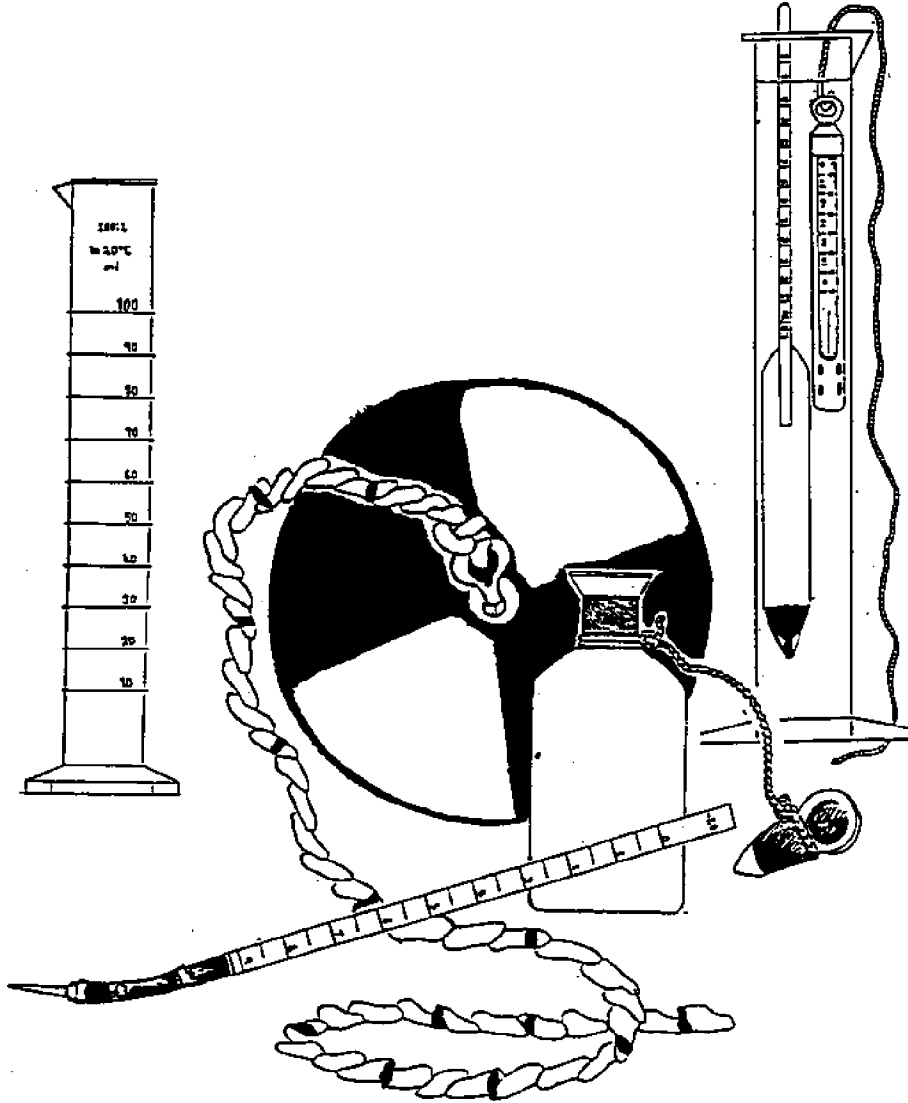


Great Bay Watch

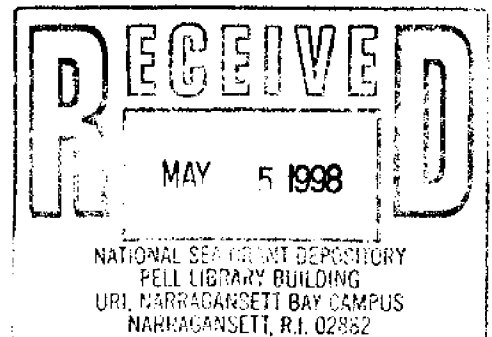
A Citizens' Monitoring Program



Office of State Planning / Coastal Program Grant

Final Report

June 30, 1996



Great Bay Watch
A Citizens' Monitoring Program

Final Report to Office of State Planning

for

November 15, 1995 to June 30, 1996

Submitted by

Bonnie S. Meeker

Ann S. Reid

assisted by Amy K. Carrier

Sea Grant Extension

a part of the

Cooperative Extension Program

at the

University of New Hampshire

June 30, 1996

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"Helping You Put Knowledge and Research To Work"

The University of New Hampshire Cooperative Extension is an equal opportunity educator and employer, U.S. Department of Agriculture and N.H. counties cooperating.

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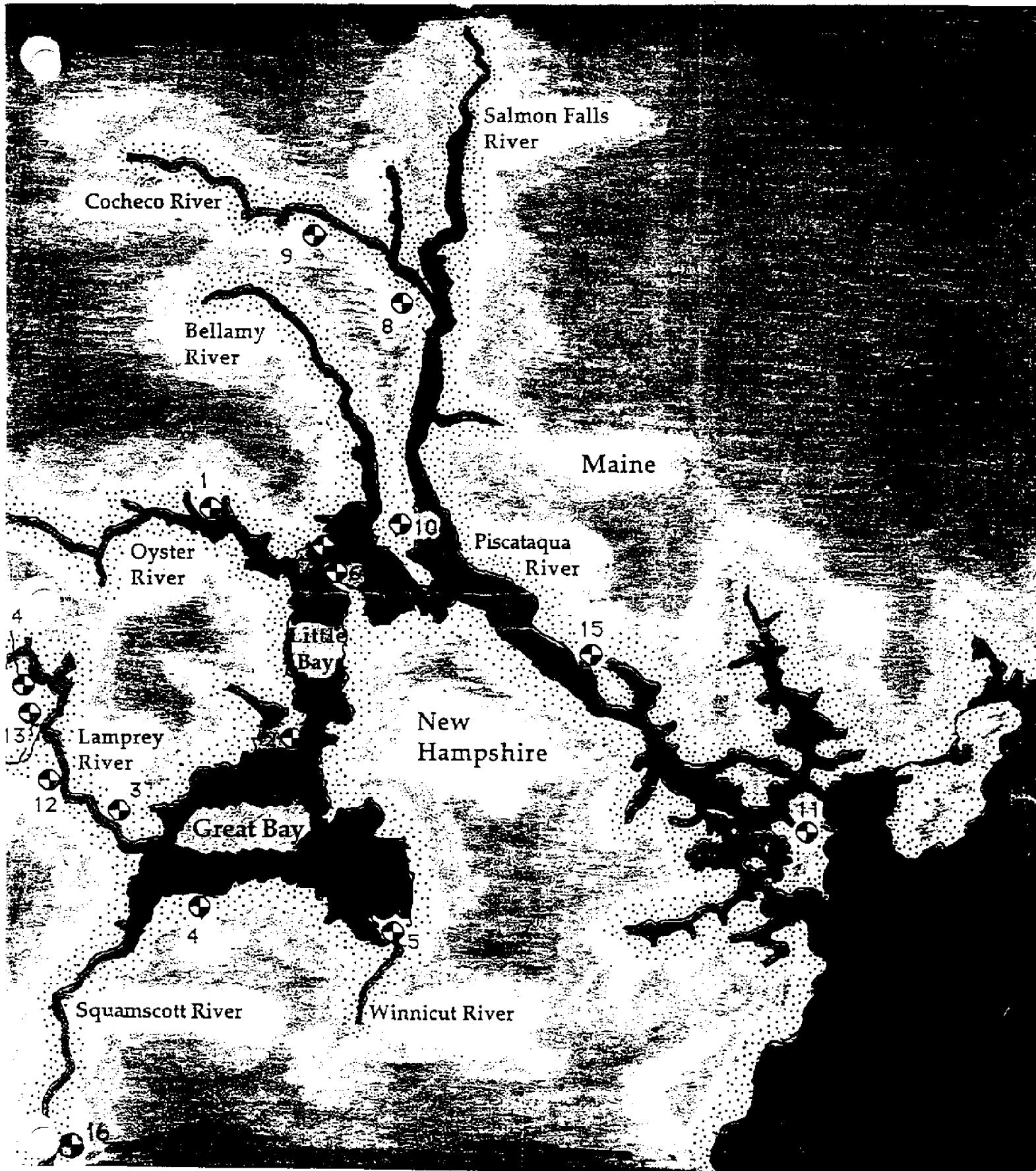
Introduction

The Great Bay Estuary is one of two estuaries in New Hampshire. The system involves eight rivers, Little Bay and Great Bay, and one-third of the watershed is located across the Piscataqua River in Maine.

According to several assessments by various government and state agencies, the Great Bay Estuary is undergoing stress as is witnessed by the closing of more than half its shellfish beds for nearly a decade. Although most sewage treatment plants have been upgraded to at least secondary treatment status, coliform counts are high in some portions of the rivers and the bays. There is potential for increased nutrient-loading, oil spills, and toxic pollution from re-suspended solids and from several Super Fund sites at the former Pease Air Force base.

The Great Bay Watch is a volunteer estuarine monitoring group of adults, teachers and students who have been taking samples and making analyses of several parameters, including dissolved oxygen, temperature, water transparency, salinity, pH and fecal coliform bacteria for the past five years. Their mission is to add information to the long term data base being developed for the estuary by the University of New Hampshire's Jackson Estuarine Laboratory and the Great Bay National Estuarine Research Reserve. Activities of the program bring attention to critical problems in water quality that are developing in the estuarine system. The Great Bay Watch is also an educational program that has done much to inform communities around the estuary about the need to conserve this valuable estuarine system. The volunteers are actively involved in this effort, as they, in turn, go back to the communities and share their knowledge and experiences. Staff members and volunteers participate in local, regional and national conferences and workshops, which help citizens to become better informed decision-makers.

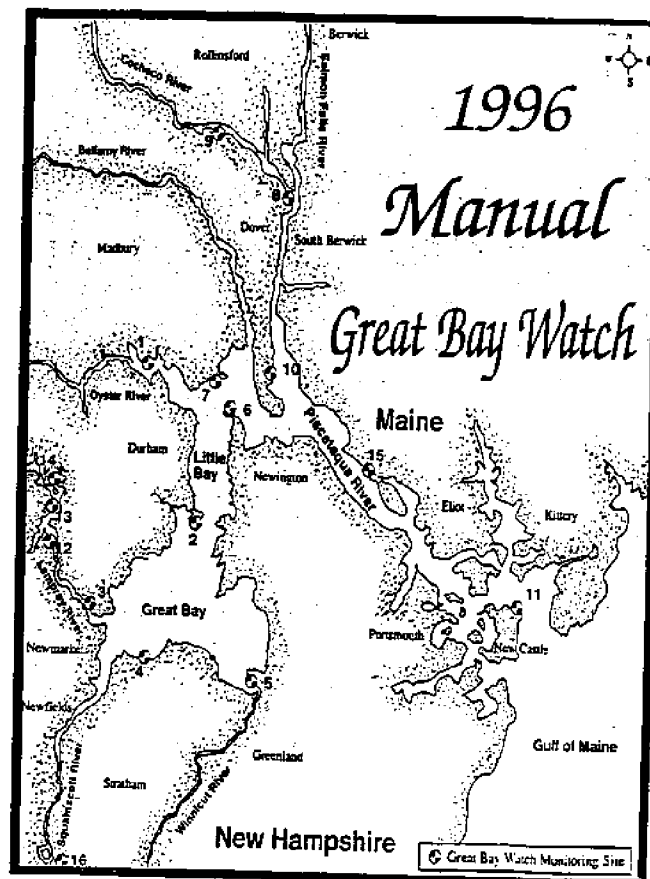
Site Name	Site #	Location	Town
Peninsula (Smith's)	1	Oyster River	Durham
Jackson Estuarine Lab	2	Great Bay	Durham
Lamprey River	3	Lamprey River	Newmarket
Depot Road	4	Great Bay (GBNERR)	Greenland/ Stratham
Portsmouth Country club	5	Winnicut River	Greenland/ Stratham
Fox Point	6	Little Bay	Newington
Cedar Point	7	Little Bay	Durham
Neals'/Williams'	9	Cocheco River	Dover
Clarks'	10	Piscataqua River	Dover
Coastal Marine Lab	11	Piscataqua River	New Castle
Waste Water Treatment Facilit	12	Lamprey River	Newmarket
Marina Falls Landing	13	Lamprey River	Newmarket
Fowlers'	14	Lamprey River	Newmarket
Patten Yacht Yard, Inc.	15	Piscataqua River	Eliot, Me
Exeter Town Docks	16	Squamscott River	Exeter



Project Goals and Objectives

Funds were requested in order to:

- 1.) Revise and print an updated Water Quality Monitoring Manual and accompanying lessons.
- 2.) Recruit and train volunteers in the Program's sampling techniques.
- 3.) Analyze the data collected during the 1995 sampling season and prepare and print the annual year-end report.
- 4.) Begin sampling (April 1996) and continue through June of 1996.



