Norman Bird Sanctuary

Water Quality Monitoring and Restoration Program (Mid-Year Update)



Presented By: Kathleen Matthews

Contents of Presentation:


Understanding Our Approach to Water Quality


What our current Water Quality Monitoring Program looks like

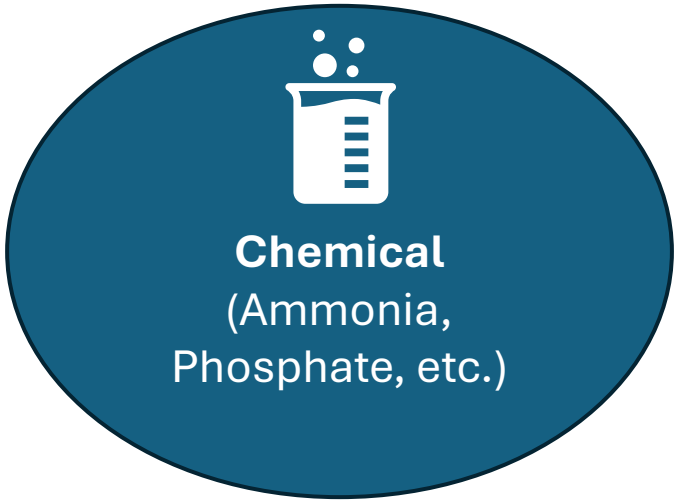

Goals of our program for the rest of 2026


Future paths for our program

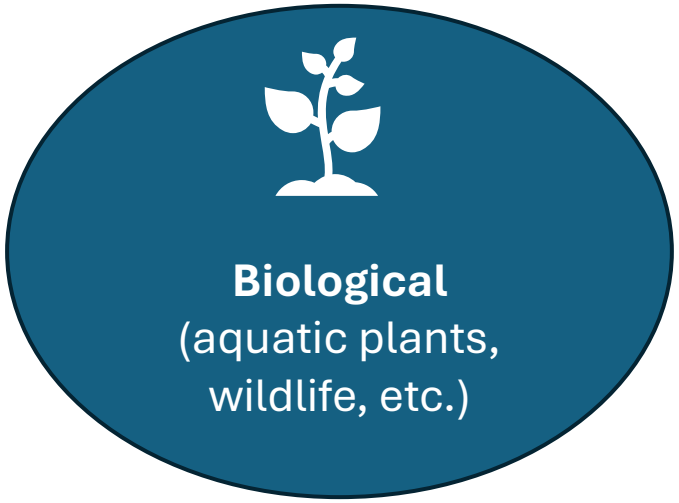

Questions

What is Water Quality?

Our Approach: The suitability of water based on its chemical, physical, and biological characteristics.







Examples of these characteristics:

Chemical

- **Nutrients:**
- Ammonia
- Phosphate
- Nitrate/Nitrite

- **Dissolved Oxygen (DO):**

-High or low levels

Physical

- **Trash**
- Microplastics
- **Water Flow**
- Human made dams
- **Temperature**
- Changes in external air temperature

Biological

- **Aquatic Plants and Wildlife:**
- Native/non-native
- Invasive/non-invasive
- Indicator Species

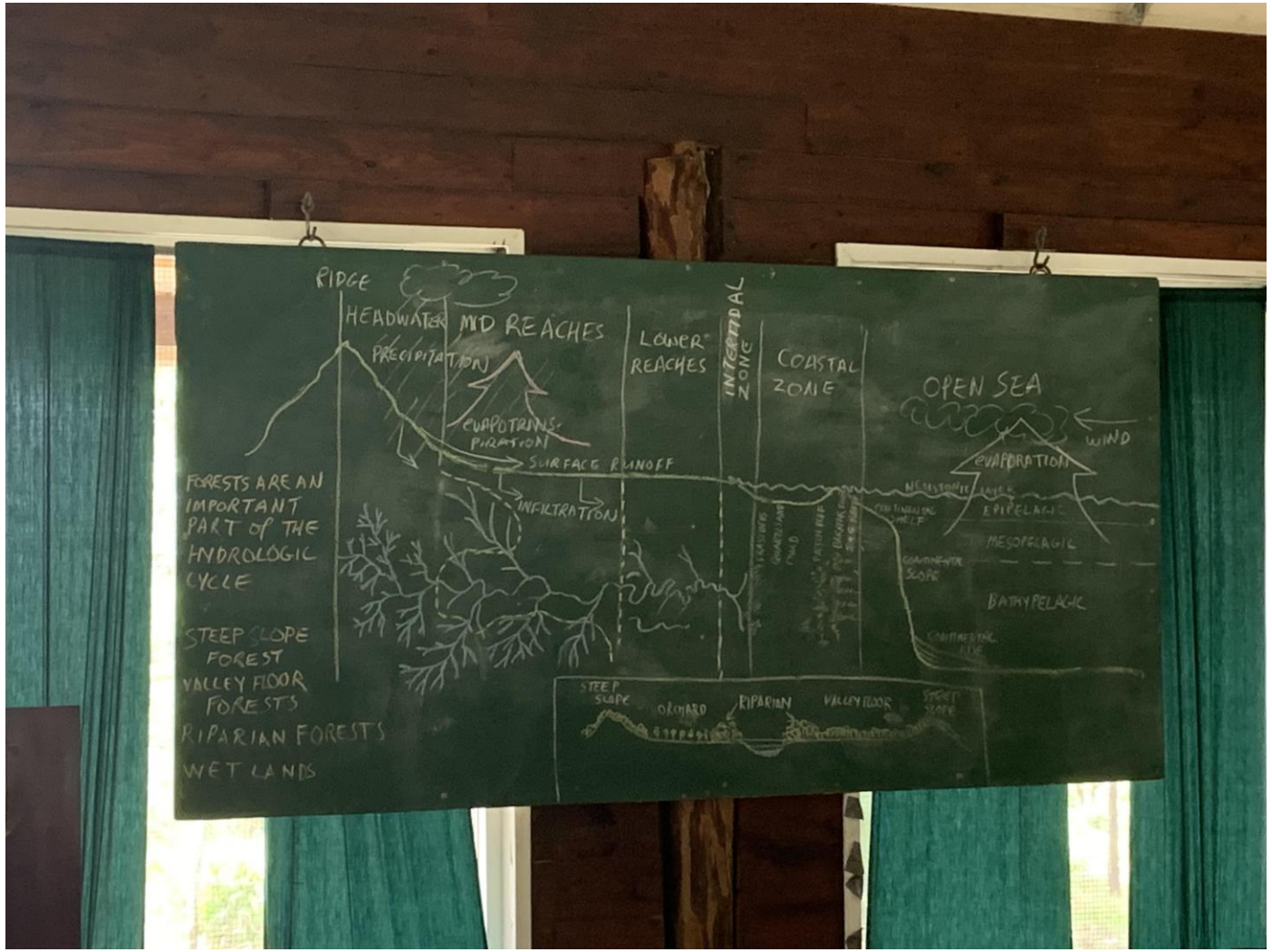
Why does this field of study matter?

Overall:

- Vital for aquatic ecosystem health.
- Supports recreational activities.
- Directly related to human health.

