2022 Integrated Water Quality Monitoring and Assessment Report

Hunt River 09/21/2021. Photo courtesy of RIDEM ARM Program.

March 2022

Section 305(b) State of the State's Waters Report

and Section 303(d) List of Impaired Waters

STATE OF RHODE ISLAND

2022 Integrated Water Quality Monitoring and Assessment Report

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Section 303(d) List of Impaired Waters

March 2022

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List of Acronyms

ACESD – Atlantic Coastal Environmental Science Division

ARM – Ambient River Monitoring

CSO – Combined sewer overflow

CWA – Clean Water Act

CWSRF – Clean Water State Revolving Fund

EPA – Environmental Protection Agency

NBC – Narragansett Bay Commission

RIDEM – Rhode Island Department of Environmental Protection

RIDOH – Rhode Island Department of Health

RIDOT – Rhode Island Department of Transportation

RIPDES - Rhode Island Pollution Discharge Elimination System

TMDL – Total Maximum Daily Load

USGS – United States Geological Survey

Chapter

1

Integrated Report Overview

Integrated Report Overview

What is in this report?

The Office of Water Resources at the Rhode Island Department of Environmental Management (RIDEM) has developed this document to provide the information on Rhode Island water quality that is required biennially by Section 305(b) of the federal Water Pollution Control Act (the Clean Water Act). This Integrated Water Quality Monitoring and Assessment Report summarizes the Department's assessment of water quality conditions in Rhode Island's surface waters, including rivers, streams, lakes, ponds, and coastal waters and also reports on groundwater and wetland conditions. Monitoring and assessing water quality are key components of Rhode Island's overall water quality management framework. The Integrated Report also highlights the environmental results that Rhode Island's water pollution control and watershed protection programs have achieved as well as recent initiatives that support management's goals of protecting and restoring of the quality of our waters and aquatic habitats.

The information provided in this report is organized consistent with guidance and requirements of the United States Environmental Protection Agency (EPA). Data for each waterbody or sections of a waterbody are reviewed in comparison to state water quality standards to determine the status of a surface water. The waterbody is assigned one of the five reporting categories based upon the water quality goals (designated use) support, the amount of information known about the waterbody's water quality status, and the type of pollution or other impairment that prevents attainment of water quality goals (designated use). When data indicates a waterbody is not meeting applicable water quality standards, the waterbody is considered impaired. Category 5 waters are the Section 303(d) list of impaired waters requiring a water quality restoration study, known as a total maximum daily load (TMDL). The process of placing each waterbody in a water quality category is known as assessment. See page 36 for additional description of assessment methods.

Monitoring continues to fill in key gaps

The assessment process relies on the generation of monitoring data within a prior time, typically about five years. Significant gaps in needed data are well-documented in past reports from the Rhode Island Environmental Monitoring Collaborative. However, with implementation of the RI Water Monitoring Strategy (2005, 2019), the State has made strides to fill certain data gaps, which in turn reduces the number of waterbodies that remain unassessed.

In rivers and streams, the major source of information for the freshwater river assessments in this report is the Rhode Island Department of Environmental Management (RIDEM)'s Ambient River Monitoring (ARM) program. This program is a rotating basin approach to systematically collect data across the state. Since the inception of the program in 2004, RIDEM has established over 300 stations, collecting information on water chemistry, bacteria, and other parameters, as appropriate, including benthic macroinvertebrates (aquatic insects and non-insects). In 2021, ARM sampled stations in freshwaters that drain to coastal waters around Narragansett Bay. This includes streams in the Greenwich Bay, West Passage, Aquidneck Island, and East Bay watersheds. For some streams in that area, this was the first-time data had been collected for assessment. ARM sampling has been limited in recent years due to staffing constraints. Sampling at nine stations with potential for removal of impairments occurred in 2018. No ARM sampling occurred in 2020 due to the COVID pandemic.

RIDEM sampling Sucker Brook, Tiverton for water chemistry, bacteria, and metals

Data on fish tissue contamination has long been a major data gap. Until 2021, a collaboration among the RIDEM Office of Water Resources, RIDEM Division of Fish and Wildlife, and the EPA-Atlantic Coastal Environmental Sciences Division laboratory generated data on mercury in freshwater fish, primarily in Rhode Island lakes. RIDEM has also received support from EPA-Chelmsford to collect fish from shallow, lightcraft-only lakes. This report includes analysis of data collected by the program.

Given its compact state size, RIDEM is fortunate to have been able to assess the majority of the state's surface waterbodies. However, it will be critical to sustain investment in existing monitoring efforts to avoid the development of future data gaps. In addition, further investment to enhance monitoring programs will be needed to support adaptive management decision-making and move Rhode Island closer to the goal of comprehensively assessing the state's surface waters.

RIDEM samples fish tissue in collaboration with state and federal partners

Key Findings

Rivers and Streams

Due to the coverage of RIDEM's ARM river monitoring program, this report shows a slight decrease (less than fifteen miles) in the number of river miles assessed (1,087 miles or 79% of the 1,376 total miles tracked[1] by RIDEM statewide). Overall, 751.4 river miles are considered impaired (69% of assessed miles) with 455 assessed miles (42% of assessed miles) on the State's 303(d) Impaired Waters List for future water quality restoration planning, known as a TMDL plan. There was no change in the number of impaired river miles and a slight decrease in rivers requiring a TMDL due to the approval of the Buckeye Brook TMDL. Most impaired river miles exhibit elevated concentrations of pathogens (bacteria) (705.5 miles). Pathogens are washed into rivers and stream via stormwater runoff from various land uses and activities. The second most prevalent cause of impairment are metals which affect 196.7 miles of impaired river miles, most often dissolved lead (95.9 miles). The other notable causes of river impairment are Nuisance Exotic Species (112.9 miles) and Biologic Integrity (75.0 miles). Biological integrity is evaluated using benthic macroinvertebrate (aquatic insect) data.

Lakes and Ponds

Lakes and ponds saw an increase in acres assessed for at least one designated use (84% of the 18,693[2] total mapped and tracked acres statewide) and a slight increase in the impaired acres (73% of assessed acres, 11,324 acres) with 5,176 assessed acres on the State's 303(d) Impaired Waters List requiring a TMDL. The decrease in the assessed acres not requiring a TMDL can be attributed to the approval of the Newport Drinking Water Supply TMDL, which included nine reservoirs. Several lakes were newly impaired for non-native aquatic plants impairments, which are non-pollutants not requiring a TMDL. The most common cause of impaired lake acres is mercury in fish tissue, which affects 6,538 acres or 85% of lake acres assessed for this designated use. Prior work has documented the primary source of mercury in RI waters being the result of atmospheric deposition originating out of state. The second most prevalent cause of impaired lake acres are Nuisance Exotic Species documented in 5,862 acres. This reflects the widespread occurrence of aquatic invasive plants in RI freshwaters. Additionally, other notable impairment causes in lakes were Phosphorus (3,553 acres) and causes associated with nutrient impairments, such as Chlorophyll-*a* (1,080 acres), Total Organic Carbon (1,196 acres), and Oxygen Depletion (1,613.3 acres). Excess nutrients in lakes often leads to symptoms of eutrophication, such algal blooms and low dissolved oxygen.

Estuarine Waters

Estuarine waters saw no change in the amount of estuarine waters assessed (156 miles^2, 98%). Of the impaired estuarine square miles (36.4 percent of assessed or 57.0 miles^2), the largest cause of water quality degradation is low dissolved oxygen which occurred in 48.8 miles^2 or

[1] Rhode Island has 1420 river miles mapped at the 1:24,000 scale. Not all these waters are tracked for assessments purposes (i.e., have a waterbody id). Additionally, Rhode Island tracks some waters smaller than this scale.

[2] Rhode Island has 20,749 lake acres mapped at the 1:24,000 scale. Not all these waters are tracked for assessments purposes (i.e., have a waterbody id). Additionally, Rhode Island tracks some waters smaller than this scale.

85.7% of impaired waters, including about one third of Narragansett Bay. Pathogens were documented to affect nearly as many estuarine waters and ranked as the second most prevalent cause with 41.6 miles^2 or 73.0% of the total impaired estuarine waters. The other highest percentage of estuarine square mile impairment causes are Nutrients (39.8 miles^2), which is typically the reason for oxygen depletion.

Highlights – Improved Water Quality

This assessment cycle saw improvements that allowed RIDEM to remove impairments because available monitoring data show that water quality criteria are now being met. In recent years, investments in pollution abatement infrastructure and practices have led to improved water quality in several waterbodies. This has resulted in the removal of impaired parameters. Waters delisted for impairments in 2022 include the Pawtuxet River Main Stem, the Blackstone River, the Maidford River, the Woonasquatucket River, and Buckeye Brook. A summary of each of these delistings is below with a more detailed report of all impairment removals provided at: 2022 Delisting Document.

Pawtuxet River

RIDEM listed the Pawtuxet River Main Stem as impaired for nutrients in 1994 with the nutrient listing changed to total phosphorus in 2008. In June 2000, RIDEM reissued Rhode Island Pollutant Discharge Elimination System (RIPDES) permits for West Warwick Wastewater Treatment Facility (WWTF; RIPDES Permit No. RI0100153), Warwick WWTF (RIPDES Permit No. RI0100234), and Cranston WWTF (RIPDES Permit No. RI0100013). The most significant change to these permits was the addition of seasonal limits for total phosphorus of 1 mg/L. Following the upgrades to facilities and subsequently meeting permit limits, RIDEM was able to remove the Pawtuxet River Main Stem dissolved oxygen impairment in 2008, but the total phosphorus impairment remained. In 2008, RIDEM reissued the RIPDES permits for the three WWTFs, lowering the seasonal total phosphorus limits to 0.1 mg/L. Permit limits at these facilities were met between October 2016 and July 2018.

Total phosphorus data collected by the U.S. Geological Survey (USGS) at Warwick Avenue (Pawtuxet, RI) between 2016 and 2020 show that phosphorus levels have decreased significantly since 2015, which corresponds with the large phosphorus reductions from the wastewater treatment facilities. Since 2016, annual and seasonal total phosphorus are below 100 µg/L, a concentration target recommended in the 1986 EPA Quality Criteria for Water for total phosphorus. There have only been two samples out of fifty-eight collected between 2016 and 2020 that exceeded 100 µg/L, and all seasonal average phosphorus concentrations have been well-below 100 µg/L in that time frame.

Blackstone River

The Blackstone River was originally listed for dissolved lead in 1992. Sampling in support of a Blackstone River TMDL demonstrated compliance with criteria in 2008, and the impairment was removed from the 303(d) List; however, data collected by USGS after the delisting had

exceedances of criteria, which led to a new dissolved lead listing in 2010. A TMDL was approved in 2013. As described in the RIDEM Blackstone River TMDL, the exceedances occurred under a variety of flow conditions with the highest lead concentrations resulting in criteria exceedances occurring during higher flows when the watershed received one to three or more inches of rainfall.

USGS collects quarterly metals samples from two locations in the Rhode Island section Blackstone River and at one location in Massachusetts just upstream of the Stateline. The USGS data show lead criteria exceedances continued until 2014. Data collected between 2015 and 2021 met the acute criteria at all three stations with one violation in the chronic criteria at the Massachusetts stations in Millville station in 2018. Compared to the TMDL 2007-2011 dataset, the 2015-2021 summary statistics suggest reductions in dissolved lead concentrations across flow conditions. While there are no specific actions that can be directly linked to the removal of the dissolved lead impairment from the Blackstone River, many restorations activities have occurred in the watershed that likely contribute to the decline in the dissolved lead concentrations in the Blackstone River.

Maidford River

The Maidford River was first listed for dissolved lead impairments in 2006 based on data collected between 2001 and 2003. RIDEM revisited the segment in 2014, 2018, and 2021 as part of the Ambient River Monitoring (ARM) program. No exceedances of acute or chronic criteria were documented. While there are no specific actions that can be directly linked to the removal of the dissolved lead impairment from the Maidford River, many restorations activities have occurred in the watershed that likely contribute to the decline in the dissolved lead concentrations in the Maidford River.

Woonasquatucket River

This headwater segment of the Woonasquatucket River was first listed as impaired for zinc in 2006 with a TMDL approved in 2007. To determine if the violation still existed, RIDEM resampled this area in its ARM dry weather program twice in 2019 and three times in 2021. In addition, RIDOT sampled two wet weather events via a contractor. These wet weather events included pre-storm samples, which are considered dry weather. While there was one sample that violated acute and chronic criteria, the data indicate that the water quality of this segment is meeting Rhode Island's water quality criteria for zinc. The one exceedance of the instream acute and chronic criteria is allowable since the Water Quality Regulations allow the criteria to be exceeded once every three years. While there are no specific actions that can be directly linked to the removal of the zinc impairment from the Woonasquatucket River, many restorations activities have occurred in the watershed that likely contribute to the decline in the zinc concentrations in the Woonasquatucket River.