Project Outcome

1.) The Great Bay Watch 1996 Water Quality Monitoring Manual was revised and rewritten, updated with new information, illustrated, printed, and distributed. We have enclosed one copy for your review.

Accompanying lessons for the many students involved in the Great Bay Watch were written by Barbara Hopkins of Oyster River High School, and Joyce Tugel of Marshwood High School. A copy of these lessons is included as Appendix A.

2.) An additional 35 volunteers were recruited through the various means listed below:

GBW teachers' meetings	Strafford County Cooperative Extension Newsletter
Sea Grant Staff Meetings	
Word-of-mouth	Seacoast Science Center display and program
UNH Water Resources staff meeting	ElderHostel display
Press releases	UNH/Thompson School Greenhouse Open House
Gulf of ME Water Quality Monitoring Conference	New Hampshire Science Teachers' Association Spring Conference
Morse Hall Women in Science Poster display and demonstrations	SEAC at UNH's Earth Day festivities display and resulting Portsmouth Herald article
Public service announcements for radio	In-Service Day display
GBW's technical advisory meetings	Continuing monthly articles in the Docent Doings newsletter

Training for 33 new and experienced volunteers was held on March 20th. Jeff Schloss of UNH Cooperative Extension Water Resources gave an in-depth presentation about the importance of dissolved oxygen, and demonstrated the Great Bay Watch's dissolved oxygen procedure. Ann Reid followed up on March 27th with demonstrations and training for the other procedures with 22 new "Watchers."

An additional 14 volunteers who joined the Great Bay Watch subsequent to the training sessions were trained in individual groups by Ann Reid, assisted by workstudy students Damon Burt, '96 water resources graduate, Amy Carrier, Amy Manzelli, Shanna Hallas, Kim Foley, and Joanne Morrill.

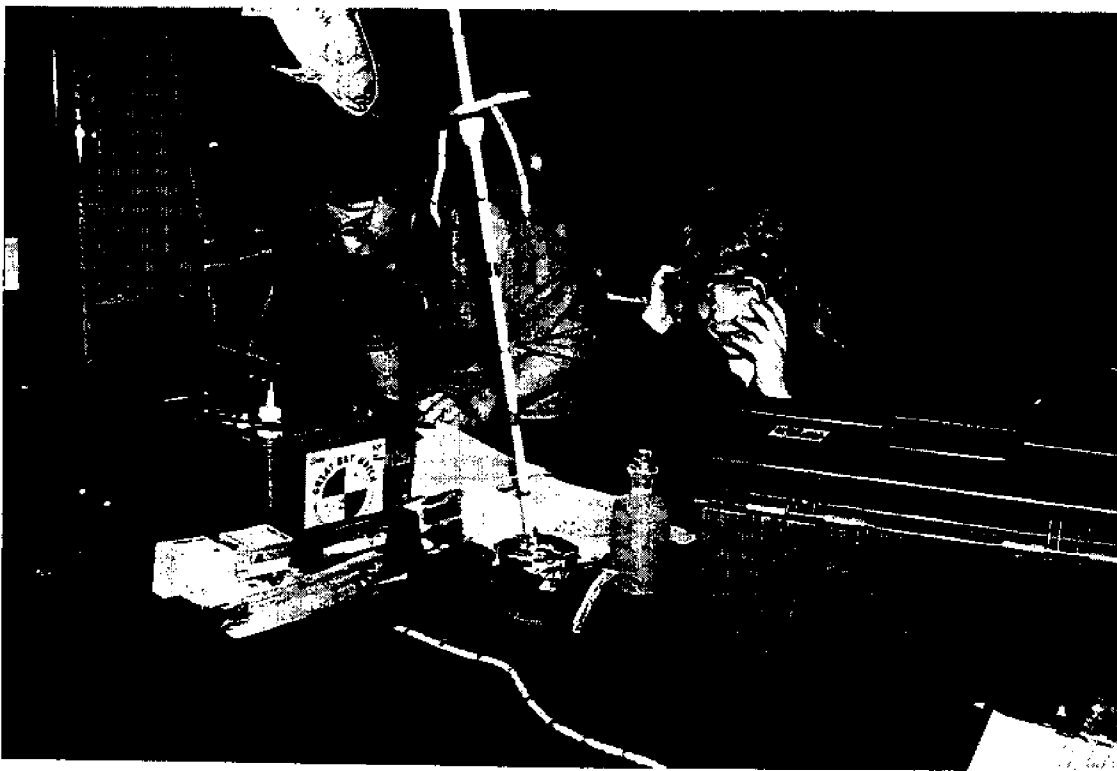


Photo: Ann Reid

Mother and son, Alison and Zak Adamczyk, one of the new home schooled families in the Watch.

3.) The data from the 1995 sampling season was checked for precision and accuracy, reviewed for trends, and condensed into the 1995 Great Bay Watch Annual Report. Please refer to pp.29-45 in the Report for a summary of the six-year trends for water quality in the Great Bay. One copy of this has been enclosed for your review, and another has been sent with the March 31st project report.

4.) On April 10th from 2-8 PM, 55 volunteers of the Great Bay Watch were certified at a Quality Assurance/Quality Control (QA/QC) session. Each of the volunteers met or exceeded Great Bay Watch standards. Thus, they were well prepared for the first sampling day on April 18th. Please refer to Appendix B for the statistical results of this QA/QC session.

In preparation for the sampling season, supplies were carefully inventoried, documented, and additional supplies were ordered as needed. Additional supplies were also ordered as needed throughout the sampling season. The existing supplies were calibrated by Amy Lindsay, UNH Chemistry Lab Supervisor, to ensure their accuracy in the 1996 sampling season.

The sampling season began as scheduled on April 18th, with subsequent sampling days occurring as planned. A complete list of sampling days for the 1996 sampling season is included as Appendix C, or refer to page 46 of the Great Bat Watch 1996 Manual.

As of June 30, 1996, five sampling days have been conducted. The collected data for this portion of the sampling season is included as Appendix D.

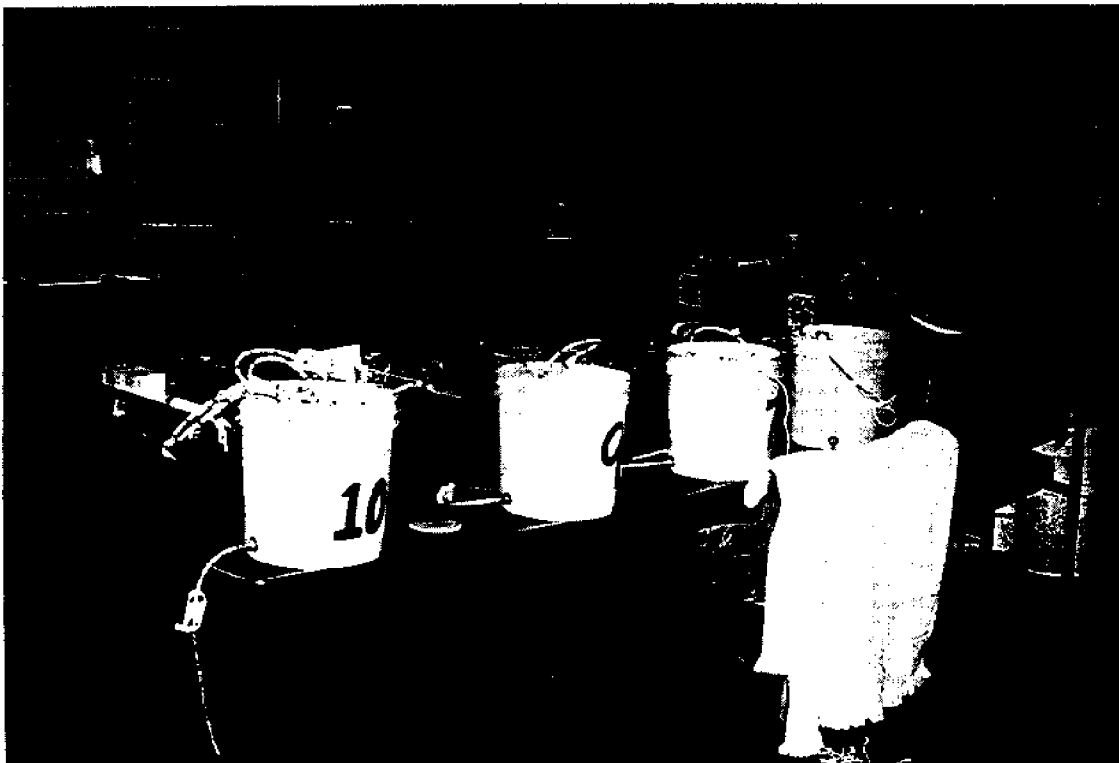


Photo: Ann Reid

Inventory and preparation for sampling season #7.

Volunteer Match

In the time between November 15, 1995 and June 30, 1996, the Great Bay Watch had a total of 130 volunteers who contributed 1,259 hours to the Great Bay Watch. This exceeds our required match of a minimum of 1,083 volunteer hours.

Statement of Budget Spent

<u>Appropriation Unit</u>	<u>Original Budget</u>	<u>Actual Spent</u>
Labor.....	\$7920.00	\$7915.53
Fringe Benefits.....	\$ 477.00	\$ 477.00
Travel.....	\$ 379.00	\$ 272.40
Supplies.....	\$1521.00	\$1514.00
Indirect Costs.....	\$2703.00	\$2703.00
Total.....	\$13,000.00	\$12,881.93

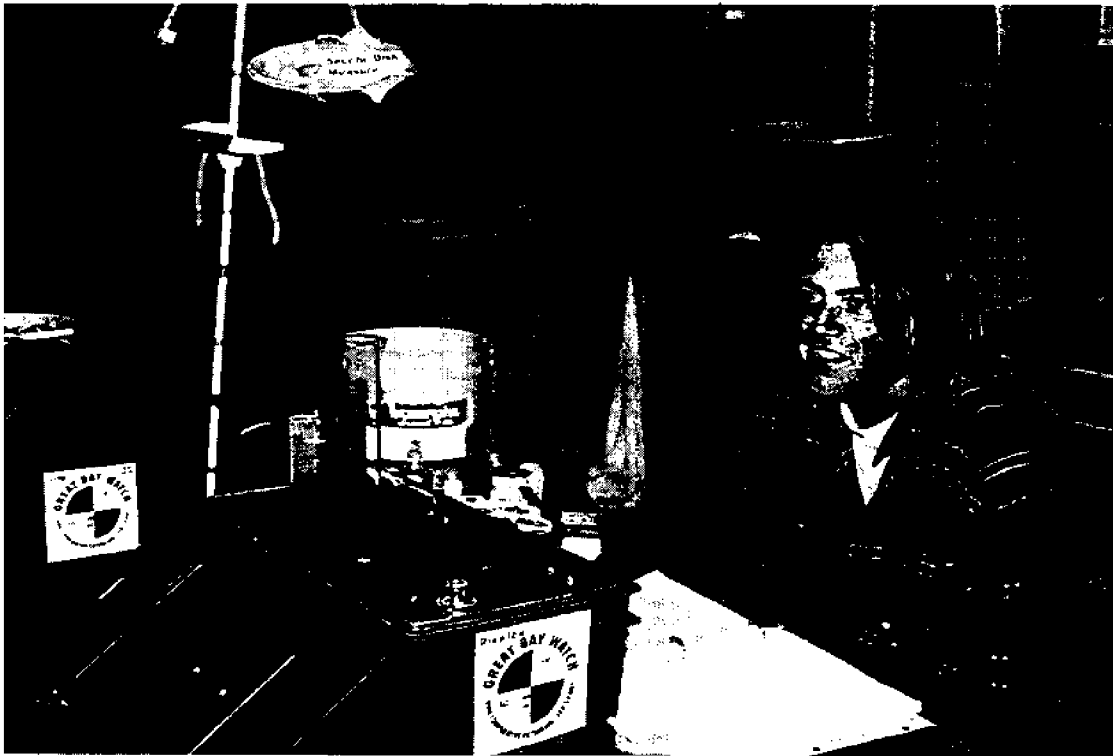


Photo: Ann Reid

New trainee and UNH student, Daniel Eves.

