

Narragansett Bay Commission's Public Outreach: Educating Youth and Engaging Stakeholders

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NEWEA Annual Conference January 28th, 2014

Narragansett Bay Commission

- Narragansett Bay Commission (NBC) is a quasi-state agency which oversees the two largest WWTFs in Rhode Island:
 - Bucklin Point in East Providence
 - Field's Point in Providence
- Service Area: 10 municipalities
- 360,000 people served
- 8,000 commercial & industrial customers



NBC's Mission Statement

*To maintain a leadership role in the **protection and enhancement of water quality** in Narragansett Bay and its tributaries by providing safe and reliable wastewater collection and treatment services to its customers at a reasonable cost.*



Snapshot of Upper Narragansett Bay

- NBC's external website dedicated to educating the public about the water quality of upper Narragansett Bay
- Online since 2011
- Received NACWA award for Excellence - Public Information and Education in E-Media 2013
- Targeted to educators, researchers, students, regulators, fishermen, boaters & the interested public
- <http://snapshot.narrabay.com/app/>



NARRAGANSETT BAY COMMISSION



NBC has created a new webpage, *Snapshot of Upper Narragansett Bay*, featuring information on upper Narragansett Bay, including weather, tidal, and water quality data. View and download Bay & river monitoring data. We also feature photos of fish caught north of Conimicut Point. To view NBC's *Snapshot of Upper Narragansett Bay*, visit: <http://snapshot.narrabay.com/app/>

SNAPSHOT OF UPPER NARRAGANSETT BAY

If you would like your catch featured on our Webpage, email your photo along with your name, address, phone number and general location of catch to

Snapshot@narrabay.com

Water Quality Conditions

Narragansett Bay Commission
SNAPSHOT of Upper Narragansett Bay
 MONITORING INITIATIVES BUOYS LEARN MORE LINKS

Welcome
 The Narragansett Bay Commission's (NBC) Mission Statement is to maintain a leadership role in the protection of water quality in Narragansett Bay and its tributaries. The NBC keeps to this vow by continually monitoring water quality at its two buoy locations, collecting water quality casts, mapping surface water quality parameters, and taking samples of the Bay's bacterial and nutrient levels.

Providence Conditions
 Live Conditions: 1/07/13:04 PM
 Wind Conditions: 13 mph NW | Temperature: 22° Air, 32° Water
 Providence Tide Predictions:
 02:00 AM -0.23' Low
 04:19 AM -0.94' High
 02:35 PM -0.19' Low
 04:15 PM 4.4' High
 Information provided by NOAA

Bullock Reach
 Last Update: 1/02/14 9:42 AM

Salinity Location	Surface	Bottom	Bottom
Depth (m)	0.00	2.00	7.8
Temperature (C)	7.40	7.00	7.00
Temperature (F)	45.33	44.60	42.60
Salinity (ppt)	26.43	26.7	26.2
Diss. Oxygen (mg/L)	0	0.24	0.24
pH	7.40	7.40	8.00
Chlorophyll (ug/L)	4.4	0.0	
Turbidity (NTU)			0.4

Phillipsdale
 Last Update: 1/05/14 9:42 AM

Salinity Location	Surface	Bottom	Bottom
Depth (m)	0.08	0.24	0.24
Temperature (C)	0.08	0.75	
Temperature (F)	32.35	45.3	
Salinity (ppt)	7.40	25.94	
Diss. Oxygen (mg/L)	40.07	0.58	
pH	7.20	7.94	
Chlorophyll (ug/L)	3.0		

Map of the area
 A map showing the location of the buoys in Providence, Bullock Reach, and Phillipsdale within Narragansett Bay.

Views around the upper Bay
 Three photographs showing views from the buoys: 1. Bullock Reach, 2. Phillipsdale, 3. Phillipsdale Lighthouse.

Sonde
 A vertical probe used for water quality monitoring, shown on the left side of the page.

