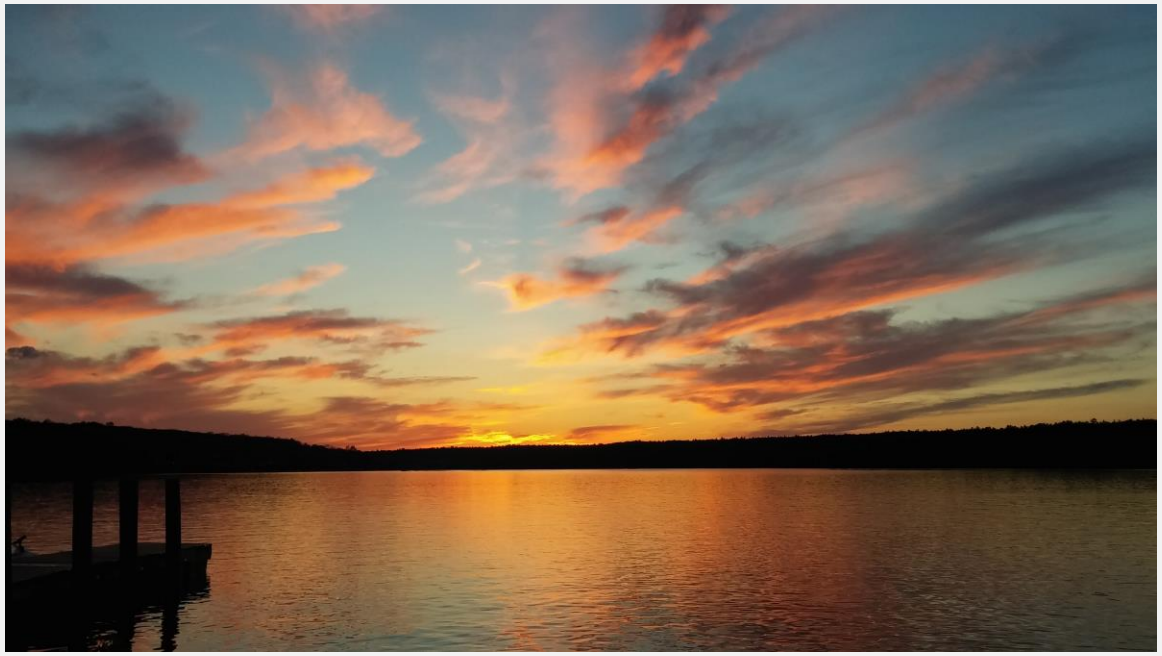
Rhode Island's Integrated Reporting Process & Draft 2016 303(d) List

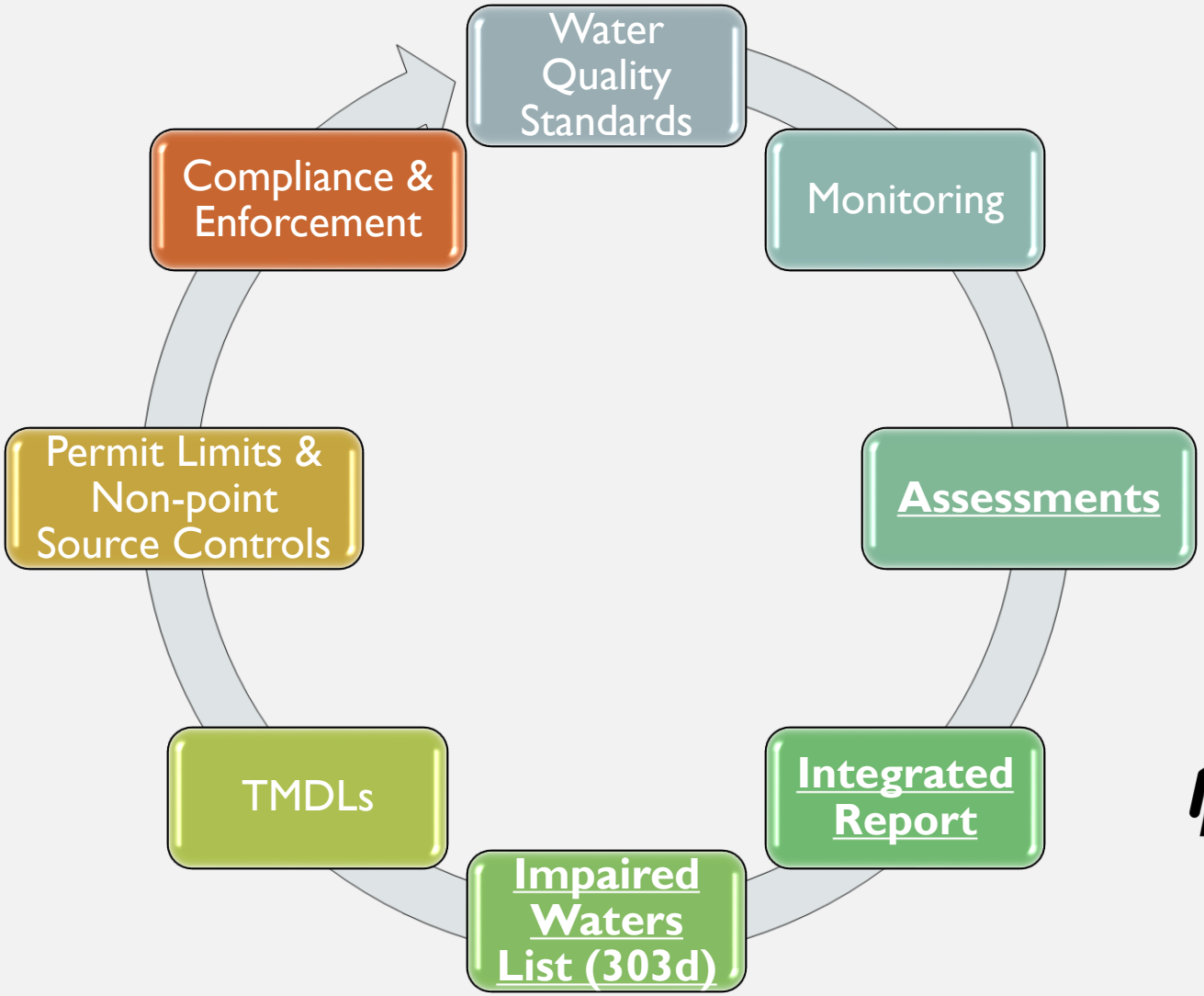


RIDEM
Office of Water Resources
January 11, 2018 3-5PM
Room 300

OVERVIEW OF PRESENTATION

- Background – federal Clean Water Act requirements
- Overview of Assessment Process
- Results of Assessment → 2016 303(d) List
- Water Quality Restoration Activities
  - Investments leading to improved water quality
  - Ongoing and planned water quality restoration studies

