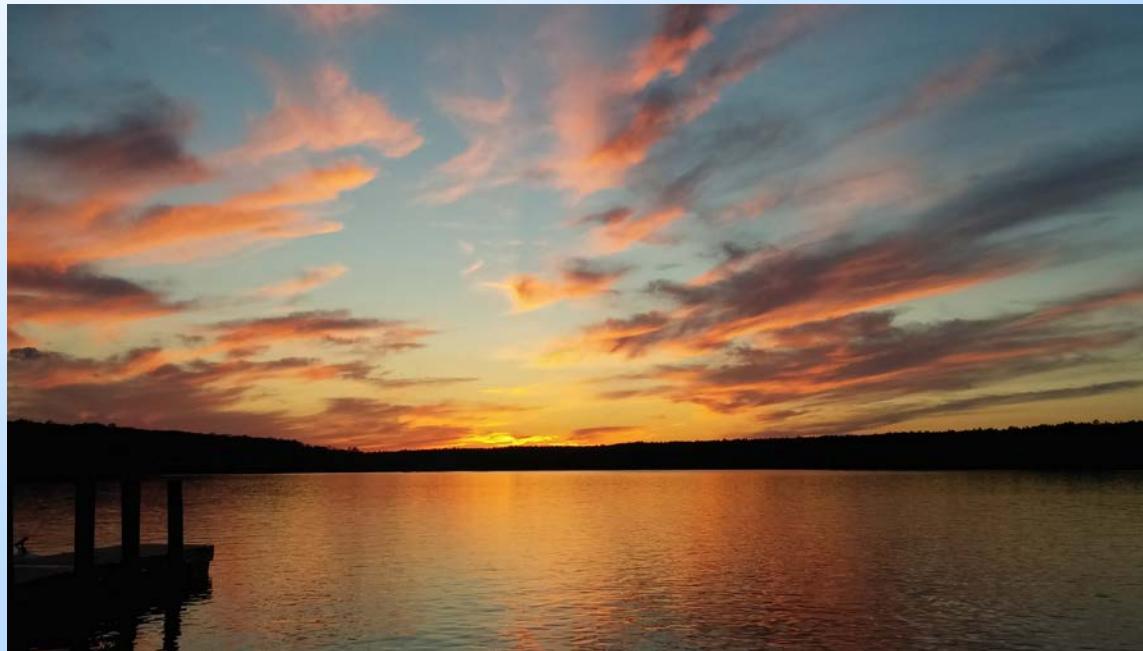




# Rhode Island's Integrated Reporting Process and Draft 2018-2020 303(d) List



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



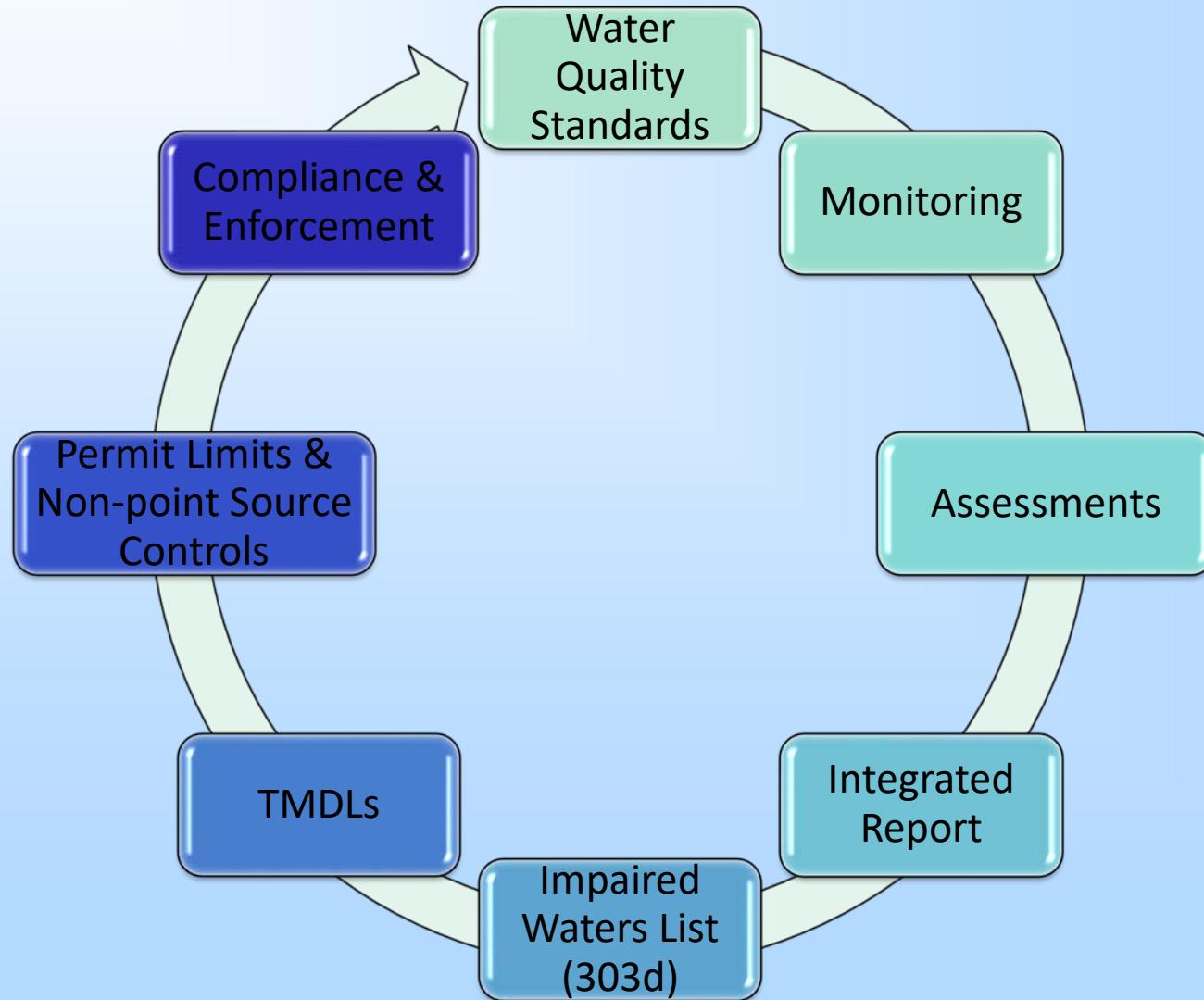
# Federal Clean Water Act

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

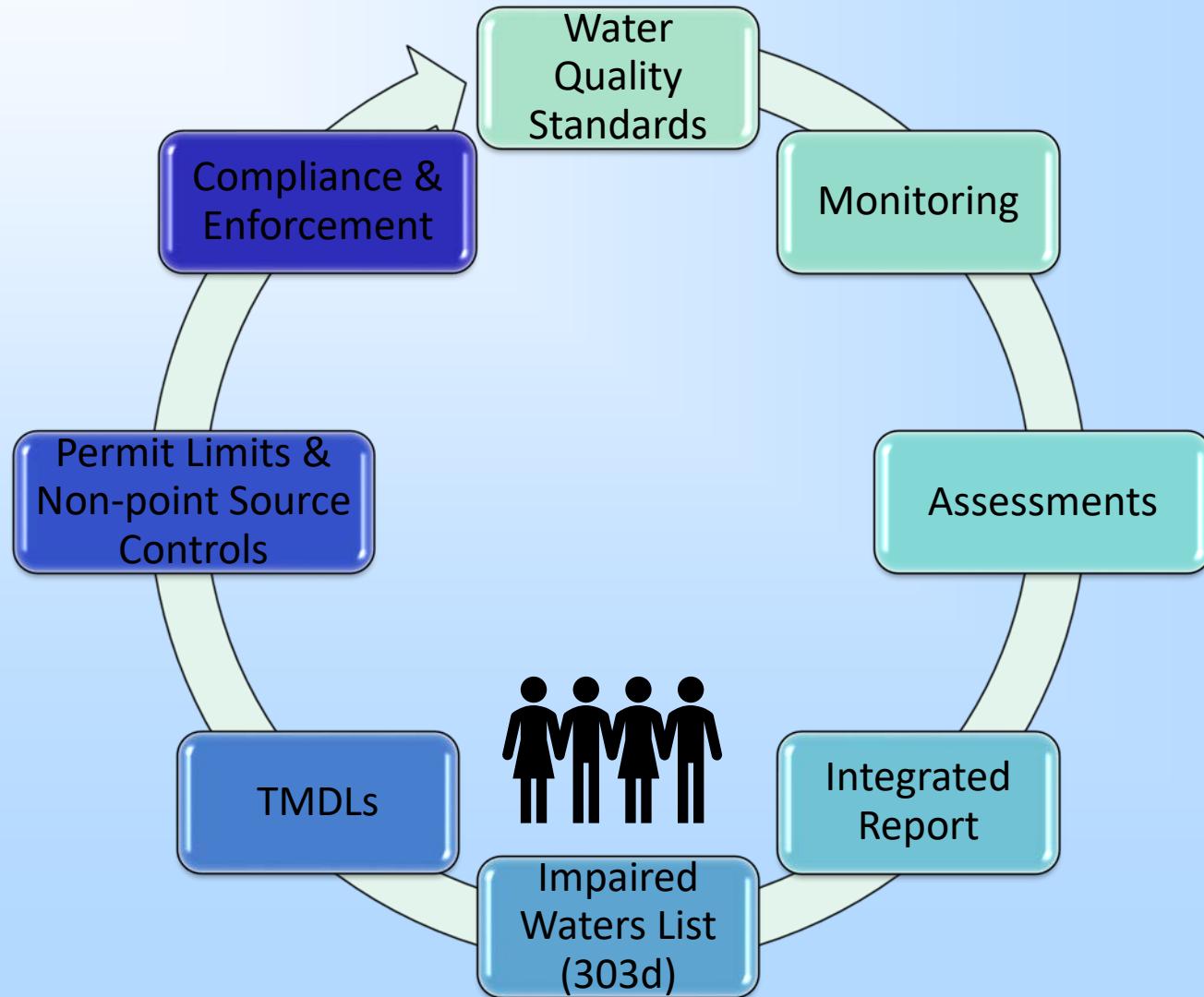




# WATER QUALITY MANAGEMENT FRAMEWORK



# WATER QUALITY MANAGEMENT FRAMEWORK





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



**DEM**  
RHODE ISLAND

# MONITOR, ASSESS, AND REPORT

**ASSIGN WATER QUALITY  
STANDARDS & CLASSIFICATION**



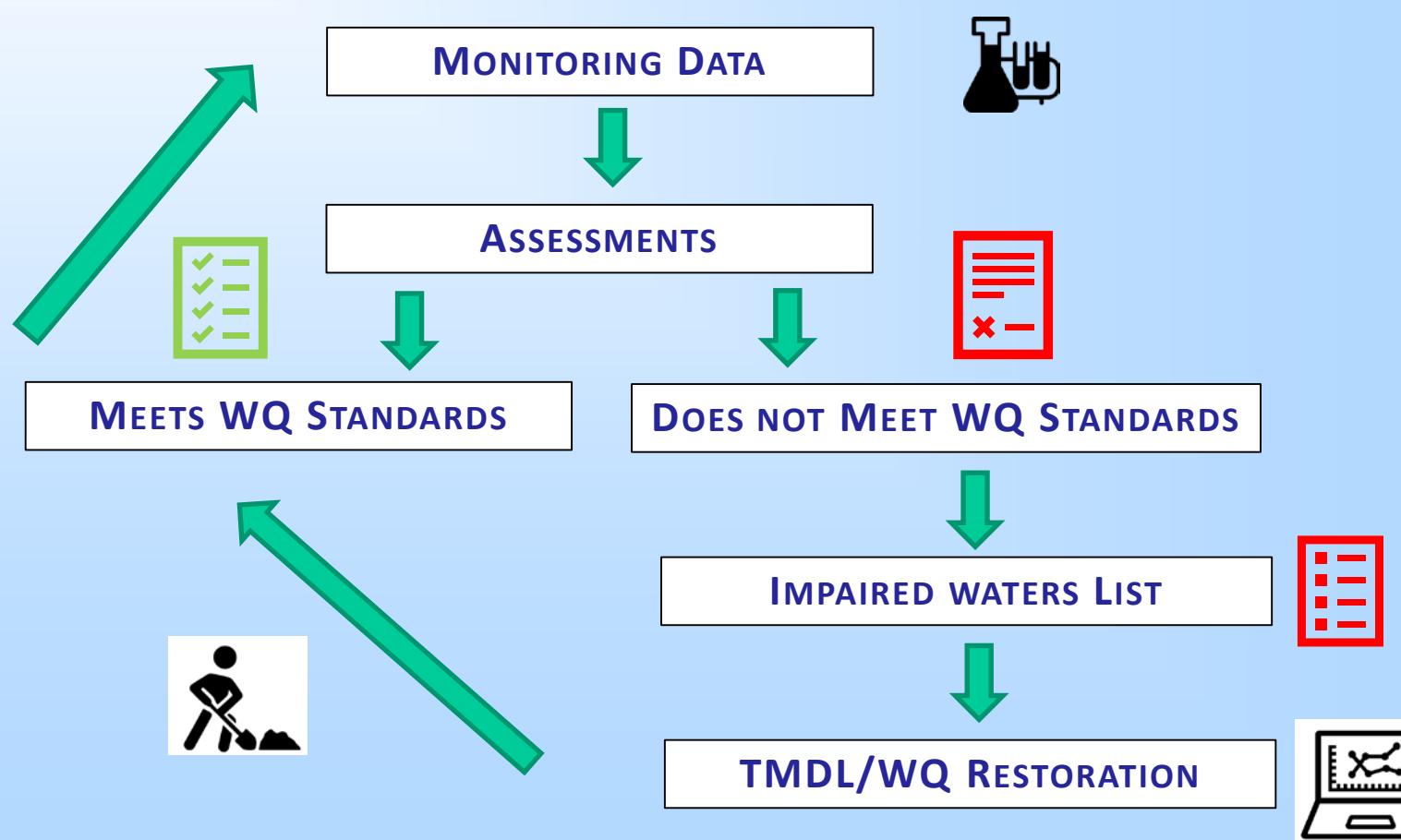
**DEFINE WATERBODY ID**

# MONITOR, ASSESS, AND REPORT

ASSIGN WATER QUALITY  
