Volunteer River Monitoring Program (VRMP)
2010 Data Report





Maine Department of Environmental Protection
Volunteer River Monitoring Program
August 2011
Doc #: DEPLW-1222

Acknowledgements & Credits

Lead Authors

Mary Ellen Dennis
Mark Whiting

Contributing Authors

Melissa Evers
Robert Mohlar
Barry Mower
Peter Newkirk

VRMP Staff Team (Maine DEP)

Kathy Hoppe
Mary Ellen Dennis
Jeff Varricchione
Mark Whiting

Cynthia Montanez (AmeriCorps)

Other Maine DEP Contributors to the VRMP

Malcolm Burson
David Courtemanch
Susan Davies
Kristin Feindel
Fred Gallant
Wendy Garland
Chris Halstead
Karla Hyde
Don Kale
Susanne Meidel

Photograph Credits

Photographs courtesy of Jeff Varricchione, Cynthia Montanez, and Rich Obrey.

Acknowledgements & Credits

Most importantly, the VRMP would like to recognize the dedication and hard work of all the volunteers who participated in the program:

2010 VRMP Volunteers

Bagaduce River Watershed Association

Diane Bartholomew
Jim Dougherty
Nonny Ferriday
Harold Hatch
Phillip Nesbit
Bob Norden
Nancy Norden
Thomas Payne
Michelle Payne
Pamela Storm

City of Lewiston & No Name Pond Association (No Name Brook)

Carmen Coulombe
Eileen Fair
Harry Gray
Jan Patterson
Jeanne Raymond
Spencer Ward

Friends of Merrymeeting Bay (Androscoggin River)

Sarah Cowperthwaite
Ed Friedman
Misty Gorski
Ruth Inness
Kathleen McGee
Nancy Murphy
Jeff Sebell
Kermit Smyth

Mousam - Kennebunk River Alliance

Jacob Aman
Joe Anderson
Nick Branchina
Fred Frodyma
Linda Lyman
Ashley Pinkham
Jennifer Shack
John White

Penjajawoc Stream Team

Hope Brogunier
Valerie Carter
Chris Easton
George Elliott
Mary Evans
Rae Fournier-Wren
Nancy Jacobson
Judy Markowski
John Minott
Libby Norton
Marion Rudnicki

Prestile Stream- Central Aroostook SWCD

Bryant Billings
Dotty Dudley
Steve Hitchcock
Kevin Kearney
Benjamin Lynch
Bob McCurry
Vicki McCurry
Brent McKeen
Jerry Weiss
Lorraine Wilcox
Roger Wilcox

Presumpscot River Watch

Forrest Bell
Fred Dillon
Dave Harradon
Ralph Johnston
Jim Linsley
Patrick Morass
Michael Parker
Tamara Lee Pinard
Linda Reed
Elizabeth Stamey
Thomas Tero

Table of Contents

Chapter 1
Overview and Introduction

2010 Overview

The 2010 sampling season marked the second year of the Volunteer River Monitoring Program. In 2010, 7 volunteer river monitoring groups comprised of 65 monitors participated in the program. These groups represented a range of locations and watersheds. In Northern Maine, the Prestile Stream-Central Aroostook Soil & Water Conservation District group monitored the Prestile Stream, a primarily agriculturally impacted river. The Bagaduce Watershed Association monitored the Bagaduce River, a coastal river in Hancock County. In the city of Bangor located in Penobscot County, volunteers monitored the urbanized Penjajawoc Stream. No Name Brook in Androscoggin County was monitored by the city of Lewiston and No Name Pond Association volunteers. Friends of Merrymeeting Bay monitored the Lower Androscoggin River in Androscoggin County- a large point and non-point source impacted river. Presumpscot River Watch monitored the Presumpscot River located in a highly developed area of the state in Cumberland County. The Kennebunk and Mousam rivers located in southern coastal York County were monitored by the Mousam and Kennebunk Rivers Alliance.

In 2010, these 7 monitoring groups and 65 monitors covered an area of over 1000 square miles of river and stream watershed and collected a vast amount of data. A total of 517 sampling events were completed at 77 sites. Data collected included temperature, dissolved oxygen, conductivity, bacteria, turbidity and total suspended solids.

VRMP Background

While DEP is responsible for monitoring and assessing the State's waters, due to limited State resources, it has long recognized the value and need of using volunteers for collecting water quality data. Therefore, there had been interest and recognition for the need to develop a statewide volunteer effort for streams and rivers for some time, similar to the very successful Lake Volunteer Monitoring Program which has been in existence since 1971. In 2007, DEP commissioned a needs assessment and determined that there was widespread support and need for a volunteer river monitoring program (VRMP). After determining where the program would be housed and how it would be organized, the VRMP was launched in 2009.