WATER QUALITY MANAGEMENT FRAMEWORK



CLEAN WATER ACT REQUIREMENTS

- **Water Quality Standards** for the state's waters
  - WQ Classification & 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 & 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
    - 5.0mg/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/Swimming	**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, & REPORT

ASSIGN WQ STANDARDS & CLASSIFICATION

DEFINE WATERBODY ID

MONITORING DATA

ASSESSMENTS

MEETS WQ STANDARDS

DOES NOT MEET WQ STANDARDS

IMPAIRED WATERS LIST

TMDL/WQ RESTORATION

ASSESSMENTS: CALM

- Consolidated Assessment and Listing Methodology
- 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** from 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: Section 305(b), State of the State's Waters Report and Section 303(d) Impaired Waters List

SOURCES OF 2016 IR 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

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
Category 2		• Attaining some designated uses • No use is threatened • Insufficient or no data to assess other designated uses	• Some designated uses are "fully supporting", more data is needed for other designated uses
Category 3		• Insufficient or no data to assess any designated use	• More monitoring is needed
Category 4		• Impaired or threatened for one or more designated use but does not require a TMDL because:	• Impaired or threatened but no TMDL needed
	A	• TMDL has been completed	
	B	• Other pollution control measures are expected to result in attainment	
	C	• Impairment not caused by pollutant	
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 2016 IR CATEGORY SUMMARY

Category	Waterbody Type				2016 Totals (WBIDs)	2014 Totals (WBIDs)
	Estuarine	Rivers	Lakes	Coastal		
1	0	0	0	0	⇩ 0	16
2	75	118	22	1	⇧ 216	190
3	9	216	101	0	⇩ 326	390
4A	18	70	31	0	⇩ 119	125
4B	0	0	0	0	0	0
4C	0	3	28	0	⇩ 31	39
5	35	104	51	0	⇧ 190	121
Totals	137	511	233	1	882	881

DRAFT 2016 IR SUMMARY STATISTICS

RIVERS

- 1,420 river miles in the state
  - ↑ 1,091 miles (77%) are assessed
  - ↑ 731 assessed miles (67%) are impaired
  - ↑ 441 assessed miles (40%) are impaired and scheduled for a TMDL.

LAKES

- 20,749 acres of lakes & ponds in the state
  - ↓ 15,293 acres (74%) are assessed
  - ↑ 11,028 assessed acres (72%) are impaired
  - ↑ 6,188 assessed acres (41%) are impaired and scheduled for a TMDL.

ESTUARIES

- 159 sq. miles in the state
  - ↔ 156 sq. miles (98%) are assessed
  - ↑ 73 assessed sq. miles (47%) are impaired
  - ↑ 67 assessed sq. miles (39%) are impaired and scheduled for a TMDL.

DRAFT 2016 IR CATEGORY SUMMARY

	Category	Primary Driver of Category Change
⇩	1	New Narragansett Bay fish tissue data not yet reviewed
⇧	2	More waters supporting some uses due to: increased monitoring and meeting WQS
⇩	3	More monitoring reducing unassessed waters
⇩	4A	Some moved to 2 (meeting WQS), some moved to 5 (impairment needing TMDL)
	4B	
⇩	4C	Moved to 5 (impairment needing a TMDL)
⇧	5	Primarily bacteria in rivers and mercury in fish tissue in lakes

INTEGRATED REPORT LISTING CATEGORIES

Category		Description	Meaning
Category 1		• Attaining all designated uses • No use threatened	• Considered "fully supporting" all designated uses
Category 2		• Attaining some designated uses • No use is threatened • Insufficient or no data to assess other designated uses	• Some designated uses are "fully supporting", more data is needed for other designated uses
Category 3		• Insufficient or no data to assess any designated use	• More monitoring is needed
Category 4		• Impaired or threatened for one or more designated use but does not require a TMDL because:	• Impaired or threatened but no TMDL needed
	A	• TMDL has been completed	
	B	• Other pollution control measures are expected to result in attainment	
	C	• Impairment not caused by pollutant	
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)

INTEGRATED REPORT LISTING CATEGORIES

Category	Description	Meaning
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)

LIST IMPAIRED WATERS
RI'S 2016 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

LISTING TRENDS

303(d) list	# of Waterbodies	Waterbody Impairments
2016	159	190
2014	96	168
2012	96	178
2010	132	234
2008	112	196
2006	161	273
2004	136	234
2002	130	233

DIFFERENCES BETWEEN 2014 AND 2016 303(D) LISTS

- **Increased number of named waterbodies on list (63 new)**
- **Increase in number of waterbody impairments**
  - **168 (2014) to 190 (2016)**
- **De-listing of impairments where WQS attained or original listing inaccurate**
  - **41 impairments removed**
- **Schedule shifts for TMDL development**

Cold (aka Cole) Brook at Quicksand Pond Rd., Little Compton

Bowdish Reservoir, Glocester

IMPAIRMENTS REMOVED FROM 303D

Cause	Waterbodies
Ambient Bioassays – Chronic Aquatic Toxicity	• Wood River (-18D)
Aquatic Macroinvertebrate Bioassessments	• Branch River (01B) • Valley Falls Pond
Benthic-Macroinvertebrate Bioassessments	• Clear River (-05D) • Blackstone River (-01A, -01B) • Woonasquatucket River (-10C, -10D) • Ten Mile (-01B) • Pawtuxet River Main Stem • Runnins River • Bailey's Brook • Maidford River • Pawcatuck River (-18D) • Wood River (-16D) • Saugatucket Pond • Dundery Brook

IMPAIRMENTS REMOVED FROM 303D #2

Cause	Waterbodies
Cadmium	• Pawtuxet River Main Stem • Ashaway River (-02A) • Chipuxet River (-06B)
Copper	• Branch River (-01B) • Chipuxet River (-06B) • Perry Healy Brook • Canonchet Brook (-04A) • Coney Brook
Enterococcus	• Nooseneck River • Boyd Brook • Pawtuxet River South Branch (-04B)
E. coli	• Moswansicut Stream
Fecal coliform	• Greenwich Cove (-05A) • Great Salt Pond: Trim's Pond and Harbor Pond (-01C)

IMPAIRMENTS REMOVED FROM 303D #3

Cause	Waterbodies
Iron	• Cedar Swamp Brook • Pawcatuck River (-18E) • Canob Brook
Mercury in Fish Tissue	• Tiogue Lake
Temperature	• Mt. Hope Bay (-01A, -01B, -01C, -01D)

