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To: Susanne Meidel, Water Quality Standards Coordinator
Maine Department of Environmental Protection
SHS 17
Augusta, ME 04333
207-441-3612
Susanne.K.Meidel@maine.gov

From: Jennifer Brockway, Executive Director
Friends of Merrymeeting Bay
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E-Filed

Subject: Water Re-Classification Proposal
River/Sections: Androscoggin from Worumbo Dam to Merrymeeting Bay
Proposed Upgrade: C to B
Basis for Proposal: Actual conditions exceed those of present classification
Documentation: Supporting data from FOMB monitoring program approved by Maine DEP and USEPA
Data Collection Periods: DO-1999 to present; Coliform Bacteria-2006 to present
Sampling Intervals: Monthly: April-October
Proposal Date: November 29, 2017

Dear Ms. Meidel:

Please consider this our formal upgrade proposal for the lower section of the Androscoggin River between Merrymeeting Bay at the line from Pleasant Point in Topsham to North Bath extending upriver to Worumbo Dam in Lisbon Falls. As our data show, while classified as C, this section has long been on the cusp of and now is actually meeting, Class B standards. We therefore propose it be upgraded from C to B.

FOMB has the most complete set of classification data for the reaches in this proposal. We began our monitoring program in 1999 and continue to this day with over twenty sampling sites on the Androscoggin, Kennebec and around Merrymeeting Bay. FOMB joined the VRMP in 2009 to further support and substantiate water classification upgrades.

Because the actual water quality of the lower Androscoggin sections described here exceeds that of their current classification, our request for a reclassification from C to B is supported by the State antidegradation policy as quoted below:

38 M.R.S.A. § 464 (F) (4)

> *"When the actual quality of any classified water exceeds the minimum standards of the next highest classification, that higher water quality must be maintained and protected. The board shall recommend to the Legislature that water be reclassified in the next higher classification."*

In the past MDEP has sometimes said they cannot upgrade a river classification because under worse case [permitted] 7Q10 scenarios, proposed Class B [in this case] standards might be violated. At the same time, the Department has also said because receiving waters meet the *current* classification levels, Maine cannot upgrade classifications to meet actual conditions.

This condition, while often supported by industry, quite clearly violates the intent of the Clean Water Act and NPDES and creates an artificial ceiling on water quality improvement. In fact, reclassification and permitting **must** be used together to improve water quality. The Supreme Judicial Court of Maine states in Bangor Hydro Electric v. BD. OF ENV. PROT., 1991 ME, 595 A.2d 438 that the BEP must consider state water reclassification when engaged in the permitting process and that **"classification is goal oriented as required by the federal Clean Water Act".**

The Clean Water Act dictates a state shall revise its standards to reflect uses and water quality actually being attained. 40 C.F.R. §131.1O. See also id. § 131.6(d); 38 M.R.S.A. § 464(4)(F). Thus, the Board's analysis must be based on *existing* water quality – not hypothetical modeling with point sources operating at maximum licensed discharge. Indeed, the Board is specifically prohibited from considering maximum licensed loads because both state and federal regulations prohibit consideration of waste discharge or transport as a designated use. 40 C.F.R. § 131.10 (a); 38 M.R.S.A. § 464(4)(F)(l)(d).

Moreover, from the DEP Submission Guidelines:

- Maine's Water Quality Classification System is goal-based.

  When proposing an upgrade in classification, recommend waters that either presently attain or with reasonable application of improved treatment or Best Management Practices (BMPs), could reasonably be expected to attain, the standards and criteria of a higher proposed class.

Information to be Submitted with Re-Classification Proposals

1. **Waterbody Name:** Androscoggin River

2. **Location of proposed change in classification:** from Worumbo Dam, Lisbon Falls to the mouth of the Androscoggin in Merrymeeting Bay

3. **Write a brief statement that justifies why the waterbody should be considered for classification change.**

   This section of the Androscoggin should be considered for an upgrade because the actual conditions exceed those of a Class C waterway and meet those of a Class B waterway. The Androscoggin often seems to be the forgotten river when it comes to requiring and enforcing improvements in water quality or for that matter, fish passage. It was not long ago that the river was considered one of the ten dirtiest rivers in the country. Water quality has improved over time however, and we have the data to support that fact. It is only fitting the old classifications are upgraded to reflect current conditions. The Androscoggin deserves the respect and attention afforded other rivers in Maine.

4. **State how the proposed change will affect other users of the waterbody, for example holders of wastewater or stormwater discharge permits or holders of land-development permits.**

   Wastewater dischargers in Maine operate with massive buffers built in to their licenses. For the many years of Androscoggin data collection and compliance with Class B standards, dischargers have been conducting business as usual. We see no adverse effect to current permit holders. Our monitoring readings, with rare exceptions, meet Class B standards. Exceptions in the recent past have been limited for the most part to occasional sampling dates preceded by heavy rain events [resulting in higher bacteria] or instances of extremely high water temperature [arguably higher than permitted by law]. Elevated coliform bacteria in particular, are indicative of rain events and may reflect stormwater or wastewater discharges as well as general runoff. Combined sewage overflow or CSO events are exempt from classification limits. While under normal conditions these sources appear to be under control and within limits, during high rain events there appears to be room for improvement, as is the case nearly everywhere, at wastewater and stormwater facilities.

   Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23°C maximum and 19°C weekly average) or 0.3°C (0.5°F) above the temperature that would naturally occur outside a mixing zone established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4°F (2.2°C) or more than 1.5°F (0.8°C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85°F (29°C) at any point outside a mixing zone established by the Board of Environmental Protection.

In 2005, The U.S. Supreme Court in S.D. Warren v. MBEP, et al held that in fact dams, because they change the nature of the river waters are dischargers and polluters. Thus, in a dam-created impoundment when waters become heated over the maximums cited above, they violate Maine statute. When in the rare instance DO levels at a few points in the Androscoggin have been just below the Class B standard, it has been in extremely high water temperatures (i.e. 7/21/13 when water temperatures in Androscoggin impoundments were just under 26 degrees and release flows were not increased to compensate for the heat wave). This situation points to a violation of Maine statutes regarding temperature rather than a problem with classification. In other words, Classification standards cannot and should not be applied to illegal conditions.

5. **Provide water quality data, if available (and source of data), that documents the attainment status of the candidate waterbody relative to the designated uses and criteria of the proposed classification.**

   See attached. All sites are VRMP approved sites. Monitoring is conducted once a month from May through October (since 2009 under VRMP protocols and prior to that under the Friends of Casco Bay EPA Quality Assurance Plan). Monitors take measurements of water temperature, specific conductivity and dissolved oxygen using equipment supplied by the Department. Samples are collected for E. coli bacteria and transported to Bowdoin College for analysis by FOMB volunteers using the IDEXX Colilert system.

   Many years of monitoring data for DO and E. coli show a steady overall compliance with Class B standards (see two attached geometric mean histograms). Increased recreational use is a clear manifestation of water quality improvements. The public appreciates clean rivers (see attached support letters) and wants them to stay clean.

6. **Provide a summary of known human activities in the watershed of the proposed reclassification that might jeopardize attainment of standards of the proposed classification, for example land-use altering activities, landfills, hazardous waste sites, wastewater discharges, etc.**

   The Androscoggin watershed has it all, from pristine shores to the full spectrum of land use activities altering both landscape and water quality. Along the proposed section there are gravel pits, agricultural and forested lands, landfills, wastewater discharges from industries and from municipalities. On the Sabattus River, a local tributary, we know there are hazardous waste sites associated with Miller Industries.

   While there may be problems associated with some of these land uses, they do not appear to be preventing compliance with DO and bacteria levels required from Class B waters. As I mentioned earlier, **"classification is goal oriented as required by the federal Clean Water Act".** That a land use could jeopardize compliance with the proposed classification some time in the future is irrelevant, since one aim of the Clean Water Act

is to use increasingly higher classifications and attainment goals to continually improve water quality.

There is widespread municipal and citizen support for a classification upgrade to the lower Androscoggin. Past letters of support are included herein.

We appreciate the opportunity to comment on this matter and submit our proposal. We hope the Department will support this proposal and carry it forward to the Legislature. If we can be of further assistance in speaking for the proposal at legislative or other levels, please don't hesitate to call. Thank you for your efforts in this matter.

Sincerely,

Jennifer Brockway
Executive Director

Attachments.

VRMP Reports 2009-2016...……Page 6
DO & E. coli Geometric Means over Time ……Page 161
Letters of Support…….Page 164

VRMP Reports

2009-2016

Section 3-2
Androscoggin River (Friends of Merrymeeting Bay)

Refer to Chapter 2 of this document for where to find information about sampling methods, sampling sites, and quality assurance.

Results

E. coli Bacteria

Water quality monitoring by the Friends of Merrymeeting Bay (FOMB) detected some exceedances of state Class C instantaneous criteria for *E. coli* bacteria at the Water Street Mooring (WSM) and Brunswick Canoe Mooring (BCM) sites on 8/23/2009 (Figures 3-2-1 & 3-2-2; Appendix A).

Specific Conductance

Specific conductance at the FOMB sites were fairly similar to each other on any given date. Values ranged from about 40 to 93 µS/cm during the year and, with the exception of relatively high values on 7/26/2009, there was a slight upward trend moving from the summer into the fall (Figure 3-2-3; Appendix A).

Dissolved Oxygen

At the shallow water site BBB, dissolved oxygen (D. O.) values were observed to be well above Class C standards on all monitoring dates, ranging between 7.5 and 9.8 mg/L (Figures 3-2-4 & 3-2-5; Appendix A).

At site BCM, dissolved oxygen values were observed to be above Class C standards on all monitoring dates, ranging between 6.6 and 9.9 mg/L (Figures 3-2-7 & 3-2-8; Appendix A). In most cases, depth profiles showed that D. O. values generally decreased by about 0.1 mg/L from waters near the surface down to 5-m below the water surface.

At site WSM, dissolved oxygen (D. O.) values were observed to be above Class C standards on all monitoring dates, ranging between 7.4 and 9.8 (Figures 3-2-10 & 3-2-11; Appendix A). D. O. values generally varied only 0.1 to 0.2 mg/L from surface to near the bottom of the river on any given date. One interesting exception was on 7/12/2009 where D. O. values actually increased

by 0.3 mg/L from 9.5 to 9.8 mg/L from the upper 2-m of water down to the 3-, 4-, and 5-m depths of water.

Water Temperature

Water temperatures at site BBB ranged between 17.5 and 20.9 ^{o}C (Figure 3-2-6; Appendix A).

Water temperatures monitored at site BCM were found to range between 17 and 25 ^{o}C and were generally fairly uniform through the depth profile with one exception: on 7/12/2009 water temperature was 18.0 ^{o}C in the upper 3-m of water and 17.0 ^{o}C at 4- and 5-m meters below the water surface (Figure 3-2-9; Appendix A).

Water temperatures at site WSM were generally pretty uniform from near the surface down to the lower depths of the river at this site with temperatures ranging between 17.6 and 25.3 ^{o}C (Figure 3-2-12; Appendix A).

Discussion

E. coli Bacteria

E. coli bacteria concentrations only exceeded Class C instantaneous state water quality criteria on one monitoring date, which may be viewed as positive from a water quality results point of view. Only one monitoring date was noted as having stormflow conditions; increased sampling

under stormflow conditions may have generated different results. (The date where exceedances were found was not noted as being under stormflow conditions, which was not the expected situation.) Additional monitoring may provide a broader picture of the bacteria situation at these monitoring sites.

Dissolved Oxygen

Dissolved oxygen levels did vary with depth at sites BCM and WSM, though the differences were only about 0.1 to 0.2 mg/L from near the river surface down to near the bottom of the river. Given that weather patterns vary from year to year, greater differences in D. O. levels over depth profiles may be encountered in other years. D. O. levels monitored by FOMB in 2009 were always above the instantaneous Class C standard of 5.0 mg/L. (There was one date [8/23/2009] where D. O. concentrations were below the Class B standard of 7.0 mg/L.) At all three sites, the lowest D. O. values were observed when the water temperatures were the highest: BBB (8/9/2009); BCM and WSM (8/23/2009).

Sources of Pollution and Other Stresses to the River

There are numerous sources of pollution and other stresses to the Androscoggin River watershed in the region sampled by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress in the densely populated and heavily developed cities of Brunswick, Topsham, and neighboring towns include:

- Nonpoint source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry
- Dams and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than if the river section was free-flowing)
- Point sources (e.g., wastewater treatment plants, industrial discharges) of pollution.

Note: This pilot year VRMP report does not attempt investigate more closely how natural land features, land use, human infrastructure, and human populations may impact water quality. More in-depth investigations into these sources of stresses to water quality and aquatic habitats, including additional mapping and geospatial analyses, may be considered in future years as time permits.

Friends of Merrymeeting Bay -
Androscoggin River Sampling Sites.
Created By Cynthia Montanez on Oct. 29, 2010.

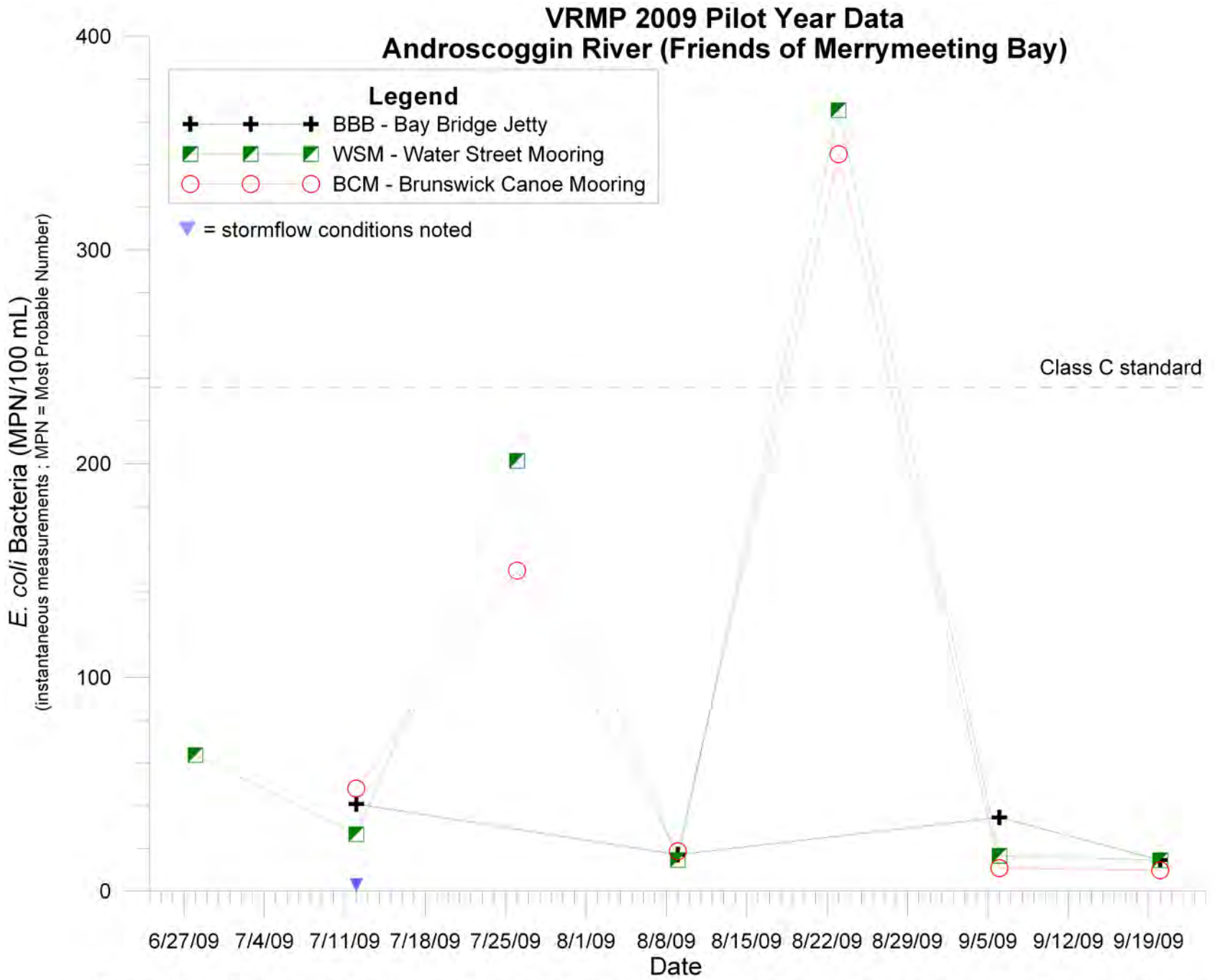


Figure 3-2-1. *E. coli* bacteria concentrations at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

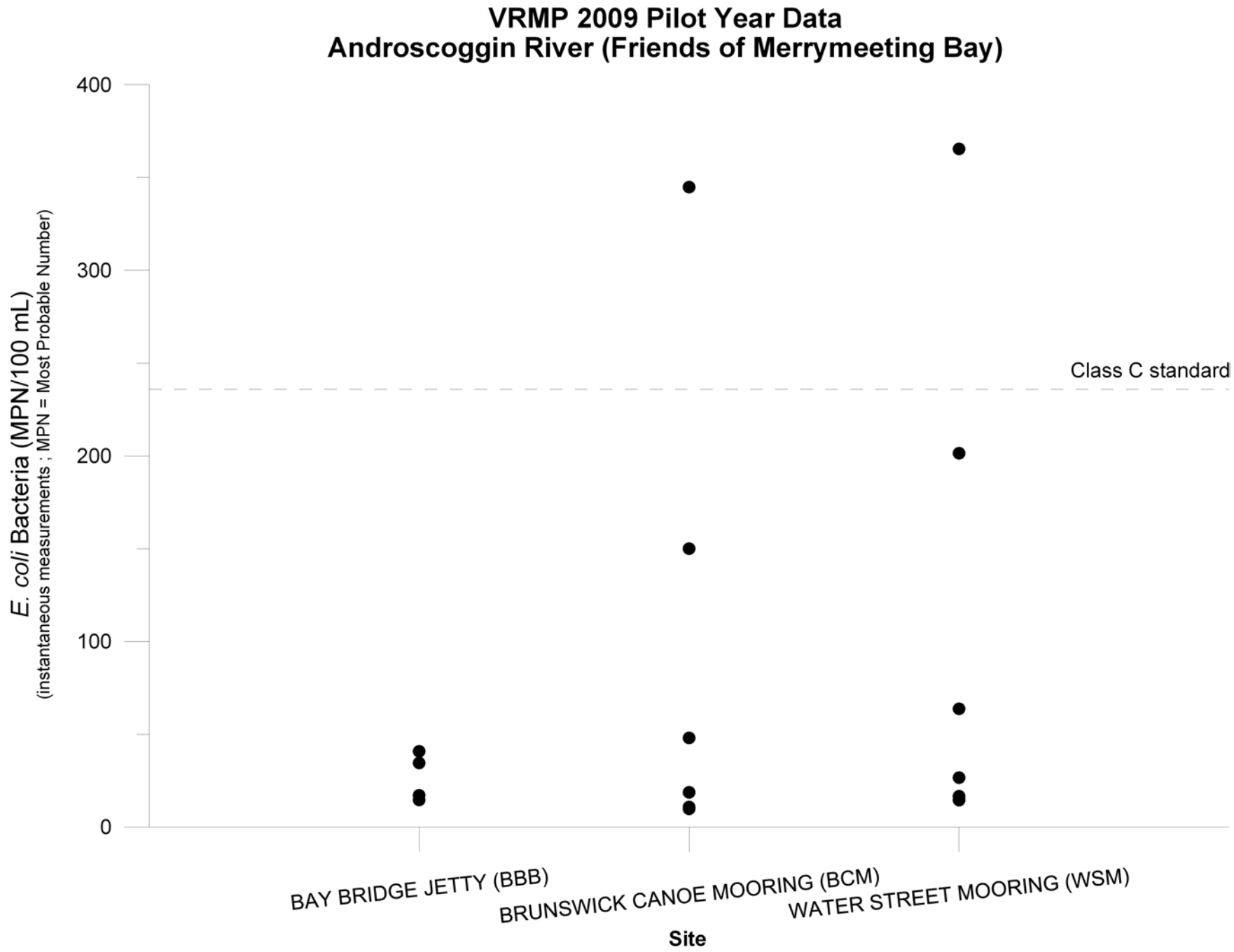


Figure 3-2-2. *E. coli* bacteria concentrations at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

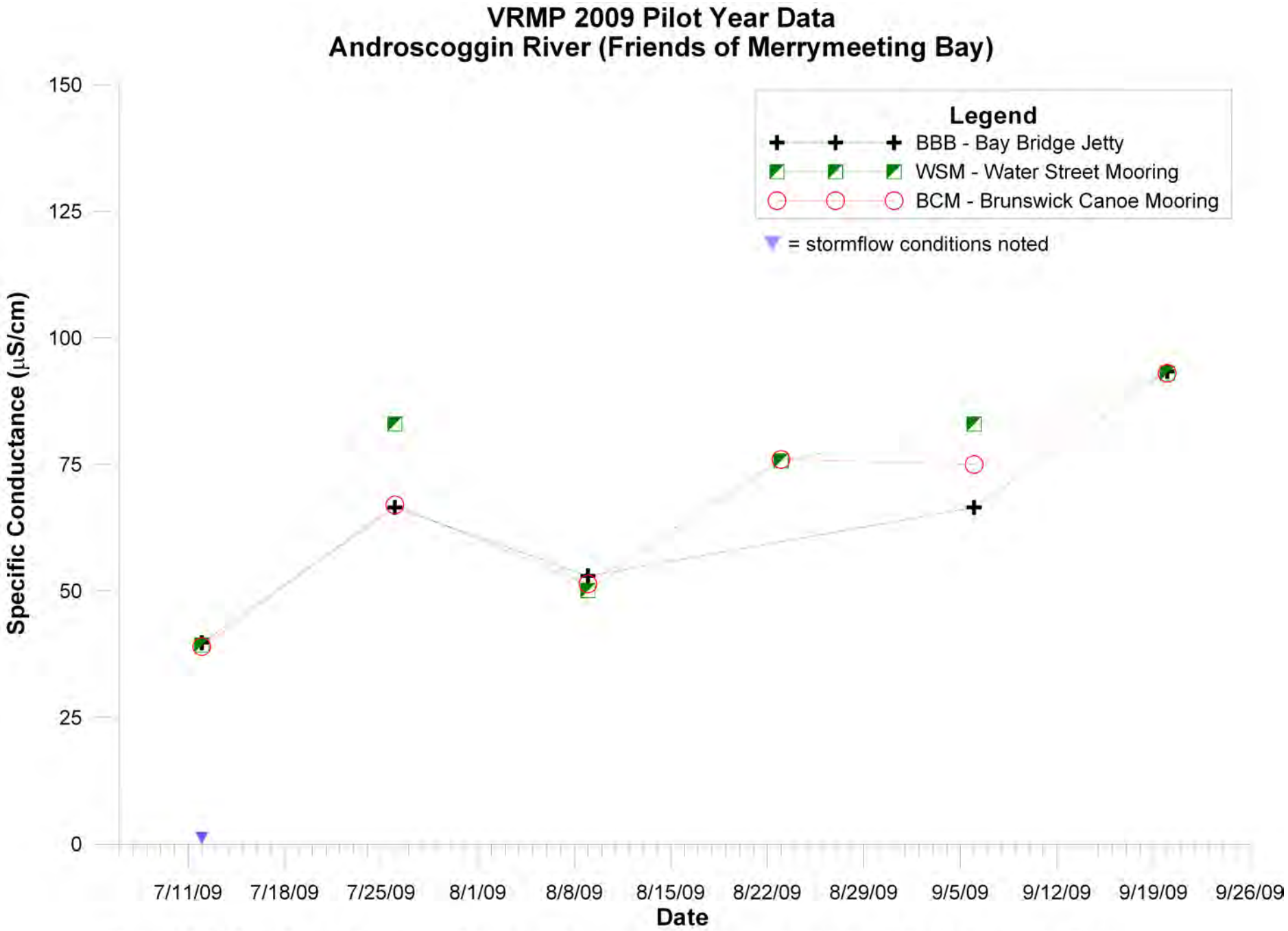


Figure 3-2-3. Specific conductance at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

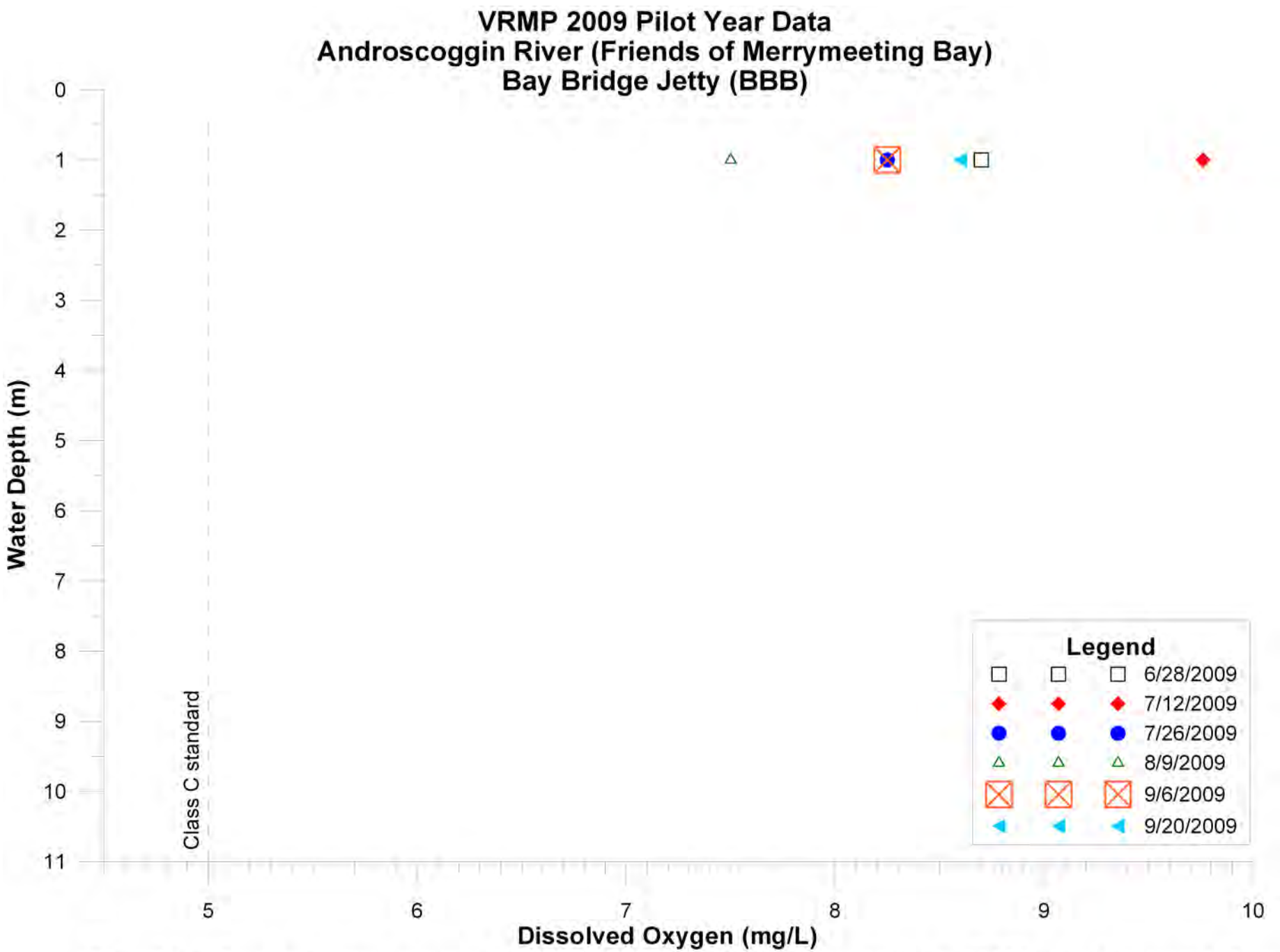


Figure 3-2-4. Dissolved oxygen concentrations at Friends of Merrymeeting Bay monitoring site "BBB" on the Androscoggin River.

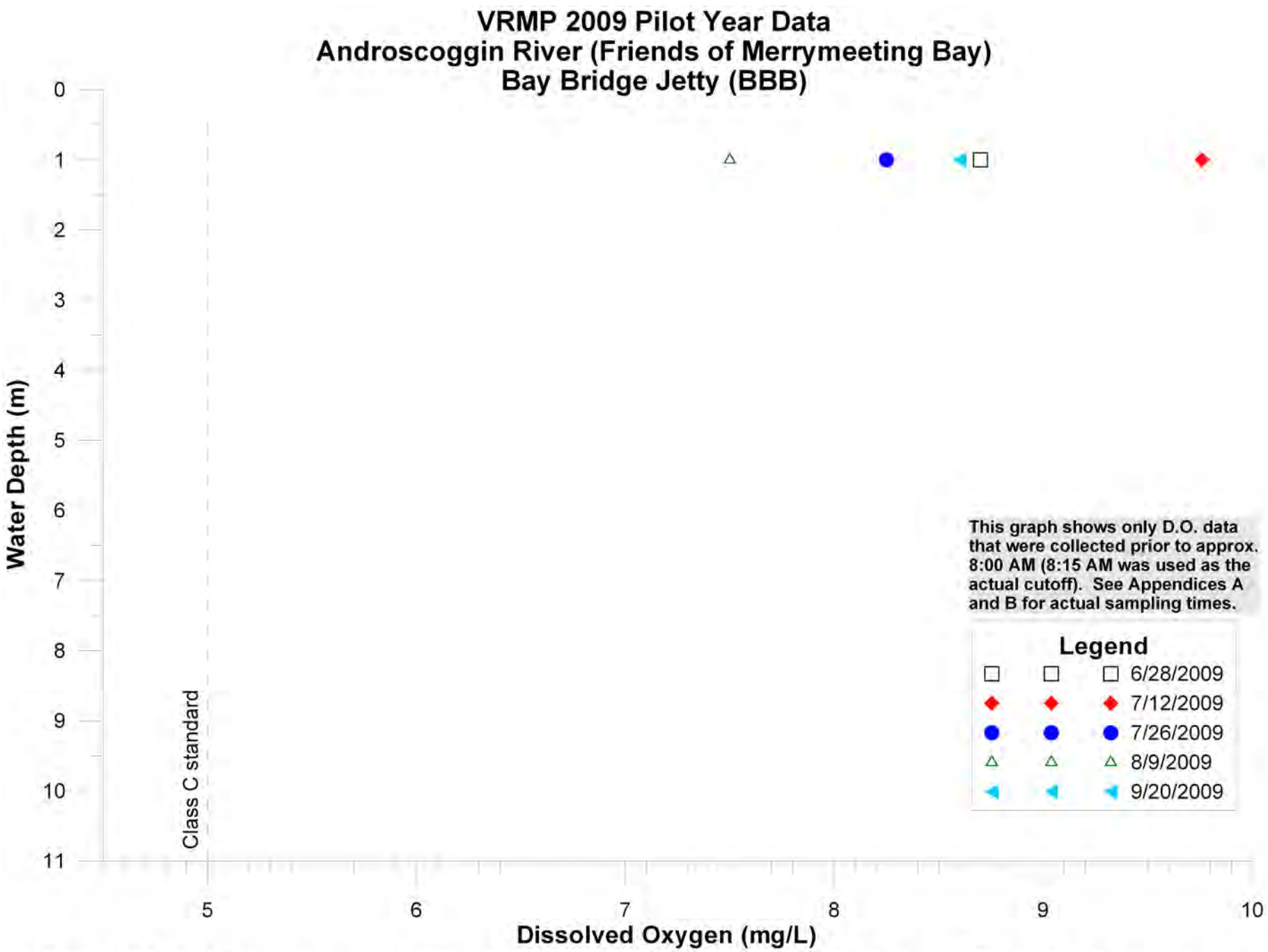


Figure 3-2-5. Early morning dissolved oxygen concentrations at Friends of Merrymeeting Bay site "BBB" on the Androscoggin River.

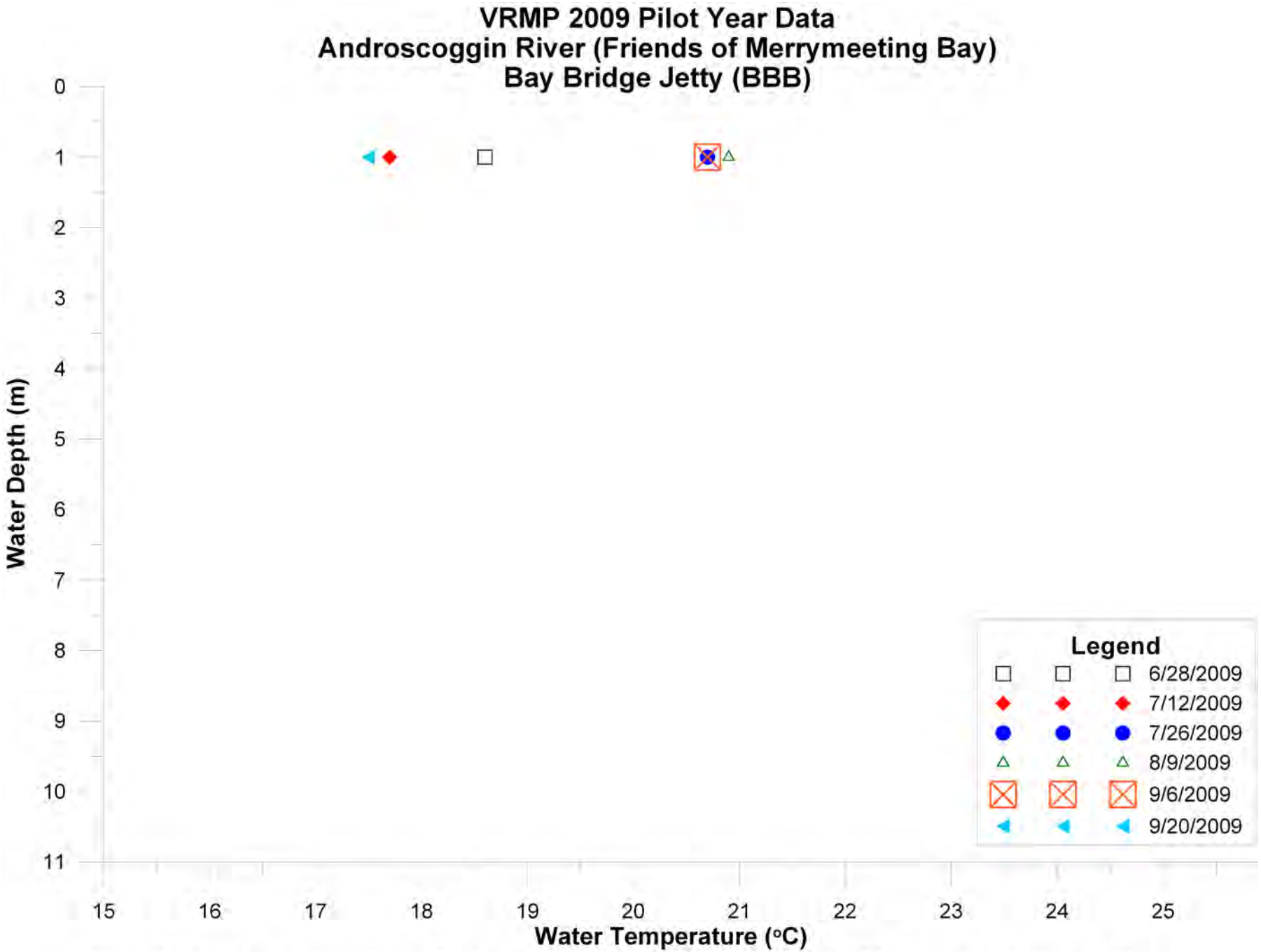


Figure 3-2-6. Water temperatures at Friends of Merrymeeting Bay monitoring site "BBB" on the Androscoggin River.

