeast Region Bacteria Source Tracking results from 2008 through 2017, and a watershed plan developed for the Barrington-Palmer-Warren Rivers in 2012.

RIDEM's Division of Site Remediation published several reports in relation to the ExxonMobil terminal site west of the Runnins River. These include a Notice of Violation and Order and Penalty (1994), a Consent Agreement (1995), and an Overview of the Site Investigation and Remediation Activities Being Conducted at the Mobil Oil Corporation, East Providence Terminal (1995).

Documents that were produced after 2002 will be the main focus in order to keep relevance with the current status of the area. Town/City master plans along with MS4 permit reports from the surrounding towns—Seekonk, MA, and East Providence and Barrington, RI—document the municipalities' goals, recommendations, and implementation guides for improved water quality.



A timeline of activities, reports and publications pertaining to water quality in Hundred Acre Cove.

Document List

Barrington: Municipal Resilience Program, Community Resilience Building Workshop, Summary of Findings, October 2019
Town of Barrington; 2019

RIPDES Small MS4 Annual Report
James Cunha, Town of Barrington Town Manager; 2019

RIPDES Small MS4 Annual Report
Erik Skadberg, City Engineer, City of East Providence; 2019

Seekonk Town By-Laws
Town of Seekonk; 2018

NPDES PII Small MS4 General Permit Annual Report: Town of Seekonk
David Cabral, Seekonk Public Works Superintendent; 2018

State of Rhode Island Impaired Waters Report
RIDEM Office of Water Resources; 2018

RIPDES Small MS4 Annual Report
Alan Corvi, Town of Barrington Director of Public Works; 2018

RIPDES Small MS4 Annual Report
Erik Skadberg, City Engineer, City of East Providence; 2018

Southeast Region Bacteria Source Tracking 2017
MADEP, Jennifer Sheppard; 2018

2016 Shellfish Program Classification Report
RIDEM Office of Water Resources: Shellfish Program; 2017

RIPDES Small MS4 Annual Report
Joe Piccerelli, Town of Barrington Director; 2017

RIPDES Small MS4 Annual Report
Erik Skadberg, City Engineer, City of East Providence; 2017

Protected Lands - Barrington
Barrington Land Trust; 2017

Southeast Region Bacteria Source Tracking 2015
MADEP, Jennifer Sheppard; 2016

2015 Shellfish Program Classification Report
RIDEM Office of Water Resources: Shellfish Program; 2016

Southeast Region Bacteria Source Tracking 2014
MADEP, Jennifer Sheppard; 2015

2014 Shellfish Program Classification Report
RIDEM Office of Water Resources: Shellfish Program; 2015

North Operations Area Perimeter Containment System Performance Monitoring Report
Daniel Grapski, Roux Associates Inc, ExxonMobil Environmental Services; 2015

Town of Barrington Comprehensive Community Plan, Ch 5
Town of Barrington; 2015

Southeast Region Bacteria Source Tracking 2013
MADEP, Jennifer Sheppard; 2014

Southeast Region Bacteria Source Tracking 2012
MADEP, Jennifer Sheppard; 2014

RIPDES Small MS4 Annual Report
Erik Skadberg, City Engineer, City of East Providence; 2013

Barrington-Palmer-Warren Rivers Watershed Plan
RIDEM, US EPA, FB Environmental; 2012

Seekonk Master Plan Volume I : Baseline Report
Horsley Witten for Seekonk, Massachusetts; 2012

Seekonk Master Plan Volume II: Issues, Goals, and Recommendations
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Sea level rise is a threat to Hundred Acre Cove; the high tide bush in the foreground is now regularly inundated by brackish water.

4. Prioritized Actions & Projects

Restoration Goals for Hundred Acre Cove

Save The Bay compiled a list of water quality and habitat restoration and adaptation projects that had been previously identified but not yet completed. Sources for these projects included the Fecal Coliform TMDLs for the Runnins River and Barrington River, published in 2002; the Barrington-Palmer-Warren River watershed plan, completed in 2012; the most recent MS4 Annual Reports from all communities; East Providence and Barrington’s Hazard Mitigation Plans and Comprehensive Plans; Seekonk’s Master Plan; Barrington’s MRP Report; and Seekonk’s MVP Report.

Additionally, new projects were identified by project partners in response to the renewed focus on the Runnins River watershed. Priorities were determined by evaluation of wet and dry weather water quality relating to conditions in Hundred Acre Cove and the Runnins River. This facilitated the creation of a project list for the Hundred Acre Cove and Runnins River watershed area.

Municipal Separate Storm Sewer System (MS4) Compliance

East Providence

When Save The Bay staff met with Department of Public Works (DPW) employees in the City of East Providence, they learned that all outfalls and catch basins had been



Dirty and clogged catch basins, like the one featured here, contribute to flooding and pollution issues in the Hundred Acre Cove watershed.

mapped since at least year two of the City's 2003 MS4 permit. Outfall testing had been done in the past decade, and the DPW does not have a plan for continued outfall testing of the 33 outfalls that are present in the watershed. The City had indicated that 90% of the outfalls were dry, however some outfalls may still flow during dry weather. The City does not have clear criteria to trigger an illicit discharge detection (IDD) other than complaints that result from obvious signs of human sewage. The East Providence DPW does have a routine maintenance plan and cleans every catch basin in town every 4 years, with the knowledge that some areas need more frequent maintenance.