NEW IMPAIRMENTS ON 2016 303(D) LIST

Cause	Waterbodies
Benthic Macroinvertebrate Bioassessments	• Cherry Brook • Moshassuck River (-01A)
Copper	• Sucker Brook
Fecal Coliform	• Pachet Brook
Iron	• Blackstone River (-01A, -01B)
Dissolved Oxygen	• Spectacle Pond* • Silver Lake
Total Phosphorus	• Bailey's Brook • Maidford River • Paradise Brook
Turbidity	• Maidford River • Paradise Brook

*Delisted to 4A due to TMDL previously completed for total phosphorus

NEW IMPAIRMENTS ON 2016 303(D) LIST #2

Cause	Waterbodies	Waterbodies (cont.)
Enterococcus	• Saunders Brook • Herring Brook • Tucker Brook • Sucker Brook • West Sneech • Monastery Brook • Unnamed Trib to Blackstone #1 • Unnamed Trib to Blackstone #2 • Mussey Brook • Spring Brook • Abbott Run Brook South • Millers River • Hawkins Brook • Reaper Brook • Woonasquatucket River (-01A) • Nine Foot Brook • Unnamed Tribs to Stillwater Pond	• West River • Hawkinson Brook • Mishnock River • Unnamed Trib #3 to S. Branch Pawtuxet • Rush Brook • Shippee Brook • Westconnaug Brook • Wilbur Hollow Brook • Mill Pond • Founders Brook • Ashaway River • Beaver River • Chickasheen Brook • Chipuxet River (-06A, -06B) • Pasquiset Brook • Pawcatuck River (-18A)

NEW IMPAIRMENTS ON 2016 303(D) LIST #3

Cause	Waterbodies	Waterbodies (cont.)
Enterococcus	• Perry Healy Brook • Queens River (-21A, -21C) • Sodom Brook • Usquepaug River • Queens Fort Brook (-31A, 31B) • Sherman Brook • Brushy Brook (-03A, -03C) • Canonchet Brook (-04A) • Falls River • Dundery Brook • Tribs East of Cold (aka Cole) Brook	• Moscow Brook • Parris Brook • Roaring Brook • Canob Brook • Adamsville Brook • Little Creek • Pachet Brook • Sin & Flesh Brook • Trib to Saugatucket Pond • Lily Pond • Cold (aka Cole) Brook

NEW IMPAIRMENTS ON 2016 303(D) LIST #4

Cause	Waterbodies
Mercury in Fish Tissue	• Wilson Reservoir • Echo Lake (aka Pascoag Reservoir) • Smith & Sayles Reservoir (aka Sand Dam) • Burlingame Reservoir • Keech Pond • Georgiaville Pond • Waterman Reservoir • Beach Pond • Carbuncle Pond • Bowdish Reservoir • Lake Washington • Clarksville Pond • Flat River Reservoir (aka Johnson Pond) • Belleville Ponds • Worden Pond • Barber Pond • Breakheart Pond • Tillinghast Pond • Deep Pond • Schoolhouse Pond • Silver Spring Lake

WATERS WITH FULLY SUPPORTING MERCURY FISH DATA

Cause	Waterbodies
Mercury in Fish Tissue	• Gorton Pond • North Carr Pond • Olney Pond • Roger Williams Park Ponds • Stafford Pond • Tiogue Lake* • Upper Dam Pond • Warwick Pond • Saugatucket River & Tribs • Saugatucket River

- Some waters tested for mercury in fish tissue meet WQS
- Other contaminants not tested
- Refer to RI Department of Health and US FDA guidelines on fish consumption www.fda.gov/fishadvice

*Delisted this cycle for mercury in fish tissue

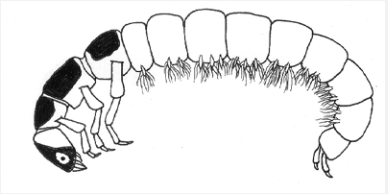
WATER QUALITY RESTORATION EFFORTS

WQ RESTORATION- DE-LISTINGS LINKED TO INVESTMENTS IN POLLUTION ABATEMENT

Woonasquatucket River – Benthic Macroinvertebrate

- WQ Improvements evident in two lower segments from Smithfield WWTF at town boundary to Eagle St in Providence
- Infrastructure investments contributing to observed improvements:
  - **Smithfield WWTF**
    - Upgrades to meet seasonal RIPDES permit limits for ammonia, total nitrogen, total phosphorus, and zinc
  - **Metals Recycling, LLC**
    - Completion of improvements to stormwater treatment system in 2012
    - Targeting reduction of BOD, COD, metals, and PCBs

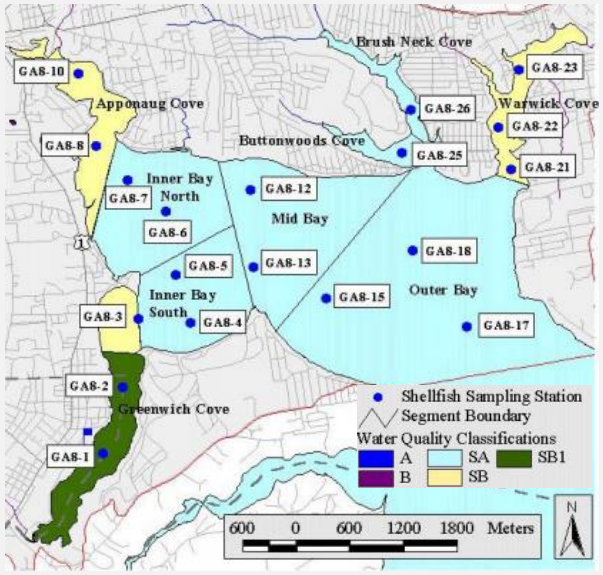
http://sethgreentu.org/stream-entomology/keys-to-caddisflies/caddis-fly-larva/



WQ RESTORATION- DE-LISTINGS LINKED TO INVESTMENTS IN POLLUTION ABATEMENT

Greenwich Cove – Recreational Use (Fecal Coliform)

- **Infrastructure investments contributing to observed improvements:**
- Town of East Greenwich
  - 23 infiltrating catch basins in Hill and Harbor District funded w EPA Section 319 & RI Bay and Watershed Restoration Fund
  - Annual catch basin cleaning & frequent street sweeping
  - Water St sewer main replacement in 2012
  - Elimination of failing on-site systems and/or illicit connections:
    - Marina
    - Senior Living Facility
    - Mill property