Buckeye Brook

The dissolved zinc impairment was removed from Buckeye Brook based on a review of the data used to list the zinc impairment during the 2018-2020 reporting cycle. In 2021, the data used to

list zinc was reviewed and determined to have failed to meet the quality control requirements of the Buckeye Brook Biodiversity Quality Assurance Project Plan. The zinc sample was not collected in an acid-washed bottle and the trip blank was suspected of contamination because measured values exceeded the corresponding reporting limits.

Chapter

2

Background Information

Background Information

Scope of Waters in the Integrated Report

Rhode Island's surface water resources include: 1,410 miles of streams and rivers, 21,537 acres of lakes and ponds, 300 square miles of ocean and near coastal waters[3], and approximately 159 square miles of estuarine waters. In general, 100% of the estuarine waters, 100% of ocean and near coastal area, 97% of the rivers/streams, and 90% of the lakes in the state mapped at a scale of 1:24,000 have been assigned a unique tracking number known as a waterbody identification number (WBID). All WBIDs are assessed, and their status is reported in the Integrated Report. For the 2022 cycle, 890 assessment units (AU or WBID) were tracked and assessed in the EPA assessment reporting database, ATTAINS. Waters not tracked generally consist of very small ponds or very small streams, many of which may not sustain permanent flows.

State Population	**2021 estimate-1,095,610[4]**
State Surface Area	**Land only-1,058 square miles**
	Total area-1,214 square miles
Number of major watersheds	**10**
Number of 8 digit HUCs	**5**
Total Stream/River miles	**1,410 miles[5]**
Lakes/Ponds total acreage	**21,537 acres[5]**
Estuarine waters area	**158.96 square miles**
Ocean and Near Coastal area	**300 square miles**
Wetland area	**92,162 acres[6]**

Water Pollution Control Programs

Rhode Island implements a variety of programs carried out at the state, federal, and local levels to monitor, protect, and restore the quality of its surface waters. State Law designates the Rhode Island Department of Environmental Management as RI's water pollution control agency to administer federal Clean Water Act programs under delegated authority from the EPA. Within the Environmental Protection branch, the RIDEM Office of Water Resources implements over a dozen regulatory and non-regulatory programs and is well positioned to reinforce watershed–based approaches to water quality protection and restoration. See box for the listing of Office of Water Resources (OWR) programs. Additional programs in this branch that contribute to preventing and remediating water quality include solid and hazardous waste, air pollution, site remediation, emergency response (e.g. oil spills). In

[3] The ocean and near coastal waters replace coastal shoreline waters that were reported coastal shoreline miles prior to the 2018-2020 assessment cycle.

[4] From: https://www.census.gov/quickfacts/RI

[5] Scale 1:24,000; Waterbody sizes are modified by RIDEM from RIGIS as of February 2022 www.rigis.org

[6] Source: I.E.P. Inc. Feb., 1990, Final report – Development and Digitization of Wetlands Data for Environmental Planning. File No: URI-1, prepared for: University of Rhode Island, Environmental Data Center, Department of Natural Resources, Kingston, RI.

addition to administration of rules, programs carry out activities involving financial and technical assistance, training and public outreach, and education.

RIDEM Office of Water Resources Programs and Activities
Water Quality Standards – Surface Water and Groundwater
Water Quality Monitoring and Assessment
Nonpoint Source Pollution Management Program
Water Quality Restoration Planning (TMDLs) and Watershed Planning
Water Quality Certification Program
Rhode Island Pollutant Discharge Elimination System (RIPDES) including stormwater management
Wastewater System Planning and Design
Wastewater Facility Operation and Maintenance Program
Onsite Wastewater Management Program
Groundwater Discharge Program (includes Underground Injection Control Program)
Freshwater Wetlands Programs
Shellfish Growing Area Management Program
Financial Assistance Programs

Rhode Island Pollutant Discharges Elimination System Program (RIPDES)

The principal mechanism used to protect waters from municipal and industrial point source discharges is through the federally delegated Rhode Island Pollution Discharge Elimination System (RIDPES) Program. This program continues to focus on the implementation of a nutrient reduction strategy that achieved significant reductions in nitrogen pollutant loadings into the upper Narragansett Bay region, including the Providence and Seekonk Rivers, via advanced treatment upgrades at 11 of the 19 Rhode Island major wastewater treatment facilities (WWTF). Managers, scientists, and others are tracking the changes in water quality in this portion of the Bay to characterize the improvements and provide information to support future decision-making on the need for further pollution controls. In addition, significant nitrogen reductions were recently implemented in the Westerly WWTF's permit, which discharges to the tidal portion of the Pawcatuck River. RIDEM and others plan to track the changes in water quality in this portion of the Pawcatuck River to characterize the improvements and provide information to support future decision-making on the need for further pollution controls. Further, significant reductions in phosphorus along the Pawtuxet River and Blackstone River have directly led to removal of several nutrient-related impacts from these rivers.

The RIPDES and related wastewater programs also oversee implementation of combined sewer overflow (CSO) abatement projects. The regional Narragansett Bay Commission has initiated construction of the third phase of its CSO Abatement Program. Phases I and II were completed in 2008 and 2014 respectively and involved the construction of a deep-rock storage tunnel, tunnel pump station and drop shafts, interceptors, sewer separation and a wetland facility.

Narragansett Bay Commission (NBC) reports about 1.1 billion gallons of combined wastewater and stormwater that would have been discharged into coastal waters is now directed to and treated at its Field's Point Wastewater Treatment Facility (WWTF) each year. Phase III involves the construction of a second deep-rock tunnel and associated infrastructure in the Pawtucket/Central Falls area with captured flows to be directed to the Bucklin Point WWTF.

In addition to wastewater, the RIPDES Program implements federal Clean Water Act requirements pertaining to stormwater. 33 of 39 RI municipalities and 7 non-municipal public entities are permitted under Rhode Island's Municipal Separate Storm Sewer System (MS4) General Permit, which includes requirements governing stormwater management. Local activities involve pre- and post- construction ordinances, illicit detection, street sweeping and related maintenance, proper management of stormwater at municipal facilities, outreach and education, as well as retrofitting existing stormwater infrastructure to improve treatment. Besides the MS4's mentioned above, 187 industrial facilities are also permitted under Rhode Island's Multi-Sector General Permit for Stormwater Discharge Associated with Industrial Activity (aka MSGP), which includes monitoring requirements, best management requirements to minimize exposure of stormwater to industrial activities, and corrective action requirements if stormwater sampling shows elevated levels of pollutants in the discharges.

Nonpoint Source Pollution Management

The RIDEM's Nonpoint Source Pollution Management Program, supported with federal Clean Water Act funding (Section 319), is focused on developing and implementing strategies to mitigate existing and prevent new sources of nonpoint source pollution. The non-regulatory program is involved in many activities and coordinates with federal, state, and other entities to achieve its goals of mitigation and prevention. Areas of focus have included watershed restoration planning, management of septic systems, replacement of cesspools, improving stormwater management with an emphasis on green infrastructure, riparian habitat restoration, pollution prevention, and encouraging conservation development and low impact development. A revised statewide Nonpoint Source Management Plan was completed in September 2019 (Rhode Island Nonpoint Source Management Program Plan). As resources allow, the program also distributes grants for eligible implementation projects identified in watershed plans. In 2020, a total of $725,000 in Section 319 funding was awarded to five projects. For more information on this program see RIDEM's website at: Nonpoint Source Program and Nonpoint Source Funding.

Restoration of Water Quality Impairments

Available data presented in this document have identified water quality impairments, associated with both point and non-point sources of pollution as well as other stressors, in almost 40% of the State's surface waters. In a few of the impaired waterbodies, water quality restoration goals have been met, but for most waters known to be impaired, additional actions and time are needed to effectively abate pollution. The Clean Water Act (CWA) Section 303(d) Program provides a mechanism to integrate and implement water quality efforts for the restoration and protection of the nation's aquatic resources. This program systematically

assesses waters and prioritizes restoration actions through water quality restoration studies known as Total Daily Maximum Loads (TMDLs), which are developed by RIDEM. These restoration plans serve to direct implementation actions, such as updated discharge permits, stormwater infrastructure improvements, other best management practices, and non-structural strategies such as pet waste control. Approved TMDL plans are listed at: TMDL Documents.

RIDEM's evolving approach to water quality restoration is consistent with the state's overall management approach and goals as articulated in the updated State Guide Plan Element Water Quality 2035.

The long-term goal for all Rhode Island watersheds is to achieve clean and healthy waters. For the period from 2015 – 2022, RIDEM's Office of Water Resources' priorities are:

- Protection and restoration of drinking water supply source waters;
- Protection and restoration of shellfish growing area waters;
- Protection and restoration of public beach waters;
- Restoration of waters degraded due to excess nutrients; and
- Protection and restoration of water quality to support high quality aquatic habitats and aquatic life.

Recent water quality restoration priority waterbodies have included the nine reservoirs that serve as sources of supply to the Newport Water Division as well as their tributary streams. The Newport Water Supply Reservoir TMDL was completed and approved by EPA November 15, 2021.

For the period of Fiscal Year 2023 – 2024, EPA has requested that states identify two-year priorities in their 2022 Integrated Report submission. Rhode Island's 2022 Integrated Report submission includes completion of the Newport Water Supply tributary phosphorus TMDLs as a priority. Additionally, RIDEM has initiated data collection and TMDL development for the Melville Ponds in Portsmouth that are heavily used for recreation. These ponds are degraded due to excess nutrients and impaired for aquatic life use.

The details of other water quality management programs are described in both the 2012 Integrated Report as well as the state planning document Water Quality 2035.

Economic Benefits of Clean Water Act Implementation

Rhode Island's marine and freshwater resources have always been central to its economy, culture, and quality of life. A recent survey of Rhode Islanders indicated that the typical resident engages in outdoor recreation almost daily, with outdoor facilities used more intensively than the national average[7], much of which is centered upon Rhode Island's shoreline and aquatic

[7] Rhode Island Outdoor Recreation Survey (RIDEM 2018) as noted in Draft Ocean State Outdoors: Rhode Island's Comprehensive Outdoor Recreation Plan (RIDEM 2019). State Guide Plan Element 152.

environments. There continues to be strong public support for investments in water quality enhancement, habitat restoration, fisheries, and outdoor recreation by federal, state, and local governments.

Section 305(b)(1)(D)(ii) and (iii) of the Clean Water Act (CWA) requires states to provide information on the economic and social impacts associated with achieving the objectives of the CWA. A comprehensive economic impact assessment is not available, but RIDEM is able to provide certain related information. The information below excludes the consideration of any economic or social impacts related to public and private drinking water supplies. It is self-evident that the public general welfare and the State's economy rely on the waterbodies which serve as a source of clean drinking water supply.

Clean water is essential to supporting important sectors in Rhode Island's economy. Rhode Island's coastline is a critical economic asset for marine-based commercial activity including recreational tourism, boat building, and commercial fishing. An analysis by University of Rhode Island (URI) estimates the total economic impact of these businesses in 2016 was $2.6 billion in sales and another $118 million in local and state tax revenue[8]. A more recent analysis reported the value of Rhode Island's "Blue Economy" in 2019 as about $2.8 billion with 45,494 jobs associated with water-related sectors[9].

Rhode Island's aquaculture sector is responsible for $26.3million of economic output

More specifically, in 2019, URI collaborated with the Rhode Island aquaculture industry and Rhode Island Coastal Resources Management Council (CRMC) to produce a first ever economic evaluation of Rhode Island aquaculture. The analysis noted 50 farms were responsible for $16.2 million of gross sales and 310 jobs in 2016. Inclusive of economic impacts statewide, the aquaculture sector is responsible for $26.3 million of economic output and 371 jobs throughout Rhode Island. See Aquaculture Impact Study for details. Since that time, the aquaculture industry has grown to 84 farms which produced a farm gate value of aquaculture products for consumption and seed of $4,289,198. Oysters remained the number one product sold by RI aquaculture farms[10].