Prior to 2009, with no or limited DEP assistance, a number of hard-working river and stream watershed groups had already developed monitoring programs on their own for a variety of reasons. According to the assessment, their reasons included an interest in land preservation, protecting endangered species, dam removal, opening clam flats, upgrading water classification, and obtaining water quality data. The VRMP brought some of the established groups and also new groups into the program.

The challenge with volunteer groups working independently is that they may use different sampling or analysis methods, data management systems, and quality assurance/quality control requirements. These groups may or may not be working under an approved quality assurance project plan. Also, for the general public, centralized access to the results of most volunteer sampling had not been available.

The VRMP was created as an organization to address these problems. The VRMP provides a network of volunteer groups, participating in quality assured volunteer sampling. Volunteer sampling is governed by a program level Quality Assurance Project Plan (QAPP) which was created and is maintained by VRMP staff. Volunteer groups are responsible for creating individual Sampling and Analysis Plans (SAPs) tailored to their specific project situation.

The creation of an approved generic QAPP and support by VRMP staff makes it easier for interested groups to tackle the rigors of water quality monitoring with reduced difficulty and time associated with the development of QAPPs, SAPs and Standard Operating Procedures (SOPs). The VRMP therefore:

1. Created and maintains a Quality Assurance Project Plan
2. Assists groups with writing Sampling and Analysis Plans
3. Provides annual training
4. Provides quality assurance/quality control of data and a centralized database
5. Produces an annual report

Chapter 2
Water Quality Monitoring

Overview of the Federal Clean Water Act and Maine's Classification System

The following section provides a brief overview about legislation in place that allows for protection and restoration of Maine's waters. It is provided here to give a better understanding of how volunteer monitoring fits into the bigger picture. For people wanting to know more about the details of this system, we recommend they visit the following website: www.maine.gov/dep/blwq/docmonitoring/classification/index.htm.

In 1972, the Federal government passed the Clean Water Act (amended in 1977) which provides the overall framework for the protection and restoration of all waters of the United States. The Clean Water Act consists of many different parts and requirements that States must implement. One important part of the Clean Water Act is the requirement that States establish a water quality standards program. Water quality standards consist of three parts: designated uses, criteria and an anti-degradation statement.

The designated uses reflect the goals for each water body. They consist of both human and ecological uses- such as support of aquatic life, fishing (including fish consumption), recreation, drinking water, navigation and hydropower. Criteria include both narrative criteria and numeric criteria, which are the minimum requirements for parameters such as dissolved oxygen, bacteria, and the health of aquatic life communities to ensure that a water body attains its designated uses. The anti-degradation statement protects existing uses and high quality waters. It also requires that, when the actual quality of any classified water exceeds the minimum standards of the next highest classification, the higher water quality must be maintained and protected..

Maine defines uses for its water bodies through the Maine Water Classification System. There is one class for lakes and ponds, three classes for marine and estuarine waters, and four classes for rivers and streams. The four classes for rivers and streams are AA, A, B, and C. Each classification specifies the designated uses and water quality criteria described earlier and the anti-degradation statement places specific restrictions on certain activities, such that the standards of each class are achieved and maintained. The results of the differences between the classes, in large part, determines how they are managed and the types of activities allowed. Table 1 shows the classifications and associated designated uses for each class. Table 2 and Table 3 show the classifications and associated water quality criteria.

Table 1: Classification and Designated Uses

Water Class	Designated Uses
Class AA	Drinking water supply, recreation in and on the water, fishing, agriculture, navigation and habitat for fish and other aquatic life.
Class A	Drinking water supply, recreation in and on the water, fishing, agriculture, industrial process and cooling water supply, hydroelectric power generation, navigation and habitat for fish and other aquatic life.
Class B	Drinking water supply, recreation in and on the water, fishing, agriculture, industrial process and cooling water supply, hydroelectric power generation, navigation and habitat for fish and other aquatic life.
Class C	Drinking water supply, recreation in and on the water, fishing, agriculture, industrial process and cooling water supply, hydroelectric power generation, navigation and habitat for fish and other aquatic life.

Table 2: Classification and Water Quality Criteria

Water Class	Dissolved Oxygen Numeric Criteria	Habitat Narrative Criteria	Aquatic Life (Biological) Narrative Criteria[1]
Class AA	As naturally occurs	Free flowing and natural	No direct discharge of pollutants; as naturally occurs
Class A	7 ppm; 75% saturation	Natural	As naturally occurs
Class B	7 ppm; 75% saturation	Unimpaired	Discharges shall not cause adverse impact to aquatic life in that the receiving waters shall be of sufficient quality to support all aquatic species indigenous to the receiving water without detrimental changes to the resident biological community.
Class C	5 ppm; 60% saturation; 6.5 ppm (monthly average) at 22° and 24°F	Habitat for fish and other aquatic life	Discharges may cause some changes to aquatic life, provided that the receiving waters shall be of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community.