Recommendation:

- Periodic inspection of outfalls in accordance with the City's Operations and Maintenance Plan.
- Water quality testing at any outfalls with dry weather flow.
- Increase staff capacity to clean catch basins annually and to manage stormwater retrofits.

Barrington

The Town of Barrington hired a consultant to map their stormwater system in 2018 and provided Save The Bay with the data. The data supported the creation of the Stormwater Infrastructure Viewer. Barrington has at least 94 outfalls in the Hundred Acre Cove/Barrington River watershed. As of this writing, the work to map the stormwater system, including accurately representing the catch basins and outfalls, remains a Town priority and is nearing completion. Following the mapping, a list of priority outfalls should be developed for dry and wet weather testing for sites with dry weather flows or consis-

tently high bacteria levels. The results of those tests will determine the final list of priority outfalls and assist with illicit discharge detection. Additionally, there are no stormwater-dedicated DPW staff in town. Routine maintenance tasks such as street sweeping and catch basin cleaning occur when other public works tasks allow. The Town needs a line item in the budget for a dedicated stormwater staff for maintenance and to manage stormwater projects.

Recommendations:

- Finish mapping the storm drain system, prioritizing accurate locations of outfalls and catch basins.
- Note condition of outfalls and develop a priority list for dry and wet weather testing.
- Assign dedicated DPW staff for maintenance, cleaning, and repairs to the town's stormwater system.
- Target neighborhoods where dog waste bags were observed in catch basins and outfalls for distribution of educational materials about illicit dumping in catch basins. This is **a high priority, immediate action item for a known source of bacteria**. Save The Bay has appropriate educational resources and can assist the town with this project in the immediate future.

Seekonk

The Town of Seekonk had a similar incomplete map of stormwater infrastructure at the beginning of this project. While working with Seekonk's Department of Public Works, it became clear that while the DPW director had intimate knowledge of where the various components of the storm drain system were, the available maps were lacking. With participation from Save The Bay, Seekonk reconvened monthly meetings of their Stormwater Action Committee. Save The Bay was able to offer internships to two undergraduate students to complete mapping of the stormwater outfalls townwide. Each outfall that was not blocked by vegetation was visited, photographed, and the outfall's general condition was noted. This work helped to generate a list of priority outfalls for water quality testing. Twenty-seven previously unmapped outfalls were located and added to Seekonk's GIS database. The town has hired a consultant to work with the DPW to test

10 problem and 20 high priority stormwater outfalls. The DPW is tasked with more work than they can reasonably accomplish, and the schedule for testing continues to be re-scheduled as of summer 2021.

Recommendations:

- Perform necessary vegetation clearing and maintenance to keep access to outfalls clear.
- Test identified problem and high priority outfalls.
- Target neighborhoods where dog waste bags were observed in catch basins and outfalls for distribution educational materials about illicit dumping in catch basins. This is **a high priority, immediate action item for a known source of bacteria**. Save The Bay has appropriate educational resources and can assist the town with this project in the immediate future.

Reducing the Impact of Septic Systems and Cesspools

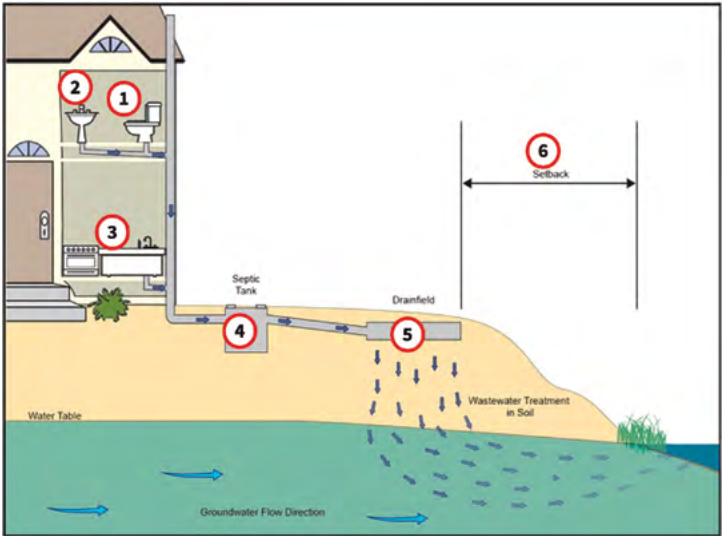
Septic System Maintenance & Inspections

The towns of Seekonk and Swansea are completely serviced by septic systems. One neighborhood north of Hundred Acre Cove in Barrington is also serviced by septic systems. Routine inspections and pump outs are essential to keep these systems functioning properly, however many homeowners are not aware that this needs to be done.

Resources for homeowners are available on the EPA website at: www.epa.gov/septic/septic-system-improvements-protect-nearby-water-sources.

Save The Bay has compiled a list of septic pump out professionals that operate in the Runnins River and Hundred Acre Cove watershed. Furthermore, Save The Bay partnered with Seekonk’s Health Agent, as well as the Narragansett Bay Estuary Program, to create maps of properties which may have very old systems, have cesspools, be within flood hazard areas, be projected to be impacted by future sea level rise scenarios, or be adjacent to wetlands and rivers.