Great Bay Watch Activities & Lessons

Title: Descriptive and attention-grabbing!

Grade Levels: Target audience for lesson/activity.

Overview: A brief description of the total lesson. Include goals and activities.

Learning Objectives: List specific knowledge or skills and the curriculum area to which they apply. These objectives should be measurable and connected through the intended assessment. Objectives should begin with phrases such as "Students will be able to..."

Benchmarks/ National Science Standards/New Hampshire State Curriculum Frameworks: List the performance standards that are involved in this lesson from the curriculum frameworks. If possible seek-out connections in at least two curriculum areas [e.g. science and math, science and social studies].

Materials & Supplies: Specify all materials or supplies needed for a class of 24 students to complete the activity. Students may be grouped, but the number of students in groups should be specified. Be sure to include resources for hard-to-find items in the resources section.

Introduction: A detailed description of the initial activities or discussion that will introduce the lesson.

Approach to Learning: Specify how the teacher will guide or coach the students through the learning phase. This should be a play-by-play chronology of the tasks used to engage the students in building their understanding of the concepts or skills described in the learning objectives. Activities should involve active manipulations of materials or data by the students.

Extensions to Learning: These activities are designed to enable students to apply their new skills or understanding beyond the classroom. These may involve projects, research components, writing to communicate ideas or understanding, and interactions with new materials.

Assessment: How will the teacher assess student skills or understanding? The learning objectives should be connected to the assessment vehicles. Assessments may be in paper and pencil format, or performance in nature. Be sure to include appropriate scoring keys or rubrics.

Additional Resources: State pertinent suppliers or resource personnel for supplies and materials. Potential guest speakers, field trips, industrial, or university contacts should be listed in a general form [i.e. local university or college personnel, county extension service].

Adaptations: Variations applicable to other grade levels or disciplines.

****Lesson Review:** Please keep a separate disk to save lessons in ASCII format. This will ensure compatibility between various software programs

Great Bay Watch Activities & Lessons

Title: How to face the change....pH..pH..changes? With Bowie or buffers?

Grade Levels: Middle/High School

Overview: How does freshwater and saltwater compare in their ability to resist changes in pH? This activity introduces buffering systems to students with previous experience in testing for pH. Students gradually add acids and bases to freshwater and saltwater samples while monitoring their pH. Graphs are constructed and interpreted for the relative changes that have occurred.

Learning Objectives:

Students will be able to:

- ◆ Demonstrate their measurement skills through the use of a pH meter.
- ◆ Construct titration graphs and interpret varying slopes of curves.
- ◆ Explain how a buffering system behaves with the addition of acids or bases.
- ◆ Explain the importance of buffering systems in the environment.

Benchmarks/ National Science Standards/New Hampshire State Curriculum Frameworks:

Benchmarks - The Nature of Science - The Scientific World View, Scientific Inquiry
The Nature of Mathematics - Patterns and Relationships,
The Nature of Technology - Technology and Science
The Living Environment - Flow of Matter and Energy
Common Themes - Systems, Models, Constancy and Change, Scale
Habits of Mind - Manipulation and Observation, Communication Skills,
Critical-Response Skills

New Hampshire Curriculum Frameworks

K-12 Mathematics - Data Analysis, Statistics, and Probability
Mathematics of Change

K-12 Science -Physical Science
Unifying Themes and Concepts

Materials & Supplies:

pH meters

Beral pipets or Burets

Beakers or clear plastic containers for samples

Water samples - freshwater, seawater, distilled water

Hydrochloric Acid 0.1 M

Sodium Hydroxide 0.1 M

Optional: Buffered & Regular Aspirin

Acetic Acid Solution [vinegar] buffered with sodium acetate

Introduction: Students should already be familiar with the operation of a pH meter and burets[if they are to be used]. Many students are already familiar with the problem of acid occurrences, and realize that lakes, ponds, and plants can be adversely affected by the addition of acids. This activity can very quickly show students how different water systems behave as an acid or base is added.

You may want to begin by asking students to predict what they think would happen to the pH of the water samples if a strong acid were to be added. Students should record their hypothesis, and then begin the activity of monitoring the pH as an acid is added. What is the value of a buffered system? How does nature create these systems? What other types of buffering systems exist in nature? In your body? The possibilities for further research and study are numerous. What negative effects have occurred because of changing pH in water systems? How have people contributed to these acid occurrences? What can you do to repair an acid-damaged environment?

Approach to Learning:

- ◆ Obtain three different water samples.
- ◆ Record the pH of these samples as HCl is slowly added. This may be done with a buret to measure the amount of acid added [measure pH with every 1.0 mL added] or with beral pipets [record pH after 5 or 10 drops of acid is added]. Continue to add the acid until the pH remains constant.
- ◆ Obtain new water samples and repeat the process above using sodium hydroxide [NaOH].
- ◆ Graph the resulting data for each water sample.
- ◆ Compare the three different graphs for the volume of acid or base needed to change the pH.
- ◆ Use GBW data to correlate the pH changes from low tide to high tide, over seasons, and after significant rainfall or spring ice melts.
- ◆ Ask students to write a discussion of their results noting the relative pH changes of the water samples.

Extensions to Learning:

- ◆ Use buffered and regular aspirin dissolved in distilled water as two additional samples to test in the procedure above. How do the water samples compare to these solutions? Which seems to mimic the response of the buffered aspirin?
- ◆ Research buffered systems and create your own [acetic acid and sodium acetate] to show how the addition of salts help to prevent changes in pH. Use equations and ionization constants to show how the particles respond when acids or bases are added to a buffered system.
- ◆ Correlate the buffering systems found in the human body, or carbonate systems in caves [stalactites].
- ◆ Ask students to write an explanation of "buffering" and apply it to other types of systems such as land use or architecture.
- ◆ Have students test the pH of soil samples from their own gardens. What course of action would they take if the soil were too acidic or too basic?

Assessment: Assessments can also be made with their graphs and written discussions. Use a buffered solution as part of a lab practical. Ask students to suggest ways in which soils might play a role in the buffering of a lake or pond.

Additional Resources:

- ◆ Invite in guest speakers from county extension agents, private water quality scientists, conservation committees, soil scientists, and other university personnel.
- ◆ Obtain acid precipitation data and pH information from other water systems in the state, U.S., or world.
- ◆ The "Planet Under Pressure" TV series [Annenberg Productions/Public TV] has wonderful, thought-provoking videos that engage viewers in the global effects of their everyday life.
- ◆ Dr. Barry Rock, Complex Systems, University of New Hampshire has worked with acid occurrences around the world relative to forest ecosystems.

Adaptations: This activity can be adjusted for younger children by using weaker acids and bases [vinegar and baking soda], and eliminating the equations/calculations. Use universal indicator to show the changes in pH instead of the pH meters.

Great Bay Watch Activities & Lessons

Title: Pollution, pH, & Problem Solving: A hazardous waste whodunit

Grade Levels: 9 - 12

Overview: This activity is based on a real-life pollution issue. Students rely upon their creative and critical thinking skills to identify the Potentially Responsible Party (PRP) of a groundwater contamination problem. After identifying a region of low pH, a topographic map is used to determine the direction of groundwater flow. When this information is superimposed on a site map, the source of the pollutant becomes evident. Students write a letter explaining the problem and offer their suggestions for remediation.

Learning Objectives:

- Students will measure the pH of water samples.
- Students will determine the region of contamination using a site map and the pH data.
- Students will predict the direction of groundwater flow using a topographic map.
- Students will identify the source of contamination by comparing the region of low acidity to the groundwater flow interpretations.
- Students will learn how science plays a meaningful role in solving local water quality problems.
- Students will understand that it is easier to prevent groundwater contamination than clean contaminated groundwater.

Benchmarks/National Science Standards/New Hampshire State Curriculum Frameworks:

- The Nature of Science: Scientific Inquiry, Scientific Enterprise
- The Living Environment: Interdependence of Life
- Human Society: Social Conflict, Social Trade-offs
- The Designed World: Agriculture, Materials and Manufacturing
- Common Themes: Constancy and Change
- Habits of Mind: Values and Attitudes, Computation and Estimation, Manipulation and Observation, Communications Skills, Critical Response Skills

Materials & Supplies:

- pH paper or pH meter
- Water samples, labeled by sample #, acidified with 0.1 M HCl to the following pH values:

pH	Sample #'s
2	10,11
3	14
4	3,4,13,16
5	15
6	1,2,6,8,12,17,18,20,22,24,26
7	5,7,9,19,21,23,25,27

Site maps, topographic maps (Appendix A)

Introduction: Students are probably aware of groundwater problems in their community, and a discussion of sources of local contamination might include heavy metals, petroleum derivatives, biocides, or other synthetic substances. While it is expensive to test for these compounds and requires specialized instrumentation, inserting small plastic wells into the ground, collecting the groundwater, and assessing the groundwater pH is relatively easy and inexpensive. If this activity is used as an introduction to acids, bases, and the pH scale, reinforce that low pH values mean high acidity.

Approach to Learning: The activity begins by forming an environmental consulting firm. After reading the preliminary report (Appendix A), the class is divided into research teams consisting of 3-4 students. Each team conducts pH measurements on an allotment of the water samples that were "collected" from the 27 wells (if there are six groups, each will have 4-5 samples). The teams then share their data, and each group highlights the wells that appear to have high acidity. At this point, the gas station, private landfill, and gravel pit seem to be possible sources of contamination.

At the same time, each group designates a member to become a topographic map specialist. The map readers, using the elevation delineations on the topographic map and knowing that water generally flows from higher to lower elevation, draw a dark arrow on their topographic map, noting the direction of water flow from the crest of the hill to the river.

The map specialists return to their team, and the site map noting the suspicious region is superimposed on the topographic map. Combining this information, students can then determine the PRP to be the gravel pit.

To end the activity, students can be told that a car reconditioning business adjacent to the gravel pit has been paying the gravel pit owner to bury barrels of paint stripping solvents. The barrels are now corroding, and the liquid is leaching through the sand, into the groundwater. Many questions now arise: Who is responsible for the cleanup, how much will it cost, what will happen to the property value and health of the neighboring homeowners, and what will be their future source of water?

Extensions to Learning:

Students may further investigate the interrelationship between local watersheds and biological or chemical contamination:

*It is often said, "The solution to pollution is dilution". What are possible point and nonpoint sources of pollution in your area? How does your watershed flow, and where would the pollution go?

*How do local or state agencies monitor activities that might lead to groundwater contamination in your area?

*It is easier to prevent groundwater contamination than clean contaminated groundwater. How is contaminated groundwater cleaned up? What can private citizens do to help prevent this financially and environmentally devastating problem from happening?

