Rhode Island's Integrated Reporting Process and Draft 2018-2020 303(d) List

RIDEM
Office of Water Resources
October 06, 2020 3-5 PM

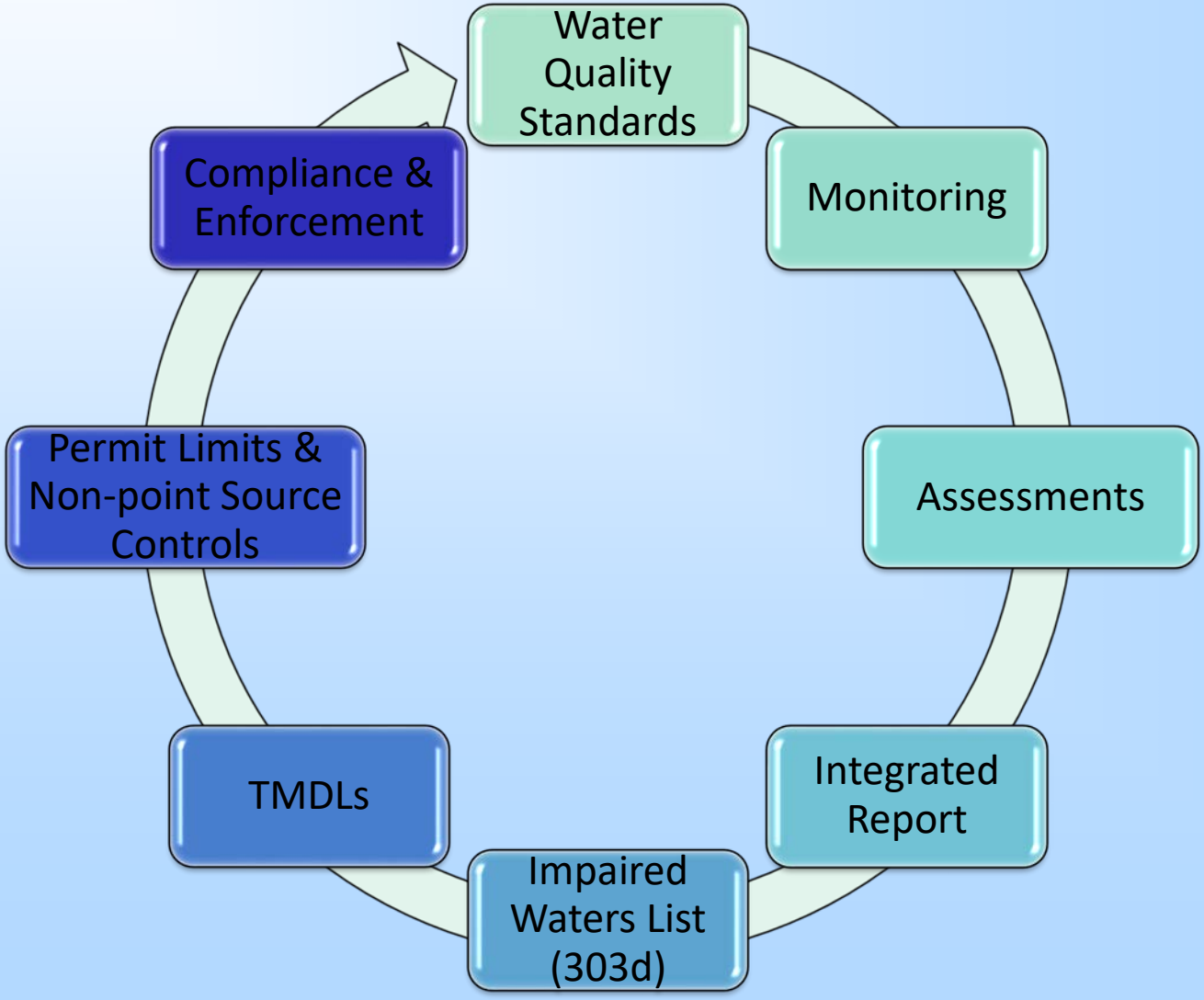
Overview of Presentation

- Background Federal Clean Water Act Requirements
- Overview of Assessment Process
- Results of Assessment → 2018-2020 303(d) List
- Water Quality Restoration Activities
  - Investments leading to improved water quality
  - Ongoing and planned water quality restoration studies

Federal Clean Water Act

Restore and maintain the chemical, physical, and biological integrity of the nation's waters.

