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JOHNSON'S POND WATER QUALITY REPORT

Executive Summary

This water quality assessment has been prepared in the context of the ongoing redevelopment planning process and is intended to document existing ecological and environmental conditions of Johnson's Pond. The analysis focuses specifically on conditions within the Pond itself to inform planning considerations as improvements and enhanced public access are evaluated as part of the broader redevelopment effort. A Redevelopment Study Area Boundary watershed has been developed as part of the redevelopment planning process encompassing Johnson's Pond, Coventry Reservoir/Stump Pond, Maple Root Pond and the Flat River Reservoir sub-watershed boundary within the Rhode Island HUC12.

Johnson's Pond (also referred to as Flat River Reservoir) is an approximately 647 acre freshwater pond in the Town of Coventry that has been classified as an impaired waterbody under the Federal Clean Water Act since 2008 for non-native aquatic plants. Since 2014, Johnson's Pond has been listed under Section 303(d) of the Clean Water Act (CWA) as a Category 5 impaired waterbody requiring a development of a Total Maximum Daily Load (TMDL) due to mercury in fish tissues. The TMDL is an established limit of a pollutant that a waterbody could receive and still meet water quality standards or a waterbody specific study that determines the allowable levels of pollution and associated pollution control activities necessary to restore water quality Previous studies conducted by Rhode Island Department of Environmental Management (RIDEM) identified atmospheric deposition from out-of-state sources as the primary contributor of mercury to the state's waters. In 2020, Johnson's Pond was also assessed as impaired for Fish and Wildlife Habitat due to non-native aquatic plants. As non-native aquatic plants are not pollutants, no TMDL is typically required under §303(d); however, lake managers, recreators, and stakeholders may still seek to manage non-native aquatic plants to protect Fish and Wildlife Habitat.

Johnson's Pond has experienced intermittent cyanobacteria (blue-green algae) blooms since 2021, including a large bloom reported by RIDEM in 2022. Although no algal bloom advisories were issued in 2023 or 2024 and routine monitoring documented clear conditions with no threshold exceedances, RIDEM issued two cyanobacteria advisories in 2025. The occurrence of blooms is most likely during mid-summer to early fall, when warm, nutrient-rich conditions are more favorable. According to RIDEM, frequent and recurring cyanobacteria blooms are difficult to manage and are often (though not always) an indication that excess nutrients are entering the waterbody from the surrounding watershed.

Johnson's Pond was subjected to prolonged and unpermitted drawdowns between 2020 and 2024 which may have deregulated natural processes within the Pond. Potential sources of nutrient loading to the Pond may include stormwater runoff from surrounding roads, driveways, and developed areas; aging or poorly maintained on-site wastewater treatment systems (septic systems); and the use of lawn fertilizers in residential areas adjacent to the shoreline. However, site-specific stormwater sampling, nutrient loading analysis, and septic system assessments have not been conducted for Johnson's Pond to confirm the relative contribution of these sources. A comprehensive watershed study is recommended to identify and prioritize the most significant nutrient sources and inform targeted management actions.

Non-native/invasive species have also been a reoccurring issue at Johnson's Pond. For over a decade, Johnson's Pond Civic Association (JPCA) has actively been involved in conducting invasive plant surveys and treating targeted areas at the Pond to manage invasive species. Surveys conducted for the Johnson's Pond Civic Association dating back to 2010 identified prevalent invasive plant species at the Pond while water quality monitoring dating back to 2008 identified impairment of fish and wildlife habitat due to non-native aquatic species. Maple Root Pond and Stump Pond, as part of the Redevelopment Study Area Boundary, have also been considered impaired due to non-native aquatic species. The Johnson's Pond Civic Association's long-standing survey and targeted treatment efforts have been effective in reducing invasive species and addressing localized water quality concerns, but comprehensive, pond-wide management strategies are still needed to fully restore and sustain Johnson's Pond's ecological health.

Improving water quality in Johnson's Pond will require a coordinated approach. Based on general watershed science and RIDEM guidance, precautionary best management practices such as maintaining vegetated shoreline buffers, minimizing or eliminating fertilizer use, managing stormwater runoff, and enhancing stormwater infrastructure through improved system design, green infrastructure, and maintenance may help reduce nutrient and sediment inputs to the Pond and lower the risk of algal blooms. Developing a comprehensive watershed management plan for the overall Pond can help identify the most effective strategies for Johnson's Pond based on its unique conditions. In addition, homeowners play a key role by following best management practices, including eliminating fertilizer use, properly disposing of pet waste, avoiding the feeding of waterfowl, maintaining septic systems, and promoting stormwater infiltration on their properties. Where feasible, connecting existing unsewered areas along the Pond to centralized wastewater infrastructure may also contribute to reduced nutrient loading. Together, these actions provide a precautionary framework for protecting and improving water quality in Johnson's Pond, though the relative effectiveness of each measure should be informed by site-specific watershed analysis.

Introduction

GZA, GeoEnvironmental, Inc. (GZA; the Consultants) and the Coventry Redevelopment Agency (RDA) have undertaken this review of publicly available water quality data prior to 2010 for Johnson's Pond including Stump Pond and Maple Pond to assess past and current ecological conditions at all three locations. On December 4, 2025, the RDA and GZA met with Rhode Island Department of Environmental Management (RIDEM) to review the Redevelopment Plan process, discuss Johnson's Pond's ecological health, and outline future obligations for maintenance, safety, enforcement, and environmental improvements aimed at enhancing public access and restoring the Pond's health. During the meeting, RIDEM offered technical guidance and data resources to support a detailed water quality analysis which would include assessment of EPA and RIDEM Water Quality Data, review of local planning documents, as well as assessment of pond-specific data.

Currently, RIDEM operates under two distinct but overlapping authorities at Johnson's Pond, the general dam safety regime, and the water-level permit regime created specifically in response to the Soscia dispute. Now that the Town owns the dam, RIDEM's role has shifted from referee between Soscia and the Town to pure regulator overseeing the Town/RDA as the new owner.

Dam Safety Oversight — R.I.G.L. Chapter 46-19

This is RIDEM's foundational authority, implemented through the Rules and Regulations for Dam Safety (250-RICR-130-05-1). Under this statute, RIDEM is required to ensure every dam in the state is inspected as often as necessary to stay informed of its condition and must submit an annual report on the program to the Governor.[1] Specific RIDEM obligations applicable to Johnson's Pond (Flat River Reservoir Dam, #167) include:

- Inspection and hazard classification: Rhode Island's roughly 670 inventoried dams are classified as High, Significant, or Low Hazard based on downstream consequences of failure, with inspection frequency tied to classification.[1] The Flat River Reservoir Dam is a High Hazard structure and is therefore subject to the most frequent inspection cycle. RIDEM completed a 2020 biennial inspection report on the dam.
- Plan review for repairs and alterations: RIDEM must review and approve engineering plans before any construction or substantial alteration occurs.
- Enforcement authority over unsafe conditions: RIDEM can issue Immediate Compliance Orders (as it did April 3, 2024 when the spillway began losing stones), Notices of Violation, and consent agreements. Section 46-19-4(c) also authorizes RIDEM to record an enforcement action for an unsafe dam in the local land evidence records, and to record release of that action upon satisfactory completion.[1]
- Emergency action authority: Following 2006 amendments, RIDEM can take direct action in an emergency to mitigate unsafe conditions and assess costs against the owner.
- EAP coordination: Under §46-19-9, the municipality where a High or Significant Hazard dam is located must maintain an Emergency Action Plan, with RIEMA coordinating development and giving final approval.[1] RIDEM works alongside RIEMA in reviewing and approving EAPs.

Importantly, the statute and regulations place primary responsibility on the dam owner, not RIDEM, to keep the dam in safe condition. With the Town now the owner, that liability and maintenance obligation has shifted to Coventry. RIDEM's role is regulatory oversight, not maintenance.

Water-Level Permit Authority — R.I.G.L. § 46-19.1 (2022 Law)

This is the statute born directly from the Soscia controversy. It requires any owner or operator of a dam with storage capacity greater than 1,400 normal storage acre-feet (and a control structure and not impounding water for a public water supply) to obtain a dam operation permit from RIDEM before raising or lowering water levels.[2] Until a permit is issued, the dam must be operated consistently with historic use as determined by RIDEM.

Johnson's Pond falls squarely under this statute - the Flat River Reservoir Dam has 4,195 normal storage acre-feet of capacity, well over the 1,400 acre-feet threshold.[3] RIDEM's specific obligations here include:

- Establishing and documenting the "historic use" baseline (RIDEM issued a historic use determination in July 2022 and a permit requirement notice in June 2023).
- Reviewing and acting on operation permit applications.

[1] RIDEM Office of Compliance and Inspection. 2023 Annual Report to the Governor on the Activities of the Dam Safety Program. May 13, 2024. Available at: https://dem.ri.gov/sites/g/files/xkgbur861/files/2024-05/damrpt23.pdf

[2] See RIDEM Dam Operation Permits at: https://dem.ri.gov/environmental-protection-bureau/compliance-and-inspection/compliance-programs/dam-safety/dam-operation-permits

[3] See RIDEM Dam Operation Permits at: https://dem.ri.gov/environmental-protection-bureau/compliance-and-inspection/compliance-programs/dam-safety/dam-operation-permits

- Enforcing the operate-at-historic-levels default.

The statute survived constitutional challenge - a federal appeals court in February 2026 affirmed dismissal of Soscia's lawsuit against RIDEM, which had challenged the law as unconstitutional.[4]

Practical Implications for the Redevelopment Plan

The most important takeaway for the §45-32-8 work: the Town/RDA, as the new owner, now bears the affirmative dam safety obligations, while RIDEM remains the regulator the Town must satisfy. Several Redevelopment Plan elements should explicitly account for this:

- Any redevelopment activity touching the dam, spillway, or impoundment will require RIDEM review and likely a dam operation permit if water levels are involved.
- The financing plan's Dam Management District concept (R.I.G.L. §45-62) should be framed as the funding mechanism the Town uses to meet its owner-side obligations under both Chapter 46-19 and §46-19.1, with RIDEM as the compliance authority.
- The conditions/covenants gap (§45-32-8(9)) is a natural place to articulate ongoing RIDEM compliance obligations as binding restrictions running with the redevelopment.
- The High Hazard classification and the 100-year/500-year storm pass-through analysis RIDEM has been pushing statewide (per the November 2024 dam owner workshop) should inform the capital cost estimates — spillway capacity upgrades may be required regardless of redevelopment ambitions.