Assessment: Each student assumes the role of property or business owner, member of the local, state, or federal government, or another person affected by this incident. The student writes a letter that uses the data to explain the situation and suggests a possible solution.

Additional Resources: Guest speakers from the County Cooperative Extension Service, Water Supply and Pollution Control Commission, or local private environmental consulting firms.

Adaptations: To adapt for grades 6-8, eliminate the topographic map and water flow interpretation, and adjust the pH of the samples near the gas station and private landfill to 6 or 7.

Acknowledgement: This lesson was published as: Tugel, J.B. 1994. Pollution, pH, & Problem Solving. *The Science Teacher* 61(2):21-25.

APPENDIX A

CLEAN WATER ENVIRONMENTAL SERVICES, INC. PRELIMINARY REPORT

REVIEW OF EXISTING INFORMATION:

The study site is located in a small town in New Hampshire. A river flows southward through the site. Some residents in the area have reported poor water quality from their wells recently. A county laboratory analyzed three residential well samples and identified elevated chloride levels, traces of dissolved heavy metals, and low pH levels.

INITIAL SITE WALKOVER INSPECTION:

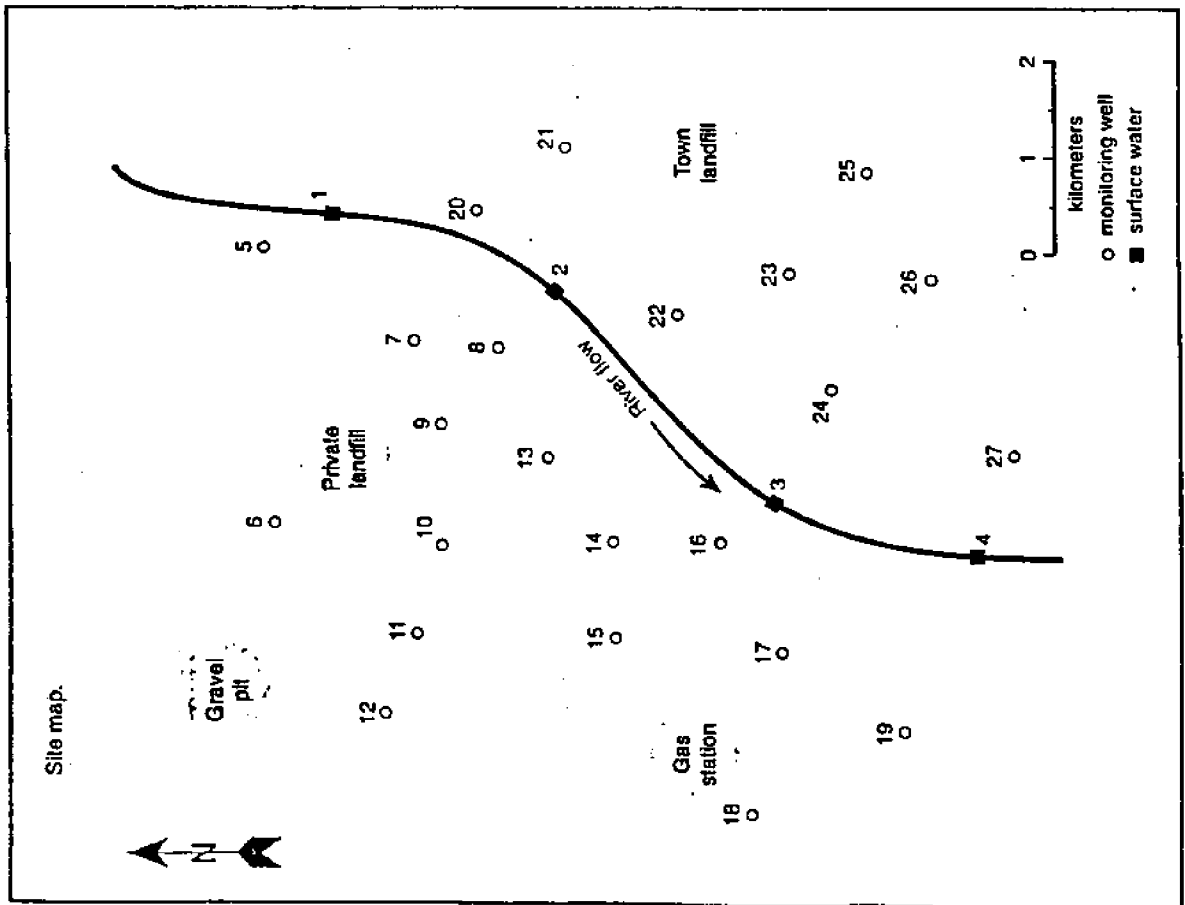
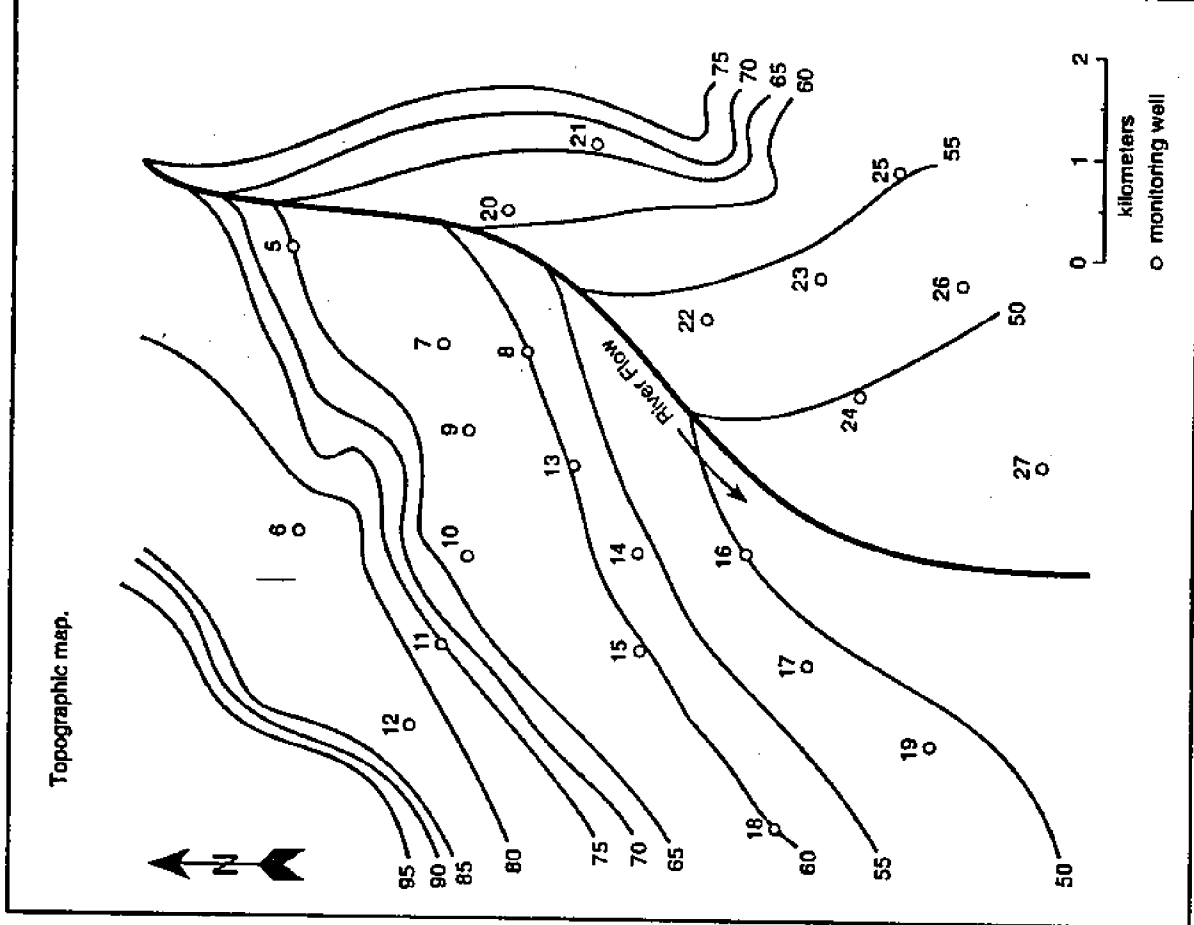
The potential sources of contamination in the area include a gravel pit located at the northwest edge of the site. The economic welfare of many of the townspeople depends on this facility. The town's solid waste is disposed of in a town-owned landfill located west of the river. Municipal and industrial solid waste from the surrounding towns is disposed of in a privately owned landfill located east of the river. Finally, there is an automobile service station located west of the river and south of the town's landfill. Gasoline is sold and vehicles are repaired routinely at this facility.

SUBSURFACE INVESTIGATION:

Holes were drilled throughout the study area and small diameter monitoring wells were installed so that groundwater samples could be obtained. Based on the water table elevation measurements in the monitoring wells, groundwater flow directions can also be determined.

COLLECTION OF GROUNDWATER SAMPLES:

Based on the review of existing information, the initial site walkover investigation, and the preliminary subsurface investigation, samples were collected from 23 monitoring wells and four sites on the river. All samples have been kept tightly capped and stored in a refrigerator.



Great Bay Watch Activities & Lessons

Title: The Bucket Stops Here!

Grade Levels: 9-12

Overview: This activity investigates the effect of physical conditions on water quality variables in an aquatic system. Students collect water samples along a river that feeds into an estuarine system, and water quality parameters are compared to proximity to the ocean.

Learning Objectives:

Students will be able to use a map to locate field sampling sites.

Students will learn field sampling protocol and laboratory analysis of water samples.

Students will be able to use the scientific process to test a hypothesis.

Students will analyze a dataset to determine the relationship of salinity, temperature, pH, and dissolved oxygen to proximity to the ocean.

Students will be able to understand the impact physical conditions have on an estuarine ecosystem.

Benchmarks/National Science Standards/New Hampshire State Curriculum Frameworks:

The Nature of Science: Scientific Inquiry

The Physical Setting: Motion

The Living Environment: Flow of Matter & Energy, Interdependence of Life

Human Society: Social Change, Trade-offs, Conflict

The Designed World: Agriculture

The Mathematical World: Relationships

Common Themes: Systems, Constancy, Change

Habits of Mind: Values, Attitudes, Estimation, Observation, Critical Response Skills

Materials & Supplies: This will depend upon which parameters you choose to measure. You will need one set of supplies for each site - except - salinity and pH measurements can be conducted back in the lab. Dissolved oxygen (DO) samples, once fixed by the first two chemicals, can be titrated in the lab.

Sampling bucket

Temperature: armored thermometer

Salinity: refractometer or hydrometer and cylinder

pH: pH meter

DO: Chemicals as described in the Great Bay Watch Manual or DO kit

Data sheets: Available in the Great Bay Watch Manual

Introduction: If students have not analyzed water samples before, you will need to explain and train students how to conduct each of the tests in advance (see Great Bay Watch Manual for descriptions of the parameters, field sampling and laboratory protocol).

Begin today's activity by asking students to pretend they're in a boat in your local river that leads to your estuarine system. Where are you going? What's different about the upland river area compared to where the river meets the sea? Today you will be quantifying some of these differences.

Develop a hypothesis that predicts how you think proximity to the ocean impacts each of the variables that you will be testing.

Approach to Learning:

Obtain a map of your region and select sampling sites (see Resources for map suppliers).

Recruit parent volunteers to be at each sampling site with the site team.

All teams will, at a designated time, collect a water sample and conduct the temperature, pH, salinity, and/or DO analyses.

Upon returning to class, compile all data.

Graph "distance from ocean" vs "temp", "pH", "salinity", and "DO". Students may want to graph each parameter separately, using appropriate ranges for each of the dependent variables.

Does your graph support your hypothesis? Why or why not?

Extensions to Learning:

Design investigations that would answer one of the following questions:

* What would happen if you followed the tide while sampling each site instead of conducting simultaneous collections?