Water Quality Management Framework



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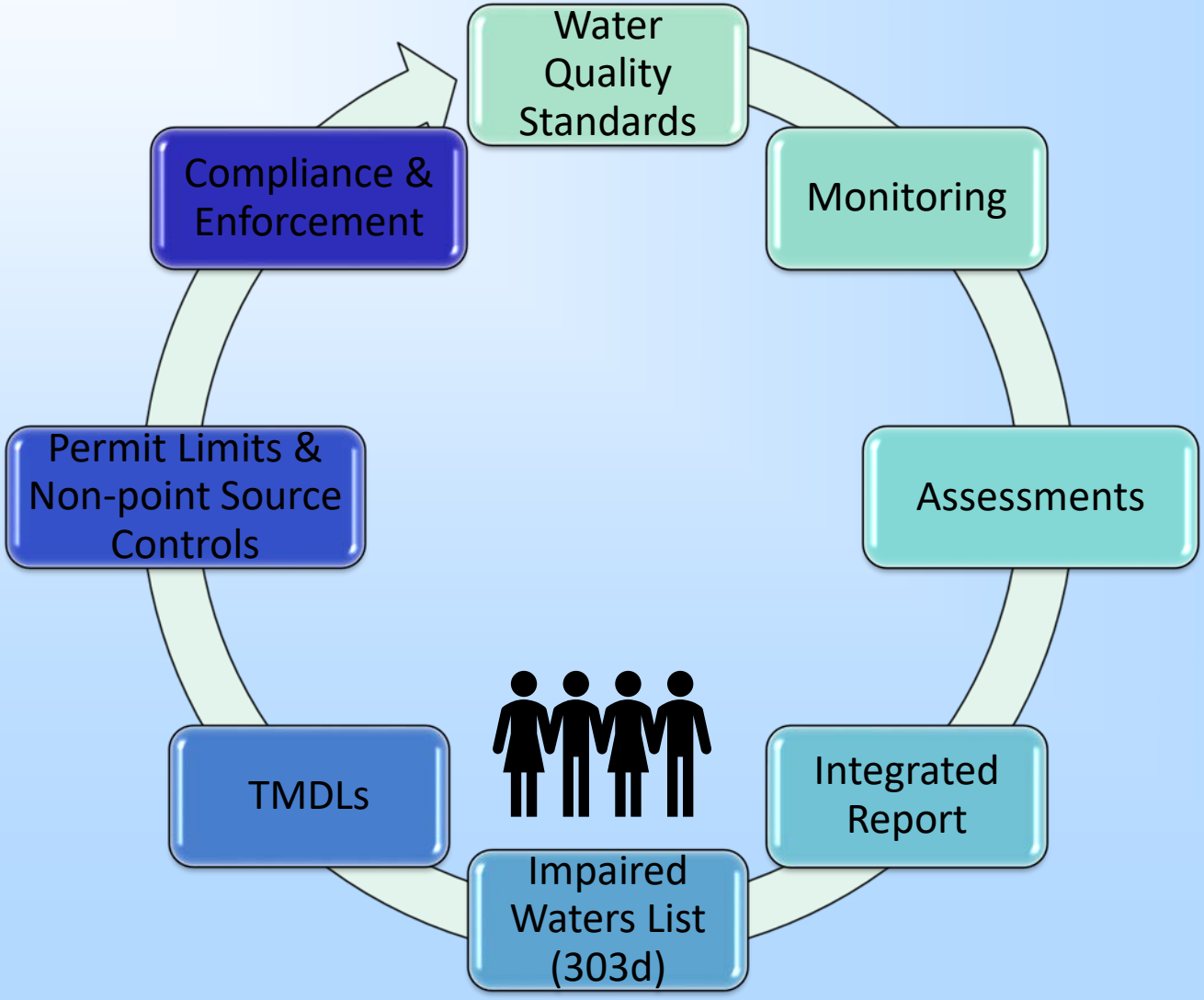

Clean Water Act Requirements

- **Water Quality Standards for the state's waters**
  - Water Quality Classification and Designated Uses
  - Water Quality Criteria
- **Monitor, Assess, and Report**
  - Water Quality Conditions of the State's Waters
  - Integrated Lists
- **List Impaired Waters**
  - Waters where *traditional technology-based* pollution controls are not adequate to meet *water quality standards*
  - Prioritize and Schedule TMDL Development for all waters on 303(d) Impaired Waters List

Water Quality Standards

Designated Uses

Goal Uses of the waterbody

Fish consumption

Swimming

Aquatic life

Drinking water, etc.

Water Classifications

Class is defined by a set of Designated Uses

AA, A, B, SA, SB, etc.

Water Quality Criteria

Pollutant thresholds to protect Designated Uses

Numeric

5.0 mg/L dissolved oxygen

Narrative

"None in concentrations or combinations that could be harmful to humans or fish and wildlife for the most sensitive and governing water class use…"

RI Water Quality Classifications

Designated Use	Applicable Classifications	Designated Use Definitions
Drinking Water Supply	AA	Supply safe drinking water with conventional treatment.
Primary Contact Recreation/Swimming	**All surface waters**	Swimming, water skiing, surfing or other recreational activities with prolonged and intimate contact by the human body with water.
Secondary Contact Recreation/Boating	**All surface waters**	Boating, canoeing, fishing, kayaking or other recreational activities with minimal contact by the human body with the water and the probability of ingestion of the water is minimal.
Aquatic Life Support/ Fish, other Aquatic Life and Wildlife	**All surface waters**	Waters suitable for the protection, maintenance, and propagation of a viable community of aquatic life and wildlife.
Shellfishing/ Shellfish Consumption	SA, SA{b}	Supports a population of shellfish and is free from pathogens that could pose a human health risk to consumers.
Shellfish Controlled Relay and Depuration	SB	Suitable for the transplant of shellfish to Class SA waters for ambient depuration and controlled harvest.
Fish Consumption	**All surface waters**	Supports fish free from contamination that could pose a human health risk to consumers.

Monitor, Assess, and Report

Assign Water Quality Standards & Classification

Define WATERBODY ID

Monitor, Assess, and Report

Assign Water Quality Standards & Classification

Define Waterbody ID

Monitoring Data

Assessments

Meets WQ Standards

Does not Meet WQ Standards

Impaired waters List

TMDL/WQ Restoration

Consolidated Assessment and Listing Methodology (CALM)

- Framework of **decision-making process** for assessments
- Defines data **quality** and **quantity**
- **Category 1-5** Integrated Report Lists
  - Each waterbody is assigned a category
  - Category is based on **meeting water quality goals**

Comprehensive Assessment of Water Quality Conditions

- Use Readily Available Data
  - Data sources include federal and state agencies, universities, and volunteers.
- Review data
  - Evaluate for compliance with water quality standards, i.e. designated uses and criteria
- Integrated Report
  - Published Biennially
  - Combines the Section 305(b) State of the State's Waters Report and the Section 303(d) Impaired Waters List

Sources of 2018-2020 Integrated Report Monitoring Data

Agency	Volunteer / Municipality / Other
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 (HEALTH)	URI Watershed Watch
RIDEM Shellfishing Program	Pawtucket Water Supply Board
US EPA NARS and AED* Hg Fish Tissue Surveys	City of Newport

*It was learned after the presentation that AED is now ACESD.