NBS Specific:

- We want healthy aquatic ecosystems for wildlife.
- Living example of healthy aquatic ecosystems for Aquidneck Island.



Water Quality Program Timeline:



Began recruiting volunteers and building program

End of 2025



Began Testing Water With Volunteers

February 2026



Mid-Year Update

August 2026



1st Year Presentation

January 2027

Freshwater Sites:

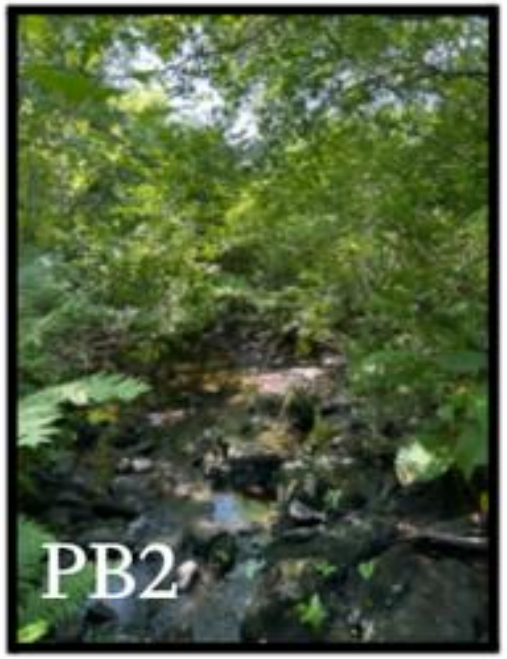
Red Maple Creek (RMC):
-3 sites (RMC1, RMC2, and RMC3)

Paradise Brook (PB):
-2 sites (PB1 and PB2)



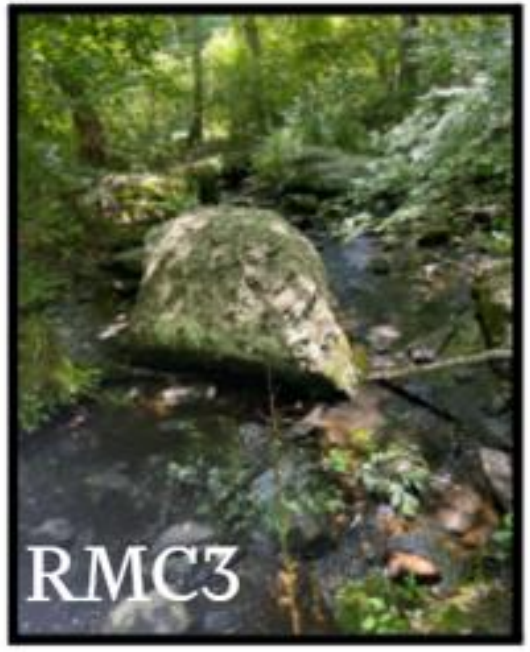
Freshwater Site Photos











What are we currently monitoring? Chemistry

Field:

- Air & Water Temperature
- pH
- Electrical Conductivity (EC)
- Salinity
- Dissolved oxygen (DO)
- Dissolved Oxygen Saturation (%DO)
- Oxidation Reduction Potential (ORP)
- Turbidity

Lab:

- Alkalinity
- Ammonia Nitrogen
- Phosphorus
- Nitrate Nitrogen
- Chloride

- E coli Bacteria (Soon to come)

Field Equipment





Lab Equipment









Chemistry Data Sheet



WATER QUALITY MONITORING & RESTORATION PROGRAM

Date:_____ Time:_____
Observer(s):_____
_____

Norman Bird Sanctuary
583 Third Beach Rd
Middletown, RI 02842
LAT: 41.499204 LON: -71.254021

Monitoring Site: [ ]

Test Equipment	Parameters	Value
Air/Water Temp Meter	Air Temperature (°C)	
Air/Water Temp Meter	Water Temperature (°C)	
Visual	Cloud Cover (%)	
Visual	Precipitation (Current) (N L M H Codes)	
Hanna 98194 Meter	Dissolved Oxygen (mg/L DO)	
Hanna 98194 Meter	DO Saturation (%DO)	
Hanna 98194 Meter	pH	
Hanna 98194 Meter	Electrical Conductivity (µS/cm EC)	
Hanna 98194 Meter	Salinity (ppt or PSU)	
Hanna 98194 Meter	Oxidation Reduction Potential (mV ORP)	
Turbidity Meter WGZ-1B 7.5v	Turbidity (NTU)	
Hanna Checker HI 775	Alkalinity (mg/L $CaCO_3$)	
Hanna Checker HI 700	Ammonia Nitrogen LR (mg/L NH_3-N)	
Hanna Photometer HI 83399	Nitrate Nitrogen (mg/L NO_3-N)	
Hanna Photometer HI 83399	Phosphate (mg/L ortho PO_4)	
Hanna Checker LR HI 753	Chloride (mg/L Cl-) (0-20)	
Hanna Kit HR HI 3815	Chloride (mg/L Cl-) (0-100) or (0-1000)	

SITE CODES:

Paradise Brook
PB1
PB2

Red Maple Creek
RMC1
RMC2(pond)
RMC3

Maidford River
MR1

Nelson Pond
NP1

Gardiner Pond
GP1

Precipitation Codes:
N - None
L - Light
M - Moderate
H - Heavy

NOTES:_____
_____
_____
_____



What are we currently monitoring? Biology



Freshwater Macroinvertebrates!











Macroinvertebrate data sheet

Common Macroinvertebrate specimens for better identification in lab



Biotic Index Data Sheet

Reproduce for use

Date: _____ Investigator Names: _____

Time: _____ AM/PM Leaf Pack Location: _____

1

Group 1: Sensitive	Group 2: Somewhat Sensitive	Group 3: Tolerant
☐ Stoneflies	☐ Damselflies	☐ Midge Flies
☐ Mayflies	☐ Dragonflies	☐ Black Flies
☐ Other Caddisflies	☐ Sowbugs	☐ Planarians
☐ Dobsonflies, Fishflies, and Alderflies	☐ Scuds	☐ Leeches
☐ Riffle Beetle Larvae/ Adults	☐ Crane Flies	☐ Left-Handed/ Lunged Snails
☐ Water Pennies	☐ Clams/Mussels	☐ Aquatic Worms
☐ Right-Handed/ Gilled Snails	☐ Crayfish	☐ Rat-Tailed Maggots
☐ Aquatic Snipe Flies	☐ Net-Spinning Caddisflies	
3 ☐ Number of TAXA	☐ Number of TAXA	☐ Number of TAXA

2 ☐ **Sum of All Individuals** *(Add the values from all boxes next to the taxa names)*

4 *Number of TAXA x 3 = INDEX VALUE* ☐ *Number of TAXA x 2 = INDEX VALUE* ☐ *Number of TAXA x 1 = INDEX VALUE* ☐

5 ☐ **Pollution Tolerance Index (PTI) Score** *(Add the three Index Values)*

Calculating the Biotic Index

Sort the macroinvertebrates into taxa groups.