[8] Uchida, E., Mead A., Giroux, A., & Hayden, S. (2019). Narragansett Bay Watershed Economy: The ebb and flow of natural capital. Narragansett, R.I.: Coastal Institute at the University of Rhode Island. https://www.nbweconomy.org/report/

[9] McCann et. Al. (2020) The Value of Rhode Island's Blue Economy. Narragansett, RI. https://web.uri.edu/gso/files/ri-blue-economy-report-2020.pdf

[10] Goetsch, Benjamin (2020). Aquaculture in Rhode Island 2020. Coastal Resources Management Council. http://www.crmc.ri.gov/aquaculture/aquareport20.pdf

There are also other ecosystem values provided by water resources that are not easily estimated by current valuation methods. Clean drinking water provides many short-term and long-term benefits to Rhode Islanders health and welfare. The network of waterways and wetlands across our landscape helps to mitigate flooding impacts and thereby reduce risk to property and people. These resources also provide passive recreational opportunities and present aesthetic and spiritual values that are not easily quantified[11].

Investments in Clean Watersheds

Protecting and restoring the quality of Rhode Island's valuable water resources has required a sustained investment in various water pollution control programs as well as in ecological restoration projects. The Clean Water State Revolving Fund (CWSRF) Program continues to operate as Rhode Island's largest financial assistance program for wastewater infrastructure and other clean water related projects. The CWSRF program is co-managed by OWR and the RI Infrastructure Bank (RIIB), formerly the RI Clean Water Finance Agency. The RIIB reported in 2022 that it had, since the program's inception in 1990, awarded $1.43 billion in total CWSRF loans along with an additional $85 million in state financed loans and $68 million in conduit debt. The funds have assisted the Narragansett Bay Commission and local communities to make various wastewater treatment facility and system improvements, including wastewater treatment facility upgrades, combined sewer overflow abatement projects, pumping station repairs, and the extension of sewer lines to areas of failing septic systems. In addition, communities have accessed the CWSRF for other eligible projects, including landfill closures, property purchase for source water protection, and stormwater abatement. RIIB has to date also administered $21 million in loans associated with the Community Septic System Loan Program which targets assistance to homeowners to replace or repair on-site wastewater systems.

In addition to CWSRF, the State of Rhode Island has also used federal and state grant funds to accelerate priority water quality and habitat restoration projects. Between 2003 – 2020, RIDEM used federal Section 319 funds to award over $6 million in non-point source pollution abatement grants for over 80 projects that will improve water quality and habitat conditions throughout Rhode Island. Similarly, since 2003, the state supported RI Coastal Resources Council has managed the Coastal and Estuarine Habitat Restoration Trust Fund which distributes grants annually for the planning and implementation of habitat restoration projects. Projects have included work related to saltmarshes, fish passage including removal of barriers and dune vegetation among others.

The state Narragansett Bays and Watershed Restoration Fund, established in 2004, has supported matching grants for water quality and habitat restoration projects and more recently has included flood mitigation projects that incorporate environmental co-benefits. Voters have approved a total of $18,500,000 in state bonds for this program over the years. Examples of completed projects funded include innovative use of ultraviolet light technology to treat

[11] Water Quality 2035: Rhode Island Water Quality Management Plan (2016). State Guide Plan Element Report #121 http://www.dem.ri.gov/programs/benviron/water/quality/pdf/wqmp2035.pdf

stormwater near a popular beach in Newport, stormwater retrofitting in the Narrow River watershed, construction of anadromous fish passage in the Pawtuxet, Ten Mile Rivers, and Pawcatuck Rivers. Of this total, $3 million was authorized in 2016 for projects addressing flood mitigation in a manner that incorporated green infrastructure or other environmental benefits. Example projects include replacement of undersized culverts in a manner that restore stream connectivity and use of green infrastructure in flood prone areas to reduce pollutant loadings to nearby waterbodies.

Launched in 2012 by the EPA, the Southeast New England Program (SNEP), has provided another important source of funding for water quality and watershed projects. SNEP funds awarded through its contractor Restore America's Estuaries, and through partnership with the Narragansett Bay Estuary Program, have advanced green infrastructure and other projects. More information is available at EPA SNEP.

Special State Concerns and Recommendations

The following highlights topics of special state concern and recommended actions to further progress toward achieving clean water goals and objectives.

Changing Climate

Rhode Island recognizes a changing climate has significant implications for our aquatic resources (Rhode Island Water Quality 2035[12]). The report "Resilient Rhody" (2018)[13] identifies warming air and water temperatures, sea level rise, changing precipitation patterns, including the frequency and intensity of storms, as manifestations of climate change that are and will continue to affect RI's environment. A summary from NOAA[14] notes that sea level has risen 9 inches since 1930 as measured in Newport and mean and extreme precipitation has increased over last century with the highest frequency of extreme events occurring over the last decade. Water quality concerns include but are not limited to inadequate stormwater infrastructure, impacts on pollution control effectiveness, and loss of important aquatic habitat and biodiversity. Degradation in coastal saltmarshes is well documented prompting adaptation and restoration efforts. On the state level, actions to mitigate and adapt to a changing climate are coordinated via the RI Executive Climate Change Commission (EC4). More information is available at Rhode Island EC4. Rhode Island recognizes that natural systems, including waterways and wetlands, provide important functions, including carbon storage and flood protection, that are vital to RI's overall resilience to climate change. Climate considerations are being integrated into programs aimed at both protecting and restoring water resources as part of fostering needed resiliency within watersheds. Vulnerability assessments of wastewater

[12] Rhode Island Water Quality Management Plan: Water Quality 2035. State Guide Plan Element Report #121 (2016) http://www.dem.ri.gov/programs/benviron/water/quality/pdf/wqmp2035.pdf

[13] Resilient Rhody: An Actionable Vision for Addressing the Impacts of Climate Change in Rhode Island. (2018) http://climatechange.ri.gov/documents/resilientrhody18.pdf

[14] Rhode Island Climate Summary. NOAA National Centers for Environmental Information. (http://climatechange.ri.gov/documents/noaa-climate-rhode-island-state-summary.pdf

infrastructure have been completed and a number of projects undertaken to mitigate risks in wastewater systems. Regular evaluation of adaptation and mitigation strategies will be needed as new scientific understanding about climate impacts is developed.

Bipartisan Infrastructure Law and Municipal Constraints

Near the end of 2021, the passage of the federal Bipartisan Infrastructure Law (BIL) authorized increased funding for a wide variety of federal programs related to water resources. EPA notes this "historic legislation puts the country on a path toward achieving . . . ambitious climate goals" and "marks the single largest investment in water that the federal government has ever made". RIDEM is excited about the opportunity the BIL offers and is working diligently to plan for and promote the strategic investment of the forthcoming funds in the CWSRF and other programs.

The BIL presents both opportunities and challenges. Recruiting and retaining experienced engineers in RIDEM positions is growing more difficult as the BIL has spurred greater competition in the job market. Building capacity in the programs overseeing CWSRF implementation is needed to ensure the efficient distribution and use of funds. In RI, responsibility for implementing many of the needed clean water projects falls upon local governments or other entities. Achieving clean water goals will require municipal governments to expand their activities, especially with respect to stormwater management and other actions to protect and restore water resources. Watershed organizations and other partners are also interested in completing more ecological restoration and resiliency projects. Additional capacity is needed to identify, design, and manage projects that are implemented at the local level. A lack of sufficient capacity, in terms of staffing and expertise, is currently a barrier to advancing water quality restoration work in many communities.

Local capacity is of particular concern regarding stormwater management, including the maintenance of stormwater infrastructure. This is a significant concern that will only grow over time as more retrofitting is completed including installation of green infrastructure. **Development of sustainable funding to support local stormwater programs is a priority need**. In addition to funding, expanding training opportunities, building, and leveraging partnerships, and fostering regional collaborative solutions are actions that can assist in mitigating the local capacity constraints. Also see Stormwater Management.

Stormwater Management

Untreated stormwater discharges constitute a widespread and major pollution concern in Rhode Island associated with beach closures, shellfish closures, and other adverse impacts to aquatic ecosystems and human health. Runoff from a wide range of land uses, e.g., urban, suburban, industrial, and agricultural contributes to water quality degradation and has been implicated as a source of pollutant loadings in a majority of the TMDLs completed in Rhode Island. Given the density and pattern of land development in the state, strategies to address stormwater management must involve both prevention and abatement, e.g. retrofit programs.

With the implementation of Phase II stormwater requirements, municipalities, and other publicly owned stormwater systems (e.g., the University of Rhode Island and the Rhode Island Department of Transportation) are responsible for taking actions to improve stormwater management. Much of the work to address upgrading existing stormwater infrastructure is being achieved through partnerships and with diverse funding sources. Highlights of some of the progress being made includes:

- In November 2017, RIDEM awarded $3.78 million in state grants from the RI Bay and Watershed Restoration Fund to municipalities and other entities for stormwater projects that improved treatment or enhanced local capacity to carry out street sweeping and maintenance of stormwater infrastructure. About $1.06 million was awarded to municipalities to purchase vacuum trucks or other equipment and $2.68 million was awarded for green infrastructure (GI) projects aimed at mitigating stormwater pollution.
- Between 2018 and 2021, over $2.95 million in grants to foster installation of more Green Infrastructure or "nature-based" stormwater solutions in RI were awarded through the SNEP Watershed Implementation grant program administered by Restore America's Estuaries. More information at: SNEP Watershed Implementation Grants.
- In 2019, EPA launched the "SNEP Network" which established a technical assistance network that is working with partners on stormwater-related projects and initiatives.
- RIDOT continues to invest in improved stormwater management consistent with its consent agreement with EPA. This is a $100 million in expenses over ten years. RIDOT partners with local entities on projects that provide credit against its overall goals.
- The Narragansett Bay Commission has pledged to invest $ 40 million in green stormwater infrastructure as part of the phased implementation of its CSO abatement program. Initial work has included Green Stormwater Infrastructure projects in Pawtucket and Central Falls.
- In 2021, the Narragansett Bay Estuary Program (NBEP) awarded 8 planning grants to RI local entities to support work that lays the groundwork for future installation of green infrastructure and enhanced stormwater management.
- The Providence Stormwater Center is a partnership-based program based at Roger Williams Park that conducts research and training regarding stormwater best management practices. A wide range of green stormwater infrastructure has been installed in the park and serve to demonstrate strategies for improving water quality and wildlife habitat in an urbanized watershed.

While the expanded efforts noted above are promising, RIDEM reiterates that there remains a clear need for adequate, sustainable funding for local stormwater management programs.

Management of stormwater associated with new development and redevelopment is governed by the state stormwater regulations and the state stormwater design manual which together set minimum treatment standards and provide technical guidance on stormwater BMPs, including the application of low impact development policies. First adopted in a stormwater

design manual in 2011 and then largely codified as Regulation in 2018, the standards give greater emphasis on effectively treating the stormwater to reduce pollutant loadings as well as managing stormwater flows to support natural hydrologic regimes, with emphasis on encouraging infiltration to support base flow. The existing design manual would benefit from updating including consideration of New England's changing climate.

Lake Management & Cyanobacteria Blooms

Lake management issues continue to demand greater attention in Rhode Island. RIDEM is encouraging development of lake management plans as an effective means of fostering protection and restoration of lake water quality conditions. Priority concerns include proliferation of aquatic invasive plants, increased number of confirmed cyanobacteria blooms, nutrient enrichment, and management of hydromodifications. RIDEM seasonal aquatic invasive plant survey data, coupled with information collected via the Rhode Island Natural History Survey and the URI Watershed Watch Program, has documented aquatic invasive species as being a widespread problem in Rhode Island. The Rhode Island state management plan for aquatic invasive species recommended that RIDEM establish a lake management program. Resource limitations have prevented RIDEM from doing so to date, but the strong need for a program remains. RIDEM is continuing to pursue potential options for establishing the program including through the pending FY23 state budget.

RIDEM seasonal sampling of cyanobacteria confirmed blooms in 46 waterbodies as of 2020. When resources allow, RIDEM conducts sampling with two different objectives: pre-emptive surveillance sampling on waterbodies that frequently experience cyanobacteria blooms and in response to community complaints of potential cyanobacteria blooms. RIDEM and the Rhode Island Department of Heath (RIDOH) collaborate to jointly issue recreational health advisories for lakes and ponds with confirmed cyanobacteria blooms.

PFAS

Per- and polyfluoroalkyl substances (PFAS) are a class of chemicals widely used in a variety of products and applications including non-stick cookware, upholstered furniture, clothing, food packaging, and firefighting foam. Studies indicate that exposure to PFAS above certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants, cancer, and effects to the liver, immune system, or thyroid.

In 2016, the EPA established a Drinking Water Health Advisory for two of these PFAS compounds – perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), or a combination of PFOA and PFOS at 70 parts per trillion. In 2017, RIDEM adopted the EPA health advisory as a groundwater quality standard. In the absence of a federal drinking water standard, the RIDOH tested public water systems for PFAS and found only one system (Oakland Association in Burrillville) that exceeded the 70 ppt health advisory. RIDOH established a PFAS Drinking Water Technical Advisory Committee (DEM is a member) in 2019 to work with RIDOH in its efforts to develop a RI drinking water standard for PFAS. RIDOH has prepared documents supporting a state standard much lower than the federal health advisory for 6 PFAS.