On January 7, 2026, GZA and the RDA met with the Johnson's Pond Civic Association (JPCA) President to discuss the association's Pond testing and treatment efforts over the last decade. GZA reviewed the Town 2023 Wastewater Facility Plan and the 2024 Hazard Mitigation Plan to understand how existing stormwater and wastewater infrastructure may be contributing to water quality issues. These planning documents also outline key recommendations that can be implemented to support water quality improvements at Johnson's Pond.

EPA and RIDEM Water Quality Data

State of Rhode Island Section 303(d) List of Impaired Waters and Integrated Water Quality Monitoring Reports (2012 through 2024)

Rhode Island boasts extensive water resources that play a crucial role in drinking water supply, recreational swimming, ecological habitats, and the availability of fish and shellfish for consumption. To comply with the Federal Clean Water Act, RIDEM implements the state's Water Quality Standards Program. The purpose of this program is to protect and improve Rhode Island's water quality so that waterbodies remain safe for existing uses, meet fishable and swimmable goals where attainable, support designated uses, and safeguard public health and the environment.[5] The Federal Clean Water Act Section 303(d) requires states to identify and list those waterbodies that are not expected to meet state water quality standards after the implementation of technology-based controls and, as such, require the development of Total Maximum Daily Load (TMDL). A TMDL represents the total pollutant that a waterbody can adapt to and still meet water quality standards.[6] Any waterbody that does not meet its water quality standards (designated uses and criteria) is placed on the federal 303(d) List of Impaired Waters.

[4] See article at: https://turnto10.com/i-team/johnsons-pond-court-fight-appeals-court-sides-with-rhode-island-coventry-soscia-holdings-department-environmental-management-water-levels-lawsuits-complaints-condemnation-february-16-2026

[5] RIDEM. Surface Water Quality. Accessed December 2025. Available at: https://dem.ri.gov/environmental-protection-bureau/water-resources/research-monitoring/water-quality-resources/surface-water-quality

[6] RIDEM. Water Quality Restoration Studies. Accessed December 2025. Available at: https://dem.ri.gov/environmental-protection-bureau/water-resources/research-monitoring/restoration-studies-tmdl

Surface waters in Rhode Island are assigned to one of four freshwater classifications (Class AA, A, B, B1).[7] Each class identifies the designated uses, which reflect the most sensitive uses the class is intended to protect. Surface waters may be suitable for other beneficial uses but are regulated to protect and enhance the designated uses. Johnson's Pond is a Class B waterbody. Class B waterbodies are designated for fish and wildlife habitat and primary and secondary contact recreational activities. They should be suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters should have good aesthetic value.

Section 305(b) of the Clean Water Act requires states to check whether their waters meet the fishable and swimmable goals based on the applicable classification of water and to report these findings every two years. To determine if a waterbody meets federal goals, the state evaluates whether a waterbody supports its designated uses by comparing available water quality information to the water quality standards established in the Rhode Island Water Quality Regulations (Class AA, A, B, B1). Each waterbody is placed into one of the five reporting categories for various aspects of water quality, with Category 1 considered fully supporting all designated uses, and Category 5 requiring the development of a TMDL as the waterbody is impaired or threatened for one or more designated uses.

According to the RIDEM Integrated Water Quality Monitoring and Assessment Reports (Integrated Reports) and 303(d) Lists of Impaired Waters from 2016 to 2024, Johnson's Pond was included in both Category 4C and Category 5. Category 4C includes waterbodies that are impaired for causes that are not pollutants and do not require a TMDL.

Beginning in 2008 through 2014 reporting years, Johnson's Pond was included in Category 4C for impairment of the fish and wildlife habitat designated use. The cause/impairment was due to non-native (invasive) aquatic species. No TMDL was required as the impairment was not a pollutant. Fish consumption was not assessed, and the Pond was fully supporting of primary contact and secondary contact recreation during these reporting years.[8]

The 2016 through 2024 reporting years included Johnson's Pond in Category 5 due to impairments of two designated uses: fish and wildlife habitat; and fish consumption. For fish and wildlife habitat, non-native (invasive) aquatic species were the cause/impairment; however, no TMDL was required for fish and wildlife habitat as invasive species are not a pollutant. For fish consumption, mercury in fish tissue was the cause/impairment and a scheduled timeframe for development of a TMDL is noted for 2035 in the 2022 and 2024 Integrated Reports.[9] According to the 2024 Integrated Report, the most common cause of impairment in lakes and ponds in Rhode Island is mercury in fish tissue. Previous studies by RIDEM have identified atmospheric deposition from out-of-state sources as the primary contributor of mercury to the state's waters.[10]

Maple Root Pond, encompassing approximately 21 acres and designated as a Class B waterbody, is hydrologically connected to Johnson's Pond. Between 2012 and 2024, Maple Root Pond was included in Category 4C for impairment of fish and wildlife habitat. Similar to Johnson's Pond, non-native (invasive) aquatic species were the cause/impairment and no TMDL is required.

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[7] Rhode Island Department of State. Water Quality Regulations (250-RICR-150-05-1). Accessed December 2025. Available at: https://rules.sos.ri.gov/regulations/part/250-150-05-1

[8] All Integrated Water Quality Monitoring and Assessment Reports and Section 303(d) List of Impaired Waters referenced in this report are available at: Integrated Water Quality Monitoring and Assessment Reporting | Rhode Island Department of Environmental Management and https://dem.ri.gov/environmental-protection-bureau/water-resources/research-monitoring/restoration-studies-tmdl-reports

[9] The 2016 Integrated Report identified a 2020 TMDL schedule while the 2018-2020 Integrated Report identified a 2025 TMDL schedule.

[10] RIDEM Office of Water Resources. 2024 Integrated Water Quality Monitoring and Assessment Report. December 2024. Available at: 2024 RIDEM Integrated Report.pdf

Coventry Reservoir (Stump Pond), a 168± acre Class B waterbody, is hydrologically connected to Johnson's Pond through Quidnick Brook. Between 2012 and 2016, Stump Pond (Coventry Reservoir), was included on the Category 3 waters list due to insufficient or no data to evaluate any designated uses. In 2022 and 2024, Stump Pond was included in Category 4C for impairment of fish and wildlife habitat. Similar to both Johnson's Pond and Maple Root Pond, non-native (invasive) aquatic species were the cause/impairment and no TMDL is required.

RIDEM Cyanobacteria Advisories (2021 – 2025)

Johnson's Pond is routinely monitored by the RIDEM Office of Water Resources (OWR) and the Rhode Island Department of Health (RIDOH) as part of the state's Freshwater Cyanobacteria Monitoring Program. Advisories in Rhode Island are issued when any of the following are observed: (i) a visible bloom/scum/mat, (ii) total cyanobacteria cell counts > 70,000 cells/mL, or (iii) total microcystins ≥ 4.0 µg/L. Advisories recommend avoiding contact with the water, including swimming and boating, and preventing pets from exposure. Below is a history of cyanobacteria advisories issued between 2021 and 2025.[11] It should be noted that there were no advisories issued by RIDEM prior to those listed in the table below.

Advisory Posted Date	Advisory Lifted Date
9/24/2025	11/04/2025
7/21/2025	8/22/2025
7/29/2022	10/31/2022
9/20/2021	12/7/2021

RIDEM Sample Results and Monitoring Program Reports (2020 – 2025)

RIDEM provided the Consultants with a list of cyanobacteria samples collected at Johnson's Pond in 2021, 2022, and 2025, which are provided in the table below. These samples prompted RIDEM to issue cyanobacteria advisories. The table below also includes follow-up samples (biweekly) taken during those advisories to evaluate whether total microcystin levels or total cell counts had fallen below the thresholds required to lift the advisories.

Sample Collection Date	Total Microcystin Concentration (ug/L)	Total Cell Count (cells/mL)	Sample Location
Action Level	≥ 4.0 µg/L	**>70,000 cells/mL**	**N/A**
1/3/2025	<2.5	0	Island Drive Bridge
10/22/2025	<2.5	0	Island Drive Bridge
9/23/2025*	≥10	0	Island Drive Bridge
8/20/2025	Non-detect	3900	Island Drive Bridge
8/13/2025	Non-detect	0	Island Drive Bridge
7/30/2025	Non-detect	62,100	64 Indian Trail
7/16/2025*	Non-detect	129,300	Island Drive Bridge
7/16/2025	Non-detect	11,270	40 Acres Dock
10/26/2022	Non-detect	0	Island Drive Bridge
10/13/2022	Non-detect	0	Island Drive Bridge
9/14/2022	120	1,723,700	Island Drive Bridge
8/30/2022	Non-detect	1,400	Island Drive Bridge
7/28/2022*	35	96,790	Island Drive Bridge
7/21/2022	Non-detect	0	78 Wood Cove Dr.

[11] Past and current cyanobacteria advisories are available at: Cyanobacteria (Blue-Green Algae) | Rhode Island Department of Environmental Management

Sample Collection Date	Total Microcystin Concentration (ug/L)	Total Cell Count (cells/mL)	Sample Location
Action Level	≥ 4.0 µg/L	**>70,000 cells/mL**	**N/A**
11/30/2021	Non-detect	0	Island Drive Bridge
11/16/2021	Non-detect	0	39 Sharon Dr
11/16/2021	Non-detect	39,100	Island Drive Bridge
11/2/2021	Non-detect	0	39 Sharon Dr
11/2/2021	14	10,220	Island Drive Bridge
9/17/2021	Non-detect	230	222 Racoon Run Rd
9/17/2021*	16	41,940	39 Sharon Dr
6/18/2020	Non-detect	0	Zeke's Bridge

*Advisory issued after testing.