[1] Numeric biocriteria in Maine rule Chapter 579; Classification Attainment Evaluation Using Biological Criteria for Rivers and Streams.

Table 3: Classification and Bacteria Criteria

Waterbody Class	Bacteria Criteria
Fresh water	
Class AA	As naturally occurs[1]
Class A	As naturally occurs[1]
Class B	Between May 15th and Sept. 30th *E. coli* of human and domestic animal origin shall not to exceed a geometric mean of 64/100mL or an instantaneous level of 236/100mL
Class C	May 15th – Sept. 30th *E. coli* of human and domestic animal origin shall not to exceed a geometric mean of 126/100mL or an instantaneous level of 236/100mL
Class GPA	Between May 15th and Sept. 30th *E. coli* of human origin shall not to exceed a geometric mean of 29/100mL or an instantaneous level of 194/100mL

[1] Defined in 38 MRSA §466(2): "As naturally occurs" means conditions with essentially the same physical, chemical and biological characteristics as found in situations with similar habitats free of measurable effects of human activity." In practice, the Class GPA standard for *E. coli* may be used as a surrogate target if a freshwater's "natural" bacteria levels are unknown.

While the Water Quality Classification program establishes goals, designated uses and criteria, it does not necessarily mean that a water body is actually attaining water quality conditions as defined in its assigned class. Another part of the Clean Water Act is Section 305(b) which requires that states assess the condition of its waters toward meeting designated uses and prepare a report biannually to Congress. This report is referred to as the 305(b) report or "Integrated Water Quality Monitoring and Assessment Report". "The "Integrated Report" summarizes water quality data collected by the DEP and other state, federal, and tribal government agencies, volunteer water monitoring organizations and other sources." The report provides a general overview of the conditions of Maine's waters and the appendices give the conditions of specific waterbodies. The report also includes a list of "impaired waterbodies".

Why Monitor Certain Water Quality Parameters?

This report will not attempt to describe the importance of various types of water quality parameters. VRMP annual trainings provide an opportunity for volunteers to learn about different parameters. Another good educational resource is the U. S. Environmental Protection Agency's "Volunteer Stream Monitoring: A Methods Manual" (USEPA, 1997), which can be found online at: http://water.epa.gov/type/rsl/monitoring/stream_index.cfm . Parameters described in Chapter 5 of that manual include:

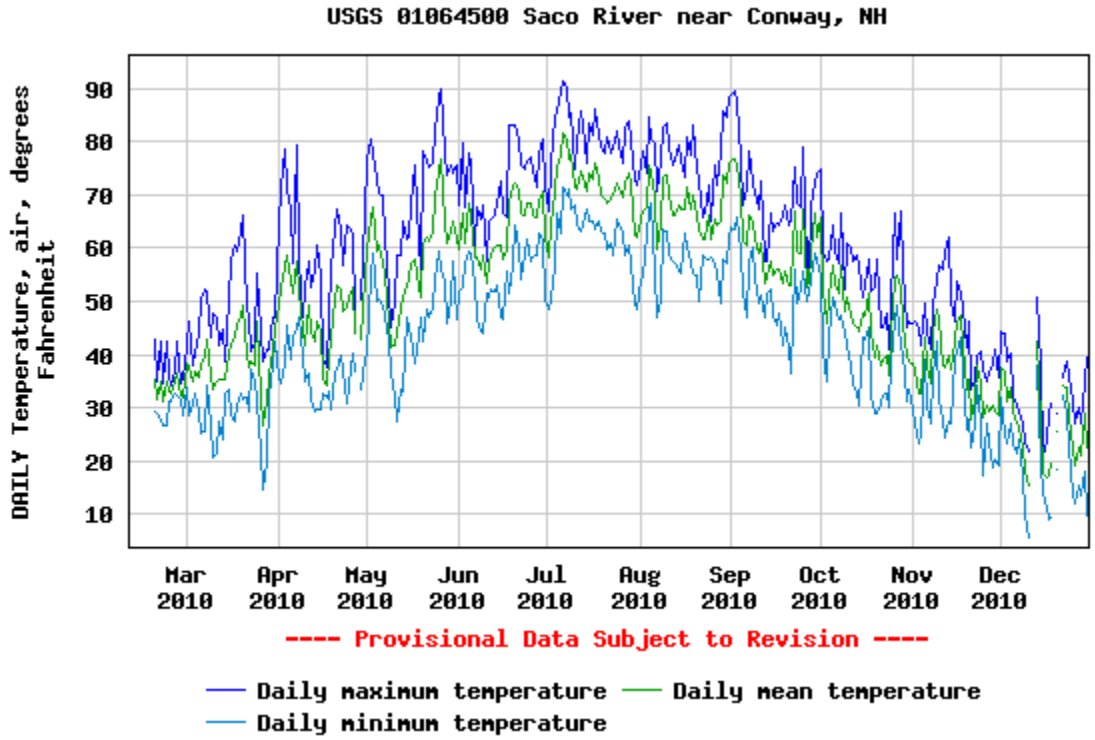
- Dissolved Oxygen & Biochemical Oxygen Demand
- Temperature
- pH
- Turbidity
- Phosphorus
- Nitrates
- Total Solids
- Conductivity
- Total Alkalinity
- Fecal Bacteria