Designated Uses & Assessment Indicators

Designated Use	Indicator
Drinking Water	• Safe Drinking Water Act Standards (MCLs) • Finished drinking water restrictions • Treatment requirements more than conventional treatment • Fecal coliform bacteria (terminal reservoir)
Swimming/Primary & Secondary Recreation	• **Enterococci bacteria** • **Fecal coliform bacteria** • **Beach closure information for designated beach waters** • Water quality general criteria and aesthetics
Aquatic Life (fish, etc.) and Wildlife	• **Biological (macroinvertebrate) data with physical habitat** • **Conventional parameters** • Toxic parameters in water column • Toxicity data • Water quality general criteria and aesthetics
Shellfish Consumption/Depuration	• **Fecal coliform bacteria** • **RI Shellfish Growing Area Monitoring Program classifications** • Water quality general criteria and aesthetics
Fish Consumption	• **Fish consumption advisories**

* Core indicators are represented in BOLD lettering.

Integrated Report Listing Categories

Category	Description	Meaning
Category 1	• Attaining all designated uses • No use threatened	• Considered “fully supporting” all designated uses

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	B	• Other pollution control measures are expected to result in attainment	
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Category 5		• Impaired or threatened for one or more designated use and requires a TMDL	• Development of a water quality restoration plan needed (TMDL) • Impaired Waters List (303d)

Draft 2018-2020 Integrated Report Category Summary

Category	Waterbody Type					Totals (Waterbody IDs)		
	Estuary	Rivers	Lakes	Ocean	Ocean / Near Coastal	2018-20	2016	2014
1	0	0	0	0	0	0	0	16
2	70	116	21	4	4	215	216	190
3	14	212	101	0	0	327	326	390
4A	18	69	31	0	0	118	119	125
4B	0	0	0	0	0	0	0	0
4C	0	3	29	0	0	32	31	39
5	36	111	51	0	0	198	190	121
Totals	**138**	**511**	**233**	**4**	**4**	**890**	**882**	**881**

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3	14	212	101	0	0	⇧ 327	326
4A	18	69	31	0	0	⇩ 118	119
4B	0	0	0	0	0	0	0
4C	0	3	29	0	0	⇧ 32	31
5	36	111	51	0	0	⇧ 198	190
Totals	**138**	**511**	**233**	**4**	**4**	**890**	**882**

Draft 2018-2020 Integrated Report Summary Statistics

RIVERS

1376 Miles in RI

- 1101 miles (80%) are assessed
- 751 assessed miles (68%) are impaired
- 458 assessed miles (42%) are impaired and scheduled for a TMDL.

LAKES AND PONDS

18,693 Acres in RI

- 15,330 acres (82%) are assessed
- 11,040 assessed acres (72%) are impaired
- 6,188 assessed acres (40%) are impaired and scheduled for a TMDL.

ESTUARIES

159 Sq. Miles in RI

- 157 sq. miles (98%) are assessed
- 57 assessed sq. miles (36%) are impaired
- 51 assessed sq. miles (33%) are impaired and scheduled for a TMDL.

Draft 2018-2020 Integrated Report Category Summary

	Category	Primary Driver of Category Change
⇔	1	
⇩	2	
⇩	3	
⇩	4A	
	4B	
⇩	4C	
⇧	5	

Draft 2018-2020 Integrated Report Category Summary

	Category	Primary Driver of Category Change
⇔	1	Narragansett Bay fish tissue data not yet reviewed
⇩	2	
⇩	3	
⇩	4A	
	4B	
⇩	4C	
⇧	5	

Draft 2018-2020 Integrated Report Category Summary

	Category	Primary Driver of Category Change
⇔	1	Narragansett Bay fish tissue data not yet reviewed
⇩	2	Waters switching between assessed and not assessed along with splitting the coastal shoreline waterbodies.
⇩	3	
⇩	4A	
	4B	
⇩	4C	
⇧	5	

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⇩	3	Waters switching between assessed and not assessed.
⇩	4A	One waterbody moved to 5 (impairment needing a TMDL).
	4B	
⇩	4C	
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⇩	4A	One waterbody moved to 5 (impairment needing a TMDL).
	4B	
⇩	4C	One waterbody moved to 5 (impairment needing a TMDL).
⇧	5	Bacteria, phosphorus, and iron found due to Newport Water Supply tributary monitoring.

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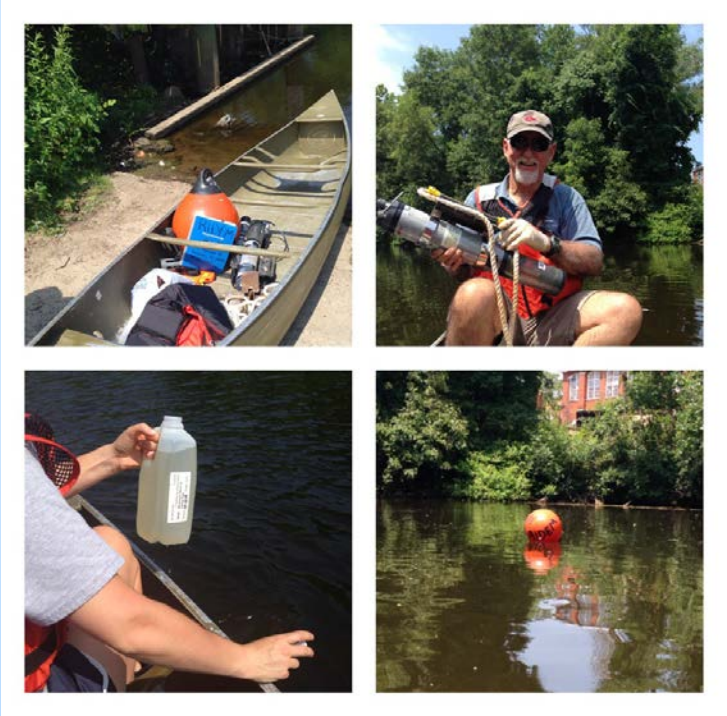
Impaired Waters List
RI 2018-2020 303(d) List

Category 5 Waters

- **Impaired or threatened** for one or more designated use and requires a TMDL
- **Establishes scheduled time frame** for development of TMDLs
- Helps **prioritize** the State's water quality monitoring and restoration activities