1. Count the number of individual macroinvertebrates for each taxa. Record the quantity in the box to the left of the taxa name.
2. Determine the **Sum of All Individuals** by adding the numbers in the boxes next to all of the the taxa names. Record the total in the **Sum of All Individuals** box on the far right.
3. Count how many boxes in each sensitivity group column have a quantity entered. (Group 1 and Group 2: maximum 8, Group 3: maximum 7). Enter the **Number of TAXA** in the box at the bottom of each column.
4. Multiply the **Number of TAXA** by the weighting factor (3, 2 or 1) at the bottom of the column to obtain the **Index Value** for each Sensitivity Group.
5. Add the **Index Values** for the three groups to determine the **Pollution Tolerance Index (PTI) Score**. Enter the **PTI Score** in the box.
6. Determine the **Pollution Tolerance Index Rating** from the PTI Score.

6

POLLUTION TOLERANCE INDEX RATING		
23 or more	Excellent	☐
17-22	Good	☐
11-16	Fair	☐
10 or less	Poor	☐

New NBS Lab Space



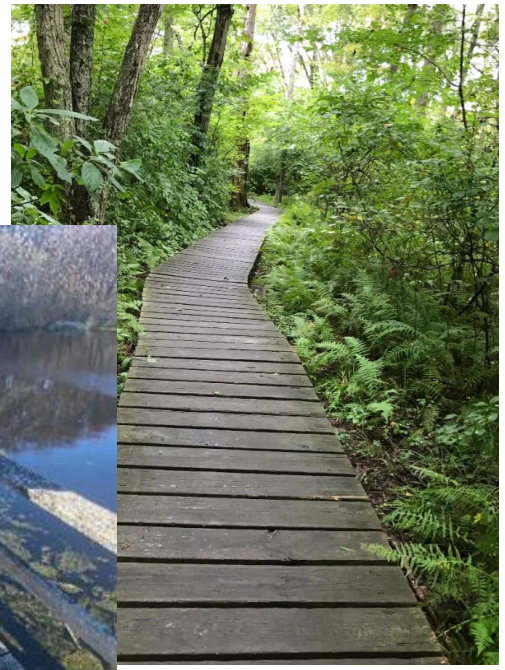


NBS Water Quality Monitoring and Restoration Program

Volunteer Positions



Site Guides





Description:

- Guide volunteers and college students to water collection sites using site maps.
- Carry equipment backpack and ensure everything is returned to lab.
- Oversee equipment safety while in use.
- Be the emergency contact for the group (call and report any injuries/concerns to front desk and/or 911).

Why?

- To improve safety for volunteers and students.
- To ensure samples are taken in the correct locations and points within streams/ponds/beach (for consistency in data).
- To prevent equipment damage in transport and use.

Water Quality Samplers/Testers

Field Samplers/Testers

- Collect samples at NBS sample sites
- Conduct in-field tests
- Bring samples to NBS lab when finished
- Optional: Be a part of analysis and discussion of results.

Lab Testers

- Test field samples in NBS lab
- Lab clean-up and prep for next sample day
- Optional: Be a part of analysis and discussion of results.

Water Quality Volunteer Info

Schedule:
Thursdays Bi-weekly
Following Monday as rain date

- Online schedule portal
- First come first serve basis for sign-ups

Schedule:

<u>Field Samplers/testers:</u>
12pm-2pm (5 spots)

<u>Lab Testers:</u>
2-4pm (4 spots)

*Times may become less with more volunteers

Field Samplers/Testers:
Distance = 1.75 miles

Age Restriction:
Must be 18+

Seasonal Macro Days

Need to know Fresh and Salt:

- **Occur once a season (except winter)**
- **Dates determined weeks in advance**
- **To sign up, register for a shift on our WQ Volunteer Local page**
- **We provide all needed sampling equipment (but if you have your own D-frame net feel free to bring it)**



Interested in Volunteering?

Send an email to:
kmatthews@normanbirdsanctuary.org



Results

WQ Dashboard

Water Quality Results

About this Website

This website holds the NBS Water Quality Monitoring and Restoration Program's results. Within this page, you can explore our site maps, generate graphs to compare sample sites or tests, print entire data sets, and more!

About the NBS Water Quality Monitoring and Restoration Program

The water quality program began testing in February of 2026 and monitors the chemical, biological, and physical characteristics of Norman Bird Sanctuary's aquatic systems. The list of everything we test along with the field and lab equipment we use can be found on the water quality website linked below under "Resources". Our goals are to understand our aquatic systems, monitor their health, and pursue restoration efforts when needed.

This program is made possible by our staff, advisory board, college interns, dedicated community volunteers, and support from local conservation organizations. If you have an interest in volunteering with us, check out our website below!

Note: Water Quality Samplers/Testers and Site Guide volunteer positions are 18+ age restricted.

NBS Water Quality Website: https://normanbirdsanctuary.org/about/water-quality-monitoring-program/

Water Quality Results

About | **Map** | Report Card | Graphs | Download Data

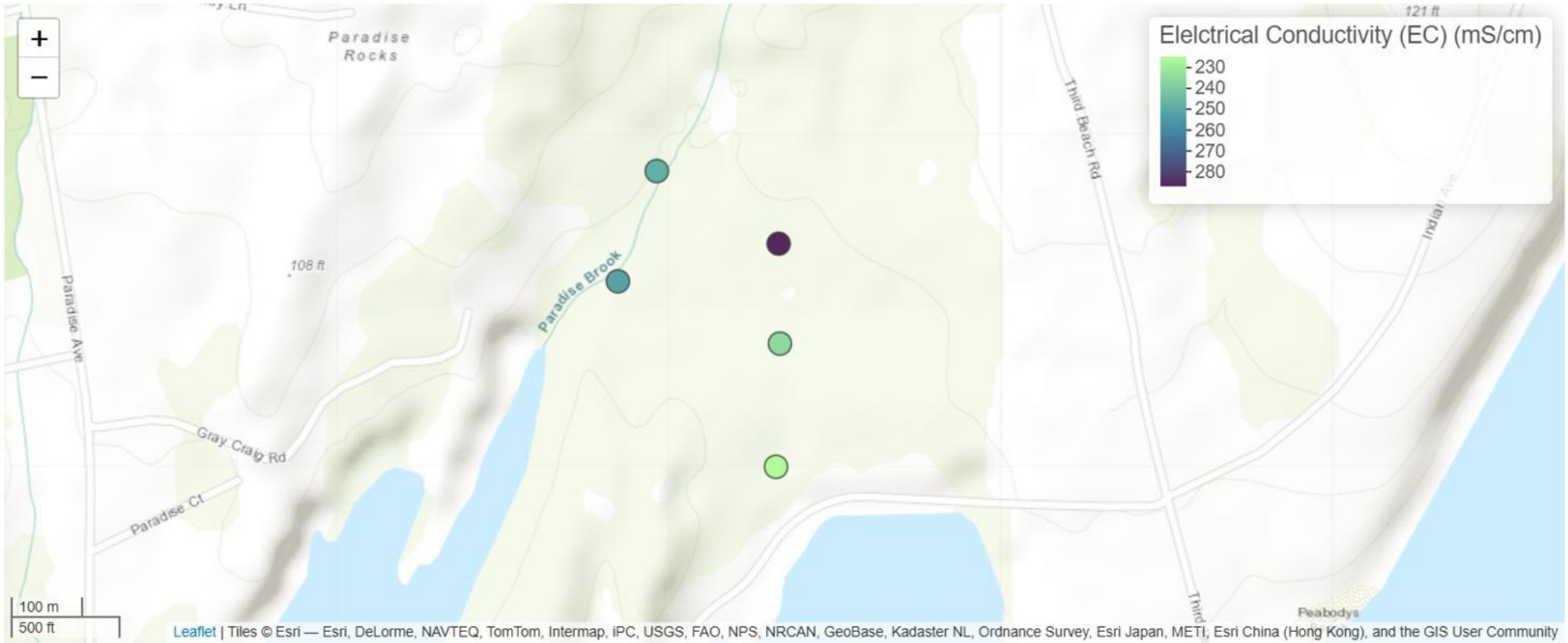
1. Location

2. Data

3. Date

Elelctrical Conductivity (EC) (2026)