A database which can be sorted by priority ranking was also developed, so that health agents and project partners can target outreach to home and business owners for maintenance and inspection.



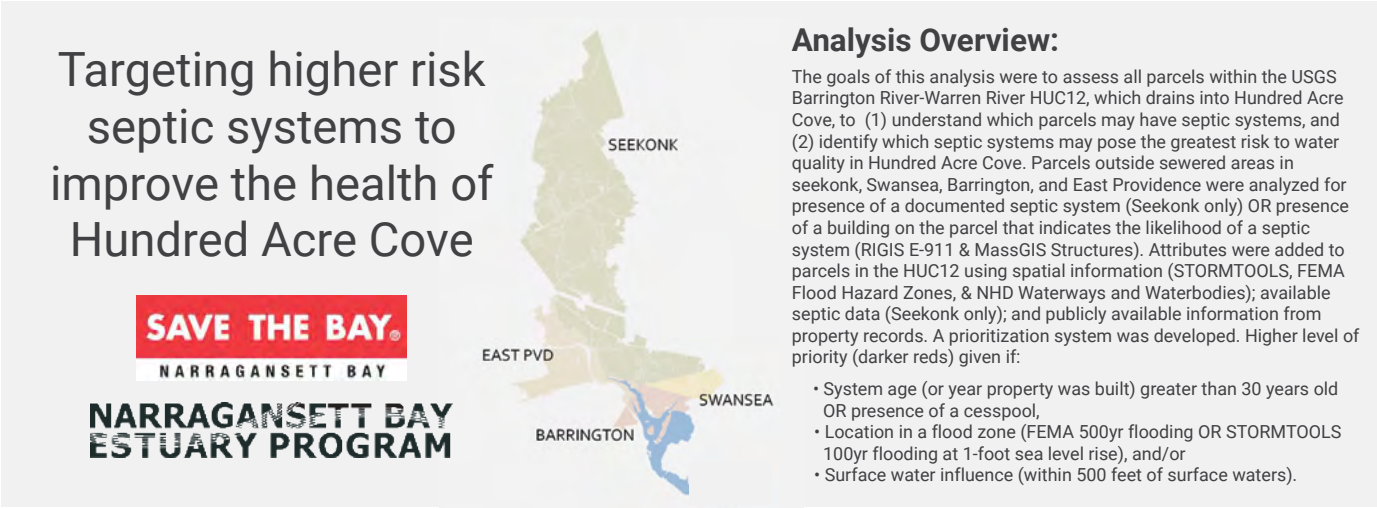
This graphic from the EPA illustrates the function of the average septic system. Regularly inspecting and pumping your septic tank can prevent backups, protects your system, and improve water quality in the watershed you live in.

Policy and Regulatory Changes: Wastewater Management Ordinance

Malfunctioning and failing septic systems have the potential to significantly impact human health and the water quality of the Runnins River and other streams and ponds in Seekonk. Mandatory routine inspections of septic systems is a tool that a municipality can use to determine the condition and the needed maintenance frequency of septic systems.

In Massachusetts, Title 5 sets forth the minimum state standards for the governance of wastewater treatment systems. Local boards of health are empowered to adopt ordinances that are more stringent than Title 5. Because of the potential impact septic systems have on the Runnins River and Hundred Acre Cove, the Town of Seekonk could adopt a wastewater management ordinance to require regular inspection and maintenance of on-site wastewater systems. The Town of Seekonk could model an inspection and maintenance program after other successful programs in the region, such as the wastewater management program in the Charlestown, RI. Charlestown’s program required a baseline inspection for all septic systems within three years of the passage of their ordinance. The purpose of the first maintenance inspection for existing systems was to inventory the systems and identify those in need of repair or replacement. The results of the baseline inspection are used to determine the frequency of required routine maintenance inspections, between three to five years. The inspections are conducted by a Town of Charlestown Approved Septic Service Provider who is required to upload the inspection information to the Town’s Septic System Database using the Town of Charlestown Conventional OWTS Inspection Report.

The Town of Gloucester, Massachusetts has specifically adopted “Standards for Clean-Up of Existing Septic Systems,” and chosen to be more proactive and stringent than Title 5 (*City of Gloucester Board of Health Regulations, Onsite Wastewater Regulations, adopted August 3, 2000, revised June 5, 2008* [OWR Regulations]). The City is working to identify on-site septic disposal systems that are failing to protect the environment, public health or safety and requires inspections and repairs in “priority drainage areas.” Cesspools located in a critical buffer zone must be replaced. (OWR Section 6.1-6.3.4.) Gloucester and other Massachusetts communities such as Duxbury and Harwich have defined cesspools as failed systems and have required replacement of the cesspool with a septic system within a certain period of time after transfer of the property. In Westport, Massachusetts, a requirement to replace cesspools is under consideration in the town’s *Proposed Septic System Water Resources Protection Regulation*.



The analysis conducted with the datasets in the NBEP watershed maps.

Recommendation:

- In the short term, the Town of Seekonk’s Board of Health could begin educating the public about the need to properly care for and maintain cesspools and septic systems, as well as the need for more stringent regulations.
- In the long term, the Town should draft an ordinance to require regular inspection and maintenance of septic systems using the regulations promulgated by the Town of Charlestown and City of Gloucester as models, and use the Septic System mapping tool to prioritize areas for inspection and maintenance.