STANDARDS & CLASSIFICATION



DEFINE WATERBODY ID





# 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
	<p>Drinking Water</p> <ul style="list-style-type: none"> <li>Safe Drinking Water Act Standards (MCLs)</li> <li>Finished drinking water restrictions</li> <li>Treatment requirements more than conventional treatment</li> <li>Fecal coliform bacteria (terminal reservoir)</li> </ul>
	<p>Swimming/Primary &amp; Secondary Recreation</p> <ul style="list-style-type: none"> <li><b>Enterococci bacteria</b></li> <li><b>Fecal coliform bacteria</b></li> <li><b>Beach closure information for designated beach waters</b></li> <li>Water quality general criteria and aesthetics</li> </ul>
	<p>Aquatic Life (fish, etc.) and Wildlife</p> <ul style="list-style-type: none"> <li><b>Biological (macroinvertebrate) data with physical habitat</b></li> <li><b>Conventional parameters</b></li> <li>Toxic parameters in water column</li> <li>Toxicity data</li> <li>Water quality general criteria and aesthetics</li> </ul>
	<p>Shellfish Consumption/Depuration</p> <ul style="list-style-type: none"> <li><b>Fecal coliform bacteria</b></li> <li><b>RI Shellfish Growing Area Monitoring Program classifications</b></li> <li>Water quality general criteria and aesthetics</li> </ul>
	<p>Fish Consumption</p> <ul style="list-style-type: none"> <li><b>Fish consumption advisories</b></li> </ul>