- Live weather conditions & local tidal information available directly from NOAA
- Near real-time “snapshots” of water quality are updated every hour from NBC sponsored buoys
- Map of the area
- “Snapshots” of views around the upper Bay

Water Quality Conditions

 Narragansett Bay Commission

 **SNAPSHOT**
of Upper Narragansett Bay

MONITORING INITIATIVES BUOYS LEARN MORE LINKS

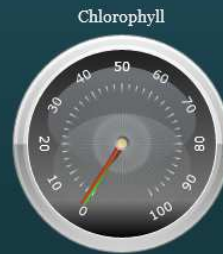
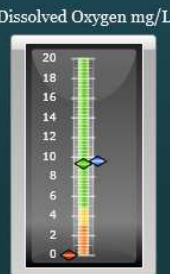
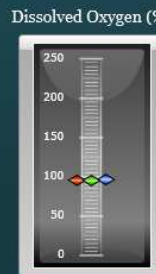
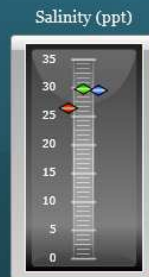
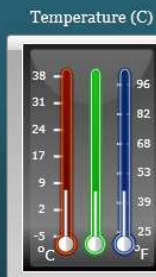
Current Conditions

Current Location:

Last Updated: 11/25/2014 9:15:00 AM

■ Surface ■ Middle ■ Bottom

Parameter	Surf.	Mid.	Bot.
Chlorophyll	1.4	0.6	
Flouresence			
Dissolved O2 (mg/L)	0	9.31	9.54
Dissolved O2 (%)	95.3	95	95.9
pH	7.83	7.83	8.16
pHmv			
Salinity	26.43	29.7	29.5
SpCnd	41.66	46.36	46.05
Temperature (C)	7.46	7.13	7.23
Turbidity			0.4
Depth	0.992	5.332	7.8



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Contact Us at snapshot@narrabay.com



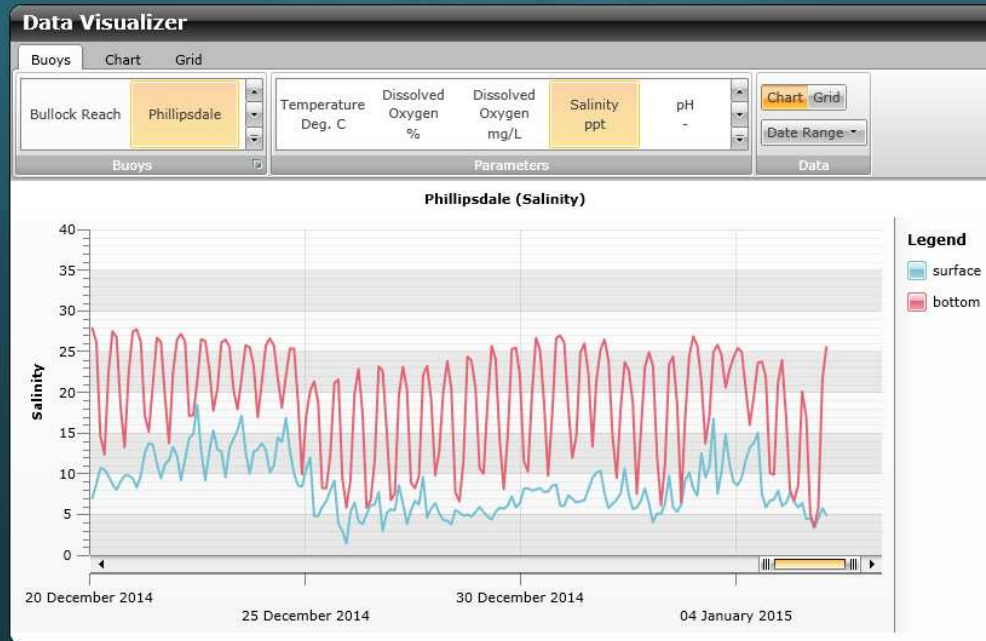
Water Quality Conditions

 Narragansett Bay Commission

 **SNAPSHOT**
of Upper Narragansett Bay

[MONITORING INITIATIVES](#) [BUOYS](#) [LEARN MORE](#) [LINKS](#)