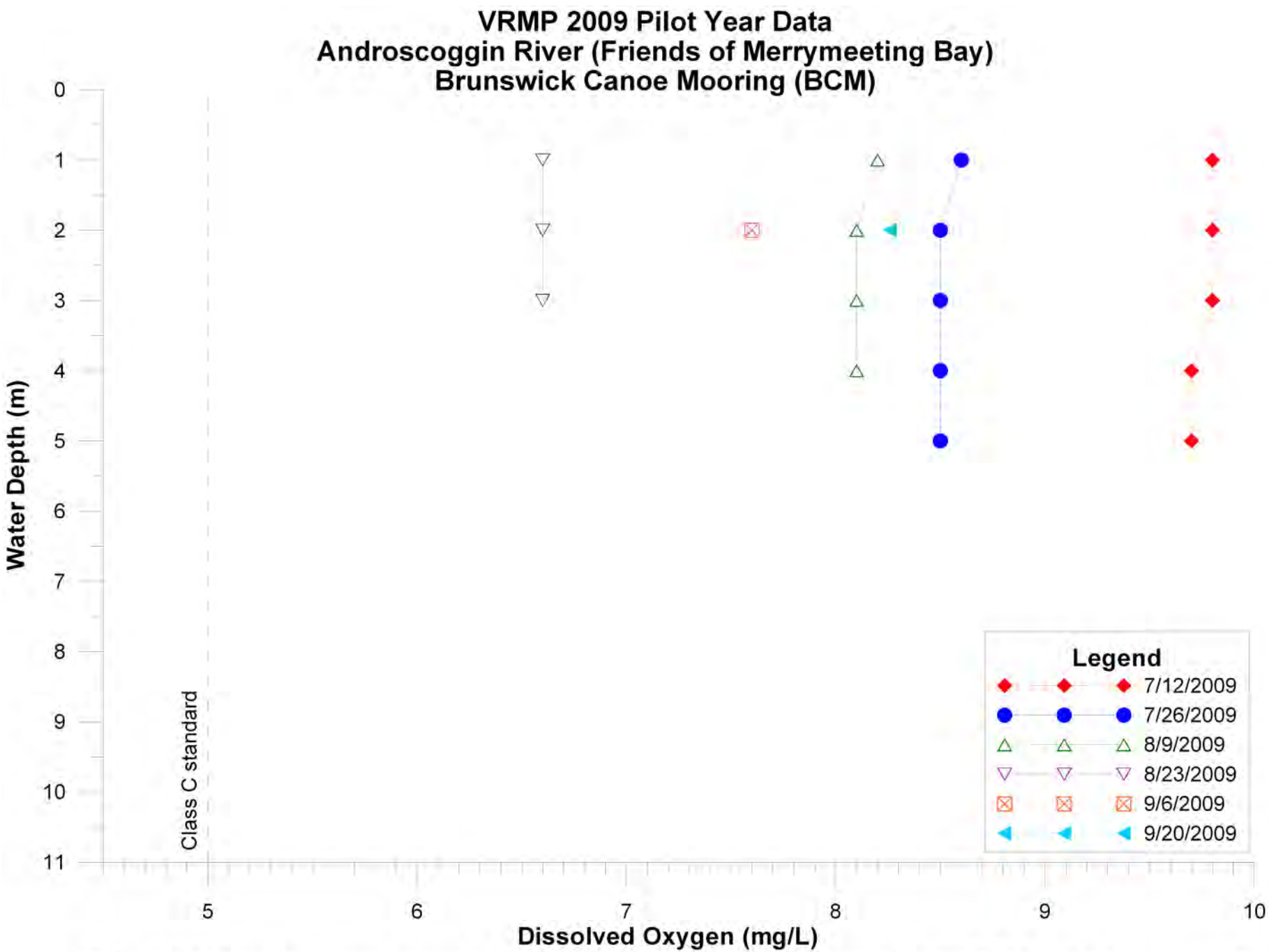


Figure 3-2-7. Dissolved oxygen concentrations at Friends of Merrymeeting Bay monitoring site "BCM" on the Androscoggin River.

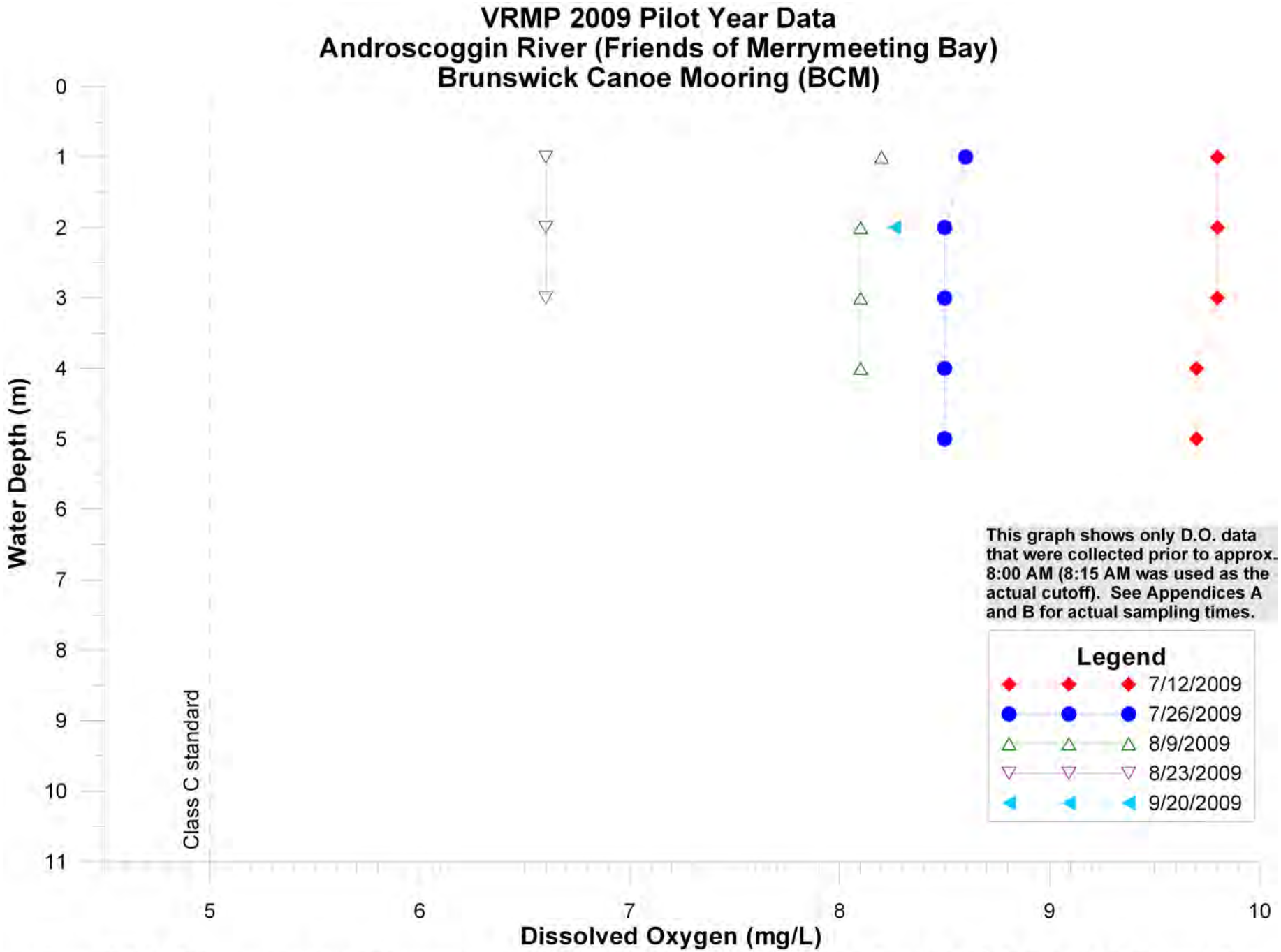


Figure 3-2-8. Early morning dissolved oxygen concentrations at Friends of Merrymeeting Bay site "BCM" on the Androscoggin River.

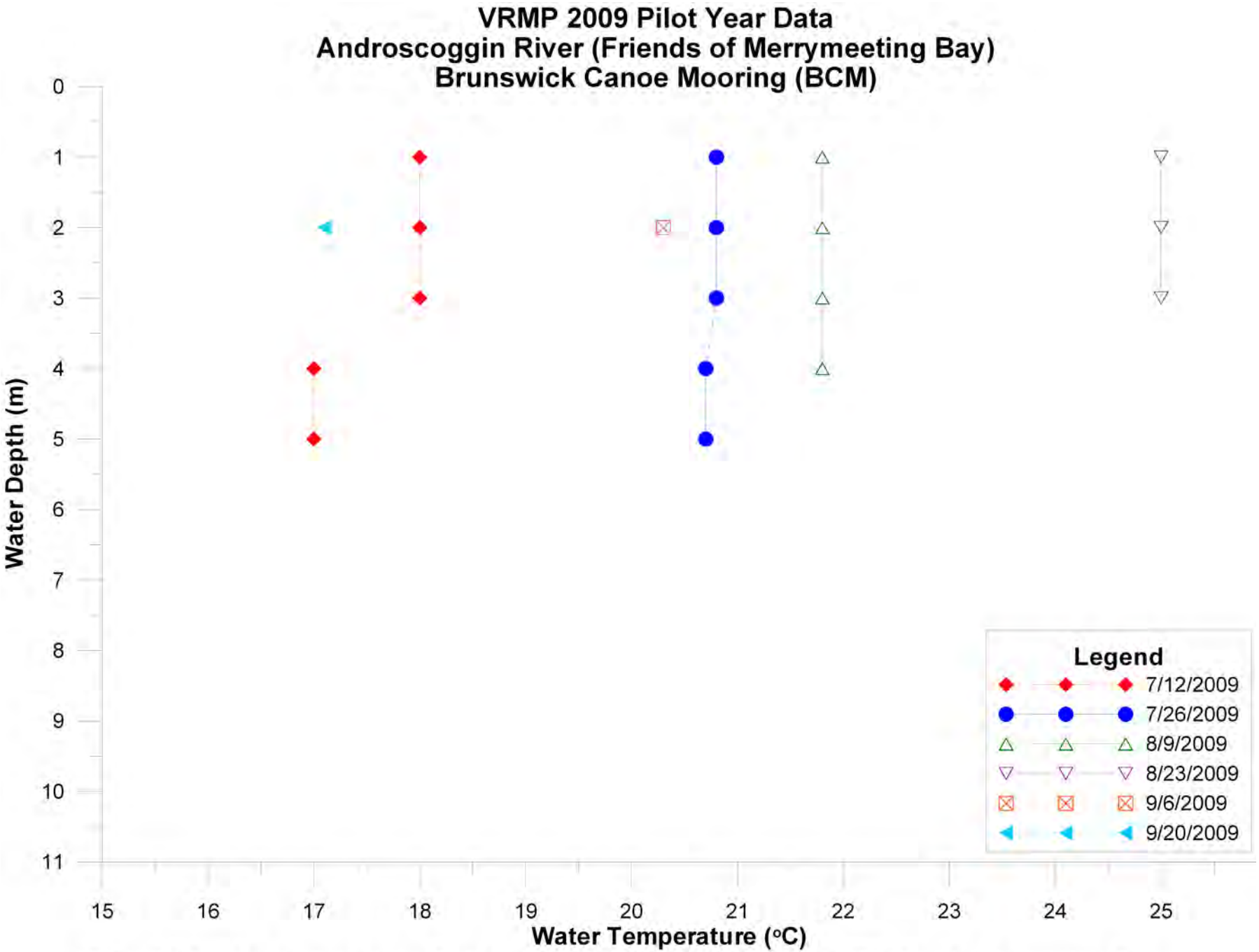


Figure 3-2-9. Water temperatures at Friends of Merrymeeting Bay monitoring site "BCM" on the Androscoggin River.

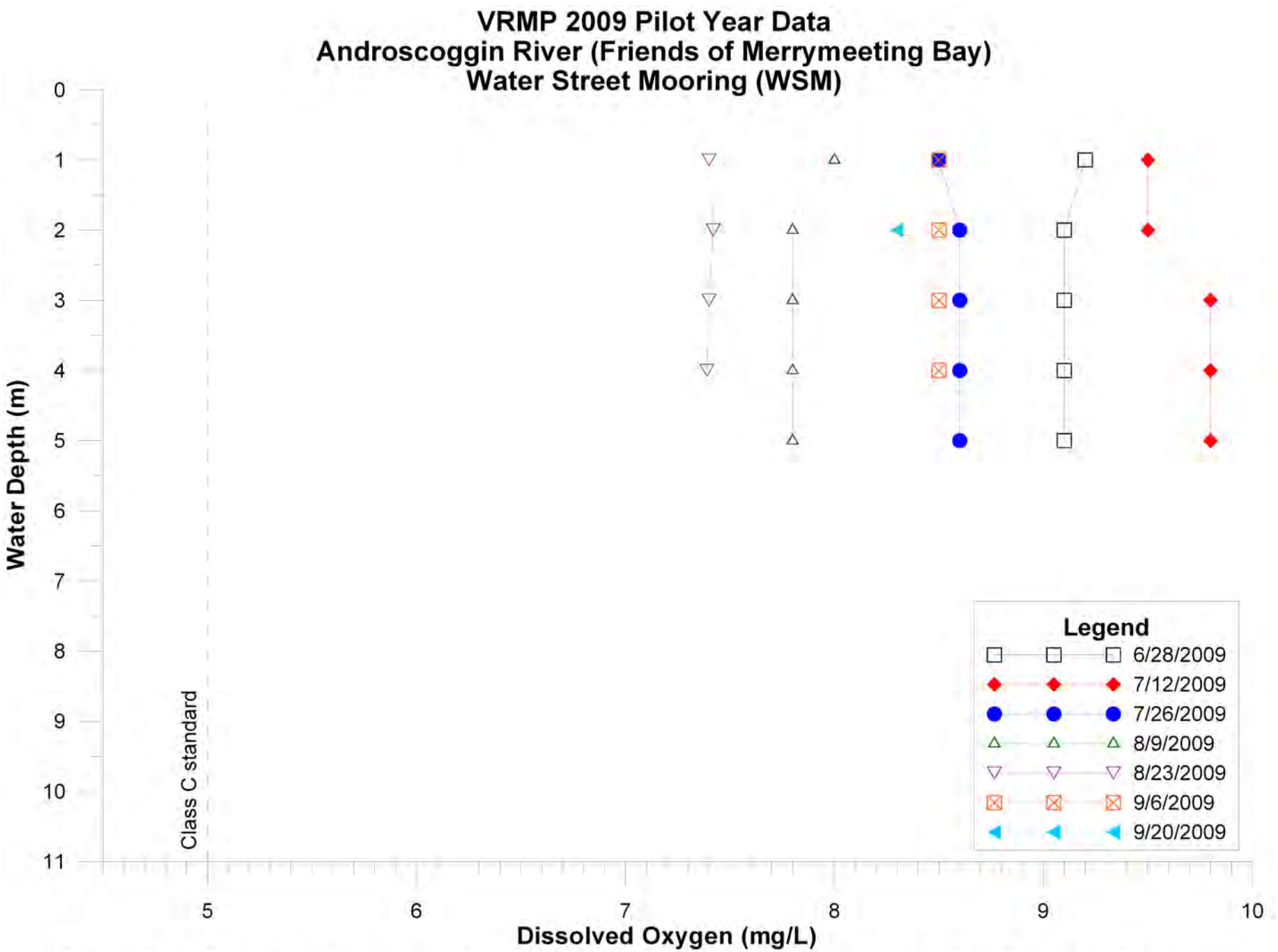


Figure 3-2-10. Dissolved oxygen concentrations at Friends of Merrymeeting Bay monitoring site "WSM" on the Androscoggin River.

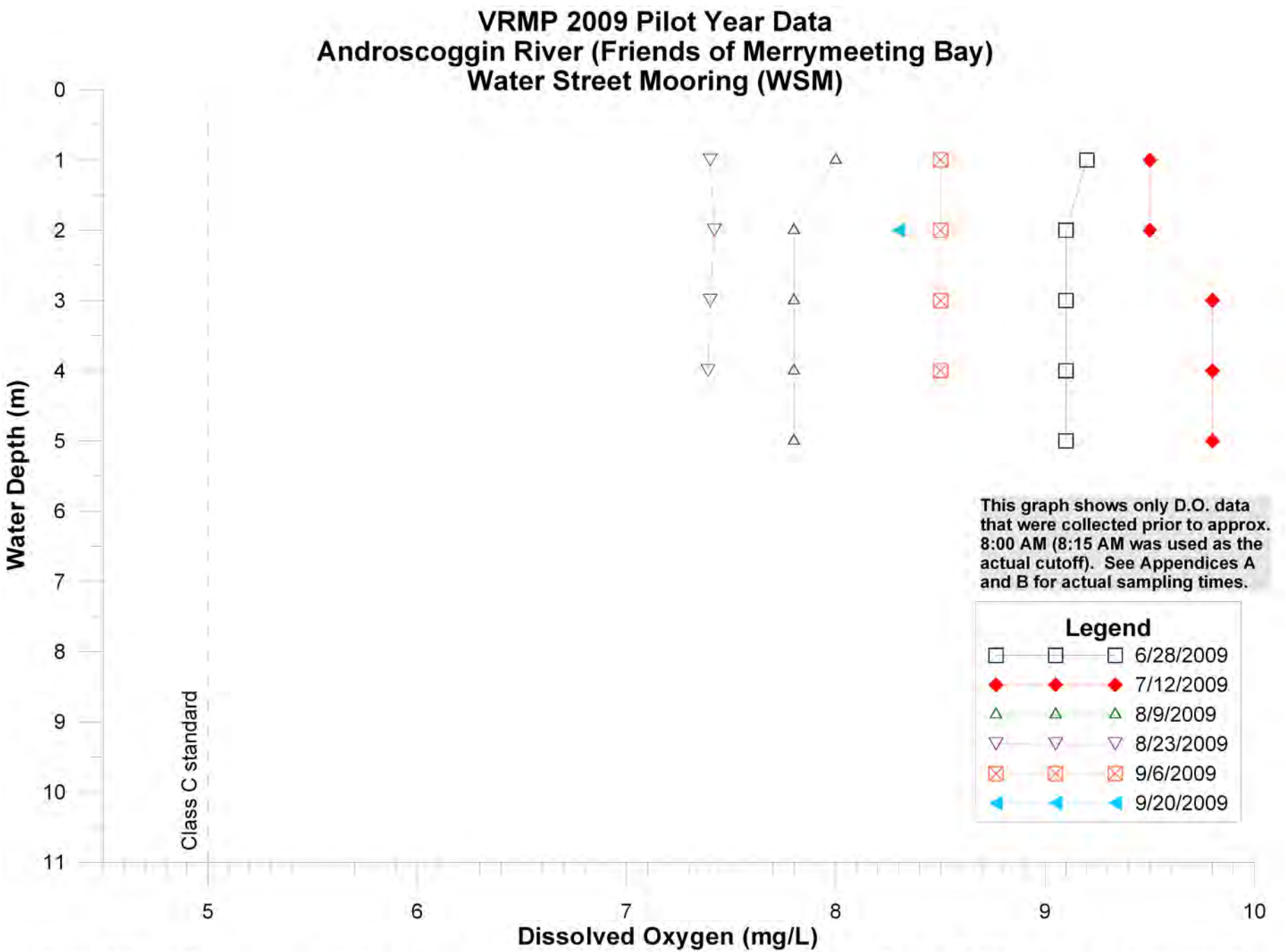


Figure 3-2-11. Early morning dissolved oxygen concentrations at Friends of Merrymeeting Bay site "WSM" on the Androscoggin River.

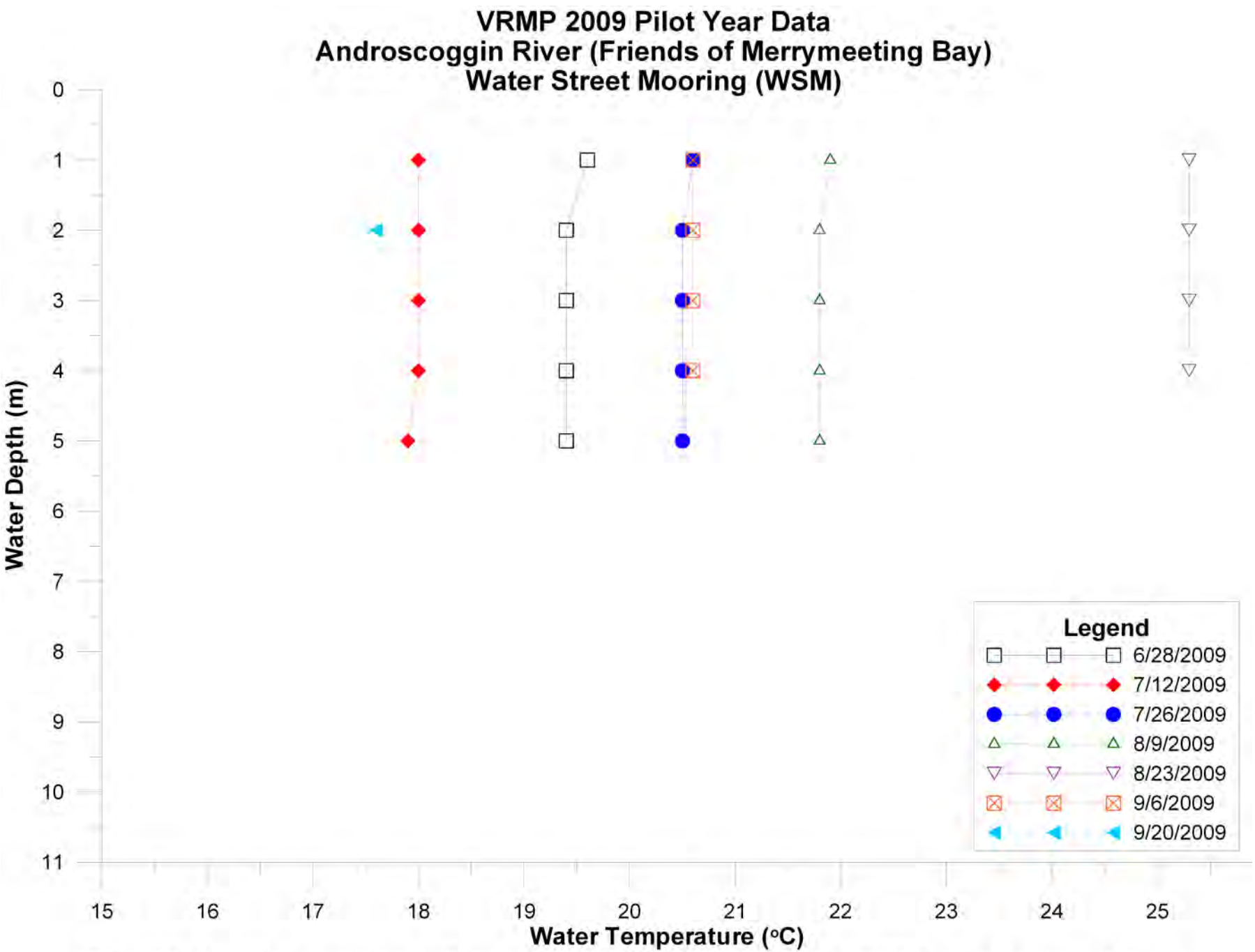


Figure 3-2-12. Water temperatures at Friends of Merrymeeting Bay monitoring site "WSM" on the Androscoggin River.

Section 5-1
Androscoggin River (Friends of Merrymeeting Bay)

Refer to Chapter 4 of this document for information about sampling methods, sampling sites, and quality assurance.

Overview

The lower Androscoggin River is monitored by the Friends of Merrymeeting Bay (FOMB). Friends of Merrymeeting Bay has been in existence since 1975 and focuses on protecting the Merrymeeting Bay watershed through research, education, advocacy and land conservation. They have been monitoring the lower part of the Androscoggin River, tributaries to Merrymeeting Bay and the Bay since 1999. During this time their monitoring has extended up the Androscoggin at times (depending on volunteers) to Livermore Falls. They joined the VRMP in 2009 with an interest in bringing about water classification upgrades when possible. The Androscoggin River is the third largest river in the state. It has a length of 177 miles and drainage area of 3,450 square miles (2,730 miles in Maine).[1] The headwaters are Umbagog Lake in New Hampshire. From there it flows into New Hampshire and then back into Maine through the towns of Gilead and Bethel. It continues flowing through the towns and cities of Bethel, Rumford, Mexico, Dixfield, Jay, Livermore Falls, Lewiston, Auburn, Lisbon, Lisbon Falls, Durham, Brunswick and Topsham where it joins the Kennebec River at Merrymeeting Bay.

The Androscoggin River is assigned Class B from the Maine/New Hampshire boundary to its confluence with the Ellis River. It is assigned Class C from the confluence with the Ellis River to Merrymeeting Bay. The "DEP 2010 [pending approval] Integrated Water Quality Monitoring and Assessment Report" lists segments of the main stem in 3 categories:

- The main stem, upstream of Gulf Island Pond is listed in Category 4-A (Rivers and Streams with Impaired Use, TMDL completed). Causes of impairment are phosphorus, dissolved oxygen, total suspended solids, biological oxygen demand, and algal blooms. Also Category 4-A is Lewiston-Auburn variable mileage, CSO affected. Cause of impairment is E.Coli.
- A number of segments are listed in Category 4-B (Rivers and Streams Impaired by Pollutants-Pollution Control Requirements Expected to Result in Attainment). The cause of non-attainment is dioxin.
- A number of segments are listed in Category 5-D (Rivers and Streams Impaired by Legacy Pollutants). The cause of non-attainment is Polychlorinated biphenyls (PCBs).

The Androscoggin River has a long history of industrial and municipal use over the last 200 years.[1] Beginning in the early 1800s, many dams were constructed for mills in primarily the lower part of the river. By the late 1800s, many textile and lumber mills were in operation from primarily Lewiston to Brunswick. Pulp and paper mills that are still in operation today were established in the late 1800s in New Hampshire, Rumford and Jay. Beginning in the late 1920s, Central Maine Power built hydroelectric dams that impounded much of the river from Lewiston

[1] Maine Rivers Website- Androscoggin River Profile

to Livermore Falls. Some of these uses continue today. "Along its course to the sea, the river is repeatedly dammed. It receives discharges from industrial and municipal sources, as well as polluted runoff from a variety of sources."[2] Specific problems include mill discharges, combined sewer overflows (CSOs), dam impacts (28 dams exist) and historical sediment toxics.

The primary purpose of monitoring performed by FOMB done under the Volunteer River Monitoring Program is to acquire data that will facilitate the water quality classification upgrade of the lower portion of the Androscoggin River. FOMB currently monitors at numerous sites from Merrymeeting Bay upstream to Lewiston. FOMB will continue to gather data from sample stations and through methods not accepted by DEP and for a subset of stations acceptable to DEP. For 2010, three stations met VRMP requirements for sample location and methods. Due to interest in classification upgrade, these stations also met requirements for VRMP "Tier 1" data. Tier 1 has higher level requirements for vertical sampling depth and dissolved oxygen equipment checks. This report provides the data and analysis for the three approved Tier 1 sites. Five additional sites are reported here also. For these sites, both the monitor and equipment were certified by VRMP in 2010. These additional five sites however do not meet the requirements for being approved sites and some methods may not be approved.

Methods

The volunteers monitored the Androscoggin River in 2010 at three Tier 1 approved stations [BBB, WSM, BCM] and five non-approved stations [DBL, BIL, FBD, FPU, PBL] on the main stem. Table 1 provides a list of the sites and Figures 1A-1C are maps of sampling site locations.

Table 1: Sampling Sites

VRMP Site ID	Organization Site Code	Sample Location	Class
Androscoggin River-A231-VRMP	BBB	Bay Bridge Jetty	C
Androscoggin River-A281-VRMP	WSM	Water Street Mooring	C
Androscoggin River-A299-VRMP	BCM	Brunswick Canoe Mooring	C
Androscoggin River-A158-FOMB	DBL	Durham Boat Launch	C
Androscoggin River- A24-FOMB	BIL	Brunswick Interstate Ledges	C
Androscoggin River-A45-FOMB	FBD	Fish Park Down	C
Androscoggin River-A47-FOMB	FPU	Fish Park Up	C
Androscoggin River-A71-FOMB	PBL	Pejepscot Boat Launch	C

[2] Androscoggin River Alliance Website-Androscoggin River slideshow

Figure 1A: Map of All Sampling Sites

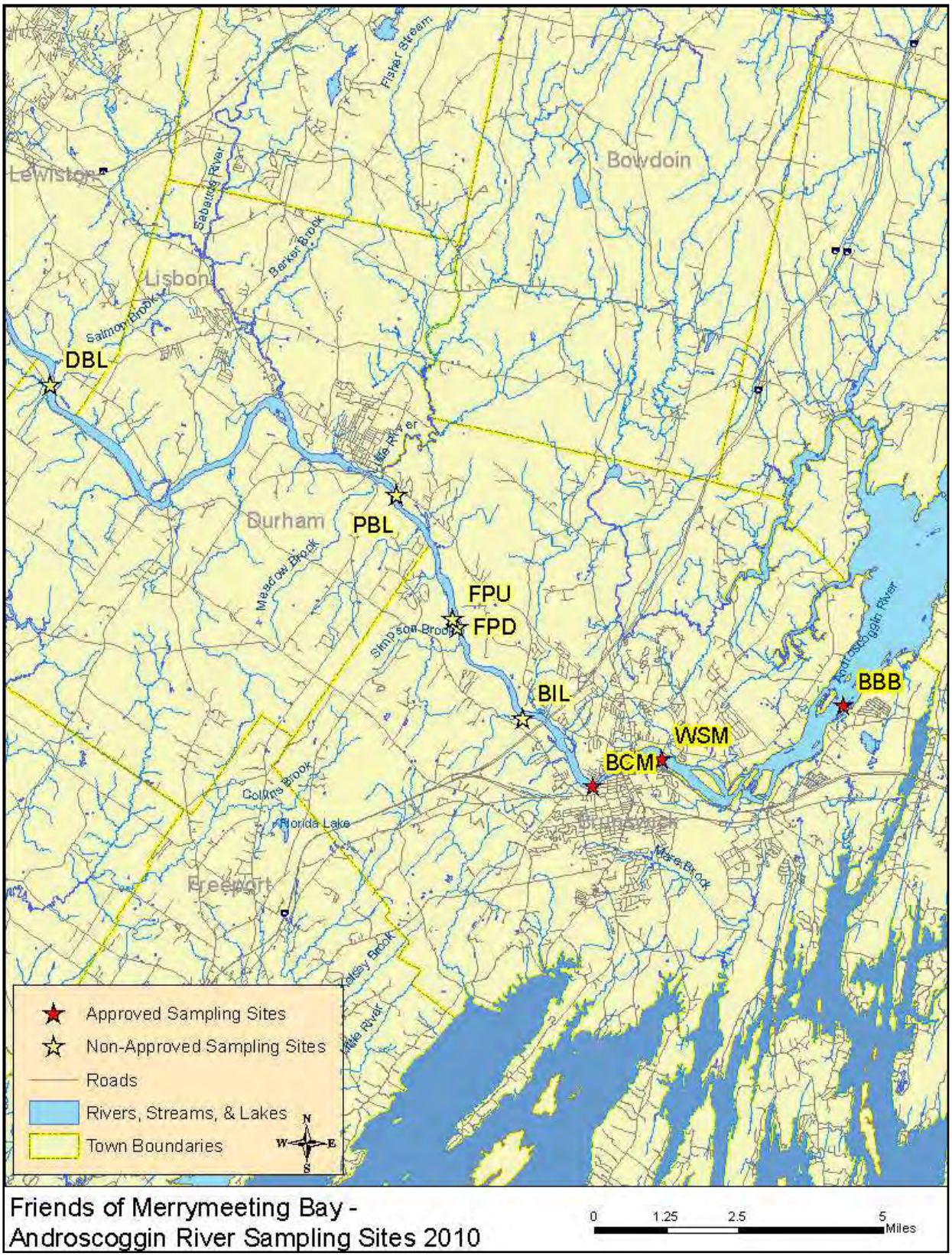
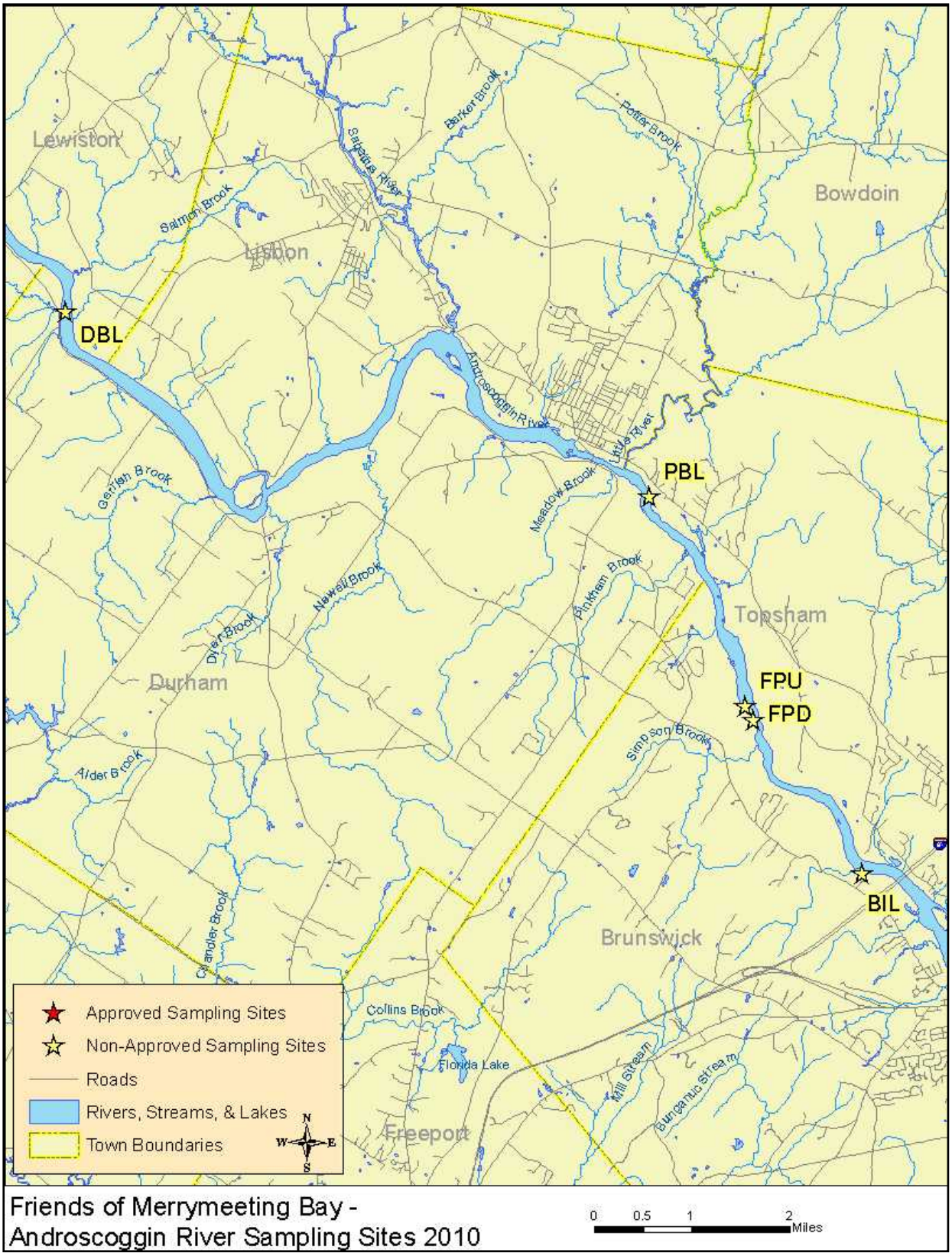


Figure 1B: Map of Approved Sampling Sites

Figure 1C: Map of Non-Approved Sampling Sites



Monitoring was conducted from May through September once per month. At each site, the monitors made direct measurements of water temperature, dissolved oxygen, and specific conductance using a handheld YSI 85 meter. Samples were also collected for E. Coli bacteria. The approved sites used a DEP designed bacteria sampling device (which uses sterile whirl-paks for water collection). Bacteria samples were delivered to Bowdoin College for analysis by FOMB volunteers.

The approved sites met VRMP requirements for sampling laterally and vertically in the river to obtain well-mixed representative samples. Two of the sites were sampled from a boat attached to a mooring and one site from a jetty allowing for representative, well-mixed areas of the river to be monitored. Tier 1 requirements also require that rivers/streams that are ≥ 3 meters in depth sample at 1 meter increments to obtain vertical profiles for dissolved oxygen and temperature.

Results

Dissolved Oxygen

Dissolved oxygen was measured 1-5 times at each of the eight sampling sites. Monitoring occurred from May through September. Class C criteria for dissolved oxygen are a minimum of 5.0 mg/l (milligrams/liter) or 60% saturation. To meet water quality criteria, both concentration and saturation standards must be met. Table 2 and Table 3 provide a summary of dissolved oxygen concentration and percent saturation for each site including minimum, maximum and average values.