## INTEGRATED REPORT LISTING CATEGORIES

Category	Description	Meaning
Category 1	<ul style="list-style-type: none"><li>• Attaining all designated uses</li><li>• No use threatened</li></ul>	<ul style="list-style-type: none"><li>• Considered “fully supporting” all designated uses</li></ul>



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Category 5	<ul style="list-style-type: none"> <li>• Impaired or threatened for one or more designated use and requires a TMDL</li> </ul>	<ul style="list-style-type: none"> <li>• Development of a water quality restoration plan needed (TMDL)</li> <li>• Impaired Waters List (303d)</li> </ul>

# 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
<b>Totals</b>	<b>138</b>	<b>511</b>	<b>233</b>	<b>4</b>	<b>4</b>	<b>890</b>	<b>882</b>	<b>881</b>



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Category	Waterbody Type					Totals (Waterbody IDs)	
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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
<b>Totals</b>	<b>138</b>	<b>511</b>	<b>233</b>	<b>4</b>	<b>4</b>	<b>890</b>	<b>882</b>

# 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	



# 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 changes to coastal shoreline waterbodies.
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4A	
4B	
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1	Narragansett Bay fish tissue data not yet reviewed
2	Waters switching between assessed and not assessed along with changes to coastal shoreline waterbodies.
3	Waters switching between assessed and not assessed.
4A	One waterbody moved to 5 (impairment needing a TMDL).
4B	
4C	
5	



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1	Narragansett Bay fish tissue data not yet reviewed
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4B	
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5	



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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 changes to coastal shoreline waterbodies.
3	Waters switching between assessed and not assessed.
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.

# INTEGRATED REPORT LISTING CATEGORIES

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## INTEGRATED REPORT LISTING CATEGORIES

Category	Description	Meaning
Category 5	<ul style="list-style-type: none"><li>Impaired or threatened for one or more designated use and requires a TMDL</li></ul>	<ul style="list-style-type: none"><li>Development of a water quality restoration plan needed (TMDL)</li><li>Impaired Waters List (303d)</li></ul>



# Impaired Waters List

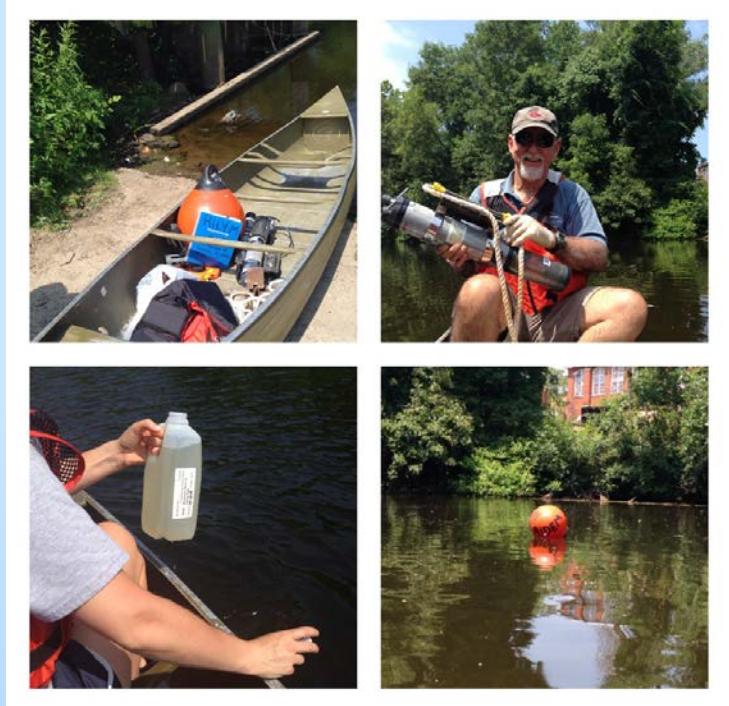
## RI 2018-2020 303(d) List

### 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	<ul style="list-style-type: none"><li>• Borden Brook &amp; Tribs</li><li>• Dry Brook &amp; Tribs (Johnston)</li><li>• Quaket Creek</li><li>• Trib to Nonquit Pond</li></ul>
Iron	<ul style="list-style-type: none"><li>• Burnt Swamp Brook &amp; Tribs</li><li>• Indian Brook</li><li>• Quaket Creek</li><li>• Sylvyns Brook</li></ul>
Total Phosphorus	<ul style="list-style-type: none"><li>• Borden Brook &amp; Tribs</li><li>• Quaket Creek</li><li>• Trib to Nonquit Pond</li><li>• Tribs to Watson Reservoir</li><li>• Paradise Brook</li></ul>