Chapter 3
2010 Monitoring Data

Weather and Flow Data for 2010 Field Season

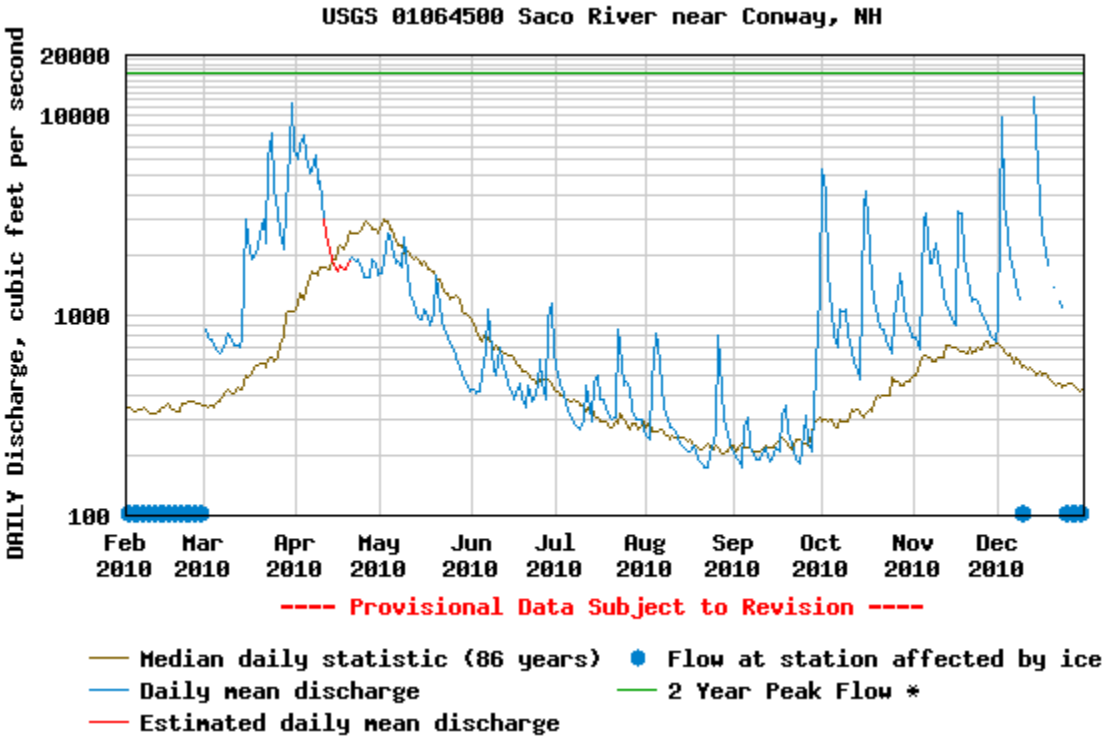
The weather for 2010 included extremes. For instance, the year was the warmest on record for Portland Maine (a 70 year record), including the warmest spring and warmest summer on record. There were heat waves in mid-March, early April, early and late May, the July 4th weekend, and early September (Figure 1). Ice-out conditions for Maine's lakes and streams in the spring of 2010 were approximately one month in advance of normal. On the other hand, the combination of warm spells that were followed immediately by cold snaps in late March and the second week of May severely damaged the state's strawberry crop.

Figure 1: Air temperature recorded in the Saco River at Conway NH by the USGS stream gauge. Maximum minimum and mean temperatures are given.



Rainfall patterns were also extreme. The 2010 rain total for Portland was 6.5 inches above normal, with 11.24 inches recorded in March alone. On the other hand, May through June were very dry, with stream flows generally well below normal (Figure 2). In southern Maine, July through September had generally normal flows. March and April and October through December were very wet with very high flows, caused by one wave after another of big storms.

Figure 2: Stream gauge data from the Saco River showing daily discharge in cubic feet per second for the 2010 field season (in blue). Also shown is the 68-year median flow (in brown).



