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UNH Great Bay Coast Watch Involvement in the New Hampshire Estuaries Project

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A Final Report to the New Hampshire Estuaries Project

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Cover Photo: Watchers and Docents on Valentines cruise of Great Bay. Photo by Ann S. Reid.

Introduction

The Great Bay Coast Watch (GBCW) is a volunteer estuarine monitoring program established in 1989 that includes teachers, students, and local citizens with a diversity of backgrounds. Volunteers participate in a variety of training programs that enable them to monitor water quality parameters in Great Bay and coastal areas, sample for marine phytoplankton along coastal New Hampshire and conduct shoreline surveys and habitat evaluations.

Since 1997 the New Hampshire Estuaries Project (NHEP) has relied on the ability of GBCW to recruit and train volunteers to assist with the implementation of its plan to protect, restore and manage the state's estuarine systems. This year GBCW participated in plan implementation by assisting the NH Department of Environmental Services (NHDES) Shellfish Program. Volunteers completed a variety of program work tasks, including mussel collection for toxicity monitoring, water quality sampling and sample transport.

Goals and Objectives

The purpose of this project was to assist the NHEP with implementation of its management plan. GBCW assisted the NHDES Shellfish Program with a variety of work tasks. Specific goals were:

- Recruit, train and organize volunteers for project tasks.
- Collect mussel samples from the site at Isle of Shoals and transport samples to the state lab in Concord in order to test for Paralytic Shellfish Poisoning (PSP).
- Participate in wet weather culvert sampling and transport samples to Concord and/or Durham.
- Assist with ambient water quality sampling in Great Bay, Little Harbor and Hampton Harbor and transport samples to Concord.
- Provide general field assistance as needed.

Methods and Accomplishments

Wet weather and ambient water quality sampling:

GBCW recruited volunteers and organized training events for water quality sampling. NHDES Shellfish Program conducted training on site locations, equipment use, sampling methods and data collection and sample transport (see Appendix B).

NHDES notified GBCW of potential sample days and GBCW subsequently organized volunteer teams for sampling. Sample dates included pre-scheduled events as well as storm sampling. To assist NHDES with storm events, GBCW developed a list of trained volunteers that could be called for unscheduled sample events. Volunteers assisted with sampling for 25 events and transported samples 12 times (see appendix A). All samples and data sheets were transferred to NHDES after collection. Numerous samples were collected for fecal coliform analysis by the state to aid in determining potential pollution sources.

Due to some staff changes at NHDES, this project end date was extended and project tasks were modified; volunteers completed training for future assistance with a NHDES Total Maximum Daily Load (TMDL) study and the shoreline survey work task was deleted from the project. To further assist the NHDES Shellfish Program, volunteers participated in data entry and completed a tidal current study.

- Volunteers contributed over 600 hours to this NH Estuaries Project grant

Bob Rowe. Photo by Ann S. Reid

Mussel collection for toxicity monitoring:

To monitor for PSP in shellfish growing areas, a sampling site for mussel collection was established at Star Island in 2000 with the cooperation of the Isles of Shoals Steamship lines and the Star Island Corporation. Mussels cannot be easily harvested on the island. Therefore, mussels are collected and bagged from the Hampton Harbor area, then transported to and hung from the Star Island Corporation docks and left to filter for a minimum of two weeks. GBCW volunteers traveled out to the sample site weekly to

collect a bag of mussels for transport to the state lab in Concord. Travel to the island was primarily on the Isles of Shoals Steamship Company ferry with some runs via a NHDES boat. Volunteers assisted with mussel collection in Hampton Harbor and sample transport to Concord as requested by NHDES. Volunteers completed 19 trips to the sample site and delivered samples to Concord for 13 events.

An additional activity conducted by volunteers which is not specifically supported by this grant, is public education and outreach. On the return trips from the Isle of Shoals, trained volunteers would process phytoplankton samples collected from the Star Island site. Interested passengers onboard the ferry were frequently engaged in conversations about coastal issues and encouraged to examine phytoplankton samples under a microscope and assist with the water quality tests.

Discussion and Recommendations

Great Bay Coast Watch provides a valuable trained and flexible work force of volunteers. A great example is the ability of GBCW to compile a list of trained volunteers available for unscheduled sampling during storm events. The Watch was able to accommodate additional project work tasks, such as training for a TMDL project. GBCW involvement with NHDES Shellfish Program projects continues to assist the program with significant data collection and public outreach.