URIWW Enterococci <35

	2012	2013	2014	2015	2016
# of Samples	6	6	6	6	6
WW325 – EG Town Dock	27.9	13.6	22.2	14.2	9.9

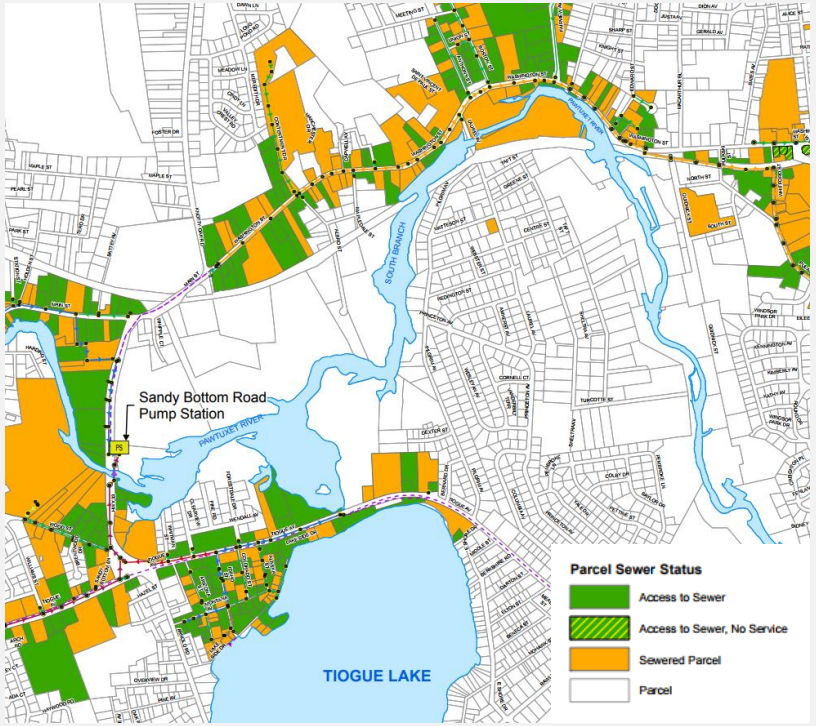
RIDEM Shellfishing Fecal coliform <50

	Site 8-1		Site 8-2	
Year	Geomean	# of Samples	Geomean	# of Samples
2013	3.5	15	5.5	15
2014	3.5	14	7.7	15
2015	5.7	13	5.7	15

WQ RESTORATION- DE-LISTINGS LINKED TO INVESTMENTS IN POLLUTION ABATEMENT

South Branch Pawtuxet River – Recreational Use (Enterococcus)

- Infrastructure investments contributing to observed improvements:
- Town of Coventry Sewering
  - Sandy Bottom & Main St 2008
  - Tiogue Ave & Arnold Rd 2011-12
  - Mandatory tie-in



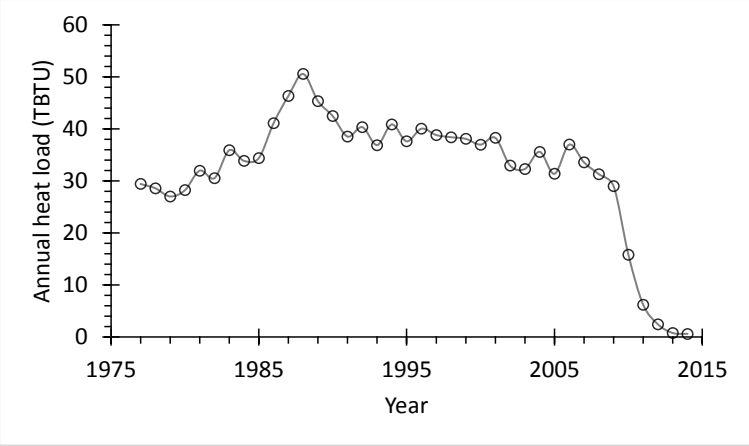
Recent enterococcus values <54

Station ID	Location	2006-08	2012	2016
PXT03	Pulaski St.	266	36.77	42.24
PXT04	Factory St.	265	N/A	N/A
SBP06	Main St.	85	N/A	N/A
SBP07a	Providence St.	25	46.83	18.00

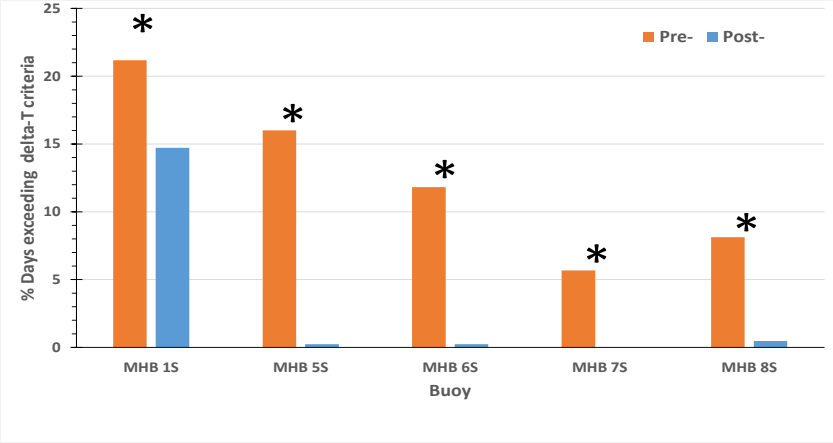
WQ RESTORATION- DE-LISTINGS LINKED TO INVESTMENTS IN POLLUTION ABATEMENT

Mt. Hope Bay – Aquatic Life Use (Temperature)

- **Infrastructure investments contributing to observed improvements:**
- **Brayton Point Station**
  - **Natural Draft Cooling Towers – 2012**
  - **Operation ceased May 31, 2017**



Annual heat load (trillions BTU/year) Brayton Point cooling water 1977 to 2014.
(Data source: Table 1-5 of 2014 Brayton Point Annual Report)



Frequency of days exceeding summer seasonal ΔT prior to and following conversion to closed cycle cooling at five buoy location in Mt. Hope Bay.
*Statistically significant difference between pre- and post-cooling

WQ RESTORATION- DE-LISTINGS LINKED TO INVESTMENTS IN POLLUTION ABATEMENT

Cedar Swamp Brook – Aquatic Life Use (Total Iron)

- **Infrastructure investments contributing to observed improvements:**
  - Many State and Federal remediation actions
  - Operational Improvements at Central Landfill
  - Stream relocated and restored 2002-2017
  - System constructed to capture and treat discharge from underdrain for ammonia and iron