In contrast, in eastern and northern Maine, the spring of 2010 was dry followed by a very dry early summer. For instance, for the Narraguagus River in Washington County, by the end of May the observed flows were below 150 cfs (normal is almost 400 cfs). By the first of September, the flow was 40 cfs (while the normal is about 80 cfs). For the Meduxnekeag River in Aroostook County, the observed flow by the first of September was 4.0 cfs (while the normal is about 40 cfs). There was a break in the weather in late summer so that strong rains returned in September and normal flows were seen in throughout the fall. Central Maine stream flows were fairly normal overall in 2010, although September was especially wet. For instance, the normal flow for the Ducktrap River in Waldo County for September is about 0.4 cfs. The peak flow for September in the Ducktrap was 90 cfs.

Weather is important for streams because temperature and flow strongly influence water chemistry and wildlife health and behavior. For instance, cold water reduces biological activity and has a high solubility for dissolved gasses such as oxygen and carbon dioxide. In warm water, oxygen solubility is greatly reduced and it can become limiting for fish and other aquatic organisms. Stream flow, both water depth and velocity, is also important. Large fish need more water than smaller fish, and water depth can limit wildlife access to upstream habitat. Culverts,

dams (including beaver dams), and sometimes bridges can be impediments to fish passage, especially during low flows. High flows can also impede wildlife migrations if the flows are too fast for weak swimmers. Deep water and high velocities tend to mitigate for low oxygen solubility during the summer months. Deep water often stratifies, collecting cold and well oxygenated water on the bottom. These deep spots are often summer refuges for fishes like trout and salmon that require colder water. Trout and salmon prefer waters around 60-64 º F and will avoid waters with temperatures above 70 º F if possible. Also, strong stream flows promote turbulence that restores oxygen by mixing water that is in contact with the atmosphere with water that is relatively depleted of oxygen. Stagnant water is often rapidly depleted of oxygen in the summer months and can result in fish kills.

In summary, during the summer field season in 2010 streams were generally warmer than average with below average flows in April, May and June. Thereafter, air temperature and water temperatures remained high while rain returned and stream flows recovered in late summer. Fall was characterized by waves of strong storms and stream flows were correspondingly good.

Monitoring and Time of Day

In order to assess attainment of D.O. criteria within Maine's Water Quality Standards, early morning monitoring may be necessary. Dissolved oxygen (D.O.) values generally fluctuate depending on time of day. The lowest values often occur in early morning and the highest values late in the day. The fluctuation may be minimal or significant depending on a number of factors (e.g. streamflow, water temperature, plant and algae growth). Dissolved oxygen data collected during the early morning (between dawn and 8:00 AM) are therefore important for water quality monitoring purposes. Except as naturally occurs, if D.O. concentration falls below the applicable D.O. criteria at any time of day, this also signals non-attainment.

In 2010, dissolved oxygen was measured at different times of the day by different volunteer groups and individuals, often depending upon their schedules and availability. Collecting water quality data at certain times of the day (e.g., very early in the morning) can be difficult and inconvenient; however it is encouraged whenever possible.

Water Quality Results and Associated Information from the VRMP Groups

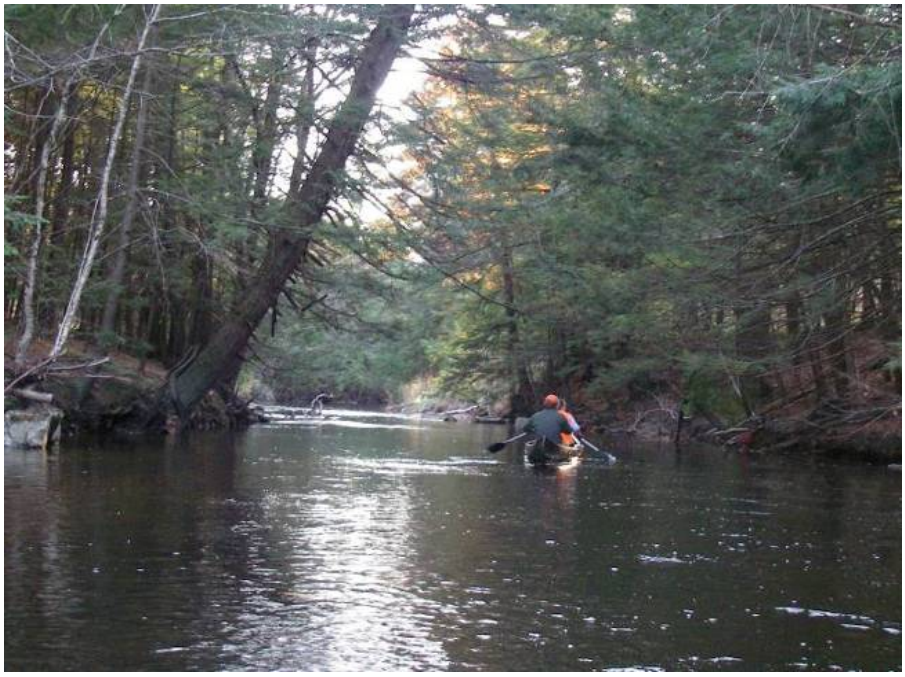
Sections 5-1 through 5-8 present sampling overview, methods, result summaries, figures (graphs) of water quality data, discussion and data for each group. The sections are as follows:

Section	River/Stream and Volunteer Group
5-1	Androscoggin River – Friends of Merrymeeting Bay

5-2 Bagaduce River & tributaries – Bagaduce River Watershed Association
5-3 Kennebunk River – Mousam and Kennebunk Rivers Alliance
5-4 Mousam River & tributaries – Mousam and Kennebunk Rivers Alliance
5-5 No Name Brook & tributaries – City of Lewiston & No Name Pond Assoc.
5-6 Penjajawoc Stream – Penjajawoc Stream Team
5-7 Prestile Stream- Central Aroostook Soil & Water Conservation District
5-8 Presumpscot River & tributaries – Presumpscot River Watch

Bacteria Data

The River/Stream reports contain the bacteria data taken by the volunteer groups and the calculated geometric means. The means were calculated for all the sites, regardless of the number of samples taken. To calculate a mean for regulatory purposes, at least six samples are required throughout the season (May 15- September 30) and it is subject to review by DEP Division of Environmental Assessment staff.



Chapter 4
Quality Assurance/Quality Control

VRMP Quality Assurance Project Plan [QAPP], Sampling and Analysis Plans [SAPs], and Sampling Sites

The VRMP's network of volunteer groups monitor under quality-assured volunteer sampling as governed by:

(a) A program-level Quality Assurance Project Plan (QAPP)[1], which includes data quality objectives and numerous Standard Operating Procedures (SOPs) for how to collect water samples and how to use various VRMP-approved water quality meters, written by VRMP staff (Maine DEP, 2009), and;

(b) Individual Sampling and Analysis Plans (SAPs)[2], created by each volunteer group to tailor the program-level QAPP to their specific project situation and which are reviewed/approved by VRMP staff. A SAP provides specific information, including the group's goals and objectives. Project specific details include items such as detailed site location information, sampling frequency and sample season. They also include the parameters being monitored, brands and models of equipment being used, and specific SOPs (or reference to the SOPs). Individual SAPs also allow the flexibility for groups to adapt the design of this program to local situations, conditions and available resources.

This VRMP report will not describe the details (e.g., sampling methods, sample sites) that may be found in the documents just described. To view these documents, visit the VRMP website[1,2] or contact the VRMP directly.

VRMP Quality Control Steps

---

[1] Maine Department of Environmental Protection (MDEP). 2009. Maine Volunteer River Monitoring Program (VRMP) – Quality Assurance Program (Project) Plan. Prepared by J. Varricchione and L. Vickers. Volunteer River Monitoring Program, Maine Department of Environmental Protection, Portland, ME. DEPLW-0984. Last viewed at http://www.maine.gov/dep/blwq/docstream/vrmp/publication.htm on November 16, 2010.

[2] Sampling and Analysis Plans (SAPs) for individual VRMP groups, which include site descriptions and photographs, may be found online* or by contacting the VRMP directly.
* http://www.maine.gov/dep/blwq/docstream/vrmp/publication.htm

The following bullets summarize the various QA/QC measures that are a part of the VRMP Program.

- Individual volunteers are evaluated on the adequacy of their sampling techniques and the measurement abilities of their monitoring/sampling equipment at annual volunteer certification/re-certification workshops.
- The accuracy of monitoring equipment or techniques is tested as described in Table 3a of the Quality Assurance Project Plan (Maine DEP [QAPP], 2009).
- Monitors follow an approved SOP for each parameter monitored. Additionally, field calibration and/or accuracy determination procedures are performed for those parameters that require it, as listed in Table 3a or in the parameter's specific SOP.
- A field duplicate is obtained by each volunteer for at least 10% (1 duplicate per 10 samples collected or monitored) annually of their own sampling efforts for all parameters. Comparisons of duplicate results versus "original sample" results are expected to meet the criteria listed in Table 3a.
- For water samples requiring laboratory analyses, duplicate samples are obtained for at least 10% of samples (i.e. 1 duplicate per 10 samples) collected per parameter (Table 3c of the Quality Assurance Project Plan).
- Sample bottles or containers, if used, are appropriately prepared (e.g. rinsed, sterilized) prior to sampling, by either a laboratory or the volunteer group according to approved SOPs.
- Laboratories that are used by member organizations meet the criteria listed in Appendix 11 of the QAPP. Also, they are expected to provide their own internal approach to quality control for each parameter being analyzed, and their testing shall meet VRMP criteria outlined in Table 3a if the data are to be included in the VRMP's water quality database. Quality control data will be submitted by each laboratory to their patron volunteer monitoring groups who will, in turn, submit copies of this information to the VRMP. The volunteer group reviews the lab QA/QC data for potential problems first, and informs the VRMP of any problems. The VRMP will perform a secondary check to confirm the absence of problems.
- Water quality data is reviewed according to procedures outlined in the next section.