Chart Wizard



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Water Quality Conditions

Narragansett Bay Commission

SNAPSHOT
of Upper Narragansett Bay

MONITORING INITIATIVES BUOYS LEARN MORE LINKS

Data

Export to CSV Export to Excel

Name Location x

Location	Time	Chl	O2 conc	Sal	Temp	Z
Location: Bullock Reach (bottom)						
Bullock Reach (bottom)	9/14/2014 7:45:00 AM	5.86	30.75	21.21	7.694	
Bullock Reach (bottom)	9/14/2014 7:30:00 AM	5.84	30.83	21.2	7.679	
Bullock Reach (bottom)	9/14/2014 7:15:00 AM	5.88	30.89	21.2	7.681	
Bullock Reach (bottom)	9/14/2014 7:00:00 AM	5.81	30.93	21.19	7.693	
Bullock Reach (bottom)	9/14/2014 6:45:00 AM	5.81	30.96	21.2	7.655	
Bullock Reach (bottom)	9/14/2014 6:30:00 AM	6.18	30.42	21.29	7.603	
Bullock Reach (bottom)	9/14/2014 6:15:00 AM	6.04	30.42	21.3	7.561	
Bullock Reach (bottom)	9/14/2014 6:00:00 AM	6.03	30.52	21.31	7.499	
Bullock Reach (bottom)	9/14/2014 5:45:00 AM	5.99	30.5	21.33	7.431	
Bullock Reach (bottom)	9/14/2014 5:30:00 AM	5.94	30.54	21.33	7.358	
Bullock Reach (bottom)	9/14/2014 5:15:00 AM	5.87	30.62	21.31	7.295	
Bullock Reach (bottom)	9/14/2014 5:00:00 AM	5.83	30.39	21.31	7.24	
Bullock Reach (bottom)	9/14/2014 4:45:00 AM	6.03	29.51	21.35	7.225	
Bullock Reach (bottom)	9/14/2014 4:30:00 AM	6.04	29.57	21.35	7.232	
Bullock Reach (bottom)	9/14/2014 4:15:00 AM	6.08	29.63	21.36	7.246	
Bullock Reach (bottom)	9/14/2014 4:00:00 AM	6.03	29.86	21.38	7.282	
Bullock Reach (bottom)	9/14/2014 3:45:00 AM	6.01	29.83	21.38	7.333	
Bullock Reach (bottom)	9/14/2014 3:30:00 AM	6.16	29.71	21.37	7.388	
Bullock Reach (bottom)	9/14/2014 3:15:00 AM	6.19	29.78	21.36	7.472	
Bullock Reach (bottom)	9/14/2014 3:00:00 AM	6.27	29.71	21.35	7.569	

Sonde

Displaying items 1 - 20 of 2016

Weekly Blogs

- NBC staff update blogs as new data from the NBC's monitoring initiatives are available
- Blogs are written in an easy to understand narrative format
- Previous blogs can be seen with the click of a mouse
- Information on specific monitoring initiative is easily available

Phytoplankton Sampling

(Historical Blog)

Week of December 7 - 13, 2014

Phytoplankton samples were collected at Bullock's Reach on December 10, 2014 and analyzed in the laboratory shortly after collection. It was a very cold and foggy day on Narragansett Bay. Surface water quality data indicated a temperature of 6.53°C and salinity at 18.03 ppt.

The plankton tow net sample was filterable with a 20 micron mesh. This concentrate was a medium brown color with noticeable dark precipitate and plant material. It was analyzed qualitatively for microorganisms. Microscopic examination of the sample under 100x phase contrast microscopy revealed phytoplankton activity.

The whole water sample was analyzed quantitatively under 200x phase contrast microscopy. A Hensen Stempel pipette was used to accurately deliver 1ml of sample to a Sedge-wick Rafter chamber. This analysis revealed a total of 150,000 cells per Liter.

There was a decrease in the number of flagellates in today's sample as compared to the previous examination. In addition, there seemed to be an increase in pennate diatoms and some more diverse species were detected in today's sample such as loricate ciliates, *Odontella*, and *Striatella*.

The most predominant phytoplankton genus was the pennate diatoms which were found at 87,000 cells/L. Other representative genera include flagellates, *Leptocylindrus*, and *Skeletonema*.

200x phase contrast image of *Odontella* spp.



Benthic Video Blog

(Historical Blog)

Week of October 26 - November 1, 2014

Benthic video surveys were conducted at several locations throughout the upper Bay this week. On October 28th, video was recorded along a north-south transect from offshore of the Edgewood Yacht Club south towards Pawtuxet Cove; on October 30th, surveys were conducted along an east-west transect from Sabin Point towards Pawtuxet Cove, and north-south between Gaspee Point and Conanicut Point, passing the area of the Bullock's Reach buoy. Visibility was generally good in these areas, and we were able to get a good view of the benthic habitat and organisms on both days. The benthos in these areas included soft-sediment bottom (i.e., silt and silty sand) with extensive areas of *Ampellicora* amphipod tube mats, sea lettuce (*Ulva* sp.) and other algae (e.g., *Grateloupia* and *Gracilaria*), and shell hash/rubble. Some areas had a thin layer of brown diatom growth visible over the sediment.