Table 2: Dissolved Oxygen Concentration (mg/l) Summary

Site	Approved Site	# of Sampling Events	Minimum Value	Maximum Value	Average Value
BBB	Y	5	6.4	10.7	8.2
WSM	Y	5	6.9	11.0	8.6
BCM	Y	5	7.0	11.3	8.3
DBL	N	1	7.0	7.0	7.0
BIL	N	5	7.3	10.6	8.3
FPD	N	5	7.2	10.6	8.3
FPU	N	5	7.2	10.6	8.3
PBL	N	5	7.3	10.5	8.4

Table 3: Dissolved Oxygen Saturation (%) Summary

Site	Approved Site	# of Sampling Events	Minimum Value	Maximum Value	Average Value
BBB	Y	5	78	99	88
WSM	Y	5	81	103	92
BCM	Y	3	75	88	83
DBL	N	1	82	82	82
BIL	N	5	85	99	89
FPD	N	5	85	99	89
FPU	N	5	85	99	89
PBL	N	5	86	97	90

Dissolved oxygen concentrations measured at Androscoggin River approved sites ranged from 6.4 milligrams/liter to 11.3 mg/l. At Site BBB, the lowest readings occurred in mid-July (6.4 mg/l) and mid-August (7.2 mg/l). Site WSM was similar with lowest readings in mid-July (7.2 mg/l) and mid-August (6.9 mg/l). Site BCM also had its lowest readings in mid-July and mid-August (both 7.0 mg/l). Dissolved oxygen profiles were done at Site WSM at depths from 0-4 meters and at Site BCM at depths from 1-3 meters. Readings were the same or very similar throughout the profile. Dissolved oxygen never dropped below the Class C standard of 5.0 milligrams/liter. Dissolved oxygen percent saturation ranged from 78%-103% and did not go below the Class C standard of 60%.

Dissolved oxygen concentrations measured at Androscoggin River non-approved sites ranged from 7.0 mg/l -10.6 mg/l. Site DBL was sampled only once in mid-August and had the lowest reading for these sites at 7.0 mg/l. Sites BIL, FPU, FPD and PBl were all very similar. The lowest readings all around 7.2-7.3 mg/l occurred during mid-July and mid-August sampling events. Dissolved oxygen never dropped below the Class C standard of 5.0 milligrams/liter. Dissolved oxygen percent saturation ranged from 78%-103%. It did not go below the Class C standard of 60%.

Friends of Merrymeeting Bay volunteers do a good job of getting out early in the morning to sample. All sampling occurred by 8:15 am or earlier. This is the recommended time to sample because dissolved oxygen is lowest at this time of day. Dissolved oxygen is also affected by flow conditions. During high flow conditions, more oxygen is added to the river from the atmosphere, as the water is more turbulent and there is more opportunity for reaeration. If flow during the summer months is higher or lower than generally normal, then this will affect the dissolved oxygen.

Water Temperature

Temperature was also measured 1-5 times at each of the eight sampling sites. Monitoring occurred from May through September. Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23°C maximum and 19°C weekly average) or 0.3°C (0.5°F) above the temperature that would naturally occur outside a mixing zone

established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4°F (2.2°C) or more than 1.5°F (0.8°C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85°F (29°C) at any point outside a mixing zone established by the Board of Environmental Protection.

Table 4 provides a summary of temperature values for each site including minimum, maximum and average values.

Table 4: Temperature (° Celsius) Summary

Site	Approved Site	# of Sampling Events	Minimum Value	Maximum Value	Average Value
BBB	Y	5	12.7	25.1	19.8
WSM	Y	5	12.2	25.3	19.8
BCM	Y	5	12.4	25.3	19.8
DBL	N	1	22.6	22.6	22.6
BIL	N	5	12.4	25.1	19.8
FPD	N	5	12.2	25.1	19.8
FPU	N	5	12.3	25.2	19.6
PBL	N	5	11.9	24.4	19.4

Temperatures measured at all the Androscoggin River sites ranged from 11.9˚-25.3˚ C (Celsius). All of the sites were very similar. The lowest values occurred in May with temperatures around 12˚. In June, temperatures ranged from 18-19˚ at all the sites. Temperatures became high in July and August ranging from 23-25˚. In September, temperatures dropped back down to 18-19˚. Temperature profiles were done at Site WSM at depths from 0-4 meters and at Site BCM at depths from 1-3 meters. Readings were the same or very similar throughout the profile.

Specific Conductance

Specific conductance was measured 1-5 times at each of the eight sampling sites as well. Monitoring occurred from June through September. Specific conductance is related to the amount of dissolved materials in the water. While there are no numerical standards, a relationship exists between conductivity and chloride which has numerical criteria. In general, streams located in urban areas tend to have high specific conductance due to polluted urban stormwater runoff. This may also in large part be due to salt buildup in surface and groundwater from road maintenance practices. Also, discharges from pulp and paper mills upstream measurably increase the conductivity of the river. Table 5 provides a summary of specific conductance values for each site including minimum, maximum and average values.

Table 5: Specific Conductance (micro-ohms/centimeter) Summary

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	4	54	115	87
WSM	Y	4	54	112	103
BCM	Y	3	41	115	75
DBL	N	1	95	95	95
BIL	N	5	55	119	89
FPD	N	4	78	118	97
FPU	N	5	55	118	89
PBL	N	5	58	116	87

Specific conductance at all the sites ranged from 54-115 µS/cm, which are elevated from natural background values, reflecting upstream point and non-point source discharges. The sites were all very similar with minimum ranging from 41-78 (exclusive of Site DBL which was only sampled once) and maximum ranging from 112-118 µS/cm, which shows that sources are farther upstream.

Bacteria

E. Coli bacteria was also measured 1-5 times at each of the eight sampling sites. Monitoring occurred from May through September. Most if not all samples were taken during baseflow conditions. Enterococcus bacteria are used as the indicator organism for marine waters and E. Coli bacteria are used for freshwaters. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms including bacteria and viruses that can cause gastrointestinal illnesses. Class C criteria for bacteria are as follows: "Between May 15th and September 30th, the number of Escherichia Coli of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml."

Table 6 provides a summary of bacteria values for each site including minimum, maximum and geometric means. Geometric means are calculated instead of averages because measures like bacteria often have a few very large values that strongly influence the mean and make it a poor predictor.

Table 6: Bacteria Most Probable Number (MPN) Summary

Site	Bacteria Type	# of Samples	Minimum Value	Maximum Value	Geometric Mean
BBB	E. Coli	5	8	90	26
WSM	E. Coli	5	9	86	26
BCM	E. Coli	4	20	123	38
DBL	E. Coli	1	22	22	22
BIL	E. Coli	5	7	148	28
FPD	E. Coli	4	5	160	38
FPU	E. Coli	5	5	152	27
PBL	E. Coli	5	6	225	35

None of the sampling sites exceeded the instantaneous criterion or geometric mean criterion. The non-approved sites generally had higher individual values. This may be due to a difference in method used by volunteers at the approved sites versus the non-approved sites.

Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Androscoggin River sites monitored by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

- Point source pollution (pollution originating from a direct discharge including wastewater treatment plant discharge, combined sewer overflows and overboard discharges).
- Nonpoint source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, septic systems, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry.
- Ponds and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than free-flowing waters)
- Natural effects of wetlands (such as contributing waters to a stream/river that have low dissolved oxygen levels due to the decomposition of large amounts of organic matter, respiration of abundant plant matter, and low re-aeration rates that is characteristic of many wetlands).

The following are recommendations for future monitoring:

- Most if not all the sampling events were done during baseflow conditions. If possible, it might be worthwhile trying to capture 1 or 2 stormflow events to see how bacteria levels compare to baseflow. This might be difficult however, since the volunteers sample once a month on a set schedule in order to coordinate with the bacteria lab analysis.
- Continue monitoring at all stations (or at least a subset of sites) to develop a long term trend database.

Appendix A-1. 2010 water quality data for "Approved" and "Non-Approved" sites. Non-Approved sites do not yet meet official VRMP sample location criteria and/or require further inspection and review.
* Sampling depths are only reported for Tier 1 VRMP sites.
** "N" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "TSS" = total suspended solids"
Refer to Appendix A-2 for observational data and quality assurance/quality control (QA/QC) notes.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp. (DEG C)	D.O. % Sat.	D.O. (MG/L)	Spec. Cond. (US/CM)	Salinity(PPTH)	Turbidity (NTU)	E Coli Bacteria (MPN/ 100ML)
Androscoggin River - Friends of Merrymeeting Bay (Approved Sites)													
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	5/15/2010	8:00 AM	N						54			13.4
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	5/15/2010	8:00 AM	N	2.0	M	12.7	99.5	10.66				
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	6/13/2010	7:15 AM	N						84.9			110.6
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	6/13/2010	7:15 AM	N	1.0	M	18.7	87.8	8.23				
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	6/13/2010	7:15 AM	D									69.7
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	7/11/2010	7:00 AM	N						95			72.4
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	7/11/2010	7:00 AM	N	2.0	M	25.1	77.9	6.45				
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	8/14/2010	7:10 AM	N									8.4
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	8/14/2010	7:10 AM	N	1.0	M	23.8	85	7.2				
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	9/19/2010	7:55 AM	N						114.6			17.5
BAY BRIDGE JE	ANDROSCOGGIN RIVER - A231 - VRMP	9/19/2010	7:55 AM	N	1.0	M	18.6	92	8.48				
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	5/15/2010	7:20 AM	N						53.6			8.6
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	5/15/2010	7:20 AM	N	1.0	M	12.2	102.7	11				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	5/15/2010	7:20 AM	N	2.0	M	12.3	102.7	11				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	5/15/2010	7:20 AM	N	3.0	M	12.2	102.5	11.01				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	5/15/2010	7:20 AM	N	4.0	M	12.2	102.5	11.03				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	6/13/2010	8:00 AM	N						79.8			28.8
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	6/13/2010	8:00 AM	N	.0	M	19	100.1	9.3				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	6/13/2010	8:00 AM	N	1.0	M	18.9	100.1	9.3				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	6/13/2010	8:00 AM	N	2.0	M	18.9	100.1	9.3				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	6/13/2010	8:00 AM	N	3.0	M	18.9	100.1	9.3				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	6/13/2010	8:00 AM	N	4.0	M	18.9	100.1	9.28				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	7/11/2010	8:00 AM	N						93.4			52.9
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	7/11/2010	8:00 AM	N	.0	M	25.3	87	7.2				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	7/11/2010	8:00 AM	N	1.0	M	25.3	87.3	7.17				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	7/11/2010	8:00 AM	N	2.0	M	25.3	87	7.19				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	7/11/2010	8:00 AM	N	3.0	M	25.3	87	7.2				
WATER STREE	ANDROSCOGGIN RIVER - A281 - VRMP	7/11/2010	8:00 AM	N	4.0	M	25.3	87	7.19				

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp. (DEG C)	D.O. % Sat.	D.O. (MG/L)	Spec. Cond. (US/CM)	Salinity(PPTH)	Turbidity (NTU)	E Coli Bacteria (MPN/ 100ML)
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	8/14/2010	8:00 AM	N									9.7
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	8/14/2010	8:00 AM	N	.0	M	23.8	82.1	7				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	8/14/2010	8:00 AM	N	1.0	M	23.7	81.5	6.9				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	8/14/2010	8:00 AM	N	2.0	M	23.7	81.5	6.9				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	8/14/2010	8:00 AM	N	3.0	M	23.7	82	7				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	8/14/2010	8:00 AM	N	4.0	M	23.7	81.5	6.9				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	9/19/2010	7:10 AM	N						112.3			86
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	9/19/2010	7:10 AM	N	.0	M	18.7	90.4	8.4				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	9/19/2010	7:10 AM	N	1.0	M	18.7	89.8	8.4				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	9/19/2010	7:10 AM	N	2.0	M	18.7	89.8	8.4				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	9/19/2010	7:10 AM	N	3.0	M	18.7	89.8	8.4				
WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	9/19/2010	7:10 AM	N	4.0	M	18.7	89.8	8.4				
BRUNSWICK CANOE MOORING (BCM)	ANDROSCOGGIN RIVER - A299 - VRMP	5/16/2010	8:00 AM	N						40.9			8.5
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	5/16/2010	8:00 AM	N	1.0	M	12.4		11.28				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	5/16/2010	8:00 AM	N	2.0	M	12.4		11.24				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	5/16/2010	8:00 AM	N	3.0	M	12.4		11.22				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	6/13/2010	8:00 AM	N						70.5			20.1
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	6/13/2010	8:00 AM	N	1.0	M	19	88.5	8.25				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	6/13/2010	8:00 AM	N	2.0	M	19	88.5	8.25				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	7/11/2010	8:00 AM	N									41.7
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	7/11/2010	8:00 AM	N	1.0	M	25.3	85	7				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	7/11/2010	8:00 AM	N	2.0	M	25.3	85	7				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	7/11/2010	8:00 AM	D	1.0	M	25.3	85	7				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	8/15/2010	8:15 AM	N									19.7
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	8/15/2010	8:15 AM	N	1.0	M	23.8	75.4	7.04				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	8/15/2010	8:15 AM	N	2.0	M	23.8	75.5	7.05				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	8/15/2010	8:15 AM	N	3.0	M	23.8	75.5	7.05				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	9/19/2010	8:00 AM	N						114.6			143.9
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	9/19/2010	8:00 AM	N	1.0	M	18.6		8.1				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	9/19/2010	8:00 AM	N	2.0	M	18.6		8.1				
BRUNSWICK CA	ANDROSCOGGIN RIVER - A299 - VRMP	9/19/2010	8:00 AM	D									101.7
Androscoggin River - Friends of Merrymeeting Bay (Non-Approved Sites)													
Durham Boat Launch (DBL)	ANDROSCOGGIN RIVER - A158 - FOMB	8/15/2010	7:10 AM	N						95.5			19.7
DBL	ANDROSCOGGIN RIVER - A158 - FOMB	8/15/2010	7:10 AM	N	1.0	M	22.6	81.6	7				
DBL	ANDROSCOGGIN RIVER - A158 - FOMB	8/15/2010	7:10 AM	D						95.5			24.6

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp. (DEG C)	D.O. % Sat.	D.O. (MG/L)	Spec. Cond. (US/CM)	Salinity(PPTH)	Turbidity (NTU)	E Coli Bacteria (MPN/ 100ML)
DBL	ANDROSCOGGIN RIVER - A158 - FOME	8/15/2010	7:10 AM	D	1.0	M	22.6	81.6	7				
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - FOMB	5/16/2010	8:15 AM	N						55.3			8.5
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	5/16/2010	8:15 AM	N	1.0	M	12.4	99.4	10.6				
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	6/13/2010	8:10 AM	N						79.8			16.9
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	6/13/2010	8:10 AM	N	1.0	M	18.9	89.3	8.3				
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/11/2010	8:10 AM	N						94.1			81.6
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/11/2010	8:10 AM	N	1.0	M	25.1	88.3	7.3				
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/11/2010	8:10 AM	D						94.1			159.7
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/11/2010	8:10 AM	D	1.0	M	25.1	88.3	7.3				
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/15/2010	8:15 AM	N						99.5			7.3
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/15/2010	8:15 AM	N	1.0	M	23.9	85.3	7.3				
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	9/19/2010	7:45 AM	N						118.6			148.3
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	9/19/2010	7:45 AM	N	1.0	M	18.7	84.6	7.9				
Fish Park Down (FPD)	ANDROSCOGGIN RIVER - A45 - FOMB	5/16/2010	7:55 AM	N						55.8			5.2
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	5/16/2010	7:55 AM	N	1.0	M	12.2	98.8	10.6				
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	5/16/2010	7:55 AM	D									5.2
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	6/13/2010	7:50 AM	N						78.4			17.5
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	6/13/2010	7:50 AM	N	1.0	M	19	89.4	8.3				
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/11/2010	7:40 AM	N						93.8			160.7
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/11/2010	7:40 AM	N	1.0	M	25.1	89.5	7.4				
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	8/15/2010	7:55 AM	N						99.8			8.6
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	8/15/2010	7:55 AM	N	1.0	M	24	85	7.2				
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	9/19/2010	7:17 AM	N						117.8			133.3
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	9/19/2010	7:17 AM	N	1.0	M	18.7	85	7.9				
Fish Park Up (FBU)	ANDROSCOGGIN RIVER - A47 - FOMB	5/16/2010	7:45 AM	N						54.8			5.2
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	5/16/2010	7:45 AM	N	1.0	M	12.3	98.6	10.6				
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/13/2010	7:35 AM	N						78.4			18.5
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/13/2010	7:35 AM	N	1.0	M	18.9	89.3	8.3				
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/13/2010	7:35 AM	D						78.4			16.1
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/13/2010	7:35 AM	D	1.0	M		89.3	8.3				
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	7/11/2010	7:20 AM	N						93.3			91
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	7/11/2010	7:20 AM	N	1.0	M	25.2	89	7.3				
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	8/15/2010	7:45 AM	N						99.6			12.1
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	8/15/2010	7:45 AM	N	1.0	M	22.9	85	7.2				
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	9/19/2010	7:05 AM	N						118.3			152.9
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	9/19/2010	7:05 AM	N	1.0	M	18.7	85	8				

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp. (DEG C)	D.O. % Sat.	D.O. (MG/L)	Spec. Cond. (US/CM)	Salinity(PPTH)	Turbidity (NTU)	E Coli Bacteria (MPN/ 100ML)
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - FOMB	5/16/2010	7:20 AM	N						58.5			6.3
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/16/2010	7:20 AM	N	1.0	M	11.9	97.4	10.5				
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	6/13/2010	6:55 AM	N						72.6			36.9
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	6/13/2010	6:55 AM	N	1.0	M	18.3	88.4	8.3				
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	7/11/2010	7:00 AM	N						91.1			224.7
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	7/11/2010	7:00 AM	N	1.0	M	24.4	89.2	7.4				
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	8/15/2010	6:50 AM	N						99.2			18.7
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	8/15/2010	6:50 AM	N	1.0	M	23.9	86.3	7.3				
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/19/2010	6:15 AM	N						115.8			42.8
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/19/2010	6:15 AM	N	1.0	M	18.5	89.3	8.3				
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/19/2010	6:15 AM	D									74.3
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/19/2010	6:15 AM	D	1.0	M	18.5	89.3	8.3				

Appendix A-2. 2010 observational data and quality assurance/quality control (QA/QC) notes for "approved" and "non-approved" sites.
** "N" = normal environmental sample; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "TSS" = total suspended solids
Refer to Appendix A-1 for water quality data

Organization Site Code	VRMP Site ID	Date	Time	Sample Type Qualifier	Flow	Stage	Air Temp. (DEG C)	Sample Location	Current Weather	Air Condi-tion	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
Androscoggin River - Friends of Merrymeeting Bay (Approved Sites)															
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	5/15/2010	8:00 AM	N	BASEF	MEDIUM	14	BRIDGE	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	5/15/2010	8:00 AM	N	BASEF	MEDIUM		BRIDGE	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	6/13/2010	7:15 AM	N			18.3	WADING	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	6/13/2010	7:15 AM	N				WADING	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	6/13/2010	7:15 AM	D				WADING							WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	7/11/2010	7:00 AM	N	BASEFLOW		22.7	WADING	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	7/11/2010	7:00 AM	N	BASEFLOW			WADING	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	8/14/2010	7:10 AM	N	BASEFLOW		18.2	WADING	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	8/14/2010	7:10 AM	N	BASEFLOW			WADING	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	9/19/2010	7:55 AM	N			13.1	WADING	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	WADEABLE/MID-DEPTH
BAY BRIDGE J	ANDROSCOGGIN RIV	9/19/2010	7:55 AM	N				WADING	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	WADEABLE/MID-DEPTH
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	5/15/2010	7:20 AM	N	BASEF	MEDIUM	14	BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	5/15/2010	7:20 AM	N	BASEF	MEDIUM		BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	5/15/2010	7:20 AM	N	BASEF	MEDIUM		BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	5/15/2010	7:20 AM	N	BASEF	MEDIUM		BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	5/15/2010	7:20 AM	N	BASEF	MEDIUM		BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N			18.3	BOAT	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N				BOAT	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N				BOAT	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N				BOAT	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N				BOAT	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N				BOAT	CLOUDY	CALM	PARTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEFLOW		22.7	BOAT	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEFLOW			BOAT	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEFLOW			BOAT	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEFLOW			BOAT	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEFLOW			BOAT	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEFLOW			BOAT	CLOUDY	BREEZE	MOSTLY CLOUDY	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	8/14/2010	8:00 AM	N	BASEFLOW		18.2	BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	8/14/2010	8:00 AM	N	BASEFLOW			BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	8/14/2010	8:00 AM	N	BASEFLOW			BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	8/14/2010	8:00 AM	N	BASEFLOW			BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	8/14/2010	8:00 AM	N	BASEFLOW			BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	8/14/2010	8:00 AM	N	BASEFLOW			BOAT	CLEAR	STRONG	CLEAR	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	9/19/2010	7:10 AM	N			13.1	BOAT	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	9/19/2010	7:10 AM	N				BOAT	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	9/19/2010	7:10 AM	N				BOAT	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	9/19/2010	7:10 AM	N				BOAT	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	9/19/2010	7:10 AM	N				BOAT	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
WATER STREE	ANDROSCOGGIN RIV	9/19/2010	7:10 AM	N				BOAT	LIGHT RAI	CALM	LIGHT RAIN	RUN		MEDIUM	NON-WADEABLE/MID-DEPTH
BRUNSWICK CANOE MOORING (BCM)	ANDROSCOGGIN RIVER - A299 - VRMP	5/16/2010	8:00 AM	N			15.9	BOAT		CALM	CLEAR				CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.

Organization Site Code	VRMP Site ID	Date	Time	Sample Type Qualifier	Flow	Stage	Air Temp. (DEG C)	Sample Location	Current Weather	Air Condi-tion	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
BRUNSWICK C	ANDROSCOGGIN RIV	5/16/2010	8:00 AM	N				BOAT		CALM	CLEAR				NO OBSERVATIONAL DATA. DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	5/16/2010	8:00 AM	N				BOAT		CALM	CLEAR				CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	5/16/2010	8:00 AM	N				BOAT		CALM	CLEAR				CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N		LOW	18	BOAT	CLOUDY, PARTLY C		CLEAR, PARTLY CL	RUN		DARKLY	DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N		LOW		BOAT	CLOUDY, PARTLY C		CLEAR, PARTLY CL	RUN		DARKLY	DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	6/13/2010	8:00 AM	N		LOW		BOAT	CLOUDY, PARTLY C		CLEAR, PARTLY CL	RUN		DARKLY	DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEF	LOW	23.8	BOAT	PARTLY C	BREEZE	MOSTLY CLOUDY, F	RUN		DARKLY STAINED	
BRUNSWICK C	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEF	LOW		BOAT	PARTLY C	BREEZE	MOSTLY CLOUDY, F	RUN		DARKLY STAINED	
BRUNSWICK C	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	N	BASEF	LOW		BOAT	PARTLY C	BREEZE	MOSTLY CLOUDY, F	RUN		DARKLY STAINED	
BRUNSWICK C	ANDROSCOGGIN RIV	7/11/2010	8:00 AM	D				BOAT							
BRUNSWICK C	ANDROSCOGGIN RIV	8/15/2010	8:15 AM	N	BASEF	LOW	18.8	BOAT	CLEAR		CLEAR	RUN			
BRUNSWICK C	ANDROSCOGGIN RIV	8/15/2010	8:15 AM	N	BASEF	LOW		BOAT	CLEAR		CLEAR	RUN			
BRUNSWICK C	ANDROSCOGGIN RIV	8/15/2010	8:15 AM	N	BASEF	LOW		BOAT	CLEAR		CLEAR	RUN			
BRUNSWICK C	ANDROSCOGGIN RIV	8/15/2010	8:15 AM	N	BASEF	LOW		BOAT	CLEAR		CLEAR	RUN			
BRUNSWICK C	ANDROSCOGGIN RIV	9/19/2010	8:00 AM	N	BASEF	LOW	17.9	BOAT	CLEAR	CALM	CLEAR	RUN		DARKLY	DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	9/19/2010	8:00 AM	N	BASEF	LOW		BOAT	CLEAR	CALM	CLEAR	RUN		DARKLY	DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	9/19/2010	8:00 AM	N	BASEF	LOW		BOAT	CLEAR	CALM	CLEAR	RUN		DARKLY	SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
BRUNSWICK C	ANDROSCOGGIN RIV	9/19/2010	8:00 AM	D				BOAT							DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE (ANALYST PORTION). NO VALUE FOR D.O. IN % SATURATION. NO VERTICAL DEPTH DESCRIPTION FOR CONDUCTIVITY.
Androscoggin River - Friends of Merrymeeting Bay (Non-Approved Sites)															
Durham Boat Launch (DBL)	ANDROSCOGGIN RIVER - A158 - FOMB	8/15/2010	7:10 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
DBL	ANDROSCOGGIN RIV	8/15/2010	7:10 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
DBL	ANDROSCOGGIN RIV	8/15/2010	7:10 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE

Organization Site Code	VRMP Site ID	Date	Time	Sample Type Qualifier	Flow	Stage	Air Temp. (DEG C)	Sample Location	Current Weather	Air Condi-tion	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
DBL	ANDROSCOGGIN RIV	8/15/2010	7:10 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - FOMB	5/16/2010	8:15 AM	N				BANK	CLEAR	CALM	CLEAR, PARTLY CLOUDY, MOSTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
BIL	ANDROSCOGGIN RIV	5/16/2010	8:15 AM	N				BANK	CLEAR	CALM	CLEAR, PARTLY CLOUDY, MOSTLY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
BIL	ANDROSCOGGIN RIV	6/13/2010	8:10 AM	N			17.7	BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
BIL	ANDROSCOGGIN RIV	6/13/2010	8:10 AM	N				BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
BIL	ANDROSCOGGIN RIV	7/11/2010	8:10 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NOT APPROVED SITE. NON-WADEABLE/3 FT BELOW
BIL	ANDROSCOGGIN RIV	7/11/2010	8:10 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NOT APPROVED SITE. NON-WADEABLE/3 FT BELOW
BIL	ANDROSCOGGIN RIV	7/11/2010	8:10 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NOT APPROVED SITE. NON-WADEABLE/3 FT BELOW
BIL	ANDROSCOGGIN RIV	7/11/2010	8:10 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NOT APPROVED SITE. NON-WADEABLE/3 FT BELOW
BIL	ANDROSCOGGIN RIV	8/15/2010	8:15 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
BIL	ANDROSCOGGIN RIV	8/15/2010	8:15 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
BIL	ANDROSCOGGIN RIV	9/19/2010	7:45 AM	N			7	BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NOT APPROVED SITE. NON-WADEABLE/3 FT BELOW
BIL	ANDROSCOGGIN RIV	9/19/2010	7:45 AM	N				BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NOT APPROVED SITE. NON-WADEABLE/3 FT BELOW
Fish Park Down (FPD)	ANDROSCOGGIN RIVER - A45 - FOMB	5/16/2010	7:55 AM	N				BANK	CLEAR	CALM	CLEAR, PARTLY CLOUDY, MOSTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	5/16/2010	7:55 AM	N				BANK	CLEAR	CALM	CLEAR, PARTLY CLOUDY, MOSTLY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	5/16/2010	7:55 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	6/13/2010	7:50 AM	N			17.7	BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	6/13/2010	7:50 AM	N				BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	7/11/2010	7:40 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	7/11/2010	7:40 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	8/15/2010	7:55 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	8/15/2010	7:55 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	9/19/2010	7:17 AM	N			7	BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FPD	ANDROSCOGGIN RIV	9/19/2010	7:17 AM	N				BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
Fish Park Up (FBU)	ANDROSCOGGIN RIVER - A47 - FOMB	5/16/2010	7:45 AM	N				BANK	CLEAR	CALM	CLOUDY, MOSTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FBU	ANDROSCOGGIN RIV	5/16/2010	7:45 AM	N				BANK	CLEAR	CALM	CLEAR, PARTLY CLOUDY, MOSTLY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FBU	ANDROSCOGGIN RIV	6/13/2010	7:35 AM	N			17.7	BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. SLIGHT OILY SHEEN. NON-WADEABLE/3 FT BELOW

Organization Site Code	VRMP Site ID	Date	Time	Sample Type Qualifier	Flow	Stage	Air Temp. (DEG C)	Sample Location	Current Weather	Air Condi-tion	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
FBU	ANDROSCOGGIN RIV	6/13/2010	7:35 AM	N				BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. SLIGHT OILY SHEEN. NON-WADEABLE/3 FT BELOW
FBU	ANDROSCOGGIN RIV	6/13/2010	7:35 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. SLIGHT OILY SHEEN. NON-WADEABLE/3 FT BELOW
FBU	ANDROSCOGGIN RIV	6/13/2010	7:35 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. SLIGHT OILY SHEEN. NON-WADEABLE/3 FT BELOW
FBU	ANDROSCOGGIN RIV	7/11/2010	7:20 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FBU	ANDROSCOGGIN RIV	7/11/2010	7:20 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FBU	ANDROSCOGGIN RIV	8/15/2010	7:45 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FBU	ANDROSCOGGIN RIV	8/15/2010	7:45 AM	N				BANK			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FBU	ANDROSCOGGIN RIV	9/19/2010	7:05 AM	N			7	BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLING FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
FBU	ANDROSCOGGIN RIV	9/19/2010	7:05 AM	N				BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLING FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - FOMB	5/16/2010	7:20 AM	N				BANK	CLEAR	CALM	CLEAR, PARTLY CLOUDY, MOSTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	5/16/2010	7:20 AM	N				BANK	CLEAR	CALM	CLEAR, PARTLY CLOUDY, MOSTLY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	6/13/2010	6:55 AM	N			17.7	BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	6/13/2010	6:55 AM	N				BANK	PARTLY C	CALM	PARTLY CLOUDY, SHOWERS, LIGHT				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	7/11/2010	7:00 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	7/11/2010	7:00 AM	N				BANK	CLOUDY, I	CALM	MOSTLY CLOUDY, LIGHT RAIN				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	8/15/2010	6:50 AM	N				WADING			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	8/15/2010	6:50 AM	N				WADING			CLEAR, PARTLY CLOUDY				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	9/19/2010	6:15 AM	N			7	BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	9/19/2010	6:15 AM	N				BANK			CLEAR				NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	9/19/2010	6:15 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE
PBL	ANDROSCOGGIN RIV	9/19/2010	6:15 AM	D				BANK							NO OBSERVATIONAL DATA. SAMPLED FROM BANK. NON-WADEABLE/3 FT BELOW SURFACE

Section 5-1
Androscoggin River (Friends of Merrymeeting Bay)

Refer to Chapter 4 of this document for information about sampling methods, sampling sites, and quality assurance.

Overview

The lower Androscoggin River is monitored by the Friends of Merrymeeting Bay (FOMB). FOMB has been in existence since 1975 and focuses on protecting the Merrymeeting Bay watershed through research, education, advocacy, and land conservation. They have been monitoring the lower part of the Androscoggin River, tributaries to Merrymeeting Bay, and the Bay since 1999. Their monitoring has extended up the Androscoggin at times (depending on volunteers) to Livermore Falls. FOMB joined the VRMP in 2009 with an interest in bringing about water classification upgrades when possible.

The Androscoggin River is the third largest river in the state. It has a length of 177 miles and drainage area of 3,450 square miles (2,730 miles in Maine).[1] The headwaters are Umbagog Lake in New Hampshire. From there it flows into New Hampshire and then back into Maine through the towns of Gilead and Bethel. It continues flowing through the towns and cities of Bethel, Rumford, Mexico, Dixfield, Jay, Livermore Falls, Lewiston, Auburn, Lisbon, Lisbon Falls, Durham, Brunswick, and Topsham where it joins the Kennebec River at Merrymeeting Bay.

The Androscoggin River is assigned Class B from the Maine/New Hampshire boundary to its confluence with the Ellis River. It is assigned Class C from the confluence with the Ellis River to Merrymeeting Bay. The "DEP 2010 Integrated Water Quality Monitoring and Assessment Report" lists segments of the main stem in 3 categories:

- The main stem, upstream of Gulf Island Pond, is listed in Category 4-A (Rivers and Streams with Impaired Use, TMDL completed). Causes of impairment are phosphorus, dissolved oxygen, total suspended solids, biological oxygen demand, and algal blooms. In addition, Category 4-A is Lewiston-Auburn variable mileage, CSO affected. Cause of impairment is *E.coli*.
- A number of segments are listed in Category 4-B (Rivers and Streams Impaired by Pollutants-Pollution Control Requirements Expected to Result in Attainment). The cause of non-attainment is dioxin.
- A number of segments are listed in Category 5-D (Rivers and Streams Impaired by Legacy Pollutants). The cause of non-attainment is polychlorinated biphenyls (PCBs).

The Androscoggin River has a long history of industrial and municipal use over the last 200 years.[1] Beginning in the early 1800s, many dams were constructed for mills, primarily in the lower part of the river. By the late 1800s, many textile and lumber mills were in operation, mostly from Lewiston to Brunswick. Pulp and paper mills that are still in operation today were established in the late 1800s in New Hampshire, Rumford, and Jay. Beginning in the late 1920s,

[1] Maine Rivers Website- Androscoggin River Profile

Central Maine Power built hydroelectric dams that impounded much of the river from Lewiston to Livermore Falls. Some of these uses continue today. "Along its course to the sea, the river is repeatedly dammed. It receives discharges from industrial and municipal sources, as well as polluted runoff from a variety of sources."[2] Specific problems include mill discharges, combined sewer overflows (CSOs), dam impacts (28 dams exist), and historical sediment toxics.

The primary purpose of monitoring performed by FOMB, done under the VRMP, is to acquire data that will facilitate the water quality classification upgrade of the lower portion of the Androscoggin River. FOMB currently monitors at numerous sites from Merrymeeting Bay upstream to Lewiston. FOMB will continue to gather data from sample stations using methods not accepted by DEP, as well as for a subset of stations acceptable to DEP. For 2011, three stations met VRMP requirements for sample location and methods. This report provides the data and analysis for the three approved sites. Five additional sites are reported here also. For these sites, both the monitor and equipment were certified by VRMP in 2011. These additional five sites, however, do not meet the requirements for being approved sites, and some methods may not be approved.

In 2011, FOMB requested that two of the three approved sites (Water Street Mooring, WSM and Brunswick Canoe Mooring, BCM) be moved from mid-channel to shore. They submitted monitoring data from mid-channel and shore to demonstrate similarity. The Department approved relocation of these approved sites. FOMB renamed these sites Brunswick Water Street (BWS) and Brunswick Canoe Portage (BCP), respectively.

Methods

The volunteers monitored the Androscoggin River in 2011 at three approved stations [BBB, BWS, BCP] and five non-approved stations [DBL, BIL, FPD, FPU, PBL] on the main stem (Table 5-1-1 and Figures 5-1-1 through 5-1-3).

Table 5-1-1: Friends of Merrymeeting Bay sampling sites at Androscoggin River.