Below is information specific to Johnson's Pond from RIDEM's Cyanobacteria Monitoring Program Reports between 2020 and 2025.[12]

2020

RIDEM conducted cyanobacteria monitoring at Johnson's Pond on June 18, 2020, in response to an animal (dog) becoming sick the prior day. The sample did not exceed the total microcystin concentration advisory threshold, or the cell count advisory threshold. As such, no advisory was issued.

2021

The confirmed cyanobacteria bloom at Johnson's Pond between September 20, 2021, and December 7, 2021, was due to samples at the Pond exceeding the total microcystin concentration advisory threshold from a response visit by RIDEM. On September 17, 2021, RIDEM noted that a cyanobacteria bloom was only visible at response sites but not at access points. A sample from Racoon Run did not exceed the total microcystin concentration advisory threshold but the threshold was exceeded in a sample from Sharon Drive. After samples were collected on November 2, 2021, November 16, 2021, and November 30, 2021, the advisory was lifted.

2022

The confirmed cyanobacteria bloom at Johnson's Pond between July 29, 2022, and October 31, 2022, was due to samples at the Pond exceeding the total microcystin concentration advisory threshold and the cell count advisory threshold on July 28th and September 14th. The report notes that on July 21, 2022, several residents reported a bloom in their backyards and while green clumps were present in the water, analysis showed no cyanobacteria were present. On July 28, 2022, residents of Sharon Drive claimed to have seen a bloom. While no bloom was present at Sharon Drive per RIDEM, a bloom was present on Island Drive. As a result, an advisory was put in place on July 29, 2022. On September 14, 2022, a large bloom was present at Island Drive with the appearance of bubbling scum on the top of the surface, as well as the bright green streaks along the shoreline. As no blooms were present in October, RIDEM took the first sample to lift the advisory on October 13, 2022, with a second sample occurring on October 26, 2022, and the advisory was lifted on October 31, 2022.

2023

On June 6, 2023, RIDEM responded to reports of suspicious looking algae at a private residence at Shippy Cove Rd. Algae was determined to not be cyanobacteria.

2024

[12] All reports are available at: https://dem.ri.gov/environmental-protection-bureau/water-resources/research-monitoring/cyanobacteria-blue-green-algae

As no advisories were issued in 2024, the Monitoring Report did not note any information pertaining to cyanobacteria.

2025

On July 21, 2025, RIDEM posted a cyanobacteria advisory due to samples during routine testing at the Pond exceeding the total cell count advisory threshold. The advisory was lifted on August 22, 2025, as the bloom subsided, but it re-emerged several weeks later. As a result, a new advisory was issued on September 24, 2025, after routine sampling by Island Drive at the Pond exceeded the total microcystin concentration advisory threshold. This advisory was lifted on December 4, 2025.

RIDEM Cyanobacteria Online Information

Cyanobacteria blooms are influenced by several environmental factors, including excess nutrients (particularly nitrogen and phosphorus) from sources such as lawn fertilizers, failing septic systems, and stormwater runoff, as well as warm temperatures, abundant sunlight, and stagnant or slow-moving water.[13] According to RIDEM, frequent and recurring cyanobacteria blooms are difficult to manage. They are often (though not always) an indication that excess nutrients are entering the waterbody from the surrounding watershed. There are many mitigation strategies for cyanobacteria, and the development of site-specific management plans can determine which strategy is most effective for a specific waterbody.[14] There are also best management practices that homeowners can follow to reduce the amount of nutrients entering the waterbody. These practices include reducing or eliminating the use of fertilizer on the lawn, picking up pet waste in your yard and in public spaces, avoiding feeding of waterfowl, keeping up with septic system maintenance, and promoting stormwater infiltration.[15]

Johnson's Pond Civic Association Testing, Treatment and Monitoring Efforts

The JPCA serves as a dedicated steward of Johnson's Pond, working year-round to protect, preserve, and enhance this valued natural resource to enhance the social, public safety, and environmental qualities of life in and around Johnson's Pond. Through community engagement, environmental advocacy, and hands-on stewardship efforts, the JPCA promotes the long-term health of the Pond while fostering a shared sense of responsibility among residents. The JPCA has historically prepared treatment maps, coordinated survey and treatment efforts, collected payment from homeowners and notified residents of when treatments would be performed. In addition to coordinating and funding aquatic invasive species surveys and targeted treatment efforts, the JPCA works with the University of Rhode Island's (URI) Watershed Watch program to help monitor water quality throughout the Pond.

Aquatic Plant Surveys of Johnson's Pond (2010 – 2011)

Northeast Aquatic Research LCC (NEAR) was contracted by the Johnson's Pond Civic Association to conduct two aquatic plant surveys between 2010 and 2011. The first survey documented spring growth conditions in 2010 while the second survey assessed conditions during full summer growth in 2011.

Over four days of surveys in 2010, 52 species of aquatic plants were identified ranging from shoreline edge plants to those growing in deeper water. Three aquatic macrophyte invasive plants between 37% and 39% frequency of occurrence were found across 630 acres of the Pond: fanwort, variable-leaf milfoil and swollen bladderwort. The

[13] RIDEM Office of Water Resources. What Causes Cyanobacteria Blooms? May 2025. Available at: https://dem.ri.gov/sites/g/files/xkgbur861/files/2025-06/CyanobacteriaCauses.pdf
[14] RIDEM Office of Water Resources. Common Questions About Cyanobacteria. July 2024. Available at: https://dem.ri.gov/sites/g/files/xkgbur861/files/2025-02/CommonQuestionsCyanobacteria.pdf
[15] Information available at: Educational Materials: Phosphorus | Rhode Island Department of Environmental Management

2010 Survey evaluated several strategies for managing weeds and invasive species, including lowering water levels (i.e., drawdown) to expose and freeze plant roots.

The 2011 survey noted that native aquatic plant species were less abundant compared to non-native aquatic plant species in Johnson's Pond. Additionally, the 2011 survey noted that winter water level drawdowns were occurring at the Pond but did not mention when annual winter drawdowns began. The 2011 survey recommended development of a Pond-wide management plan to identify all the high-use areas where control is most needed to control invasive aquatic plant growth. The 2011 survey noted that the best cost per-unit-effort of control would be with herbicides as these will control plants over a large area at one time and over all depth ranges in which it is used. The 2011 survey noted that monitoring would be required in high use areas and recommended regular monitoring of aquatic plant growth to assess if the management plan is achieving its goals. Additionally, the 2011 survey emphasized the need to document the outcomes of future experimental control measures.

In 2012, RIDEM's Rhode Island Freshwater Lakes and Ponds: Aquatic Invasive Plants and Water Quality Concerns, noted the presence of two of the three invasive species (fanwort and variable-leaf milfoil)[16] as documented in the NEAR surveys.

Aquatic Plant Surveys of Johnson's Pond (2014 – 2016)

Additional aquatic surveys were conducted by NEAR for the JPCA in 2014 and 2015 following herbicide applications to targeted treatment areas by Aquatic Control Technologies in prior years. Target areas were chosen using distribution mapping of invasive species made in 2011. NEAR concluded that herbicide treatment applied to a targeted area in Johnson's Pond in 2014 was effective in treatment against two invasive species (fanwort and variable-leaf milfoil) while herbicide treatment to control fanwort, variable milfoil, and inflated bladderwort was effective throughout targeted areas in 2015.

During the winter of 2015-2016, water levels were lowered 12 feet below the spillway for dam repairs. Surveys conducted following pond refill in 2016 found reduced invasive species density and coverage throughout the pond. As fanwort was widespread in low densities throughout the Pond, NEAR concluded in a 2016 report that selecting treatment areas in the Pond in the future would be difficult and the entire Pond should be surveyed each year to determine treatment locations. However, the 2016 report considered several options including yearly surveys to monitor the success of treatment areas and winter water level drawdowns; continue to focus on treatment on targeted areas in 2014 and 2015; aggressive spot treatment in the Western Arm area of the Pond where fanwort was found; target the densest beds of fanwort that remained after drawdown (which included the dense beds south of Hill Farm Road); and systematically remove fanwort from headwater coves as these areas could have contributed to overall Pond infestation. The 2016 report noted that swollen bladderwort decreased significantly over values reported in 2010 and 2011. By 2017, treatment of bladderwort no longer appeared to be conducted.

Surveys and Treatments (2017 – 2021)

Between 2017 and 2019, the JPCA contracted SOLitude Lake Management to conduct Annual Aquatic Management Programs at Johnson's Pond to control variable leaf milfoil and fanwort through spot treatments throughout the Pond using herbicides. Initial inspections were then conducted prior to herbicide treatment and post-treatment vegetation surveys were performed as part of these Programs. Based on the reports provided by JPCA and reviewed by GZA, all herbicide treatments through the Programs were successful at controlling targeted

[16] RIDEM. Rhode Island Freshwater Lakes and Ponds: Aquatic Invasive Plants and Water Quality Concerns. A Report to the Governor and Rhode Island General Assembly. February 2012. Available at: https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/water/quality/surfwq/pdfs/lakes012.pdf

milfoil and fanwort growth based on the established goals Additional information for each of the Programs is as follows:

- 2017: Approximately 24 acres in designated areas were treated. Post treatment, water lilies and bladderwort could be seen throughout the treatment areas. On the day of the post-treatment, survey there was a small amount of microscopic algae present in several of the cove areas, though one resident had noted a large algae bloom prior to the final inspection, after the herbicide treatment.
- 2018: Approximately 31.6 acres in designated areas were treated. Post treatment, large amounts of milfoil were seen outside the treatment areas. The areas that were treated in 2017 had very minimal milfoil regrowth. No fanwort was observed in 2017 treatment areas. Very little microscopic algae were observed throughout the Pond.
- 2019: Approximately 28 acres in designated areas were treated. Post treatment, all areas were cleaned of milfoil and fanwort besides the channel area under the bridges. Due to the high flow of water, there was some regrowth near the shorelines of the channel. Small patches of fanwort were observed outside the treatment areas but did not appear to impact recreational activities. Water lilies and bladderwort could be seen throughout the treatment areas. Treated areas had very minimal milfoil regrowth. At the time of the inspection the water quality was good, and no microscopic algae blooms were observed.