Photo: http://www.parecorp.com/portfolio/wetlands-permitting/cedar-swamp-brook-relocation

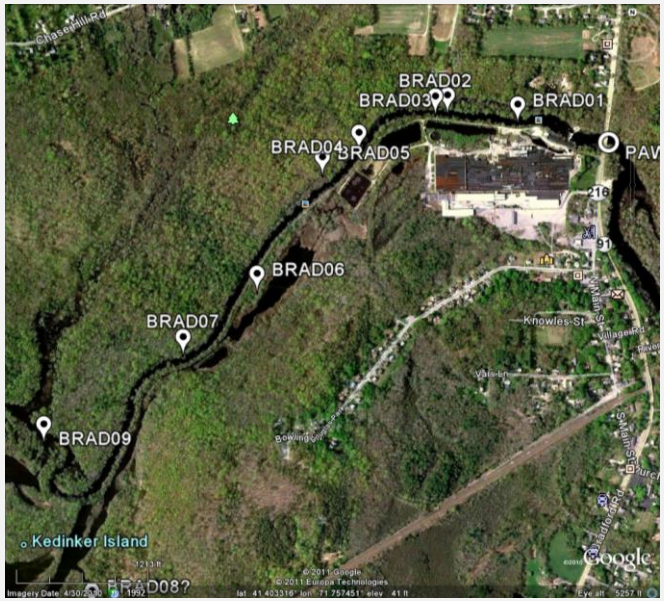
Recent total iron values <1000

Station ID	8/2012	11/2012	2/2013	5/2013	8/2013	2/2014	5/2014	8/2014	11/2014	2/2015	5/2015	8/2015	11/2015	2/2016	5/2016
SW-1B	510	147	710	170	290	96	99	570	120	53	150	340	180	200	80
SW-A	460	258	200	310	470	320	210	1000	450	100	300	600	230	490	250
SW-B	500	408	270	340	580	320	220	840	560	250	330	570	470	550	310
SW-C	570	383	270	320	580	340	260	960	490	270	320	780	480	510	270
SW-7	160	222	300	510	400	400	280	520	200	200	310	120	150	490	260

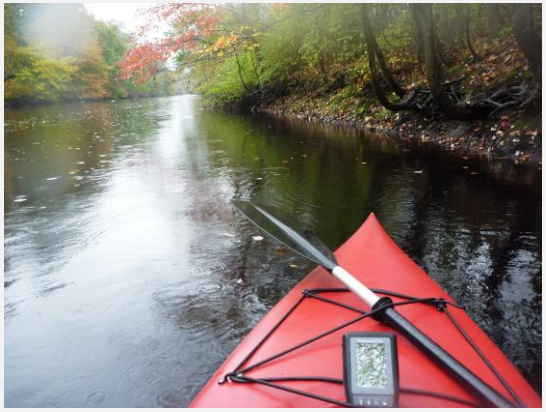
WQ RESTORATION- DE-LISTINGS LINKED TO INVESTMENTS IN POLLUTION ABATEMENT

Pawcatuck River – Aquatic Life Use (Benthic Macroinvertebrate Bioassessments)

- Original listing based on excessive amounts of sulfur-fixing bacteria near Bradford Dyeing Association discharge
- **Infrastructure investments contributing to observed improvements:**
- RIPDES permit required BDA to suspend use of unlined pH neutralization lagoons switching to indoor computerized system to maintain pH
- Visual inspection by RIDEM in 2011 indicated no visual evidence of sulfur-fixing bacteria or other biodiversity impacts
- BDA ceased discharge of effluent in 2015



2011 Inspection locations along the Pawcatuck River



Stream banks on 10/19/2011 at BRAD03

WQ RESTORATION- DE-LISTINGS LINKED TO INVESTMENTS IN POLLUTION ABATEMENT

Wood River – Aquatic Life Use (Ambient Bioassays-Chronic Aquatic Toxicity & Benthic Macroinvertebrate Bioassessments)

- Original listing based on visual observations at Charbert, and data documenting wastewater discharges to lagoons and groundwater leachate
- RIDEM/OWM Site Remediation
  - Site remediation underway 1998 to present
  - Extensive compliance monitoring
  - Water samples from January 30, 2009 did not contain VOCs
  - Water samples from diffusion bags buried in river sediment in 2008 and 2015 demonstrate effectively reduced mass of contaminants discharging to river
  - Charbert facility ceased operations in February 2008

Wood River at Rt. 91

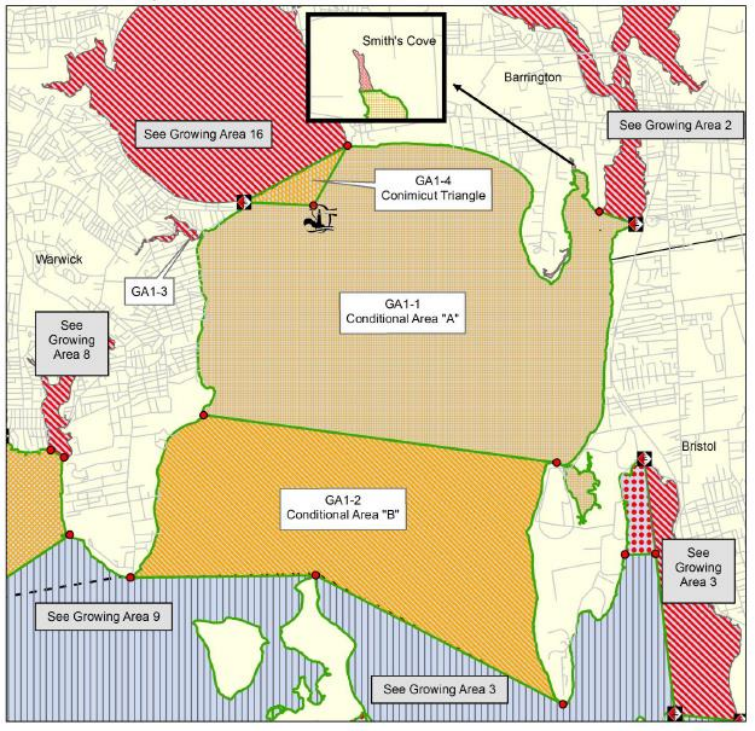
ONGOING WATER QUALITY RESTORATION EFFORTS

DEM works with partners to restore water quality through:

- Issuance of Point Source Discharge and Stormwater Permits
- Financial and/or technical assistance to cities/towns in:
  - Implementing stormwater controls & habitat improvements
  - Evaluating feasibility of Stormwater Management Districts
- Development of TMDL Studies
- Development of Watershed Plans:
  - Nonquit Reservoir – slated for completion early 2018
  - Narrow River – slated for completion mid-2018
  - Wood-Pawcatuck – slated for completion mid-2018
  - Scituate Reservoir – begun late 2017
  - Aquidneck Island – to begin in 2018