Comparing the 2016 and 2018-2020 303(d) Lists

- Increased number of named waterbodies on list
  - 10 Waterbodies Added
- Increased number of waterbodies with impairments (Category 5 Waters)
  - 198 (2018-2020) to 190 (2016)
- De-listing of impairments where Water Quality Standards attained or original listing inaccurate
  - 10 impairments removed
- Schedule shifts for TMDL development



Blackstone River

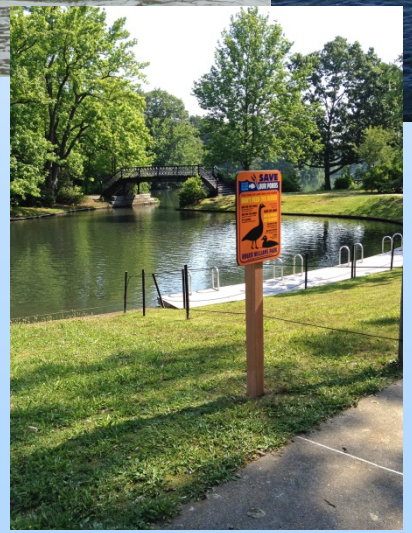
New Impairments on 2018-2020 303(d) List

Cause	Waterbodies
Enterococci	• Borden Brook & Tribs • Dry Brook & Tribs (Johnston) • Quaket Creek • Trib to Nonquit Pond
Iron	• Burnt Swamp Brook & Tribs • Indian Brook • Quaket Creek • Sylvyns Brook
Total Phosphorus	• Borden Brook & Tribs • Quaket Creek • Trib to Nonquit Pond • Tribs to Watson Reservoir • Paradise Brook

Impairments Removed from 303d List

Cause	Waterbodies
Copper	• Wood River (-18D)
Dissolved Oxygen	• Blackstone River (-01A, -01B)
Fecal Coliform	• Upper Narragansett Bay (-01B)
Fish Bioassessments	• Mt. Hope Bay (-01A, -01B, -01C, -01D)
Total Phosphorus	• Blackstone River (-01A, -01B)

Water Quality Restoration Efforts

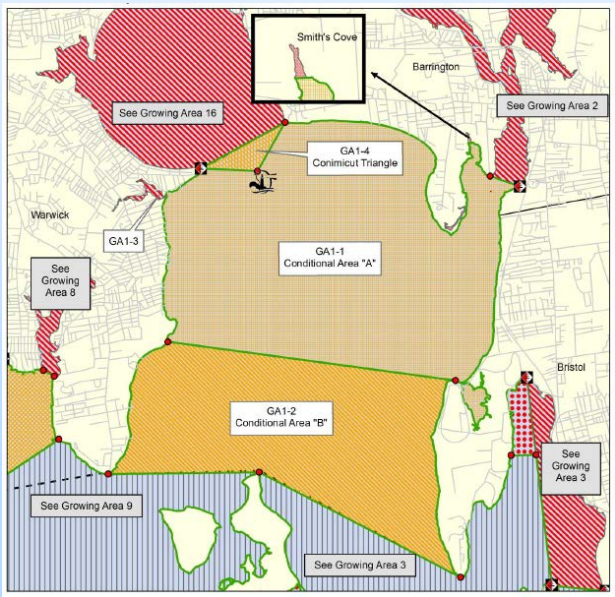


Photos: Providence Journal, NOAA, RIDEM

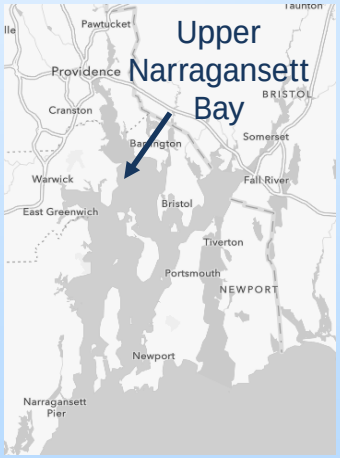
Water Quality Restoration
De-Listings Linked to Pollution Abatement Investments

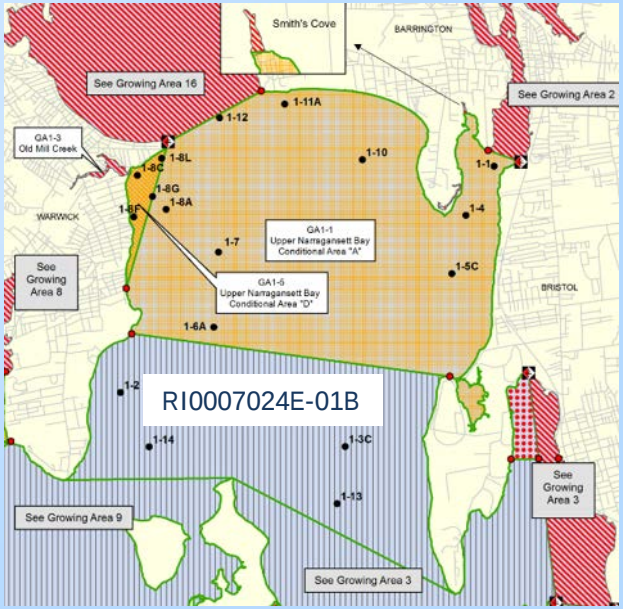
Upper Narragansett Bay

Shellfish harvesting restrictions removed in May 2017 after a ~70-year closure.



Shellfish Growing Area Map Showing Conditional Area B as a Conditional Shellfish Harvesting Water.





Shellfish Growing Area Map Showing Former Conditional Area B as an Approved Shellfish Harvesting Water.