Policy & Regulatory Changes: Financing Stormwater Programs, Maintenance and Retrofits

The three municipalities have limited capacity to maintain and upgrade stormwater infrastructure. Resources are needed for personnel, equipment and project planning, design, construction and implementation, and maintenance.

Stormwater Utility Districts (SUDs) are an approach to financing stormwater management through a fee-based system, in which system “users” or residential, commercial or industrial properties are assessed a fee based on the amount of impervious surface on their property. SUDs often assess fees to entities, such as nonprofit organizations, that otherwise do not pay taxes but still create demands for stormwater management services because their parking lots can generate significant runoff. SUDs can include incentives for reduced fees for system users who reduce their impervious surfaces and install green infrastructure to capture and filter stormwater runoff. When designed and implemented well, SUDs are considered a fair, equitable and effective way of generating revenues that help municipalities meet operational and capital demands, while removing stormwater management from “competition” with other important municipal needs that are often funded by property taxes and borrowing, such as schools, waste collection, and other basic services.

SUDs help municipalities achieve compliance with MS4 permits and leverage federal and other grant funding for system improvements, a timely opportunity given that Congress is currently developing a large-scale infrastructure plan. Save The Bay offers its assistance in securing support to undertake a detailed evaluation of potential Stormwater Utility District options for each municipality.

Nearly 2,000 communities in the United States have adopted Stormwater Utility Districts. In Massachusetts, the towns of Franklin, Newton, Northampton, Reading, and Tewksbury have created SUDs.

A helpful reference for learning more about SUDs is the [Cape Cod Stormwater Resource Hub](#), which provides an overview on stormwater financing challenges and solutions. The hub specifically includes a primer on Stormwater Utility Districts.

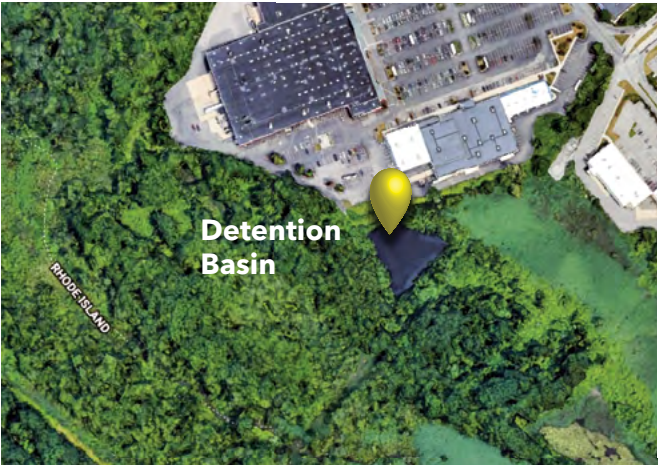
Recommendation:

- Seekonk, East Providence and Barrington should consider establishing a Stormwater Utility District (SUD) or Stormwater Enterprise Fund to cover the costs of infrastructure maintenance and stormwater retrofits needed to help improve water quality in the Hundred Acre Cove watershed, including the Runnins River.

Targeted Stormwater Management Projects

Design and construct stormwater BMP for Route 6 Stream #2, Seekonk

Route 6 Stream #2 was identified as the largest wet weather contributor of fecal coliform to the Runnins River in the Fecal Coliform TMDL for the Runnins River. This stream drains an area of Seekonk north of the Route 6/Mink Street intersection. The surrounding wetland provides little storage for stormwater runoff. The wetland also functions poorly as a pollutant buffer for the Runnins River. For example, fecal coliform concentrations were an order of magnitude lower in Route 6 Stream #1, despite its proximity to the Seekonk commercial district. Stream #1 drains a large area, including Route I-195 to the north. (RIDEM, 1996). A BMP to collect and treat stormwater runoff would help reduce storm-related loadings to the river by reducing the volume of runoff and fecal coliform concentrations entering the river during rain events. In addition to a BMP, it is recommended that an investigation into illegal connections to storm drains in this area be conducted. The Town of Seekonk, with assistance from other Massachusetts agencies, has obtained 604(b) funding to address stormwater loadings to this area.



The basin shown above—located at 175 Highland Avenue in Seekonk, MA—was constructed in the late 1980s or the early 1990s. The basin contains water year-round, and likely does not remove pollutants as well as a more modern stormwater infiltration area would.

Retrofits to Existing Detention Basins

One unique approach to improve stormwater management in highly developed sections of the watershed is to retrofit existing detention or retention basins and engineer them to more effectively treat the stormwater that they capture. A publicly owned detention basin at the end of Industrial Way in Seekonk suffers from significant algal blooms and discharges to a small stream that flows into Hundred Acre Cove. This detention basin has been highlighted as a potential retrofit opportunity and could provide a model for the retrofit of other detention basins that are privately owned in the watershed.



In the image shown here, one can observe sediment that has been carried by stormwater into a forested area northeast of Boyd Avenue in East Providence. A stormwater infiltration project here would improve water quality in a tributary to the Runnins River.