In 2020, after the dam was purchased by Soscia Holdings, lower than average water levels due to unpermitted drawdowns prevented SOLitude Lake Management from performing surveying and treatment activities.

In 2021, JPCA contracted Water & Wetland to apply for RIDEM permitting, conduct pre- and post-treatment surveys, and apply treatment to 12 acres of the Pond. Treatment areas were prioritized to include high- traffic/use areas as well as areas with historically dense invasive vegetation. The areas previously treated include the ski area, a channel to limit further fragmentation/spread, as well as the areas of Indian Trail Road and Acre of Pine Road. Outside of the treatment areas, dozens of acres contained fanwort. While variable milfoil was observed in low densities, fanwort had overtaken the milfoil and became the most dominant invasive species in Johnson's Pond. Water quality/clarity was good and there were no signs of an observed algae blooming during the post-survey. The biologist from Water & Wetland noted in the 2021 report that water levels were below average.

2022 – 2024

Between 2022 and 2024, the JPCA was not authorized by Soscia Holdings to conduct aquatic vegetation surveys or targeted treatment activities. In 2022, the JPCA retained Water & Wetland and initiated the permitting process; however, authorization to proceed was not granted. As a result, surveying and treatment efforts were not undertaken during the 2023 and 2024 monitoring seasons.

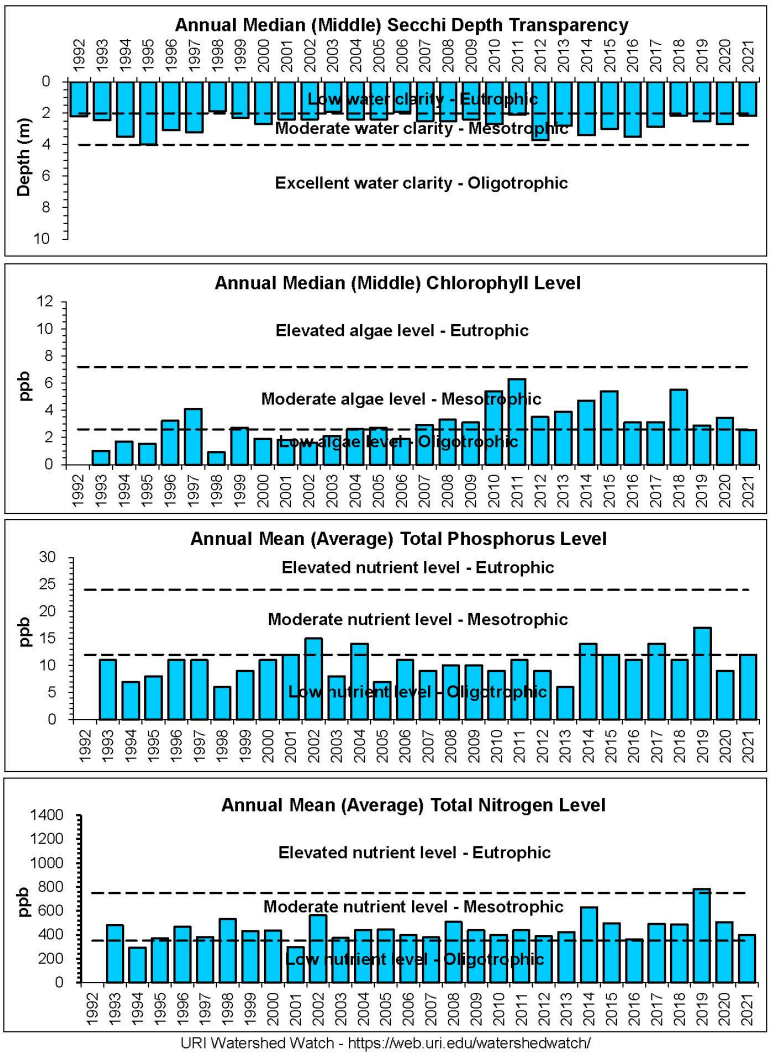
2025

In 2025 after the Town gained ownership of the dam and Pond, grant funding from the Town enabled the JPCA to conduct aquatic vegetation surveys and treatment across a larger portion of the Pond than in previous years. Based on the treatment area maps provided by the JPCA, approximately 197 acres of the Pond were treated with herbicides to target various invasive species, primarily variable milfoil and fanwort. Variable milfoil and fanwort were seen topped out through most of the Pond. Water & Wetland recommended continued management of invasive fanwort and variable milfoil is recommended at Johnson's Pond in 2026, as well as continued collection of basic water quality data to track overall Pond health and provide long-term context for management decisions.

URI Water Quality Data

URI Watershed Watch (URIWW) is a volunteer water quality monitoring program that works with local communities & organizations to assess water quality, identify sources of pollution in water and provide information about water leading to more effective management of critical water resources. Led by trained scientists, URI Watershed Watch helps local governments, watershed, tribal and other organizations recruit and train volunteers to become citizen scientists gathering detailed, quality assured monitoring data. JPCA has supported URI Watershed Watch monitoring at Johnson's Pond since 2000. JPCA volunteers collect water samples from the Pond, which URI Watershed Watch analyzes and reports annually. Below is a multi-year summary of water sampling efforts between 1992 and 2021.

Flat River Reservoir Multi-year Summary



URI Watershed Watch - https://web.uri.edu/watershedwatch/

It is important to note that from 2022 through 2024, water levels were consistently below normal, restricting boat access for sampling and resulting in the lack of data. Additionally, URI is still in the process of analyzing and proofing 2025 data for Johnson's Pond.

Stormwater Management and Wastewater Treatment

The Town of Coventry operates under a Rhode Island Pollutant Discharge Elimination System (RIPDES) Phase II Municipal Separate Storm Sewer Systems (MS4) General Permit. The permit is required because portions of the Town are located within the 2010 Urbanized Area (UA) as defined by the U.S. Census Bureau. The Town is required to maintain an illicit discharge detection and elimination (IDDE) ordinance and manage stormwater quality to meet environmental regulations. Stormwater Management is governed by Chapter 206 of the Town of Coventry Code. The RI Department of Transportation (RIDOT) also operates an MS4 system within Coventry, often acting in conjunction with municipal efforts. Coventry's Department of Public Works manages and maintains the community's stormwater system, encompassing 2,517 catch basins, 11 structural Best Management Practices (BMP's), and 14 outfalls.[17] According to the Town's 2024 Hazard Mitigation and Floodplain Management Plan Update (2024 Hazard Mitigation Plan), neither Johnson's Pond nor Stump Pond are considered stormwater impaired or potentially stormwater impaired waterbodies. According to the 2024 Hazard Mitigation Plan, 97% of residents in Coventry rely on private on-site wastewater treatment systems (i.e., septic systems); the remaining 3% of the population use the West Warwik Regional Wastewater Treatment Facility. Flood events and soil saturation from these have caused the inadequate performance of many septic systems and cesspools, which results in groundwater contamination. Sewer service is very limited, serving only customers along Route 117, Route 3, Hopkins Hill Rd, Route 33, New London Turnpike, and portions of the Center of New England. The Woodland Manor, Sandy Bottom Road, and Flat River Road pump stations service 611 sewer customers in Coventry.

In 2023, the Town participated in the Community Resilience Building process through the Rhode Island Infrastructure Bank's Municipal Resilience Program to increase resilience to extreme weather events and changing climate. The Community Resilience Building Summary of Findings Report noted that water quality impacts to lakes and ponds in Coventry may result from polluted stormwater runoff flowing across roads and parking lots; however, site-specific stormwater monitoring at Johnson's Pond has not been conducted to confirm this as a contributing factor at this location.[18] Additionally, the Report states that stormwater is known to carry a suite of pollutants which can result in water quality impacts to lakes and ponds. According to the Report, there are a limited number of treatment systems for stormwater mitigation in the Town (passive or active such as vortex style of tanks that remove oil and road waste). Infrastructure improvements (i.e. road/bridge/dams, stormwater management systems, green stormwater infrastructure, sanitary sewer system) were recommended in the Report to improve resilience. Stormwater and wastewater priority actions from this Report to improve resilience that are relevant to Johnson's Pond included:

- Work to ensure dedicated funding is made available on an annual basis to conduct necessary improvements and upgrades of municipal infrastructure, including stormwater management systems, installation of green stormwater infrastructure, fleet updates, culvert replacement, and public building upgrades
- Create a Sewer Department to manage existing and future expansion of the sewer system per the 20-year Sewer Facilities Plan which will involve increasing the number of users and sewer use fees
- Fix the two sewer pump stations to help increase rate and volume capacity on the sewer system. Ensure sewer pump stations are upgraded prior to installing any additional sewer lines

[17] Fairweather Science, LLC. Town of Coventry, Rhode Island 2024 Hazard Mitigation and Floodplain Management Plan Update. Adopted by the Town Council: September 24, 2024. Dates Active: December 5, 2024 - December 4, 2029. Available at: https://coventryri.gov/sites/coventryri.gov/files/attachments/Town%20of%20Coventry%20Rhode%20Island%202024%20Hazard%20Mitigation%20and%20Floodplain%20Mana....pdf