VRMP Site ID	Organization Site Code	Sample Location	Class
Androscoggin River-A231-VRMP	BBB	Bay Bridge Jetty	C
Androscoggin River-A281BK-VRMP	BWS	Brunswick Water Street	C
Androscoggin River-A299BK-VRMP	BCP	Brunswick Canoe Portage	C
Androscoggin River-A158-FOMB	DBL	Durham Boat Launch	C
Androscoggin River- A24-FOMB	BIL	Brunswick Interstate Ledges	C
Androscoggin River-A45-FOMB	FPD	Fish Park Downstream	C
Androscoggin River-A47-FOMB	FPU	Fish Park Upstream	C
Androscoggin River-A71-FOMB	PBL	Pejepscot Boat Launch	C

[2] Androscoggin River Alliance Website-Androscoggin River slideshow

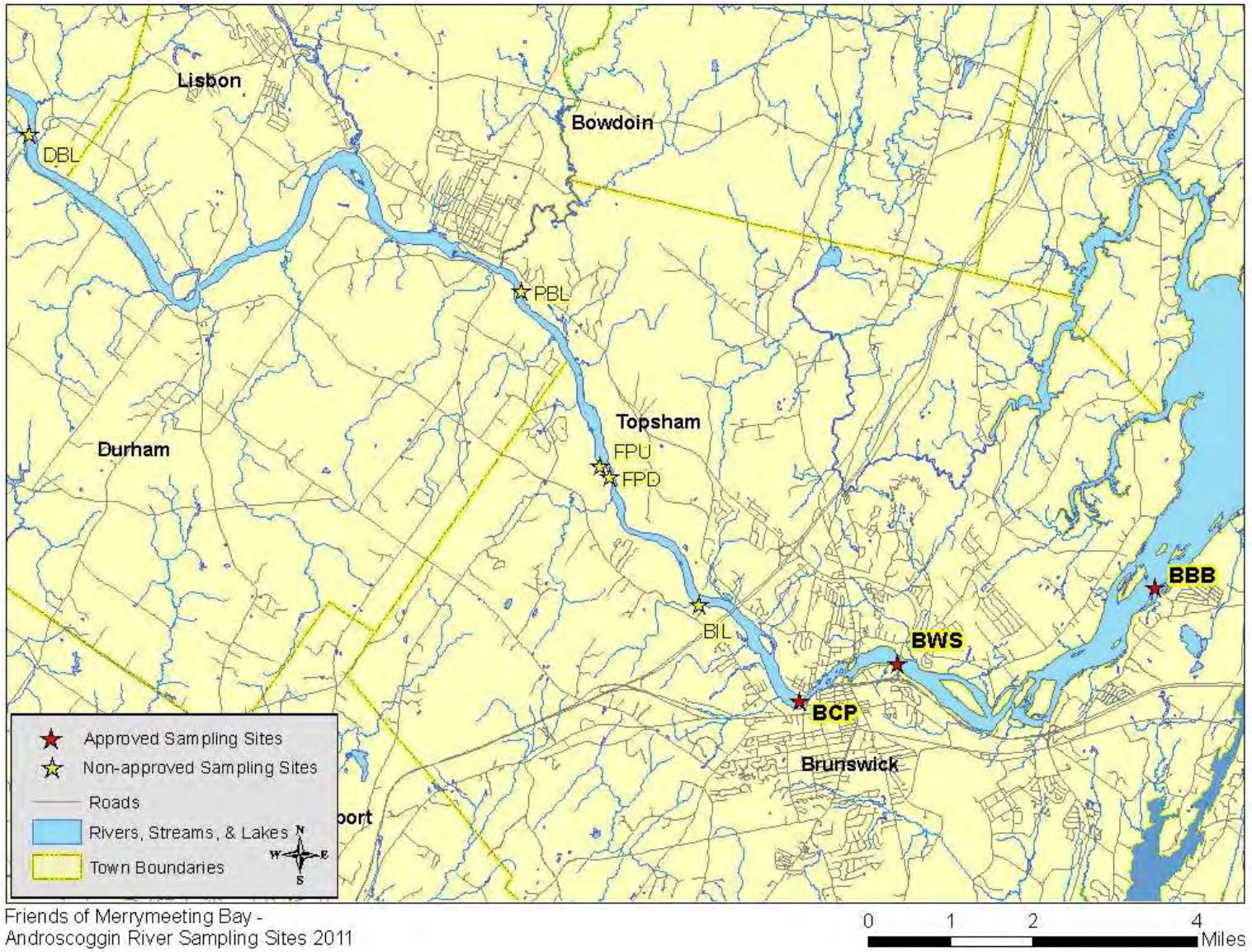


Figure 5-1-1: Map of all Friends of Merrymeeting Bay sampling sites on the Androscoggin River.

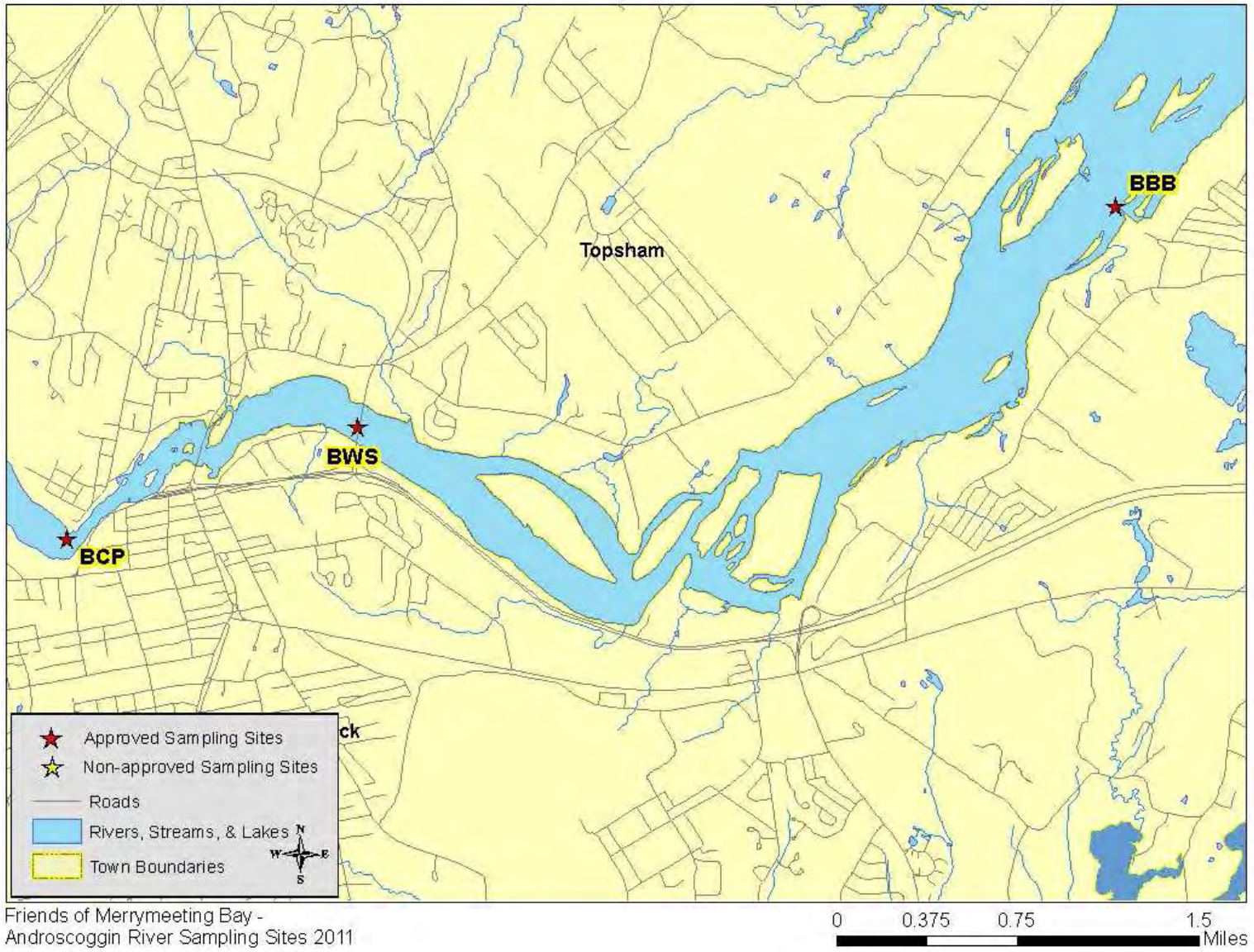


Figure 5-1-2: Map of approved Friends of Merrymeeting Bay sampling sites on the Androscoggin River.

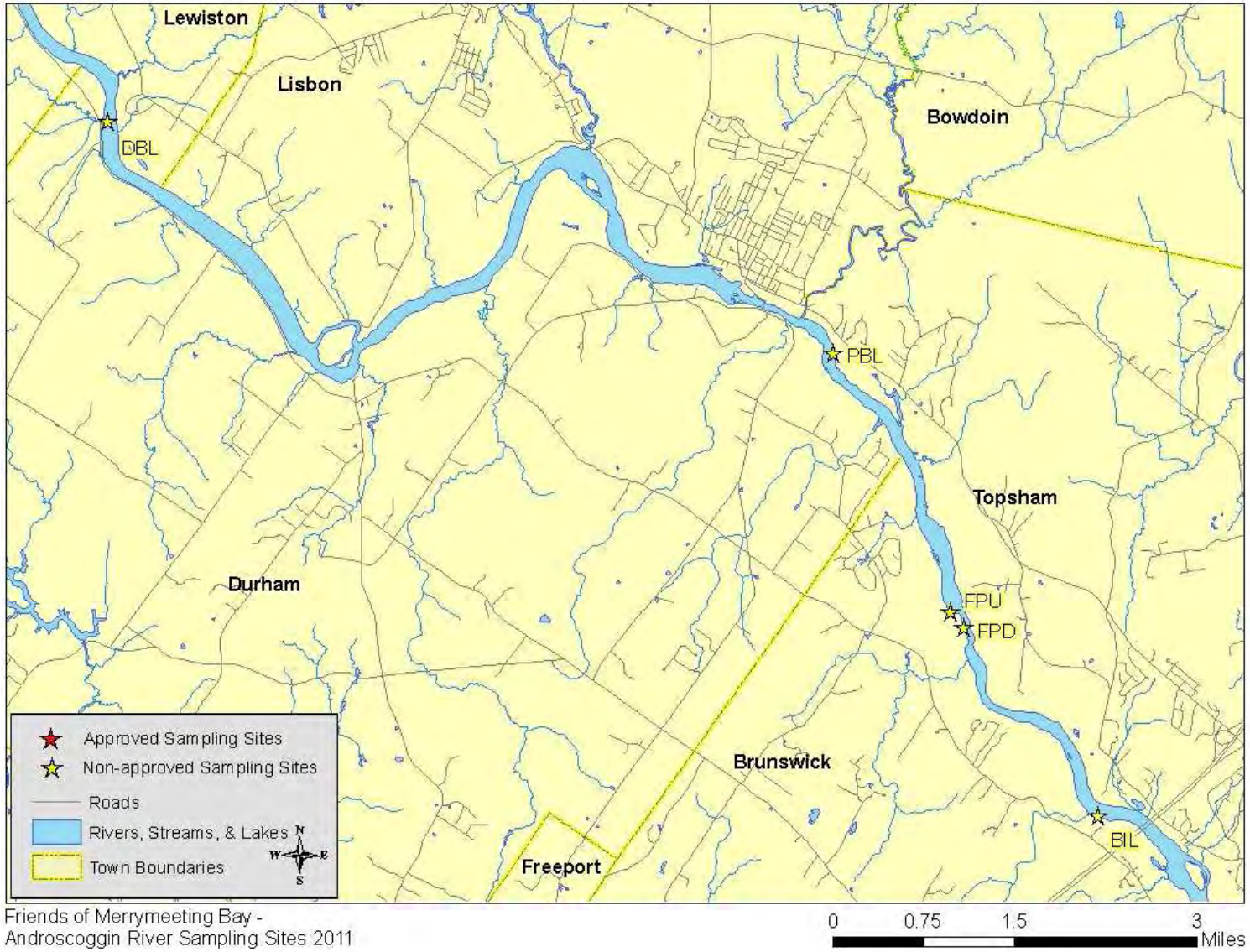


Figure 5-1-3: Map of non-approved Friends of Merrymeeting Bay sampling sites on the Androscoggin River.

Monitoring was conducted from April through October, once per month. At each site, the monitors made direct measurements of water temperature, dissolved oxygen, and specific conductance using a handheld YSI 85 meter. Samples were also collected for *E. coli* bacteria at the three approved sites with a DEP designed bacteria sampling device or extension pole (which uses sterile whirl-paks for water collection). Bacteria samples were delivered to Bowdoin College for analysis by FOMB volunteers.

The approved sites met VRMP requirements for sampling laterally and vertically in the river to obtain well-mixed representative samples. As noted in the previous section, two of the approved sites were sampled from shore. The third was sampled from a jetty allowing for representative, well-mixed areas of the river to be monitored.

Results

Refer to Appendices A-1 and A-2 in discussion of individual site data and trends, as well as graphed data (Figures 5-1-5 through 5-1-14), at the end of this section of the report.

Dissolved Oxygen

Dissolved oxygen (DO) was measured 2-7 times at each of the eight sampling sites (Table 5-1-2 and Table 5-1-3). Monitoring occurred from April through October. Class C criteria for DO are a minimum of 5.0 mg/l (milligrams/liter) or 60% saturation, whichever is higher. To meet water quality criteria, both concentration and saturation standards must be met.

Table 5-1-2: A summary of minimum, maximum, and average dissolved oxygen concentration values (mg/l) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Sampling Events	Minimum Value	Maximum Value	Average Value
BBB	Y	7	7.1	13.5	9.4
BWS	Y	7	7.7	13.7	9.8
BCP	Y	6	7.2	15.3	8.8
DBL	N	2	7.8	14.5	11.2
BIL	N	7	7.0	14.7	9.6
FPD	N	7	7.0	14.9	9.6
FPU	N	7	7.1	14.4	9.4
PBL	N	7	7.2	14.2	9.5

Table 5-1-3: A summary of minimum, maximum, and average dissolved oxygen saturation (%) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Sampling Events	Minimum Value	Maximum Value	Average Value
BBB	Y	7	84.9	107.4	94.0
BWS	Y	7	91.0	107.1	97.8
BCP	Y	5	82.8	115.0	94.6
DBL	N	2	84.0	112.8	98.4
BIL	N	7	84.5	115.2	95.0
FPD	N	7	85.5	114.5	95.7
FPU	N	7	85.3	111.6	94.6
PBL	N	7	85.2	111.5	94.8

Dissolved oxygen concentrations measured at Androscoggin River approved sites ranged from 7.0 mg/l to 15.3 mg/l. At site BBB, the lowest readings occurred in mid-July (7.1 mg/l) and mid-August (7.2 mg/l). Site BWS was similar with lowest readings in mid-July (8.3 mg/l) and mid-August (7.7 mg/l). Site BCP had its lowest readings in mid-June (8.0 mg/l) and mid-July (7.2 mg/l). Dissolved oxygen never dropped below the Class C standard of 5.0 mg/l. Dissolved oxygen percent saturation ranged from 82.8%-115% and did not go below the Class C standard of 60%.

Dissolved oxygen concentrations measured at Androscoggin River non-approved sites ranged from 7.0 mg/l -14.9 mg/l. Site DBL was sampled only two times (once in mid-April and once in mid-June) and was not included in this analysis. The remaining sites BIL, FPU, FPD, and PBL were all very similar. The lowest readings, all around 7.0-7.2 mg/l occurred during mid-July sampling events. Dissolved oxygen never dropped below the Class C standard of 5.0 mg/l. Dissolved oxygen percent saturation ranged from 84.5%-115.2% and did not go below the Class C standard of 60%.

Friends of Merrymeeting Bay volunteers do a good job of getting out early in the morning to sample. All but five of the forty-five samples sampling occurred by 8:15 am or earlier. This is the recommended time to sample because DO is lowest at this time of day. Dissolved oxygen is also affected by flow conditions and temperature. During high flow conditions, more oxygen enters the river from the atmosphere as the water is more turbulent and there is more opportunity for re-aeration. Cooler water holds more oxygen. If the intent is to assess low DO concentrations for water quality classification, including early or late season measurements will skew the results. For example, the average water temperature for all sampling sites (sans DBL) from April through October is 16.3°C; for June through September it is 21.1 °C. The corresponding average DO concentrations are 9.4 mg/l and 8.0 mg/l respectively.

Water Temperature

Temperature was also measured 2-7 times at each of the eight sampling sites (Table 5-1-4). Monitoring occurred from April through October. Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23°C maximum and 19°C weekly average) or 0.3°C (0.5°F) above the temperature that would naturally occur outside a mixing zone established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4°F (2.2°C) or more than 1.5°F (0.8°C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85°F (29°C) at any point outside a mixing zone established by the Board of Environmental Protection.

Table 5-1-4: A summary of minimum, maximum, and average water temperature (°C) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Sampling Events	Minimum Value	Maximum Value	Average Value
BBB	Y	7	5.0	24.3	16.5
BWS	Y	7	4.9	24.7	16.4
BCP	Y	4	4.9	19.2	11.8
DBL	N	2	4.8	18.9	11.9
BIL	N	7	4.9	25.1	16.7
FPD	N	7	4.8	25.5	16.8
FPU	N	7	4.7	25.3	16.8
PBL	N	7	5.1	25.5	16.8

Temperatures measured at all the Androscoggin River sites ranged from 4.7˚-25.5˚C (Celsius). All of the sites were very similar, except BCP, which lacked mid-summer readings – this skewed maximum and average values. The lowest values occurred in April with temperatures around just below 5.0˚C. In June, temperatures ranged from 18.9-19.5˚C at all the sites. Temperatures became high in July and August ranging from 23.6-25.5˚C. In October, temperatures dropped back down to 13.5-13.7˚C.

Specific Conductance

Specific conductance was measured 2-7 times at each of the eight sampling sites as well (Table 5-1-5). Monitoring occurred from April through October. Specific conductance is related to the amount of dissolved materials in the water. While there are no numerical standards, a relationship exists between conductivity and chloride which has numerical criteria. In general, streams located in urban areas tend to have high specific conductance due to polluted urban stormwater runoff. This may also in large part be due to salt buildup in surface and groundwater from road maintenance practices. Also, discharges from pulp and paper mills upstream measurably increase the conductivity of the river.

Table 5-1-5: A summary of minimum, maximum, and average specific conductance values (micro-ohms/cm, µS/cm) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	7	35	125	67
BWS	Y	7	58	136	86
BCP	Y	5	53	131	80
DBL	N	2	35	69	52
BIL	N	7	39	137	75
FPD	N	7	38	138	74
FPU	N	7	38	137	74
PBL	N	7	38	140	75

Specific conductance at all the sites ranged from 35-140 µS/cm, which are elevated from natural background values, reflecting upstream point and non-point source discharges. The sites were all very similar with minimum values ranging from 35-58 (exclusive of Site DBL, which was only sampled twice) and maximum ranging from 69-140 µS/cm, which shows that sources are farther upstream.

Bacteria

Escherichia coli bacteria was also measured 7 times at each of the three approved sampling sites (Table 5-1-6). Monitoring occurred from April through October. Enterococcus bacteria are used as the indicator organism for marine waters, and *E. coli* bacteria are used for freshwaters. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms including bacteria and viruses that can cause gastrointestinal illnesses. Class C criteria for bacteria are as follows: "Between May 15th and September 30th, the number of Escherichia Coli of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml."

Results for the non-approved sites were not included, since non-approved methods are used for collection at those sites. Geometric means are calculated instead of averages because measures like bacteria often have a few very large values that strongly influence the mean and make it a poor predictor.

Table 5-1-6: A summary of minimum, maximum, and geometric mean values (MPN/100mL) for bacteria at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Bacteria Type	# of Samples	Minimum Value	Maximum Value	Geometric Mean
BBB	*E. coli*	7	22	816	81
BWS	*E. coli*	7	24	457	73
BCP	*E. coli*	7	10	687	58

Each one of these sites have maximum values exceeding the instantaneous criterion (see Appendix A-1 and Figure 5-1-14 at the end of this report). All of these exceedances occurred on

the same sampling date (10/16/11). Typically, observed high bacterial levels are associated with stormwater runoff and/or combined sewer overflows. Rainfall totals at the weather station at Highland Green in Topsham included 1.22 inches of rain during the period from 10/13 to 10/14 (Figure 5-1-4). Stormwater travel times from the Brunswick/Topsham urban area to the first two upstream sample stations is shorter than 24 hours, however, and there are no combined sewer overflows or waste water discharges directly upstream.

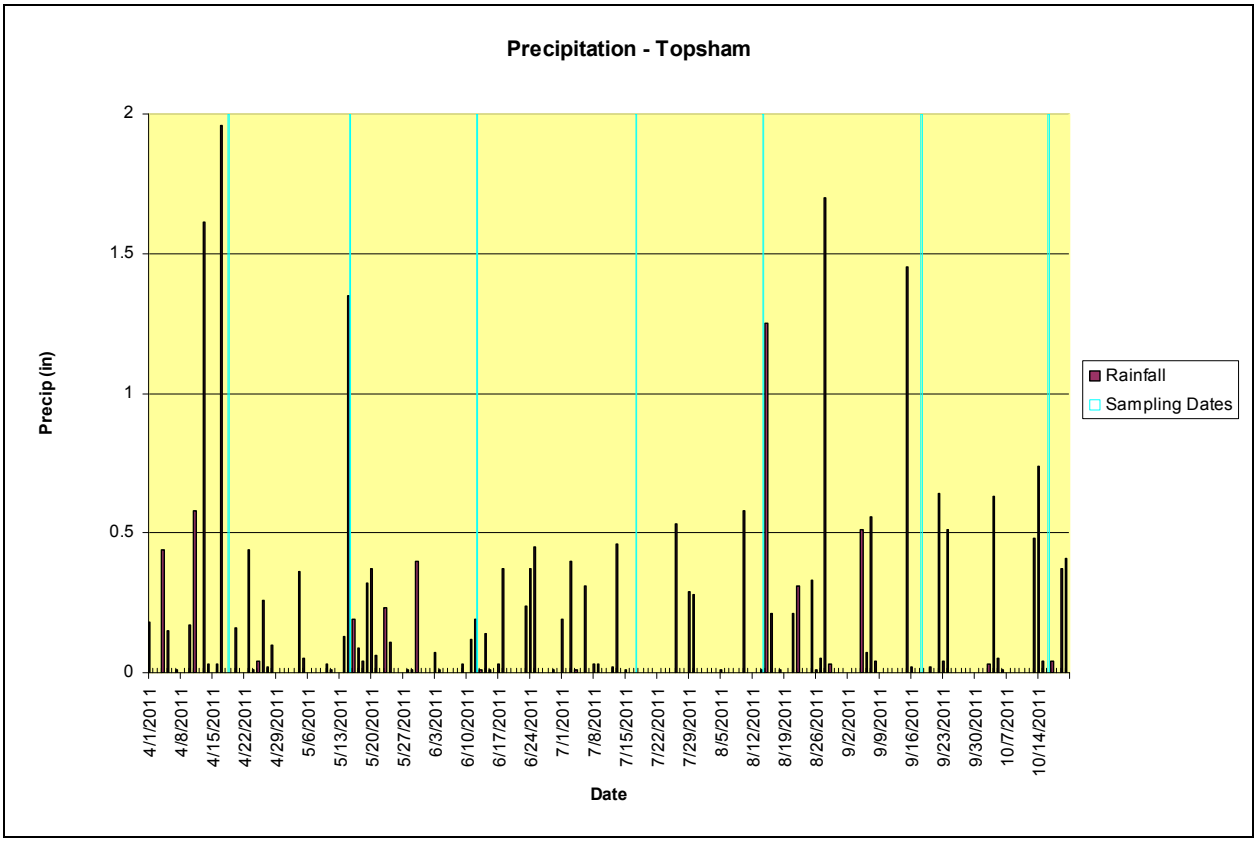


Figure 5-1-4: Seasonal precipitation measured at Highland Green, Topsham.

Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Androscoggin River sites monitored by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

- Point source pollution (pollution originating from a direct discharge including wastewater treatment plant discharge, combined sewer overflows and overboard discharges).
- Non-point source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, septic systems, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry.

- Ponds and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than free-flowing waters).
- Natural effects of wetlands (such as contributing waters to a stream/river that have low dissolved oxygen levels due to the decomposition of large amounts of organic matter, respiration of abundant plant matter, and low re-aeration rates that are characteristic of many wetlands).

The following are recommendations for future monitoring:

- This is the first year the sampling season was extended to April and October. As noted in the discussion of temperature effects on dissolved oxygen, river temperatures are substantially lower in April and dissolved oxygen concentrations are proportionally higher. There is a good argument for collecting as much water quality data as possible, but if a primary goal of FOMB is to demonstrate the river meets minimum DO criterion for reclassification, they should reconsider the values of extending the season.
- Continue monitoring at all stations (or at least a subset of sites) to develop a long term trend database.

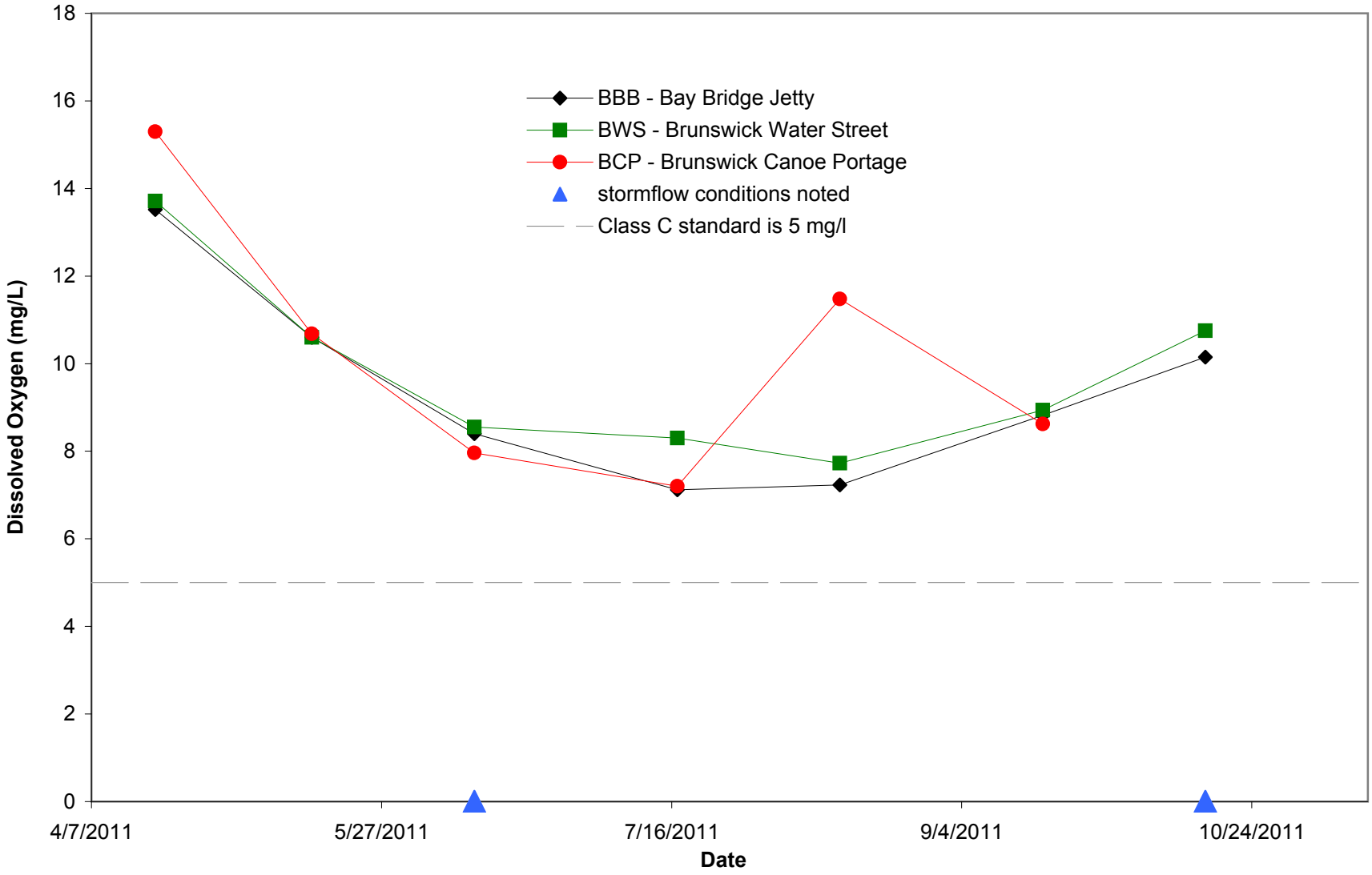


Figure 5-1-5. Dissolved oxygen concentrations at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2011.

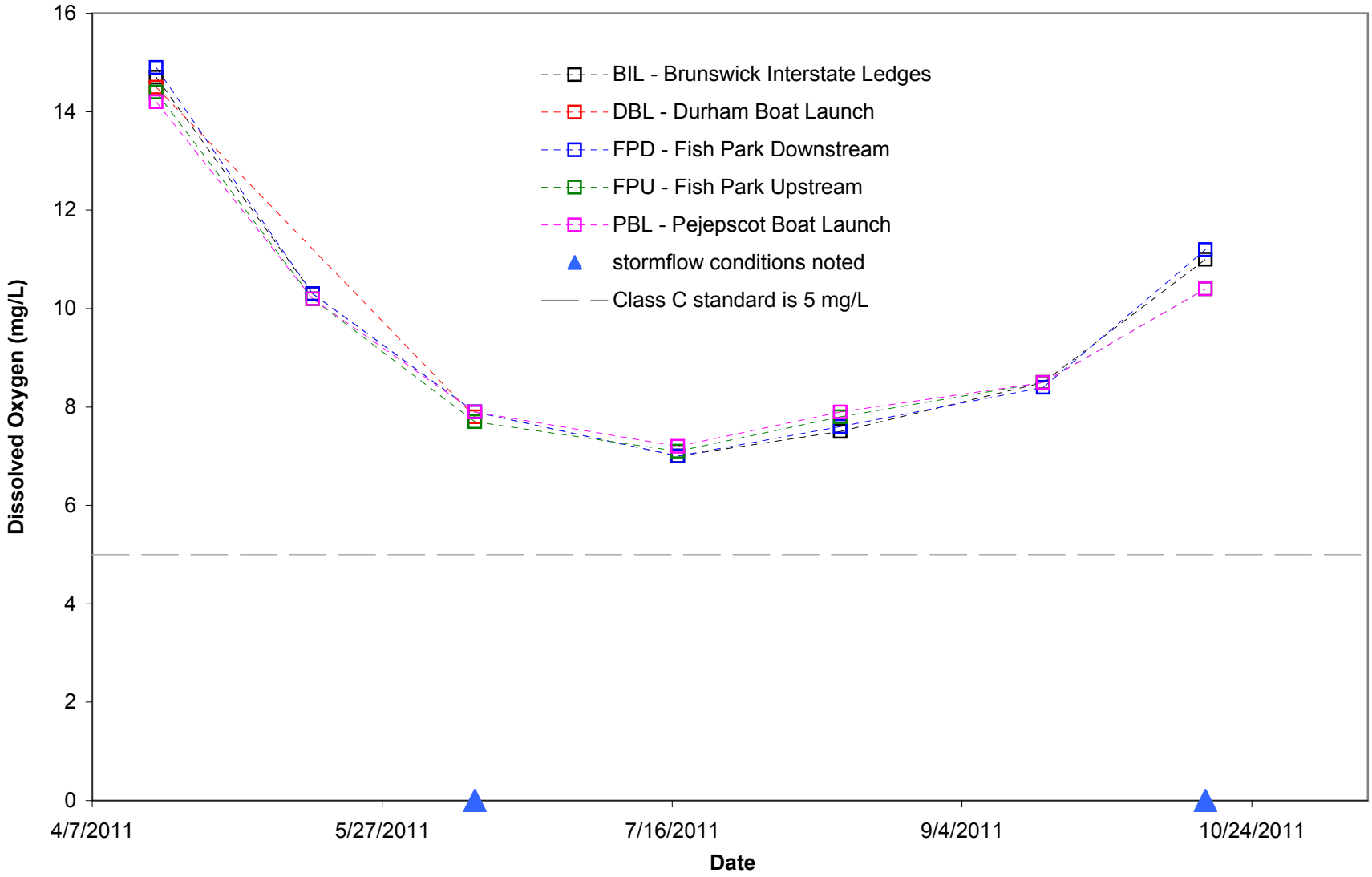


Figure 5-1-6. Dissolved oxygen concentrations at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2011.

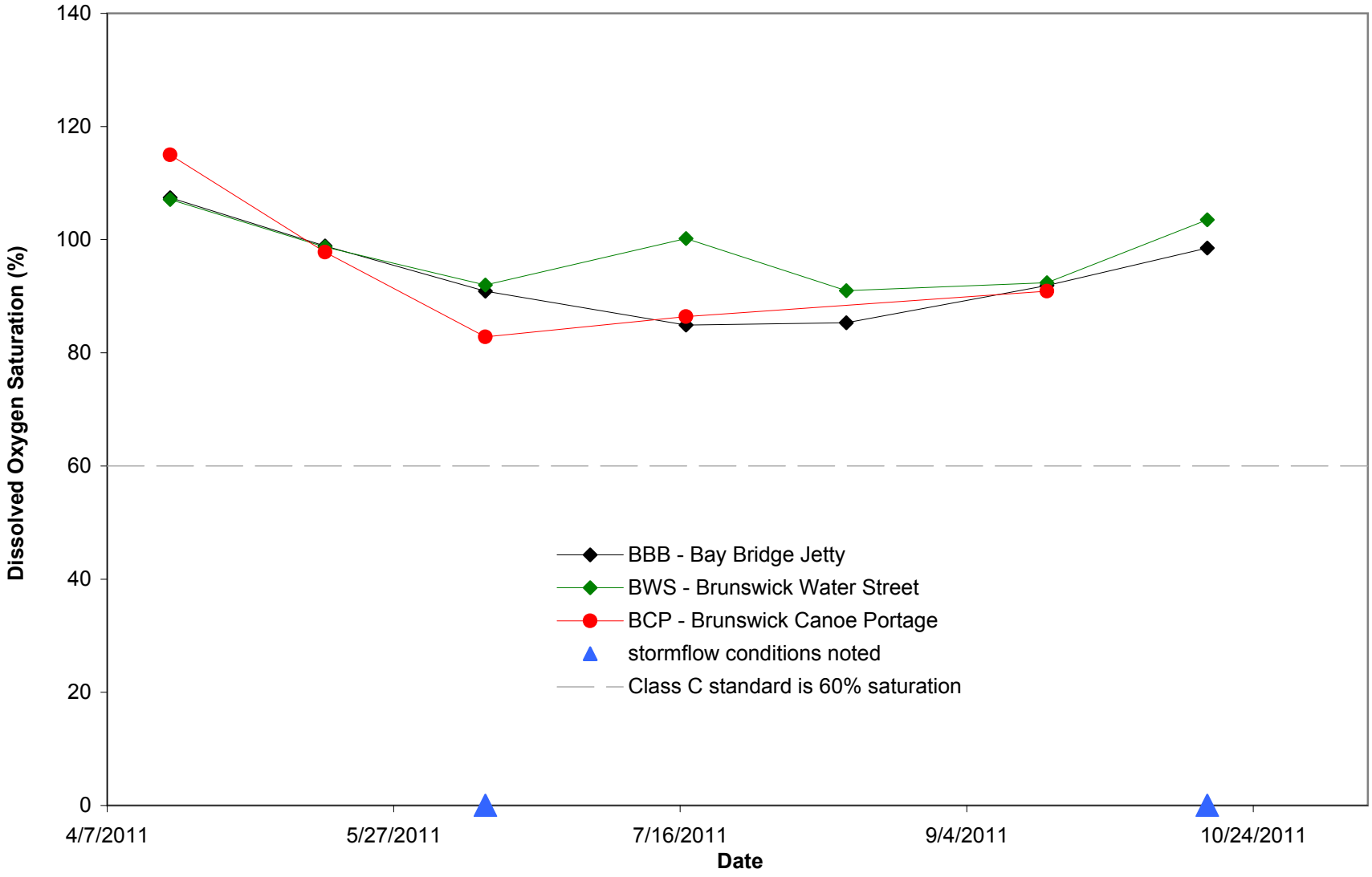


Figure 5-1-7. Dissolved oxygen % saturations at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2011.

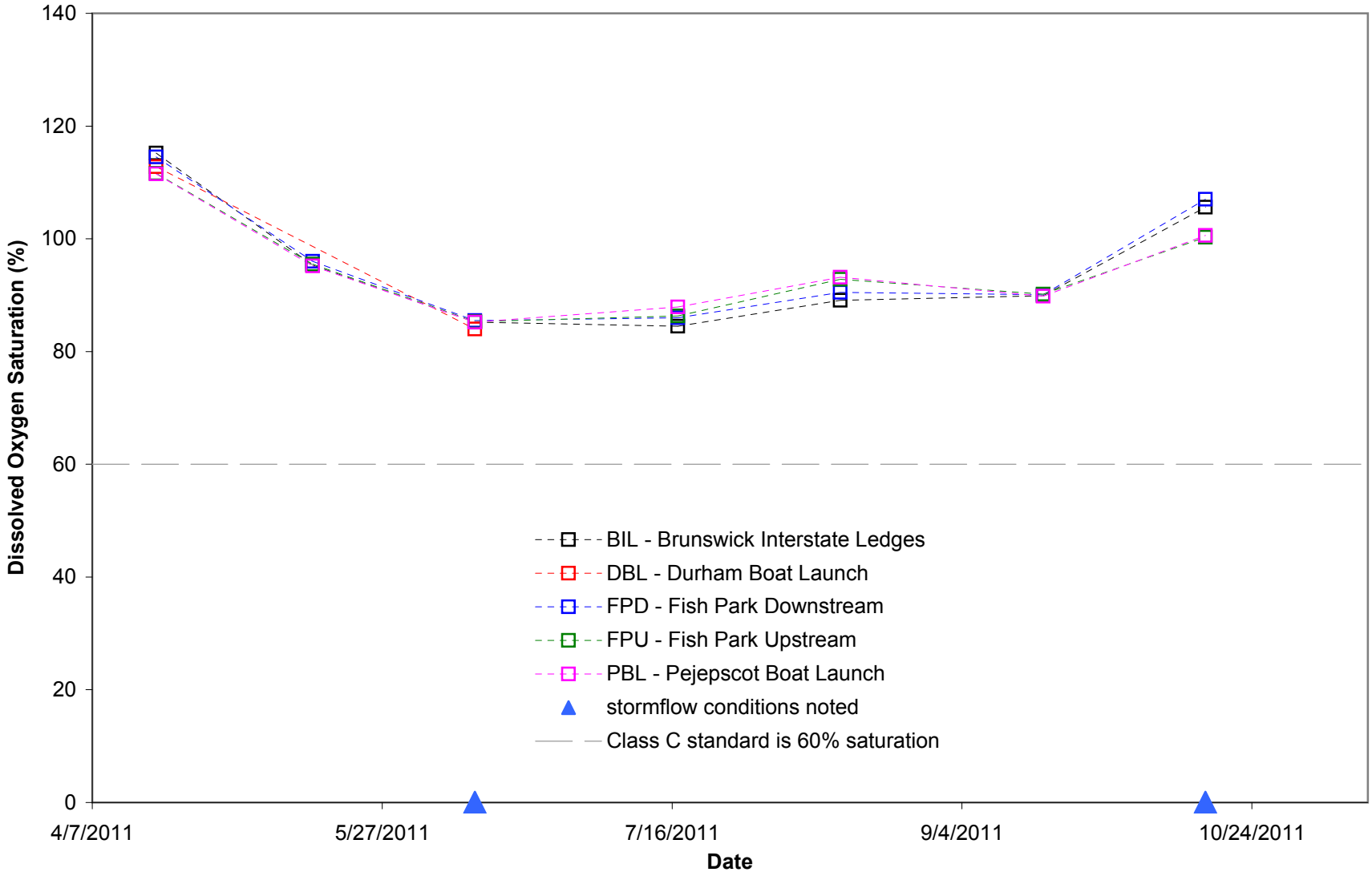


Figure 5-1-8. Dissolved oxygen % saturations at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2011.