Linear Stormwater Infiltration along Boyd Avenue, East Providence

Stormwater runoff from the Armington Corner neighborhood east of Pawtucket Avenue runs down the hillside and picks up road sediments, depositing them into a wooded area east of Boyd Avenue. Stormwater that enters catch basins ends up directly discharging into an unnamed tributary stream that flows under the East Shore Expressway (Rt. 114), and through the Amaral Street industrial park and Risho/Catamore Boulevard office park, before joining the Runnins River. Capturing and infiltrating stormwater along the edge of Boyd Avenue, relatively high in the watershed, would create cleaner water downstream.

Pavement Removal at Amaral Street, Risho Avenue and Catamore Blvd, East Providence

Save The Bay identified areas of pavement along Amaral Street in East Providence, at the western end of Risho Avenue and the southern end of Catamore Blvd, that could be removed near the unnamed tributary stream to the Runnins River. Stormwater runoff from Amaral Street flows directly into the unnamed stream. An infiltration area could be created along the northern side of the stream in a paved section of the right-of-way. Sheet flow runoff that discharges down a paved swale to the Runnins River could be diverted into an infiltration area by removing pavement at the end of Catamore Blvd. Additional opportunities exist in the right-of-way off Risho Avenue by diverting runoff into linear stormwater infiltration areas along the north and south side of Risho Avenue.

Pavement Removal at 1275 Fall River Avenue, Seekonk

A parking lot that has been abandoned for several years consists of at least 10,000 square feet of impervious surface behind Funcity Trampoline Park. Currently, concrete barriers block vehicles from entering the lot, which was constructed between 1988 and 1997. At a minimum, reduction in impervious surface here will have a water quality benefit, however this area is low in the watershed, and review of aerial imagery shows that wetlands may have been impacted by the filling and paving for this unused lot. An opportunity to restore wetlands or construct a stormwater improvement BMP is present at this location.



An area of pavement adjacent to a tributary to the Runnins River, east of "the triangle" in Seekonk, MA, is no longer being used as a parking lot. The site offers an opportunity to restore the area to wetland, supporting water quality in the river.

End-of-Road Retrofits along Hundred Acre Cove, Barrington

Many roads dead end along Hundred Acre Cove and provide an opportunity for stormwater management by either removing redundant pavement and creating a stormwater infiltration area, or by creating subsurface infiltration if space for pavement removal is limited. Save The Bay has worked with the Town of Barrington to identify potential end-of-road retrofits. Another opportunity for stormwater management is in existing public rights-of-way to the shore. The Town of Barrington has received funding from Rhode Island's Municipal Resilience Program to infiltrate stormwater in existing rights-of-way at Opechee and Bowden Avenues.

Stormwater Management along State Roadways

The Rhode Island Department of Transportation (RIDOT) is planning to develop a stormwater control plan for state roads in the Runnins River and Hundred Acre Cove watersheds, including Rt. 6, I-195 and Rt. 114. The stormwater control plans for these watersheds are scheduled to be started in 2022 and completed by December 2023. During the development of the plans, the City of East Providence and the Town of Barrington should collaborate with RIDOT on the development of the stormwater control plans for state roads and look for opportunities to address runoff from municipal roads with shared drainage systems. In Seekonk, the Massachusetts Department of Transportation (MASSDOT) recently completed work, including a culvert upgrade, on Rt. 114A, just south of Grist Mill Pond. Other opportunities to improve streamflow and stormwater treatment should be considered on nearby MASSDOT roads, including along Rt. 6.

Targeted Wetland Restoration Projects

Restore Wetland along Runnins River in “The Triangle,” Seekonk & East Providence

An area known as “the triangle” on the border between Seekonk and East Providence has been subject to water quality testing in an effort to find a hotspot of bacterial pollution. The triangle is a brackish tidal marsh that is dominated by *Phragmites australis* (also known as common reed), although tree of heaven, gray willow, wild grape, red osier dogwood, oriental bittersweet, alder, multiflora rose, autumn olive, greenbrier, japa-

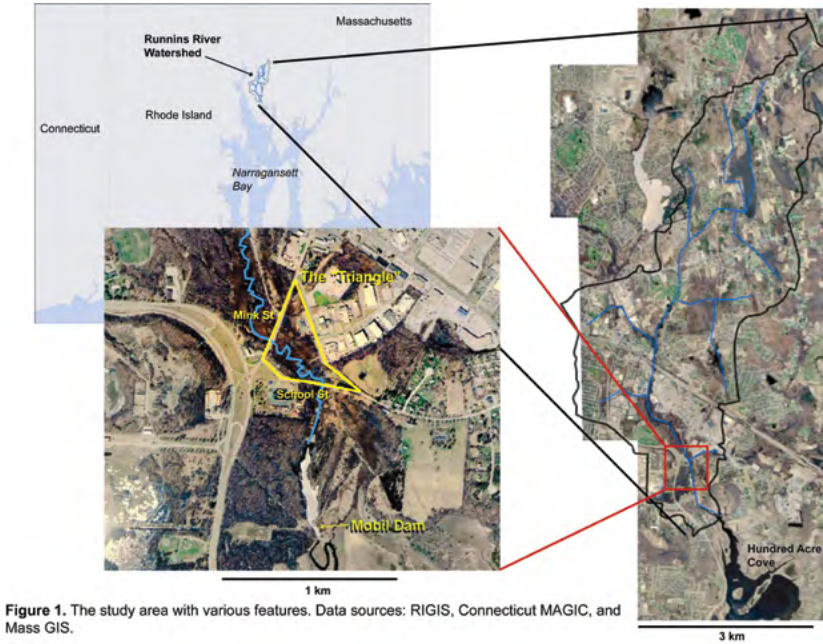


Figure 1. The study area with various features. Data sources: RIGIS, Connecticut MAGIC, and Mass GIS.