Water Quality Restoration
De-Listings Linked to Pollution Abatement Investments

Upper Narragansett Bay

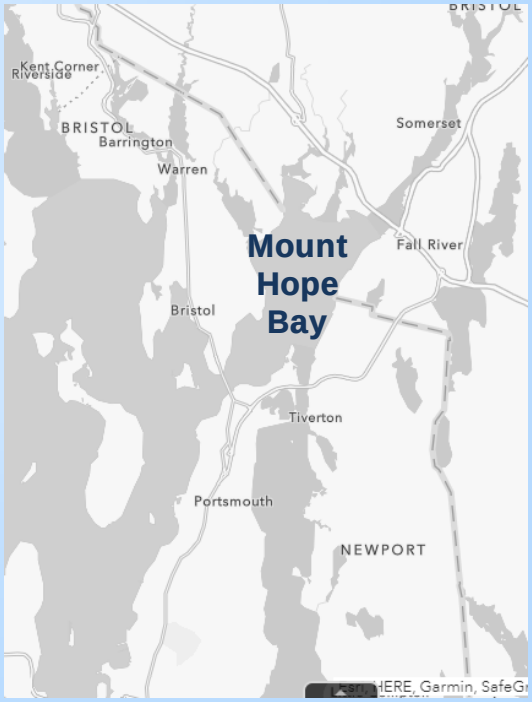
- Shellfish Harvesting restrictions removed in May 2017.
- CSO Infrastructure Improvements by the Narragansett Bay Commission.

https://snapshot.narrabay.com/app/Services/MossFile.ashx?file=/s/emda/snapshot/Documents/Publications/Water%20Quality%20Reports/Water%20Quality%20Improvements%20Associated%20with%20Phase%20I%20CSO%20%20Tunnel.pdf

Water Quality Restoration
De-Listings Linked to Pollution Abatement Investments

Mount Hope Bay*

- Aquatic Life Use – Fish Bioassessments
- Infrastructure Improvements at the Brayton Point Power Station.
  - Cooling towers fully operational in 2012
  - Plant operation ceased May 31, 2017



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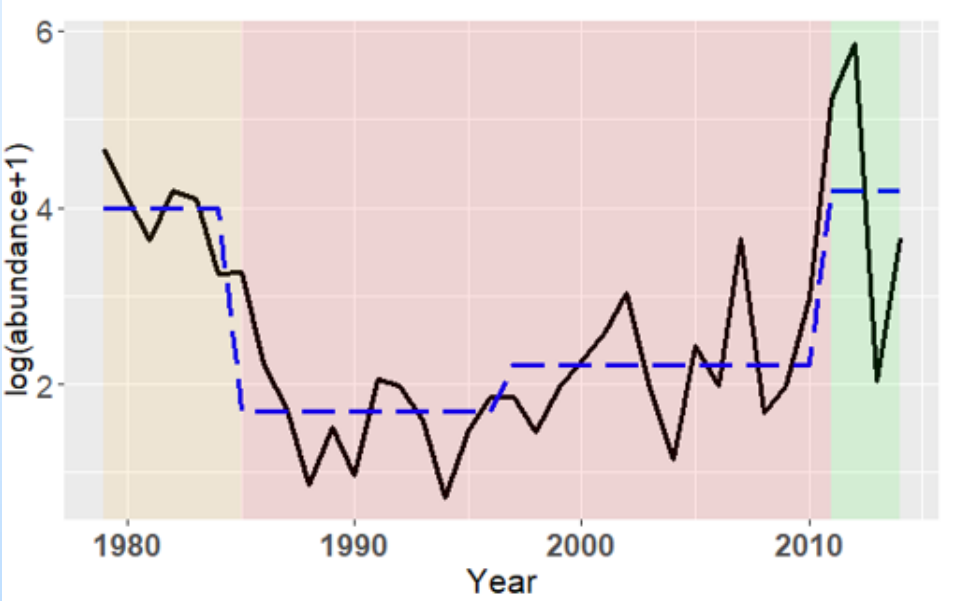


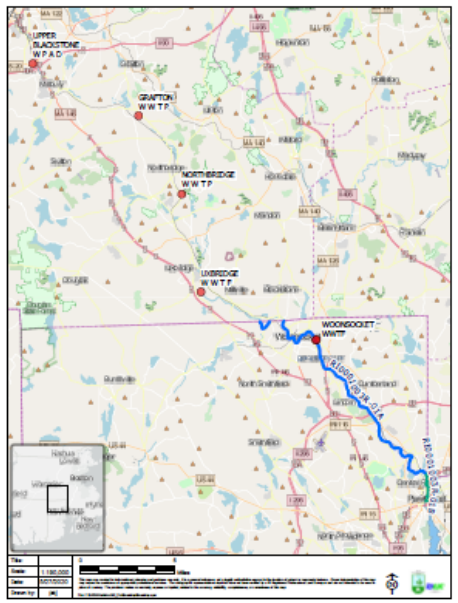
Figure 5. Time series of log-transformed aggregate finfish abundance in Mt. Hope Bay 1979-2014 (black), with selected intervention-only time series model (dashed blue line). Orange, red, and green background panels indicate medium, high and low Brayton Point cooling water flow phases, respectively. The selected model demonstrates the negative correlation between the plant's water output and finfish abundance; the years of lowest average abundance occurred when cooling water flow was at time series high levels (see Figure 4).