Map | Table



Water Quality Results

About | Map | Report Card | **Graphs** | Download Data

1. Location

Select Site

Paradise Brook 1

2. Data

Select Indicator

Temperature, air

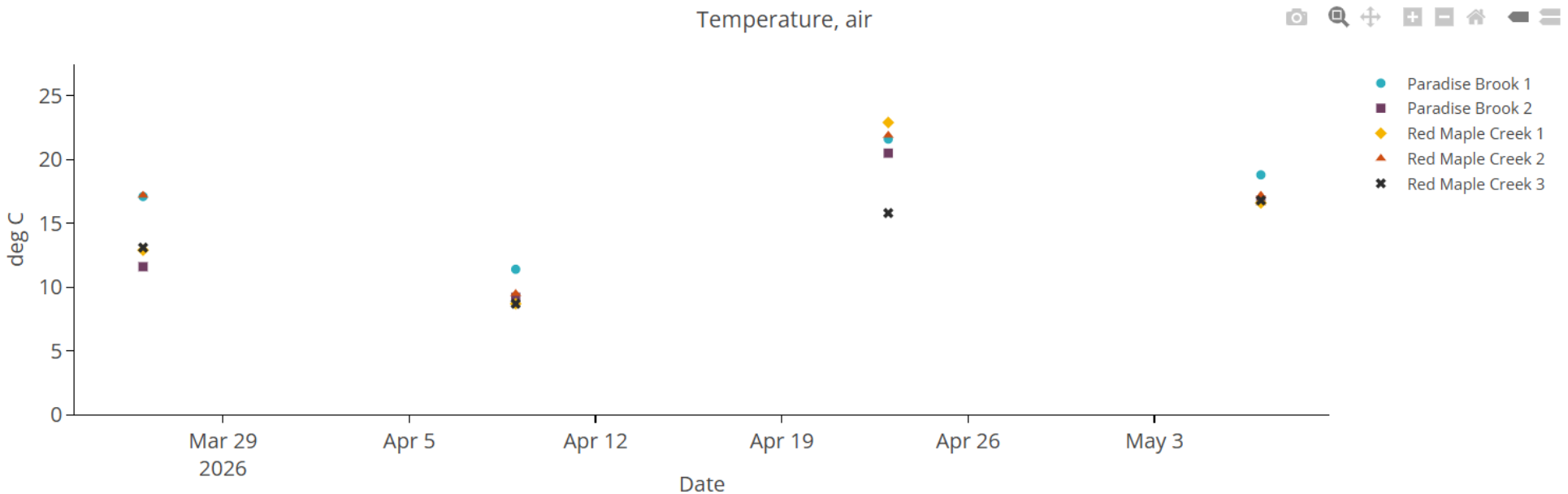
3. Date

Site Trends | **Compare Sites** | Compare Parameters | Options

Select up to five sites

5 items selected

Graph | Table



Water Quality Results

About | Map | Report Card | **Graphs** | Download Data

1. Location

Select Site

Paradise Brook 1

2. Data

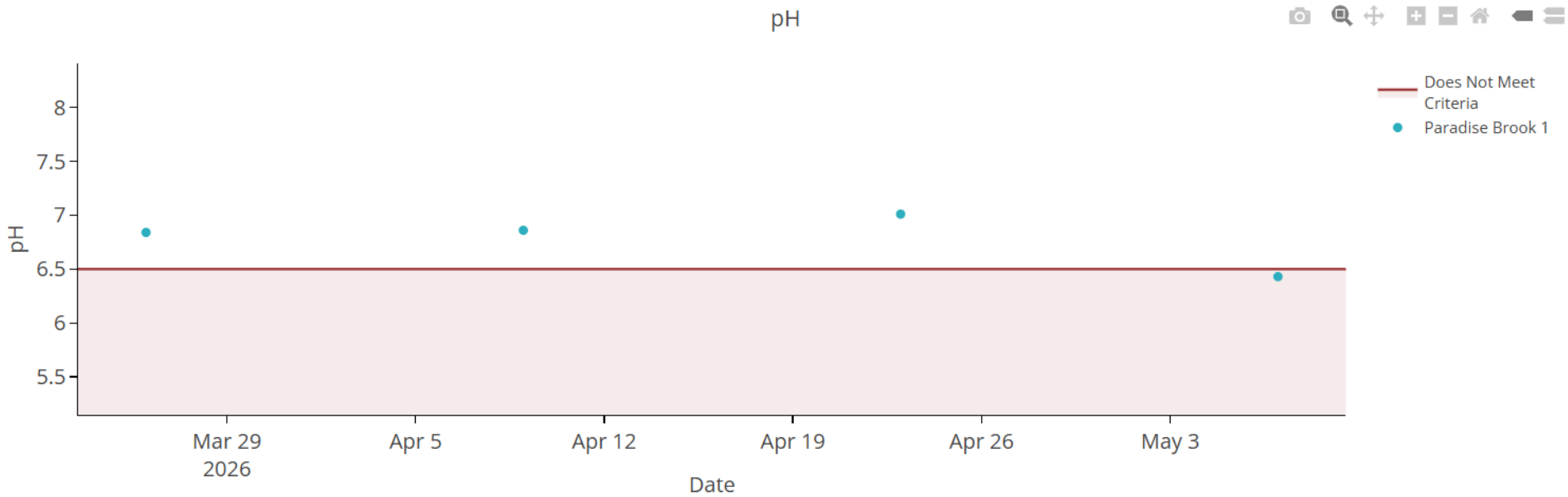
Select Indicator

pH

3. Date

Site Trends | Compare Sites | Compare Parameters | Options

Graph | Table



Unable to calculate trend. At least ten years of data required.

