Water Quality Monitoring in North River and Little River in Nottingham, NH

A Final Report to

The New Hampshire Estuaries Project

Submitted by

Deb Kimball
Town of Nottingham

September 26, 2008

This project was funded in part by a grant from the New Hampshire Estuaries Project as authorized by the U.S. Environmental Protection Agency's National Estuary Program.

TABLE OF CONTENTS

Contents

Abstract

The Town of Nottingham Conservation Commission (NCC) in New Hampshire purchased water testing equipment for monitoring the North and Little Rivers as part of the New Hampshire Volunteer River Assessment Program (VRAP). The equipment enabled NCC and Lamprey River Watershed Association (LRWA) volunteer water samplers to efficiently monitor water quality on the two rivers twice a month from May 2007 to June 2008.

Executive Summary

The NCC purchased water-testing equipment in April of 2007 to enable NCC and LRWA volunteers to test water in the North and Little Rivers, which are part of the Lamprey River Watershed. The water quality monitoring activities were part of VRAP. Equipment included a dissolved oxygen-conductivity-temperature meter, a pH meter, and a turbidity meter. New Hampshire Department of Environmental Services (NHDES) water specialist Ted Walsh facilitated the purchase of equipment. A field kit was assembled which included the new water testing equipment, a plastic equipment case, test solutions (donated by NH DES), deionized bottles (donated from various sources), kim wipes(donated from Sue Mooney), rope, collecting pail, sampling instructions, extra batteries and writing utensils. The NCC began sampling on the North and Little Rivers in May 2007 and continued until September in 2007. Sampling resumed in 2008 in May and continued to the end of the NH Estuaries Program grant termination in June 2008.

Introduction

The NCC received funding from the NHEP to purchase of a water quality monitoring equipment to be used by VRAP volunteer monitors in Nottingham, New Hampshire. The project addressed Action LND-2, which states, “To implement steps to limit impervious cover and protect streams at the municipal level” and LND-2 activity #7, which states, “To maintain stream protection infrastructure through BMP maintenance, enforcement, and public outreach / pollution preventions and stream monitoring”.

In 1998, the NHDES established VRAP to promote awareness and education of the importance of maintaining water quality in New Hampshire’s rivers and streams. VRAP aims to educate people about river and stream water quality and ecology and to improve water quality monitoring coverage for the protection of water resources.

VRAP loans water quality monitoring equipment, provides technical support, and facilitates educational programs and establishes a regular volunteer-driven water-sampling program to assist NHDES in evaluating water quality throughout the state.

Prior to this project NCC VRAP volunteers shared one water quality monitoring kit with several other towns in the Lamprey River watershed. As a result, the availability of the

equipment was limited and up keep on this one kit was difficult. VRAP encourages groups like the NCC to invest in their own equipment for long-term monitoring.

NCC has assisted the Lamprey River Watershed Association in the coordination of the water testing and feels there is a need for the town to have its own monitoring kit. In addition to twice monthly data collection on the Little River and North River from May through September, the town could also check water quality at other times of the year and at other locations on the rivers. Which the help of the New Hampshire Estuaries Project, the town of Nottingham purchased a water testing kit in 2007 for testing in the Lamprey River Watershed as part of the New Hampshire Volunteer River Assessment Program (VRAP).

Project Goals and Objectives

NCC goal for this project was to facilitate water quality monitoring in the Lamprey River Watershed from May 2007 to June 2008 by providing necessary equipment to VRAP volunteers.

Activities

Creation of Water Quality Monitoring Field Kit

On April, 24 2007 the NCC purchased from Fisher Scientific a multimeter (measuring conductivity, DO, and temperature) a turbidity meter, and a pH meter. The VRAP Coordinator negotiated a discount for the equipment from Fisher Scientific. NHDES staff donated necessary chemicals for the testing kit and calibrated the equipment. A plastic carrying case, pails (5 gallon and 2.5 gallon), and rope were purchased from Ace Hardware in Raymond, NH. Batteries were purchased through various outlets. Donations of deionized water, kimwipes, pencils, and squirt bottles to dispense the deionized water rounded out the monitoring kit. The binder for VRAP monitoring protocols and data sheets was organized by a volunteer and placed with the kit (Appendix A).

Table 1: Equipment costs

Equipment	Cost*
Multi-meter	$1,024.66
Turbidity meter	$679.00
pH meter	$277.36

* NHDES negotiated an approximately $500 discount

NHDES evaluated and recalibrated Nottingham's monitoring kit and donated new solutions. VRAP volunteers prepared the kit for the 2008 seasons.

Field Sampling

VRAP volunteers from NCC and LWRA began taking field samples in May 2007 in the Little and North Rivers. A group of six total volunteers tested every other weekend at three locations- two along the North River and one location along the Little River. Two volunteers tested at a time. The monitoring ended in late September 2007. The results

for Nottingham's water monitoring in the Lamprey River Watershed in 2007 is available through the NHDES VRAP site (Appendix B).

A retraining session for VRAP volunteers occurred in early May 2008 and was attended by three Nottingham volunteers. Sampling of the North and Little Rivers resumed later that month and continued past the end of the NHEP grant period (June 30, 2008). Six volunteers were involved in 2008 and two sampled every other weekend.