*How would sampling at high tide vs low tide affect your results?

*How would a river sampling compare to a standing pond?

*What would a depth instead of a spatial profile look like?

*If point or nonpoint source pollution entered your system (eg. thermal pollution, fertilizers, storm drain runoff), how would that affect your results?

Assessment: Assessment in the form of student reports should include their original hypothesis, graph, and analysis of data that justifies their hypothesis about relationships between water quality parameters and proximity to the ocean. Understanding of ecosystems can be demonstrated through their suggestions for further investigation.

Additional Resources:

*USGS topographical maps are available at local stores and county agencies.

*The State of NH, by 1997, should have scan maps on the NH Resource Net;
nhresnet.sr.unh.edu

*Faye Rubin, GIS Coordinator, University of NH, Durham, (603)862-1792 may have other resource ideas unique to your region.

Adaptations: To adapt for grades 7-8, conduct only salinity and temperature analyses. For assessment, ask students to use their data to write a story: You're a tiny creature in a toy boat. As you flow along the river to the ocean, what do you see? How is the taste and the feel of the water changing?

Great Bay Watch Activities & Lessons

Title: Sleuths on Shore!

Grade Levels: High School

Overview: A mystery can provoke the Sherlock Holmes in students and put them in the scientists' role. Once students have participated in water quality testing, the necessary methods to measure the physical characteristics are now at their fingertips. Students may need additional practice to hone their measurement skills, and may begin to question how one characteristic might affect another. This is an ideal situation for promoting students as scientists! The analysis of Great Bay Watch [GBW] data through time will suggest relationships to students, but designing experiments to test out their ideas will generate ownership, creativity, and critical thinking skills that engage students. In this activity students will work in small teams to analyze a relationship between two of the physical parameters documented with GBW data, and then design an experiment to test out their hypothesis about that relationship. A total of six research teams will enable students to compare the influence temperature, salinity, pH, and dissolved oxygen play on each other. Cooperative learning strategies can be employed to help students work together and team reports can communicate their findings with the class or entire school.

Learning Objectives:

Students will be able to:

- Demonstrate their measurement skills through the use of a thermometer, hydrometer, and pH meter.
- Manipulate a spreadsheet to obtain graphs that compare one physical parameter to another, and determine a plausible relationship between the two.
- Use the scientific process to test a hypothesis, and interpret the results to support or negate their hypothesis.
- Work collaboratively with other students to design and implement an experiment.
- Use statistical tools in the analysis of data.
- Predict the effects of changing parameters on an estuarine system.

Benchmarks/ National Science Standards/New Hampshire State Curriculum Frameworks:

Benchmarks - The Nature of Science - The Scientific World View, Scientific Inquiry
The Nature of Mathematics - Patterns and Relationships,
Mathematics, Science, and Technology
The Nature of Technology - Technology and Science
The Living Environment - Flow of Matter and Energy
Common Themes - Systems, Models, Constancy and Change, Scale
Habits of Mind - Values and Attitudes, Computation and Estimation,
Manipulation and Observation, Communication Skills, Critical-Response Skills

New Hampshire Curriculum Frameworks

K-12 Mathematics - Problem Solving and Reasoning
Data Analysis, Statistics, and Probability
Mathematics of Change

K-12 Science - Science As Inquiry
Physical Science
Unifying Themes and Concepts

Quality Assurance / Quality Control Analyses

Parameter	GBW Standards		GBW Samplers	
	Accuracy	Precision	Accuracy	Precision
Salinity	0.82 ppt	1.00 ppt	0.40 ppt	0.58 ppt
D. O.	0.3 mg/L	0.9 mg/L	0.1 mg/L	0.2 mg/L
pH	0.1 pH units	0.1 pH units	0.1 pH units	0.1 pH units

Results of the QA/QC sessions are largely encouraging. Calculations for precision among volunteers show that variation among volunteers was fairly low. Calculations for accuracy among volunteers shows that, at this QA/QC session, for all parameters tested, the difference between the known values and the average of those obtained by the volunteers were fairly small. Therefore it seems clear that the Great Bay Watch volunteers can, and do, collect quality data.



Photo: Ann Reid

Rachael and Jessica Williams, mother-daughter, and Jamie Perrin, new trainees during QA/QC.

Great Bay Watch 1996 Sampling Season

Tidal and Sampling Times for 1996 Season		18-Apr	6-May	20-May	3-Jun	17-Jun	1-Jul	15-Jul	30-Jul	14-Aug	29-Aug	16-Sep	30-Sep	15-Oct	29-Oct	6-Nov
adjustment		6:07 AM	7:48 AM	7:53 AM	6:42 AM	6:52 AM	5:33 AM	5:53 AM	5:14 AM	6:00 AM	5:48 AM	7:38 AM	7:50 AM	7:10 AM	6:24 AM	1:23 PM
		12:21 PM	2:04 PM	2:07 PM	12:58 PM	1:05 PM	11:48 AM	12:04 PM	11:29 AM	12:11 PM	12:02 PM	1:50 PM	2:04 PM	1:21 PM	12:36 PM	7:14 AM
LOW	Site 1 - Peninsula - Oyster River	1:50	9:36	9:43	8:32	8:42	7:23	7:43	7:07	7:50	7:38	9:28	9:40	9:00	8:14	15:13
HIGH		1:45	15:49	15:52	14:43	14:50	13:33	13:49	13:14	13:56	13:47	15:35	15:49	15:06	14:21	8:59
LOW	Site 2 - Jackson Laboratory	2:00	9:48	9:53	8:42	8:52	7:33	7:53	7:14	8:00	7:48	9:38	9:50	9:10	8:24	15:23
HIGH		2:00	16:04	16:07	14:58	15:05	13:48	14:04	13:29	14:11	14:02	15:50	16:04	15:21	14:36	9:14
LOW	Site 3 - Lamprey River	3:00	10:48	10:53	9:42	9:52	8:33	8:53	8:14	9:00	8:48	10:38	10:50	10:10	9:24	16:23
HIGH		2:40	16:44	16:47	15:38	15:45	14:28	14:44	14:09	14:51	14:42	16:30	16:44	16:01	15:16	9:54
LOW	Site 4 - Depot Road (Sandy Pt) *	2:45	8:52	10:38	9:27	9:37	8:18	8:38	7:59	8:45	8:33	10:23	10:35	9:55	9:09	16:08
HIGH		2:45	15:06	16:52	15:43	15:50	14:33	14:49	14:14	14:56	14:47	16:35	16:49	16:06	15:21	9:59
LOW	Site 5 - Portsmouth Country Club	2:40	8:47	10:25	9:22	9:32	8:13	8:33	7:54	8:40	8:28	10:18	10:30	9:50	9:04	16:03
HIGH		2:20	14:41	16:27	15:18	15:25	14:08	14:24	13:49	14:31	14:22	16:10	16:24	15:41	14:56	9:34
LOW	Site 6 - Fox Point	2:00	9:07	9:48	8:42	8:52	7:33	7:53	7:14	8:00	7:48	9:38	9:50	9:10	8:24	15:23
HIGH		2:00	14:21	16:07	14:58	15:05	13:48	14:04	13:29	14:11	14:02	15:50	16:04	15:21	14:36	9:14
LOW	Site 7 - Cedar Point	1:50	7:57	9:43	8:32	8:42	7:23	7:43	7:04	7:50	7:38	9:28	9:40	9:00	8:14	15:13
HIGH		1:55	14:16	16:02	14:53	15:00	13:43	13:59	13:24	14:06	13:57	15:45	15:59	15:16	14:31	9:09
LOW	Site 9 - Cochecho River	1:20	7:27	9:13	8:02	8:12	6:53	7:13	6:34	7:20	7:08	8:58	9:10	8:30	7:44	14:43
HIGH		1:20	13:41	15:27	14:18	14:25	13:08	13:24	12:49	13:31	13:22	15:10	15:24	14:41	13:56	8:34
LOW	Site 10 - Piscataqua River	1:20	7:27	9:13	8:02	8:12	6:53	7:13	6:34	7:20	7:08	8:58	9:10	8:30	7:44	14:43
HIGH		1:20	13:41	15:27	14:18	14:25	13:08	13:24	12:49	13:31	13:22	15:10	15:24	14:41	13:56	8:34
LOW	Site 11 - Coastal Marine Lab	0:16	6:23	8:09	6:50	7:00	5:49	6:09	5:30	6:16	6:04	7:54	8:06	7:26	6:40	13:39
HIGH		0:16	12:37	14:23	13:14	13:21	12:04	12:20	11:45	12:27	12:18	14:06	14:20	13:37	12:52	7:30
LOW	Site 12 - Fleymarket STP	3:00	9:07	10:40	9:42	9:52	8:33	8:53	8:14	9:00	8:48	10:38	10:50	10:10	9:24	16:23
HIGH		3:00	15:21	17:04	15:58	16:05	14:48	15:04	14:29	15:11	15:02	16:50	17:04	16:21	15:36	10:14
LOW	Site 13 - Marina Falls Landing	3:00	9:07	10:48	9:42	9:52	8:33	8:53	8:14	9:00	8:48	10:38	10:50	10:10	9:24	16:23
HIGH		3:00	15:21	17:04	15:58	16:05	14:48	15:04	14:29	15:11	15:02	16:50	17:04	16:21	15:36	10:14
LOW	Site 14 - Fowler's Dock	3:00	9:07	10:48	9:42	9:52	8:33	8:53	8:14	9:00	8:48	10:38	10:50	10:10	9:24	16:23
HIGH		3:00	15:21	17:04	15:58	16:05	14:48	15:04	14:29	15:11	15:02	16:50	17:04	16:21	15:36	10:14
LOW	Site 15 - Patten Yacht Yard, Inc.	1:00	7:07	8:48	7:42	7:52	6:33	6:53	6:14	7:00	6:48	8:38	8:50	8:10	7:24	14:23
HIGH		1:00	13:21	15:04	13:58	14:05	12:48	13:04	12:29	13:11	13:02	14:50	15:04	14:21	13:36	8:14
LOW	Site 16 - Exeter Docks	2:50	8:57	10:38	9:32	9:42	8:23	8:43	8:04	8:50	8:38	10:28	10:40	10:00	9:14	16:13
HIGH		3:10	15:31	17:14	16:08	16:15	14:58	15:14	14:39	15:21	15:12	17:00	17:14	16:31	15:46	10:24