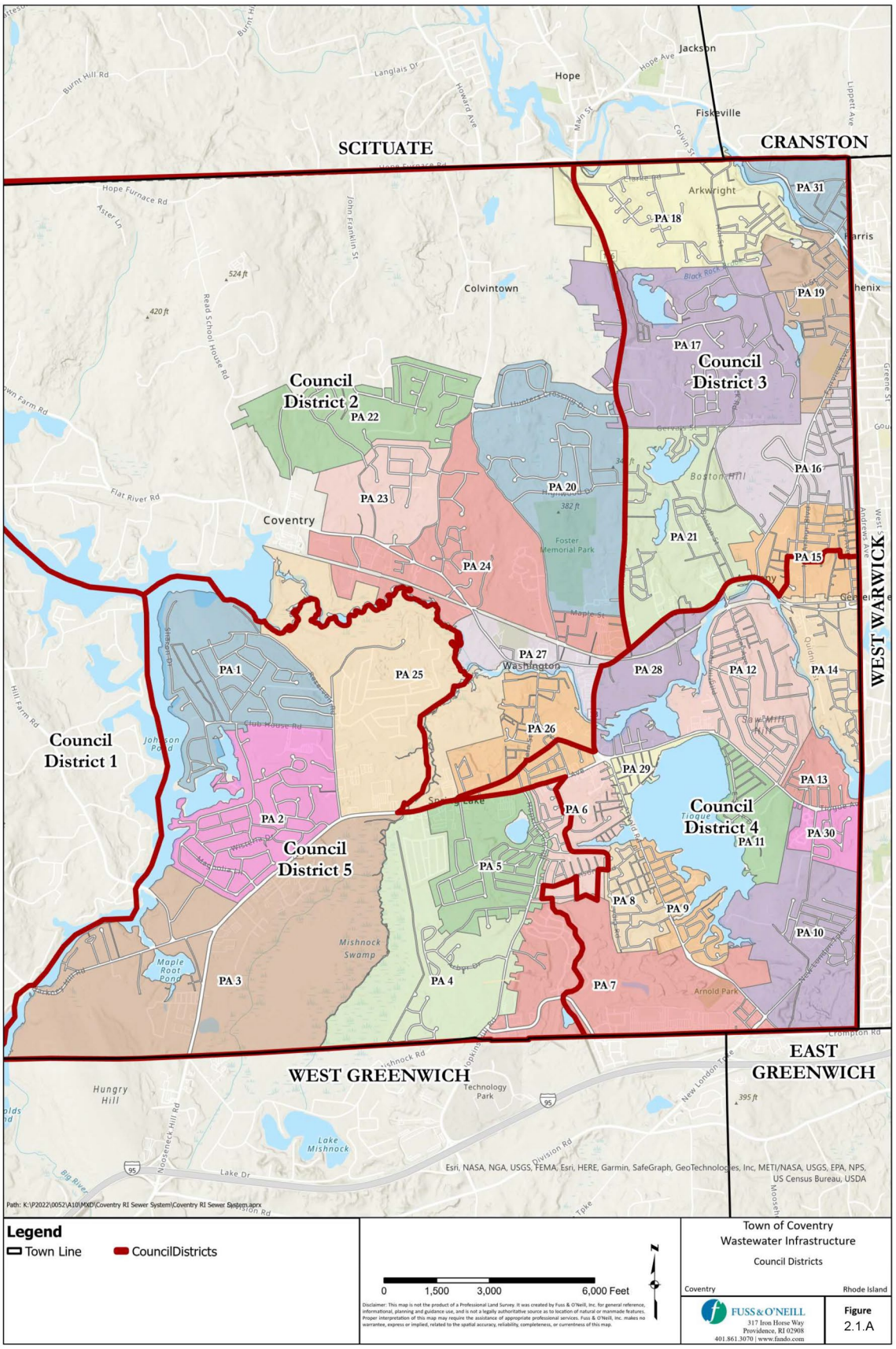
[18] . The Nature Conservancy and Rhode Island Infrastructure Bank. Town of Coventry Online Community Resilience Building Workshop - Summary of Findings Report. May 2023. Available at: https://www.riib.org/wp-content/uploads/2023/08/Final-Coventry-Community-Resilience-Building-Summary-of-Findings-May-2023.pdf

- Extend and connect sewer system to the High School and explore further expansion to the neighborhoods north of the High School on Reservoir Road
- Explore mechanisms to track impervious surfaces and identify green stormwater infrastructure projects to help reduce localized flooding issues
- Restore and further protect Coventry's water resources and quality by regulating the size of landscapes that require irrigation, require the use of conservation plumbing, require vegetative buffer zones, among other related activities
- Work towards more restoration and protection of freshwater resources in Coventry through stormwater regulations
- Develop a tree inventory and maintenance program in Coventry
- Develop a drought coordination and mitigation plan, including providing a way for residents to monitor and share condition information. This could help generate a better understanding of the geographic extent of drought over time
- Condition planning board approvals on specifying that new landscape planting will require the use of native species and that the planting take place in the spring
- Identify, monitor, and seek to correct water quality issues in lakes and ponds caused by stormwater runoff.

2023 Wastewater Facility Plan

A Wastewater Facility Plan was prepared for Coventry in 2023 by Fuss & O'Neill to evaluate wastewater infrastructure in the Town and guide infrastructure improvements, including extending existing sewer infrastructure to currently unsewered areas, over the next 20 years. Coventry's existing sewer infrastructure is located in the densely populated, eastern portion of Town. The western portions of Town not currently served by public sewers are utilizing conventional on-site wastewater treatment systems (OWTS) such as septic tank-leach field or cesspool systems. The Wastewater Facility Plan notes that, in general, private septic systems can contribute to the impairment of water bodies; however, a site-specific assessment of septic system impacts on Johnson's Pond water quality has not been conducted.

Planning Areas were delineated in the Wastewater Facility Plan to prioritize potential future sewer extension projects. Planning Areas abutting Johnson's Pond include PA 1, PA 2, PA 3 and PA 25 (see image below). The Wastewater Facility Plan did not contemplate areas to the west and north of Johnson's Pond which typically have larger lots and a higher concentration of open space and agricultural land. A privately owned force main and pump station are located on reservoir road which services PA 25 but not PA 1 and PA 2. Additionally, the Woodland Manor pump station services the Woodland Manor Housing Complex on Nooseneck Hill Road in PA 3.


SCITUATE
CRANSTON
WEST WARWICK
WEST GREENWICH
EAST GREENWICH
Jackson
Hope
Fiskeville
Arkwright
Harris
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Burnt Hill Rd
Langlais Dr
Howard Ave
Main St
Hope Ave
Lippett Ave
Aster Ln
John Franklin St
Read School House Rd
Flat River Rd
Hill Farm Rd
Club House Rd
Maple St
Foster Memorial Park
Boston Hill
Saw Mill Hill
Arnold Park
Mishnock Swamp
Maple Root Pond
Hungry Hill
Technology Park
Lake Mishnock
Nooseneck Hill Rd
Lake Dr
Division Rd
Crompton Rd
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Disclaimer: This map is not the product of a Professional Land Survey. It was created by Fuss & O'Neill, Inc. for general reference, informational, planning and guidance use, and is not a legally authoritative source as to location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. Fuss & O'Neill, Inc. makes no warrantee, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.
Town of Coventry
Wastewater Infrastructure
Council Districts
Coventry
Rhode Island
FUSS & O'NEILL
317 Iron Horse Way
Providence, RI 02908
401.861.3070 | www.fando.com
Figure
2.1.A

The Wastewater Facility Plan recommended expanding the Town's existing sewer system to the Planning Areas 1 and 2 adjacent to Johnson's Pond as they are currently being served entirely by decentralized wastewater treatment systems. Planning areas 1 and 2 are jointly recommended as the infrastructure required to extend sewer to planning area 1 would facilitate the expansion into PA 2. Sewering these planning areas "derives an environmental benefit due to their proximity to Johnson Pond".[19] In addition, the Wastewater Facility Plan recommended upgrades to the Woodland Manor pump station, though this did not include expanding the service area. There were no sewer extension plans proposed for PA 25.

Conclusion

Johnson's Pond faces complex and interconnected water quality challenges potentially influenced by nutrient loading, stormwater and wastewater inputs, and the continued presence of invasive species. While natural factors and regional influences such as atmospheric mercury deposition play a role, local watershed conditions and land use practices may also contribute to the frequency and severity of cyanobacteria blooms and ecological stress within the Pond, though the specific causal relationships have not been established through site-specific study. Past monitoring, management efforts, and targeted invasive species control have demonstrated the value of proactive stewardship; however, recurring cyanobacteria blooms and the continued presence of invasive species highlight the need for a more comprehensive and coordinated approach.

Long-term improvement of water quality in Johnson's Pond would benefit from an integrated watershed management approach that may include infrastructure upgrades, improved stormwater and wastewater controls, responsible water level management, and continued community participation, informed by site-specific studies to confirm the primary contributors to water quality impairment. By implementing targeted planning strategies, reinforcing best management practices, and supporting continued monitoring and adaptive management, the Town and its partners can reduce nutrient inputs, enhance ecosystem resilience, and protect the environmental, recreational, and ecological value of Johnson's Pond for future generations.

[19] Fuss & Oneill. Town of Coventry Wastewater Facility Plan. December 2023. Available at: https://coventryri.gov/sites/coventryri.gov/files/attachments/20240116_Coventry%20RI%20Sewer%20Facility%20Plan.pdf

RIDEM Resources

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

FACT SHEET

Office of Water Resources / May 2025

WHAT CAUSES CYANOBACTERIA BLOOMS?

There are multiple environmental factors that contribute to the formation of cyanobacteria blooms. Cyanobacteria naturally make up the phytoplankton community in most fresh waterbodies and are normally present in low numbers. Excess nutrient input, warm weather and sunlight, and stagnant or slow-moving water help cyanobacteria grow rapidly and produce a bloom.

While the environmental conditions listed above often correlate with cyanobacteria blooms, a complex interaction of physical, biological and chemical parameters contribute to the formation of a bloom and the exact conditions that trigger a bloom are not always fully understood. More information about the factors that contribute to cyanobacteria blooms are listed below.