The graphic above uses RIGIS, Connecticut MAGIC, and MA GIS as sources to clarify the geography of the study area.

nese barberry, and red maple are also present. An inspection within an old abandoned road, between lots 2 and 27 in Seekonk, revealed old stone bridge abutments and fill. A review of historical aerial photographs shows a road present up to 1951, and a bridge that was removed in 1962. A large scour pool is present downstream of this old road bed, and vegetation growing on the elevated surface includes white oak, apple, eastern red cedar, black oak, poison ivy, bush honeysuckle, and wild grape. Removal of this restrictive structure could improve river connectivity, reduce the height and vigor of the common reed growing in the river channel upstream of the structure, and reduce the stagnant water conditions. The bacteria present in “the triangle” may be incubating within the *Phragmites* marsh itself, as stagnant water warms in the vegetation.

The Town of Seekonk, with Save The Bay’s support, applied for a Municipal Vulnerability Program (MVP) Action grant to assess existing, municipally-owned hydraulic restrictions for opportunities to restore degraded riparian corridors and improve climate resiliency. The restrictions included the Attleboro Dye Works Dam on the Ten Mile River, the Burr’s Pond Dam on the Runnins River, and former bridge abutments on the Runnins River.



Top, the Mobil Dam in 1993. Above, the Mobil Dam in 2018.

Mobil Dam Removal

The head-of-tide dam owned by Exxon/Mobil Oil Corporation has been identified in the Barrington-Palmer-Warren Rivers Watershed Plan as a watershed obstruction that contributes to the stagnant water in the Runnins River from the dam and north 0.4 miles to at least School Street. Removal of the dam would increase bi-directional flow in the river, lower the water temperature and potentially improve water quality. Additionally, the dam removal would increase the salinity level in the Runnins, which would reduce the height and vigor of *Phragmites australis* and enhance marsh migration with projected sea level rise.



Accommodating marsh migration corridors will support the health and water quality of Hundred Acre Cove.

Marsh Migration Facilitation along Walker Farm, Barrington

The shoreline of Walker Farm is low-lying, and over the past two decades the mowed lawn has begun to convert to salt marsh. When the site was a farm, concrete rubble and fill was placed along the shoreline at the edge of the salt marsh. Invasive shrubs and trees are growing out of the rubble lining the shoreline. Save The Bay identified this location as a potential marsh migration and shoreline adaptation project and worked with the Town of Barrington to develop a plan and secure funding for the project. Restoration activities include removing concrete debris along

the shoreline that is preventing marsh migration, regrading the bank, and planting a native buffer in the existing lawn area. The Town applied for and received funding from CRMC's Coastal and Estuarine Habitat Restoration Trust Fund and the Rhode Island Municipal Resilience Program to design, permit and implement the project. Additional areas for debris removal and marsh migration facilitation have been identified in the wooded area to the north of the lawn. Restoration activities should occur in the fall of 2021.

Marsh Migration Corridor West of Rt. 114, Barrington

Using the results of CRMC's Sea Level Rise Affecting Marshes Model (SLAMM) to identify salt marsh migration corridors along Hundred Acre Cove, Save The Bay has identified town-owned parcels where salt marsh vegetation has begun to migrate into low-lying uplands and freshwater wetlands adjacent to Hundred Acre Cove, west of the Wampanoag Trail (Rt. 114). The salt marshes are exhibiting signs of degradation due to shallow standing water that is causing salt marsh vegetation to die off. The bordering freshwater wetlands and undeveloped uplands have been identified as potential areas for marsh migration facilitation due to their gentle slope, low elevation and lack of development. The migration sites are located in a red maple swamp on the west side

of Rt. 114, near the Barrington/East Providence border, and are connected via culverts under Rt. 114, with salt marshes bordering Hundred Acre Cove. Salt marsh and brackish marsh vegetation have migrated into the red maple swamp on the west side of Rt. 114. Water is impounded on the salt marsh and is causing the vegetation to die off. Enhancing drainage through the excavation of shallow runnels is an adaptation strategy that can improve the health and function of the salt marsh as it migrates inland. Funding for this project has been secured from CRMC's Coastal and Estuarine Habitat Restoration Trust Fund.

Marsh Migration at Barrington Community Garden

A small, isolated brackish and salt marsh area adjacent to the Barrington Community Garden is connected to Hundred Acre Cove via a small culvert. The Town of Barrington acquired the farm about 15 years ago and has created a community garden in the former agricultural field. As part of the creation of the community garden, Save The Bay and the Barrington Town Planner conducted site assessments of the existing marsh area. A former access road to the farm crossed the salt marsh and the marsh vegetation was mowed by the former owner. The Town has re-routed the farm road, allowing the marsh to revegetate. Additional work is needed to address impounded water that is trapped in this isolated salt marsh, and to facilitate future marsh migration.

