NARROW RIVER PRESERVATION ASSOCIATION
PO Box 8 ~ SAUNDERSTOWN, RI 02874 ~ 401-783-6277
www.narrowriver.org ~ nrpa@narrowriver.org

Water Quality Monitoring Program of the Lower Narrow River

By the Narrow River Preservation Association

Interim Report - 2014 Monitoring Program

Cooperative Agreement No. FI4AC00J04 USFWS

Introduction

In 2014, Narrow River Preservation Association (NRPA) initiated a two-year water quality program as identified in The Nature Conservancy and U.S. Fish and Wildlife Service Cooperative Agreement No. FI4AC00J04. For more than two decades NRPA has had a River Watch program that monitors the water quality at fourteen locations spanning the entire length of the Narrow River. Since the start of the program, elevated bacteria levels have been regularly observed at Mumford Brook and Mettatuxet Brook. Since 2001, elevated bacteria levels have also been observed at Middlebridge.

The focus of this program is to conduct supplemental water quality monitoring in the waters and streams of the John H. Chafee National Wildlife Refuge that reside within the towns of South Kingstown and Narragansett, Rhode Island to support saltmarsh and estuarine resiliency and restoration actions.

Work Conducted During 2014

Project Team

NRPA hired a University of Rhode Island graduate student, Courtney Schmidt, to carry out the field program. NRPA Board members, Veronica Berounsky, Ph.D. and Annette DeSilva provided project oversight.

Site Selection

In early May 2014, Veronica Berounsky, Annette DeSilva and Courtney Schmidt evaluated potential monitoring locations along the southern portion of the Narrow River. Locations of interest included streams and brooks that feed into the river and Pettaquamscutt Cove. The waters in the areas of Middlebridge and Mettatuxet were also of interest.

Thirteen sites were selected for monitoring. The sites included two existing Narrow River monitoring locations and 11 new sites. The sites were selected with input from USFWS, town officials, R.I. Department of Environmental Management and NRPA. Public and safe access to each site was a priority in the selection. All sites can be monitored from the shore. Table 1 provides a list of the selected sites. The general monitoring areas are overlaid on the image of the Narrow River in Figure 1.

Table 1: Monitoring Location Sites

Site Code	Location	Latitude	Longitude
NR11	Mettatuxett Brook	41.28.16 N	71.26.41 W
NR12	Mumford Brook	41.26.19 N	71.28.32 W
NR17	Mettatuxett Rd	41.28.32 N	71.26.35 W
NR18	Middlebridge - SE		
NR19	Middlebridge - NE		
NR20	Middlebridge - SW		
NR21	Middlebridge - NW		
NR22	Middlebridge - mid	41.27.30 N	71.27.09 W
NR23	Garrison Trail	41.27.17 N	71.27.19 W
NR24	Starr Drive	41.26.39 N	71.27.20 W
NR25	Crooked Brook	41.26.28 N	71.28.04 W
NR26	Kimberly Drive	41.26.31 N	71.28.23 W
NR27	Bike Path Culvert	41.26.14 N	71.28.33 W

Figure 1: Monitoring Areas Overlayed on Narrow River Image

Field Work and Sampling Plan

- The monitoring season began in mid-May and ran through mid-October.
- Water samples were collected approximately every two weeks on 11 occasions during the monitoring season. On each sampling date, the collected samples were placed in a cooler and then transported to URI's Watershed Watch office.
- These samples were analyzed by URI's Watershed Watch (WW) Office staff for bacteria and nutrient levels. WW basic bacteria capacity is for total coliforms and E.coli with Colilert-18 incubated at 35 C; Fecal coliform with Colilert-18 incubated at 44.5 C, and enterococci with Enterolert incubated at 41 C. Details about URI's WW services and

protocols are available at http://www.uri.edu/ce/wq/ww/index.htm. The WW Office personnel compile the bacteria and nutrient data and provide the data in Excel format.

- In addition to water collections, additional parameters were measured bi-weekly using a YSI probe. Parameters include:
  Dissolved Oxygen
  Salinity
  Temperature
- Weather, wind, and tide observations were recorded on each sampling date.

Equipment Used

- YSI Probe Pro2030 with 20 m cable and with polorographic DO sensor and with galvanic DO sensor
- Pole and bucket samplers for select sites where an extended reach was necessary to collect a water sample
- Cooler for transporting samples from river sites to the URI Watershed Watch office

Sampling Data

The 2014 Narrow River sampling data are reported in two attached Excel® files:

- YSI and observation data: <2014NarrowRiver_YSI_Observation_Data.xlsx>
- Bacteria data: <2014NarrowRiver_BacteriaData.xlsx>

The files include worksheets with all of the data collected and charts with plots of the data. Selected charts have been included below in Figures 2 through 6.