Thresholds

Acceptable: 6.5 - 9

Water Quality Results

About | Map | **Report Card** | Graphs | Download Data

1. Location

2. Data

3. Date

Report Card (2026)

Site Name	Group	Parameter	Score
Paradise Brook 1	-	pH	Does Not Meet Criteria
Paradise Brook 2	-	pH	Meets Criteria
Red Maple Creek 1	-	pH	Meets Criteria
Red Maple Creek 2	-	pH	Does Not Meet Criteria
Red Maple Creek 3	-	pH	Meets Criteria

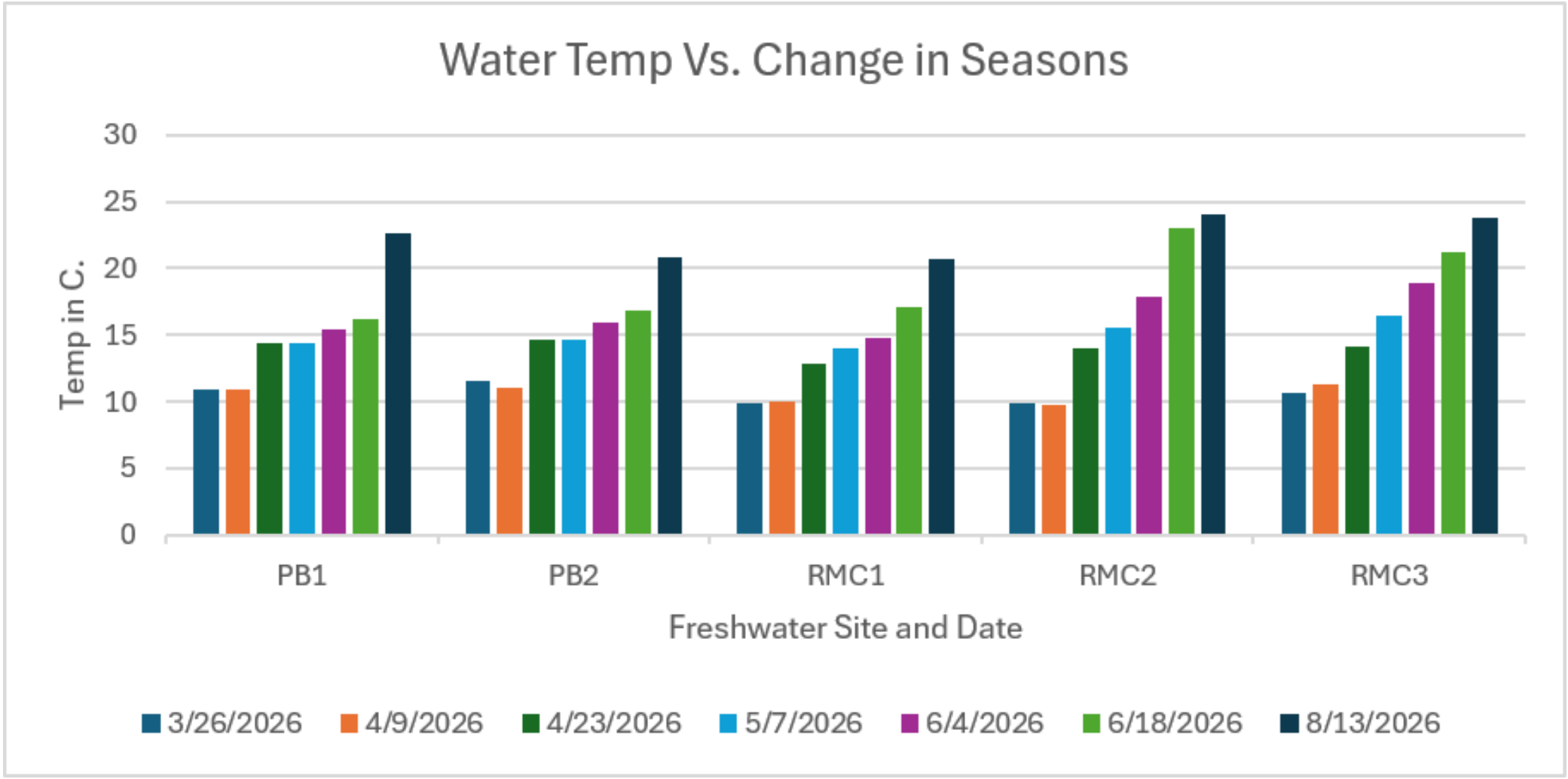
Download Report (PDF)

Big thank you to Narraganset Bay Estuary Program

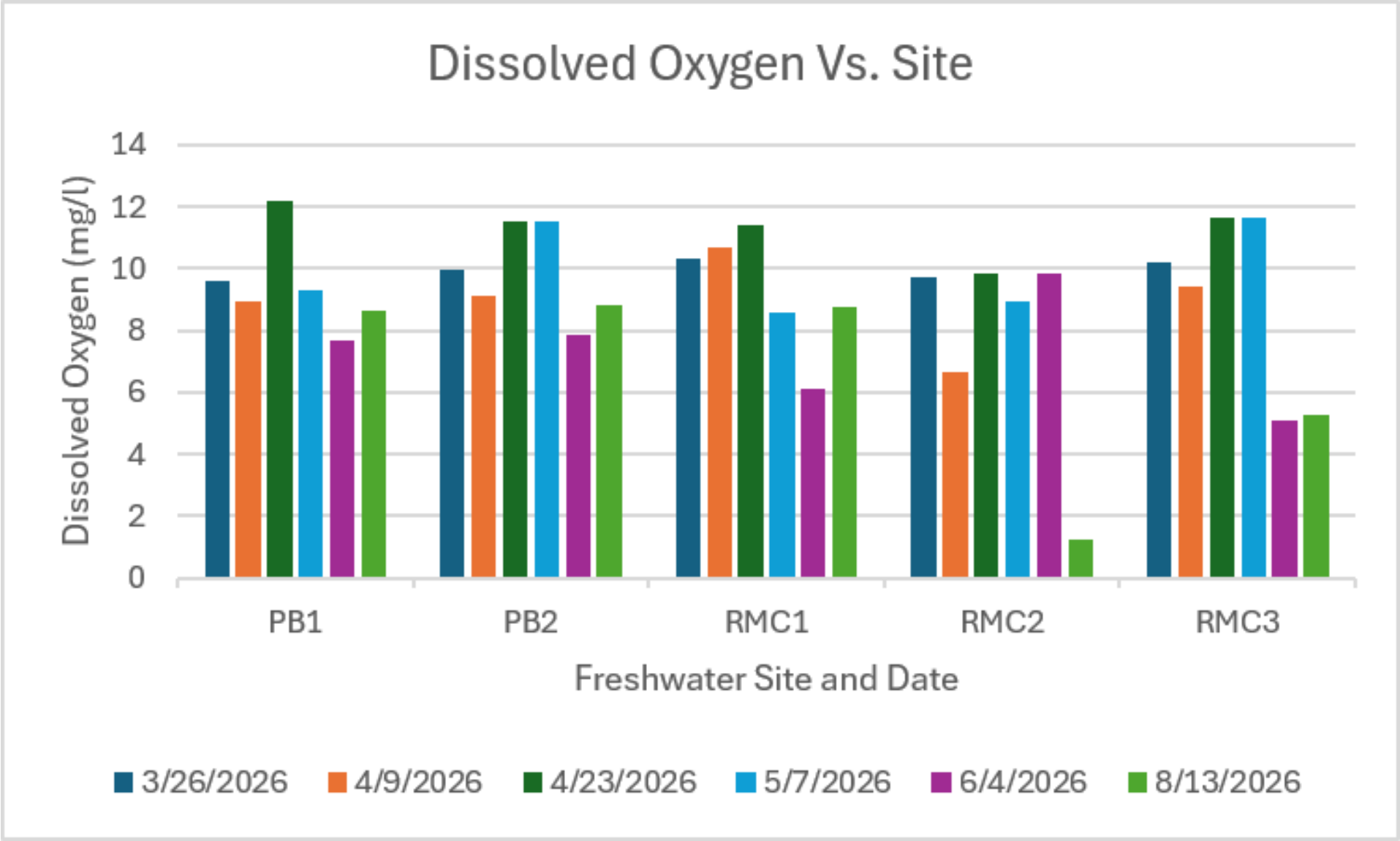
For making the WQ Dashboard and making it open source for programs to use!