ONGOING WATER QUALITY RESTORATION EFFORTS

Increased Shellfishing Opportunity in Upper Narragansett Bay



Measuring improvements by acre-days = # of days open *x* total acres available to harvest shellfish

ONGOING WATER QUALITY RESTORATION EFFORTS

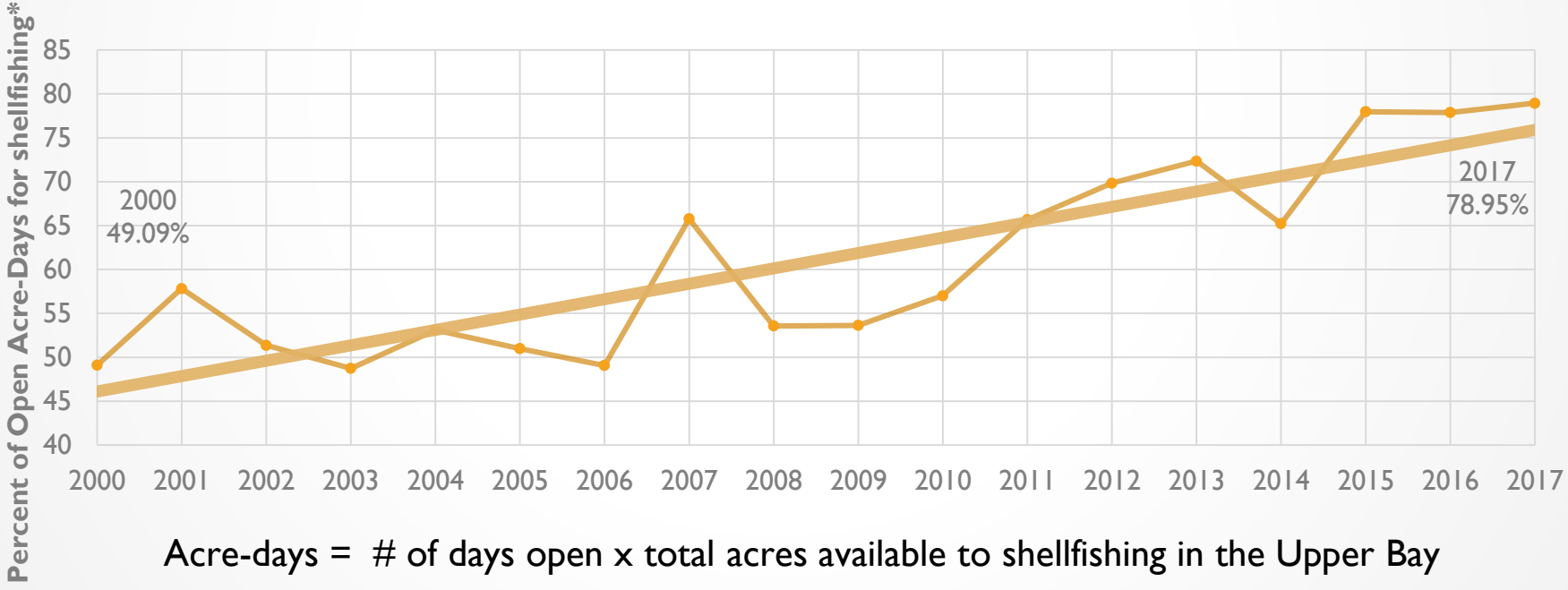
Investments by NBC to control CSOs leads to Increased Shellfishing Opportunity in Upper Bay

NBC completes Phase I CSO tunnel in Dec 2009; DEM changes closure criteria in May 2011:

- Conimicut Triangle: unchanged at 0.5" rain
- Area A: 0.5" to 0.8" rain
- Area B: 1.0" to 1.5" rain

NBC Completes Phase II CSO improvements in Dec 2014; DEM changes closure criteria in May 2017:

- Conimicut Triangle merged with Area A:
- Area A: 0.8" to 1.2" rain
- Area B: APPROVED!!!

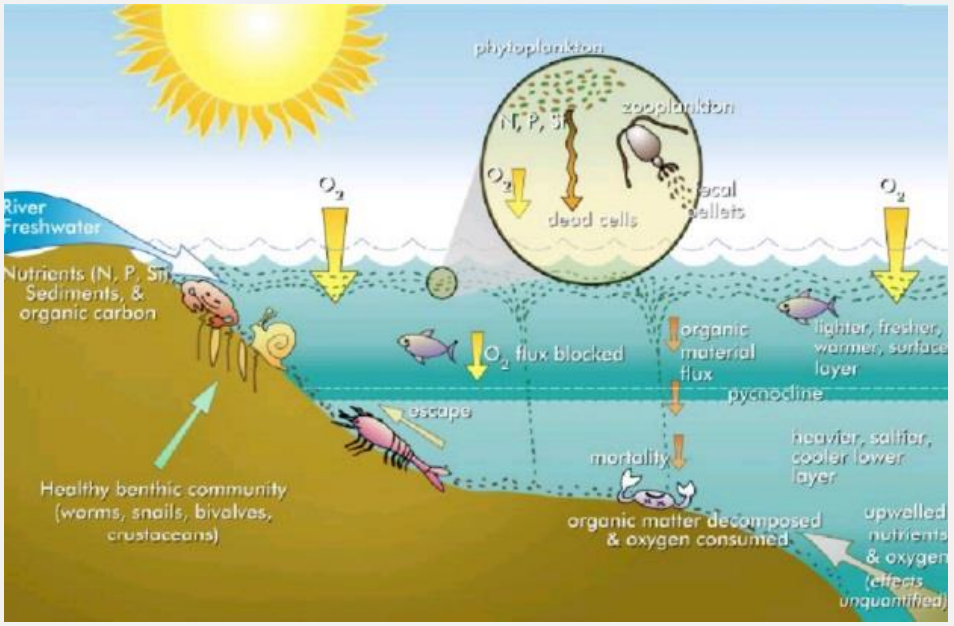


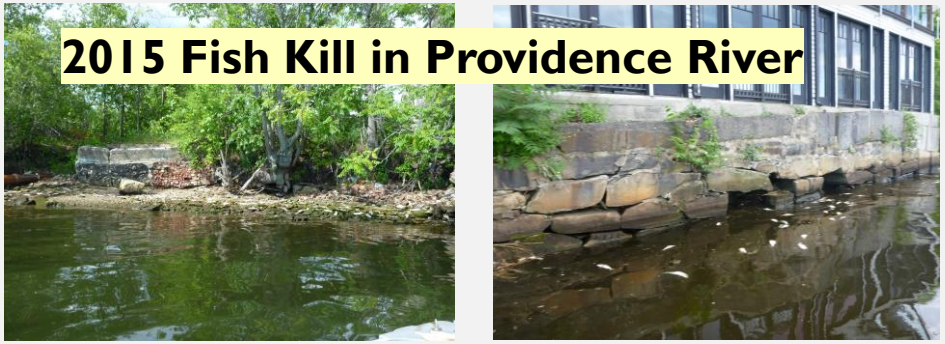
Acre-days = # of days open x total acres available to shellfishing in the Upper Bay