# Impairments Removed from 303d List

Cause	Waterbodies
Copper	<ul style="list-style-type: none"><li>• Wood River (-18D)</li></ul>
Dissolved Oxygen	<ul style="list-style-type: none"><li>• Blackstone River (-01A, -01B)</li></ul>
Fecal Coliform	<ul style="list-style-type: none"><li>• Upper Narragansett Bay (-01B)</li></ul>
Fish Bioassessments	<ul style="list-style-type: none"><li>• Mt. Hope Bay (-01A, -01B, -01C, -01D)</li></ul>
Total Phosphorus	<ul style="list-style-type: none"><li>• Blackstone River (-01A, -01B)</li></ul>

## WATER QUALITY RESTORATION EFFORTS



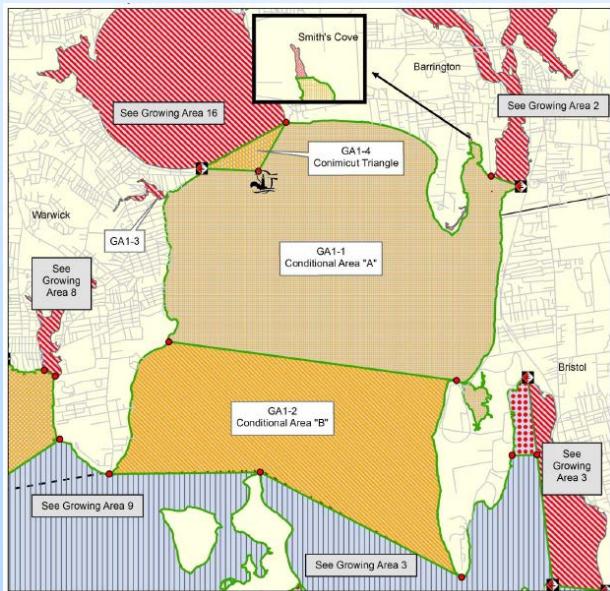
Photos: Providence Journal, NOAA, RIDEM

# Water Quality Restoration

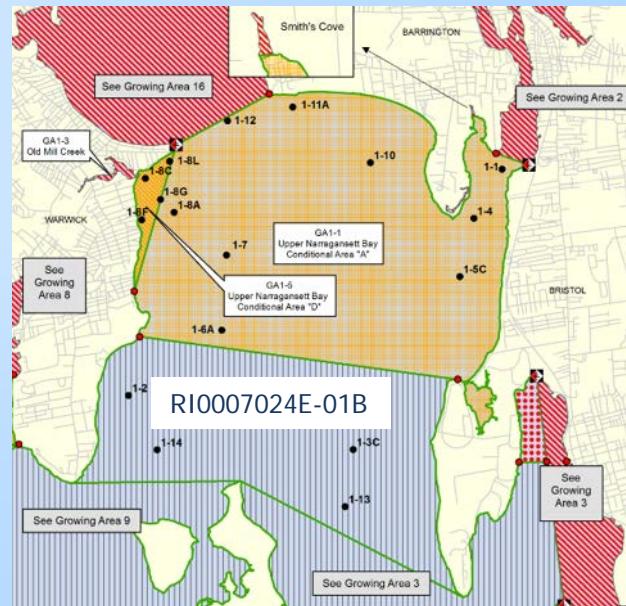
## De-Listings Linked to Pollution Abatement Investments

### 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/emsda/snapshot/Documents/Publications/Water%20Quality%20Reports/Water%20Quality%20Improvements%20Associated%20with%20Phase%201%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



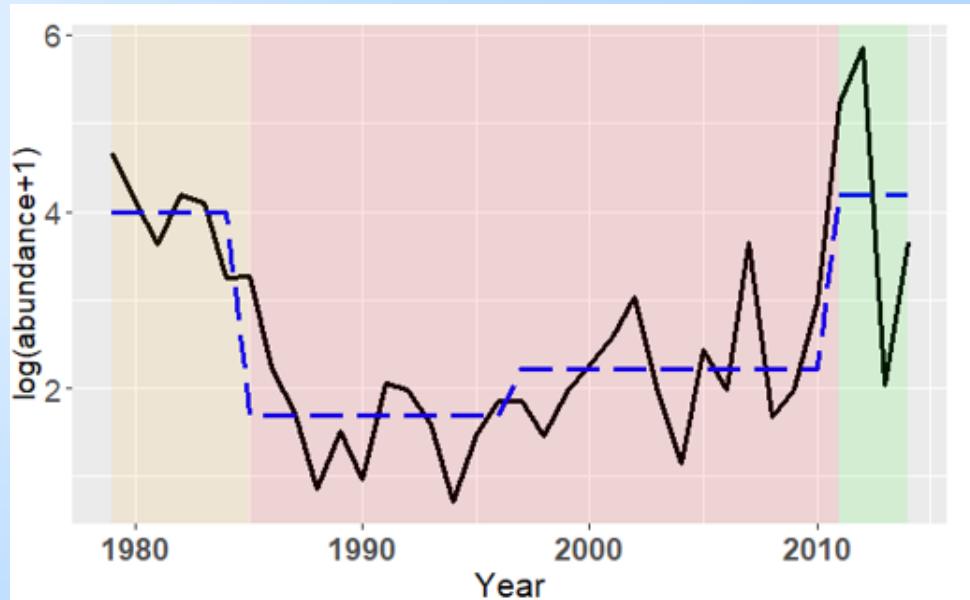
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**Figure 5.** Time series of log-transformed aggregate finfish abundance in Mt. Hope Bay 1979-2014 (black), with selected intervention-only time series model (dashed blue line). Orange, red, and green background panels indicate medium, high and low 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).