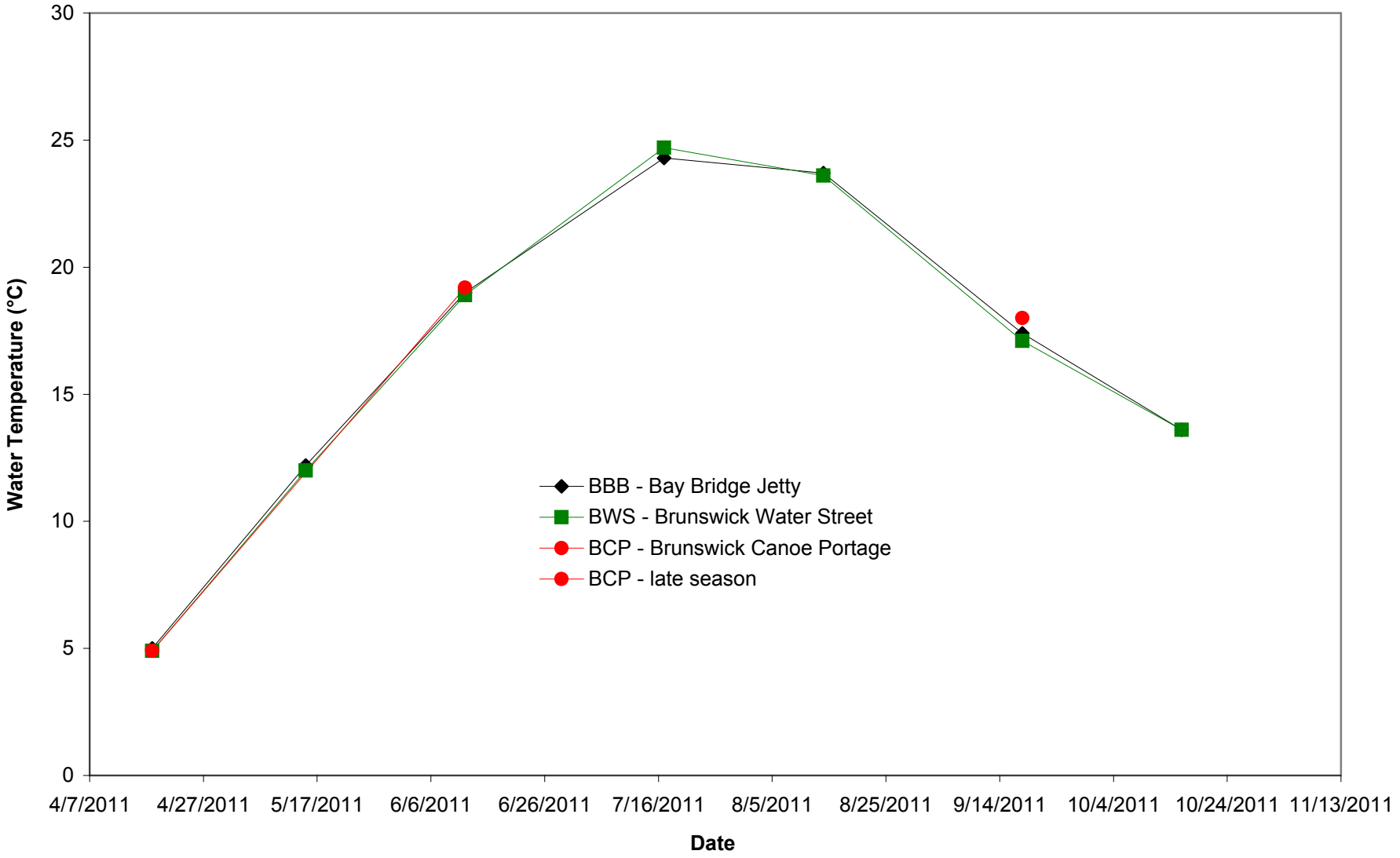


Figure 5-1-9. Water temperatures at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2011.

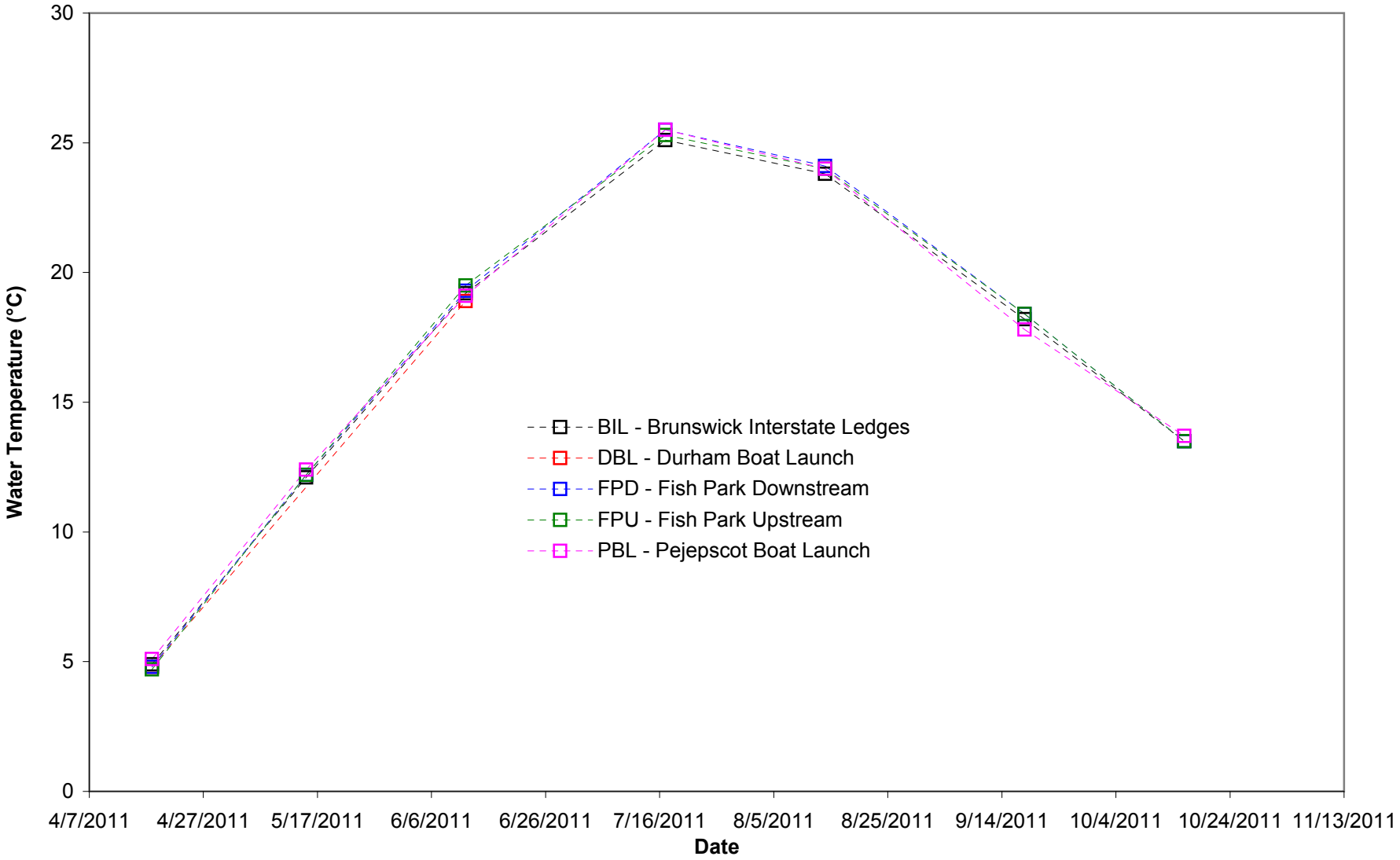


Figure 5-1-10. Water temperatures at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2011.

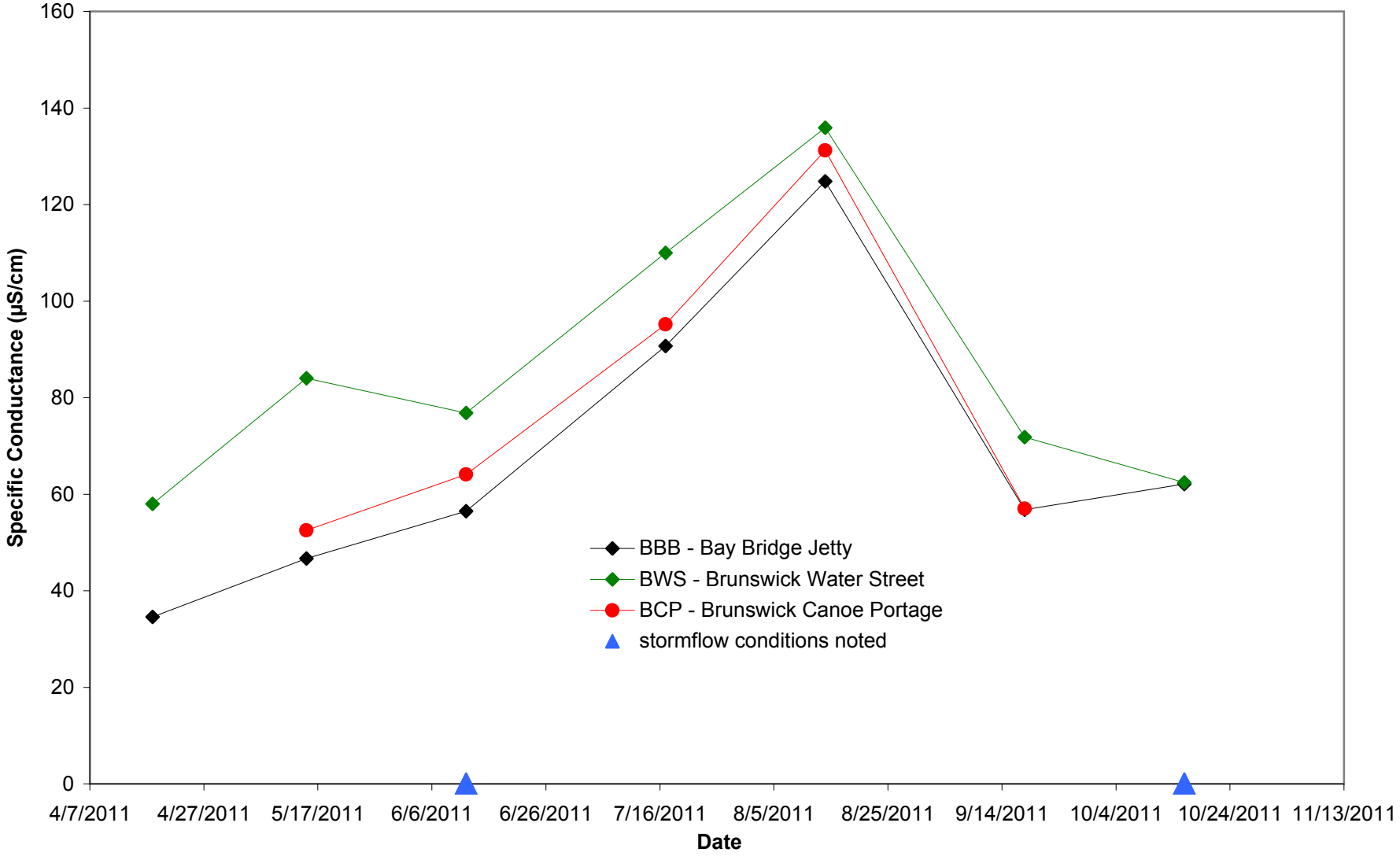


Figure 5-1-11. Specific conductance at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2011.

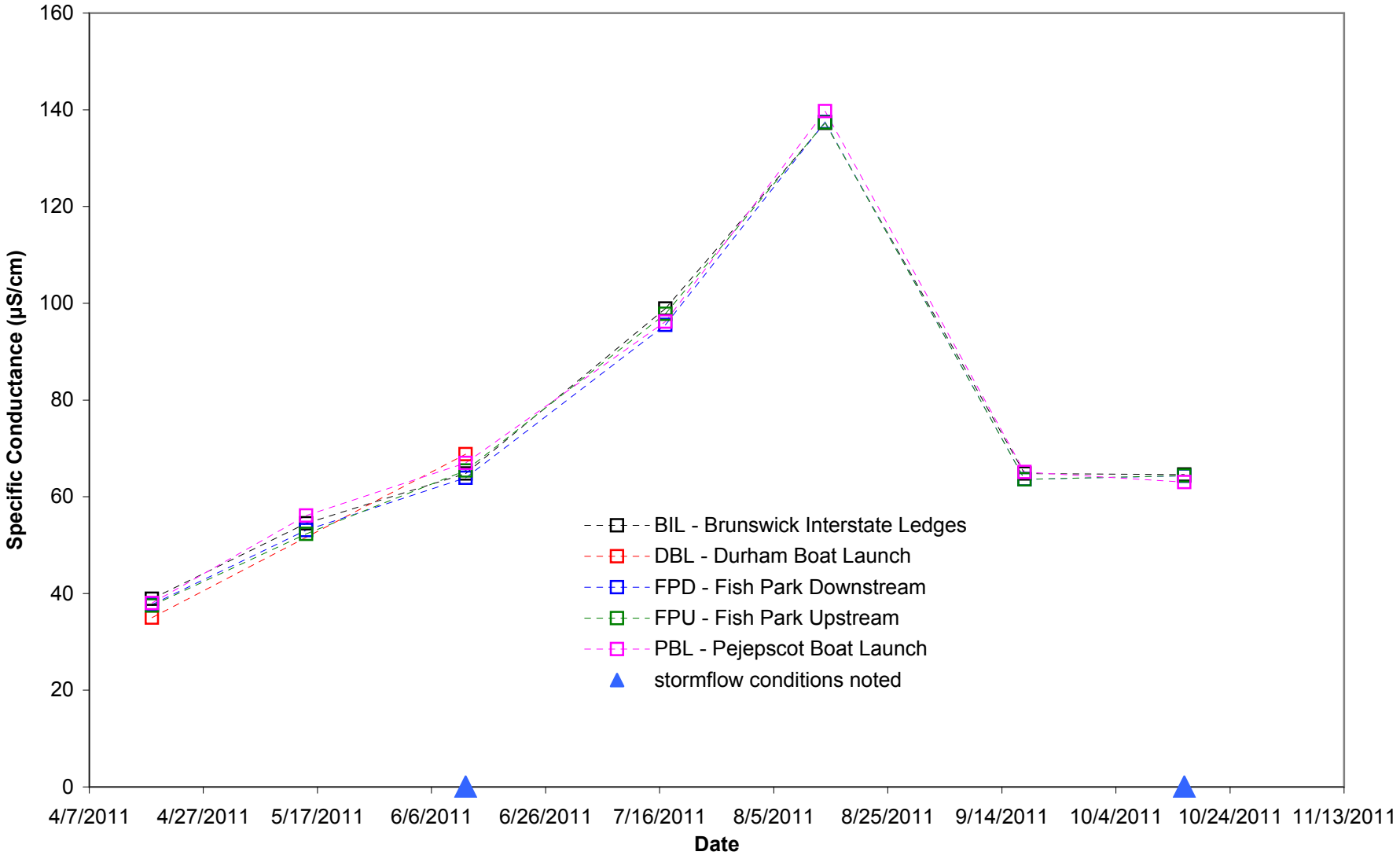


Figure 5-1-12. Specific conductance at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2011.

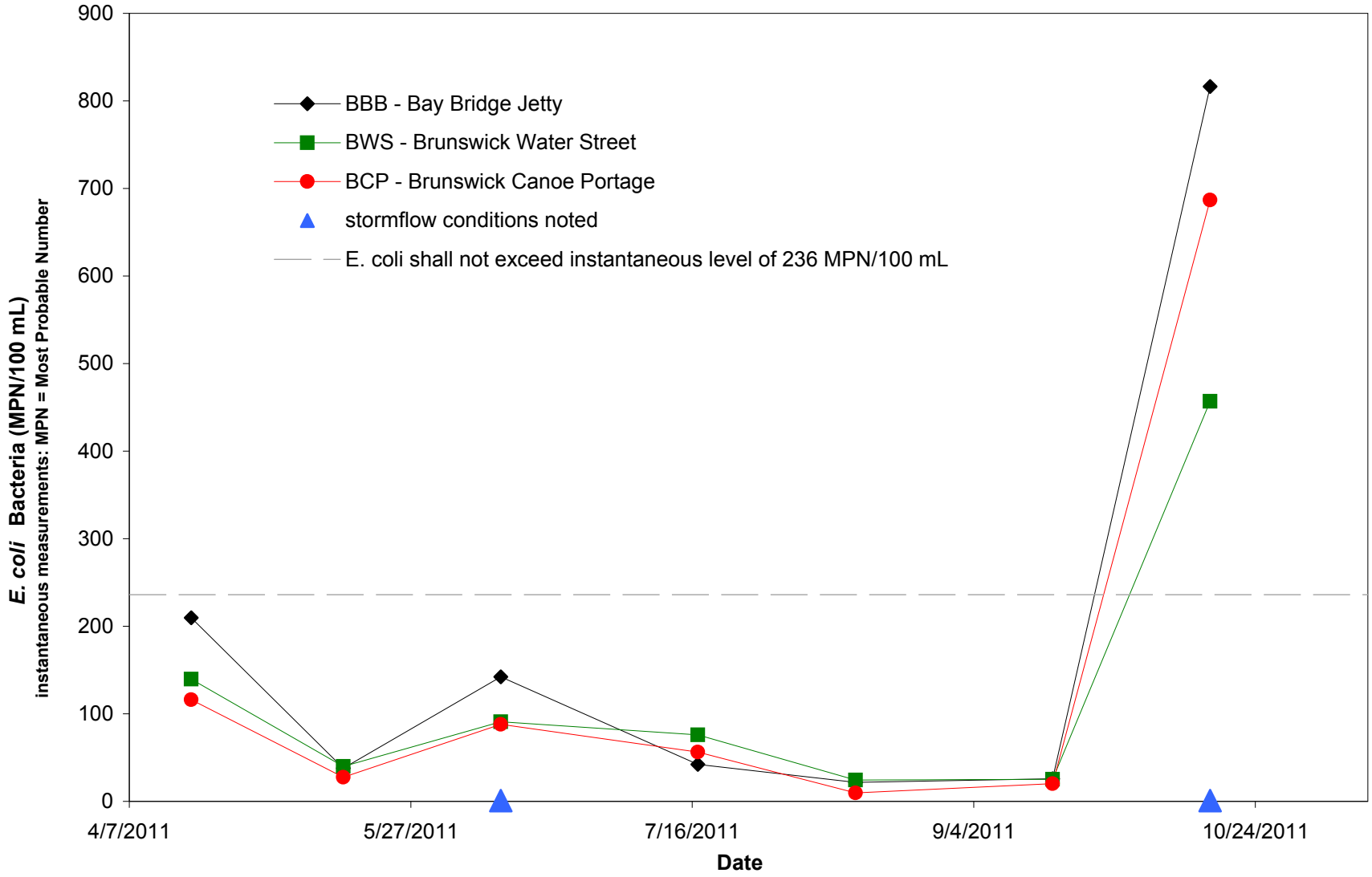


Figure 5-1-13. *E. coli* bacteria concentrations at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2011.

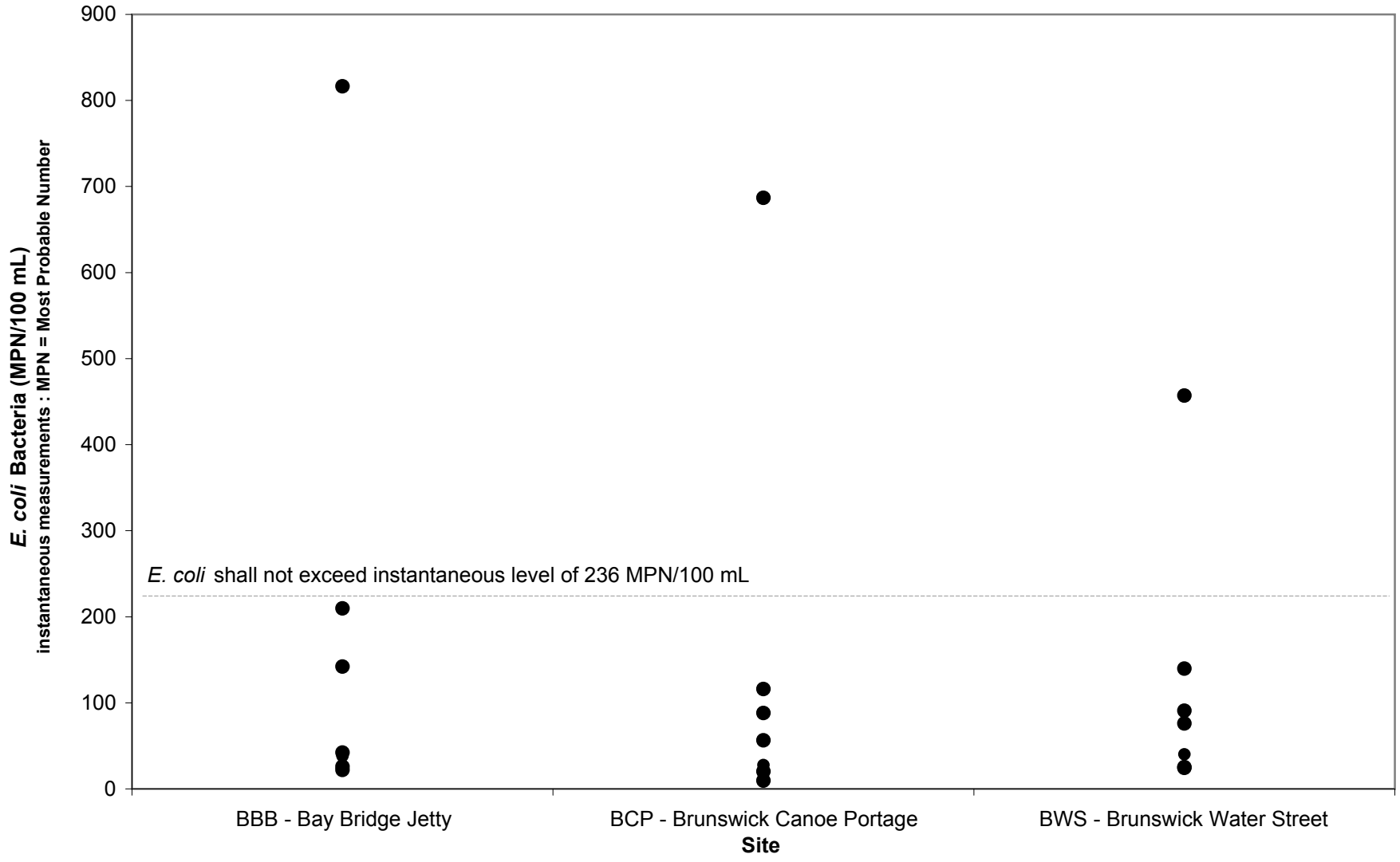


Figure 5-1-14. *E. coli* bacteria concentrations at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2011.

Appendix A-1. 2011 water quality data for "Approved" and "Non-Approved" sites. Non-Approved sites do not yet meet official VRMP sample location criteria and/or require further inspection and review.
* Sampling depths are only reported for Tier 1 VRMP sites.
** "N" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "TSS" = total suspended solids"
Refer to Appendix A-2 for observational data and quality assurance/quality control (QA/QC) notes.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity(PPTH)	Turbid-ity (NTU)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)
Androscoggin River - Friends of Merrymeeting Bay (Approved Sites)														
BBB -BAY BRIDGE JETTY	ANDROSCOGGIN RIVER-A231-VRMP	4/18/2011	7:20 AM	N			5	107.4	13.52	34.6				209.8
BBB	ANDROSCOGGIN RIVER-A231-VRMP	5/15/2011	7:40 AM	N			12.2	98.9	10.6	46.7				37.9
BBB	ANDROSCOGGIN RIVER-A231-VRMP	5/15/2011	7:40 AM	D										34.1
BBB	ANDROSCOGGIN RIVER-A231-VRMP	6/12/2011	7:55 AM	N			19	90.9	8.4	56.5				142.1
BBB	ANDROSCOGGIN RIVER-A231-VRMP	7/17/2011	7:00 AM	N			24.3	84.9	7.12	90.7				42.2
BBB	ANDROSCOGGIN RIVER-A231-VRMP	8/14/2011	7:50 AM	N			23.7	85.3	7.23	124.8				21.8
BBB	ANDROSCOGGIN RIVER-A231-VRMP	9/18/2011	7:50 AM	N			17.4	91.9	8.82	56.8				25.9
BBB	ANDROSCOGGIN RIVER-A231-VRMP	10/16/2011	9:20 AM	N			13.6	98.5	10.15	62.1				816.4
BCP - BRUNSWICK CANOE PORTAGE	ANDROSCOGGIN RIVER-A299BK-VRI	4/18/2011	8:00 AM	N			4.9	115	15.3					116
BCP	ANDROSCOGGIN RIVER-A299BK-VRI	5/15/2011	7:45 AM	N				97.8	10.68	52.5				27.5
BCP	ANDROSCOGGIN RIVER-A299BK-VRI	6/12/2011	8:05 AM	N			19.2	82.8	7.96	64.1				88
BCP	ANDROSCOGGIN RIVER-A299BK-VRI	7/17/2011	8:00 AM	N				86.4	7.2	95.2				56.3
BCP	ANDROSCOGGIN RIVER-A299BK-VRI	8/13/2011	8:00 AM	N					11.48	131.2				9.6
BCP	ANDROSCOGGIN RIVER-A299BK-VRI	8/13/2011	8:00 AM	D										5.2
BCP	ANDROSCOGGIN RIVER-A299BK-VRI	9/18/2011	8:10 AM	N			18	90.9	8.62	57				20.3
BCP	ANDROSCOGGIN RIVER-A299BK-VRI	10/16/2011	8:00 AM	N										686.7
BWS - BRUNSWICK WATER STREET	ANDROSCOGGIN RIVER-A281BK-VRI	4/18/2011	8:00 AM	N			4.9	107.1	13.71	58				139.6
BWS	ANDROSCOGGIN RIVER-A281BK-VRI	5/15/2011	7:05 AM	N			12	98.7	10.6	84				39.9
BWS	ANDROSCOGGIN RIVER-A281BK-VRI	6/12/2011	7:20 AM	N			18.9	92	8.55	76.8				90.8
BWS	ANDROSCOGGIN RIVER-A281BK-VRI	6/12/2011	7:20 AM	D										185
BWS	ANDROSCOGGIN RIVER-A281BK-VRI	7/17/2011	7:30 AM	N			24.7	100.2	8.3	110				75.9
BWS	ANDROSCOGGIN RIVER-A281BK-VRI	8/14/2011	7:00 AM	N			23.6	91	7.73	135.9				24.3
BWS	ANDROSCOGGIN RIVER-A281BK-VRI	9/18/2011	7:15 AM	N			17.1	92.4	8.94	71.8				25.3
BWS	ANDROSCOGGIN RIVER-A281BK-VRI	10/16/2011	8:50 AM	N			13.6	103.5	10.75	62.4				456.9

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity(PPTH)	Turbid- ity (NTU)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)
Androscoggin River - Friends of Merrymeeting Bay (Non-approved Sites)														
BIL - BRUNSWICK INTERSTATE LEDGES	ANDROSCOGGIN RIVER-A24-FOMB	4/18/2011	8:00 AM	N			4.9	115.2	14.7	38.9				
BIL	ANDROSCOGGIN RIVER-A24-FOMB	5/15/2011	7:55 AM	N			12.1	95.3	10.3	54.5				
BIL	ANDROSCOGGIN RIVER-A24-FOMB	6/12/2011	8:05 AM	N			19.2	85.2	7.9	64.8				
BIL	ANDROSCOGGIN RIVER-A24-FOMB	7/17/2011	7:55 AM	N			25.1	84.5	7	98.9				
BIL	ANDROSCOGGIN RIVER-A24-FOMB	8/14/2011	8:00 AM	N			23.8	89.1	7.5	137.3				
BIL	ANDROSCOGGIN RIVER-A24-FOMB	8/14/2011	8:00 AM	D			23.8	89.1	7.5	137.3				
BIL	ANDROSCOGGIN RIVER-A24-FOMB	9/18/2011	8:15 AM	N			18.2	89.9	8.5	64.8				
BIL	ANDROSCOGGIN RIVER-A24-FOMB	10/16/2011	9:05 AM	N			13.5	105.6	11	64.6				
DBL - DURHAM BOAT LAUNCH	ANDROSCOGGIN RIVER-A158-FOMB	4/18/2011	7:00 AM	N			4.8	112.8	14.5	35				
DBL	ANDROSCOGGIN RIVER-A158-FOMB	4/18/2011	7:00 AM	D			4.8	112.8	14.5	35				
DBL	ANDROSCOGGIN RIVER-A158-FOMB	6/12/2011	7:00 AM	N			18.9	84	7.8	68.8				
FPU - FISH PARK UPSTREAM	ANDROSCOGGIN RIVER-A47-FOMB	4/18/2011	7:30 AM	N			4.7	111.6	14.4	37.5				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	5/15/2011	7:20 AM	N			12.2	95.5	10.2	52.3				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	6/12/2011	7:35 AM	N			19.5	85.3	7.7	65.4				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	6/12/2011	7:35 AM	D			19.2	85.3	7.7	65.4				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	7/17/2011	7:10 AM	N			25.3	86.3	7.1	97.8				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	7/17/2011	7:10 AM	D			25.3	86	7					
FPU	ANDROSCOGGIN RIVER-A47-FOMB	8/14/2011	7:05 AM	N			24	92.8	7.8	137.4				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	9/18/2011	7:45 AM	N			18.4	90.2	8.5	63.6				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	10/16/2011	8:35 AM	N			13.5	100.3	10.4	64.4				
FPU	ANDROSCOGGIN RIVER-A47-FOMB	10/16/2011	8:35 AM	D			13.5		10.4	64.4				
FPD - FISH PARK DOWNSTREAM	ANDROSCOGGIN RIVER-A45-FOMB	4/18/2011	7:45 AM	N			4.8	114.5	14.9	37.7				
FPD	ANDROSCOGGIN RIVER-A45-FOMB	5/15/2011	7:30 AM	N			12.2	96	10.3	53.1				
FPD	ANDROSCOGGIN RIVER-A45-FOMB	6/12/2011	7:45 AM	N			19.3	85.5	7.9	63.9				
FPD	ANDROSCOGGIN RIVER-A45-FOMB	7/17/2011	7:25 AM	N			25.5	86	7	95.5				
FPD	ANDROSCOGGIN RIVER-A45-FOMB	8/14/2011	7:20 AM	N			24.1	90.5	7.6	137.5				
FPD	ANDROSCOGGIN RIVER-A45-FOMB	9/18/2011	7:55 AM	N			18.4	90.1	8.4	63.6				
FPD	ANDROSCOGGIN RIVER-A45-FOMB	10/16/2011	8:50 AM	N			13.5	107	11.2	64.3				

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity(PPTH)	Turbid-ity (NTU)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)
PBL - PEJEPSCOT BOAT LAUNCH	ANDROSCOGGIN RIVER-A71-FOMB	4/18/2011	6:30 AM	N			5.1	111.5	14.2	38				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	5/15/2011	6:50 AM	N			12.4	95.2	10.2	56.1				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	5/15/2011	6:50 AM	D			12.4	95.2	10.2	54.5				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	6/12/2011	6:25 AM	N			19.1	85.2	7.9	67				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	7/17/2011	6:40 AM	N			25.5	87.9	7.2	96.2				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	8/14/2011	6:45 AM	N			24	93.2	7.9	139.7				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	9/18/2011	7:20 AM	N			17.8	89.8	8.5	65.1				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	9/18/2011	7:20 AM	D			17.8			65.1				
PBL	ANDROSCOGGIN RIVER-A71-FOMB	10/16/2011	8:10 AM	N			13.7	100.6	10.4	63				

Appendix A-2. 2011 observational data and quality assurance/quality control (QA/QC) notes for "approved" and "non-approved" sites.
** "N" = normal environmental sample; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "TSS"=total suspended solids
Refer to Appendix A-1 for water quality data

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (° C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
Androscoggin River - Friends of Merrymeeting Bay (Approved Sites)															
BBB - BAY BRIDGE JETTY	ANDROSCOGGIN RIV	4/18/2011	7:20 AM	N		HIGH	3.5	WADING	PARTLY CLOUDY	BREEZE	PARTLY CLOUDY	RUN		DARKLY STAINED	VERY FAST CURRENT, VERY HIGH WATER. WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BBB	ANDROSCOGGIN RIV	5/15/2011	7:40 AM	N	BASE FLOW	MEDIUM	11.4	WADING	CLOUDY, LIGHT RAIN	CALM	CLOUDY, HEAVY RAIN	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BBB	ANDROSCOGGIN RIV	5/15/2011	7:40 AM	D				WADING							WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BBB	ANDROSCOGGIN RIV	6/12/2011	7:55 AM	N		HIGH	15	WADING	HEAVY RAIN, SHOWER		CLOUDY, LIGHT RAIN, SHOWERS	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BBB	ANDROSCOGGIN RIV	7/17/2011	7:00 AM	N			24.7	WADING				RIFFLE		DARKLY STAINED	WADEABLE/MID-DEPTH TIME SAMPLED WAS NOT WRITTEN DOWN, SO ESTIMATE WAS DERIVED BY LOOKING AT START AND END TIME OF SAMPLING. DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BBB	ANDROSCOGGIN RIV	8/14/2011	7:50 AM	N	BASE FLOW	MEDIUM	20.9	WADING	CLOUDY, PARTLY CLOUDY	BREEZE	CLEAR, PARTLY CLOUDY	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BBB	ANDROSCOGGIN RIV	9/18/2011	7:50 AM	N		HIGH	14.4	WADING	PARTLY CLOUDY	CALM	PARTLY CLOUDY	RUN		DARKLY STAINED	LOTS OF FISH JUMPING. WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BBB	ANDROSCOGGIN RIV	10/16/2011	9:20 AM	N	BASE FLOW	MEDIUM	13.8	WADING		STRONG WIND	CLEAR	RUN		DARKLY STAINED	VERY WINDY - DANGEROUS CURRENTS. VERY HIGH TIDE. WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BCP - BRUNSWICK CANOE PORTAGE	ANDROSCOGGIN RIV	4/18/2011	8:00 AM	N			5.3	BANK	CLEAR	CALM	CLEAR, HEAVY RAIN				WADEABLE/1.5 FT BELOW SURFACE DID NOT RECORD ANY OBSERATIONAL DATA.
BCP	ANDROSCOGGIN RIV	5/15/2011	7:45 AM	N	BASE FLOW	MEDIUM	12	WADING	MOSTLY CLOUDY, SHOWERS	CALM	CLOUDY, SHOWERS	RUN		MEDIUM STAINED	WATER SAMPLING APPARATUS SNAPPED @ 1.5M-RETRIEVAL SUCCESSFUL, BUT UNSURE OF SAMPLE NON-WADEABLE/3 FT BELOW SURFACE, WATER SAMPLING APPARATUS SNAPPED @ 1.5M-RETRIEVAL SUCCESSFUL, BUT UNSURE OF SAMPLE NON-WADEABLE/3 FT BELOW SURFACE; WATER TEMPERATURE NOT RECORDED
BCP	ANDROSCOGGIN RIV	6/12/2011	8:05 AM	N	STORM FLOW	MEDIUM	14.8	WADING	HEAVY RAIN, SHOWER	CALM	LIGHT RAIN, MOSTLY CLOUDY, SHOWERS	RUN		MEDIUM STAINED	HEAVY RAIN PRIOR TO SAMPLING WADEABLE/MID-DEPTH
BCP	ANDROSCOGGIN RIV	7/17/2011	8:00 AM	N	BASE FLOW	MEDIUM		BOAT	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	SAMPLING DONE FROM BOAT-POISON IVY WAS THICK. NON-WADEABLE/3 FT BELOW SURFACE, SAMPLING DONE FROM BOAT-POISON IVY WAS THICK. NON-WADEABLE/3 FT BELOW SURFACE; WATER TEMPERATURE NOT RECORDED