ONGOING WATER QUALITY RESTORATION EFFORTS

Efforts to Address Nutrient related Aquatic Life Use Impairments in Upper Bay (including Providence/Seekonk Rivers & Greenwich Bay)

- Dissolved oxygen impairments, and excessive phytoplankton and excessive seaweed in Greenwich Bay, Providence and Seekonk Rivers, and Upper Narragansett Bay.
- 1995-2000 Rhode Island and Massachusetts WWTFs contributed 62-73% of nitrogen to Narragansett Bay.
- Management efforts focused on reducing nitrogen from WWTFs impacting the Providence River, Seekonk River, Upper Narragansett Bay and Greenwich Bay

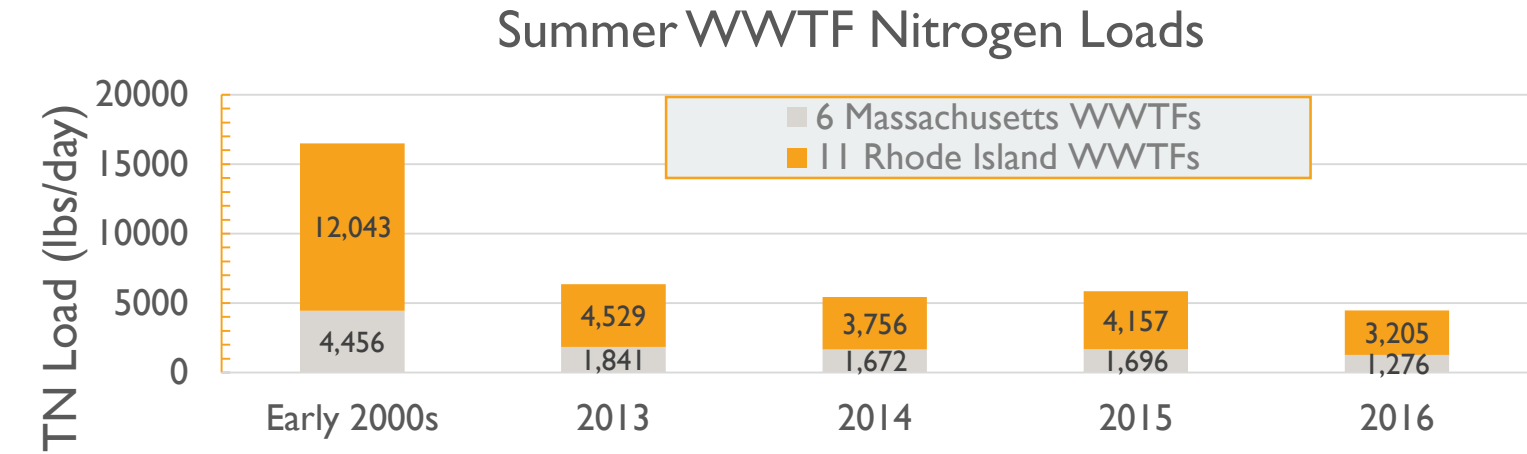




ONGOING WATER QUALITY RESTORATION EFFORTS

Efforts to Address Nutrient related Aquatic Life Use Impairments in Upper Bay (including Providence/Seekonk Rivers & Greenwich Bay)

Nitrogen Reductions from WWTFs:



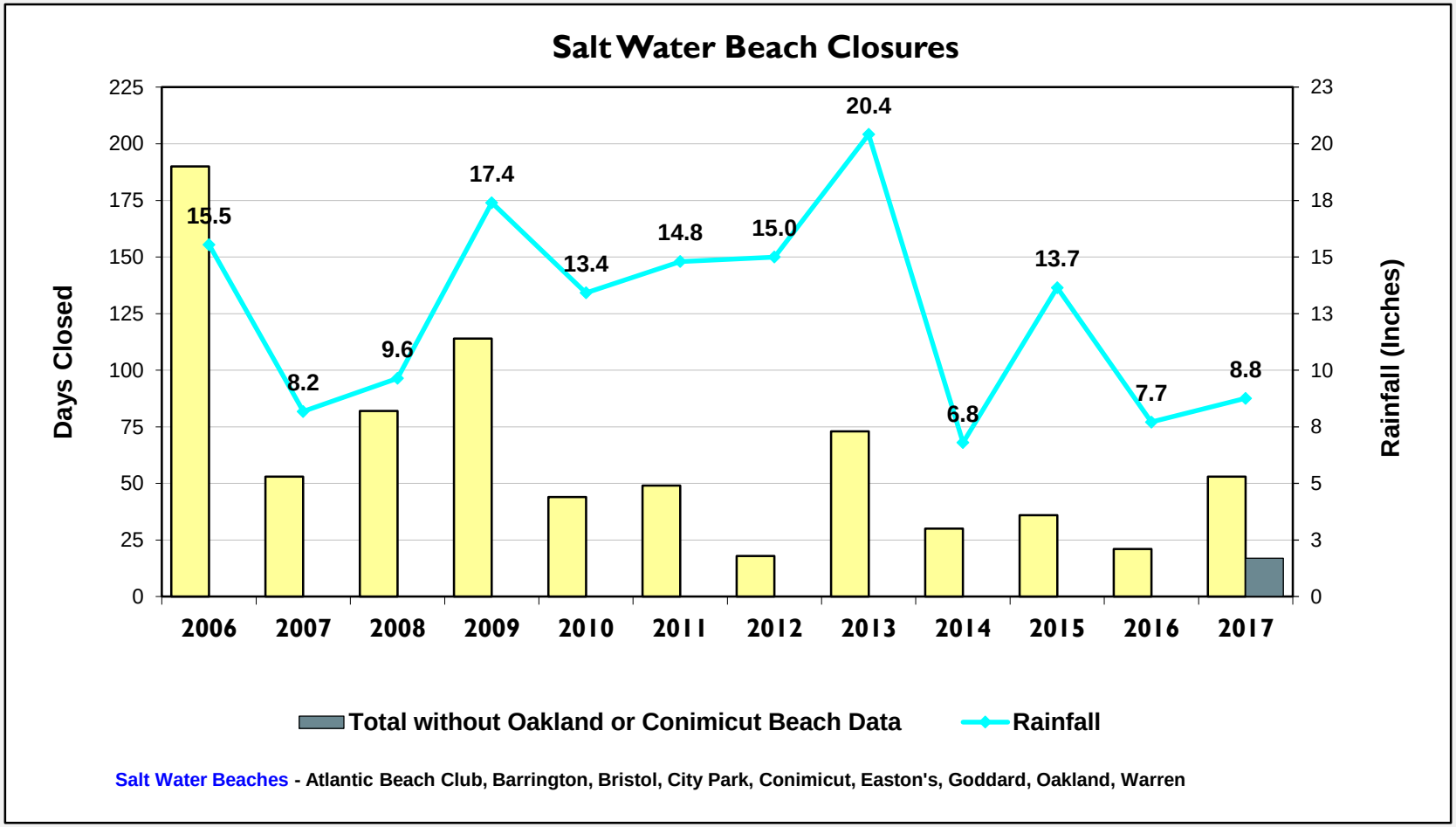
RI WWTFs: Burrillville, East Greenwich, East Providence, NBC Bucklin Point, NBC Fields Point, Smithfield, Cranston, Warren, Warwick, West Warwick, Woonsocket; **MA WWTFs**: Attleboro, Graton, North Attleborough, Northbridge, UBWPAD, Uxbridge