Several benthic organisms were observed on these surveys, including juvenile black sea bass (*Centropristis striata*), sea stars (*Asterias forbesi*), horseshoe crabs (*Limulus polyphemus*), mantis shrimp (*Squilla empusa*), hermit crabs (*Pagurus* sp.), sand shrimp (Crangonidae), soft-shelled clams (*Mya arenaria*), slipper snails (*Crepidula* sp.), mud snails (*Lymnaea obsoleta*), and a benthic sponge (Porifera). One of the most notable observations was an aggregation of hundreds of spider crabs (*Lithinia emarginata*), observed near Bullock's Reach. These crabs are known to form such aggregations while molting or mating.



Monitoring Initiatives

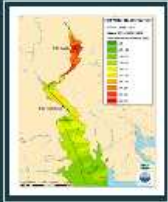


Fixed Water Quality Monitoring

The NBC maintains two of the ten real-time water quality stations in Narragansett Bay. Sensors at Phillipsdale Landing and Bullocks Reach record, temperature, salinity, dissolved oxygen, pH, chlorophyll a, and water clarity.

Water Quality Profiles

The NBC collects water quality profiles of the water column at six locations throughout the Upper Bay. The parameters collected including depth, temperature, salinity, dissolved oxygen, pH, and chlorophyll a.



Surface Mapping

The NBC employs state of the art equipment to automatically map surface water quality while their vessel, R/V Monitor, is underway. Parameters mapped include temperature, salinity, dissolved oxygen, pH, and chlorophyll a.



Bay Pathogen Monitoring

The NBC collects bi-weekly bacteria samples at twenty stations throughout the Upper Bay. All of the bacteria samples are analyzed for fecal coliform and one quarter are selected to be analyzed for enterococcus.



Nutrient Monitoring

The NBC samples its receiving waters for various nutrient parameters twice a month from six stations throughout the Upper Bay. Analyzed parameters include nitrite, nitrate ammonia, total dissolved nitrogen, orthophosphate, and silicate.

Water Clarity

The NBC collects water clarity samples at six locations throughout the Upper Bay. Water clarity parameters include Secchi disk and photosynthetically active radiation or PAR.



Phytoplankton Monitoring

The NBC collects phytoplankton samples on a bi-weekly basis at the Bullock's Reach fixed site monitoring station. Samples are analyzed to document the presence and number of various groups of phytoplankton present in the sample.

Monitoring Initiatives

- NBC's site reports on 8 different initiatives:
 - Fixed Site WQ Monitoring
 - WQ Profiles
 - Surface Mapping
 - Bay Pathogens
 - Nutrient Monitoring
 - Water Clarity
 - Phytoplankton Monitoring
 - Benthic Video (in development)

Monitoring Initiatives

- Each initiative has a separate page relaying specific information about:
 - Sampling locations
 - Methods
 - Relevant pictures of sampling and results
 - Spreadsheets of annual data sets available for download

Narragansett Bay Commission


SNAPSHOT of Upper Narragansett Bay

MONITORING INITIATIVES BUOYS LEARN MORE LINKS

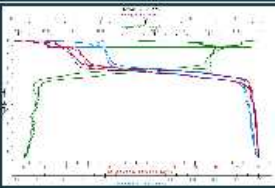

Water Quality Profiles

The NBC collates supplementary water quality profiles at six stations throughout the Upper Bay, from Phillipps Landing to Conimicut Point. A profile is a cross sectional view of the water column and describes the conditions at each depth. The stations are monitored twice per month for depth, temperature, salinity, dissolved oxygen, density and PAR (photosynthetically active radiation) using a Seabird Electronics profiler. This data has been collected by the NBC at these six stations since 2006. Once on the station, the profiler is turned on and allowed to warm up for approximately 2 minutes. After the profiler is acclimated, the profiler is slowly lowered to the bottom, collecting data every quarter a second and internally logging it.