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (° C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appearance	Comments
BCP	ANDROSCOGGIN RIV	8/13/2011	8:00 AM	N	BASE FLOW	LOW	22.3	WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	BOAT PARKED ALONG DOCK AND SLICK OF OILY BLUE TRAILING DOWNSTREAM. WADEABLE/1.5 FT BELOW SURFACE BOTH NON-WADEABLE (3 FT BELOW SURFACE) AND WADEABLE (1.5 FT BELOW SURFACE) CIRCLED ON FIELD SHEET., WATER TEMPERATURE NOT RECORDED; D.O. SATURATION OUTSIDE VALIDATION RANGE (134.7); BOAT PARKED ALONG DOCK AND SLICK OF OILY BLUE TRAILING DOWNSTREAM. WADEABLE/1.5 FT BELOW SURFACE; BOTH NON-WADEABLE (3 FT BELOW SURFACE) AND WADEABLE (1.5 FT BELOW SURFACE)
BCP	ANDROSCOGGIN RIV	8/13/2011	8:00 AM	D				WADING							BOAT PARKED ALONG DOCK AND SLICK OF OILY BLUE TRAILING DOWNSTREAM. WADEABLE/1.5 FT BELOW SURFACE BOTH NON-WADEABLE (3 FT BELOW SURFACE) AND WADEABLE (1.5 FT BELOW SURFACE) CIRCLED ON FIELD SHEET.
BCP	ANDROSCOGGIN RIV	9/18/2011	8:10 AM	N		HIGH	15.9	BANK	PARTLY CLOUDY	CALM	PARTLY CLOUDY	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH
BCP	ANDROSCOGGIN RIV	10/16/2011	8:00 AM	N	STORM FLOW	HIGH	13.8	BRIDGE	CLEAR	BREEZE	CLEAR, CLOUDY, SHOWERS	RUN		DARKLY STAINED	WAS NOT ABLE TO TEST FROM ROCKS-TESTED FROM SWINGING BRIDGE. NON-WADEABLE/3 FT BELOW SURFACE
BWS - BRUNSWICK WATER STREET	ANDROSCOGGIN RIV	4/18/2011	8:00 AM	N		HIGH	3.5	WADING	PARTLY CLOUDY	BREEZE	PARTLY CLOUDY	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BWS	ANDROSCOGGIN RIV	5/15/2011	7:05 AM	N	BASE FLOW	MEDIUM	11.6	WADING	CLOUDY, LIGHT RAIN	CALM	CLOUDY, HEAVY RAIN	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BWS	ANDROSCOGGIN RIV	6/12/2011	7:20 AM	N		HIGH	14.5	WADING	HEAVY RAIN, SHOWER		CLOUDY, LIGHT RAIN, SHOWERS	RUN		DARKLY STAINED	D.O. TITRATION DUPLICATE=8.4 WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BWS	ANDROSCOGGIN RIV	6/12/2011	7:20 AM	D				WADING							D.O. TITRATION DUPLICATE=8.4 WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BWS	ANDROSCOGGIN RIV	7/17/2011	7:30 AM	N			25	WADING				RIFFLE		DARKLY STAINED	WADEABLE/MID-DEPTH TIME SAMPLED WAS NOT WRITTEN DOWN, SO ESTIMATE WAS DERIVED BY LOOKING AT START AND END TIME OF SAMPLING. DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BWS	ANDROSCOGGIN RIV	8/14/2011	7:00 AM	N	BASE FLOW	MEDIUM	20.9	WADING	CLOUDY, PARTLY CLOUDY	BREEZE	CLEAR, PARTLY CLOUDY	RUN		DARKLY STAINED	D.O. TITRATION DUPLICATE=7.8 MG/L WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BWS	ANDROSCOGGIN RIV	9/18/2011	7:15 AM	N		HIGH	14.6	WADING	PARTLY CLOUDY	CALM	PARTLY CLOUDY	RUN		DARKLY STAINED	D.O. DUPLICATE TITRATION=8.8 WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE
BWS	ANDROSCOGGIN RIV	10/16/2011	8:50 AM	N	BASE FLOW	MEDIUM	13.8	WADING		STRONG WIND	CLEAR	RUN		DARKLY STAINED	D.O. DUPLICATE TITRATION=10.8 MG/L WADEABLE/MID-DEPTH DID NOT COMPLETE CHAIN OF CUSTODY FOR LAB SAMPLE

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (° C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
Androscoggin River - Friends of Merrymeeting Bay (Non-approved Sites)															
BIL - BRUNSWICK INTERSTATE LEDGES	ANDROSCOGGIN RIV	4/18/2011	8:00 AM	N			6.5	BANK	PARTLY CLOUDY	BREEZE	CLEAR, CLOUDY, HEAVY RAIN, PARTLY CLOUDY				D.O. DUPLICATE TITRATION=13.4 (MG/L)- SHALLOWER THAN PROBE NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERATIONAL DATA.
BIL	ANDROSCOGGIN RIV	5/15/2011	7:55 AM	N			10	BANK	CLOUDY		CLEAR, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIV	6/12/2011	8:05 AM	N			12	BANK	MOSTLY CLOUDY, SHOWERS	CALM	CLOUDY, LIGHT RAIN				NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIV	7/17/2011	7:55 AM	N			22	BANK	CLEAR		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIV	8/14/2011	8:00 AM	N				BANK	PARTLY CLOUDY		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIV	8/14/2011	8:00 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIV	9/18/2011	8:15 AM	N			13	BANK	CLEAR		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIV	10/16/2011	9:05 AM	N			11.5	BANK	PARTLY CLOUDY	BREEZE	CLEAR, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
DBL - DURHAM BOAT LAUNCH	ANDROSCOGGIN RIV	4/18/2011	7:00 AM	N			5	BANK	PARTLY CLOUDY	BREEZE	CLEAR, CLOUDY, HEAVY RAIN, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERATIONAL DATA.
DBL	ANDROSCOGGIN RIV	4/18/2011	7:00 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERATIONAL DATA.
DBL	ANDROSCOGGIN RIV	6/12/2011	7:00 AM	N			10	BANK	MOSTLY CLOUDY, SHOWER	CALM	CLOUDY, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU - FISH PARK UPSTREAM	ANDROSCOGGIN RIV	4/18/2011	7:30 AM	N			6.5	BANK	PARTLY CLOUDY	BREEZE	CLEAR, CLOUDY, HEAVY RAIN, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERATIONAL DATA.
FPU	ANDROSCOGGIN RIV	5/15/2011	7:20 AM	N			10	BANK	CLOUDY		CLEAR, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	6/12/2011	7:35 AM	N			10.8	BANK	MOSTLY CLOUDY, SHOWER	CALM	CLOUDY, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	6/12/2011	7:35 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	7/17/2011	7:10 AM	N			18	BANK	CLEAR		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	7/17/2011	7:10 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	8/14/2011	7:05 AM	N				BANK	PARTLY CLOUDY		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	9/18/2011	7:45 AM	N			9	BANK	CLEAR		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	10/16/2011	8:35 AM	N			11	BANK	PARTLY CLOUDY	BREEZE	CLEAR, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIV	10/16/2011	8:35 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD - FISH PARK DOWN STREAM	ANDROSCOGGIN RIV	4/18/2011	7:45 AM	N			6.5	BANK	PARTLY CLOUDY	BREEZE	CLEAR, CLOUDY, HEAVY RAIN, PARTLY CLOUDY				NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERATIONAL DATA.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (° C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
FPD	ANDROSCOGGIN RIV	5/15/2011	7:30 AM	N			10	BANK	CLOUDY		CLEAR, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIV	6/12/2011	7:45 AM	N			10.8	BANK	MOSTLY CLOUDY, SHOWER	CALM	CLOUDY, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIV	7/17/2011	7:25 AM	N			19	BANK	CLEAR		CLEAR				NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIV	8/14/2011	7:20 AM	N				BANK	PARTLY CLOUDY		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIV	9/18/2011	7:55 AM	N			9	BANK	CLEAR		CLEAR				NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIV	10/16/2011	8:50 AM	N			11.1	BANK	PARTLY CLOUDY	BREEZE	CLEAR, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL - PEJEPSCOT BOAT LAUNCH	ANDROSCOGGIN RIV	4/18/2011	6:30 AM	N			4	BANK	PARTLY CLOUDY	BREEZE	CLEAR, CLOUDY, HEAVY RAIN, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	5/15/2011	6:50 AM	N			10	BANK	CLOUDY		CLEAR, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	5/15/2011	6:50 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	6/12/2011	6:25 AM	N			10.8	BANK	MOSTLY CLOUDY, SHOWER	CALM	CLOUDY, LIGHT RAIN				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	7/17/2011	6:40 AM	N			17.5	BANK	CLEAR		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	8/14/2011	6:45 AM	N				BANK	PARTLY CLOUDY		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	9/18/2011	7:20 AM	N			9	BANK	CLEAR		CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	9/18/2011	7:20 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIV	10/16/2011	8:10 AM	N			11.5	BANK	PARTLY CLOUDY	BREEZE	CLEAR, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.

Section 5-2
Androscoggin River (Friends of Merrymeeting Bay)

Refer to Chapter 4 of this document for information about sampling methods, sampling sites, and quality assurance.

Overview

The lower Androscoggin River is monitored by the Friends of Merrymeeting Bay (FOMB). FOMB has been in existence since 1975 and focuses on protecting the Merrymeeting Bay watershed through research, education, advocacy, and land conservation. They have been monitoring the lower part of the Androscoggin River, tributaries to Merrymeeting Bay, and the Bay since 1999. Their monitoring has extended up the Androscoggin at times (depending on volunteers) to Livermore Falls. FOMB joined the VRMP in 2009 with an interest in bringing about water classification upgrades when possible.

The Androscoggin River is the third largest river in the state. It has a length of 177 miles and drainage area of 3,450 square miles (2,730 sq. mi. in Maine).[1] The headwaters are Umbagog Lake in New Hampshire. From there it flows into New Hampshire and then back into Maine through the towns of Gilead and Bethel. It continues flowing through the towns and cities of Bethel, Rumford, Mexico, Dixfield, Jay, Livermore Falls, Lewiston, Auburn, Lisbon, Lisbon Falls, Durham, Brunswick, and Topsham where it joins the Kennebec River at Merrymeeting Bay.

The Androscoggin River is assigned Class B from the Maine/New Hampshire boundary to its confluence with the Ellis River. It is assigned Class C from the confluence with the Ellis River to Merrymeeting Bay. The "DEP 2010 Integrated Water Quality Monitoring and Assessment Report" lists segments of the main stem in 3 categories:

- The main stem, upstream of Gulf Island Pond, is listed in Category 4-A (Rivers and Streams with Impaired Use, TMDL completed). Causes of impairment are phosphorus, dissolved oxygen, total suspended solids, biological oxygen demand, and algal blooms. In addition, Category 4-A is Lewiston-Auburn variable mileage, CSO affected. Cause of impairment is *E.coli*.
- A number of segments are listed in Category 4-B (Rivers and Streams Impaired by Pollutants-Pollution Control Requirements Expected to Result in Attainment). The cause of non-attainment is dioxin.
- A number of segments are listed in Category 5-D (Rivers and Streams Impaired by Legacy Pollutants). The cause of non-attainment is polychlorinated biphenyls (PCBs).

The Androscoggin River has a long history of industrial and municipal use over the last 200 years.[1] Beginning in the early 1800s, many dams were constructed for mills, primarily in the lower part of the river. By the late 1800s, many textile and lumber mills were in operation, mostly from Lewiston to Brunswick. Pulp and paper mills that are still in operation today were established in the late 1800s in New Hampshire, Rumford, and Jay. Beginning in the late 1920s, Central Maine Power built

[1] Maine Rivers Website- Androscoggin River Profile

hydroelectric dams that impounded much of the river from Lewiston to Livermore Falls. Some of these uses continue today. "Along its course to the sea, the river is repeatedly dammed. It receives discharges from industrial and municipal sources, as well as polluted runoff from a variety of sources."[2] Specific problems include mill discharges, combined sewer overflows (CSOs), dam impacts (28 dams exist), and historical sediment toxics.

The primary purpose of monitoring performed by FOMB, done under the VRMP, is to acquire data that will facilitate the water quality classification upgrade of the lower portion of the Androscoggin River. FOMB currently monitors at numerous sites from Merrymeeting Bay upstream to Lewiston. Three of FOMB's sampling sites are VRMP approved sites and five are non-approved sites.

In 2011, FOMB requested that two of the three approved sites (Water Street Mooring, WSM and Brunswick Canoe Mooring, BCM) be moved from mid-channel to shore. They submitted monitoring data from mid-channel and shore to demonstrate similarity. The Department approved relocation of these approved sites. FOMB renamed these sites Brunswick Water Street (BWS) and Brunswick Canoe Portage (BCP), respectively.

Methods

The volunteers monitored the Androscoggin River in 2012 at three approved stations [BBB, BWS, BCP] and five non-approved stations [DBL, BIL, FPD, FPU, PBL] on the main stem (Table 5-2-1 and Figures 5-2-1 through 5-2-3).

Table 5-2-1: Friends of Merrymeeting Bay sampling sites at Androscoggin River.

VRMP Site ID	Organization Site Code	Sample Location	Class
Androscoggin River-A231-VRMP	BBB	Bay Bridge Jetty	C
Androscoggin River-A281BK-VRMP	BWS	Brunswick Water Street	C
Androscoggin River-A299BK-VRMP	BCP	Brunswick Canoe Portage	C
Androscoggin River-A158-FOMB	DBL	Durham Boat Launch	C
Androscoggin River- A24-FOMB	BIL	Brunswick Interstate Ledges	C
Androscoggin River-A45-FOMB	FPD	Fish Park Downstream	C
Androscoggin River-A47-FOMB	FPU	Fish Park Upstream	C
Androscoggin River-A71-FOMB	PBL	Pejepscot Boat Launch	C

[2] Androscoggin River Alliance Website-Androscoggin River slideshow

2012 Androscoggin River Sampling Sites
Friends of Merrymeeting Bay

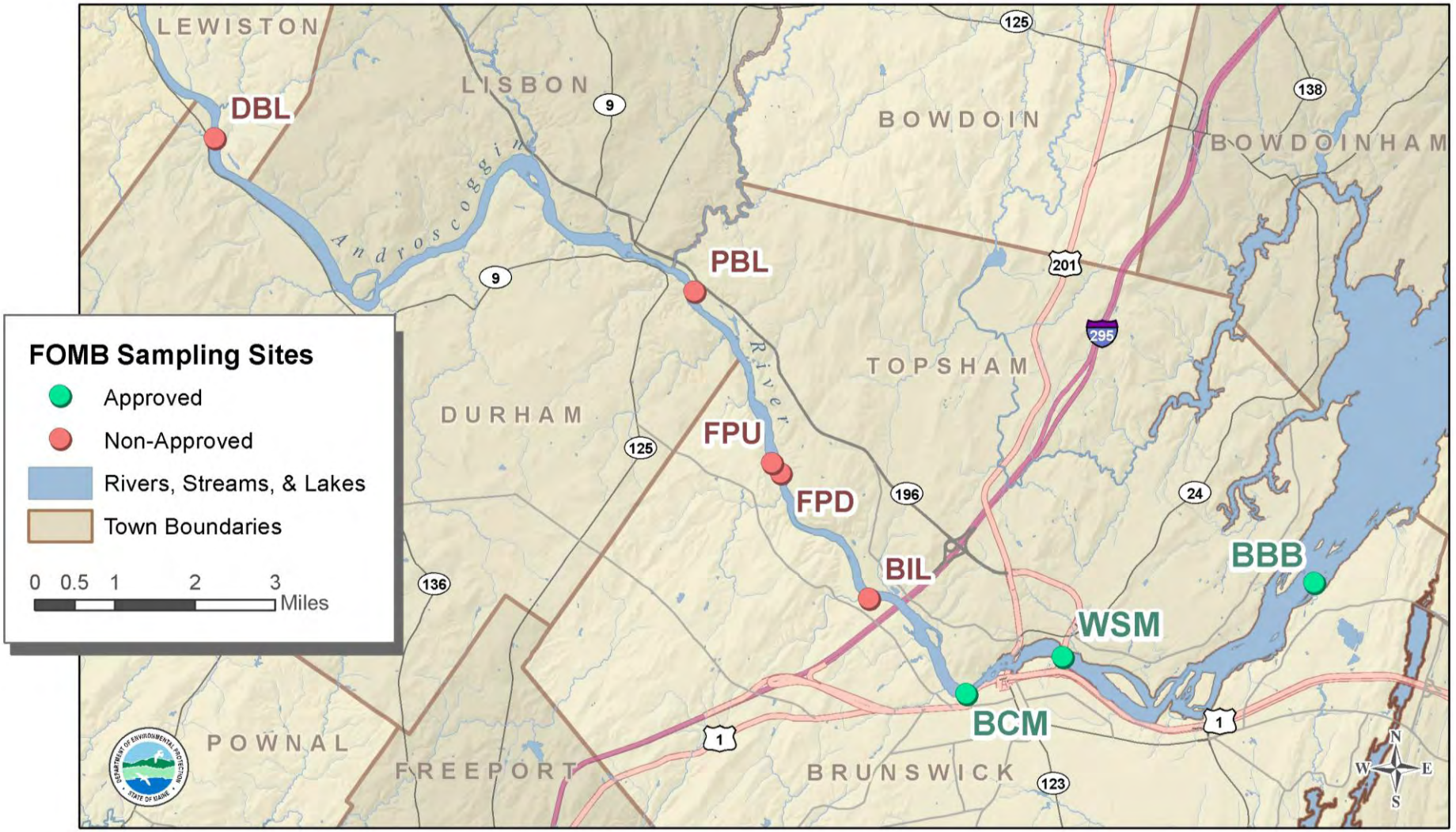


Figure 5-2-1: Map of all Friends of Merrymeeting Bay sampling sites on the Androscoggin River.

Monitoring was conducted from April through October, once per month. At each site, the monitors made direct measurements of water temperature, dissolved oxygen, and specific conductance using a handheld YSI 85 meter. Samples were also collected for *E. coli* bacteria at the three approved sites with a DEP designed bacteria sampling device or extension pole (which uses sterile whirl-paks for water collection). Bacteria samples were delivered to Bowdoin College for analysis by FOMB volunteers. Bacteria monitoring was also done at the non-approved sites, but since sampling at these sites does not meet VRMP requirements the data is not included.

The approved sites met VRMP requirements for sampling laterally and vertically in the river to obtain well-mixed representative samples. As noted in the previous section, two of the approved sites were sampled from shore. The third site was sampled from a jetty allowing for a representative and well-mixed area of the river to be monitored.

Results

Refer to Appendices A-1 and A-2 in discussion of individual site data and trends, as well as graphed data (Figures 5-2-5 through 5-2-14), at the end of this section of the report.

Precipitation

Figure 5-2-4 provides a graph of rainfall and sampling dates for the monitoring period. Rainfall data was obtained from Weather Underground (http://www.wunderground.com). Weather station choice was based on proximity and station with most complete records. If there was an airport station close by, this was chosen. This information provides an overview of rainfall events and can be useful in interpreting monitoring results for some parameters.

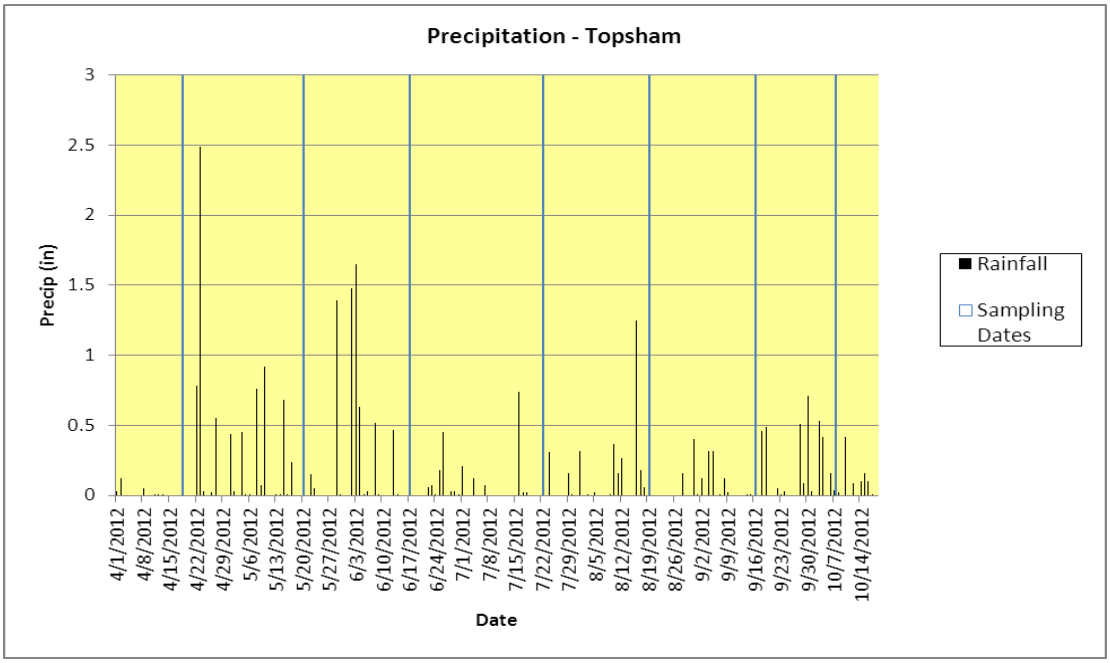


Figure 5-2-2: Seasonal precipitation measured at Highland Green, Topsham.

Dissolved Oxygen

Dissolved oxygen (DO) was measured 1-7 times at each of the eight sampling sites (Table 5-2-2 and Table 5-2-3). Monitoring occurred from April to October. Class C criteria for DO are a minimum of 5.0 mg/l (milligrams/liter) or 60% saturation, whichever is higher. To meet water quality criteria, both concentration and saturation standards must be met.

Table 5-2-2: A summary of minimum, maximum, and average dissolved oxygen concentration values (mg/l) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	6	7.2	10.3	8.4
BWS	Y	5	7.6	10.7	8.9
BCP	Y	6	7.1	9.8	8.2
DBL	N	1	14.5	14.5	14.5
BIL	N	5	7.4	14.7	9.6
FPD	N	7	7.5	14.9	9.3
FPU	N	7	7.5	14.4	9.3
PBL	N	7	7.5	14.2	9.3

Table 5-2-3: A summary of minimum, maximum, and average dissolved oxygen saturation (%) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	6	83.5	103.5	90.8
BWS	Y	5	87.6	105.4	96.8
BCP	Y	6	83.4	101.1	88.6
DBL	N	1	112.8	112.8	112.8
BIL	N	5	87.7	115.2	96.9
FPD	N	7	87.7	114.5	95.3
FPU	N	7	88.1	111.6	94.8
PBL	N	7	87.6	111.5	96.1

Dissolved oxygen concentrations measured at Androscoggin River approved sites ranged from 7.1 mg/l to 10.7 mg/l. The three sites are very similar, although BWS was slightly higher. The lowest values were the late July and/or mid-August sampling events. Site BBB values for July and August were both 7.2 mg/l. BWS lowest value was in August at 7.6 mg/l. Site BCP July and August values were 7.1mg/l and 7.4 mg/l, respectively.

Dissolved oxygen concentrations measured at Androscoggin River non-approved sites ranged from 7.4 mg/l -14.9 mg/l. Site DBL was sampled only 1 time-mid April. The remaining sites BIL, FPU, FPD, and PBL were all very similar. The lowest readings were all around 7.5-8.3 mg/l for the late July and mid-August sampling events. Dissolved oxygen never dropped below the Class C standard of 5.0 mg/l. Dissolved oxygen percent saturation ranged from 83.4%-115.2% and did not go below the Class C standard of 60%. [See graphs at end of report]

Friends of Merrymeeting Bay volunteers do a good job of getting out early in the morning to sample. All but 2 of the 44 measurements were taken by 8:15 am or earlier. This is the recommended time to sample because DO is lowest at this time of day. Dissolved oxygen is also affected by flow conditions and temperature. During high flow conditions, more oxygen enters the river from the atmosphere as the water is more turbulent and there is more opportunity for re-aeration. Cooler water holds more oxygen.

Water Temperature

Temperature was measured 1-7 times at each of the eight sampling sites (Table 5-2-4). Monitoring occurred from April through October. Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23°C maximum and 19°C weekly average) or 0.3°C (0.5°F) above the temperature that would naturally occur outside a mixing zone established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4°F (2.2°C) or more than 1.5°F (0.8°C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85°F (29°C) at any point outside a mixing zone established by the Board of Environmental Protection.

Table 5-2-4: A summary of minimum, maximum, and average water temperature (°C) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	3	16.2	20.7	18.8
BWS	Y	5	14.9	24.5	19.6
BCP	Y	4	15.1	23.4	18.7
DBL	N	1	4.8	4.8	4.8
BIL	N	5	4.9	24.9	17.8
FPD	N	7	4.8	25.2	17.8
FPU	N	7	4.7	25.1	17.8
PBL	N	7	5.1	25.3	17.5

Temperatures measured at all the Androscoggin River sites ranged from 4.7˚-25.2˚C (Celsius).

All of the approved sites had very similar temperature for all but one date. The August value at Site BBB was lower than the other two sites (20.7°C vs. 22.7- 23.4°C) which were high. Temperature was not recorded in July for Sites BBB and BCP. The July value for Site WSM was the highest recorded (24.5°C). The non-approved sites were all very similar. Temperature was high in July and August ranging from 22.9-25.3°C.

Specific Conductance

Specific conductance was measured 1-7 times at each of the eight sampling sites as well (Table 5-2-5). Monitoring occurred from April through October. Specific conductance is related to the amount of dissolved materials in the water. While there are no numerical standards, a relationship exists between conductivity and chloride which has numerical criteria. In general, streams located in urban areas tend to have high specific conductance due to polluted urban stormwater runoff. This may also in large part be due to salt buildup in surface and groundwater from road maintenance practices. Also, discharges from pulp and paper mills upstream measurably increase the conductivity of the river.

Table 5-2-5: A summary of minimum, maximum, and average specific conductance values (micro-ohms/cm, µS/cm) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	6	58	108	81
BWS	Y	5	105	111	109
BCP	Y	5	54	86	70
DBL	N	1	35	35	35
BIL	N	5	39	92	66
FPD	N	7	38	100	74
FPU	N	7	38	94	74
PBL	N	7	38	99	75

Specific conductance at all the sites ranged from 35-111µS/cm, which are elevated somewhat from natural background values, reflecting upstream point and non-point source discharges.
Approved Sites BBB and BCP were very similar with minimum values 54-58 µS/cm and maximum values 86- 108 µS/cm. Site BWS was higher with values consistent through the season ranging from 105-111 µS/cm. The non-approved sites were all very similar with minimum values 38-39 µS/cm and maximum values 66-74 µS/cm (exclusive of Site DBL which was sampled only 1 time).

Bacteria

Escherichia coli bacteria were measured 6 times at each of the three approved sampling sites (Table 5-2-6). Monitoring occurred from April through October. Enterococcus bacteria are used as the indicator organism for marine waters, and *E. coli* bacteria are used for freshwaters. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms including bacteria and viruses that can cause gastrointestinal illnesses. Class C criteria for bacteria are as follows: "Between May 15th and September 30th, the number of *Escherichia Coli* of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml."

Results for the non-approved sites were not included, since non-approved methods are used for collection at those sites. Geometric means are calculated instead of averages because measures like bacteria often have a few very large values that strongly influence the mean and make it a poor predictor.

Table 5-2-6: A summary of minimum, maximum, and geometric mean values (MPN/100mL) for bacteria at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Bacteria Type	# of Samples	Minimum Value	Maximum Value	Geometric Mean
BBB	*E. coli*	6	10	78	34
BWS	*E. coli*	6	12	101	29
BCP	*E. coli*	6	7	71	19

None of these approved sites had maximum values exceeding the instantaneous criterion (see Appendix A-1 and the graphs at the end of this report). Typically, observed high bacterial levels are associated with stormwater runoff and/or combined sewer overflows. None of the sampling coincided with significant rain events. The only sampling date close to a significant rain event was the August 19th date. There was recorded 1.25" of rain at the Highland Green in Topsham monitoring station on 9/16/2013. The highest values for the three sites were for this date ranging from 71-101MPN/100 ml.

Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Androscoggin River sites monitored by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

- Point source pollution (pollution originating from a direct discharge including wastewater treatment plant discharge, combined sewer overflows and overboard discharges).
- Non-point source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, septic systems, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry.

- Ponds and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than free-flowing waters).
- Natural effects of wetlands (such as contributing waters to a stream/river that have low dissolved oxygen levels due to the decomposition of large amounts of organic matter, respiration of abundant plant matter, and low re-aeration rates that are characteristic of many wetlands).

The following are recommendations for future monitoring:

- River temperatures are substantially lower in April and October, and dissolved oxygen concentrations are proportionally higher. There is a good argument for collecting as much water quality data as possible, but if a primary goal of FOMB is to demonstrate the river meets minimum DO criterion for reclassification, they should reconsider the value of extending the season.
- Bacteria monitoring should include a mix of sampling events to include both dry and runoff events. High bacteria levels appear to be related here, not surprisingly, to precipitation/runoff events. If possible, volunteer leaders could try to collect 1-2 bacteria samples during/after rain events.
- Continue monitoring at all stations (or at least a subset of sites) to develop a long- term trend database.

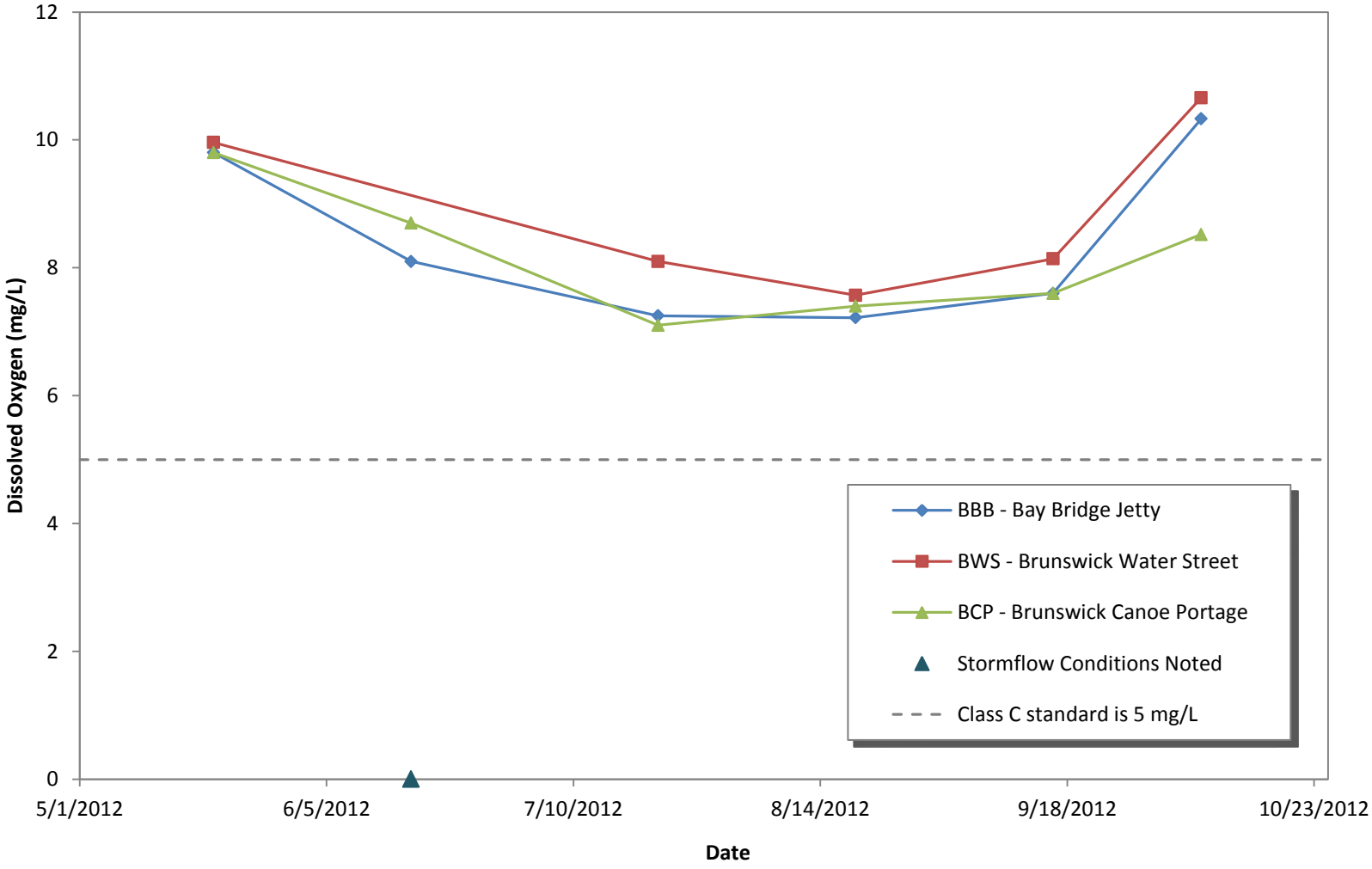


Figure 5-2-3. Dissolved oxygen concentrations of Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2012

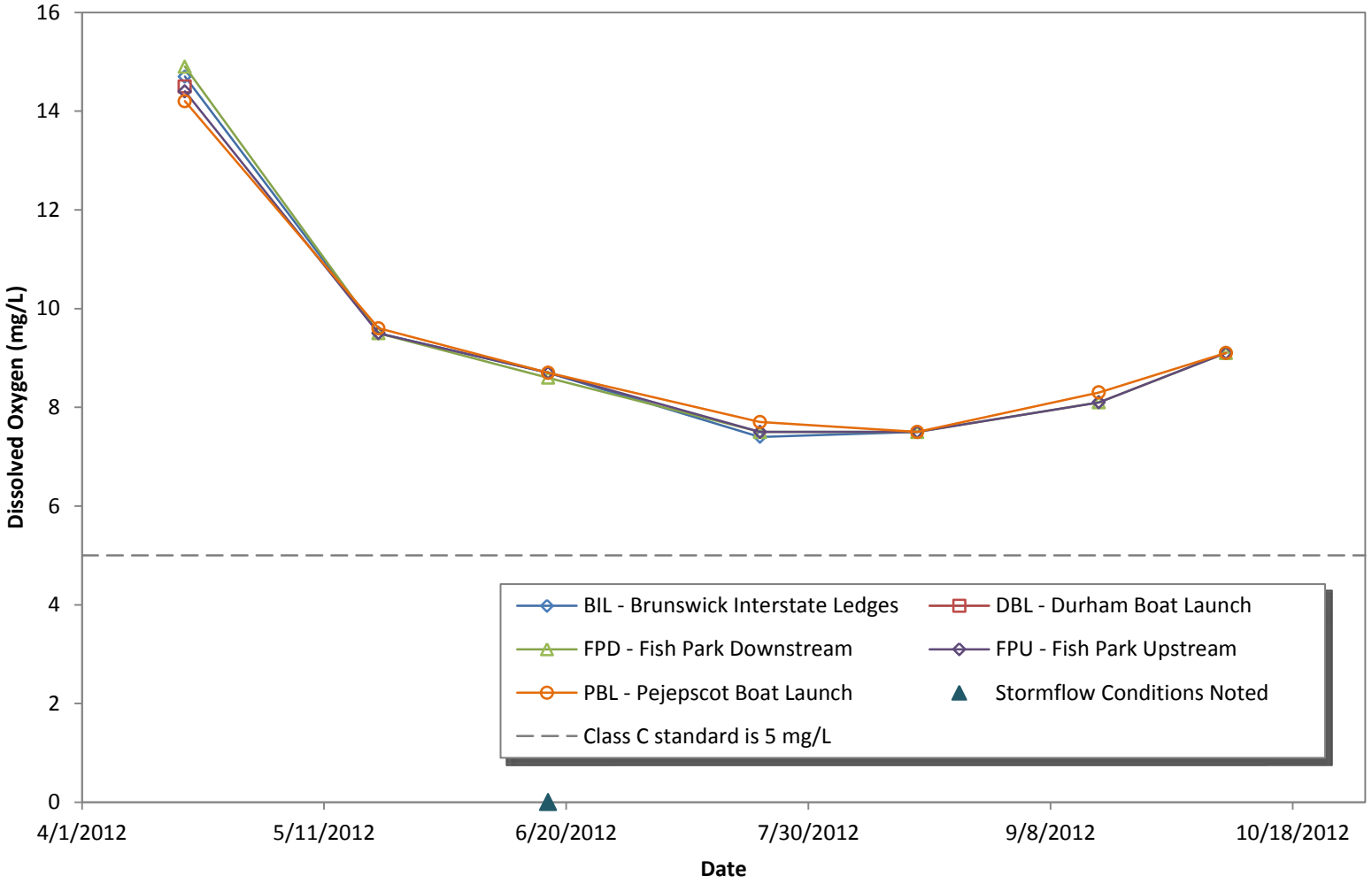


Figure 5-2-4. Dissolved oxygen concentrations at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2012