Next Steps:

- Monitor bay's response to nutrient reductions (nutrient, chlorophyll a, dissolved oxgyen) and improve understanding of biological interactions
- Continue to work with partners towards development of a water quality model that can be used to establish TMDL

ONGOING WATER QUALITY RESTORATION EFFORTS

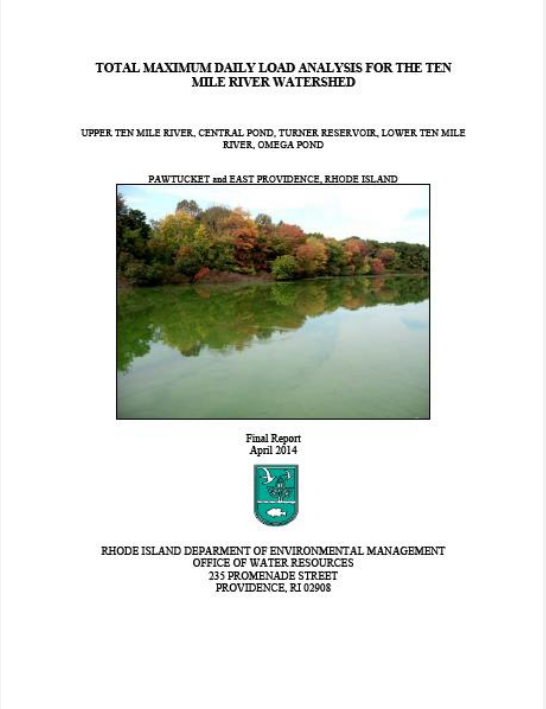
Tracking Beach WQ Improvements related to pollution abatement efforts



Salt Water Beaches - Atlantic Beach Club, Barrington, Bristol, City Park, Conimicut, Easton's, Goddard, Oakland, Warren

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

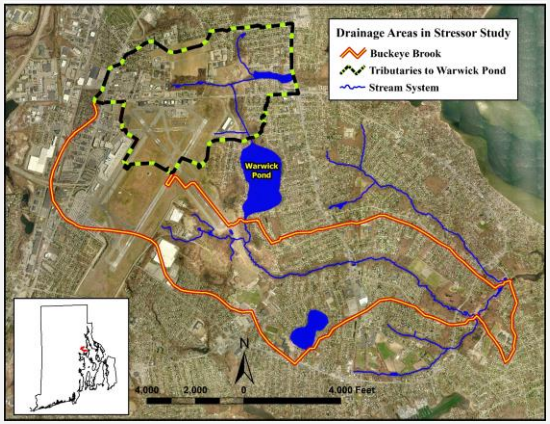
TMDL - WQ RESTORATION STUDIES UNDERWAY

Draft TMDL out for public review & comment (due February 9th):

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

Draft TMDL in development:

- **Newport Water's Source 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



TMDL - WQ RESTORATION STUDIES PROPOSED NEAR TERM

- **Bailey Brook, Maidford River, and Paradise Brook**
  - Tributaries to Newport Water Supply Reservoirs
  - aquatic life use impairments caused by phosphorus and/or turbidity, and sources of phosphorus to reservoirs
- **Pawtuxet River Main Stem and its tributaries, Pocasset River and Print Works Pond**
  - recreational use impairments caused by bacteria;
  - bacteria source to Providence River
- **Twenty-one Mercury Impaired Lakes and Ponds**
  - fish consumption advisories caused by elevated mercury in fish tissue
- **Tidal Pawcatuck River and Little Narragansett Bay**
  - Aquatic life use impairments associated with nutrient enrichment and dissolved oxygen

"TAKE-AWAYS" FROM 2016 ASSESSMENT AND IMPAIRED WATERS REPORT

- Targeted WQ monitoring has documented improvements resulting from infrastructure investments. Three notable examples:
  - Greenwich Cove – recreational use improvements
  - Lower Woonasquatucket River – macroinvertebrate improvements
  - Upper Bay - increased opportunities for shellfishing
- Increased surface water quality monitoring in 2011-2016 has reduced miles of un-assessed rivers
  - In total, 41 waterbody impairments that can be removed from state's 303(d) List
  - Increased # waterbodies considered assessed and meeting WQ standards
  - Increased # of known impaired waterbodies – largely due to bacteria
- Filling the gap in fish tissue monitoring for mercury
  - Increased # of known lakes/ponds with fish consumption impairments – though not all lakes where mercury fish tissue data available are impaired
- Ongoing or planned TMDL development focused on nutrient related impairments
- More work needed to address stormwater related impairments

DEM ACCEPTING COMMENTS ON DRAFT 2016 303(D) LIST

Send Comments to:

Elizabeth Scott
DEM/Office of Water Resources
235 Promenade Street, Providence, RI 02908
elizabeth.scott@dem.ri.gov

View or download the draft 2016 303(d)list:

http://dem.ri.gov/programs/benviron/water/quality/surfwq/pdfs/iwr17.pdf

Comments accepted through February 9, 2018