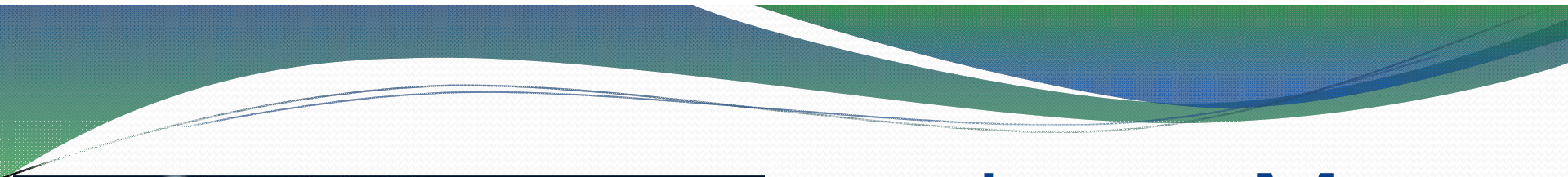
Once the sampling day is complete, the data is uploaded to a computer and backed up. On the computer, the data is separated into individual station profiles and checked for false readings. Prior to graphing the data, it is often smoothed out by averaging all the values in a given depth range to represent a single value. This assists in managing the large amount of data gathered, so it can then be plotted versus depth to show the water column conditions (as shown below). The water column profiles are important in identifying when poor water quality conditions, such as hypoxia, exist. The profile plots also indicated if stratification of the water column is present, which could lead to a hypoxic event.



Sonde



- [Water Quality Profile Locations](#)
- [2014 Water Column Profile Data](#)
- [2013 Water Column Profile Data](#)
- [2012 Water Column Profile Data](#)
- [2011 Water Column Profile Data](#)
- [2010 Water Column Profile Data](#)
- [2009 Water Column Profile Data](#)
- [2008 Water Column Profile Data](#)
- [2007 Water Column Profile Data](#)



Narragansett Bay Commission

SNAPSHOT
of Upper Narragansett Bay

MONITORING INITIATIVES BUOYS LEARN MORE LINKS

Learn More

Get a deeper understanding of Narragansett Bay and the Narragansett Bay Commission through the links provided below.

Historical Blog
Allows access to various blogs that have been previously posted.

Annual Data Reports
The NBC's Environmental Monitoring and Data Analysis (EMDA) section prepares an all-inclusive annual data report documenting all of their monitoring activities for the year. Each report details the EMDA section's sampling activities and the sample results for the NBC's award winning comprehensive receiving water monitoring program, as well as the results from monitoring activities at each of the NBC facilities, Field's Point and Bucklin Point.

PowerPoint Presentations & Poster Presentations
NBC staff is periodically invited to various local and national conferences or workshops by professional associations to present on NBC's latest data findings and initiatives.

Fact Sheets
Supplemental information prepared by the NBC staff on other water quality related topics presented on a single page.

Water Quality Reports
Detailed description of the results and conclusions from the NBC's comprehensive monitoring program.

Glossary
List of terms that are utilized throughout the website summarized in layman's terms.

Contact Us at snapshot@narrabay.com

Learn More

- Other information that users can dive into:
 - Historical blog posts
 - Annual reports
 - PowerPoint & Poster Presentations
 - Fact Sheets
 - Water Quality Reports
 - Glossary
- Links tab directs users to other local resources

Snapshot Use & NBC Outreach Initiatives

- NBC staff work routinely with local high school students on their science fair projects
- A local university utilizes the Snapshot website for hands-on data analysis experience for students
- Researchers at URI, UMASS have used NBC data from Snapshot for dissertations and water quality models
- Public able to email NBC through Snapshot with questions

Bishop Feehan student working with NBC staff on her award winning science fair project



Narragansett Bay fisherman proudly showing off his Striper catch to NBC staff



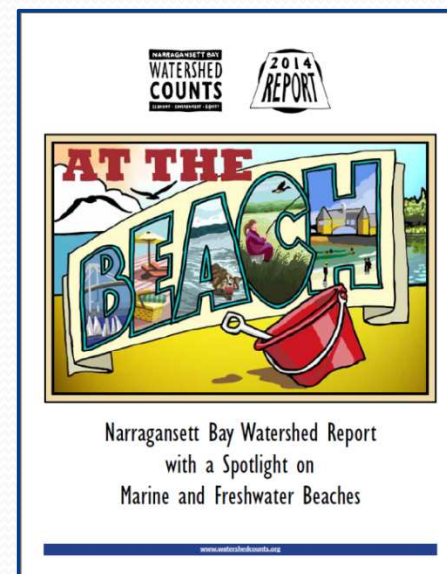


- NBC IM Staff at the Providence Children's Museum "Touch a Truck" event
- NBC Operations, Science, and Lab staff talking to high school students about BNR process
- NBC participating in "Governors' Bay Day" Public event