* no sampling low tide at site 4

Site 1 - Peninsula

YEAR	DATE	SAMPLER	WTEMP-L	WTEMP-H	DOL	DOH	SAL-L	SAL-H	BAT-L	BAT-H	PH-L	PH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATMP-L	ATMP-H	WATER-L	WATER-H	WEATHER-L	WEATHER-H	ACTIVITY-L	ACTIVITY-H
80	01/06/90		4.0	6.0	11.3	12.9	92	15.8	91.93	116.04	6.8	7.2			28.0	113.0			-2.0	8.5	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	8.5	10.0	9.2	6.8	13.2	17.8	97.43	94.06	6.8	6.2			50.0	110.0			9.5	11.0	ripple	ripple	clear	clear	1 unit cow	
80	01/06/90	JF MS BF	11.0	18.0	8.5	6.4	11.2	17.9	92.73	96.45	7.2	7.8			50.0	110.0			9.5	28.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	17.5	19.5	6.5	7.7	11.2	17.8	92.38	96.37	7.3	7.8			50.0	110.0			16.0	21.0	ripple	ripple	clear	clear	1 unit cow	
80	01/06/90	JF MS BF	16.5	19.5	6.7	6.0	18.8	24.4	97.81	100.31	7.2	7.7			50.0	110.0			16.0	28.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	21.0	22.0	6.3	7.4	24.0	26.5	96.19	99.43	7.3	7.8			50.0	110.0			21.8	23.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	23.0	24.5	6.7	7.3	28.2	30.0	97.98	101.45	7.6	7.8			50.0	120.0			21.8	23.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	24.0	23.0	6.9	7.2	27.2	32.0	91.57	91.70	7.3	7.7			50.0	160.0			12.0	21.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	20.0	24.0	6.8	7.3	22.0	28.9	92.39	102.08	7.7	7.8			50.0	160.0			16.0	22.5	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	24.5	22.5	6.8	6.8	22.5	26.0	96.35	96.99	7.2	7.7			100.0	230.0			6.5	10.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	13.0	16.0	7.8	6.3	28.1	31.8	91.27	98.31	7.5	7.9			125.0	230.0			6.5	10.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	13.0	16.0	6.8	6.8	17.8	24.0	91.28	96.60	7.4	7.8			100.0	180.0			10.0	21.0	ripple	ripple	clear	clear	several roads	
80	01/06/90	JF MS BF	7.5	10.5	13.4	10.8	16.0	9.4	123.47	102.06	7.6	7.9			90.0	110.0			6.0	11.0	ripple	ripple	clear	clear	several roads	
81	04/19/91	JF MS BF	15.0	13.0	8.4	9.5	10.3	16.3	93.04	99.47	7.4	7.8			75.0	93.0			14.0	24.5	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	15.0	15.0	7.5	7.2	13.7	18.3	76.27	96.53	7.8	7.8			40.0	75.0			12.0	24.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	18.0	19.0	6.8	7.8	19.4	23.7	96.21	96.47	6.8	7.0			60.0	130.0			14.0	19.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	21.0	21.0	6.7	7.3	24.2	27.7	92.76	96.03	7.2	7.7			75.0	140.0			19.0	31.5	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	22.0	6.1	6.3	25.9	28.9	97.92	111.33	6.8	7.8			85.0	110.0			12.0	35.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	21.5	21.5	6.8	7.7	28.9	31.8	97.49	110.23	7.2	7.7			85.0	110.0			22.0	24.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	21.5	21.5	6.2	6.6	30.6	32.1	95.48	102.22	7.6	7.8			85.0	130.0			17.0	21.5	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	21.0	21.0	6.2	6.2	21.2	25.0	93.36	94.49	6.6	7.2			120.0	130.0			17.0	21.5	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	19.0	21.0	6.2	7.3	19.5	26.9	96.67	95.84	6.7	7.2			120.0	250.0			3.0	14.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	14.0	17.0	6.1	7.8	10.8	20.6	90.41	98.58	6.8	7.2			65.0	140.0			16.0	18.5	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	8.5	8.5	8.8	8.8	14.8	14.8	84.45	88.88	6.8	7.2			100.0	100.0			1.0	3.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	6.5	9.0	8.4	8.3	15.6	23.6	86.64	91.20	7.2	7.4			150.0	210.0			3.0	9.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	12.5	12.5	10.8	10.7	13.0	21.6	90.29	91.24	6.8	7.7			100.0	140.0			1.0	9.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	14.5	14.0	7.8	8.4	18.8	23.3	85.33	112.38	7.7	7.5			80.0	100.0			11.0	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	17.5	16.5	6.8	6.0	22.8	26.3	89.21	95.74	7.2	7.6			50.0	100.0			10.0	18.5	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0	21.8	90.71	96.63	7.1	7.1			50.0	120.0			11.5	18.0	ripple	ripple	clear	clear	several roads	
81	05/19/91	JF MS BF	20.0	21.0	6.8	7.6	18.0																			

Site 2 - JEL

YEAR	SITE	DATE	SAMPLER	DEPTH	WTEMP	DO-L	DO-H	SAL-L	SAL-H	BATH	PH-L	PH-H	FECAL-L	FECAL-H	LPL	LPH	DEPTH	DEPTH	ATEMP	ATEMP	WATER	WATER	WEATHER	WEATHER	ACTIVITIES	ACTIVITIES	
				OC	OC	OC	OC	OC	OC	M	M	CFU/100ml	CFU/100ml	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	
90	2	04/25/90		8.5	10.8	10.8	10.8	20.5	22.4	98.95	104.25	8.3	8.1	80	100	126.0	126.0	10.0	10.0	ripple	ripple	overcast	overcast	lab tour			
90	2	04/25/90		11.7	10.1	10.1	10.1	18.4	21.7	97.10	103.65	7.5	7.8	60	105	115.0	115.0	9.0	9.0	ripple	ripple	overcast	overcast	16 hr after storm			
90	2	05/09/90		10.1	12	12	12	9	21.6	93.34	98.12	7.4	7.5	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	05/23/90		17.5	18	18	18	21.8	23.9	100.94	96.22	7.5	7.5	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	06/05/90		18.5	18	18	18	28.1	28.9	100.94	94.66	7.31	7.6	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	07/04/90		20.5	21	21	21	28.1	27.4	101.81	95.88	7.9	7.9	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	07/21/90		24	20	20	20	28.1	30.4	92.82	97.43	7.4	7.1	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	08/19/90		20	22	22	22	28.1	30.4	92.82	97.43	7.4	7.1	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	09/04/90		13	14	14	14	28.1	28.5	92.82	97.43	7.4	7.1	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	10/04/90		14	15	15	15	28.1	28.5	92.82	97.43	7.4	7.1	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
90	2	10/20/90		14	15	15	15	28.1	28.5	92.82	97.43	7.4	7.1	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	04/27/91	WP, JH, SJ	8.0	10.3	10.3	10.3	20.5	22.4	98.95	104.25	8.3	8.1	80	100	126.0	126.0	10.0	10.0	ripple	ripple	overcast	overcast				
91	2	04/27/91	WP, JH, SJ	11.7	10.1	10.1	10.1	18.4	21.7	97.10	103.65	7.5	7.8	60	105	115.0	115.0	9.0	9.0	ripple	ripple	overcast	overcast				
91	2	05/12/91	JH, AR, BP	11.0	12.0	12.0	12.0	9.4	10.3	93.34	98.12	7.5	7.5	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	05/29/91	JH, SJ, DJ	18.5	18	18	18	28.1	28.9	100.94	94.66	7.31	7.6	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	06/12/91	JH, WP	20.5	21	21	21	28.1	27.4	101.81	95.88	7.9	7.9	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	06/25/91	JH, WP	19.5	18.5	18.5	18.5	28.1	28.9	100.94	94.66	7.31	7.6	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	07/11/91	JH, WP	22.0	22.0	22.0	22.0	28.1	31.1	83.00	111.78	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	08/05/91	JH, WP	20.0	21.0	21.0	21.0	28.1	31.1	83.00	111.78	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	08/25/91	JH, WP	19.0	18.0	18.0	18.0	28.1	28.5	92.82	97.43	7.4	7.1	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	09/23/91	BP, SJ	13.0	15.0	15.0	15.0	28.1	28.5	92.82	97.43	7.4	7.1	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
91	2	10/06/91	SJ, BP	8.0	10.0	10.0	10.0	20.5	22.4	98.95	104.25	8.3	8.1	80	100	126.0	126.0	10.0	10.0	ripple	ripple	overcast	overcast				
91	2	11/06/91	BP, BP	8.0	8.0	8.0	8.0	20.5	22.4	98.95	104.25	8.3	8.1	80	100	126.0	126.0	10.0	10.0	ripple	ripple	overcast	overcast				
92	2	05/01/92	MS, BP	12.0	11.0	11.0	11.0	10.7	10.7	103.65	103.65	7.5	7.5	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast				
92	2	05/15/92	MS, BP	13.5	14.0	14.0	14.0	8.8	8.7	24.7	96.07	106.68	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
92	2	05/15/92	MS, BP	15.5	16.0	16.0	16.0	8.8	8.7	24.7	96.07	106.68	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
92	2	05/15/92	MS, BP	18.5	20.5	20.5	20.5	7.1	7.8	28.9	102.57	100.99	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
92	2	07/13/92	MS, BP	20.5	20.5	20.5	20.5	7.1	7.8	28.9	102.57	100.99	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
92	2	07/26/92	MS, BP	20.0	20.0	20.0	20.0	6.6	7.6	28.9	102.57	100.99	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
92	2	08/27/92	MS, BP	21.4	18.8	18.8	18.8	7.1	7.1	28.1	82.40	81.81	7.5	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
92	2	10/11/92	MS, BP	14.0	16.0	16.0	16.0	8.4	8.8	30.4	31.1	82.02	97.82	7.5	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast		
92	2	10/25/92	MS, BP	15.5	16.0	16.0	16.0	8.7	8.0	31.1	82.02	106.70	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
92	2	11/09/92	MS, BP	8.0	10.1	10.1	10.1	8.8	28.5	28.9	96.81	96.28	8.0	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	04/21/93	MS, BP	10.0	11.5	11.5	11.5	11.2	17.0	20.2	127.01	121.37	7.1	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	05/09/93	BP, NP, MS	14.5	13.5	13.5	13.5	7.5	8.0	23.3	93.00	88.37	7.1	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	06/03/93	BP, NP, MS	13.5	12.5	12.5	12.5	7.8	7.5	24.9	97.01	93.09	7.4	7.5	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	07/03/93	BP, NP, MS	15.5	17.5	17.5	17.5	7.5	7.2	27.2	98.91	91.71	8.0	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	07/22/93	BP, NP, MS	20.0	20.5	20.5	20.5	6.6	7.6	28.9	102.57	100.99	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	08/03/93	BP, NP, MS	21.0	21.0	21.0	21.0	6.6	7.6	28.9	102.57	100.99	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	08/19/93	BP, NP, MS	21.0	20.0	20.0	20.0	5.9	7.0	30.7	91.78	105.78	7.7	7.7	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	09/23/93	BP, NP, MS	21.5	22.5	22.5	22.5	6.0	6.2	32.6	91.78	105.78	7.7	7.7	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	10/04/93	BP, NP, MS	13.5	14.5	14.5	14.5	7.1	8.0	31.4	84.33	95.01	7.9	7.9	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
93	2	11/03/93	BP, NP, MS	10.0	10.0	10.0	10.0	6.2	8.0	30.9	86.28	84.78	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
94	2	04/28/94	BP, NP, MS	8.0	7.0	7.0	7.0	10.2	19.4	22.2	93.84	87.91	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
94	2	05/10/94	BP, NP, MS	12.0	12.0	12.0	12.0	8.9	17.8	19.0	92.03	91.71	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
94	2	06/03/94	BP, NP, MS	17.0	17.0	17.0	17.0	8.0	8.5	24.5	95.05	91.43	7.7	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
94	2	06/23/94	BP, NP, MS	20.0	18.0	18.0	18.0	8.4	7.8	29.5	92.57	95.87	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple	overcast	overcast			
94	2	07/11/94	BP, NP, MS	22.0	22.0	22.0	22.0	8.8	7.8	29.1	90.17	102.47	7.8	7.8	100	110	110.0	110.0	11.0	11.0	ripple	ripple					