VRMP Quality Assurance Review of Data Collected in 2010

After water quality and associated data are submitted, the VRMP undertakes a thorough review of field hardcopy forms and electronic spreadsheets to assess the accuracy of the information that was submitted. VRMP also reviews the data to determine whether some of the QA/QC (quality assurance / quality control) measures stipulated in the VRMP QAPP were carried out by volunteers.

In this second year of the program, there was much improvement from the first year in the quality of the data. However, there continues to be issues with some of the data- some are significant, but many are minor. Both the VRMP staff and volunteers should continue working toward improvement. Any problems with the data are documented in the database under the "Comments" section. Some of the problems are minor (e.g. "did not record observational data", "did not complete chain of custody for datasheet"). Other problems are significant (e.g. "did not record dissolved oxygen "reading/value" after calibration", "no vertical depth recorded"). The following explains the steps taken in review of the data and how problem data was handled:

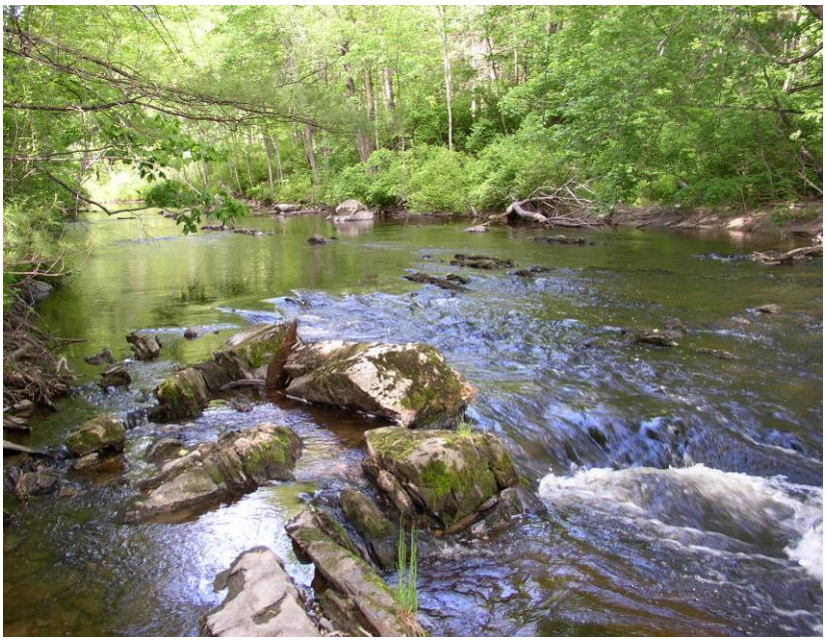
1) VRMP water quality data are entered on to standard field forms. These VRMP datasheets include space for data elements that are entered into the VRMP database. This includes information on how samples were collected, sample location, equipment used and other important notes or observations.
2) Data are entered by the group's data manager into a standardized spreadsheet template called a "pre-EDD" (Pre-electronic Data Deliverable).
3) The electronic data and hard copies of the datasheets are sent to the VRMP.
4) VRMP staff compares the group's datasheets and electronic files to ensure the records match. A review of field duplicate data and laboratory quality assurance information is also conducted.
5) When reviewing the data, VRMP staff identifies any problems and enters specific comments in the SAMPLE_Comments field of the Pre-EDD. An entry for each sample date is entered in the file named "VRMP_[Year]_Data Sheet Quality Tracking.xls". The purpose of the tracking sheet is to identify QA/QC issues, track duplicates, and to allow further review of the data (i.e. compare to Data Quality Objectives).
6) VRMP staff, along with Division of Environmental Assessment Staff, review the Data Sheet Quality Tracking data. It was decided that data with any comments will be flagged in the EGAD Database. Flagging the data allows data users to see what comments are associated with the data [and they can decide if they want to use the data based on those comments].
7) Data are uploaded into the DEP's EGAD database. Some data were excluded from the database. The four reasons for exclusion were:
    - Calibration value for dissolved oxygen meter is outside the accepted calibration range [<97% or >103%]
    - There was no indication on the datasheet that the dissolved oxygen meter was calibrated
    - There was a Pre-EDD, but no hardcopy of the datasheet
    - Dissolved oxygen kits had used outdated chemicals

Comments/problems with the data are listed in the "Comments" column of the water quality data tables located in Appendix A-2 of each individual report.