Excess Nutrients

Phosphorus and nitrogen are nutrients that are essential for all living things and are naturally present in fresh waterbodies. Excess nutrient input from the surrounding watershed can lead to rapid, excessive growth of cyanobacteria, resulting in frequent blooms. Sources of excess nutrients in the surrounding watershed include:

- Lawn fertilizer,
- Pet, wildlife (especially waterfowl) and livestock waste,
- Failing septic systems,
- Erosion and sediment,
- Stormwater runoff.

Excess nutrients, particularly phosphorus, are also often stored in the sediment at the bottom of lakes. Low oxygen conditions at depth encourage the release of sediment-bound phosphorus into the water column, which can further fuel cyanobacteria blooms.

Warm Weather and Sunlight

Cyanobacteria blooms occur more frequently in the summer when the water is warm and sunlight is abundant, however blooms may occur year-round. Cyanobacteria use sunlight to photosynthesize and grow, and their growth is optimal at warmer temperatures.

Slow Moving or Stagnant Water

Nutrient levels and temperature can increase quickly in slow-moving or stagnant water, both of which are beneficial to the growth of cyanobacteria.

Strong Competitors

Cyanobacteria have been around for billions of years and often naturally out-compete green algae.

TO REPORT A BLOOM: Email info and photos to dem.owrcyano@dem.ri.gov
For more information visit dem.ri.gov/bluegreen

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How Healthy Is Your Septic System?

Updated 2017

How Does My Septic System Affect Water Quality?

If your home is not on a municipal sewer, when you flush your toilet or pour something down the drain, it goes to a septic system. Eventually, that wastewater exits the septic tank and enters a drainfield, where it passes into the soil. The soil acts as a biological filter and continues the treatment process that began in the tank. The soil is able to remove harmful organisms, organic matter and some nutrients.

However, if your septic tank is not regularly inspected and pumped, it will begin to accumulate solids and overflow, clogging the drainfield. Not only can this cause your system to fail, but it also can spread disease and contaminate ground and surface waters.

Everyday Actions

Having regular maintenance inspections and pump-outs of your septic system will keep it working efficiently and can prevent costly repairs. However, there are also daily precautions that you can take to help your septic system function properly.

Think before you flush. Aside from wastewater, toilet paper is the only other thing that should be flushed. Using the toilet to dispose of items such as sanitary products, paper towels, disposable diapers, cigarette butts, and even tissues will harm your septic tank and cause you to need pump-outs more often.

Don't put food down your sink. Septic systems are not intended to dispose of food waste, coffee grounds, grease, or fat, and, in fact, they will harm the septic tank. Try using a compost pile for non-meat food waste; it will help you avoid paying for unnecessary septic system repairs!

Don't use a kitchen garbage disposal. Having a garbage disposal doesn't make food waste, grease, or fat any easier for your system to handle. If you do use a garbage disposal, it's especially important that you have a larger than normal tank, that it has an effluent screen, and that you pump out more frequently.

Don't rinse toxic materials down your sink or toilet. Pouring disinfectants, large amounts of bleach, drain clearing products, oils, and other chemicals down your sink, bathtub, or toilet will damage your septic system. Even rinsing paintbrushes in the sink or toilet allows enough paint to travel to your tank that the tank's function can be impaired.

Reduce your water usage. Water conservation protects your septic system because it reduces the load of wastewater your system has to handle. It also will save you money on water bills, and with a little practice, it's easy to do:

- Repair leaky faucets and toilets.
- Install low-flow water fixtures.
- Turn off the water while brushing your teeth or shaving.

Balance your water usage throughout the week. When your septic system receives large volumes of water within a short period of time, it can cause solids to move into the drainfield, resulting in a clog. Don't do all your laundry at one time; spread the chore out over the week.

Did you know? *Improperly maintained septic systems are a top contaminant of water resources in Rhode Island.*

Produced by URI Cooperative Extension with funding from the RI Department of Transportation and support from the Rhode Island Department of Environmental Management.

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A Strategy for Stormwater Education Through Yard Care Workshops

Updated 2018

What do we want residents to do?

- Practice more storm-waterfriendly lawn and garden care.

What are the messages?

- Fertilize sparingly.
- Sweep up, don't hose.
- Water wisely.
- Divert or collect rooftop runoff.

Help Lawn and Garden Enthusiasts Be Stormwater-Friendly!

Achieving a lush green lawn, beautiful spring flowers, and hearty summer crops are understandable gardening goals.

Unfortunately, the gardening practices used to achieve those goals often contribute to stormwater pollution. Most notably, the use of excessive lawn chemicals and excessive watering.

It is important to convey to our neighbors that they can still have beautiful lawns and gardens, while promoting the health of local water resources at the same time.

Lawn chemicals often wind up washing directly into local waters. Sparing use of fertilizers and pesticides helps reduce stormwater pollution.

Inside this issue:

What Help Is Out There?

If you want lawns and gardens to be less of a stormwater concern in your town, then we have a strategy for you!

This newsletter highlights four steps to achieving that goal. To help you along, we can offer you:

- contact information for URI's Cooperative Extension Master Gardener Program,
- a sample flyer and PowerPoint for the Master Gardener presentation,
- fact sheets on stomewater-friendly gardening practices and diverting rooftop runoff,
- sample factsheets on rain barrels and rain gardens, and
- a sample press release for a rain barrel sale.

These resources can be found on the **Rhode Island Stormwater Solutions** website.
Organizing a rain barrel sale: https://web.uri.edu/riss/take-action/in-your-community/organize-a-rain-barrel-sale/resources/
Building a community rain garden: https://web.uri.edu/riss/take-action/in-your-community/build-a-community-rain-garden/resources/

Step 1. Schedule a Master Gardener Presentation

The following **materials** will be available to help with this step:

- a sample flyer for advertising the event
- a PowerPoint presentation, illustrating the main messages
- factsheets for distribution about lawn care practices and diverting rooftop runoff

Steps to take:

- Contact the Master Gardener Program by email *gardener@uri.edu* or by phone March – October, Monday – Thursday, 9 am – 2 pm at 874-4836.
- Advertise the presentation. Consider making it part of an already-scheduled committee meeting.

Volunteers could be recruited to:

- Help publicize and staff the event or provide refreshments.

Step 2. Hold a Rain Barrel Sale

The following **materials** will be available to help with this step:

- a press release on the rain barrel sale
- a rain barrel fact sheet
- rain barrel purchasing information
- factsheet about diverting rooftop runoff

Steps to take:

- Distribute press releases.

Volunteers could be recruited to:

- Help staff the event or provide refreshments.

Step 3. Create a Demonstration Rain Garden

The following **materials** will be available to help with this step:

- a brochure about an exisiting demonstration rain garden project, including costs and design features
- a rain garden fact sheet

Steps to take:

- Check with RI DEM for Earth Day grants.
- Pick a visible location with some degree of public access.
- Collaborate with a local landscape architect or Master Gardener, *who is familiar with rain garden design.*

Volunteers could be recruited to:

- Seek contributions from local businesses for funds to create the garden or specifically from local plant nurseries to donate advice, labor, and/or plants to the creation of the garden.

Step 4. Publicize Yearly Reminders

The following **materials** will be available to help with this step:

- short articles for local papers reminding people about stormwater-friendly gardening tips.

Steps to take:

- Distribute the short article to local papers.

Keep Track of Your Success

Documenting your success at increasing residents' awareness of stormwater-friendly lawn and garden care will be instrumental to having continued support for the program. Here are a few methods you could use:

1. Keep records of the number of press releases and articles that have been printed, informing the public about related events or stormwater-friendly practices.
2. Keep records of the number of people who attend workshops.
3. Keep records of the number of rain barrels sold through an organized Rain Barrel Sale.

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Do *You* Scoop The Poop?

Updated 2017

Pet waste doesn't just decompose. It adds harmful bacteria and nutrients to local waters when it's not disposed of properly.

It's Really A Problem?

It might not seem like a stormwater problem, but animal waste is one of the many seemingly small sources of pollution that can add up to big problems for water quality, and even human health.

Animal waste contains two main types of pollutants that harm local waters: nutrients and pathogens. When this waste ends up in water bodies, it decomposes, releasing nutrients that cause excessive growth of algae and weeds. This makes the water murky, green, smelly, and even unusable for swimming, boating, or fishing. The pathogens, disease-causing bacteria and viruses, can also make local waters unswimmable and unfishable, and have caused severe illness in humans.

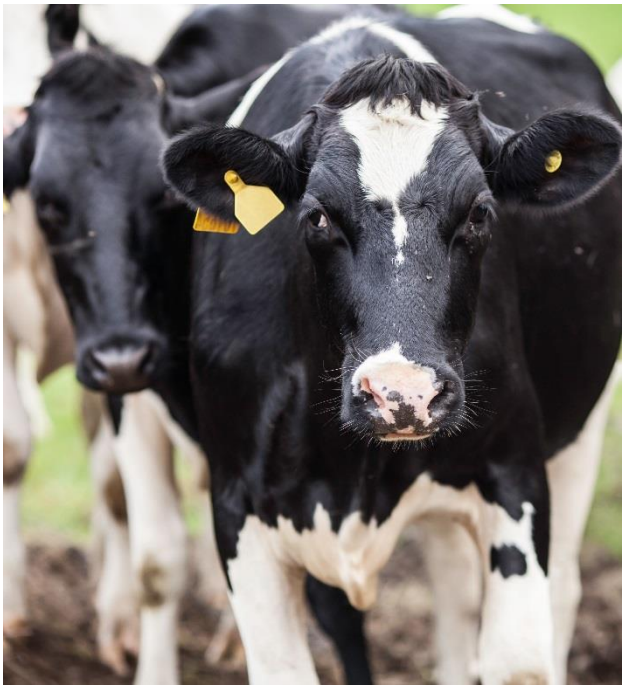
As you can see, animal waste doesn't simply decompose. So, the easiest way to avoid these problems is to clean up after your pet each and every time, and dispose of the waste properly!