Monitoring programs are under development and in some cases underway to generate data to characterize the extent of PFAS/PFOA contamination in Rhode Island's environment. RIDEM has targeted PFAS sampling as part of site investigations at several locations across the state. More work is planned to sample surface waters, wastewater and biosolids associated with wastewater treatment.

Although PFOA and PFOS are no longer produced, they remain in the environment due to their persistence and existence in outdated products. Current areas of concern regarding PFAS include: determining the appropriate drinking water standard for PFOA and PFOS, identifying the health effects and potential drinking water protection guidelines for some of the thousands of other PFAS compounds in use, determining guidelines and eventually water quality criteria for in PFAS in surface waters, and establishing discharge requirements in RIPDES permits. These determinations will support management decision-making relative to efforts to regulate and remediate those facilities that may have or may be using or disposing of PFAS, including numerous types of commercial and industrial operations, airports, fire training academies, landfills, and other waste disposal facilities.

Wetland Protection – Rule Revisions

In 2015, the General Assembly passed state new law acknowledged the need to strengthen freshwater wetlands protection and the need to protect and regulate the area adjacent to these wetlands. The law expanded the jurisdiction of RIDEM and CRMC while eliminating the municipal authority for setting local requirements for freshwater wetlands buffers or setbacks. The state agencies were directed to develop a single set of buffer standards for freshwater wetlands. After extensive stakeholder and public engagement, RIDEM and CRMC undertook formal rulemaking which led to the adoption of new Freshwater Wetland Rules within their respective authorities that will go into effect on July 1, 2022. The rules adopt a tiered approach to the buffer standard that, as directed by the amended law, was developed with consideration of the resource characteristics, watershed protection, and existing land uses. The rules specify buffer zones within three mapped regions as well as an overlay of public drinking water supply watersheds. The buffer zones are further tiered according to multiple factors including the frequency of their occurrence, sensitivity to disturbances, and their sizes. All wetlands are designated with some level of buffer protection which ranges from 25 feet to 200 feet with a few exceptions. The Rules articulate standards by where alterations of freshwater wetlands and buffers are to be avoided and in some circumstances creation of new buffer on already disturbed properties will be required.

Combined Sewer Overflows (CSOs) – Upper Narragansett Bay

A major impairment of use in Narragansett Bay results from bacterial contamination. The most significant sources are the combined sewer overflows (CSOs) that discharge from the Providence metropolitan region into the upper Bay or its tributaries. To address these CSO impacts, the NBC continues to implement a CSO abatement program, through which the number of permitted CSO outfalls have been reduced from 73 when the NBC's permits were

issued in 2001 (28 in the Bucklin Point service area, including the North Diversion Structure and 45 in the Field's Point service area, including its wet weather treatment system) to 65 when the permits were reissued in 2017 (27 in the Bucklin Point service area, including the North Diversion Structure and its new wet weather treatment system and 38 in the Field's Point service area, including its wet weather treatment system). In addition, upgrades to the NBC's Wet Weather Treatment Facilities located at the Field's Point and Bucklin Point wastewater treatment facilities (WWTFs) in 2006 and 2008 provide primary treatment and disinfection for up to 123 MGD and 70 MGD of wet weather flow, respectively.

Phase I, completed in 2008, included a main spine storage tunnel with an effective volume of 62 million gallons. Phase II, completed in 2014, included two new sewer interceptors that convey additional CSOs along the Woonasquatucket and Seekonk Rivers to the main spine tunnel. Phase II also included sewer separation projects, a wetlands treatment system, and floatables control facilities. NBC's Phase III plan was approved by RIDEM in 2017 and includes a 61.4 million gallon deep rock storage tunnel that will collect CSOs in the Bucklin Point WWTF service area and convey flow to the Bucklin Point WWTF. Phase III also includes CSO regulator modifications, sewer separation projects, new sewer interceptors, green stormwater infrastructure projects, and an additional stub storage tunnel. RIDEM and NBC entered a consent agreement in 2018 that includes a schedule for the design and construction of Phase III. Construction of the Phase III storage tunnel began in 2021 and the tunnel system is expected to be operational by 2027/2028. The remaining Phase III projects are scheduled to be completed over a period of time starting in 2021 and ending in the early 2040s.

Although significant portions of the estuary area are still temporarily closed to shellfish harvesting following rainfall events, the CSO reduction has allowed RIDEM to increase the rainfall thresholds that trigger shellfish closures from 0.5 inches (Conditional Area C) and 0.8 inches (Conditional Area A) in May 2011 to 1.2 inches of rain (merged Conditional Areas A and C) in July 2017. Since 2017, Conditional Area A has remained opened about 68% of each year. In addition, Conditional Area B was upgraded from Conditionally Approved to Approved shellfishing status as a result of the prior CSO abatement work. The area of Conditional Area B in Upper Narragansett Bay was delisted as impaired for the shellfish harvesting use in the 2018-2020 assessment cycle. Water quality data continues to be collected to evaluate the effectiveness of the CSO abatement measures.

Narragansett Bay – Nutrients and Dissolved Oxygen

Eutrophication caused by nutrient enrichment is a priority water quality concern for Narragansett Bay. About one-third of the RI portion of Narragansett Bay is designated as impaired for low dissolved oxygen, also called hypoxia. Significant investment led to completion of upgrades of wastewater treatment facilities located in both RI and MA that discharge into the upper Bay region and its tributaries. The targeted Rhode Island WWTFs first achieved the 50% summer reduction goal during the 2012 summer season. Between 2016 and 2021, the percent reduction of the nitrogen loads from the eleven RI and six MA WWTFs ranged from 70

to 76% when compared to the (pre-nitrogen reduction) early 2000s[15]. Since that time, RIDEM, partners, and researchers have been focused on monitoring the improvement in water quality. Given the high degree of interannual variability in the data, on-going monitoring is needed to properly characterize water quality trends. A reduction in frequency and duration of hypoxic events has occurred in recent years, but additional data is needed to ascertain significance in the trend[16]. The reduction of hypoxic events has not been great enough to remove impairments for low oxygen in Narragansett Bay based on the Rhode Island estuarine water quality criteria for dissolved oxygen. Therefore, for this assessment cycle, no change was made in the impairment status of the Bay relative to dissolved oxygen.

Monitoring Needs

Having timely information on the condition of Rhode Island's water resources is essential for management decision-making. Through the 305(b) assessment process, RIDEM identified gaps in available water quality data as a continuing concern. While steps have been taken to expand monitoring, as this report indicates, the data gaps remain significant: 16.5% of lake acres and 21% of river miles are unassessed. Additionally, while progress has been made to reduce the gap, the limitations of the available fish tissue contamination data is evident in this report. Sustaining support for monitoring programs is important to avoid creating new gaps when the available data used to support the assessment of surface waters becomes outdated (more than five years old). In some cases, changes in program capacity, due to changes in personnel, also presents a challenge to sustaining needed long-term data collection, e.g., certain bay monitoring surveys.

RIDEM updated its surface water monitoring strategy in 2019. The strategy consists of a mix of sampling designs organized to cost-effectively reduce data gaps while meeting the data needs of state water management programs. It includes fixed-site networks, a rotating basin approach to rivers and streams, targeted surveys, and an expansion of the use of biological indicators. The framework reflects the partnerships and collaborations that occur among state, local and federal agencies, universities and colleges, other organizations, and volunteers regarding monitoring activities. In FY22, the RI Environmental Monitoring Collaboration, RIDEM and other partners engaged in an initiative known as "Smart Bay" that is seeking funding aimed at enhancing bay monitoring, data analysis tools, and distribution.

Onsite Wastewater Treatment Systems

Onsite Wastewater Treatment Systems (OWTS), either failed or substandard, are recognized as one of the leading non-point source pollution problems in the state, contributing nutrients, bacteria, and potentially viruses to both coastal and inland waters. There are an estimated 150,000 OWTS in the state. Consistent with the Nonpoint Source Pollution Management Plan, a

[15] RIDEM calculates annual and seasonal nitrogen loads and reductions from eleven Rhode Island and six Massachusetts WWTFs using monthly data submitted by the facilities to the EPA ICIS-NPDES database as a requirement of their NPDES permits.

[16] Codiga, Daniel L. (2021). Analysis and Synthesis of Eutrophication-Related Conditions in Narragansett Bay (RI/MA USA): Updated Through 2019. https://figshare.com/articles/book/Analysis_and_Synthesis_of_Eutrophication-Related_Conditions_in_Narragansett_Bay_RI_MA_USA_Updated_Through_2019/14830890?file=30730451

multi-faceted strategy has been pursued to prevent and abate pollution from septic systems. Continued implementation of state program initiatives to encourage the upgrade and replacement of inadequate septic systems will remain a priority. Pursuant to legislation adopted in 2007, approximately 1100 cesspools have been removed from use within 200 feet of the coast, public wells and drinking water reservoirs. Amendments to the legislation in 2015 require the removal of cesspools within one year of the property's point of sale statewide. RIDEM estimates that there are approximately 11,500 cesspools remaining in use. For more information, see OWTS Cesspool Phaseout. RIDEM regulations since 2008 have required advanced treatment for OWTS to control the discharge of nitrogen in certain sensitive coastal watersheds. Through 2021, approximately 9,500 denitrification systems have been installed in Rhode Island.

Watershed Restoration – Developing & Implementing TMDLs

Watershed restoration plans, known as TMDLs, provide the technical basis for optimizing investments to abate water pollution. Current federal and state funding levels constrains RIDEM's capacity to complete needed water quality studies and modeling, especially for larger watersheds. Once TMDLs are completed, as discussed above, there are often barriers to implementation of needed pollution control actions. In many of the impaired waters, the absence of point source wastewater discharges means that stormwater and other nonpoint sources of pollution are predominant. Properly managing stormwater within a sub-basin typically requires further assessment work to identify and prioritize viable sites for retrofitting stormwater best management practices (BMPs). Municipalities often bear a major responsibility for implementation of TMDLs. Federal and state grant programs have fostered dozens of implementation projects in recent years; however, additional resources are needed to meet the requirements of the TMDL mandate. The needs include funding for further assessment, building local capacity to implementation projects, and program coordination.

Habitat Restoration – Coastal and Inland

Habitat restoration is recognized as increasingly important to sustaining healthy ecosystems and supporting Rhode Island's resiliency in climate change. Within the coastal zone, the CRMC estimates that Rhode Island has lost more than 50% of its salt marshes over the past 200 years. Eelgrass beds in coastal waters are another important aquatic habitat that are significantly diminished as well. In addition to the damaging effects of climate change and sea level rise, coastal marshes have been impacted from nonpoint source pollution and sedimentation as well as lost to land development. Governmental agencies, including CRMC and the Narragansett Bay National Estuarine Research Reserve (NBNERR), along with partners have updated planning for habitat restoration and produced a Rhode Island Coastal Wetland Restoration Strategy in 2018. Partners are piloting strategies to improve the resilience of salt marshes to sea level rise with restoration projects undertaken in the Narrow River, Ninigret Pond and Quononchontaug Pond. More information at: CRMC Habitat Restoration.

Inland habitat restoration has focused on fish passage, stream connectivity, invasives control, and riparian buffers. The loss of freshwater wetlands is not as well quantified but has been

considerable in portions of the State.

Hydromodification and Withdrawals

Most of Rhode Island's rivers and streams are subject to some type of anthropogenic hydromodification, including the presence of dams as well as water withdrawals. Low flow characteristics of streams are important elements in the planning and utilization of water resources, especially with respect to water supply and wastewater discharge. Additionally, public concern with hydrological manipulations of lake water levels through operation of dams has been heightened in recent years. Further program development is needed to ensure that hydrology is properly managed to support the beneficial uses of RI's waters including water supply, recreation, and aquatic habitat and that artificially created unacceptable low flow conditions are avoided.

Recommendations

The following list of recommendations outlines general actions that are deemed necessary to achieve the objectives of the CWA in Rhode Island waters.

- **Integrate climate change considerations into all water programs and develop policies to incentivize adaptation and resiliency actions.** Regularly review programs and policies to incorporate new scientific understanding of our changing climate.

- **Strategically expend BIL funds for needed wastewater and stormwater improvements.** The State Revolving Fund (SRF) is relied upon as the major source of funding for large wastewater treatment and other clean water projects in Rhode Island. Continue to work with the RIIB and other programs to support the identification and development of priority projects and build capacity among municipalities and partners for implementation. Update ranking criteria used to develop the Project Priority List to incorporate environmental justice factors. Continue RIDEM participation in interagency BIL task force to coordinate funding and leveraging opportunities.