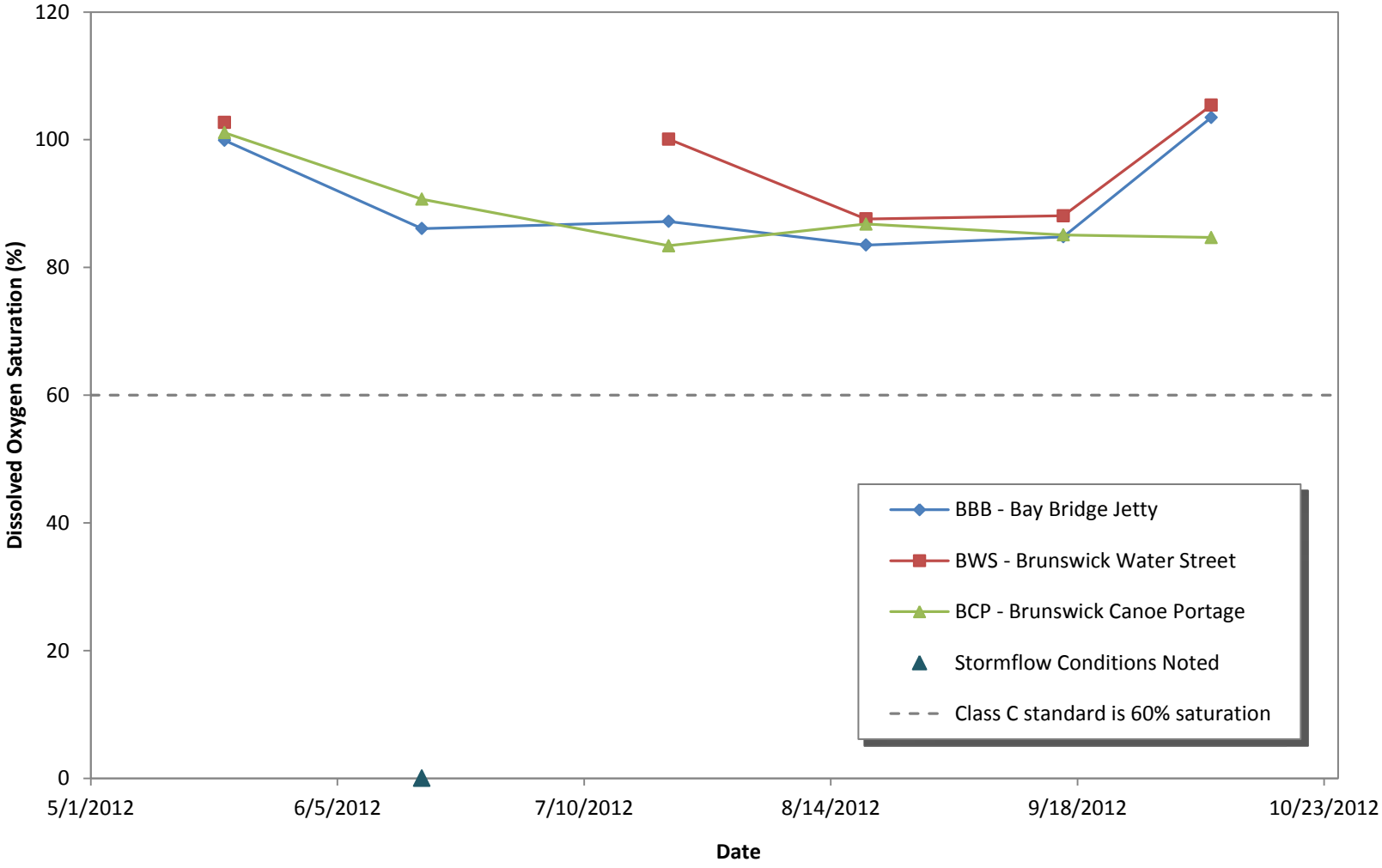


Figure 5-2-5. Dissolved oxygen % saturation of Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2012

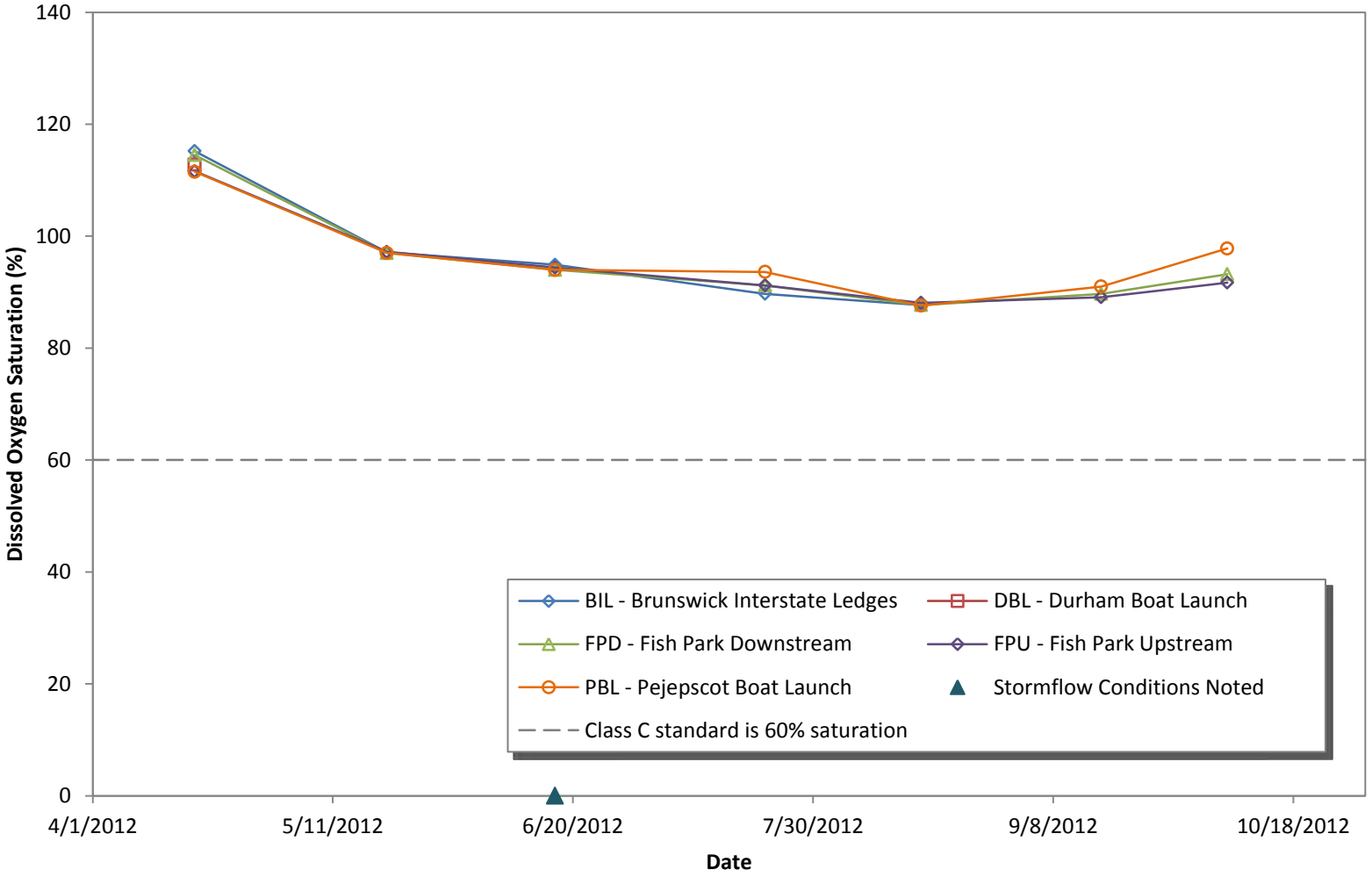


Figure 5-2-6. Dissolved oxygen % saturation at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2012

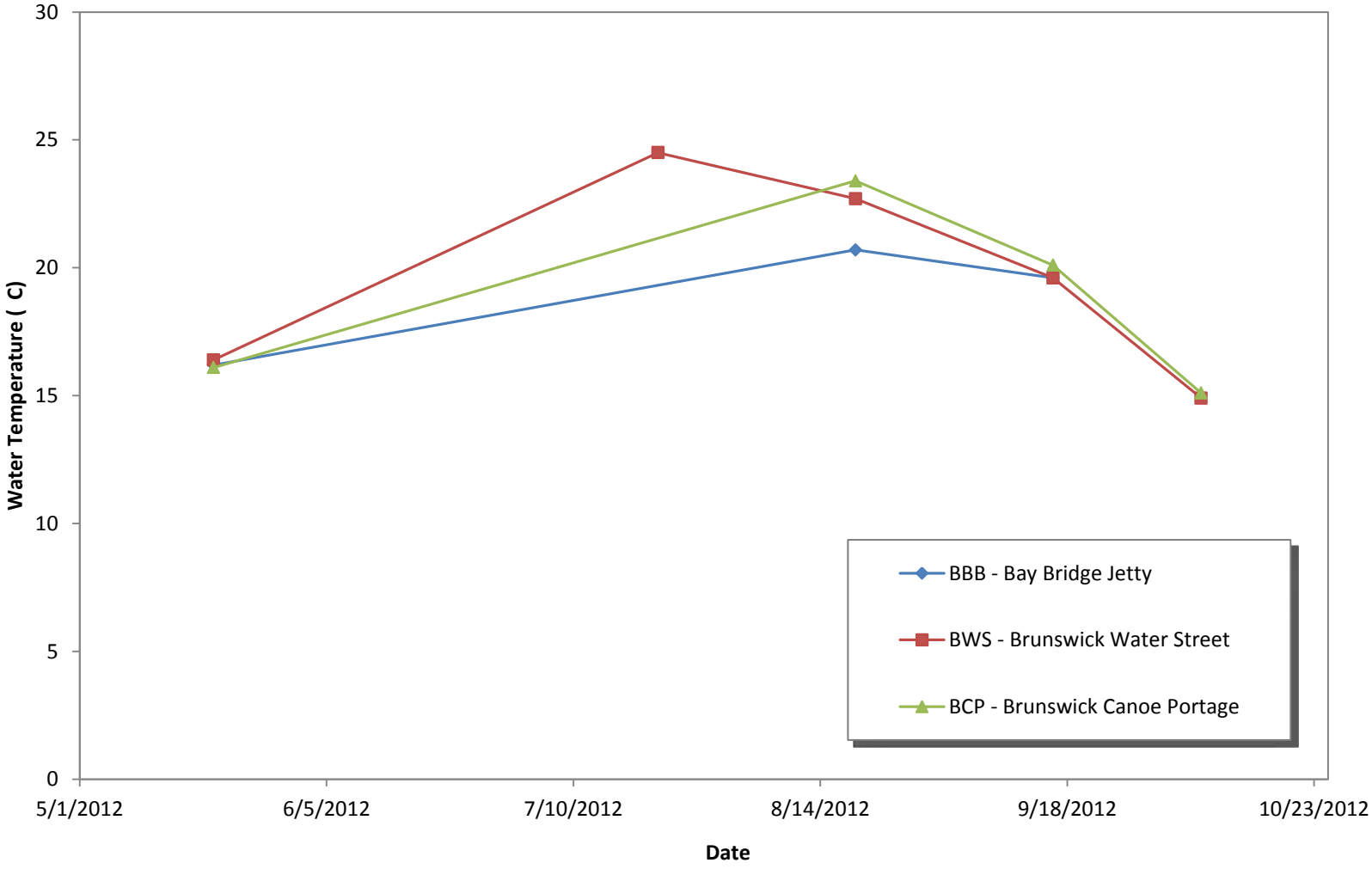


Figure 5-2-7. Water temperatures of Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2012

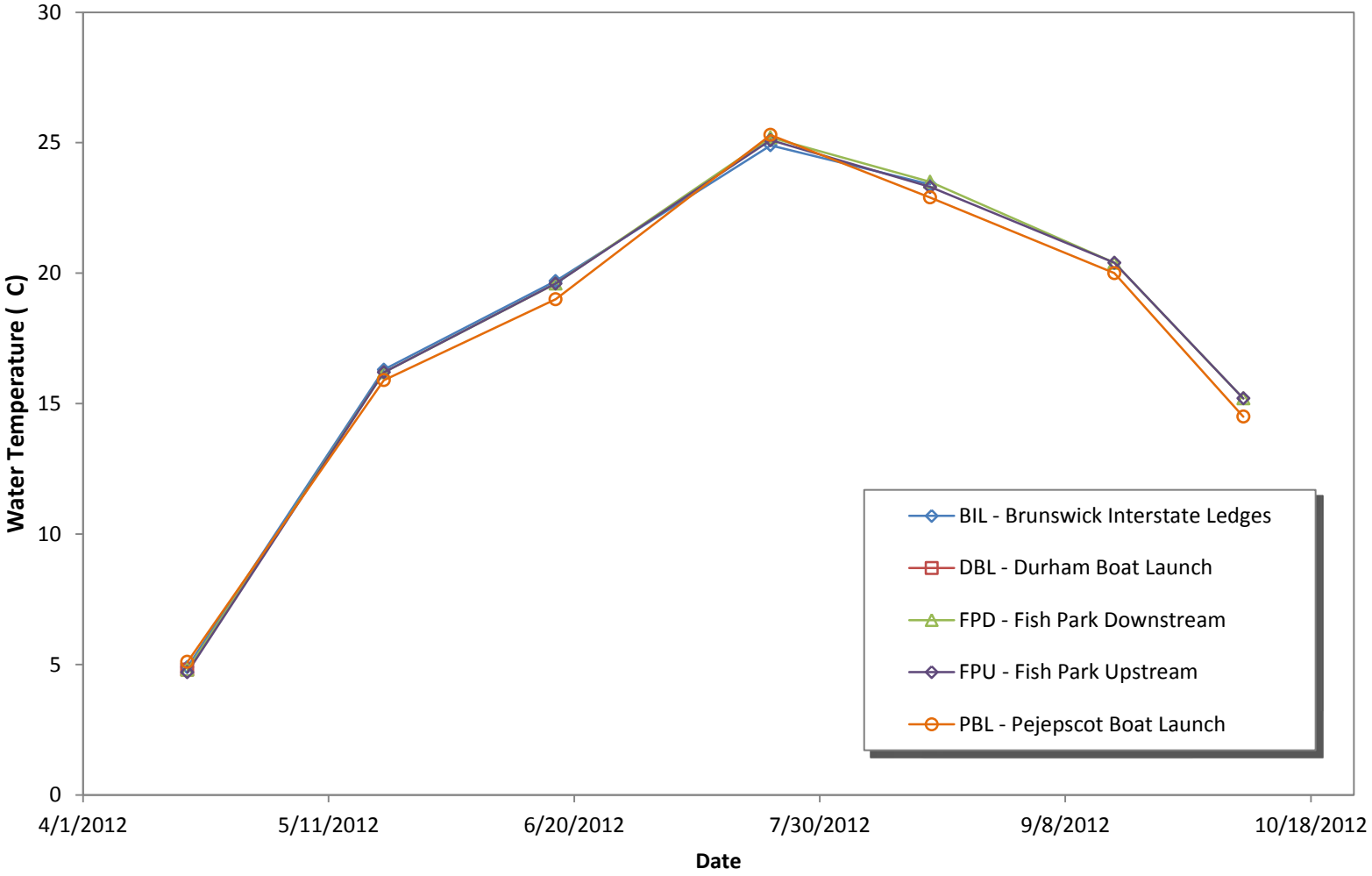


Figure 5-2-8. Water temperatures at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2012

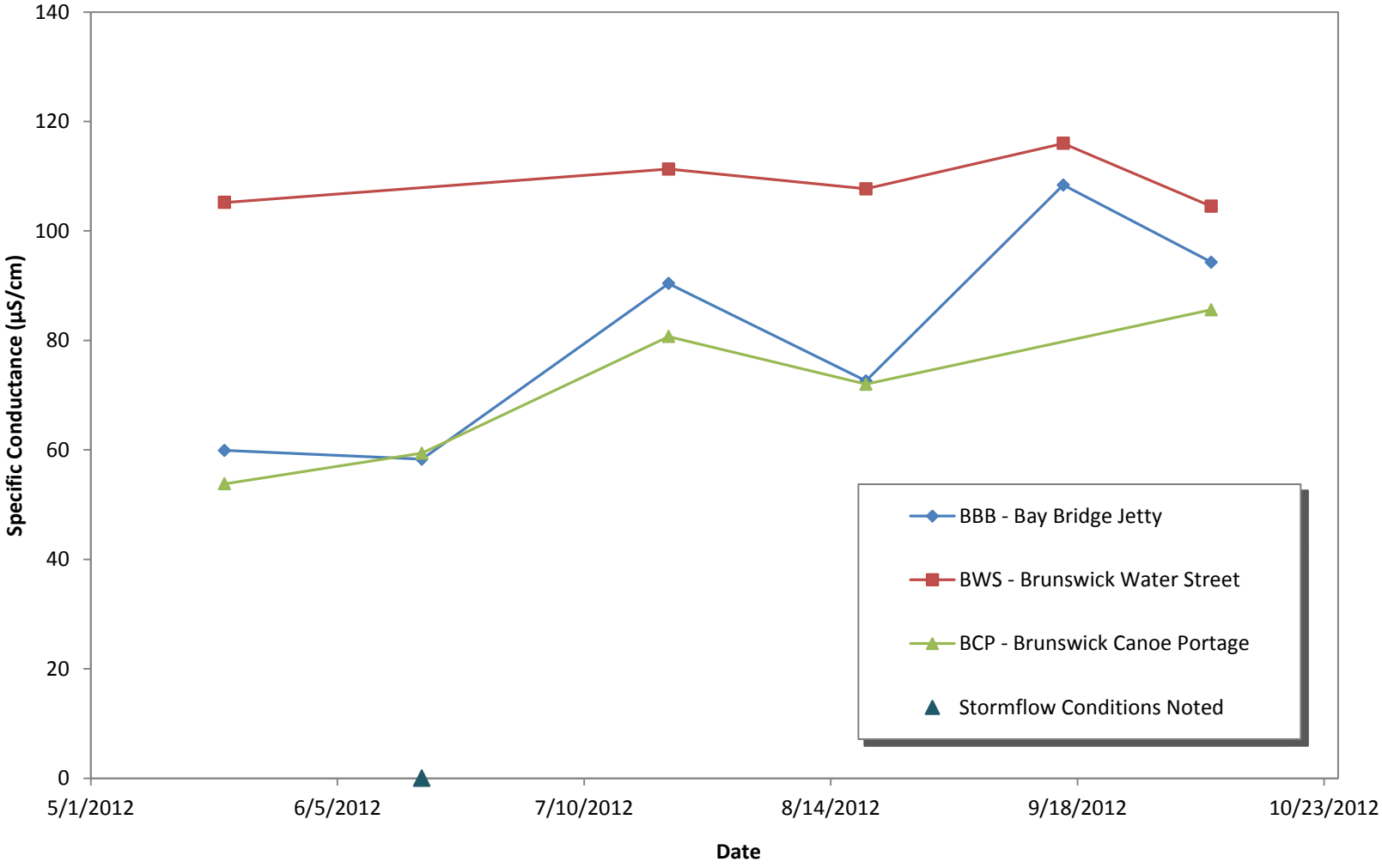


Figure 5-2-9. Specific Conductance at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2012

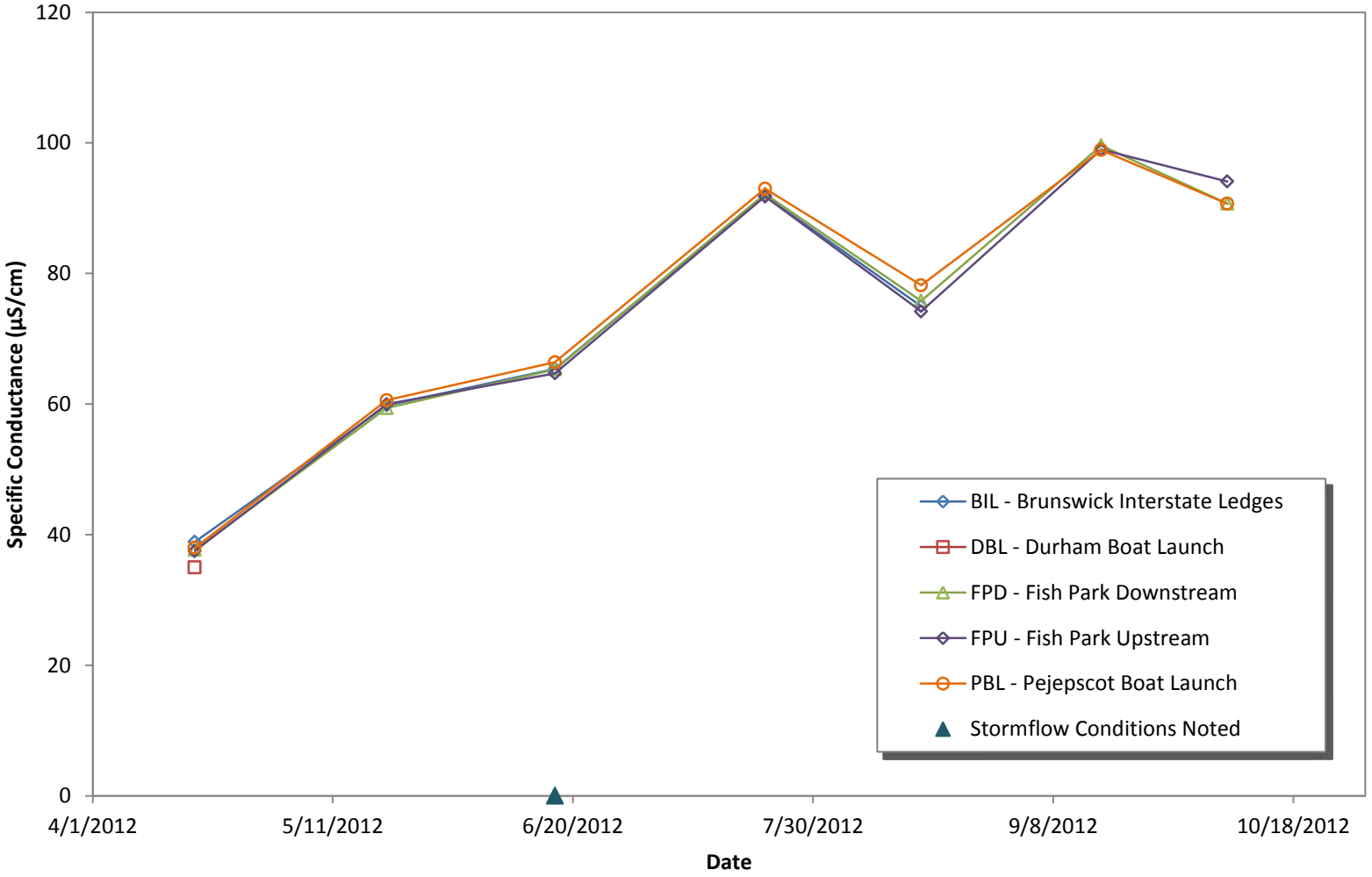


Figure 5-2-10. Specific conductance at Friends of Merrymeeting Bay non-approved monitoring sites on the Androscoggin River for 2012

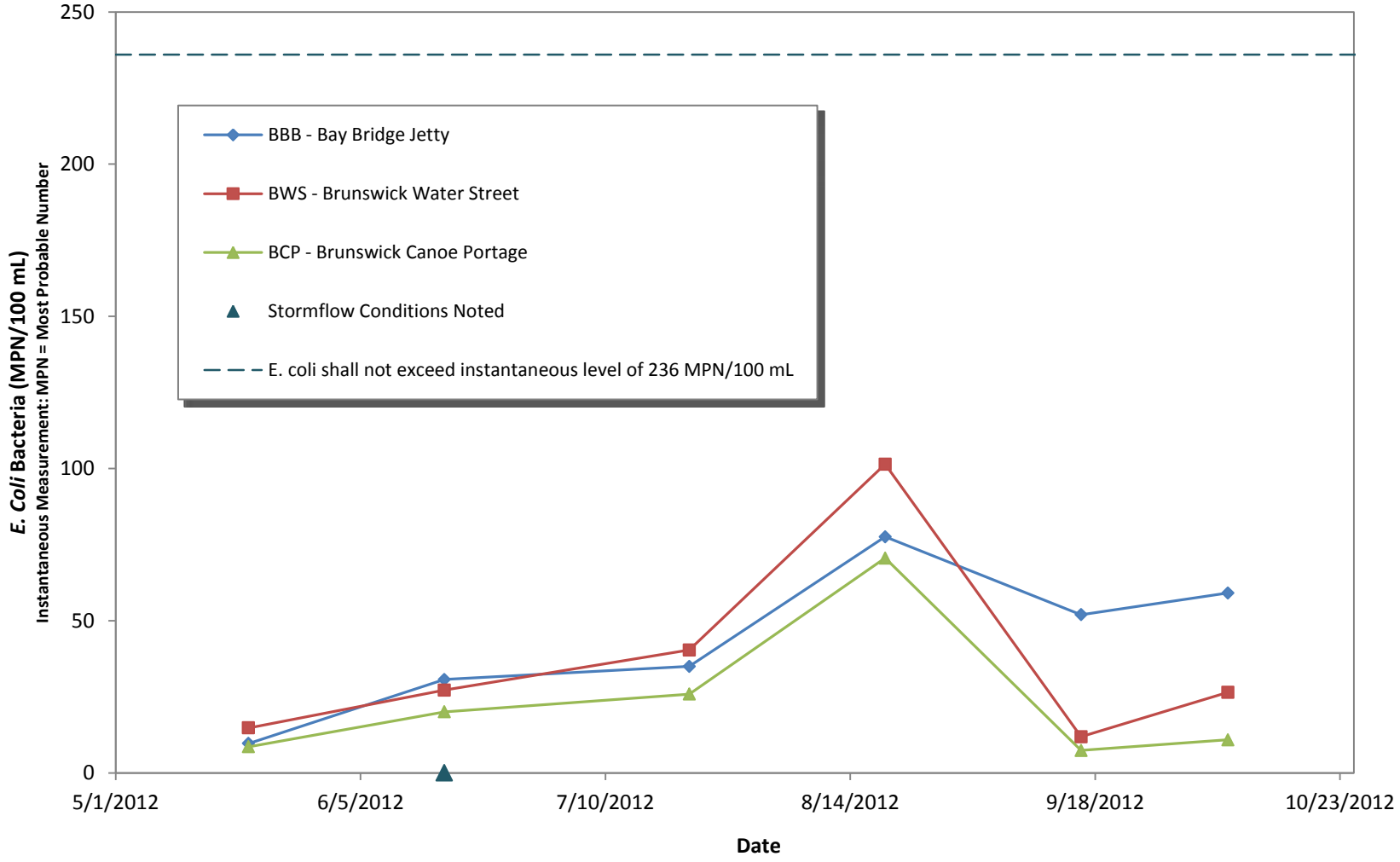


Figure 5-2-11. *E. Coli* bacteria at Friends of Merrymeeting Bay approved monitoring sites on the Androscoggin River for 2012

Appendix A-1. 2012 water quality data for "Approved" and "Non-Approved" sites. Non-Approved sites do not yet meet official VRMP sample location criteria and/or require further inspection and review.
* Sampling depths are only reported for Tier 1 VRMP sites.
** "N" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "Turb" = turbidity; "TSS" = total suspended solids"
Refer to Appendix A-2 for observational data and quality assurance/quality control (QA/QC) notes.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
Androscoggin River, Friends of Merrymeeting Bay - Approved Sites:															
BBB - BAY BRIDGE JETTY	ANDROSCOGGIN RIVER - A231 - VRMP	5/20/2012	8:15 AM	N			16.2	99.9	9.8	59.9				9.7	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	6/17/2012	7:30 AM	N				86.1	8.1	58.3				30.7	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	7/22/2012	7:50 AM	N				87.2	7.25	90.4				35	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	8/19/2012	7:35 AM	N			20.7	83.5	7.22	72.6				77.6	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	9/16/2012	7:45 AM	N			19.6	84.8	7.6	108.4				52	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	10/7/2012	8:40 AM	N				103.5	10.33	94.3				59.1	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	10/7/2012	8:40 AM	D										59.1	
WSM - WATER STREET MOORING	ANDROSCOGGIN RIVER - A281 - VRMP	5/20/2012	7:45 AM	N			16.4	102.7	9.96	105.2				14.8	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	6/17/2012	7:45 AM	N										27.2	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	7/22/2012	7:20 AM	N			24.5	100.1	8.1	111.3				40.4	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	7/22/2012	7:20 AM	D										52.8	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	8/19/2012	7:12 AM	N			22.7	87.6	7.57	107.7				101.4	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	9/16/2012	7:10 AM	N			19.6	88.1	8.14	116				11.9	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	10/7/2012	8:10 AM	N			14.9	105.4	10.66	104.5				26.5	
BCP - BRUNSWICK CANOE PORTAGE	ANDROSCOGGIN RIVER - A299 - VRMP	5/20/2012	7:45 AM	N			16.1	101.1	9.8	53.8				8.6	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	6/17/2012	8:00 AM	N				90.7	8.7	59.4				20.1	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	6/17/2012	8:00 AM	D										24.1	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	7/22/2012	7:45 AM	N				83.4	7.1	80.7				25.9	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	8/19/2012	8:05 AM	N			23.4	86.8	7.4	72				70.6	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	9/16/2012	7:40 AM	N			20.1	85.1	7.6					7.4	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	10/7/2012	8:45 AM	N			15.1	84.7	8.52	85.6				10.9	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
Androscoggin River, Friends of Merrymeeting Bay - Non-approved Sites:															
DBL - DURHAM BOAT LAUNCH	ANDROSCOGGIN RIVER - A158 - FOMB	4/18/2012	7:00 AM	N			4.8	112.8	14.5	35					
DBL	ANDROSCOGGIN RIVER - A158 - FOMB	4/18/2012	7:00 AM	D			4.8	112.8	14.5	35					
BIL - BRUNSWICK INTERSTATE LEDGES	ANDROSCOGGIN RIVER - A24 - FOMB	4/18/2012	8:00 AM	N			4.9	115.2	14.7	38.9					
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	5/20/2012	8:00 AM	N			16.3	97.1	9.5	59.8					
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	6/17/2012	8:00 AM	N			19.7	94.9	8.7	65.4					
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/22/2012	8:00 AM	N			24.9	89.7	7.4	91.9					
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/17/2012	7:55 AM	N			23.4	87.7	7.5	75					
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/17/2012	7:55 AM	D			23.4	87.7	7.5	75					
FPD - FISH PARK DOWNSTREAM	ANDROSCOGGIN RIVER - A45 - FOMB	4/18/2012	7:45 AM	N			4.8	114.5	14.9	37.7					
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	5/20/2012	7:45 AM	N			16.2	97	9.5	59.4					
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	6/17/2012	7:40 AM	N			19.6	94	8.6	65.3					
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/22/2012	7:45 AM	N			25.2	91.2	7.5	92.2					
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/22/2012	7:45 AM	D			25.2	91.2	7.5	92.2					
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	8/17/2012	7:30 AM	N			23.5	87.7	7.5	75.8					
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	9/16/2012	7:30 AM	N			20.4	89.7	8.1	99.6					
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	10/7/2012	7:45 AM	N			15.2	93.2	9.1	90.7					
FPU - FISH PARK UPSTREAM	ANDROSCOGGIN RIVER - A47 - FOMB	4/18/2012	7:30 AM	N			4.7	111.6	14.4	37.5					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	5/20/2012	7:30 AM	N			16.2	97.2	9.5	60					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	6/17/2012	7:25 AM	N			19.6	94.4	8.7	64.7					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	6/17/2012	7:25 AM	D			19.8	94.4	8.7	64.7					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	7/22/2012	7:30 AM	N			25.1	91.2	7.5	91.8					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	8/17/2012	7:20 AM	N			23.3	88.1	7.5	74.2					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	9/16/2012	7:20 AM	N			20.4	89.1	8.1	99					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	10/7/2012	7:25 AM	N			15.2	91.7	9.1	94.1					
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	10/7/2012	7:25 AM	D			15.2	91.7	9.1	94.1					

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
PBL - PEJEPSCOT BOAT LAUNCH	ANDROSCOGGIN RIVER - A71 - FOMB	4/18/2012	6:30 AM	N			5.1	111.5	14.2	38					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/20/2012	7:00 AM	N			15.9	97	9.6	60.6					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/20/2012	7:00 AM	D			15.9	97	9.6	60.6					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	6/17/2012	7:00 AM	N			19	94	8.7	66.4					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	7/22/2012	7:05 AM	N			25.3	93.6	7.7	93					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	8/17/2012	7:00 AM	N			22.9	87.6	7.5	78.2					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/16/2012	6:55 AM	N			20	91	8.3	98.9					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/16/2012	6:55 AM	D			20	91	8.3	98.9					
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	10/7/2012	7:05 AM	N			14.5	97.8	9.1	90.7					

Appendix A-2. 2012 observational data and quality assurance/quality control (QA/QC) notes for "approved" and "non-approved" sites.
** "N" = normal environmental sample; "D" = field duplicate; "L" = lab duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "Turb"= turbidity
Refer to Appendix A-1 for water quality data

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
Androscoggin River, Friends of Merrymeeting Bay - Approved Sites:															
BBB - BAY BRIDGE JETTY	ANDROSCOGGIN RIVER - A231 - VRMP	5/20/2012	8:15 AM	N	BASE FLOW	MED	19	BANK	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	6/17/2012	7:30 AM	N	STORM FLOW	HIGH		WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	EXTREMELY HIGH WATER & SIGNIFICANT FRESET NO VERTICAL DEPTH RECORDED. NO VALUE FOR WATER TEMPERATURE. D.O. METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (15 MINS). DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	7/22/2012	7:50 AM	N	BASE FLOW	MED	20.9	BANK	PARTLY CLOUDY	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH NO VALUE FOR WATER TEMPERATURE. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	8/19/2012	7:35 AM	N		MED		BANK	CLEAR	BREEZE	HEAVY RAIN, LIGHT RAIN	RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	9/16/2012	7:45 AM	N	BASE FLOW	MED		BANK	CLEAR	BREEZE		RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	10/7/2012	8:40 AM	N	BASE FLOW	MED	12	BANK	PARTLY CLOUDY			RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH NO VALUE FOR WATER TEMPERATURE. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	10/7/2012	8:40 AM	D				BANK							NON-WADEABLE/MID-DEPTH NO VALUE FOR WATER TEMPERATURE. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
WSM - WATER STREET	ANDROSCOGGIN RIVER - A281 - VRMP	5/20/2012	7:45 AM	N	BASE FLOW	MED	19	BANK	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH DO TITRATION = 9.3, 9.4 AND 9.2. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	6/17/2012	7:45 AM	N											NON-WADEABLE/MID-DEPTH NO FIELD SHEET SO ONLY ENTERED BACTERIA RESULTS. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	7/22/2012	7:20 AM	N	BASE FLOW	MED	20.7	BANK	PARTLY CLOUDY	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH D.O. TITRATION=7.7 AND 7.8 DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	7/22/2012	7:20 AM	D				BANK							NON-WADEABLE/MID-DEPTH D.O. TITRATION=7.7 AND 7.8 DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	8/19/2012	7:12 AM	N		MED		BANK	CLEAR	CALM	HEAVY RAIN, LIGHT RAIN	RUN		DARKLY STAINED	COOL RAIN FOR DAYS BEFORE. NON-WADEABLE/MID-DEPTH DO TITRATION = 7.4 AND 7.6. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	9/16/2012	7:10 AM	N	BASE FLOW	MED		BANK	CLEAR	BREEZE		RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	10/7/2012	8:10 AM	N	BASE FLOW	MED	11.5	BANK	PARTLY CLOUDY			RUN		DARKLY STAINED	NO RAIN, COLD NON-WADEABLE/MID-DEPTH D.O. TITRATION = 8.8, 8.6 AND 8.7. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BCP - BRUNSWICK CANOE PORTAGE	ANDROSCOGGIN RIVER - A299 - VRMP	5/20/2012	7:45 AM	N	BASE FLOW		16.1	WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	WADEABLE/1.5 FT BELOW SURFACE DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	6/17/2012	8:00 AM	N	STORM FLOW	HIGH		WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	D.O. METER- DID NOT ALLOW TO WARM UP AT LEAST 20 MINUTES (15 MIN). NO VERTICAL DEPTH RECORDED. NO VALUE FOR WATER TEMP. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	6/17/2012	8:00 AM	D				WADING							D.O. METER- DID NOT ALLOW TO WARM UP AT LEAST 20 MINUTES (15 MIN). NO VERTICAL DEPTH RECORDED. NO VALUE FOR WATER TEMP. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	7/22/2012	7:45 AM	N	BASE FLOW	LOW	19.9	WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	WADEABLE/1.5 FT BELOW SURFACE D.O. METER- DID NOT ALLOW TO WARM UP AT LEAST 20 MINUTES (15 MIN). NO VALUE FOR WATER TEMP. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	8/19/2012	8:05 AM	N	BASE FLOW	MED	21	BANK	CLEAR		HEAVY RAIN, LIGHT RAIN	RUN		DARKLY STAINED	COOL RAIN SEVERAL DAYS BEFORE. NON-WADEABLE/MID-DEPTH DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	9/16/2012	7:40 AM	N	BASE FLOW	LOW	13.9	WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	NO VERTICAL DEPTH RECORDED. DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	10/7/2012	8:45 AM	N	BASE FLOW	LOW		WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH DID NOT COMPLETE LAB PARAMETERS TO BE SAMPLED PORTION OF VRMP FIELD DATA SHEETS.