Be Prepared

- Picking up after your pet is easy, if you're prepared. Simply carry a plastic bag with you on every walk with your dog, and you'll have the equipment to remove your dog's waste. Then throw it in the nearest trash can, and you're done! There are even compact, refillable bag dispensers (such as Earth Rated®) that you can attach right to your dog's leash.
- Many parks and recreational areas have courtesy bags and disposal boxes, designed specifically for dog waste. Ask your town to install one in the park you like to visit with your pooch.
- Avoid letting your dog do his business within 200 feet of a water body.
- And of course, never throw dog waste into a storm drain!

Pet Waste At Home

- For dog, cats, and other pets that are meat eaters, it's important to **dispose of the waste in the garbage**. Wastes from meat eaters should not be placed in a compost pile because the parasites, bacteria, and viruses are not readily destroyed during the composting process and can be passed on to humans.
- While it's common courtesy to pick up after your dog when you go on walks, it's also a good idea to **pick up after him at home**. Some diseases can be transmitted form pet waste to humans through contact with the soil. Children playing outside and adults who garden are most at risk. Rhode Island has several "pet waste pick-up" services that will come to your home. Check your local directory for listings.
- If you have large animals, **barnyard and manure management is critical** to the protection of water resources. Please visit our website for information specific to livestock.



Don't Feed The Fowl

Unfortunately, an activity many of us enjoyed as children actually has damaging impacts not only for the waterfowl themselves but also for local waters. While ducks, geese, and swans love to eat the bread we offer them, it lacks the nutrition of their natural diet and can cause long-term health problems.

Feeding waterfowl also causes them to concentrate in higher numbers than they would if they had to rely solely on natural food supplies, and that results in large quantities of waste for local waters! It's also illegal in the state of Rhode Island.

If geese visit your property, you can discourage them by letting a natural buffer grow.

Produced by URI Cooperative Extension with funding from the RI Department of Transportation and support from the Rhode Island Department of Environmental Management.

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Soil Erosion, Runoff, and Sedimentation Overview

Updated 2017

You've been informed about the necessity of soil erosion, runoff, and sedimentation control measures, but you're still wondering about the details. Why is it so important?

What is Soil Erosion?

Soil erosion is the detachment and movement of soil particles by water, wind, ice, or gravity.

What is Sedimentation?

Sediment is the result of erosion. **Sedimentation** is the build-up of eroded soil particles that are transported in **runoff** from their site of origin and deposited in drainage systems, on other ground surfaces, or in bodies of water or wetlands.

Why Should I Care?

- It's the law: Federal, State, and local regulations require construction sites to be compliant with the Clean Water Act.
- Water quality: Erosion from construction projects can be a non-point source pollutant that deteriorates the health of our lakes, streams and Narragansett Bay.
- Soil loss- Much of the total sediment loss that occurs each year is generated by highway construction and land development projects.
- Quality of life: If you enjoy fishing, eating local shellfish, or swimming at one of Rhode Island's beautiful beaches, this pollution can threaten your quality of life.

What Problems Happen on Construction Sites?

- Safety and Nuisance Issues: Sediment on roadways and in the air can cause safety hazards.
- Flooding: Excessive sediment accumulation in drainage systems can create blockages that promote flooding.
- Sediment Build-Up: Sediment that accumulates in streams, lakes, and bays can only be remediated by costly dredging.
- Increased Costs: Uncontrolled erosion and sedimentation requires costly maintenance and repair. ***It is cheaper and easier to prevent erosion than to fix sedimentation problems.***
- Negative Public Perception: Observing muddy water flowing from construction sites negatively affects how the public feels about your work.

Sediment-filled runoff from a construction site

What can be done to control soil erosion, runoff, and sedimentation?

Install, maintain, and inspect control measures on your construction site according to the site's Soil Erosion and Sediment Control (SESC) Plan or Stormwater Pollution Prevention Plan (SWPPP).

Types of Controls

Erosion Controls

- The primary defense against sediment pollution
- Installed to prevent sediment from being detached by natural causes
- Examples: Keeping exposed soil covered with mulch or temporary vegetation; covering soil stockpiles; slope surface roughening

Runoff Controls

- Used to slow the velocity of flowing stormwater
- Diverts water towards a stabilized outlet or treatment practice
- Examples: check dams; pipe slope drains

Sediment Controls

- The last line of defense against moving sediment
- Prevents sediment from leaving construction sites and entering environmentally sensitive areas
- Examples: construction entrances; sediment traps; inlet protection; compost filter socks; wheel wash system

Compost filter socks used as check dams to control runoff

Where Can I Get Help?

- Your construction project's site-specific **SESC Plan** or **SWPPP** has measures identified specifically for your construction site.
- **RI Erosion and Sediment Control Handbook:** Suitable control measures exist for every conceivable erosion, runoff, and sediment control challenge. Refer to the *RI Soil Erosion and Sediment Control Handbook* at:

  www.dem.ri.gov/programs/bnatres/water/pdf/riesc-handbook16.pdf

Even if control measures are correctly installed and maintained according to the approved SESC Plan/SWPPP, the site is only in compliance when erosion, runoff, and sedimentation are effectively controlled throughout the entire site.

Produced by RI Stormwater Solutions with support from the RI Department of Transportation and the Rhode Island Department of Environmental Management.

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www.ristormwatersolutions.org

What Do You Do With Household Chemicals?

Updated 2017

There's Hazardous Waste in my Home?

If you look closely in your kitchen, bathrooms, basement, or garage, you just might find some household hazardous waste! Many common household products such as drain and oven cleaners, paint, and paint thinner (to name only a few!) contain chemicals that qualify as hazardous waste. These hazardous substances are toxic, corrosive, can easily catch fire, or are dangerous when mixed with other chemicals. If you see the words *caution, hazardous, danger, flammable, or poison*, you know to use these products with caution. You need to use caution when disposing them, too.

Don't Pour It Out!

When toxic chemicals are poured down household drains, storm drains, toilets, or on the ground, those chemicals are likely to end up in nearby waters. Even throwing household chemicals in the trash can contaminate water resources, once they are in the landfill. And your garbage collector will thank you, too! Many trash handlers have been injured by fumes and splashing chemicals.

In Rhode Island, you can make an appointment to bring your household chemicals to the Eco-Depot, a free drop-off at the Rhode Island Resource Recovery Corporation's facility at the Central Landfill in Johnston. Call 942-1430 ext. 241 to schedule a date and time.

Do I Have Other Options?

Yes! Here are a few ideas for reducing the amount of household hazardous waste in your home, which means less waste you have to dispose of.

- If the product is still useable, but you don't need it all, share with friends or neighbors who might need it.
- Buy only what you need for the job you're working on. More is not always better, when you think about the extra effort to store and dispose of the product.
- Choose non-hazardous products when you can. Lemon juice, vinegar, hot water, borax, soap, and baking soda are good alternatives to harsh, chemical cleansers. Check online for non-toxic toxic home cleaning recipes.
- Buy phosphate-free, biodegradable detergents and cleaners and water-based products, when possible, as these are typically less toxic.

Storm drains lead directly to local waters. No filters. No treatment. Chemicals that enter storm drains wind up in the water we drink, fish, and swim.

A Few Good Recipes

All-purpose cleaner: ½ cup vinegar and ¼ cup baking soda mixed into ½ gallon of water

Bathroom mold: mix one part hydrogen peroxide (3%) with two parts water; spray on mold and wait one hour before cleaning

Carpet stains: ¼ cup borax, ¼ cup salt, and ¼ cup vinegar mixed into a paste; leave on stain for a few hours, then vacuum

Drain cleaner: pour ½ cup baking soda down the drain, then ½ cup vinegar; after 15 minutes, pour in boiling water to clear residue. Caution: only use this method with metal plumbing. Plastic pipes can melt if excess boiling water is used. Do not use this method after trying a commercial drain opener; the vinegar can react with the drain opener to create dangerous fumes.

Toilet bowl cleaner: ¼ cup baking soda mixed with 1 cup vinegar; pour into toilet bowl and let it sit before scrubbing

The Usual Suspects

How can you tell if the product you want to throw away is toxic and needs special disposal procedures? Read the label! If in doubt, the following list includes common household items that contain hazardous ingredients:

Cleaning products: oven cleaners, drain cleaners, wood and metal cleaners and polishes, toilet cleaners, tub, tile and shower cleaners, bleach, pool cleaners

Automotive products: motor oil, fuel additives, carburetor and fuel injection cleaners, air conditioning refrigerants, starter fluids, automotive batteries, transmission and brake fluid, antifreeze

Lawn and garden products: herbicides, pesticides, fungicides, wood preservatives

Indoor pesticides: ant and cockroach sprays and bait, flea repellants and shampoos, bug sprats, houseplant insecticides, moth repellants, mouse and rat poisons and baits

Workshop or painting supplies: adhesives and glues, furniture strippers, oil- or enamel-based paint, stains and finishes, paint thinners and turpentine, paint strippers and removers, photographic chemicals, fixatives, and other solvents