- Continue to involve GBCW volunteers in estuary projects – GBCW is skilled at recruiting and training volunteer teams and these projects build a local citizenry educated on coastal issues.

- Allow for project flexibility to accommodate changing DES Shellfish Program needs that arise from time to time. For example, weather conditions or staff changes which result in changing project focus.

APPENDIX B

NHDES Shellfish Program, 5/6/02
Shoreline Survey, 2002

DES Shellfish Program Shoreline Survey Studies, 2002

Introduction and Background:

Thank you for participating in this year's studies. The purpose is to collect water samples from potential pollution sources during both dry weather and wet weather conditions. Due to last year's dry conditions we still need water samples from Great Bay, Lower Little Bay and the Bellamy River for one wet weather event. We will also be looking to sample two dry weather and two wet weather events for the Upper Piscataqua River, Cocheco River, Salmon Fal1s River and possibly the Winnicut River. Water samples will be analyzed for fecal coliform concentrations.

The potential pollution sources may be stormwater pipes, failing septic systems, seeps, streams or rivers, etc. Descriptions and locations for each of these potential pollution sources in the Great Bay, Little Bay and Bellamy River can be found on the enclosed map and spreadsheet. Maps showing locations of pollutions sources on the Upper Piscataqua River, Cocheco River, Salmon Falls River and Winnicut River will be distributed in late summer.

Equipment:

Each sampling team win need the following equipment.

-Whirl-paks (20 max per sampling event).
-sterilized 250-mL bottles (4 max per sampling event).
-yard stick
-2 gallon bucket
-carpenter's ruler
-4 Ft. stick
-8 Ft. stick
-tape measure
-watch
-stopwatch (or watch with second hand).

The DES Shellfish Program will provide each team with whirl-paks, sterilized bottles, a 2 gallon bucket, a carpenter's ruler, 4 ft. stick, 8 ft. stick and Styrofoam. The team members will be responsible for bringing their own watch and stopwatch. Each team will be responsible for returning the DES Sampling equipment to Ann Reid at the end of the sampling season (Friday before Thanksgiving Holiday at the latest).

Methods and Procedures:

The following information applies to both dry weather and wet weather sampling events. Dry weather event sampling will occur when there has been a stretch of several days with little to no rain. Wet weather events are sampled after receiving approximately 1.0 inch or more of rain proceeded by 3 or more days of dry weather. Sampling will most likely take place within 3 hrs (+or -) of low tide. Sampling will occur during daylight hours only. If the "perfect storm" occurs we may have to gather prior to sunrise if preparing to sample or after sunset if finishing after sampling.

Station ID:

Each pollution source site has been given a StationID (first column on spreadsheet). These stations correspond to those seen on the map. The StationID includes a waterbody designation (GB, ULB, LLB, WIN, BLM, UPR, CR, SFR), PS (for "pollution source") and assigned number. Label the sample with the StationID- THIS IS VERY IMPORTANT. Also be sure to record the StationID on the field data sheet.

Collection of a water sample:

Water samples will be collected at all sites that have flowing water. Water samples will be collected from a source that is not flowing only if there is convincing evidence that sewage might be present (i.e. sewer smell, waste debris, etc.). Whirl-paks will be used to collect the water samples. First, label the whirl-pak with the date, time of sample collection, sampler's initials and StationID using a black permanent marker (Sharpie). Tear off the top of the pack along the perforation. Open the mouth of the bag using the white pull-tabs, being sure not to touch or contaminate the inside of the pack, and collect a water sample from the pipe discharge. You will often either be able to hold the pack up to the pipe and let the water flow in it or move the pack through the water to collect the sample. If moving the water through the sample, keep the pack moving in one direction. This will prevent disturbed substrate from going into the sample and prevent water from flowing over the outside of the pack (possible contamination point) and into the sample. Also refer to the attached SOP for water sample collection. The pack should be approximately 3/4 full. Please note that sample collection with a whirl-pak may be difficult in shallow water conditions. If this is the case it may be necessary to use a sterilized bottle to collect the sample and pour into the whirl-pak. It may take several "dunks" of the sterilized bottle to get a whirl-pak 3/4 ful1. Again, do not al1ow disturbed substrate into the bottle. Do *not* use the same sterilized bottle at more than one site. Mark on masking tape that the bottle was used (no longer sterile) and return to DES Shellfish Program at the end of the sampling event.