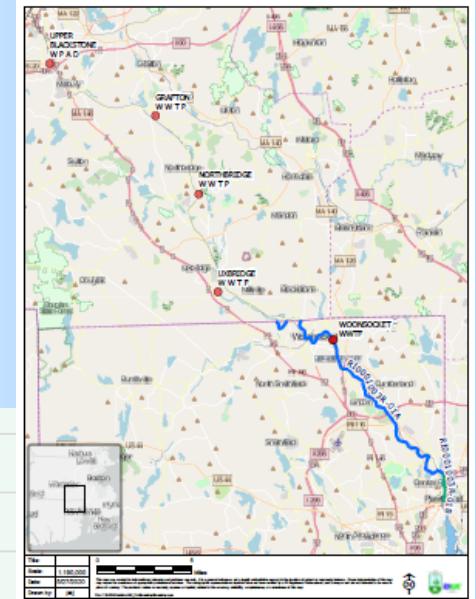
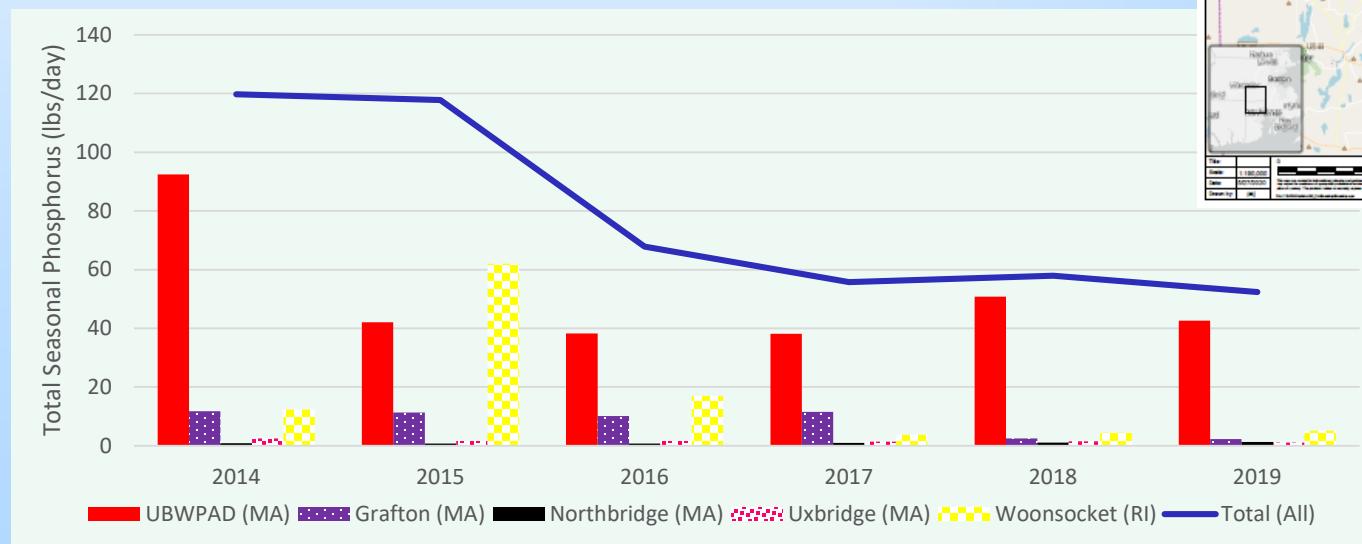
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# Water Quality Restoration