- **Improve stormwater management**. Continue to develop a comprehensive approach to stormwater management program to mitigate and control the runoff generated from both new and existing land uses. Elements should include: promotion of the use of green infrastructure strategies which benefit water quality and deliver co-benefits, expanded application of low impact development techniques for new and re-development projects, reissuance of the RI MS4 permit, updating the RI Stormwater Management, Design and Installation Rules (250-RICR-150-10-8), expanded training and technical assistance to municipalities, fostering partnerships including those with RIDOT, expanding financial assistance and the development of stable long-term financing to address municipal constraints.

- **Establish a lake management program within RIDEM**. Declining conditions in freshwater lakes, including excessive growth of invasive plants, have highlighted the need for a state program that would facilitate development and implementation of lake management plans. The plans are needed to guide actions to address water quality and aquatic habitat degradation including but not limited to nutrient pollution, cyanobacteria blooms, and invasive plant management. DEM's capacity to provide technical and financial assistance to local entities and lake associations should be expanded to meet the demands for more effective lake management.

- **Build capacity to monitor and respond to harmful algal blooms.** Rhode Island needs to build capacity within state and local programs to more effectively address problems with harmful algal blooms (HABs), including cyanobacteria which have been confirmed in 46 freshwater bodies in RI. Additional capacity is needed to conduct more frequent monitoring to track bloom conditions (including toxicity) and to support communication for public health protection.

- **Characterize PFAS/PFOA contamination in RI waters and respond to locations of elevated contamination.** RI needs to expand monitoring of PFAS/PFOA in surface waters, wastewater and biosolids to improve understanding of the extent of contamination in RI's environment. There will be continued targeted response actions at locations with elevated contamination. RIDEM should continue to participate in discussions about the management of PFAS/PFOA and possible regional approaches.

- **Implement new Freshwater Wetland Rules**: Provide training and updated guidance to support the transition to newly promulgated Freshwater Wetland Rules which strengthen protection of wetland resources. Continue projects to identify and map vernal pools.

- **Continue combined sewer overflow abatement.** Implementation of Phase III of the Narragansett Bay Commission combined sewer overflow (CSO) abatement program is needed to further reduce untreated discharges to the Blackstone and Seekonk Rivers.

- **Assess water quality improvements resulting from implementation of the nutrient reduction strategy for the Upper Bay.** RIDEM, in cooperation with its partners, should continue monitoring in the Bay to assess changes in water quality including the frequency and duration of hypoxia as well as trends in temperature and other climate related impacts. Due to interannual variability, several years of data will be needed to assess changes.

- **Invest in adequate water quality monitoring.** Additional investment in ambient monitoring is needed to reduce current data gaps and provide data that allows for a more complete assessment of water quality in surface waters, groundwaters as well as the condition of wetlands. Data management system improvements are needed to facilitate analysis of monitoring data and public access to data via the internet.

- **Build capacity for regular reviews of water quality standards.** RIDEM should build capacity for regular reviews and updates to the state water quality standards to ensure protection of Rhode Island's surface waters and their designated uses, and to allow for enhanced assessment tools. Incorporation of biocriteria, where possible, and refinement of nutrient criteria are needed. Waters which fail to support designated uses should be further evaluated and restored through the development of water quality restoration plans, known as TMDLs.

- **Strengthen Local On-site Wastewater Management Programs**. All communities which rely significantly on OWTSs should implement active local wastewater management programs which provide oversight, as well as financial assistance as appropriate, to promote effective on-site wastewater system maintenance and address repair and replacement needs in the community.

- **Continue phase-out of cesspools.** The State should continue to implement mandatory cesspool phase-out in environmentally sensitive areas pursuant to 2007 state law, continue to encourage the voluntary phase out of cesspools in other areas, and support point of sale requirements statewide.

- **Develop water quality restoration and protection plans**. Continue to develop water quality restoration plans (TMDLs) to identify and prioritize needed water pollution control actions in waters with documented impairments. Additional funding is needed to support the application of water quality modeling tools that are available. Building on TMDLs, develop watershed plans to guide implementation of additional protection actions including habitat restoration.

- **Invest in priority habitat restoration projects**. RIDEM should continue to work with partners to secure funding to support priority aquatic habitat restoration projects including those related to stream connectivity and riparian buffers among others. State and local funds should be used to leverage federal funds available for such purposes.

- **Protect water quality and conserve vital aquatic habitats through open space acquisition.** RI should continue to strategically conserve lands through acquisition or easements that will protect water quality and aquatic habitat.

- **Build capacity for managing hydromodifications**. Further development of statewide policy/guidance is needed in the areas of water use (water withdrawals, out-of-basin transfers and other hydromodifications) in relation to water quality and aquatic habitat. Expanded data collection on water use is needed to inform policy development, and an improved, more transparent permitting process for withdrawals is being developed.

- **Promote compliance with the no discharge designation granted for Rhode Island coastal waters.** Continue to issue grants to foster a network of boat pump out facilities that supports the no-discharge designation for RI coastal waters.

- **Continue to implement strategies to prevent groundwater pollution**. Enforce siting restrictions and encourage use of overlay zoning to protect groundwater resources used for water supply from higher risk pollution sources. Enforce design and operating requirements to prevent the release of pollutants to groundwater from regulated facilities including landfills and underground storage tanks among others.

- **Eliminate high risk discharges to groundwater**. Discharges that pose a high risk for adversely affecting groundwater quality should continue to be eliminated under the closure procedures administered by the Groundwater Discharge/Underground Injection Control (UIC) Program. Best management practices should be encouraged at facilities to minimize pollution risks.

- **Maintain strong partnerships**. DEM should continue to participate in regional partnership programs and collaborate with watershed organizations and other stakeholders to foster implementation of protection and restoration actions. Partnerships help align resources to accelerate getting the needed work done.

Chapter

3

Monitoring and Assessment

Surface Water Monitoring and Assessment

In accordance with Section 305(b) of the CWA, states are required to survey their water quality for attainment of the fishable/swimmable goals of the Act and to report the water quality assessments biennially (every even year). The attainment of the CWA goals is measured by determining how well waters support their designated uses. For the purposes of the 305(b) water quality assessments, seven designated uses are evaluated: fish and wildlife habitat (aquatic life use), drinking water use, shellfish consumption, shellfish controlled relay and depuration, fish consumption, primary contact recreation and secondary contact recreation (swimming use), as assigned by classification in the Rhode Island Water Quality Regulations.

In the assessments, use support status is determined by comparing available water quality information and data to the water quality standards established in the Rhode Island Water Quality Regulations. The methodology for this assessment process is outlined in RI's Consolidated Assessment and Listing Methodology (CALM). The results of this comparison are then used to categorize each waterbody's specific designated uses as "Fully Supporting" or "Not Supporting". If data is insufficient or not available to evaluate a designated use, it is considered "Not Assessed". Waterbodies that are not supporting their criteria or designated uses by a pollutant are placed on the state's List of Impaired Waters, which is developed in accordance with Section 303(d) of the CWA. This List is prioritized, and schedules are set for developing Water Quality Restoration Plans, also TMDLs.

Monitoring Program

OWR has a primary role in both conducting monitoring programs and collaborating on water monitoring carried by other entities. Collectively, DEM's monitoring programs are aimed at gathering ambient water quality to assess water quality conditions and support management decision-making at various scales. Among many applications, the data generated are used in establishing and reviewing the state's water quality standards, measuring progress toward achieving the state and federal water quality goals, and supplying information for use in development of permit limits for wastewater discharges and TMDLs. A mix of monitoring strategies is employed to collect data from estuarine waters, freshwater rivers and streams, and lakes and ponds and are described further in the Rhode Island Water Monitoring Strategy.

Estuarine and Coastal Monitoring Programs

Over the past decade, the capacity to monitor water quality in Narragansett Bay has been maintained. Current water quality sampling approaches constitute variations of fixed-site sampling designs with different locations, parameters, and sample frequency being employed to support specific program needs. The programs are coordinated, and in some cases, designed to complement each other to provide both spatial and temporal information.

Rhode Island's criteria for dissolved oxygen in salt waters has emphasized the need for collection of continuous measurements of dissolved oxygen and related parameters. This is accomplished through the multi-partner Narragansett Bay Fixed Site Monitoring Network

(NBFSMN) which consists of thirteen (13) stations located on either docks or buoys in RI waters and two newer stations in Mt. Hope Bay in MA. The stations collect data on a continuous basis seasonally. The network is described further at Fixed-Site Monitoring Stations and Data in Narragansett Bay. Until 2022, collection of water quality profile data from more than 75 locations in the mid to upper Bay region comprised the Narragansett Bay Dissolved Oxygen Surveys. These two long-range programs are supplemented with water quality data collected in certain target coastal waters by NBC and generated via water quality restoration studies conducted by RIDEM, as well as by other research projects of various duration and scope. One area of recent focus has been water clarity measurements with the NBEP orgnaizing a work group to identify avaialble data, evaulate methods and make reocmmendations for enhancing monitoring for this parameter.

In addition to water quality parameters, there exists extensive monitoring of the coastal waters for pathogens. On a statewide basis, the RIDEM Shellfish Growing Area Monitoring Program and the RIDOH Beach Monitoring Program extensively samples for pathogens. In addition, the NBC samples its receiving waters for pathogens as part of its overall management of its wastewater system. For more information on bacteriological monitoring see DEM's Shellfish Monitoring Program. For more information on Rhode Island's Beach Program see RIDOH's website. NBC describes its activities and makes data available via its website portal "Snapshot of the Bay".

In addition to the above, there are volunteer monitoring programs active in RI coastal waters. The URI Watershed Watch Program also has active coastal and estuarine sites, including many of RI's southern coastal ponds. Volunteers are active in the Blackstone River Watershed as part of regional monitoring program. A collaborative effort led by Surfrider Association is resulting in additional data being collected on beach water quality on Aquidneck Island and along the southern RI shore; this data includes the off-season, and helps to identify potential pollution sources that may affect priority beaches. Clean Ocean Access also carries out volunteer monitoring on Aquidneck Island.

While capacity has increased, there are gaps in the current configuration of monitoring activities. RIDEM notes little data has been collected from the Sakonnet River and that additional monitoring is needed to properly characterize local conditions in many coastal embayments. A USGS project funded by SNEP monitored water quality in the Sakonnet River in 2018 using continuous water quality monitoring buoys and associated surveys. This work continued on a more limited basis in 2019, but no long-term, stable funding has been secured. Future investment in additional monitoring will be needed to characterize conditions more fully in the Sakonnet River.

Freshwater Monitoring Programs

RIDEM ARM sampling Carr River, West Greenwich

RIDEM adopted a rotating basin approach to sampling wadeable rivers and streams that was first implemented in 2004. The sampling design involves an intensive data collection effort conducted at the 10-12 digit HUC watershed scale. This monitoring approach results in a portion of the state's watersheds being sampled annually on a schedule aimed at covering the entire state every four to five years depending upon staffing and resources. More information about the ARM Program can be found in the Quality Assurance Project Plan (QAPP) for the project. The ARM program rotated to the watersheds of the Clear, Branch, Blackstone, and Woonasquatucket Rivers in 2019 and to the East Bay, Aquidneck Island, and coastal Bay tributaries in 2021[17]. With support of contractor assistance, RIDEM expects to rotate to the Wood/Pawcatuck and Saugatucket watersheds in 2022.

In addition to the Ambient River Monitoring Program, RIDEM continued to partner with USGS on water quality monitoring of large (non-wadeable) rivers, which occurs monthly for a core set of parameters. Stations sampled in the program are located on the Blackstone, Pawtuxet, and Pawcatuck Rivers. Data on river water quality is also generated by the Narragansett Bay Commission, Pawtucket Water Supply, Providence Water Supply, and through volunteer programs, including URI Watershed Watch and the Blackstone River Watershed Council/Friends of the Blackstone. This data supplements the State's core programs and may be helpful in identifying changes in water quality conditions that may be occurring in between the State's rotations in a watershed.

With respect to lakes, RIDEM relies primarily on the water quality data generated by the University of Rhode Island Watershed Watch Program, which coordinates the volunteer-based monitoring of lakes throughout the state. RIDEM supports this program with an annual grant agreement. RIDEM has also completed more detailed assessment of water quality conditions for lakes as part of the development of water quality restoration studies, known as TMDLs.

Growing public interest in the problem of nuisance aquatic invasive plant growth in lakes and ponds prompted RIDEM to establish a seasonal monitoring program that surveys for the presence and extent of aquatic invasive species (AIS), specifically targeting aquatic invasive plants. Information from the surveys is combined with data reported via the URI Watershed Watch Program and RI Natural History Survey to track the locations of Aquatic Invasive Species.