To seal the whirl-pak, hold the yellow tabs, flip the top portion of the pack to make a temporary seal and whirl 3-4 times for a permanent seal. Twist the two yellow ends together, hiding the metal ends as best as possible (so they don't puncture other samples in the cooler). The pack should be taught with an air pocket. This is important for the lab must shake the water sample in the bag prior to analysis. Place the water sample on ice/ice-pack in a cooler immediately.

Recording water flow:

For each of the sites I would like water flow to be recorded. This information along with the fecal coliform (FC) result wi1l allow us to determine a FC load for this pol1ution source. If there is no flow at the source please note this on the field data sheet. To measure water flow you will need to choose the appropriate method, either volumetric (bucket), velocity-pipe, or velocity-stream for the source:

1. Volumetric (using the bucket): Flow will be determined for small pipes using a bucket and stopwatch or watch with a second hand. The bucket holds 2 gallons of water. Hold the bucket under the pipe and record the number of seconds it takes to fill the bucket. Measure and record the time it takes to fill the bucket three times. If the bucket does not fill in 1 minute's time, record as <2GPM. GPM= gallons per minute.
2. Velocity-Pipe (stick method): Measure (in inches) the width of the water in pipe. Also measure the water depth using a carpenter's square if possible. Measure to the closest 1/8 inch. To measure water velocity, balance a piece of 1 in. sq. Styrofoam on the end of the 4 ft. stick and extend the full length of the stick with Styrofoam into the pipe. Release the Styrofoam. . Measure and record how long (seconds) it takes to the Styrofoam to travel the 4 ft. to the pipe's outlet three times. This will give you the flow rate (ft./sec.) for the water in the pipe. If the recorded time is less than 2 seconds use the 8 ft. stick if possible.
3. Velocity-Stream. Measure (in inches) water width and depth. To measure water velocity, measure and record the time it takes a piece of Styrofoam to travel down X ft. stretch of a stream three times. You will want to choose a part of the stream with a 4-10 ft. stretch that is relatively uniform in width and depth and with few bends as possible. Record the stretch of stream length used.
4. Perennial Stream/River: Do not record flow for perennial streams where safety is a concern. Do not record now for Rivers.

Completing the field data sheet:

Each field data sheet has room to record information for three site locations. A field data sheet is completed for each site location regardless of a sample actua11y being collected. For each sample the date, time (military), and person sampling is recorded. The StationID is recorded - this is very important. Measurements to determine flow are recorded. Please note that you only need to record the flow by one of the methods, either volumetric, velocity-pipe or velocity-stream. You will make the determination of the most appropriate method in the field. Simply collect the flow measurements for the appropriate method. Due to time constraints, do not calculate the actual water flow. This will be done later by the Shellfish Program. If there is no flow and a sample is not collected record this information (write "no flow, no sample"). If there is no flow but a sample was collected record this information (write no flow, sample collected. The only circumstance that you would collect a water sample when there is no flow is when there is evidence of sewage. In addition to estimating flow, record comments that may help in assessing the sample. Comments are recorded to alert the labs of samples with suspected sewage and to assist with assessing a source at a later date. For example, sample color (green, red, gray, white etc.), sample turbidity (cloudy or clear?), and sample smell (sewer?) are all helpful in assessing a water sample. Also note iron bacteria when present (iron bacteria wi11look like an oil slick but win break apart, unlike oil, when disturbed), or if there are black, grey, white, green, brown, or red colors on the substrate, culverts, rocks, etc. which may be associated with sewer or algae. Add other comments when necessary. Please be brief and direct as this information is manually entered into the database.

Water Sample Storage:

Samples are stored on ice or ice packs (at least two for small coolers and four for big coolers, assuming the coolers are well insulated).

Water Sample Transportation:

The Jackson Estuarine Laboratory (JEL), NHDES laboratory and perhaps the DHHS laboratory will be used. Therefore, samples will be transported ASAP to one of these three labs. Which samples go to which labs will depend on the number of samples collected.