NARRAGANSETT BAY ESTUARY PROGRAM

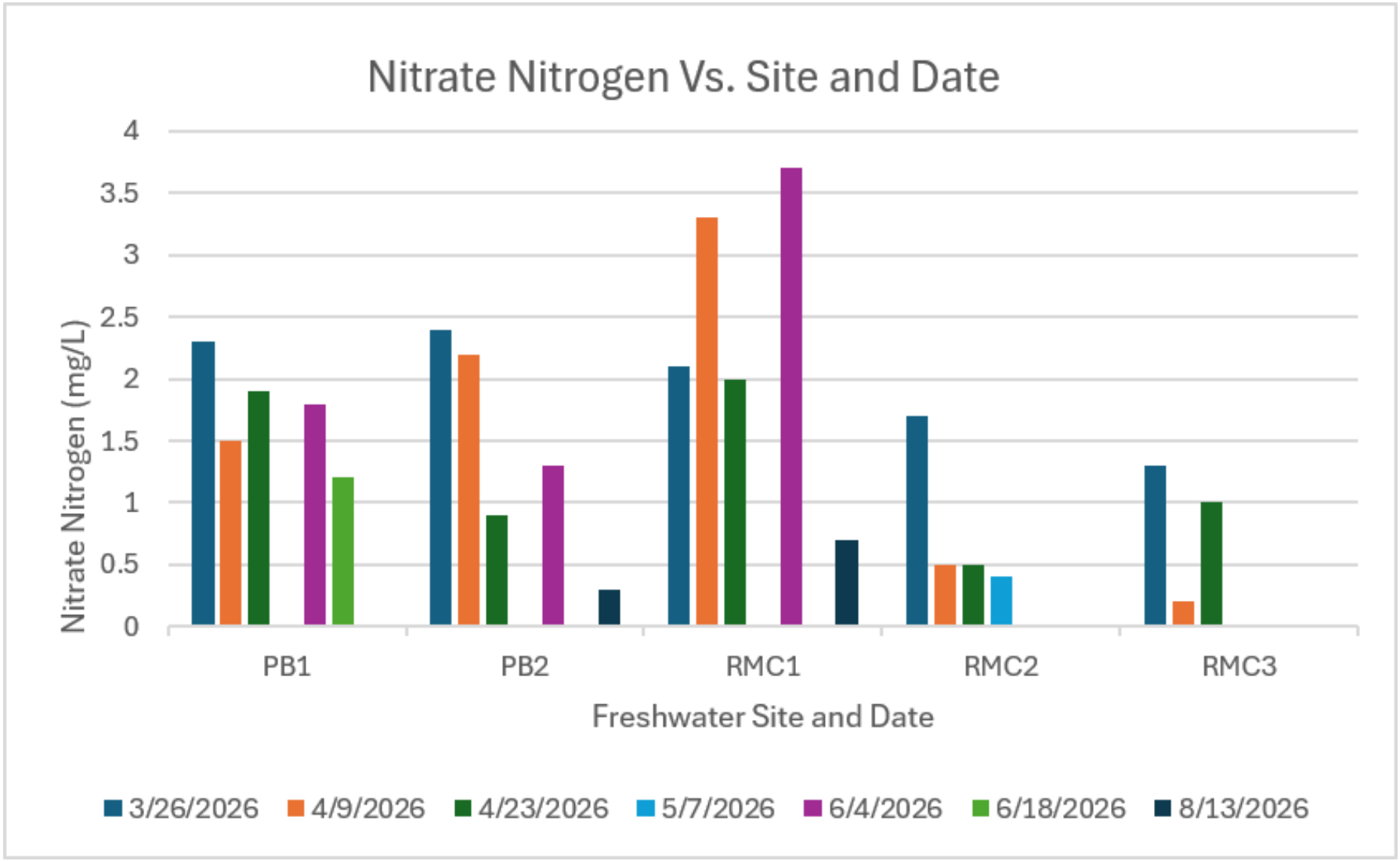
WQ Results so far (Feb.- Aug. 2026)



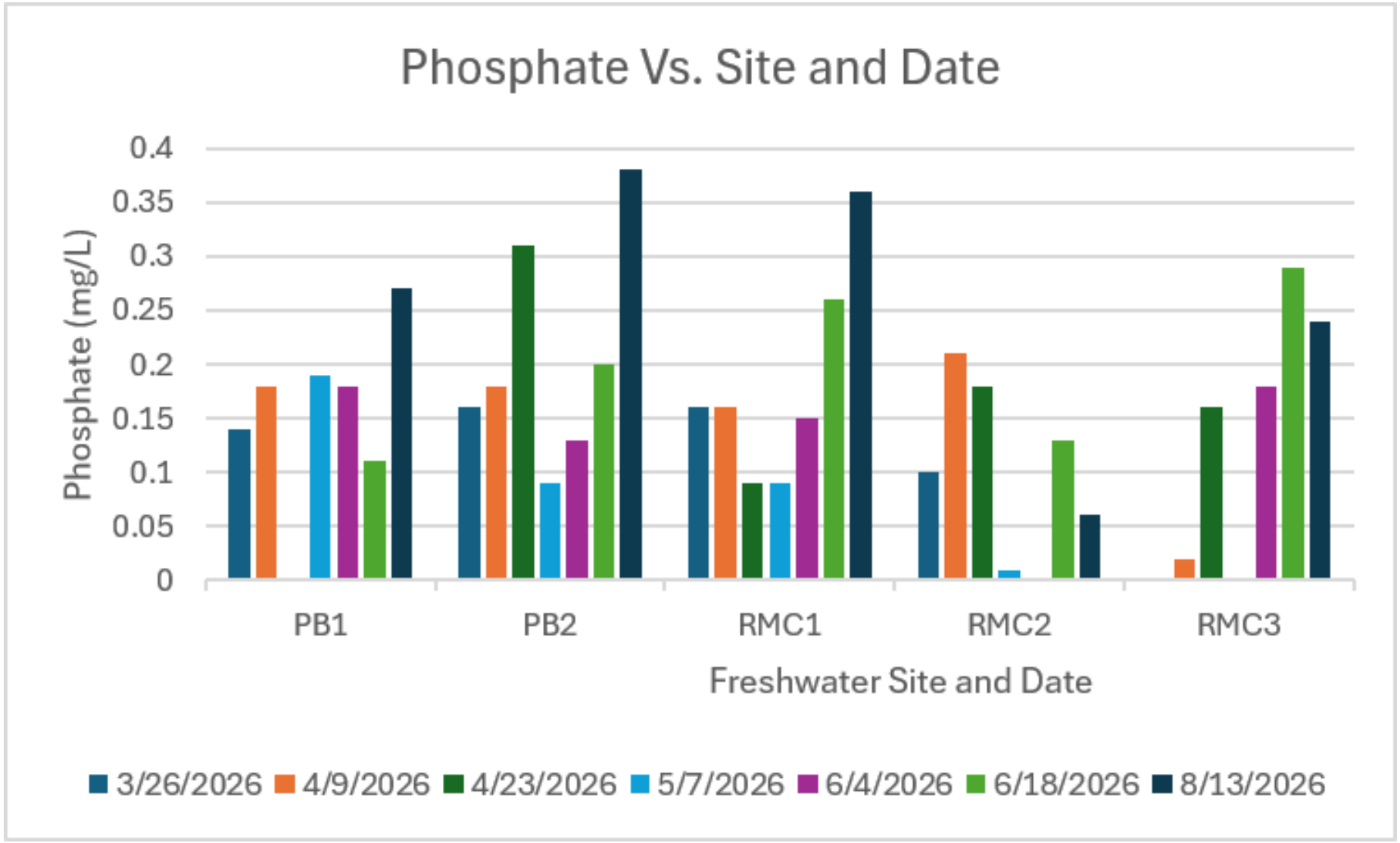
WQ Results so far (Feb.- Aug. 2026)