The URI Watershed Watch Office analyzes and compiles the nutrient data. Much of the compilation work is carried out over the winter months. NRPA has not received the nutrient data at the time of this report.

Data Plots

Figure 2: Narrow River Temperature Data

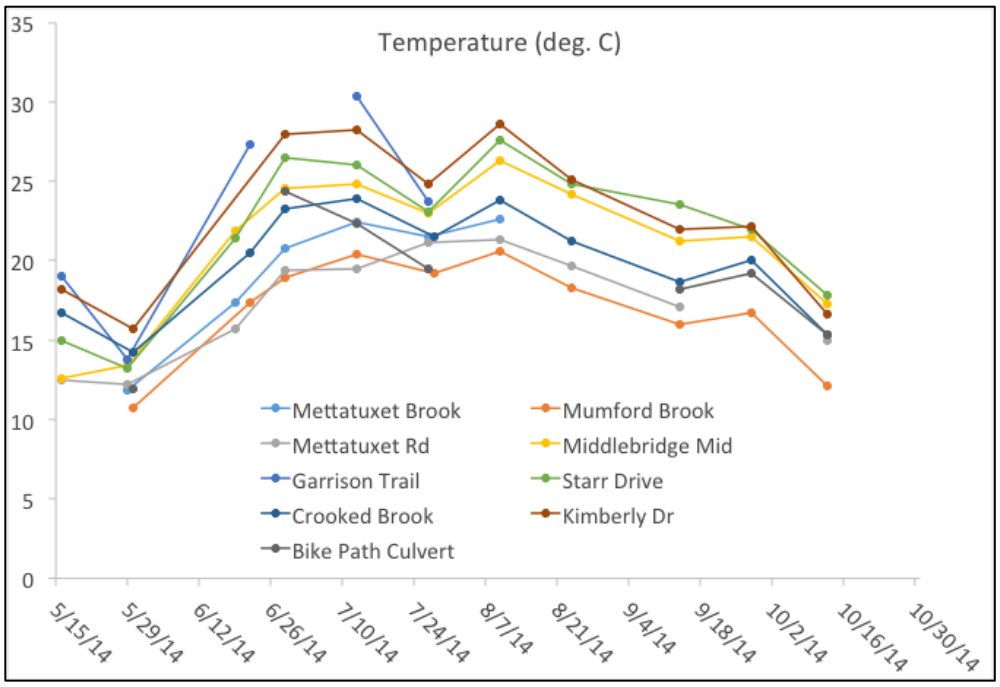


Figure 3: Narrow River Salinity Data

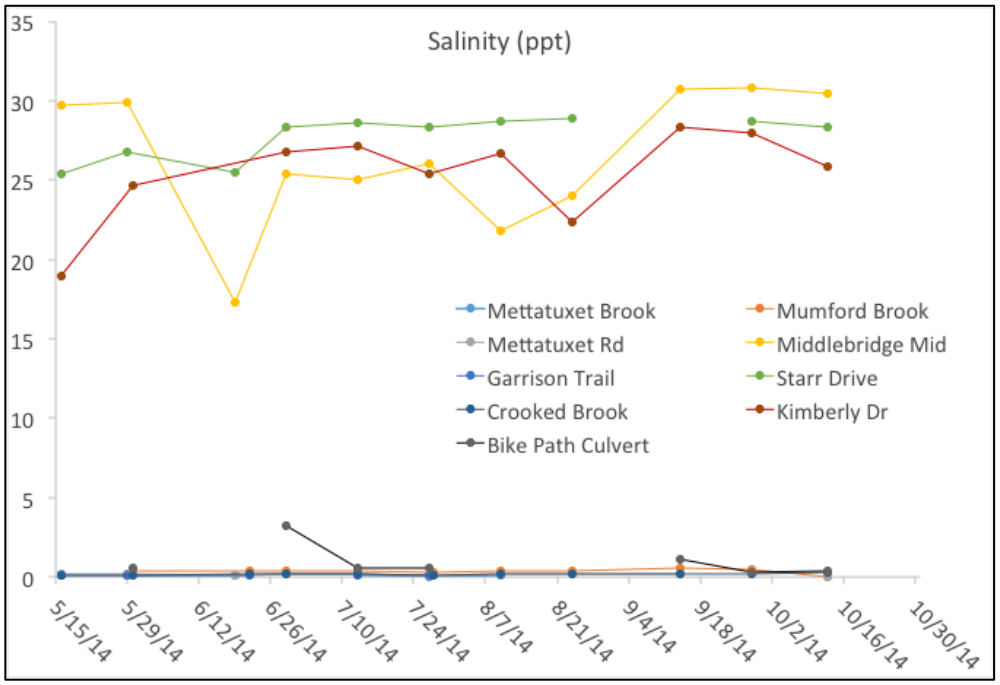
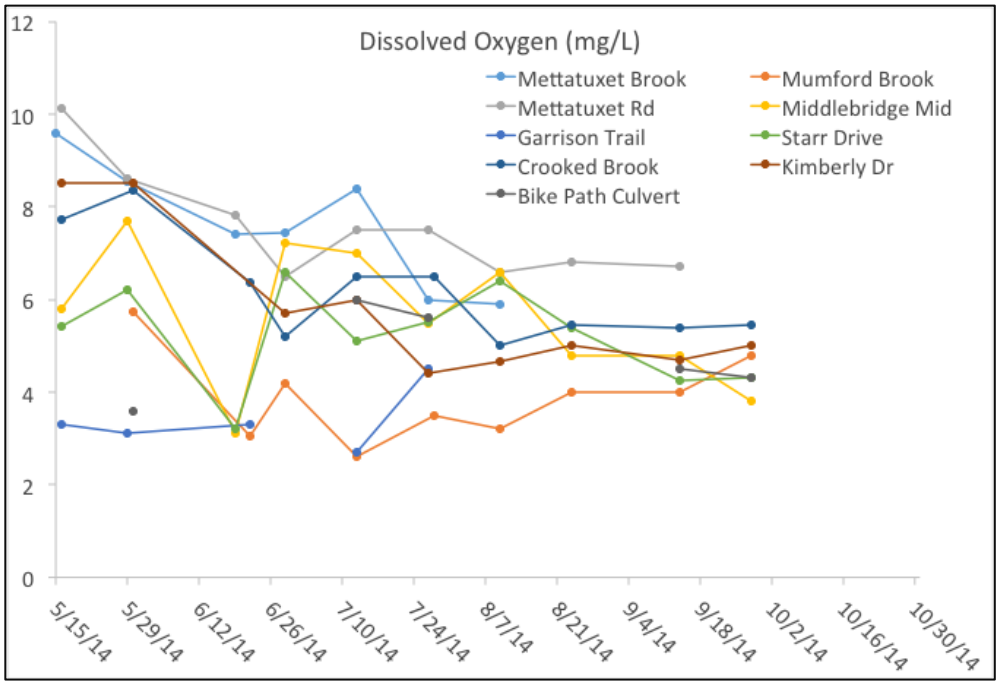


Figure 4: Narrow River Dissolved Oxygen Data



Figures 5 and 6 below are plots of the bacteria (fecal coliform) data, the marine water (saltwater) sites plotted on Figure 5 and the fresh water sites plotted on Figure 6. The red horizontal lines on each chart indicate the standards for recreational contact (safe swimming) and for shellfish harvesting.

Marine water: Standard for recreational contact = <50 FC/100mL

Standard for shell fishing = <14 FC/mL (red dashed line)