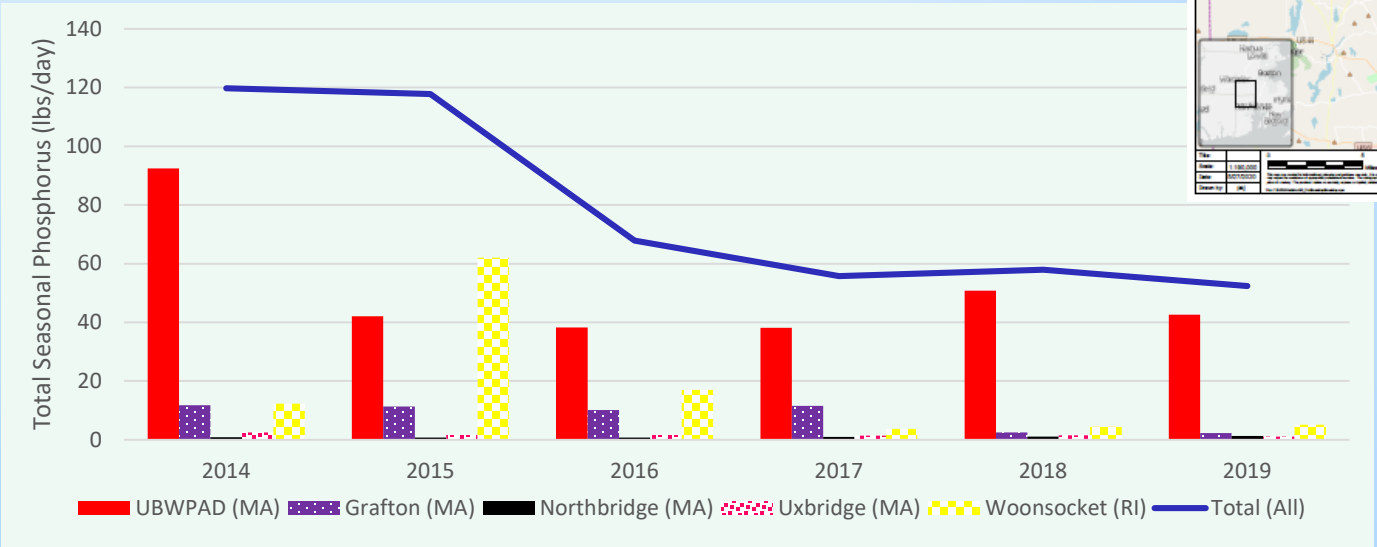
*Proposed Delisting applies to RI Waters.

Water Quality Restoration
De-Listings Linked to Pollution Abatement Investments

Blackstone River*

- Aquatic Life Use – Dissolved Oxygen and Total Phosphorus
- Phosphorus Reductions at 1 Rhode Island and 4 Massachusetts Wastewater Treatment Facilities.





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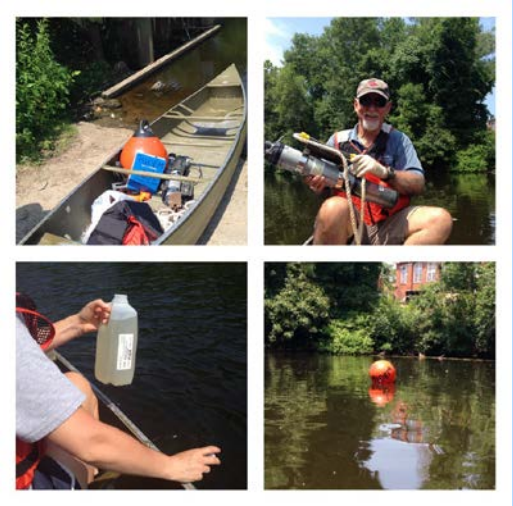

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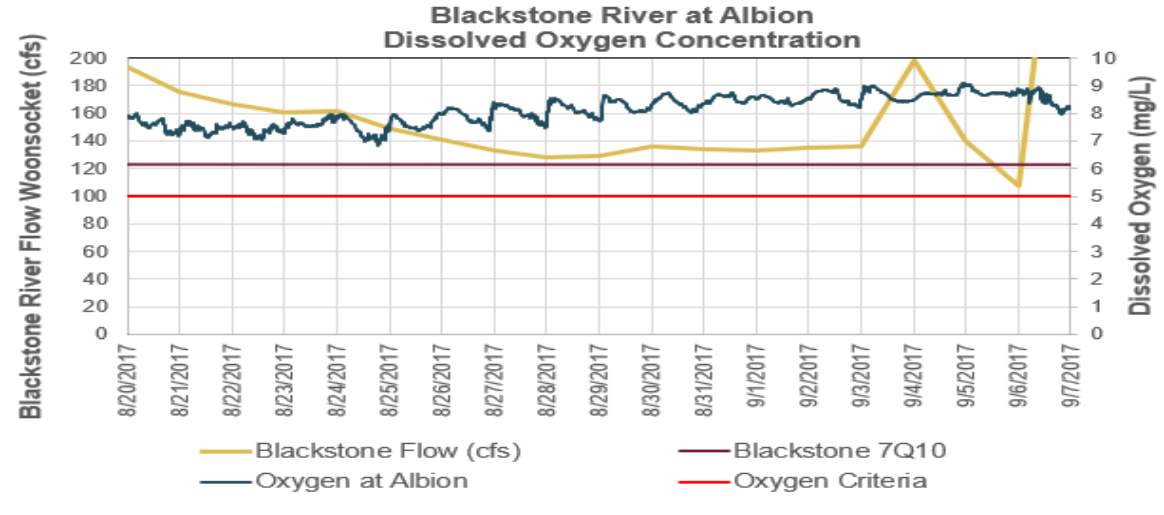

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Water Quality Restoration
De-Listings Linked to Changes in Assessment Techniques

Wood River and Tribs

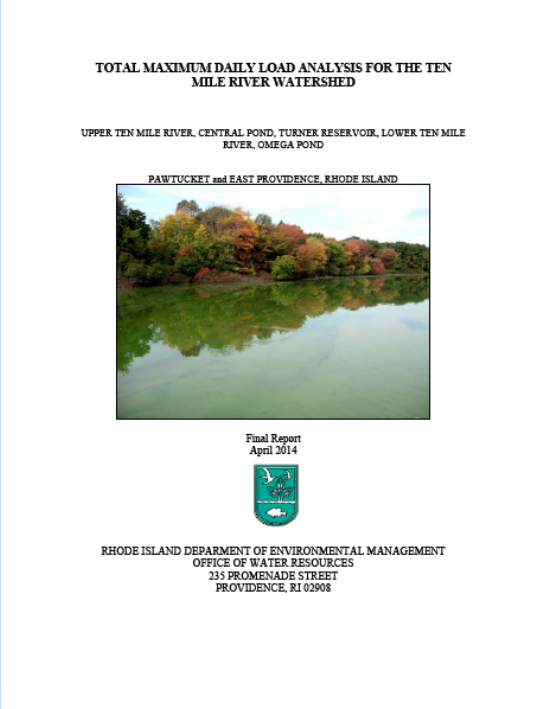
- Aquatic Life Use – Dissolved Copper
- Impairment based on a criteria derived using average hardness across all samples. DEM now calculates a criterion for each sampling date. All samples met both the acute and chronic criteria.