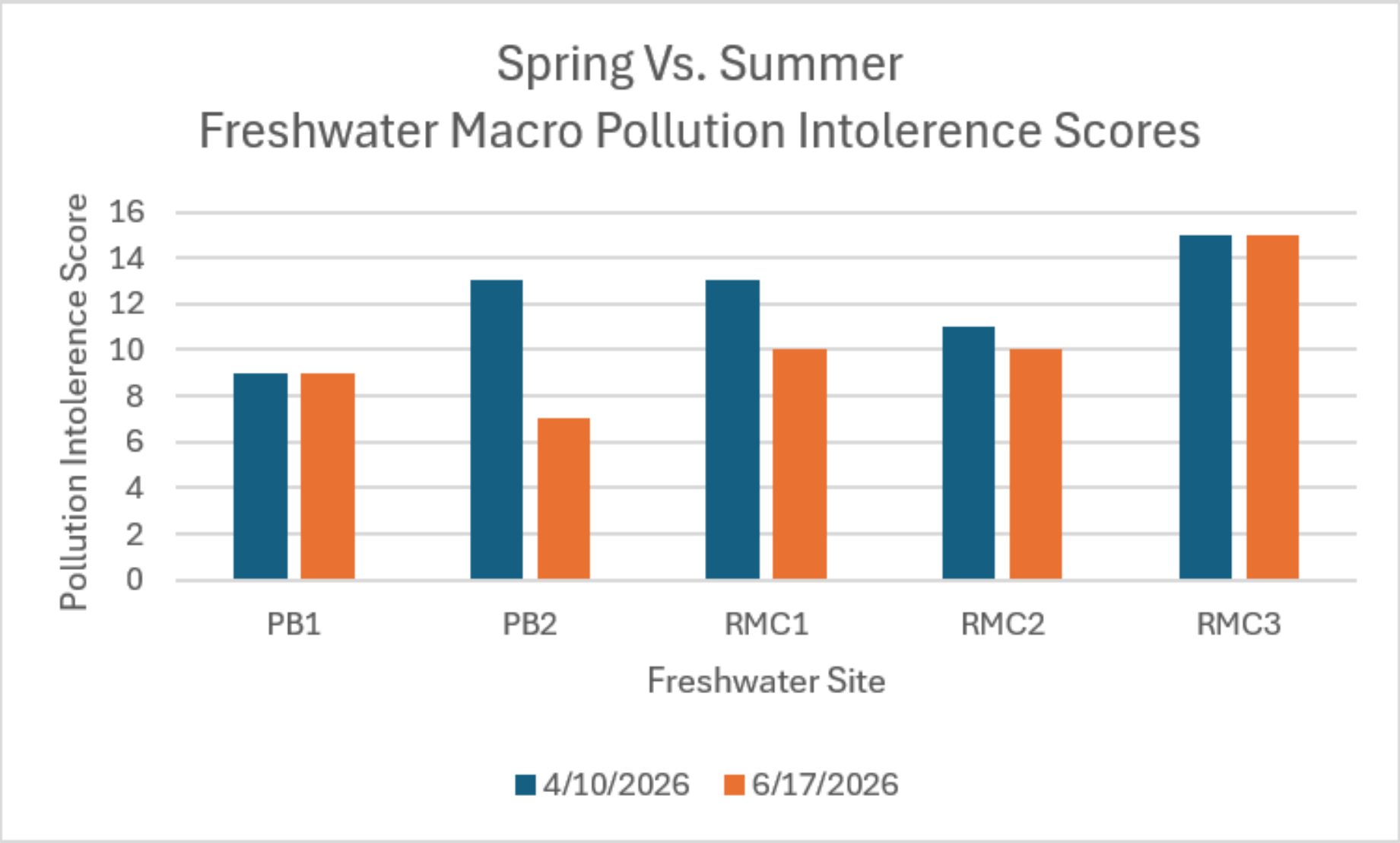
WQ Results so far (Feb.- Aug. 2026)



WQ Results so far (Feb.- Aug. 2026)



WQ Results so far (Feb.- Aug. 2026)



Trash Report







Date:	Location:	Partnership:	Number of Volunteers:	Most Collected Items in Order of #:	Amount of Trash (lbs.):
11/09/2024	Third Beach	Save The Bay	38	Lobster cages, construction materials (rusty pipes and concrete blocks), and dog poop bags	811.71
03/29/2025	Third Beach	Save The Bay	35	Dog poop bags, food packaging, cigarette butts, assorted bottles, and plastic caps	157
04/30/2025	Norman Bird Sanctuary Roadside and Streams	Litter Free Rhode Island	15	Nips, beer cans/bottles, cigarette butts, and chip bags	87
10/18/2025	Third Beach	Save The Bay	35	Dog poop bags, beer cans/bottles, nips, cigarette butts, and assorted food packaging	100
04/25/2026	Third Beach	Save The Bay	45	Dog poop bags (70), beer cans/bottles, nips, cigarette butts, and assorted food packaging.	310
05/20/2026	Norman Bird Sanctuary Roadside and Streams	RI Surfrider Foundation	5	Cigarette butts, beer cans, beer glass bottles, nips	9.19
07/10/2026	Third Beach	Save the Bay & Litter Free Rhode Island	12	Cigarette butts, Dog poop bags, glass beer bottles, assorted food packaging.	21
Total:			**185**		**1,495.9**







SAVE THE BAY®
NARRAGANSETT BAY





1st beach clean-up at Third Beach

812lbs.!!