[17] The data collected in 2021 was not available for use in this assessment cycle and is expected to be first utilized in the 2024 assessment cycle.

Assessment Methodology and Results

Data Sources

RIDEM's methods for assessing water quality are specified in a document referred to as the Consolidated Assessment and Listing Methodology (CALM). As noted in the CALM, RIDEM strives to consider all readily available water quality data and related information in assessing surface waters quality. In determining if data are appropriate, RIDEM considers quality assurance/quality control, data quality objectives, monitoring design, age of data, accuracy of sampling location information, data documentation, and data format (hard copy versus electronic). The data quality objectives outlined in the CALM are used to allow RIDEM to determine, in a consistent manner, whether data can be used to make determinations about the water quality attainment status. Detailed requirements for data considered in this cycle can be found in the 2022 Consolidated Assessment and Listing Methodology (CALM 2022).

For the 2022 cycle, a comprehensive review of water chemistry data included all available data from 2015 to 2020 that met minimum Quality Assurance and Quality Control procedures outlined in the 2022 CALM. In a few limited cases, data into 2021 were also included. The primary resources of data are presented below:

Table 1 Data Sources Used in Assessments

Ambient River Monitoring (RIDEM)	Fixed Site Monitoring in Narragansett Bay*
Large River Monitoring (USGS)	Narragansett Bay Commission
TMDL Studies (RIDEM)	Providence Water Supply Board
Fish Consumption, Beach Closure, & Drinking Water (RIDOH)	URI Watershed Watch
RIDEM Shellfishing Program	Pawtucket Water Supply Board
Collaborative Hg Fish Tissue Surveys	City of Newport

*Joint program administered by RIDEM through contract with URI

Given the small size of the state, RIDEM has been able to conduct a census survey of publicly accessible lakes in lieu of implementing a probabilistic sampling design as suggested by EPA. The data provided by the collaborative mercury fish tissue surveys has reduced the data gap with respect to lakes with major public access. The results to date are included in the assessment of Fish Consumption in coordination with RIDOH for individual waterbodies and data has been collected since 2004.

Data Assessment

The CALM describes in detail the decision-making process for assessing the quality of surface waters in accordance with requirements of Section 305(b) and for generating the list of impaired waters in accordance with requirements of Section 303(d). The Methodology describes the quality of data necessary to be used in the assessment and listing process, and how that data and information are then interpreted to arrive at an assessment of water quality

for placement in one of the five Integrated Report Categories.

Assessment Results

Table 2 shows the summary of assessment units (waterbody IDs) for each Water Quality Category and by waterbody type. Most assessment units in the state fell into Category 3 (Insufficient or no data to assess any designated use). One hundred and twenty-seven (127) assessment units are impaired for one or more designated uses **and** have a TMDL approved by EPA for all causes of impairment (Category 4A). No waterbodies or impairments fell into Category 4B, following the removal of Aquatic Life Use impairments for fish four segments of Mt. Hope Bay during the 2018-2020 assessment cycle. The waterbodies in Category 4C are primarily for impairments associated with the presence of invasive species of aquatic plants and/or animals. One hundred and ninety-two (192) assessment units are in Category 5, the 2022 303(d) List of Impaired Waters needing a TMDL. The 303(d) List identifies waterbodies within the State, which are not currently meeting Rhode Island Water Quality Standards. The Category 1-4 Lists and the Category 5 303(d) List can be found at: 2022 Integrated Reporting Lists.

The rationale for delisting of waterbodies can be found at: 2022 Delisting Document.

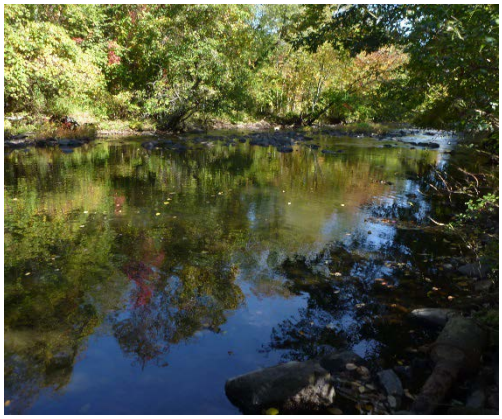
Table 2. Assessment Unit Category Listing Summary

Category	Waterbody Types								Total Number AUs / WBIDs
	Estuarine Waters		Rivers / Streams		Lakes / Ponds		Ocean / Near Coastal		
	Square Miles	AUs / WBIDs	Miles	AUs / WBIDs	Acres	AUs / WBIDs	Square Miles	AUs / WBIDs	
1	0	0	0	0	0	0	0	0	**0**
2	99.7	70	335.2	109	4278.9	21	300.1	8	**208**
3	2.6	14	289.2	219	3089.8	94	0	0	**327**
4A	5.6	18	277.5	70	4389.2	39	0	0	**127**
4B	0	0	0	0	0	0	0	0	**0**
4C	0	0	18.6	3	1759.1	33	0	0	**36**
5	51.4	36	455.3	110	5175.7	46	0	0	**192**
TOTALS	**159**	**138**	**1376**	**511**	**18,693**	**233**	**300**	**8**	**890**

Summaries of Designated Use Support

Rivers and Streams

Almost eighty percent of mapped river miles are assessed for at least one designated use. Most river miles assessed have enough data to assess Fish and Wildlife Habitat and/or Recreational Use. The low percentage of assessed river miles for fish consumption and public drinking water supply are due to limitations on available data.



Branch River at Douglas Turnpike, Burrillville

Of the impaired river miles (751.4 miles), most impaired river miles (93.9%, 705.5 miles) have a pathogen impairment. The second most prevalent cause of impairment are metals with 26.2% (196.7 miles) of impaired river miles. The metal with the highest percent of impaired river miles (12.8%, 96 miles) is dissolved lead. Additional notable causes of river impairments are Nuisance Exotic Species (15%, 113 miles) and Biologic Integrity (9.98%, 75.0 miles).

The 2022 Assessment saw few changes in the assessment status of rivers. The largest change in assessment status was that for the Fish and Wildlife Habitat Use and the Recreation Use about 20 to 30 miles of rivers were reclassified from fully supporting to not assessed due to lack of data.

Table 3 Individual Use Support Summary for Rivers and Streams (miles)

USE	Total Size (miles)	Assessed	Fully Supporting Assessed	Not Supporting Assessed	Not Assessed/ Insufficient Information
Fish and Wildlife habitat (Aquatic Life)	1375.8	1043.8 (75.9%)	763.2	280.2	332.0
Fish Consumption	1375.8	43.6 (3.2%)	0.0	43.7	1332.2
Swimming (Primary & Secondary Contact Recreation)	1375.8	976.9 (71.0%)	271.4	705.5	398.9
Public Drinking Water Supply	205.8	6.1 (3.0%)	6.1	0.0	199.7

Table 4 Miles of Rivers and Streams Impaired by Various Causes

Cause Group/detail *Total Impaired Miles: 731.2*	Size (miles)	% of Total Impaired Miles	% of Total Miles
PATHOGENS	705.5	93.9%	**51.3%**
Enterococcus	609.25	81.1%	**44.3%**
Fecal Coliform	137.6	18.3%	**10.0%**
BIOLOGIC INTEGRITY (BIOASSESSMENTS)	**75.0**	**10.0%**	**5.4%**
Benthic-Macroinvertebrate Bioassessments	75.0	10.0%	5.4%
BIOASSAYS	**6.1**	**0.8%**	**0.4%**
Ambient Bioassays -- Chronic Aquatic Toxicity	4.0	0.5%	0.3%
Whole Effluent Toxicity (WET)	2.2	0.3%	0.2%
OXYGEN DEPLETION	21.1	2.8%	**1.5%**
Oxygen, Dissolved	21.1	2.8%	**1.5%**
NUTRIENTS (Macronutrients/Growth Factors)	**29.03**	**3.9%**	**2.1%**
Phosphorus (Total)	29.03	3.9%	**2.1%**
TOXIC ORGANICS	**28.4**	**3.8%**	**2.1%**
Dioxin (including 2,3,7,8-TCDD)	8.7	1.2%	0.6%
Polychlorinated biphenyls	8.7	1.2%	0.6%
PCB in Fish Tissue	28.4	3.8%	2.1%
TOXIC INORGANICS	**17.4**	**2.3%**	**1.3%**
Chloride	17.4	2.3%	1.3%
METALS	196.70	26.2%	**14.3%**
Aluminum	6.8	0.9%	0.5%
Cadmium	53.2	7.1%	3.9%
Copper	42.3	5.6%	**3.1%**
Iron	64.3	8.6%	**4.7%**
Lead	95.91	12.8%	**7.0%**
Mercury	8.7	1.2%	0.6%
Zinc	8.51	1.1%	**0.6%**
Mercury in Fish Tissue	43.7	5.8%	3.2%
Mercury in Water Column	4.6	0.6%	0.3%
OTHER	**8.6**	**1.1%**	**0.6%**
Turbidity	8.6	1.21%	0.6%
NUISANCE EXOTIC SPECIES	112.86	15.0%	**8.2%**
Non-Native Aquatic Plants	112.86	15.0%	**8.2%**
NUISANCE NATIVE SPECIES	**1.6**	**0.2%**	**0.1%**
Aquatic Plants - Native	1.6	0.2%	0.1%

Lakes and Ponds

Of the impaired lake acres (11,324 acres), the highest cause of impaired lake acres is metals (61.0% of impaired acres, 6911 acres), with the highest metal impairment being mercury in fish tissue (57.7%, 6537.8 acres). The second most prevalent cause of impaired lake acres are Nuisance Exotic Species with 51.8% (5862 acres). The other highest percentage of lake acre impairment causes are Nutrients (31.4%, 3553.1 acres) and causes associated with nutrient impairments such as Chlorophyll-a (9.5%, 1080 acres and Total Organic Carbon (10.6%, 1196.1 acres) and Oxygen Depletion (14.2%, 1,613.3 acres).

Peace Dale Reservoir, South Kingstown

In this 2022 assessment, the biggest change was in the number of lakes impaired for aquatic invasive species, which increased by fourteen lakes. In addition, four lakes were found to have impairments in the Fish Consumption Use as seen in unsafe levels of mercury in fish tissue.

Table 5 Individual Use Support Summary for Lakes and Ponds (acres)

USE	Total Size (acres)	Assessed	Fully Supporting Assessed	Not Supporting Assessed	Not Assessed/ Insufficient Information
Fish and Wildlife habitat (Aquatic Life)	18,693	11533 (61.7)	3027	8,506	7,160
Fish Consumption	18,693	7760 (41.5%)	1,146	6,615	10,933
Swimming (Primary & Secondary Contact Recreation)	18,693	8143 (43.6%)	7,786	366	10,550
Public Drinking Water Supply	7,789	5519 (70.9%)	4,268	1,251	2,270

Table 6 Acres of Lakes and Ponds Impaired by Various Causes

Cause Group/detail	Size (acres)	% of Impaired Acres	% of Total Acres
PATHOGENS	**356.5**	**3.1%**	**1.9%**
Enterococcus	29.1	0.3%	0.2%
Fecal Coliform	327.4	2.9%	1.8%
OXYGEN DEPLETION	**1613.3**	**14.2%**	**8.6%**
Oxygen, Dissolved	1613.3	14.2%	8.6%
NUTRIENTS (Macronutrients/Gr	3553.1	31.4%	**19.0%**
Phosphorus	3553.1	31.4%	**19.0%**
TOXIC INORGANICS	**26.3**	**0.2%**	**0.1%**
Chloride	26.3	0.2%	0.1%
TOXIC ORGANICS	**76.8**	**0.7%**	**0.4%**
PCB in Fish Tissue	76.8	0.7%	0.4%
METALS	6910.5	61.0%	**37.0%**
Aluminum	245.0	2.2%	1.3%
Cadmium	245.0	2.2%	1.3%
Copper	282.4	2.6%	4.2%
Lead	477.3	4.3%	2.6%
Mercury in Fish	6537.8	57.7%	**35.0%**
MINERALIZATION	**81.2**	**0.7%**	**0.4%**
Total Suspended	26.3	0.2%	0.1%
Taste	42.2	0.4%	0.2%
NUTRIENT-RELATED	**2422.7**	21.4%	**13.0%**
Chlorophyll-a	1079.5	9.5%	5.8%
Total Organic Carbon (TOC)	1196.1	10.6%	6.4%
OTHER	**163.9**	**1.4%**	**0.9%**
Turbidity	163.9	1.4%	0.9%
NUISANCE EXOTIC	5862.0	51.8%	**31.4%**
Non-Native	5862.0	51.8%	**31.4%**
Non-Native Fish,	280.9	2.5%	1.5%
FLOW ALTERATIONS	**497.1**	**4.5%**	**2.7%**
Other flow regime	497.1	4.4%	2.7%

Estuarine Waters

Of the impaired estuarine miles^2 (56.95 miles^2), the highest cause of impaired estuarine miles^2 is Oxygen Depletion (85.7%, 48.8 miles^2 of the impaired area). The second most prevalent cause of impaired estuarine miles^2 is Pathogens with 73.0% (41.6 miles^2). The other highest percentage of estuarine mile^2 impairment causes are Nutrients (69.8%, 39.8 miles^2), which is often the reason for oxygen depletion. There were no changes in the estuarine assessments during this assessment.