Wood River & Tribs (RI0008040R-16D) Dissolved Copper						
Sample Date	Detection Limit (µg/L)	Quantitation Limit (µg/L)	Concentration (µg/L)	Hardness[1] (mg/L)	Copper Criteria (µg/L)	
					Acute	Chronic
5/12/2011	0.13	0.13	0.515	11.23	1.7	1.4
9/12/2011	0.13	0.13	0.73	10.6	1.6	1.3
10/3/2011	0.13	0.13	0.661	11.4	1.7	1.4
6/26/2018	0.13	1.0	0.287	16.1	2.4	1.9
7/10/2018	0.13	1.0	0.347	16.0	2.4	1.9
7/30/2018	0.13	1.0	0.227	12.4	1.9	1.5
8/29/2018	0.13	1.0	0.409	15.1	2.3	1.8
9/20/2018	0.13	1.0	0.523	14.5	2.2	1.7

TMDL – Water Quality Restoration Studies

What is a Total Maximum Daily Load?

- Federally mandated Water Quality Restoration Study
- Determines amount of a pollutant that can be discharged into a water body and still maintain water quality standards
- TMDL equals the sum of pollutant allocations for point sources (non-stormwater & stormwater), non-point sources, & a margin of safety



TOTAL MAXIMUM DAILY LOAD ANALYSIS FOR THE TEN MILE RIVER WATERSHED

UPPER TEN MILE RIVER, CENTRAL POND, TURNER RESERVOIR, LOWER TEN MILE RIVER, OMEGA POND

PAWTUCKET and EAST PROVIDENCE, RHODE ISLAND

Final Report
April 2014

RHODE ISLAND DEPARMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 PROMENADE STREET
PROVIDENCE, RI 02908

TMDL – Water Quality Restoration Studies

To date, DEM has completed and EPA has approved TMDLs addressing a total of 203 related impairments on 176 assessment units (WBIDs) accounting for 148 distinctly named waterbodies

TMDL – Water Quality Restoration Studies Underway

TMDL has undergone major revisions:

- **Buckeye Brook**
  - Aquatic life use impairments caused by benthic macroinvertebrates, cadmium, copper, iron, zinc, lead, dissolved oxygen
- **Tributaries to Warwick Pond**
  - Aquatic life use impairments caused by benthic macroinvertebrates, cadmium, iron

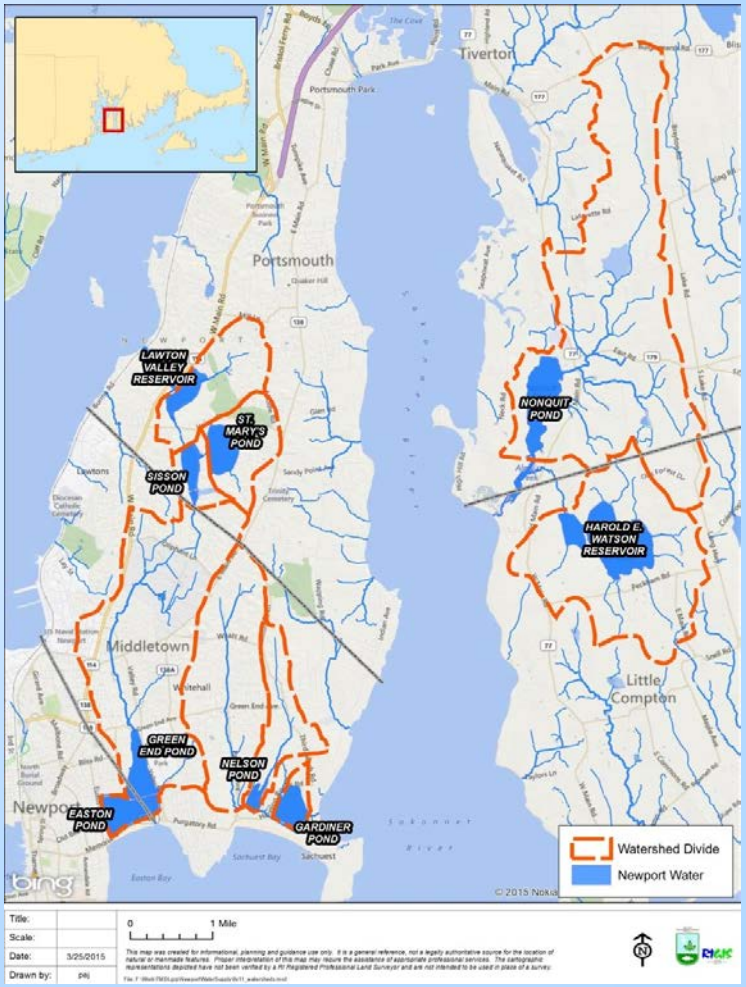
https://www.macroinvertebrates.org/taxa-characters/diptera-larva/chironomidae/tanytarsus/lateral

Skip.viator@dem.ri.gov,
jane.sawyers@dem.ri.gov

TMDL – Water Quality Restoration Studies Underway

Draft TMDL in development:

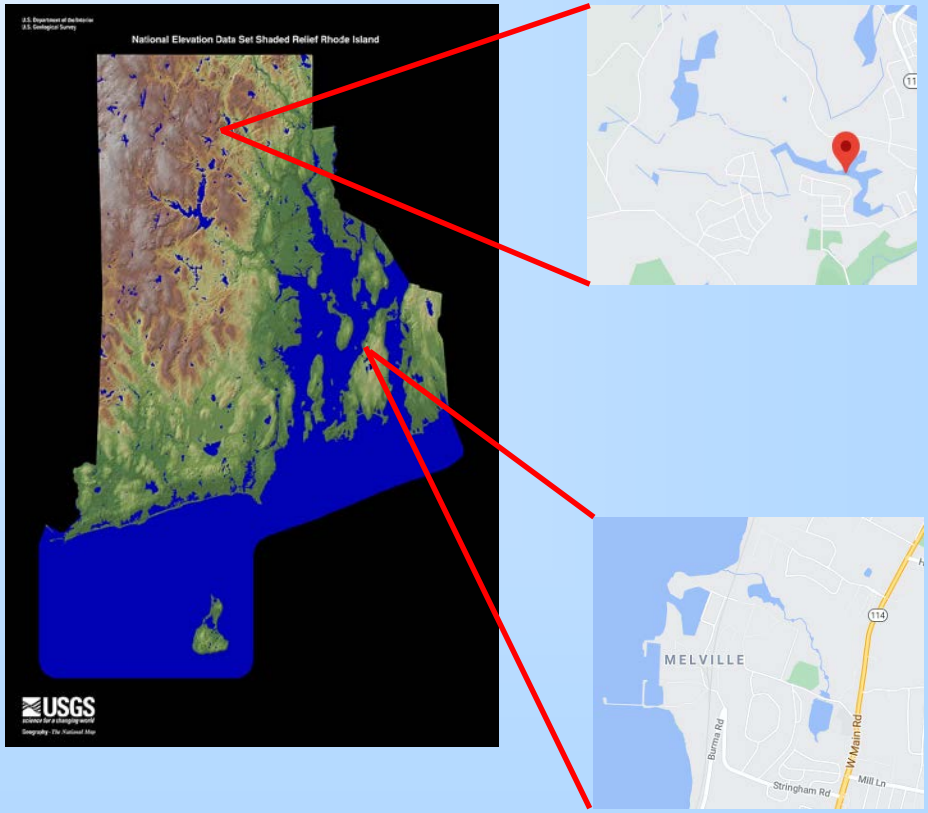
- **Newport Drinking Water Supply Reservoirs**
  - Drinking water and aquatic life use impairments caused by total organic carbon and total phosphorus
  - Gardiner Pond, Nelson Paradise Pond, South Easton's Pond, North Easton's Pond, St Mary's Pond, Sisson Pond, Lawton Valley Reservoir, Watson Reservoir and Nonquit Pond



Brian.zalewsky@dem.ri.gov,
jane.sawyers@dem.ri.gov

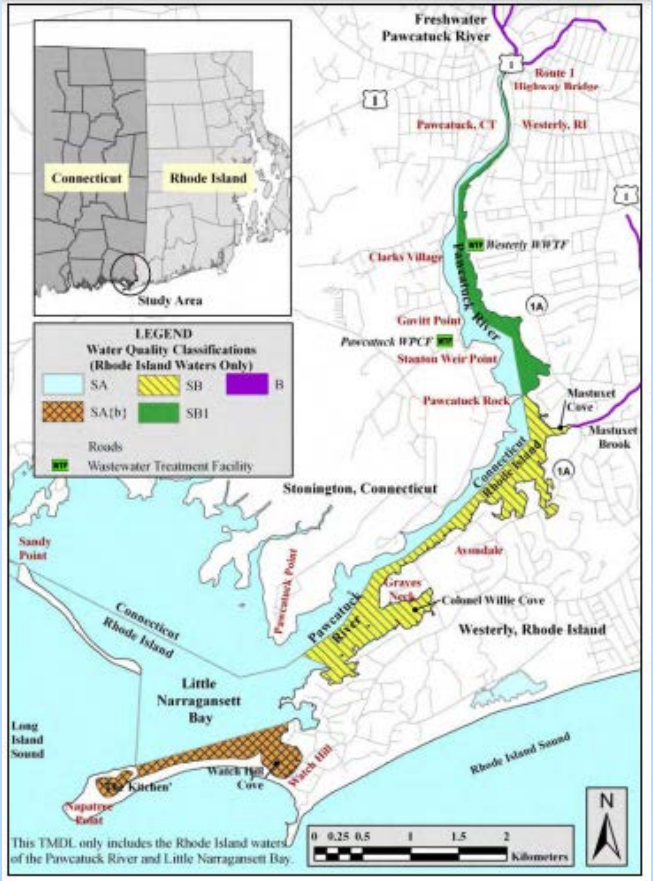
TMDL – Water Quality Restoration Studies Proposed Near Term

- **Lower Sprague Reservoir**
  - Total phosphorus
  - 1996
- **Melville Ponds**
  - Total phosphorus
  - 2008



TMDL – Water Quality Restoration Studies Proposed Near Term

- **Tidal Pawcatuck River and Little Narragansett Bay**
  - Aquatic life use impairments associated with nutrient enrichment and dissolved oxygen*
  - CT awarded SNEP grant to develop a model for FW Pawcatuck
    - FW RI Lake model development
      - Hundred Acre, Worden, and Watchaug Ponds
  - EPA AED evaluating model development for estuarine areas



*Note that RI will evaluate whether to include lower segments as impaired during the next assessment.

“Take-Aways” From 2018-2020 Assessment and Impaired Waters Report

- Targeted WQ monitoring has documented improvements resulting from stringent permitting and infrastructure investments.
  - Upper Bay – Shellfish Harvesting Restoration
  - Blackstone River– Dissolved Oxygen Improvements
  - Mt. Hope Bay – Fish Community
- Targeted monitoring has further characterized water quality conditions in the Pawcatuck River and Little Narragansett Bay
- More work is needed to characterize estuarine fish tissue

DEM ACCEPTING Comments on Draft 2018-2020 303(d) list

Send Comments to:

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View or download the Draft 2018-2020 303(d)list:
http://www.dem.ri.gov/programs/benviron/water/quality/pdf/303d1820.pdf

Comments accepted through October 30, 2020

View or download the Draft Delisting Document:
http://dem.ri.gov/programs/benviron/water/quality/pdf/iwlr1820.pdf

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