Freshwater: Standard for recreational contact = <200 FC/mL

Figure 5: Narrow River Bacteria Data at Marine Water Sites

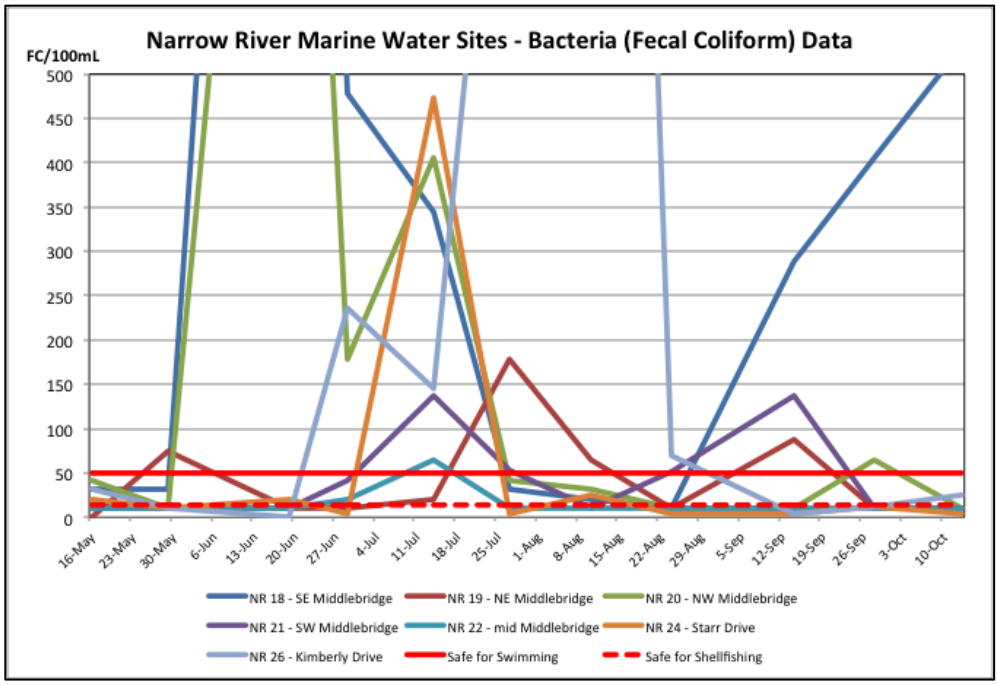
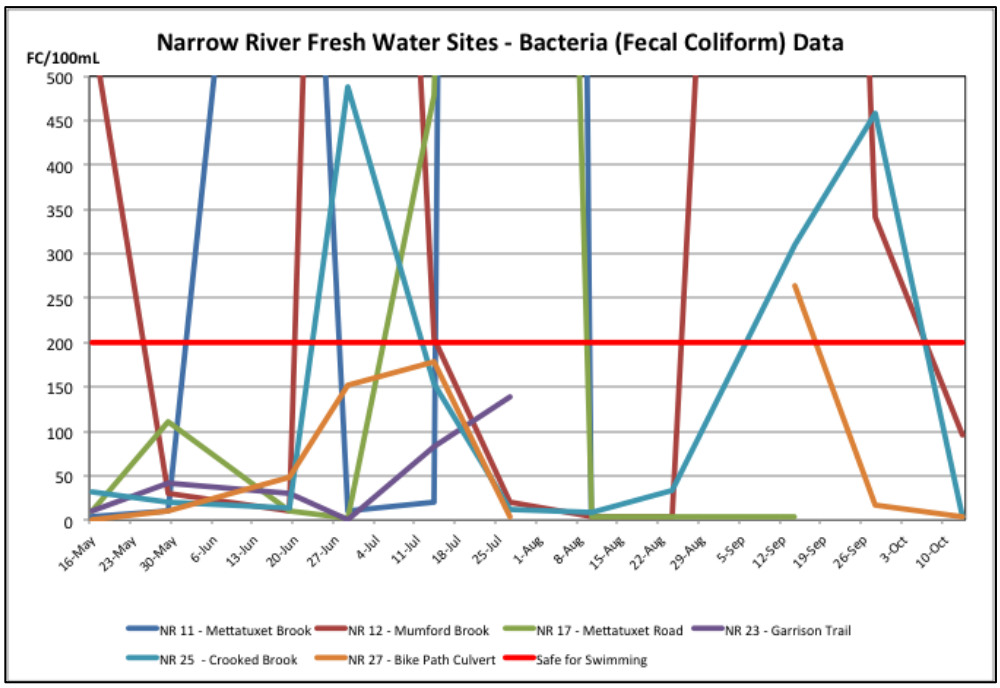


Figure 6: Narrow River Bacteria Data at Fresh Water Sites



Preliminary Findings

Below are a few preliminary findings and observations from the 2014 data:

- Temperature data reflects seasonal trends with elevated water temperatures observed at all sites during the summer months.
- The stream and brook sites are considered freshwater and the salinity levels as expected are lowest at these sites.
- All of the marine water sites had high bacteria levels at least once during the season in excess of the standard for recreational contact.
- There was considerable variability in bacteria levels at the five different Middlebridge sites and any particular sampling dates.
- Almost all of the sampled streams had very high bacterial levels on multiple occasions this season, suggesting that even small streams can contribute bacteria to Pettaquamscutt Estuary

Future work

NRPA looks forward to continuing the supplemental water monitoring program in 2015. Data evaluation will continue and site locations will be reevaluated before the start of the 2015 monitoring season.

NRPA appreciates the funding support provided by USFWS and administered by The Nature Conservancy for this program.