Table 7 Individual Use Support Summary for Estuarine Waters (square miles)

USE	Total Size (miles^2)	Assessed	Fully Supporting Assessed	Not Supporting Assessed	Not Assessed/ Insufficient Information
Fish and Wildlife habitat (Aquatic Life)	159.3	104.6 (65.7%)	54.9	49.8	54.7
Fish Consumption	159.3	0 (0%)	0.0	0	159.3
Swimming (Primary & Secondary Contact Recreation)	159.3	155.4 (97.6%)	139.0	16.4	3.9
Shellfish Consumption	135.5	132.0 (97.4%)	105.9	26.1	3.5
Shellfish Controlled Relay and Depuration	16.6	15.2 (91.6%)	14.5	0.8	1.4

Table 8 Square Miles of Estuarine Waters Impaired by Various Causes

Cause Group/detail	Size (miles^2)	% of Impaired Miles^2	% of Total Miles^2
PATHOGENS	**41.6**	**73.0%**	**26.1%**
Enterococcus	1.2	2.0%	0.7%
Fecal Coliform	40.4	71.0%	25.4%
BIOASSAYS	**1.0**	**1.8%**	**0.6%**
Sediment Bioassays for Estuarine and Marine	1.0	1.8%	0.6%
OXYGEN DEPLETION	**48.8**	**85.7%**	**30.7%**
Oxygen, Dissolved	48.8	85.7%	30.7%
NUTRIENTS (Macronutrients/Growth Factors)	**39.8**	**69.8%**	**25.0%**
Phosphorus (Total)	0.01	0.02%	0.01%
Nitrogen (Total)	39.7	69.8%	25.0%

Impairment Changes

Table 9 Waterbody Impairments Removed from Category 4 and Category 5

Cause of Impairment	Waterbodies
Lead, Dissolved	• Blackstone River (-01A, -01B) • Maidford River (-03)
Phosphorus (Total)	• Pawtuxet River Main Stem (-03)
Zinc	• WoonasquatucketRiver (-10A)
Zinc, Dissolved	• Buckeye Brook (-01)

Table 10 New Waterbody Impairments Added to the 2018-2020 303(d) List

Cause	**Waterbodies**
Enterococcus	• Ten Mile River & Tribs (01B)
Lead, Dissolved	• Pawtuxet River Main Stem (-03)
Phosphorus (Total)	• J.L. Curran Reservoir (Fiskeville Reservoir) (-02)
Mercury in Fish Tissue	• Chapman Pond (-01) • Tarbox Pond (-02) • Tarkiln Pond (-08) • Spring Lake (Herring Pond) (-04)

Assessment of Wetlands Conditions

Through their respective programs RIDEM and CRMC regulate proposed projects and activities in or near freshwater and saltwater wetlands. Strong state policies require that adverse impacts to wetlands be avoided and minimized with a goal of no net loss.

Based upon available RIDEM data, it is evident that Rhode Island is minimizing permitted losses of freshwater wetlands. During 2018 through 2020, the RIDEM Freshwater Wetlands Program permitted 1.14 acres of freshwater wetlands loss associated with nineteen (19) permitted projects. The permitted wetlands losses were commonly associated with the crossings of freshwater wetlands, including rivers or streams, to gain access to buildable upland areas.

The state is aware, however, that a significantly greater area of unpermitted (unauthorized) alterations of freshwater wetlands, including losses, occurs. The RIDEM data for the four-year period from 2013 through 2016 revealed that there were thirty-five acres of unauthorized alteration of freshwater wetlands, including rivers or streams, over the four years. Twenty-three acres of enforcement-driven wetlands restoration was completed during those years. Additional unauthorized alterations and completed restorations of the fifty-foot perimeter wetlands and one-hundred-foot or two-hundred-foot riverbank wetland and floodplain also occurred.

With funding support from the EPA Region 1 Wetland Program Development Grants, RIDEM has developed wetlands monitoring strategies and assessment tools for freshwater wetlands (2006) and salt marshes (2016) that reflect the three-tiered approach recommended by EPA that includes landscape scale, rapid and intensive assessment tools. Building on the freshwater wetlands work completed in the prior years, DEM has collaborated with the CRMC, RI Natural History Survey, and NBNERR to refine and validate a salt marsh assessment method known as MarshRAM (2019) and then more recently assessed salt marsh restoration sites (draft 2021). This work informed the development of a prioritization protocol for coastal wetland restoration.

RIDEM has continued to complete projects to further refine and develop methods to assess freshwater wetlands condition, including the tier-2 rapid assessment method referred to as RIRAM (2014). Continued application of RIRAM and exploration of the floristic quality assessment method (being developed regionally with NatureServe support) will contribute to building out a gradient of condition for freshwater wetlands in RI (draft 2020).

An earlier analysis of RIRAM data (2017) identified the most common in-wetland stresses as anthropogenic fluvial inputs, filling and dumping, and invasive plant species. The most common invasive plants found were bittersweet (*Celastrus orbiculatus*), common reed (*Phragmites australis)*, and multiflora rose *(Rosa multiflora).* Prior data analysis also found moderate to strong correlations between wetland condition and percent of developed land within concentric buffers around the wetland, in some cases out to 2000 feet from the wetland. Percent of developed area within 100 feet of a wetland was significantly correlated with RIRAM in-wetlands stressor metrics emphasizing the importance of upland buffer protection.

Public Health

Fish Consumption Advisories

All states in the northeast have issued fish advisories for mercury and other contaminants warning residents, particularly children and pregnant women, to limit ingestion of certain fish species or fish caught in particular waterbodies. The statewide freshwater advisory against consumption of fish species known to contain the most mercury and the statewide saltwater advisory against consumption of fish species known to contain mercury and PCBs are based on precautionary, region-wide advisories, and not on actual contaminant monitoring data collected within Rhode Island waters. Therefore, these advisories are not reflected in the assessment of Fish Consumption use. Unlike other northeast states, resource constraints in Rhode Island have prevented a routine surveillance program for fish tissue. Prior to 2021, RIDEM collaborated with the EPA Atlantic Coastal Environmental Sciences Division (ACESD) in Narragansett, RI, RIDEM Division of Fish and Wildlife, and EPA Region 1 Laboratory to collect fish tissue at select waterbodies each year. However, funding and staffing limitations have prevented this program from being fully implemented. This report documents the need to support this program. A number of lakes were listed as impaired for mercury in fish tissue based on the data collected by the ACESD. Mercury in fish tissue is now the top impairment for impaired lake acres in Rhode Island.

In estuarine areas of Narragansett Bay, Fish Consumption use assessments are listed as Insufficient Information. In Integrated Reports prior to 2016, RIDEM listed estuarine areas of Narragansett Bay as “Fully Supporting” for Fish Consumption use. In the 2016 cycle, RIDEM was aware of new data collected by researchers in Narragansett Bay and the Sounds and changed the assessment listing to Insufficient Information until a full review of data could occur. RIDEM and RIDOH have not fully reviewed the data collected to date and further data collection has taken place since 2016. The RIDEM plans to review and collaborate with the researchers to use this data in future assessments, dependent on resources and funding.

Shellfish Consumption

The RIDEM Shellfish Growing Area Monitoring Program provides an extensive dataset concerning pathogens in the Narragansett Bay, other embayments, and coastal ponds. The program assures compliance with the USFDA National Shellfish Sanitation Program (NSSP), which regulates the interstate shellfish industry and enforces a national health standard among all shellfish producing states. Pathogen data, and other data where relevant, supports assessment of the shellfishing use and decisions to open and close areas to shellfish harvesting. RIDEM announces seasonal shellfish closures and any changes to shellfish closure status, annually in May. A map of the status of shellfish areas, including closed areas, is available at Shellfish Map.

Protection and restoration of shellfish growing area waters is identified as a priority for the state’s ongoing water quality management and planning efforts. The efforts, investments, and coordination with many partners are allowing expanded shellfishing opportunities in Rhode Island waters, including some areas that have been restricted for decades. Due to improved

water quality, RIDEM announced several improvements in May 2017 that expanded shellfish opportunities. The greatest improvement was the reclassification of Upper Narragansett Bay Conditional Area B (3,712 acres) from Conditionally Approved to Approved status and removal of the bacteria impairment for this area from the 303(d) list in 2018-2020. Simultaneous with this, the closure rainfall threshold for Conditionally Approved Area A increased from 0.8 to 1.2 inches of rain. Unfortunately, due to localized, wet-weather bacteria sources, small conditionally approved areas were required in portions of Upper Narragansett Bay and Pt. Judith Pond.

Through significant investment by many partners, the Upper Narragansett Bay has seen great improvement in water quality and increased opportunities for shellfishing. Investments in infrastructure upgrades have brought marked improvements in water quality. Phases I and II of the NBC CSO abatement plan have collected and treated almost 13.5 billion gallons of dilute sewage between inception and early 2022 that would have been discharged to the Bay and urban rivers. Construction of NBC's Phase III CSO projects is underway and upon implementation, further improvements to Upper Narragansett Bay and the Providence, Seekonk, and Blackstone Rivers are expected.

Water quality monitoring, combined with shellfish tissue data showed that the lower portion of the Providence River could support a conditional shellfish harvest area. Shellfish harvesting had been prohibited in the lower Providence River for more than 70 years. RIDEM, along with its partners, completed analyses for the area to ensure seafood safety and the long-term sustainability of the shellfish stock. In September 2020, RIDEM organized a successful shellfish transplant from this area. In 2021, RIDEM announced the reclassification of the Lower Providence to create a new conditional area (Conditional Area E). Over 1,900 acres, or 35% of the Providence River, opened for shellfishing in accordance with a carefully developed conditional area management plan (Providence River Conditional Area Management Plan) that closes the area for seven days in response to rainfall exceeding 0.5" in the Providence area. In addition to water quality closures, the new shellfish harvest area also has fisheries management closures to ensure long term sustainability of the shellfish resource. In 2021, while the area was only open for 15 of the planned 27 days due to rainfall closures, over four million shellfish were harvested, exceeding the expected yield.

Bathing Beach Monitoring and Closures

The Rhode Island Department of Health (RIDOH) is responsible for the licensing and associated regulation of bathing beach facilities in the state of Rhode Island. This includes both fresh and saltwater beaches. Funding for the RIDOH's water quality monitoring program for saltwater beaches is provided by the EPA. These funds support risk-based surveillance for bacteriological fecal indicator, enterococci, at licensed marine beaches. EPA funds also support an array of communication methods to report elevated risks to the public. RIDOH also reports elevated risks at freshwater beaches, although managers of those beaches are responsible for monitoring and relaying data to RIDOH since EPA provides no funding for surveillance at freshwater beaches.

Consistent with EPA guidance, RIDOH implements a risk-based approach to assign sampling frequency at each of the coastal licensed beaches. Sampling frequency ranges from monthly to twice weekly throughout the beach season based on history or water quality problems, level of use, and proximity to potential pollution sources.