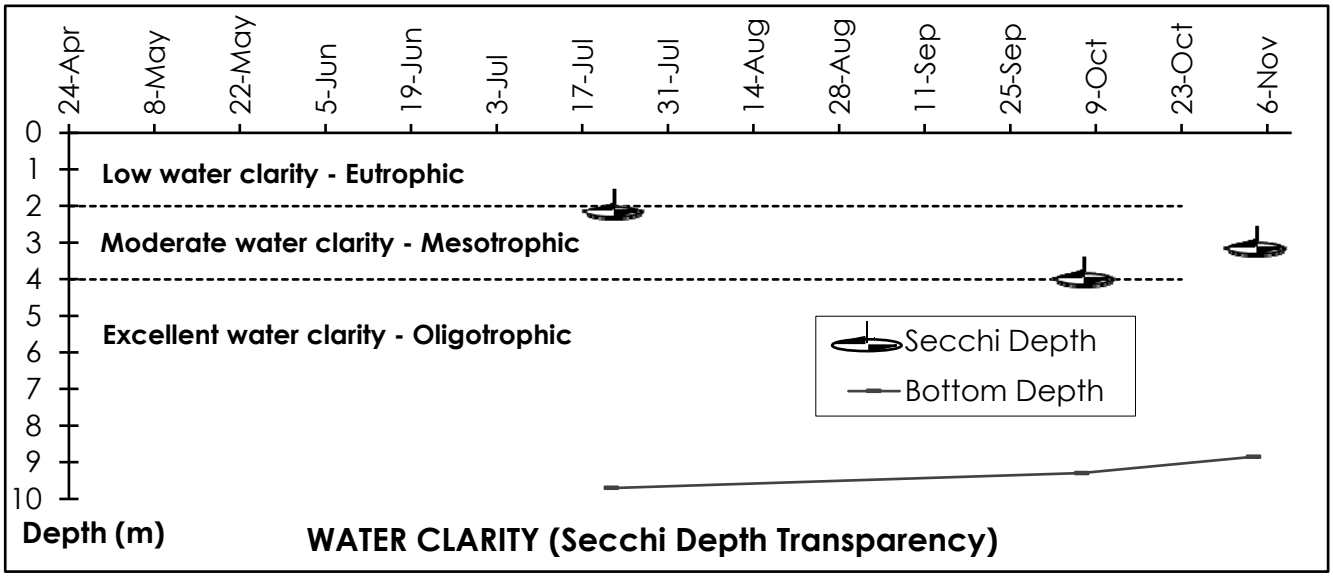
Flammable products: propane tanks and other compressed gas cylinders, kerosene, home heating fuel, diesel fuel, gas/oil mix, lighter fluid

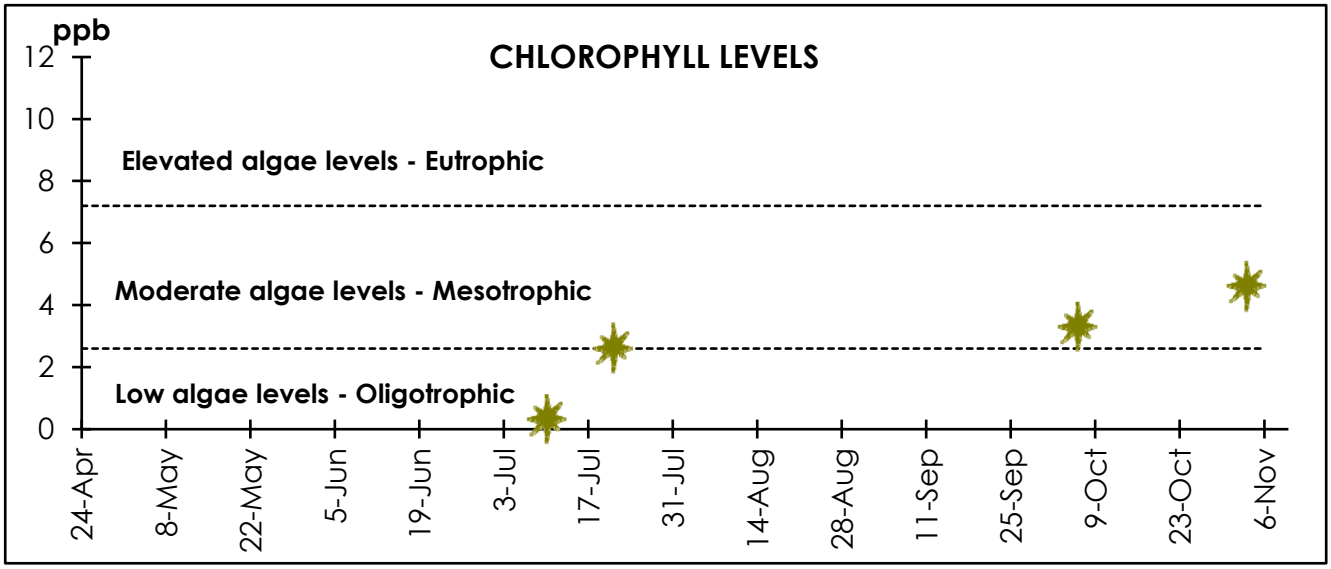
Miscellaneous: batteries, mercury thermometers or thermostats, fluorescent or energy-efficient light bulbs, driveway sealer

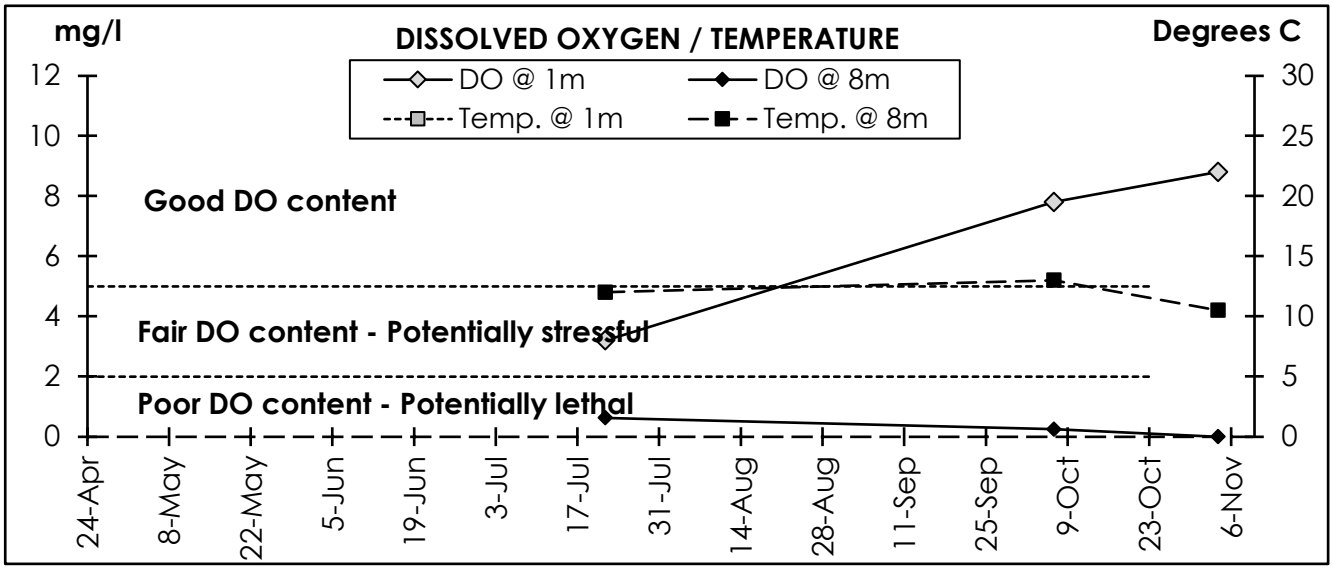
Produced by URI Cooperative Extension with funding from the RI Department of Transportation and support from the Rhode Island Department of Environmental Management.

URI 2024 Data

2024 FLAT RIVER RESERVOIR DATA







2024 FLAT RIVER RESERVOIR DATA

	MAY	JUNE	JULY	AUG	OCT	NOV	
Bottom waters with higher nutrient levels than 1 meter samples indicate internal cycling of nutrients, and potentially unstable water quality conditions.							
			----------Total Phosphorus (ppb) ----------				**Mean**
Flat River Reservoir @ 1m	-	-	19	-	11	9	**13**
Flat River Reservoir @ 8m	-	-	35	-	7	9	**17**
Low <12 ppb; Moderate 12-24 ppb; Elevated 25-67 ppb; RIDEM lake max. 25 ppb TP							
			----------Dissolved Phosphorus (ppb) ----------				**Mean**
Flat River Reservoir @ 1m	-	-	4	-	10	14	**9**
Flat River Reservoir @ 8m	-	-	22	-	9	8	**13**
Limit of Detection = 4 ppb; Mean determined with half that (2 ppb) for <4							
			---------- Total Nitrogen (ppb) ----------				**Mean**
Flat River Reservoir @ 1m	-	-	488	-	372	422	**427**
Flat River Reservoir @ 8m	-	-	719	-	823	966	**836**
Low TN < 350 ppb; Moderate TN 350 - 750 ppb; Elevated TN >750 ppb							
			---------- Nitrate-Nitrogen (ppb) ----------				**Mean**
Flat River Reservoir @ 1m	-	-	135	-	41	65	**80**
Flat River Reservoir @ 8m	-	-	126	-	48	50	**75**
			---------- Ammonia-Nitrogen (ppb) ----------				**Mean**
Flat River Reservoir @ 1m	-	-	96	-	28	50	**58**
Flat River Reservoir @ 8m	-	-	207	-	295	260	**254**
Limit of Detection = 15 ppb; Mean determined with half that (7.5 ppb) for <15							
			---------- Chlorides (ppm) ----------				**Mean**
Flat River Reservoir @ 1m	-	-	-	-	-	31	**31**
Flat River Reservoir @ 8m	-	-	-	-	-	26	**26**
Chlorides measured in spring and fall to assess the impact from winter road salt use.							
			-------- Enterococci *(per 100 mLs)* ---------				**Maximum**
Flat River Reservoir	-	-	7.5	-	4	1	**7.5**
RIHealth Standard for Recreational Contact: Maximum 60 Enterococci per 100 mLs							
			---------- pH ----------				**Minimum**
Flat River Reservoir @ 1m	-	-	6.4	-	6.8	6.7	**6.4**
Flat River Reservoir @ 8m	-	-	6.3	-	6.6	6.3	**6.3**
pH of 6 - 9 considered normal							
			-------- Alkalinity (mg/l CaCO3) ---------				**Minimum**
Flat River Reservoir @ 1m	-	-	7.7	-	9.3	9.5	**7.7**
USEPA Alkalinity Classification: Acidified <1 ppm with pH < 5.0; Critical <2 ppm; Endangered 2-5 ppm; ***Highly Sensitive 5-10 ppm*** *; Sensitive 10-20 ppm; Not Sensitive >20 ppm*							