The kit has also been used after high water or some snow events to check conductivity levels.

Outcomes

Water quality data was successfully collected in 2007 and 2008 (Appendix B). The kit that resulted from the NHEP funding enabled efficient data collection for the NHDES VRAP. To enhance the kit the NCC plans to obtain a windup reel for the rope and continue to work with VRAP staff to secure testing solutions and calibrate equipment. The NCC also intends to repair and replace equipment as needed for many years and intends to monitor the North and Little Rivers once a month year-around (weather permitting). This data is intended for Nottingham's use only.

Appendices.

Appendix A: Photos of water testing equipment and sampling sites

Photo 1 - pH kit, DeIonized water, sampling bucket, and booklet
Photo 2 - Testing solutions, multimeter, and Monitor kit in foreground. This is the set up for conducting the tests.

Photo 3- June 2008 photo of North River – NOR-05 site at McCrillis Bridge
Photo 4 - Photo of Little River water testing site LTR-05 taken June of 2008

Appendix B: VRAP data collected in Nottingham during project period

From *New Hampshire Volunteer River Assessment Program 2007 Lamprey River Watershed Water Quality Report*, document number NHDES R-WD-08-1S

09-NOR, North River, Freeman Hall Road Bridge, Nottingham - Class B

Date	Time of Sample	DO (mg/L)	DO (% sat.)	pH	Turbidity (NTUs)	Specific Conductance (µS/cm)	Water Temp. (°C)	Air Temp. (°C)
Standard	NA	>5.0	>75% Daily Average	6.5-8.0	<10 NTU above backgrd	NA	Narrative	NA
06/02/2007	09:55	8.44	92.8	6.48	0.87	96.6	19.7	20.9
06/16/2007	10:05	8.37	84.0		0.89	86.9	17.3	17.4
6/26/2007[A]	12:25	9.00	106.8	6.39		108.3	24.1	25.9
06/30/2007	10:59	9.17	96.4	6.32	0.65	107.9	18.6	18.2
07/14/2007	09:43	8.19	89.3	6.58	1.32	97.2	19.4	19.2
07/28/2007		7.75	90.5	6.44	0.92	107.3	23.1	23.3
08/11/2007	10:42	9.02	96.1	6.85	1.38	102.7	18.9	19.6
08/25/2007	09:57	~~7.52~~	~~84.9~~	6.54	0.60	107.9	21.2	22.7
09/08/2007	09:10	5.40	57.7	6.07	1.78	141.0	18.4	20.3
09/20/2007	09:45	8.59	81.5	6.20	0.44	100.8	12.9	13.2

05-NOR, North River, McCrillis Road Bridge, Nottingham - Class B

Date	Time of Sample	DO (mg/L)	DO (% sat.)	pH	Turbidity (NTUs)	Specific Conductance (µS/cm)	Water Temp. (°C)	Air Temp. (°C)
Standard	NA	>5.0	>75% Daily Average	6.5-8.0	<10 NTU above backgrd	NA	Narrative	NA
06/02/2007	08:05	7.09	80.4	6.19	0.94	57.1	20.1	19.7
06/16/2007	07:50	7.60	78.7		0.75	53.0	17.7	17.5
6/26/2007[A]	11:35	7.73	90.3	5.90		67.1	22.8	24.8
06/30/2007	08:53	7.10	78.8	6.21	0.71	74.3	20.4	7.1
07/14/2007	07:45	6.78	74.9	6.10	1.54	59.4	20.2	19.5
07/28/2007	08:15	7.09	86.1	6.01	-0.08	28.4	24.3	24.2
08/11/2007	08:02	7.58	80.7	6.47	1.31	84.9	18.4	17.8
08/25/2007	08:37	~~7.75~~	~~85.3~~	6.40	0.52	93.9	20.3	23.8
09/08/2007	07:40	7.16	76.8	6.09	0.29	93.8	18.7	19.3
09/20/2007	08:55	8.21	77.6	6.19	0.75	85.4	12.9	13.0

05-LTR, Little River, Smoke Street Bridge, Nottingham - Class B

Date	Time of Sample	DO (mg/L)	DO (% sat.)	pH	Turbidity (NTUs)	Specific Conductance (µS/cm)	Water Temp. (°C)	Air Temp. (°C)
Standard	NA	>5.0	>75% Daily Average	6.5-8.0	<10 NTU above backgrd	NA	Narrative	NA
06/02/2007	09:00	7.41	81.2	5.84	0.85	34.3	19.4	19.3
06/16/2007	09:37	8.47	88.2		0.40	45.3	17.5	17.5
06/30/2007	09:55	7.95	85.0	6.10	0.28	60.3	18.4	17.7
07/14/2007	09:01	7.30	81.7	6.00	0.51	49.2	20.5	19.1
07/28/2007	09:00	6.84	77.0	5.80	-0.56	55.5	24.1	24.3
08/11/2007	09:12	8.11	84.7	6.00	0.71	60.7	17.7	17.6
08/25/2007	09:09	~~7.52~~	~~86.5~~	6.05	0.22	51.7	21.1	22.8
09/08/2007	08:25	7.61	82.2	5.84	0.27	40.1	19.5	20.6
09/20/2007	08:03	8.99	85.3	5.96	0.23	46.7	12.9	12.7