Site 6 - Fox Pt

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DOL	DOH	SALL	BALL	BAT-L	BAT-H	PHL	PHH	FGCAL-L	FGCAL-H	LPL-L	LPL-H	DEPTH	DEPTH	ATMPL-H	ATMPL-L	WATER-L	WATER-H	WEATHER-L	WEATHER-H	ACTIVITYBL	ACTIVITYRH	
80	6	04/05/90			4.5	9	8.5	10.5	10.6	17.3	21.4	98.31	7.9	7.8			102	200	120	120	8.5	8.6							
90	6	04/05/90			11	14	7.7	8.9	21.3	24.7	61.83	100.07	7.7	7.8			105	200	110	110	11.0	11.0							
90	6	04/05/90			10.5	10.5	6.9	8.1	20.3	24.4	74.55	100.30	6.8	7.8			102	200	110	110	11.0	11.0							
90	6	04/05/90			16.5	13.5	8.0	8.1	24.3	27.3	82.81	91.14	7.6	7.7			115	205	15.5	15.5	20.0	20.0							
90	6	07/01/90			18.5	15.5	7.8	8.2	26.5	29.3	90.59	98.03	7.8	8.1			115	205	15.0	15.0	15.0	15.0							
90	6	07/02/90			21	18.5	7.2	7.8	27.8	32.3	84.70	98.37	7.6	7.9			140	190	18.0	18.0	16.5	16.5							
90	6	08/05/90			20	20	6.5	7.2	31.9	35.9	85.42	95.42	7.8	7.8			140	190	22.0	22.0	18.0	18.0							
90	6	08/05/90			20	18	6.8	8.2	26.8	31.2	88.30	91.50	7.6	8.1			175	200	18.0	18.0	18.0	18.0							
90	6	10/19/90			14	15	7.4	8.8	28.9	32.8	87.39	85.96	7.8	7.8			100	300	8.0	8.0	22.0	22.0							
90	6	10/19/90			14	13.5	7.4	7.4	30.8	32.8	89.85	92.07	7.6	7.7			100	300	8.0	8.0	22.0	22.0							
90	6	11/02/90			9	14	7.6	7.2	25.9	30.4	88.54	94.70	7.7	7.7			110	300	18.0	18.0	24.5	24.5							
91	6	04/13/91			9	11	6.9	8.3	20.2	25.5	87.34	90.48	7.4	7.4			130	330	3.5	3.5	14.5	14.5							
91	6	04/21/91			11.0	10.5	9.8	10.9	20.8	25.4	98.95	102.63	7.8	7.8			90.0	160.0	5.0	5.0	17.0	17.0							
91	6	05/13/91			17.0	17.0	7.9	8.9	18.3	23.3	92.99	96.20	7.3	7.8			100	145	12.0	12.0	12.0	12.0							
91	6	05/19/91			18.0	17.0	8.5	9.1	25.9	31.9	94.16	99.48	7.8	7.8			115.0	190.0	12.0	12.0	12.0	12.0							
91	6	05/25/91			19.0	17.0	8.5	8.6	28.9	34.9	91.54	99.48	7.8	7.8			100.0	285.0	18.0	18.0	22.0	22.0							
91	6	07/25/91			22.0	20.0	7.2	7.8	31.8	37.8	92.58	102.06	7.7	7.7			17.0	310.0	17.0	17.0	20.0	20.0							
91	6	08/01/91			20.0	19.0	7.0	7.4	31.4	37.8	92.48	98.08	7.8	7.8			100.0	165.0	17.0	17.0	22.0	22.0							
91	6	08/01/91			20.0	20.0	6.0	6.2	15.3	19.2	72.03	76.11	7.3	7.5			100.0	165.0	14.0	14.0	14.0	14.0							
91	6	09/07/91			18.0	17.0	7.3	7.1	27.2	29.5	88.92	91.33	7.6	7.6			100.0	305.0	18.0	18.0	17.0	17.0							
91	6	09/27/91			14.0	13.0	8.1	7.9	20.4	27.4	86.19	78.90	7.6	7.6			110.0	305.0	7.0	7.0	17.0	17.0							
91	6	10/27/91			11.0	12.0	8.1	8.0	25.0	27.4	86.19	88.44	7.6	7.6			150.0	300.0	7.0	7.0	17.0	17.0							
92	6	04/22/92			9	6	10.7	10.7	28.0	32.1	88.44	94.44	7.6	7.6			150.0	300.0	7.0	7.0	17.0	17.0							
92	6	05/19/92			11	9	10.8	9.7	20	24.5	108.89	81.71	7.6	7.6			100	145	12.0	12.0	12.0	12.0							
92	6	06/01/92			13	12	9.1	9.3	22.9	26.7	99.23	91.71	7.7	7.8			100	145	12.0	12.0	12.0	12.0							
92	6	06/15/92			14	12	8.2	8.9	23.2	29.1	81.93	99.97	7.7	7.7			85	200	12.0	12.0	12.0	12.0							
92	6	06/29/92			15	17	7.85	7.85	23.3	28.7	81.93	92.70	7.7	7.7			171	181	12.0	12.0	12.0	12.0							
92	6	07/16/92			18.5	16.5	8.5	8.5	28.1	32.9	106.25	108.16	7.8	7.8			2.0	2.0	18.0	18.0	22.0	22.0							
92	6	07/22/92			20	16.5	8.5	8.3	34.1	39.0	95.16	101.22	7.8	7.8			6.0	6.0	18.0	18.0	22.0	22.0							
92	6	08/27/92			18	16	7.7	8.6	30.2	30.8	88.98	91.66	7.5	7.6			6.0	6.0	18.0	18.0	22.0	22.0							
92	6	09/10/92			16	16	7.8	7.85	30.4	31	92.43	93.38	7.7	7.7			6.0	6.0	20	20	24	24							
92	6	09/26/92			14	15	8.1	8.1	30.2	32.7	94.49	94.10	7.8	7.8			20	24	20	20	27	27							
92	6	10/11/92			12	9	9.1	8.1	30.2	31.6	102.98	91.81	7.4	7.7			20	24	12	12	17	17							
92	6	10/25/92			9	8	11.8	11.8	30.2	31.4	94.49	92.43	7.8	7.7			12	17	12	12	17	17							
92	6	11/09/92			15	15	8.5	10.95	18.2	18.2	107.31	81.08	6.5	6.7			20	20	2.0	2.0	10	10							
93	6	02/19/93			13	10.5	8.0	9.2	18.1	24.3	101.49	101.16	7.5	7.7			20	20	2.0	2.0	10	10							
93	6	02/26/93			13	11	8.4	9.1	25.8	29.4	92.30	99.14	7.6	7.8			0.0	0.0	15	15	15	15							
93	6	06/23/93			12.5	11	8.4	9.1	25.8	29.4	92.30	99.14	7.6	7.8			0.0	0.0	15	15	15	15							
93	6	07/06/93			17	13	7.4	8.5	27.7	28.8	93.33	93.70	7.8	7.9			0.0	0.0	10	10	24	24							
93	6	07/23/93			20	18	6.85	7.7	28.5	30.8	88.98	91.66	7.5	7.5			0.0	0.0	10	10	24	24							
93	6	08/03/93			16	16	7.8	7.85	30.4	31	92.43	93.38	7.7	7.7			0.0	0.0	10	10	24	24							
93	6	08/15/93			21	17.5	8.5	8.1	30.5	31.4	101.82	96.77	7.7	7.2			0.0	0.0	20	20	22	22							
93	6	08/29/93			18.5	16.5	8.5	8.5	31.1	30.9	94.02	100.49	7.5	7.8			0.0	0.0	21.5	21.5	22	22							
93	6	09/05/93			14.5	12	8.2	7.8	30.1	32.3	88.98	94.44	7.9	7.8			0.0	0.0	16	16	23	23							
93	6	10/04/93			14	10	8.2	7.8	30.1	32.3	88.98	94.44	7.9	7.8			0.0	0.0	16	16	23	23							
93	6	11/09/93			10	9.5	8.2	7.8	30.1	32.3	88.98	94.44	7.9	7.8			0.0	0.0	16	16	23	23							
94	6	04/26/94			7	7	8.8	9	27.3	28.8	94.34	99.28	7.8	7.7			0.0	0.0	15	15	15	15							
94	6	05/10/94			0	6.0	10.4	10.5	22.1	27.2	100.95	100.80	7.8	8.0			0.0	0.0	15	15	15	15							
94	6	05/25/94			12	10	8.1	9.5	17.8	21.6	93.92	99.39	7.8	7.8			0.0	0.0	15	15	15	15							
94	6	06/05/94			13.5	11.5	8.4	8.5	25.8	29.4	92.30	100.47	7.7	7.9			0.0	0.0	12.0	12.0	12.0	12.0							
94																													

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LPL	LPH	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H	WATER-L	WATER-H	WEATHER-L	WEATHER-H	ACTIVITIES-L	ACTIVITIES-H		
					°C	°C	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	°C	°C								
90	8	04/09/90			3.6	5.0	11.3	12.0	2.1	4.7	88.91	88.73	7.4	7.2				100.0			3.5	8.0								
90	8	04/25/90			10.6	11.0	9.6	8.6	5.6	7.0	87.81	90.55	7.3	7.4				115.0			11.0	19.0								
90	8	05/09/90			11.0	15.5	9.4	8.6	4.5	10.3	87.86	81.66	7.2	7.5				125.0			6.0	21.0								
90	8	05/24/90			8.5	13.0	9.6	9.6	3.8	5.0	86.42	93.63	7.2	7.5				125.0			7.5	20.0								
90	8	06/08/90			17.0	21.0	7.3	7.2	13.5	14.2	81.75	87.56	7.1	7.4				160.0			17.5	22.0								
90	8	06/22/90			19.0	23.0	6.8	6.4	9.8	13.8	66.14	79.89	6.9	7.4				160.0			19.0	26.0								
90	8	07/07/90			19.5	23.0	5.3	7.1	9.9	22.2	61.13	93.77	7.1	7.7				165.0			20.0	23.0								
90	8	07/21/90																												
90	8	08/06/90			24.0	23.0	5.6	5.6	17.9	24.8	73.49	75.09	7.4	7.6				40.0	135.0		22.5	24.0								
90	8	08/19/90			19.0	23.0	4.9	6.8	9.8	22.9	55.94	89.51	7.0	7.6				35.0	120.0		17.5	22.0								
90	8	09/03/90			21.0	22.0	5.6	7.4	14.2	11.9	68.10	90.54	7.4	7.9				44.0	220.0		19.0	22.0								
90	8	09/19/90			14.0	17.0	5.9	7.0	15.8	23.8	82.93	83.32	6.9	7.7				40.0	220.0		6.5	16.0								
90	8	10/04/90			13.0	13.0	17.0	6.2	7.6	15.0	27.1	64.42	82.32	7.2	7.7				25.0	140.0		8.0	21.0							
90	8	10/18/90			14.0	18.0	7.8	7.3	3.5	19.4	77.02	85.72	7.3	7.6				40.0	220.0		11.5	23.0								
91	8	04/28/91	JR	CR	8.0	13.0	9.3	9.0	5.2	13.1	80.90	92.46	7.2	7.6				120.0			8.0	15.0	4in waves							
91	8	05/14/91	JR	KG JR	CR	18.0	15.5	8.1	8.3	5.1	13.6	84.76	90.18	7.0	7.5				73.0	95.0		17.5	19.0	calm br h2o						
91	8	05/28/91	JR	KG JR	CR	18.0	20.0	6.6	7.4	10.7	6.7	62.98	84.13	7.1	7.6				43.0	135.0		16.0	27.0	calm						
91	8	06/11/91	JR	CR	KG	20.5	22.0	5.0	7.5	15.4	24.2	60.63	98.41	7.2	7.8				130.0			25.0	30.0	calm						
91	8	06/26/91	CR	JR	21.0	23.0	7.3	8.9	10.3	12.2	86.87	111.12	7.8	8.1				120.0			17.0	32.0	ripple							
91	8	07/25/91	CR	JR	24.0	25.0	2.9	8.2	22.5	27.6	36.39	115.08	8.0	8.0				170.0			23.0	35.0	calm							
91	8	08/06/91	CR	JR	21.5	24.5	7.4	7.9	23.7	26.0	85.92	108.85	7.9	8.0				150.0			19.0	33.0	ripple							
91	8	08/24/91	CR	JR	18.0	22.0	7.6	6.6	3.2	9.3	82.02	79.62	7.2	7.2				120.0			18.0	28.0	calm							
91	8	09/06/91	CR	JR	19.5	20.0	6.3	7.0	14.5	9.4	74.56	81.31	7.3	7.7				160.0			18.0	27.0	calm							
91	8	09/23/91	CR	JR	15.0	15.0	7.5	7.5	9.2	9.2	78.63	81.31	7.4	7.4							13.0	13.0	calm							
91	8	10/07/91	CR	JR	13.0	14.0	8.0	8.5	2.1	13.2	86.62	89.28	7.3	7.6				150.0			8.0	15.0	ripple							