## 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.



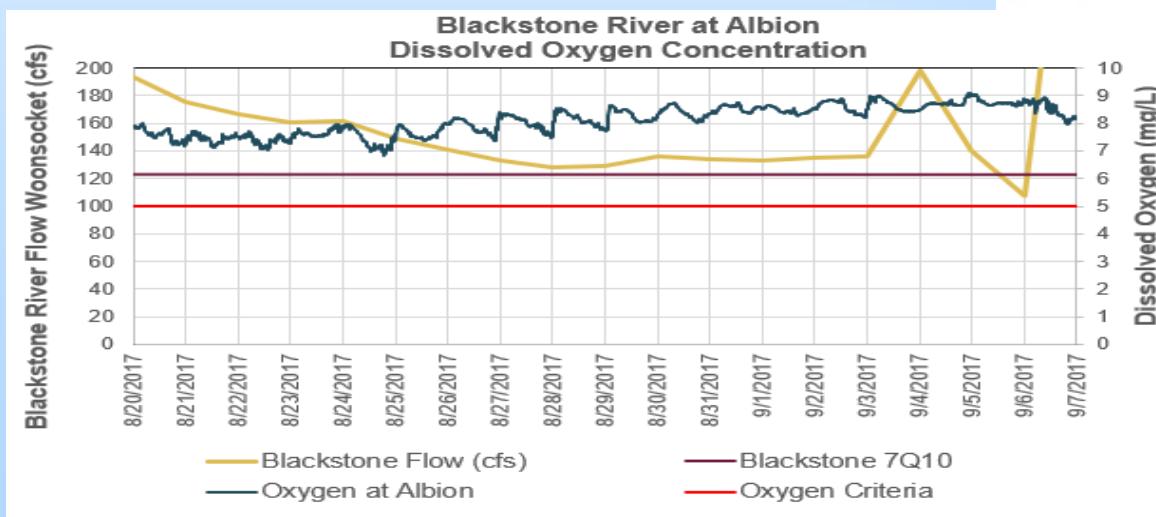
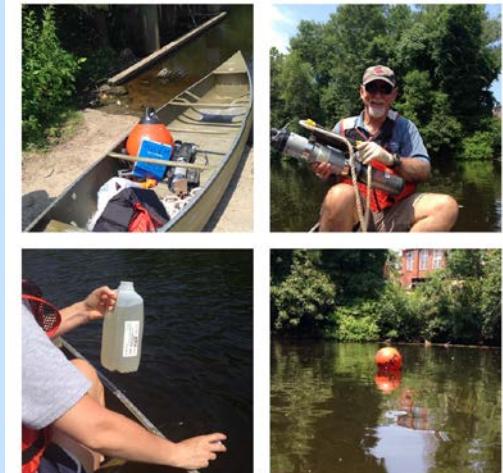
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\*Proposed Delisting applies to RI Waters.



# 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 & <del>Tribs</del> (RI0008040R-16D) Dissolved Copper						
Sample Date	Detection Limit (µg/L)	Quantitation Limit (µg/L)	Concentration (µg/L)	Hardness <sup>1</sup> (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



Final Report  
April 2014



RHODE ISLAND DEPARTMENT 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



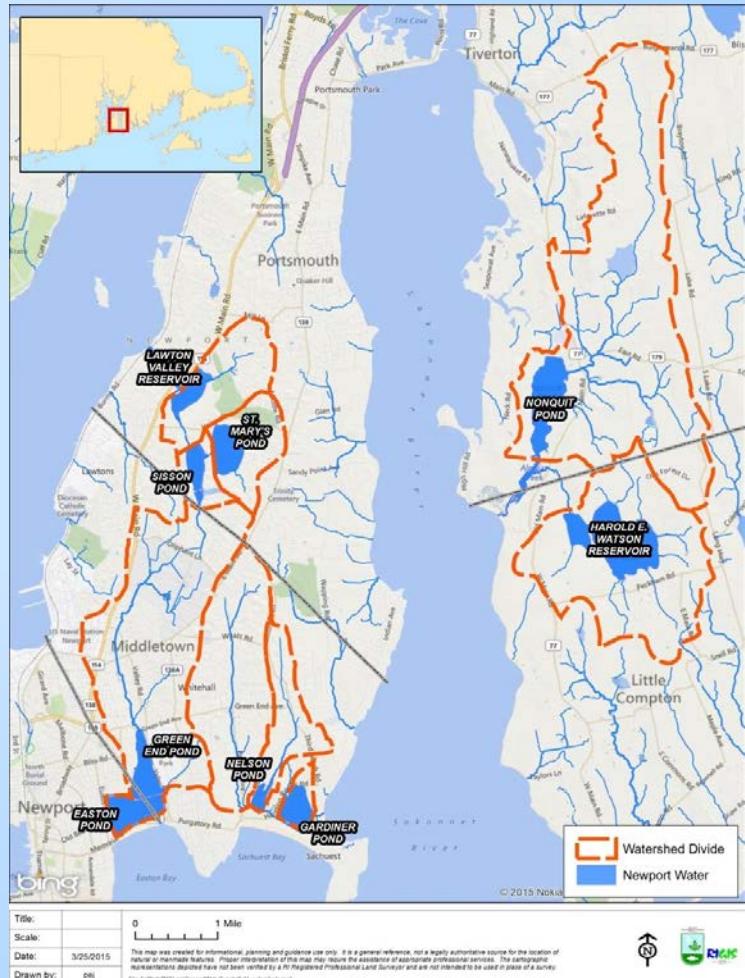
<https://www.macroinvertebrates.org/taxa-characters/diptera-larva/chironomidae/tanytarsus/lateral>

[Skip.viator@dem.ri.gov](mailto:Skip.viator@dem.ri.gov),  
[jane.sawyers@dem.ri.gov](mailto:jane.sawyers@dem.ri.gov)