Marsh Migration at Osamequin Farm, Seekonk

The open space along Osamequin Farm provides an undeveloped area for marsh migration. The volunteer stewards of Osamequin Farm have already begun helping the marsh adapt to sea level rise by closing former low lying paths along the shoreline and installing signage about sea level rise. Agricultural features in the upland, including an earthen berm, are restricting marsh migration. Removal of sections of the berm to facilitate migration and drain impounded water will help open up the migration corridor. This open space provides a great example of how to adapt to sea level rise and provide space for marsh migration.

5. Plan Moving Forward

Buffer Improvement at Risho & Catamore, East Providence

Mown lawn, a few overstory trees, and some rip rap currently line a tributary stream downstream of the Risho Avenue culvert. Stopping mowing, allowing leaf litter to collect, and planting native shrubs and additional trees in this area will be beneficial to water quality and habitat.

Land Protection in the Marsh Migration Corridor

Owners of larger parcels along Hundred Acre Cove and the Runnins River should be targeted for outreach about land protection strategies in coordination with the towns, the Natural Resources Conservation Service (NRCS), and local lands trusts, including the Barrington Land Conservation Trust, the East Providence Land Conservation Trust, the Seekonk Land Trust and the Wildlands Trust. NRCS’ Wetlands Reserve Easement (WRE) program provides easements to property owners on wetlands and associated upland areas. Funding through WRE is also available to restore wetlands impacted by past agricultural activities, including remediation of ditches, embankments and tile drains. This program has been used to protect low-lying undeveloped uplands and salt marshes bordering the Palmer River, and could be a tool for land protection in the marsh migration corridor along Hundred Acre Cove and the Runnins River. SLAMM maps created by Massachusetts Coastal Zone Management and SLAMM maps recently updated by URI’s Environmental Data Center, which include sea level rise scenarios up to 8 feet, are both useful tools for identifying and prioritizing parcels for protection.

Save The Bay is poised to help municipalities implement projects and engage with community members as we seek to build a solid foundation for action in the Hundred Acre Cove watershed. Ongoing work, assessments, and a commitment to carrying out the identified actions of this plan will continue beyond the publication of this report. We will leverage support through a collaborative effort with the Narragansett Bay Estuary Program, which could be sustained by additional SNEP funding, state, federal, or private funding.

The restoration objectives outlined here follow recommendations by the Interagency Ecological Restoration Quality Committee: SMART – Specific, Measurable, Achievable, Results-Oriented, and Time-Bound. The recommended restoration activities are likely to succeed because the objectives are clear, they define exactly what needs to be achieved, where and when.

Save The Bay will continue evaluating the outcomes of this plan, assessing the strategy’s effectiveness at achieving the intended outcomes. The primary goal of this plan for Hundred Acre Cove and the Runnins River is to move forward with the implementation of projects outlined in Chapter 4, which include: implementing water quality and habitat restoration initiatives; enacting policy and regulatory changes which directly impact water quality; and ensuring the future health and ecosystem function of Hundred Acre Cove.

Challenges to improved water quality include...

- Hundreds of aging septic systems
- Acres of roadways and parking lots
- Municipal departments of public works with responsibilities that overwhelm their capacity

It may be many years before water quality is improved to a level that supports reopening waters to shellfishing, particularly because no one single point source for bacterial pollution exists. The challenges include hundreds of aging septic systems, acres of roadways and parking lots, and municipal departments of public works with responsibilities that overwhelm their capacity. However, Save The Bay intends for this project, and subsequent work, to continue to engage community stakeholders and Hundred

Acre Cove watershed users. Our conversations with regulators and scientists at RIDEM and MADEP, as well as our work understanding water quality samples taken in the watershed, clearly illustrate both the complicated nature of bacterial water quality sampling and the continuing lack of awareness of pollution in the watershed.

Save The Bay envisions working with project partners and others to implement the recommendations set forth in this plan and to build upon the willingness of municipalities to promote the value of Hundred Acre Cove, and surrounding waterbodies, to their communities. There is significant interest from municipal partners to engage communities and volunteers in the grant work and follow-on projects.

Save The Bay also envisions opportunities to build awareness and stewardship of local water resources and the importance of protecting these resources through public and school-based education programs. Additionally, many of the projects identified in this report will benefit from the engagement of community volunteers in the hands-on restoration and adaptation activities that will directly impact the water quality of the Runnins River and Hundred Acre Cove.

The implementation of the recommendations identified in this comprehensive plan by Save The Bay and project partners will not only have a direct impact on the health of Hundred Acre Cove and the Runnins River, but will also support many of the regional priorities and goals of the EPA and SNEP, including:

- Addressing water pollution and habitat degradation issues
- Fostering collaboration among coastal and watershed communities for the protection of our local environment
- Leveraging economic and environmental investments to meet the needs of current and future generations
- Ensuring resilient ecosystems with safe and healthy waters, thriving watersheds and natural lands, and sustainable communities