Water quality has improved and there have been fewer beach closures in the last decade; however, beaches still experience closure days (Table 11). Beach closures occur at both fresh and saltwater beaches. The sources, fate, and transport of pathogen loads that trigger beach closures vary by site. Combined Sewer Systems (CSSs) are sewer systems that were designed to receive both wastewater and stormwater. During large or intense storms, these CSSs can have overflows from CSOs. Rhode Island has three WWTFs that have CSOs. While WWTFs in Rhode Island are evolving to minimize CSOs, some pathogen discharges continue to affect surface water quality. Major improvements over the past decade at these WWTFs have resulted in significantly reduced CSOs. Still, stormwater runoff from roads, parking lots, and other impervious surfaces allow transport of pathogens to Rhode Island's fresh and salt-water bodies. More information about the beach program can be found at: https://health.ri.gov/beaches/

Table 11 2008-2020 Beach Closures Days Attributed to Pathogens[1]

Beach Name	City/Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL (2012-2021)
Atlantic Beach Club	Middletown	3	1	2	2							**8**
Barrington Town Beach	Barrington		7	1		2	5		2	3		**20**
Bonnet Shores Beach Club	Narragansett							3	2		2	**7**
Briar Point Beach	Coventry							14	2			**16**
Bristol Town Beach	Bristol	6		1		2	1	1	1			**12**
Burlingame State Park Picnic Area	Charlestown								10			**10**
Camp Aldersgate	Scituate		1									**1**
Camp Aquapaug	West Kingston								1			**1**
Camp Canonicus	Exeter										9	**9**
Camp Cookie	Glocester						5					**5**
Camp Fuller	S. Kingstown		4	2					1		3	**10**
Camp Grosvenor	N. Kingstown	2						5	5			**12**
Camp Hoffman	S. Kingstown							6			13	**19**
Camp Ruggles (Iron's Homestead)	Glocester									6		**6**
Camp St. Dorothy	Bristol	5	2									**7**
Camp Watchaug	Charlestown	2							9		2	**13**
Camp Watmough	Glocester		2			11			7			**20**
City Park Beach	Warwick	1	13	1	3		2					**20**
Conimicut Point	Warwick	2	16	14	4	6	12	21	1		13	**89**
Difonso Recreation Area	Glocester							5				**5**
Dunes Club Beach	Narragansett											**0**

Beach Name	City/Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL (2012-2021)
Dunes Park Beach	Westerly								2			**2**
Dyer Woods Campground	Foster								5	6	48	**59**
Easton's Beach	Newport	1		2	6	1			2	6	4	**22**
Echo Lake Campground	Glocester							4				**4**
Episcopal Conference Center	Richmond									2		**2**
Fogland Beach	Tiverton	2	2	1						2	2	**9**
Fort Adams State Park	Newport	3	5	1	1				7		6	**23**
Ginny B's Campground	Foster								2		5	**7**
Goddard Memorial State Park Beach	Warwick	3	7	2	8	2	1	10		2	1	**36**
Gooseberry Beach	Newport	1							5	4	14	**24**
Goosewing Beach	Little Compton							3				**3**
Gorton Pond	Warwick											**0**
Governor Notte Park	N. Providence											**0**
Grinnell's Beach	Tiverton	1	2	1					2		2	**8**
Harmony Hill School Beach	Chepachet								5			**5**
Hazard's Beach	Newport		1				2	0	2	2	5	**12**
Kent County YMCA[2]	Warwick	2	2									**4**
Kent County Lower Pond[2]	Warwick						14	10	17		14	**55**
Kent County Upper Pond[2]	Warwick						8	3	7			**18**
King Park Beach	Newport	4		5	1		4		1		6	**21**
Kingston's Camp at Larkin Pond	N. Kingstown			4				14			15	**33**
Larkin's Pond Beach	Kingston						1	9		3	12	**25**
Lincoln Woods	Lincoln							2				**2**

Beach Name	City/Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL (2012-2021)
Mackerel Cove Beach	Jamestown					3					2	**5**
Misquamicut Club	N. Kingstown											**0**
Mother of Hope Day Camp	N. Kingstown											**0**
Narragansett Town Beach	Narragansett		2									**2**
Ninigret Pond	Charlestown	1				2		1				**4**
North Kingstown Town Beach	N. Kingstown		6	1	2				2	1		**12**
Oakland Beach	Warwick	2	27	3	9	9	26	6				**82**
Peabody's Beach	Middletown	3	1	2	7		3	3	3	4		**26**
Plum Beach Club	N. Kingstown						1					**1**
Roy Carpenter Beach	S. Kingstown								4			**4**
Sachuest Beach	Middletown		1									**1**
Sandy Point Beach	Portsmouth		5				2	9	9			**25**
Saunderstown Yacht Club	Saunderstown						4		2			**6**
Scarborough State Beach North	Narragansett	1	3	1	1				1		1[3]	**8**
Scarborough State Beach South	Narragansett	1	3	2	1				3	2	3[3]	**15**
Spouting Rock Beach	Newport					2	2			2	14	**20**
Spring Lake Beach	Burrillville		2						10			**12**
Surfer's Rock at Sachuest Beach	Middletown								7			**7**
Third Beach	Middletown	8		2	2		2	5	10	3	2	**34**
Warren Town Beach	Warren		2	4	4		6	1		2		**19**
Watch Hill Carousel Beach	Westerly											**0**
Westwood YMCA	Coventry									1		**1**
World War II Memorial Park	Lincoln											**0**

Beach Name	City/Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL (2012-2021)
Yawgoog Scout Reservation	Exeter		1						1			**2**
	TOTAL	**54**	**118**	**52**	**51**	**40**	**101**	**135**	**150**	**51**	**198**	

[1]Beach closures at Georgiaville Pond and Slack Reservoir attributed to cyanobacteria are not included in this table.
[2]Kent County YMCA has two distinct ponds. Prior to 2017, closure information did not distinguish which pond was closed for swimming.
[3]Scarborough State Beach reported a high result on 08/31/2021. Since follow-up sampling did not follow a typical pattern, this closure is only counted as one day.

Drinking Water Program and Assessments

RIDOH is delegated to administer the EPA's Safe Drinking Water Act. The Center for Drinking Water Quality (DWQ) at RIDOH monitors approximately 490 public water systems, which include surface and groundwater supplies. DWQ monitors drinking water quality at the source, at the entry to the distribution system, and within the distribution system to evaluate for compliance. The larger public drinking water suppliers monitor the source waters for several parameters to adjust treatment levels as necessary for compliance. More information about RIDOH's DWQ program can be found at: Center for Drinking Water Quality.

The terminal reservoir is the location within the drinking water supply system where RIDOH requires water samples to be collected that provide information on ambient surface water quality. In general, sampling conducted within the drinking water supply system upstream of the terminal reservoir has been determined by RIDOH to be too limited in scope to support a drinking water use assessment. Therefore, these upstream waters are considered unassessed for drinking water use in this report. Summaries of drinking water use assessments are shown in Table 3 for rivers and streams and in Table 5 for lakes and reservoirs.

Since RIDOH/DWQ requires filtration and disinfection for all surface waters, this report assesses surface water quality from the perspective of whether or not the water source required more than reasonable treatment. According to DWQ, source waters in the East Bay, particularly those serving Newport are challenging to treat, likely due to a combination of watershed development and land-use patterns and the small size and shallow depth of available water resources. Poor source water quality can create challenges with respect to compliance with standards for disinfection by-products.

There are nine public water systems in the state that use surface water, and they range in size from a small seasonal campground supplied by a lake up to Providence Water, which draws from the Scituate Reservoir. Starting in May 2019, Rhode Island became one of the growing number of states that regulate algal toxins in public drinking water. All water systems that utilize a surface water source must submit plans for issues such as source protection and emergency response, and various methods of raw water surveillance and testing are required from May through October at a minimum.

The Newport Water Division have made treatment plant upgrades to improve their ability to treat these challenging source waters. In addition, Newport has conducted a study of the nutrient loading and presence of cyanobacteria (blue-green algae) in all of its source waters to help assess which additional source protection measures would be most beneficial. The source waters for the Newport Water Supply are designated as impaired for the drinking water use and are the subject of TMDL development by RIDEM.

Chapter

4

Groundwater Assessments

Groundwater Assessment

In Rhode Island, groundwater is a locally abundant and widely used resource. The US Geological Survey has estimated that 27 million gallons per day of groundwater are used in the state for drinking water and other beneficial uses. Approximately 26% of the state's population is supplied with drinking water from public and private wells. Groundwater resources are expected to be utilized to meet a substantial part of the state's future water supply needs.

- Groundwater in RI is generally free of pollutants. Over 90% of the state is classified as suitable for drinking water use without treatment.
- Approximately two-thirds of the state's municipalities rely on groundwater entirely or in part as a source of drinking water.
- The state's most significant and productive aquifers are located in the glacial deposits of stratified drift. Twenty-two potentially highly productive stratified drift aquifers have been identified. The fractured bedrock underlying the state is also an important aquifer providing drinking water to most private wells and small public water systems.
- The state's groundwater resources are considered vulnerable to contamination because of the generally shallow depth to groundwater, aquifer permeability and the absence of subsurface confining layers.
- RIDEM has designated wellhead protection areas for all 692 public wells in RI identified as of 2018. 157 of these are active community wells serving a residential population. RIDEM sets a high priority for source control and remediation efforts in wellhead protection areas.
- The US Environmental Protection Agency has designated four sole source aquifers in RI: Block Island, Pawcatuck, Hunt-Annaquatucket-Pettaquamscutt, and Jamestown.

Because of the generally localized nature of groundwater contamination, no groundwater monitoring network has been established in RI. The best source of available information on ambient groundwater quality is the RI Department of Health's data on public drinking water wells that are regularly tested to ensure compliance with drinking water standards.

Nitrate is often used as an indicator of human impacts to groundwater. Natural background concentration of nitrate in groundwater is less than 1 mg/l. Five mg/l of nitrate (one–half the drinking water standard of 10 mg/l) has been established as the preventative action limit in RI state groundwater quality standards and is often used as a threshold for determining acceptable levels of impact from existing and proposed development. The data from public wells sampled for nitrate from 2013 to 2018 reveal that the annual percentage of wells that exceeded 5 mg/l averaged 6%. From 2004 through 2012, the annual percentage of wells that

exceeded 5 mg/l averaged 5%. Elevated nitrates tend to occur in specific areas affected by local land use densities and are not generally documented to occur as widespread aquifer contamination.

Volatile organic compounds (VOCs) are another often used indicator of groundwater quality conditions. The most commonly detected VOC in public wells from 2013 to 2018 was methyl tertiary butyl ether (MTBE), which was a common gasoline additive (it is no longer used). Other VOCs from gasoline are also occasionally detected at low levels but at a reduced frequency compared to years past due to the measures taken to remove older underground storage tanks and to regulate the design and installation of new tanks. Detections in public wells of VOCs used as solvents has also significantly decreased over the years due to more stringent controls on waste discharges and requirements for collecting hazardous wastes. A review of the VOC data from 1995 through 2003 revealed that annually 0-3 wells had an exceedance of a drinking water standard/health advisory for a VOC, but that from 2004 through 2018 only two wells had an exceedance.

Groundwater Protection Program

The RI Department of Environmental Management administers a number of programs that address groundwater protection (Groundwater Protection Programs). The framework for these programs is the Office of Water Resources Groundwater Classification and Standards Program. RIDEM Groundwater Quality Rules classify the state's groundwater resources into four classes, establish groundwater quality standards for each class, and designate wellhead protection areas. In addition, the Office of Water Resources administers two programs to regulate discharges to groundwater: the Onsite Wastewater Treatment System program and the Groundwater Discharge/Underground Injection Control Program for all non-sanitary discharges to groundwater, including stormwater. In addition, the RIDEM Office of Land Revitalization and Sustainable Materials Management administers several programs to regulate existing and potential sources of groundwater contamination (e.g., underground storage tanks, solid waste facilities) and manages the investigation and remediation of sites of groundwater contamination.

Management of nitrogen from (onsite wastewater treatment systems or “OWTS”) remains an area of focus for state agencies. To reduce its adverse impact to coastal waters, RIDEM has required nitrogen reducing technology for all OWTS applications since 2008 (new systems and alterations or repairs to existing systems) in the RI Coastal Resources Management Agency Salt Pond and Narrow River Critical Resource Areas. RIDEM has also been implementing Rules requiring removal of all cesspools within 200 feet of a coastal shoreline feature (anywhere in the state), as well as within 200 feet of any public well, and within 200 feet of a waterbody with an intake for a public water supply system. In addition, RIDEM rules require the removal of cesspools within one year of a property’s point of sale statewide.

Chapter

5

Public Participation

Public Participation

Public Submission of Data

Public participation for the Integrated Report begins with a public request for submissions of data and information for use in the development of the Integrated Report and Lists. RIDEM emailed its Water Quality Assessment mailing list on April 1, 2021, asking for data by June 1, 2021. The data used in this report data came from multiple partners, including agency, volunteer, municipality, and other organizations. The full list of groups is presented in Table 1.

Public Review of Draft Integrated Lists

Only Category 5 (Impaired Waters List) of the Integrated Report is subject to EPA approval and public participation requirements. While the Department provided all five Draft Integrated Lists for public information and education purposes, comments were sought only on the Category 5 list (303(d) List of Impaired Waters). A public workshop to present the 2022 Draft Integrated Lists including the 303(d) List was held on January 25, 2022, via Zoom due to the COVID-19 pandemic and public health guidance. The public comment period opened January 17, 2022 and ended on February 18, 2022. RIDEM prepared a Response to Comments document. No revisions to the draft 2022 303(d) list were made in response to comments received. There were a few minor edits to the delisting document.