Maine DEP Use of VRMP Data

The VRMP is designed to guide and train volunteer groups to collect high quality data that will be useful to various agencies within the State of Maine and beyond. Volunteers will be able to sample and monitor rivers and streams that state agencies may not have the staff or time to monitor on a regular basis and the monitoring will help maintain awareness of water quality conditions. Volunteer groups will be able to identify parts of rivers or streams which may have degraded water quality, thus helping organizations such as Maine DEP, Maine Department of Inland Fisheries and Wildlife, Maine Department of Marine Resources, non-profits, conservation districts, and towns prioritize where to investigate conditions further and where to focus best management practice implementation efforts. These data can also be used to gather baseline information and track trends over time.

While the data that VRMP affiliated groups gather will be of high quality, Maine DEP will need to decide how to use the data in decisions related to laws, enforcement, and other regulatory issues. In some cases, VRMP collected data will be viewed as primarily "advisory level data" since it may be difficult for DEP to defend the validity of volunteer collected data, regardless of the quality assurance steps that are in place. In other cases, DEP may use the VRMP data in decisions related to certain regulatory issues.



Approved vs Non-Approved VRMP Sites

Approved VRMP sites are sites that meet VRMP criteria as defined in the Maine DEP Quality Assurance Project Plan (2009). These criteria require that laterally (across the stream), sampling occurs in the "center half of flow" so that a flowing, well-mixed representative sample is collected. To reach the "center half of flow", volunteers may need to use a variety of techniques including wading, reaching, using an extension pole, using a boat, or sampling from a bridge or culvert using a VRMP approved sampling technique or device. There are also specific depth requirements depending on whether the site is a Tier 1 or Tier 2 site. Tier 1 sites require higher quality data because these sites may be those that the volunteer group is interested in re-classifying. Therefore, if the site is deep, then profile data must be collected.

Each of the VRMP sampling sites is documented and VRMP staff visit the sites to certify them. Non-approved sites are sites that, at this time, (a) VRMP staff have the understanding that these sites are not being sampled at locations [within the river/stream] that meet VRMP criteria or (b) VRMP staff are uncertain that these sites meet VRMP criteria.

It is critical that volunteers sample from the same location time after time (whenever feasible and safe) because this ensures comparability of data at that particular river or stream location.

Maine DEP River Codes that Correspond to Volunteer Group Site Code Names

Maine DEP and the VRMP have created unique River Code IDs ("VRMP Site IDs") for each of the local volunteer group names for the sites ("Organization Site Codes"). VRMP Site IDs can be found alongside volunteer Organization Site Codes in the Stream Reports data. For simplicity, only volunteer Organization Site Codes were used in the figures (graphs) in this report.

Refer to Appendix A for an explanation of how Maine DEP River Codes are established for various river sites.

References

Maine Department of Environmental Protection (MDEP). 2009. Maine Volunteer River Monitoring Program (VRMP) – Quality Assurance Program (Project) Plan. Prepared by J. Varricchione and L. Vickers. Volunteer River Monitoring Program, Maine Department of Environmental Protection, Maine. DEPLW-0984. Available at http://www.maine.gov/dep/blwq/docstream/vrmp/publication.htm.

U.S. Environmental Protection Agency (USEPA). 1997. Volunteer Stream Monitoring: A Methods Manual. U.S. Environmental Protection Agency, Office of Water, Washington. Available at http://water.epa.gov/type/rsl/monitoring/stream_index.cfm.

Appendix A

Sampling Point Coding System
Maine DEP Bureau of Land & Water Quality

Design

This document is designed to provide guidance on establishing unique ID's for sampling point data for Maine Waters. This ID system is based on river hierarchy and the mile(s) upstream from where the target stream/river branches off from its parent water.

How sites are coded

Each order of stream is given a two digit letter code that adds to the unique ID for a specific site / sampling location. For example, the following shows part of the coding for Little Androscoggin River.

A					Androscoggin River
A	**L**	**A**			**Little Androscoggin River (01)**
A	L	A	A	N	Andrews Brook
A	L	A	B	G	Bog Brook
A	L	A	C	L	Cool Brook
A	L	A	D	S	Davis Brook
A	L	A	M	G	Morgan Brook
A	L	A	M	N	Minister Brook

A sampling point on Little Androscoggin (LA) would be assigned the prefix ALA and given a number suffix that represents, in 10^{th}'s of a mile, how far upstream it is from where it branches off the main stem of the Androscoggin River (A).

Examples:
A sampling point located 2/10th of a mile up stream from where the Little Androscoggin branches off the main stem of the Androscoggin River would be called: ALA02

A sampling point located 5.2 miles upstream stream from where the Little Androscoggin branches off the main stem of the Androscoggin River would be called: ALA52

A sampling point located 10.1 miles upstream from where the Little Androscoggin branches off the main stem of the Androscoggin River would be called: ALA101

Rivermile distance coding
For codes more than a mile upstream, the last digit always represents the closest 10th of the mile. For example:
11 = 1.1 miles upstream
101 = 10.1 miles upstream
1100 = 110 miles upstream