Funding Sources

OPPORTUNITY	WHO CAN APPLY?	TIMELINE	MATCH?	ADDITIONAL INFORMATION
American Rivers - General Funding Listing	—	—	—	—
Atlantic Coastal Fish Habitat Partnership's National Fish Habitat Action Plan	Cities, Towns, Organizations	RFPs in September	TBD	Applications to restore and conserve habitat necessary to support coastal, estuarine-dependent, and diadromous fish species along the Atlantic Coast. This is federal funding.
EPA 319 Nonpoint Source Pollution Competition Grants Program (MADEP)	Towns of Seekonk and Swansea	Annually. RFRs in March, Proposals in June	TBD	Funding for implementation projects that address the prevention, control, and abatement of nonpoint source (NPS) pollution. In general, eligible projects must target the major source(s) of nonpoint source pollution within a watershed/subwatershed; contain an appropriate method for evaluating the project results; and must address activities that are identified in the Massachusetts NPS Management Plan.
EPA 319 Grants (RIDEM)	City of East Providence and Town of Barrington	Intermittent. Contact Betsy.Da-ke@dem.ri.gov to join notification list.	TBD	Nonpoint Source Pollution Management Program encourages various actions by state and local governments, businesses, watershed groups and individual landowners. The NPS Program uses the watershed approach to focus on managing nonpoint pollution problems. Only those projects that are in watersheds which have a Watershed Plan that meets the required elements in the federal guidelines and which implement recommendations in the Plan are considered eligible for funding with Section 319 grant funds.
EPA SNEP Grants	Municipalities, Nonprofits/Organizations	RFPs released March	33%	Restore clean water and healthy ecosystems to Southeast New England. target integrated approaches to water quality and ecosystem restoration. SNEP recognizes that clean water, healthy habitats, resilient ecosystems, and prosperous communities are closely interconnected, and that strong partnerships offer the most effective means of meeting Southeast New England's environmental challenges.
EPA/NBEP/NEIW-PCC Watershed Restoration Projects	State and local governments, Interstate agencies, Organizations	RFPs released in summer	25%	Varies from shovel ready projects to design/implementation of restoration projects.
MVP Action Grants	Towns of Seekonk and Swansea	RFRs in spring	25%	Offers financial resources to municipalities that are seeking to advance priority climate adaptation actions to address climate change impacts resulting from extreme weather, sea level rise, inland and coastal flooding, severe heat, and other climate impacts. Responses to the RFR may be submitted by municipalities who have received designation from the Executive Office of Energy and Environmental Affairs (EEA) as an MVP Community. All projects are required to provide monthly updates, project deliverables, and a brief project case study communicating lessons learned.
NOAA Coastal & Marine Habitat Restoration Grants	State and local governments, Nonprofits	RFPs released November/ December	1:1	The Community-based Restoration Program supports restoration projects that use a habitat-based approach to rebuild productive and sustainable fisheries, contribute to the recovery and conservation of protected resources, promote healthy ecosystems, and yield community and economic benefits. Restoration includes activities that return degraded or altered marine, estuarine, coastal, and freshwater, migratory fish habitats to functioning conditions, and techniques that return NOAA trust species to their historic habitats.
NOAA Community Based Habitat Restoration	State and local governments, Nonprofits	RFPs released October/ November	TBD	The goal of these projects is to recover and sustain fisheries—particularly those species managed by NOAA Fisheries, or those listed as endangered or threatened under the Endangered Species Act. Projects range from improving access to habitat by removing dams and other barriers, to restoring coral and oyster reefs, to rebuilding coastal wetlands.
NRCS National Water Quality Initiative	Local farms with support from towns and local NRCS	Ongoing	Unknown	NWQI provides a way to accelerate voluntary, on-farm conservation investments and focused water quality monitoring and assessment resources where they can deliver the greatest benefits for clean water. NRCS provides targeted funding for financial and technical assistance in small watersheds most in need and where farmers can use conservation practices to make a difference. State water quality agencies and other partners contribute additional resources for watershed planning, implementation and outreach.
NRCS Conservation Innovation Grants	Non-Federal entities and individuals. CIG projects must involve EQIP-eligible producers.	TBD	Unknown	Supports the development of new tools, approaches, practices, and technologies to further natural resource conservation on private lands. Through creative problem solving and innovation, CIG partners work to address our nation's water quality, air quality, soil health and wildlife habitat challenges, all while improving agricultural operations. Projects may be watershed-based, regional, multi-state or nationwide in scope.
NRCS Wetlands Reserve Easements	Private landowners	Rolling	None	The Wetlands Reserve Program is a voluntary program to enable private property owners the ability to protect and restore wetlands through securing easements on wetlands and associated uplands. Once easements are secured, funding is available for wetland restoration.
RI Coastal and Estuarine Habitat Restoration Fund	Municipalities, State governments, Nonprofits	Annually. Pre-applications due in November.	None	This fund provides grants to support restoration of coastal habitats including wetlands, buffers, anadromous fish habitat and estuarine habitat. Funds can be used for design, engineering, construction and monitoring. Match recommended, not required.
US Fish & Wildlife National Coastal Wetlands Conservation Grant Program	Federal, state and local agencies	RFPs released in March/April	Unknown	Support for: 1) Acquisition of a real property interest (e.g., conservation easement or fee title) in coastal lands or waters (coastal wetlands ecosystems) from willing sellers or partners for long-term conservation; 2) Restoration, enhancement, or management of coastal wetlands ecosystems; or 3) A combination of acquisition, restoration, enhancement, and management.



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