NBC Outreach Initiatives

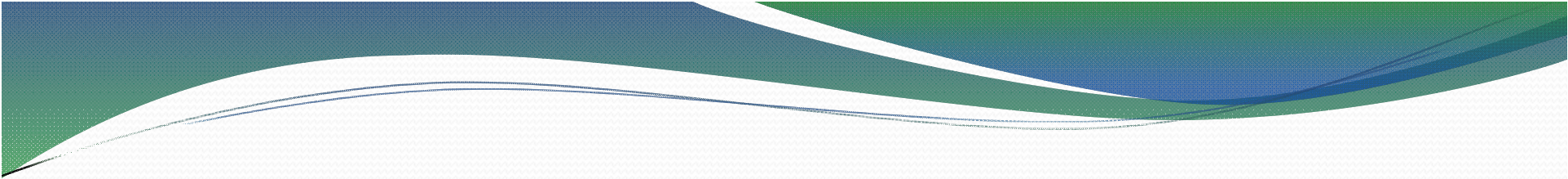
- NBC also provides & supports:
 - Internships & job shadowing opportunities
 - Tours of the NBC's facilities
 - Free workshops for researchers, managers & the interested public
 - Staff volunteering as judges at local science fair competitions
 - Stakeholder education initiatives, such as Watershed Counts (www.watershedcounts.org)
- **NBC Woon Watershed Explorers Program...**





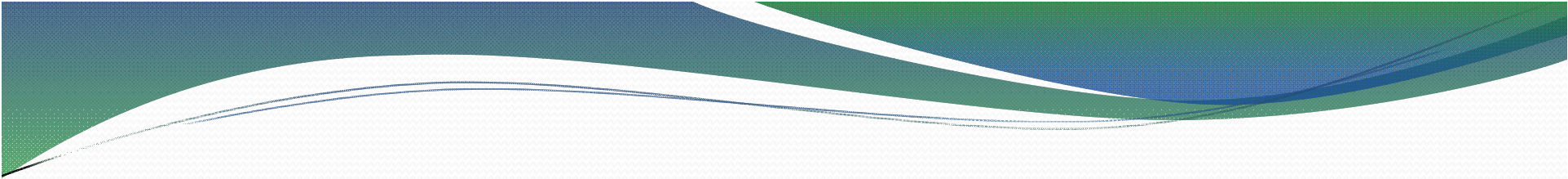
NBC

Woon Watershed
Explorers Program



“Water weaves together all living and nonliving things in an intricate tapestry of color, light, and movement. So much a part of us and our routines that we often take it for granted and forget that water—a gift of nature—is life.”

Water: A Gift of Nature

- 
- The Narragansett Bay Commission's Woon (short for Woonasquatucket) Watershed Explorers Program is a hands-on environmental education initiative.
 - The program is geared towards students in grades 2-5, but can be easily modified to benefit older students.
 - The program offers students and teachers an in-depth look into their local watershed through field trips, instructional classroom visits and a culminating environmental education symposium.
 - The program runs from September through May each year.



History

- The program began in 2001 with a grant from the Partnership for Narragansett Bay.
- In its first year the program reached 225 students from six different Rhode Island school communities which included Smithfield, Johnston, Providence, North Providence and Gloucester.
- The program now includes at least one school in each of the Commission's 10 service communities.
- To date the program has reached over 6,000 students.



Field Trips

- Each year NBC provides three field trips to each participating school.
- Field trips provide students with hands-on water quality monitoring experiences.
 - During the first field trip students visit the Narragansett Bay Commission's Field's Point WWTF for a tour and then travel to a water monitoring site in their school's neighborhood to complete water quality tests.
 - The second field trip takes students back to their local testing site for macro invertebrate study
 - The third field trip is a culminating environmental education symposium where all the schools gather together











Classroom Lessons

- NBC provides one in-classroom lesson a month for every school involved in the program.
- Classroom lessons provide insight into some of the most important aspects of the program such as:
 - * Watersheds
 - * The wastewater treatment process
 - * Non-point and point source pollution
 - * Wind power
 - * Macro invertebrate study
- Students also complete monthly journal assignments in their NBC journals which ask them to reflect on an aspect of the in-class lesson that was presented.





Environmental Education Symposium

- The environmental education summit is the culminating event of the Woon Watershed Explorers Program.
- This event has taken on many different forms since the start of the program in 2001. In its early years, the summit served as an opportunity for students and teachers to gather together and present valuable information about what they learned through completing the program.
- Recently, the summit has become a day for students and teachers to gather in one location and experience a variety of environmental education activities which the state of Rhode Island offers.
- One group from each of the participating schools is chosen to present some macro invertebrate data in an extremely interpretive and interesting way. After the presentations, students break up into small groups and participate in a variety of environmental education activities.











Thank you to all NBC
staff for your support!!





QUESTIONS



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