# TMDL – Water Quality Restoration Studies Underway

## Draft TMDL in development:

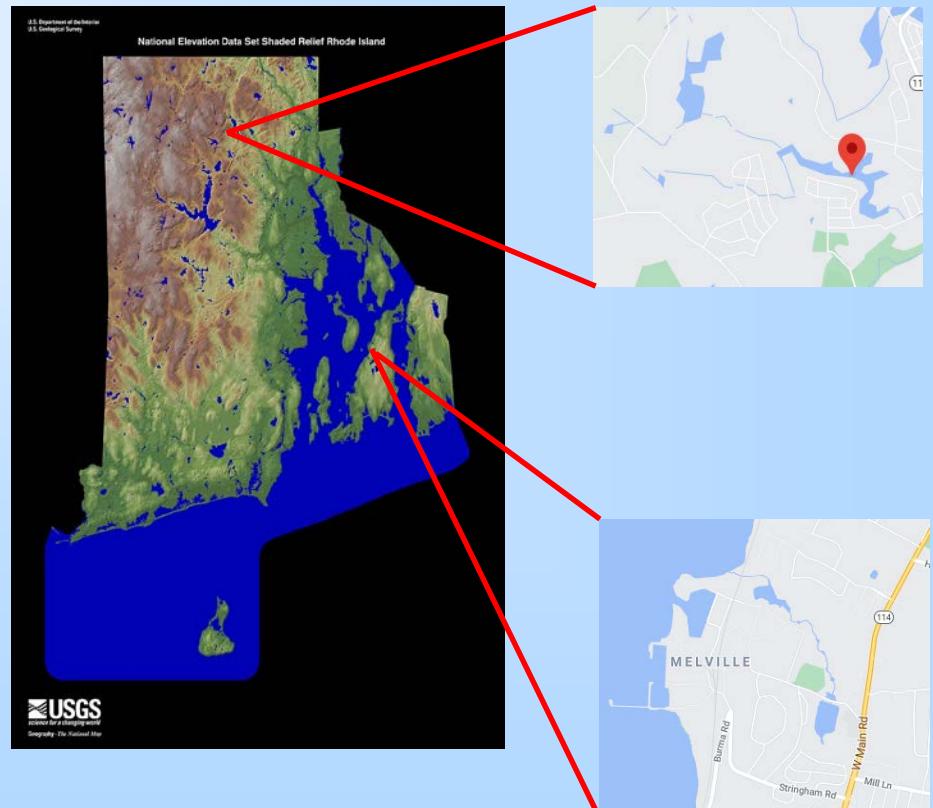
- **Newport Drinking Water Supply Reservoirs**
  - Drinking water and aquatic life use impairments caused by total organic carbon and total phosphorus
  - Gardiner Pond, Nelson Paradise Pond, South Easton's Pond, North Easton's Pond, St Mary's Pond, Sisson Pond, Lawton Valley Reservoir, Watson Reservoir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



[Brian.zalewsky@dem.ri.gov](mailto:Brian.zalewsky@dem.ri.gov),  
[jane.sawyers@dem.ri.gov](mailto:jane.sawyers@dem.ri.gov)

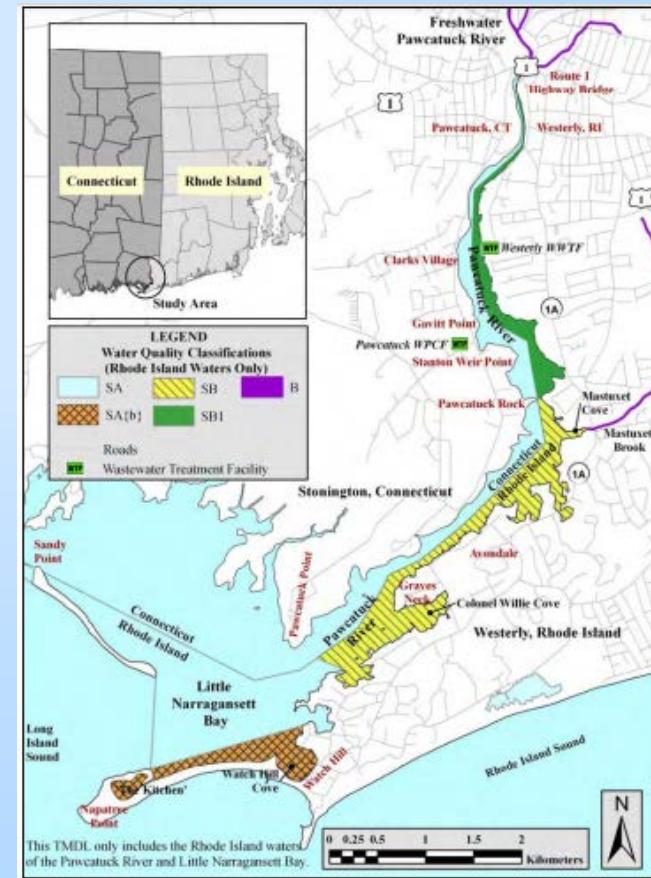
# TMDL – Water Quality Restoration Studies Proposed Near Term

- **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:

Heidi Travers  
DEM/Office of Water Resources  
235 Promenade Street, Providence, RI 02908  
[heidi.travers@dem.ri.gov](mailto:heidi.travers@dem.ri.gov)

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>