Water Quality Program 2026 overview:

- Testing 6 Freshwater sites every other Thursday for a variety of tests.
- College students and community volunteers assist with collection, testing, and open discussion of results.
- Began evaluations of biological indicators (macroinvertebrates)

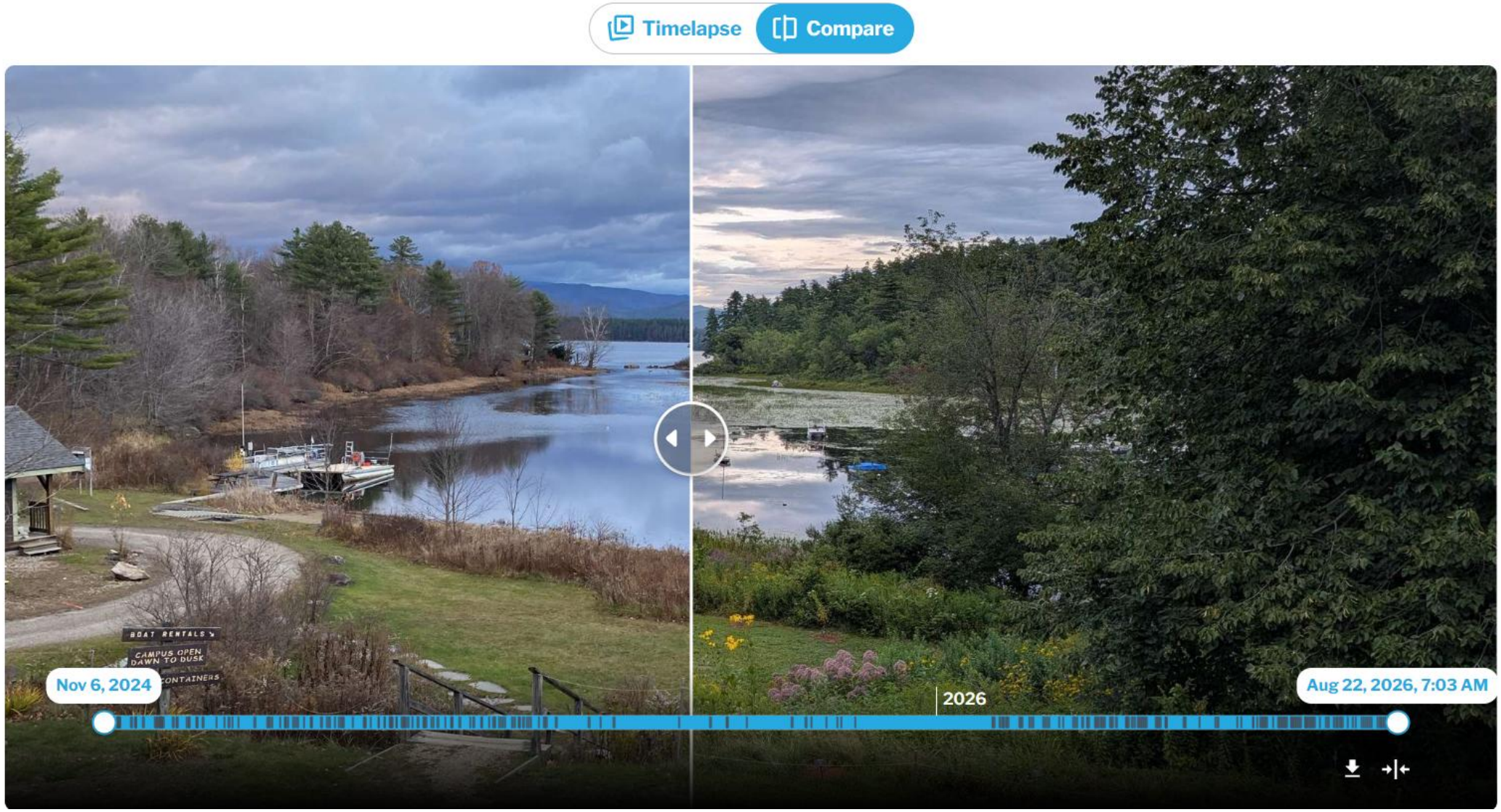


Future Goals and Plans

Water Quality Program Goals 2026:

- Log our first year of data
- Understand patterns and trends of data collected
- Increase our volunteer/intern numbers and involvement
- Continue to collaborate with local organizations
- Create plan and goals for 2027

Coming this year... Chronolog!



Future paths for the program: Next year and beyond

- Expand on the biological components of water quality (marine macroinvertebrates, bag seining fresh/salt, aquatic plant I.D.)
- Begin creating aquatic restoration plan
- Upgrade the NBS Lab for a better experience for our volunteers/students.
- Expand our Salve Regina University and new university partnerships to be a “living laboratory” for water quality studies.

Future Vernal Pool Monitoring

*LiDAR Mapping of potential vernal pools on property almost ready









Water Quality Monitoring
And Restoration Program

Vernal Pool Monitoring Field Data Sheet

Date:_____ Time: _____ Vernal Pool Site: _____

Observers:_____

Frog/Toads Heard:

- ☐ Spring Peeper Frog
- ☐ Wood Frog
- ☐ Green Frog
- ☐ Gray Treefrog
- ☐ Northern Leopard Frog
- ☐ Pickerel Frog
- ☐ American Toad
- ☐ American Bullfrog
- ☐ Other _____

Adult Frogs/Toads Seen:

- ☐ Spring Peeper Frog
- ☐ Wood Frog
- ☐ Green Frog
- ☐ Gray Treefrog
- ☐ Northern Leopard Frog
- ☐ Pickerel Frog
- ☐ American Toad
- ☐ American Bullfrog
- ☐ Other _____

Adult Salamanders/Others Seen:

- ☐ Yellow-Spotted Salamander
- ☐ Blue-Spotted Salamander
- ☐ Jefferson Salamander
- ☐ Marbled Salamander
- ☐ Unidentified Mole Salamander
- ☐ Red-Spotted Newt
- ☐ Fairy Shrimp
- ☐ Other _____

Egg Masses:

	Species	# of Egg Masses
☐	Spring Peeper Frog	
☐	Wood Frog	
☐	Green Frog	
☐	Northern Leopard Frog	
☐	Pickerel Frog	
☐	American Toad	
☐	American Bullfrog	
☐	Yellow-Spotted Salamander	
☐	Blue-Spotted Salamander	
☐	Jefferson Salamander	
☐	Marble Salamander	
☐	Unidentified Mole Salamander	
☐	Red Spotted Newt	
☐	Other:	
☐	Other:	

Larvae/Tadpoles:

	Species	Estimated Amount
☐	Spring Peeper Frog	
☐	Wood Frog	
☐	Green Frog	
☐	Northern Leopard Frog	
☐	Pickerel Frog	
☐	American Toad	
☐	American Bullfrog	
☐	Yellow-Spotted Salamander	
☐	Blue-Spotted Salamander	
☐	Jefferson Salamander	
☐	Marble Salamander	
☐	Unidentified Mole Salamander	
☐	Red Spotted Newt	
☐	Other:	
☐	Other:	

Vernal Pool Physical:

- ☐ High Water Amount
- ☐ Low water amount
- ☐ Dried up

Spermatophores:

- ☐ Present

Amount _____

Notes:

_____

_____

_____

Water Quality Partnerships:

TerraCorps

SALVE REGINA UNIVERSITY

MIDDLETOWN COASTAL ACCESS ALLIANCE

SAVE THE BAY®
NARRAGANSETT BAY

SURFRIDER FOUNDATION.
RHODE ISLAND

Questions?

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NBS Website: https://normanbirdsanctuary.org/

Facebook: normanbirdsanctuary

Instagram: normanbirdsanctuary