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YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	BAT-L	BAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LPL	LPH	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H	WATER-L	WATER-H	WEATHER-L	WEATHER-H	ACTIVITY-B-L	ACTIVITY-B-H
94	16	04/20/94	CM		10.0	10.6	10.3	10.3	0.8	0.8	95.22	95.08	8.0	7.3	117.0	117.0	70.0	70.0	87.0	310.0	8.0	8.0	RIPPLE	SHOWNERS	PT CLOUDY	SHOWERS	BIRDS	CREWBIRDS
94	16	05/10/94	CM	CK CK CJLD	18.0	16.0	8.3	8.2	0.6	0.3	93.22	90.76	7.3	7.3	200.0	110.0	100.0	100.0	100.0	307.0	16.0	17.0	RIPPLE	SHOWNERS	OVERCAST	SHOWNERS	BIRDS	BOATING
94	16	08/09/94	CM	CM BW	18.5	23.0	13.2	9.2	0.6	1.6	98.81	97.14	7.6	7.3	400.0	200.0	85.0	85.0	88.0	332.0	11.5	18.0	RIPPLE	SHOWNERS	CLEAR	SHOWNERS	BIRDS	BOATING
94	16	08/23/94	CM	CM BW	23.5	26.6	8.6	13.1	2.9	5.1	103.14	104.88	7.6	7.4	110.0	110.0	300.0	300.0	60.0	300.0	22.0	28.5	RIPPLE	CLEAR	OVERCAST	CLEAR	FISH JUMPING	CANOE
94	16	07/11/94	CM	CM ALD YT	28.0	28.6	9.6	11.2	1.8	2.3	118.04	149.56	7.8	8.1	390.0	100.0	40.5	47.5	60.0	284.0	22.0	23.0	RIPPLE	CLEAR	CLEAR	CLEAR	GULLS	NONE
94	16	07/25/94	CM	CM HB AD	26.6	29.5	7.8	9.3	2.9	10.8	99.82	129.30	7.6	8.1	500.0	300.0	48.5	34.5	67.0	287.0	29.0	27.8	CALM	OVERCAST	CLEAR	CLEAR	BOATING	SWIMMING
94	16	08/09/94	BP	BP	23.0	27.0	14.3	19.0	7.2	11.3	175.90	253.70	9.1	9.5	200.0	130.0	35.0	35.0	70.0	300.0	22.0	21.8	CALM	OVERCAST	CLEAR	CLEAR	BOATING	NO BIRDS
94	16	08/22/94	BP	BP	21.0	20.5	8.3	7.7	1.0	0.8	93.98	86.25	7.8	7.4	74.0	74.0	70.0	70.0	70.0	300.0	18.0	18.0	RIPPLE	SHOWNERS	SHOWNERS	SHOWNERS	BOATING	BREEZY
94	16	09/07/94	CM	CM	18.0	19.0	7.8	8.8	1.8	1.8	77.87	107.19	7.6	7.5	74.0	74.0	66.5	66.5	90.0	320.0	14.0	14.0	CALM	PT CLOUDY	PT CLOUDY	PT CLOUDY	BOATING	NO BIRDS
94	16	09/14/94	CM	CM	18.0	19.5	8.2	15.4	1.8	7.2	87.88	175.01	7.7	8.8	74.0	74.0	66.5	66.5	90.0	320.0	14.0	14.0	CALM	PT CLOUDY	PT CLOUDY	PT CLOUDY	BOATING	NO BIRDS
94	16	10/20/94	CM	CM	11.0	11.8	7.4	7.7	0.8	0.7	94.23	93.91	7.3	7.3	110.0	60.0	85.0	61.5	67.0	285.0	16.0	20.0	RIPPLE	CLEAR	CLEAR	CLEAR	BOATING	NO BIRDS
94	16	11/07/94	CM	CM	18.0	18.0	10.8	11.2	0.8	0.8	87.68	72.83	7.3	7.0	74.0	74.0	76.0	76.0	90.0	320.0	16.0	16.0	CALM	OVERCAST	PT CLOUDY	PT CLOUDY	BIRDS	BOATING
95	16	04/18/95	PS	PS	18.0	9.0	8.3	11.2	0.8	1.9	96.42	103.16	7.8	8.0	0.0	30.0	85.0	172.5	70.0	276.0	11.0	11.0	CALM	CLEAR	CLEAR	CLEAR	BIRDS	LAND RECREATION
95	16	05/10/95	PS	PS	12.0	11.9	7.4	7.7	0.8	0.8	87.68	72.83	7.2	7.2	74.0	74.0	76.0	76.0	90.0	320.0	6.0	6.0	CALM	OVERCAST	PT CLOUDY	PT CLOUDY	BIRDS	BOATING
95	16	05/15/95	PS	PS	14.0	13.2	11.4	10.7	0.8	1.9	107.84	103.16	7.8	8.0	0.0	30.0	85.0	172.5	70.0	276.0	11.0	11.0	CALM	CLEAR	CLEAR	CLEAR	BIRDS	LAND RECREATION
95	16	05/30/95	PS	PS	18.5	18.0	9.1	9.8	0.8	0.8	82.04	84.89	7.8	7.4	340.0	90.0	85.0	87.5	60.0	310.0	13.0	13.0	RIPPLE	SHOWNERS	SHOWNERS	SHOWNERS	BOATING	BOATING
95	16	06/27/95	CM	CM	18.5	18.0	9.1	9.8	0.8	0.8	82.04	84.89	7.8	7.4	340.0	90.0	85.0	87.5	60.0	310.0	13.0	13.0	RIPPLE	SHOWNERS	SHOWNERS	SHOWNERS	BOATING	BOATING
95	16	07/27/95	CM	CM	22.0	22.5	8.1	7.5	2.2	0.8	87.78	123.86	7.2	7.3	120.0	790.0	45.0	85.0	90.0	280.0	20.0	20.0	RIPPLE	SHOWNERS	SHOWNERS	SHOWNERS	FISHING	FISHING
95	16	08/27/95	CM	CM	21.0	24.5	8.1	8.1	15.8	14.8	97.68	87.32	7.6	7.3	120.0	790.0	45.0	85.0	90.0	280.0	20.0	20.0	RIPPLE	SHOWNERS	SHOWNERS	SHOWNERS	FISHING	FISHING
95	16	08/10/95	CM	CM	23.0	28.0	8.2	18.7	8.1	7.8	88.68	202.30	7.4	8.8	160.0	160.0	22.5	64.5	70.0	285.0	26.0	26.0	RIPPLE	SHOWNERS	PT CLOUDY	PT CLOUDY	BOATING	BOATING
95	16	08/28/95	PS	PS	23.0	23.5	11.1	9.8	0.8	1.6	209.84	209.84	8.8	8.8	100.0	120.0	35.5	32.5	58.0	285.0	21.0	21.0	RIPPLE	CLEAR	CLEAR	CLEAR	BOATING	BOATING
95	16	09/11/95	CM	CM	13.0	14.5	8.5	11.7	9.8	18.7	85.85	126.78	7.4	7.8	210.0	60.0	77.5	53.0	100.0	285.0	18.0	18.0	RIPPLE	CLEAR	CLEAR	CLEAR	BOATING	BOATING
95	16	09/26/95	CM	CM	13.0	16.0	10.5	9.8	0.7	0.7	100.81	98.01	7.8	7.3	140.0	400.0	44.0	68.0	72.0	310.0	12.5	12.5	RIPPLE	OVERCAST	OVERCAST	OVERCAST	BOATING	BOATING
95	16	10/10/95	PS	PS	12.5	13.0	9.8	9.8	0.6	0.7	92.71	91.89	7.2	7.2	400.0	80.0	85.0	100.0	61.0	305.0	12.0	16.0	CALM	CLEAR	CLEAR	CLEAR	BOATING	BOATING
95	16	11/26/95	PS	PS	4.0	3.5	9.8	12.1	0.8	0.0	78.63	81.89	7.8	7.8	180.0	80.0	85.0	112.5	105.0	285.0	4.0	-1.0	RIPPLE	PT CLOUDY	PT CLOUDY	PT CLOUDY	BOATING	BOATING
98	16	04/18/98	CM	CM	7.0	9.0	11.3	11.2	0.2	0.5	93.88	87.88	7.4	7.2	40.0	10.0	111.0	140.0	160.0	300.0	8.0	11.0	WHITECAPS	WAVES	PT CLOUDY	PT CLOUDY	BOATING	BOATING
98	16	05/20/98	CM	CM	17.0	17.0	8.4	8.4	0.8	0.8	97.88	0.00	7.8	7.8	100.0	80.0	85.0	85.0	95	100.0	4	24.0	WAVES	WAVES	PT CLOUDY	PT CLOUDY	3 MOORED BOATS	CREW JUST FINISHED

Great Bay Watch 1996 Sampling Section - Preliminary Data 4/18/96 - 6/3/96

Preliminary 1996 DATA for Fecal Coliform Counts and Dissolved Oxygen Percent Saturation											
		18-Apr	6-May	20-May	3-Jun	17-Jun	17-Jun	3-Jun	20-May	6-May	18-Apr
		Fecal Coliform Per 100 ml	Fecal Coliform Per 100 ml	Fecal Coliform Per 100 ml	Fecal Coliform Per 100 ml	Fecal Coliform Per 100 ml	Fecal Coliform Per 100 ml	Fecal Coliform Per 100 ml	Percent Saturation	Percent Saturation	Percent Saturation
Site 1 - Peninsula - Oyster River	LOW	80	30	700	50	44	44	50	76.31	79.61	94.44
	HIGH	20	100	1	27			27	100.77	94.20	102.53
Site 2 - Jackson Laboratory	LOW	33	3	2	1			1	87.20	91.40	94.58
	HIGH	0	3	1	5			5	94.36	87.46	99.17
Site 3 - Lamprey River	LOW	60	140	110	80			80	103.39	100.27	99.46
	HIGH								103.05	101.67	106.12
Site 4 - Depot Road (Sandy Pt) *	LOW										
	HIGH	20	3	11	0			0	104.06	87.92	99.73
Site 5 - Portsmouth Country Club	LOW	20	60	70	90			90	83.08	86.93	90.06
	HIGH	0	30	0	18			18	97.51	93.21	101.50
Site 6 - Fox Point	LOW	28	0	3	1			1	88.84	95.63	102.00
	HIGH	50	6		3			3	99.49	98.47	94.51
Site 7 - Cedar Point	LOW	100	103	48	19			19	96.45	90.29	96.02
	HIGH	30	1	10	5			5	97.58	96.51	99.85
Site 9 - Cochecho River	LOW	350	60	120	160			160	97.13	98.60	105.12
	HIGH	210	30	190	20			20	95.89	91.55	101.91
Site 10 - Piscataqua River	LOW	180	30	80	20			20	89.19	89.97	106.61
	HIGH	9	0	40	10			10	109.08	73.01	101.63
Site 11 - Coastal Marine Lab	LOW	20	2	12	1			1	99.56	93.50	97.26
	HIGH	0	1	0	2			2	101.46	96.23	101.45
Site 12 - Newmarket STP	LOW	50	40	100	3			3	52.92	68.88	98.83
	HIGH	50	40	110	180			180	98.67	93.24	108.68
Site 13 - Marina Falls Landing	LOW	50	40	110	240			240	96.30	101.03	100.15
	HIGH	0	40	60	91			91	93.85	99.00	100.35
Site 14 - Fowler's Dock	LOW	20	10	840	13			13	91.36	82.37	92.18
	HIGH	0	18	40	14			14	93.95	93.95	99.66
Site 15 - Patten Yacht Yard, Inc.	LOW	55	1	4	4			4	97.42	92.82	99.07
	HIGH	17	4	3	0			0	100.01	98.00	96.54
Site 16 - Exeter Docks	LOW	40	105	100	15			15	105.52		93.68
	HIGH	10	46	50	14			14	87.58		101.43

* no sampling low tide at site 4