Androscoggin River, Friends of Merrymeeting Bay - Non-approved Sites:

DBL - DURHAM BOAT LAUNCH	ANDROSCOGGIN RIVER - A158 - FOMB	4/18/2012	7:00 AM	N			5	BANK	CLEAR		CLEAR, HEAVY RAIN				NON-WADEABLE/MID-DEPTH D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (15 MINS). DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
DBL	ANDROSCOGGIN RIVER - A158 - FOMB	4/18/2012	7:00 AM	D				BANK							NON-WADEABLE/MID-DEPTH D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (15 MINS). DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL - BRUNSWICK INTERSTATE LEDGES	ANDROSCOGGIN RIVER - A24 - FOMB	4/18/2012	8:00 AM	N			6.5	BANK	CLEAR		CLEAR, HEAVY RAIN				NON-WADEABLE/MID-DEPTH D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (15 MINS). DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	5/20/2012	8:00 AM	N			14.5	BANK	CLEAR	CALM	CLEAR				WADEABLE/1.5 FT BELOW SURFACE D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (TIME NOT RECORDED)? WINKLER D.O. = 9.4 DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	6/17/2012	8:00 AM	N			14.5	WADING	CLEAR	CALM	CLEAR				WADEABLE/1.5 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/22/2012	8:00 AM	N			20	BANK	CLEAR, PARTLY CLOUDY	CALM	CLEAR, PARTLY CLOUDY				WADEABLE/1.5 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/17/2012	7:55 AM	N			17.5	WADING		CALM	CLEAR				WADEABLE/1.5 FT BELOW SURFACE D.O. TITRATION = 7.4 DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/17/2012	7:55 AM	D				WADING							WADEABLE/1.5 FT BELOW SURFACE D.O. TITRATION = 7.4 DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD - FISH PARK DOWNSTREAM	ANDROSCOGGIN RIVER - A45 - FOMB	4/18/2012	7:45 AM	N			6.5	BANK	CLEAR		CLEAR, HEAVY RAIN				NON-WADEABLE/MID-DEPTH D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (15 MINS). DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	5/20/2012	7:45 AM	N			14.5	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/3 FT BELOW SURFACE D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (TIME NOT RECORDED)? WINKLER D.O. = 9.4 DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	6/17/2012	7:40 AM	N			11.5	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/22/2012	7:45 AM	N			18.5	BANK	CLEAR, PARTLY CLOUDY	CALM	CLEAR, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/22/2012	7:45 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	8/17/2012	7:30 AM	N			15	BANK		CALM	CLEAR				WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	9/16/2012	7:30 AM	N			11	BANK	CLEAR		CLEAR, CLOUDY, LIGHT RAIN, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appear-ance	Comments
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	10/7/2012	7:45 AM	N			4.5	BANK	CLEAR, FOGGY	CALM	CLEAR, LIGHT RAIN, SHOWERS				WADEABLE/1.5 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU - FISH PARK UPSTREAM	ANDROSCOGGIN RIVER - A47 - FOMB	4/18/2012	7:30 AM	N			6.5	BANK	CLEAR	CALM	CLEAR, HEAVY RAIN				NON-WADEABLE/MID-DEPTH D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (15 MINS). DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	5/20/2012	7:30 AM	N			14.5	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/3 FT BELOW SURFACE D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (TIME NOT RECORDED)? DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	6/17/2012	7:25 AM	N			11	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	6/17/2012	7:25 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	7/22/2012	7:30 AM	N			18	BANK	CLEAR, PARTLY CLOUDY	CALM	CLEAR, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	8/17/2012	7:20 AM	N			15	BANK		CALM	CLEAR				WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	9/16/2012	7:20 AM	N			9	BANK	CLEAR		CLEAR, CLOUDY, LIGHT RAIN, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	10/7/2012	7:25 AM	N			4	BANK	CLEAR, FOGGY	CALM	CLEAR, LIGHT RAIN, SHOWERS				WADEABLE/1.5 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPU	ANDROSCOGGIN RIVER - A47 - FOMB	10/7/2012	7:25 AM	D				BANK							WADEABLE/1.5 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL - PEJEPSCOT BOAT LAUNCH	ANDROSCOGGIN RIVER - A71 - FOMB	4/18/2012	6:30 AM	N			5	BANK	CLEAR	CALM	CLEAR, HEAVY RAIN				NON-WADEABLE/MID-DEPTH D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (15 MINS). DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/20/2012	7:00 AM	N			14.5	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/3 FT BELOW SURFACE D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (TIME NOT RECORDED)? WINKLER D.O. = 9.4 DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/20/2012	7:00 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE D.O METER-DID NOT ALLOW TO WARM UP FOR AT LEAST 20 MINUTES (TIME NOT RECORDED)? WINKLER D.O. = 9.4 DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	6/17/2012	7:00 AM	N			10.5	WADING	CLEAR	CALM	CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	7/22/2012	7:05 AM	N			18	WADING	CLEAR, PARTLY CLOUDY	CALM	CLEAR, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	8/17/2012	7:00 AM	N			15	WADING		CALM	CLEAR				NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/16/2012	6:55 AM	N			8.5	WADING	CLEAR		CLEAR, CLOUDY, LIGHT RAIN, PARTLY CLOUDY				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	9/16/2012	6:55 AM	D				WADING							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	10/7/2012	7:05 AM	N			6	WADING	CLEAR, FOGGY	CALM	CLEAR, LIGHT RAIN, SHOWERS				WADEABLE/1.5 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.

Section 5-2
Androscoggin River (Friends of Merrymeeting Bay)

Refer to Chapter 4 of this document for information about sampling methods, sampling sites, and quality assurance.

Overview

The lower Androscoggin River is monitored by the Friends of Merrymeeting Bay (FOMB). FOMB has been in existence since 1975 and focuses on protecting the Merrymeeting Bay watershed through research, education, advocacy, and land conservation. They have been monitoring the lower part of the Androscoggin River, tributaries to Merrymeeting Bay, and the Bay since 1999. Their monitoring has extended up the Androscoggin at times (depending on volunteers) to Livermore Falls. FOMB joined the VRMP in 2009 with an interest in bringing about water classification upgrades when possible.

The Androscoggin River is the third largest river in the state. It has a length of 177 miles and drainage area of 3,450 square miles (2,730 sq. mi. in Maine).[1] The headwaters are Umbagog Lake in Maine/New Hampshire. From there it flows into New Hampshire and then back into Maine through the towns of Gilead and Bethel. It continues flowing through the towns and cities of Rumford, Mexico, Dixfield, Jay, Livermore Falls, Lewiston, Auburn, Lisbon, Lisbon Falls, Durham, Brunswick, and Topsham where it joins the Kennebec River at Merrymeeting Bay.

The Androscoggin River is assigned Class B from the Maine/New Hampshire boundary to its confluence with the Ellis River. It is assigned Class C from the confluence with the Ellis River to Merrymeeting Bay. The "DEP 2012 Integrated Water Quality Monitoring and Assessment Report" lists segments of the main stem in 4 categories:

- **Category 4-A:** Rivers and Streams with Impaired Use Other than Mercury, TMDL completed. Androscogging River, Lewiston-Auburn. CSO affected. Cause of impairment is *E. coli*.
- **Category 4 -B:** Rivers and Streams Impaired by Pollutants-Pollution Control Requirements Expected to Result in Attainment. A number of segments are listed. The cause of non-attainment is dioxin.
- **Category 4-C:** Rivers and Streams with Impairment not Caused by a Pollutant. Main stem, form Pejepscot dam to Brunswick dam. Cause is fish passage barrier- aquatic life impairment due to inadequate fish passage for American Shad at Brunswick dam.
- **Category 5-D:** Rivers and Streams Impaired by Legacy Pollutants. A number of segments are listed in Category 5-D. The cause of non-attainment is polychlorinated biphenyls (PCBs).

The Androscoggin River has a long history of industrial and municipal use over the last 200 years.[1] Beginning in the early 1800s, many dams were constructed for mills, primarily in the lower part of the river. By the late 1800s, many textile and lumber mills were in operation, mostly from Lewiston to Brunswick. Pulp and paper mills that are still in operation today were established in the late 1800s in

[1] Maine Rivers Website- Androscoggin River Profile

New Hampshire, Rumford, and Jay. Beginning in the late 1920s, Central Maine Power built hydroelectric dams that impounded much of the river from Lewiston to Livermore Falls. Some of these uses continue today. "Along its course to the sea, the river is repeatedly dammed. It receives discharges from industrial and municipal sources, as well as polluted runoff from a variety of sources."[2] Specific problems include mill discharges, combined sewer overflows (CSOs), dam impacts (28 dams exist), and historical sediment toxins.

The primary purpose of monitoring performed by FOMB, done under the VRMP, is to acquire data that will facilitate the water quality classification upgrade of the lower portion of the Androscoggin River. FOMB currently monitors at numerous sites from Merrymeeting Bay upstream to Lewiston. Three of FOMB's sampling sites are VRMP approved sites and five are non-approved sites.

In 2011, FOMB requested that two of the three approved sites (Water Street Mooring, WSM and Brunswick Canoe Mooring, BCM) be moved from mid-channel to shore. They submitted monitoring data from mid-channel and shore to demonstrate similarity. The Department approved relocation of these approved sites. FOMB renamed these sites Brunswick Water Street (BWS) and Brunswick Canoe Portage (BCP), respectively.

Methods

The volunteers monitored the Androscoggin River in 2013 at three approved stations [BBB, BWS, BCP] and five non-approved stations [DBL, BIL, FPD, FPU, PBL] on the main stem (Table 5-2-1 and Figure 5-2-1).

Table 5-2-1: Friends of Merrymeeting Bay sampling sites at Androscoggin River.

VRMP Site ID	Organization Site Code	Sample Location	Class
Androscoggin River-A231-VRMP	BBB	Bay Bridge Jetty	C
Androscoggin River-A281BK-VRMP	BWS	Brunswick Water Street	C
Androscoggin River-A299BK-VRMP	BCP	Brunswick Canoe Portage	C
Androscoggin River- A24-FOMB	BIL	Brunswick Interstate Ledges	C
Androscoggin River-A45-FOMB	FPD	Fish Park Downstream	C
Androscoggin River-A47-FOMB	FPU	Fish Park Upstream	C
Androscoggin River-A71-FOMB	PBL	Pejepscot Boat Launch	C
Androscoggin River-A158-FOMB	DBL	Durham Boat Launch	C

[2] Androscoggin River Alliance Website-Androscoggin River slideshow

2013 Androscoggin River Sampling Sites
Friends of Merrymeeting Bay

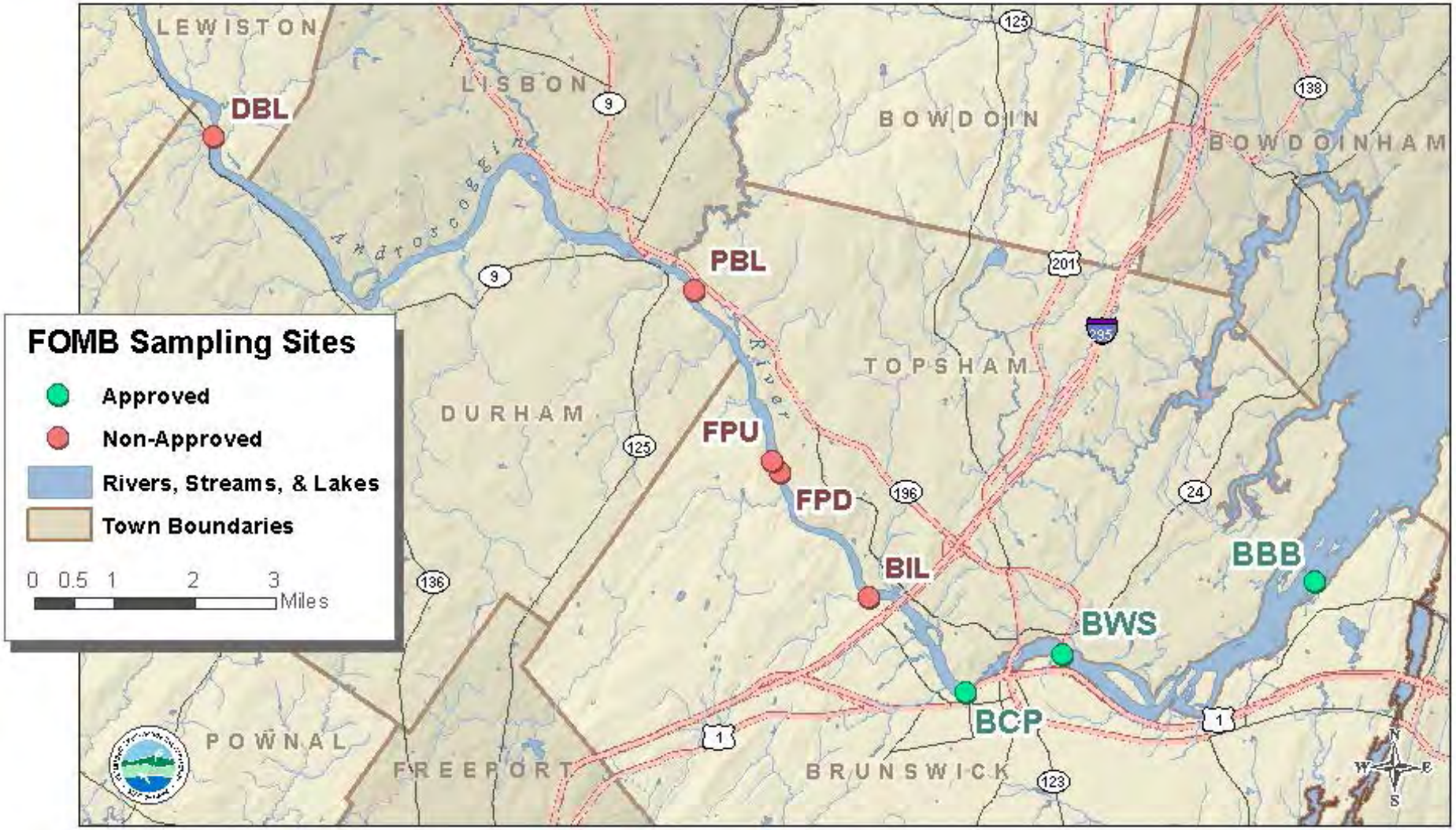


Figure 5-2-1: Map of all Friends of Merrymeeting Bay sampling sites on the Androscoggin River.

Monitoring was conducted from May through August-September, once per month. At each site, the monitors made direct measurements of water temperature, dissolved oxygen, and specific conductance using a handheld YSI 85 meter. Samples were also collected for *E. coli* bacteria at the three approved sites with a DEP designed bacteria sampling device or extension pole (which uses sterile whirl-paks for water collection). Bacteria samples were delivered to Bowdoin College for analysis by FOMB volunteers. Bacteria monitoring was also done at the non-approved sites, but since sampling at these sites does not meet VRMP requirements the data is not included.

The approved sites met VRMP requirements for sampling laterally and vertically in the river to obtain well-mixed representative samples. As noted in the previous section, two of the approved sites were sampled from shore. The third site was sampled from a jetty allowing for a representative and well-mixed area of the river to be monitored.

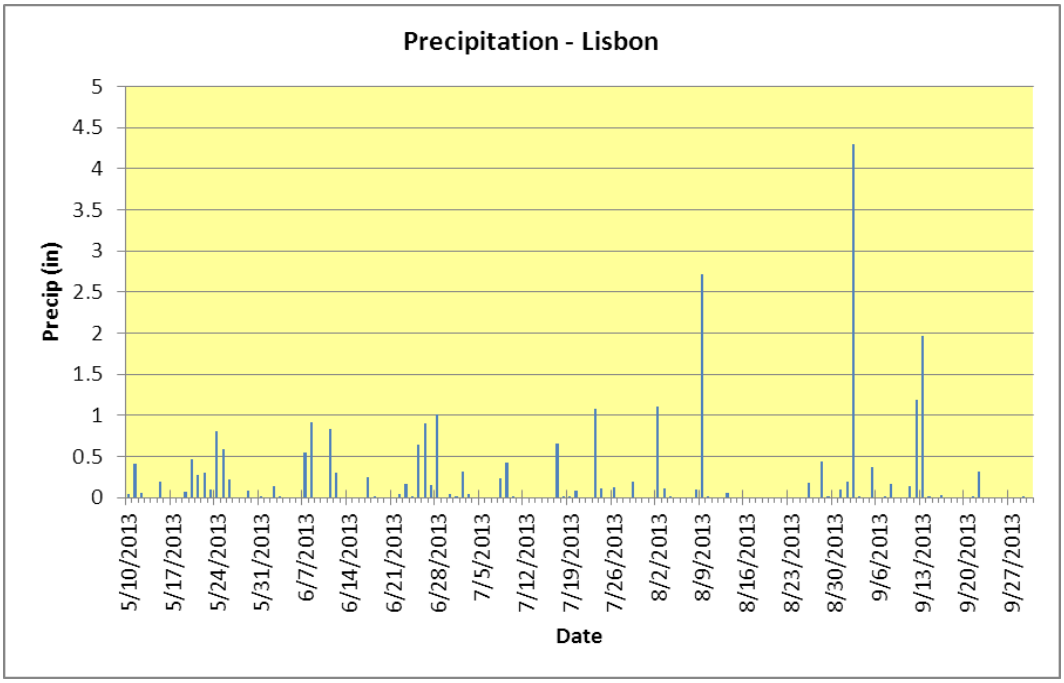
Results

Refer to Appendices A-1 and A-2 in discussion of individual site data and trends.

Precipitation

Figure 5-2-2 provides a graph of rainfall and sampling dates for the monitoring period. Rainfall data was obtained from Weather Underground (http://www.wunderground.com). Weather station (King Road-Lisbon (KMWLISBO07) choice was based on proximity and station with most complete records. If there was an airport station close by, this was chosen. This information provides an overview of rainfall events and can be useful in interpreting monitoring results for some parameters. Summer 2013 was wet with significant rain events in August and early September.

Figure 5-2-2: Seasonal precipitation measured at Lisbon.



Dissolved Oxygen

Dissolved oxygen (DO) was measured 1-5 times at each of the eight sampling sites (Figure 5-2-3 and Figure 5-2-4; Table 5-2-2 and Table 5-2-3). Monitoring occurred from May to August-September. Class C criteria for DO are a minimum of 5.0 mg/l (milligrams/liter) or 60% saturation, whichever is higher. Class B criteria are a minimum of 7.0 mg/l or 75% saturation, whichever is higher. To meet water quality criteria, both concentration and saturation standards must be met.

Figure 5-2-3: Graph of dissolved oxygen concentrations.

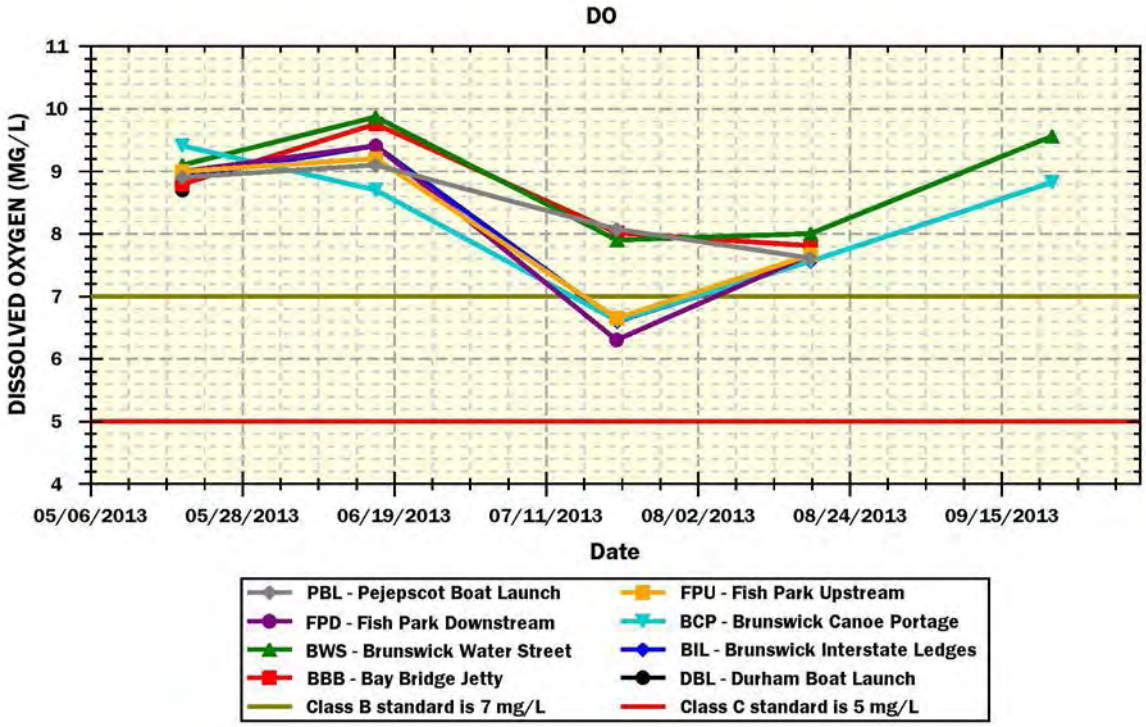


Table 5-2-2: A summary of minimum, maximum, and average dissolved oxygen concentration values (mg/l) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	4	7.8	9.8	8.6
BWS	Y	5	7.9	9.9	8.9
BCP	Y	5	6.6	9.4	8.2
BIL	N	4	6.6	9.4	8.1
FPD	N	4	6.3	9.4	8.1
FPU	N	4	6.7	9.2	8.1
PBL	N	4	7.6	9.1	8.4
DBL	N	1	8.7	8.7	8.7

Figure 5-2-4: Graph of dissolved oxygen saturation

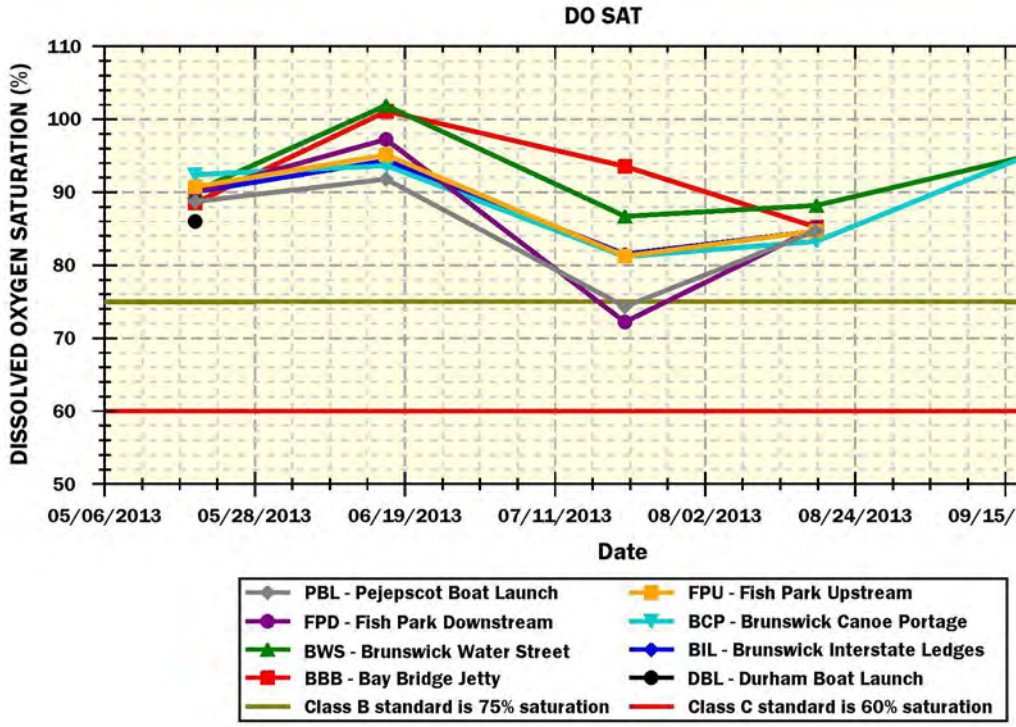


Table 5-2-3: A summary of minimum, maximum, and average dissolved oxygen saturation (%) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	4	85.2	101.1	92.1
BWS	Y	5	86.7	101.9	92.5
BCP	Y	5	81.1	96.5	89.4
BIL	N	4	81.5	94.3	87.6
FPD	N	4	72.2	97.2	86.1
FPU	N	4	81.2	95.1	87.9
PBL	N	4	74.3	91.8	84.9
DBL	N	1	86.0	86.0	86.0

Dissolved oxygen concentrations measured at Androscoggin River sites ranged from 6.3 mg/l to 9.9 mg/l. Sites BBB and BWS which are below the Brunswick dam were similar with values ranging from 7.8 mg/l to 9.9 mg/l. All values were above the Class C standard of 5.0 mg/l and Class B standard of 7.0 mg/l. Site BCP values were lower than Sites BBB and BWS, except for the May date. The July value was (6.6 mg/l) was below the Class B standard. The non-approved sites [BIL, FPD, FPU, PBL, and DBL (sampled 1X)] were overall similar with the exception of 1 date. Sites BIL, FPD and FPU were lower than Site PBL in July and a bit lower in August. These 3 sites were below the Class B standard in July.

Dissolved oxygen saturation followed a similar pattern as dissolved oxygen concentration. Sites BBB and BWS were similar and Site BCP generally a bit lower than these 2 sites. Saturation for these sites ranged from 81.1% to 101.9%. The non-approved sites' values ranged from 72.2% to 97.2%. Values at these sites were similar with the exception of July. In July Sites FPD and PBL had values below the Class B standard of 75% saturation.

Friends of Merrymeeting Bay volunteers do a good job of getting out early in the morning to sample. All but 1 of the 31 measurements were taken by 8:00 am or earlier. This is the recommended time to sample because DO is lowest at this time of day. Dissolved oxygen is also affected by flow conditions and temperature. During high flow conditions, more oxygen enters the river from the atmosphere as the water is more turbulent and there is more opportunity for re-aeration. Cooler water holds more oxygen.

Water Temperature

Temperature was measured 1-5 times at each of the eight sampling sites (Figure 5-2-5 and Table 5-2-4). Monitoring occurred from May through August-September. Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23°C maximum and 19°C weekly average) or 0.3°C (0.5°F) above the temperature that would naturally occur outside a mixing zone established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4°F (2.2°C) or more than 1.5°F (0.8°C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85°F (29°C) at any point outside a mixing zone established by the Board of Environmental Protection.

Figure 5-2-5: Graph of temperature

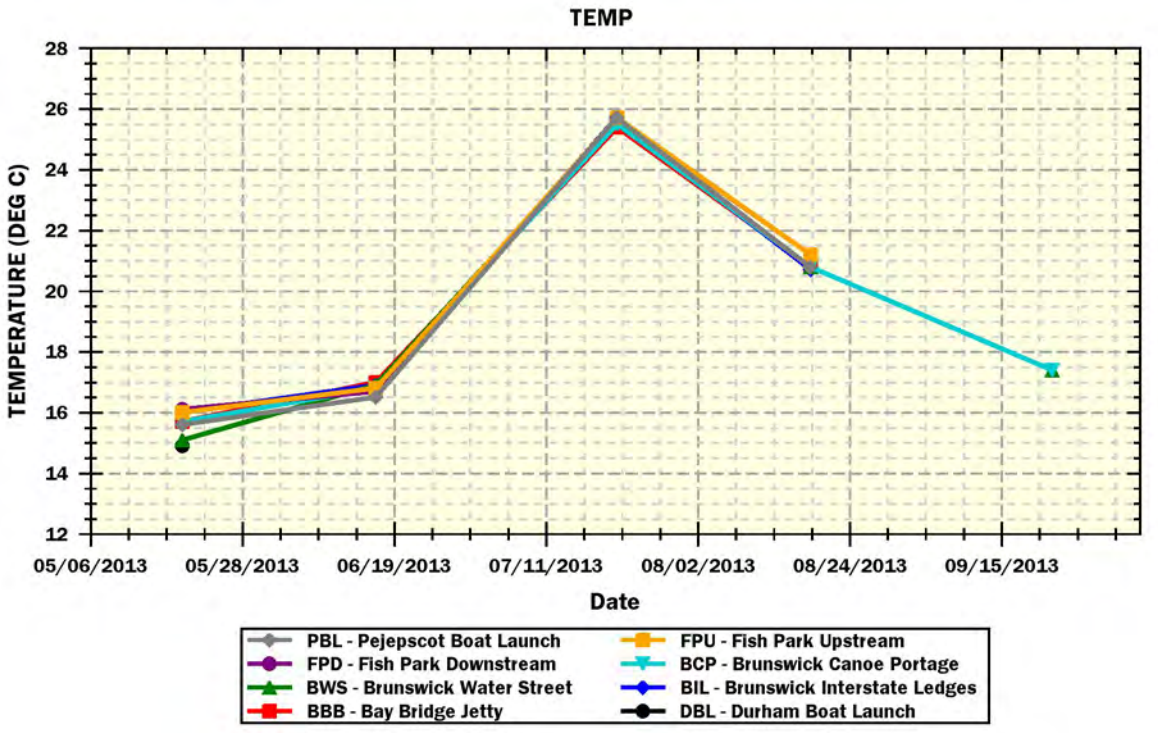


Table 5-2-4: A summary of minimum, maximum, and average water temperature (°C) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	4	15.7	25.4	19.7
BWS	Y	5	15.1	25.6	19.2
BCP	Y	5	15.7	25.5	19.2
BIL	N	4	16.0	25.6	19.8
FPD	N	4	16.1	25.7	19.9
FPU	N	4	16.0	25.7	19.9
PBL	N	4	15.6	25.7	19.7
DBL	N	1	14.9	14.9	14.9

Temperatures measured at all the Androscoggin River sites ranged from 14.9˚-25.7˚C (Celsius).
All of the sites had very similar temperatures. Temperature was very high in July (25.4˚-25.7˚C) and high in August (20.7˚-21.2˚C). Since measurements are taken close to the surface [mid-depth (1-1.5 ft.)], it is not too surprising that temperatures can get quite warm in July and August in the large open river.

Specific Conductance

Specific conductance was measured 1-5 times at each of the eight sampling sites as well (Figure 5-2-6 and Table 5-2-5). Monitoring occurred from May through August-September. Specific conductance is related to the amount of dissolved materials in the water. While there are no numerical standards, a relationship exists between conductivity and chloride which has numerical criteria. In general, streams located in urban areas tend to have high specific conductance due to polluted urban stormwater runoff. This may also in large part be due to salt buildup in surface and groundwater from road maintenance practices. Also, discharges from pulp and paper mills upstream measurably increase the conductivity of the river.

Figure 5-2-6: Graph of specific conductance

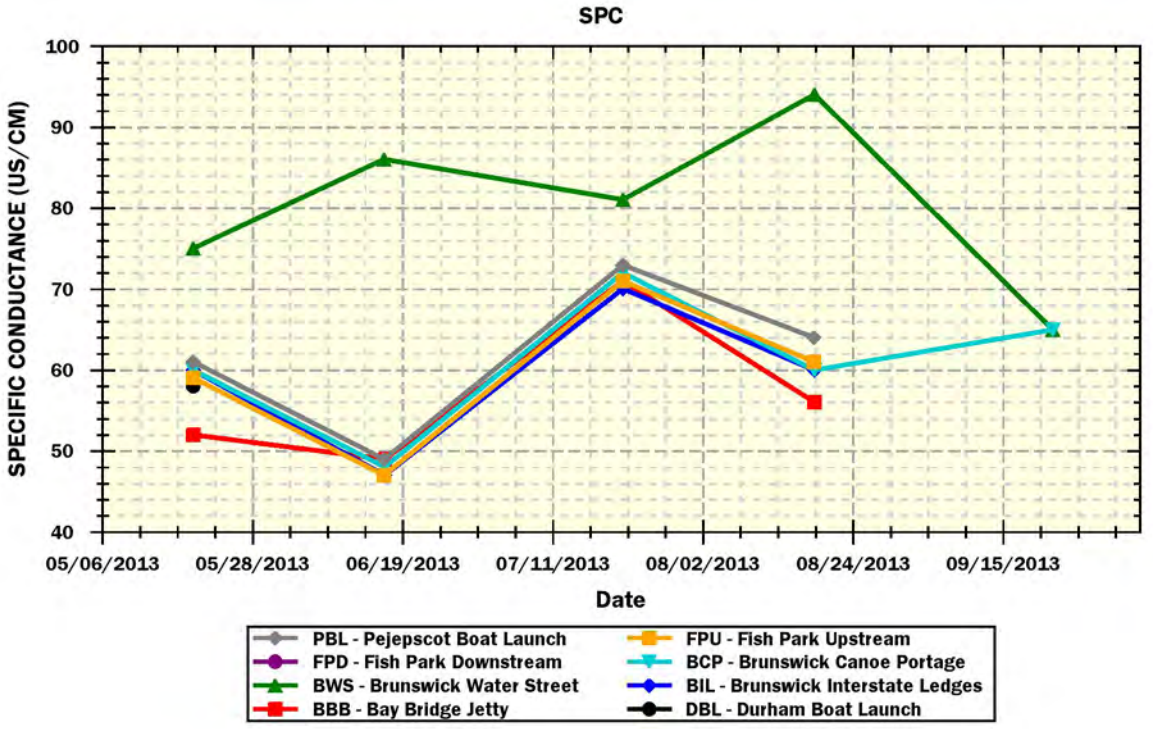


Table 5-2-5: A summary of minimum, maximum, and average specific conductance values (micro-ohms/cm, µS/cm) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Approved Site	# of Samples	Minimum Value	Maximum Value	Average Value
BBB	Y	4	49	71	57
BWS	Y	5	65	94	80
BCP	Y	5	48	72	61
BIL	N	4	47	70	59
FPD	N	4	47	71	60
FPU	N	4	47	71	60
PBL	N	4	49	73	62
DBL	N	1	58	58	58

Specific conductance at all the sites ranged from 47-94 µS/cm. All of the sites were very similar with the exception of Site BCP which was always slightly higher. All the values were below 100 µS/cm which is considered low, but somewhat elevated from natural background values reflecting point and non-point source effects.

Bacteria

Escherichia coli bacteria were measured 4-5 times at each of the eight sampling sites (Figure 5-2-7 and Table 5-2-6). Monitoring occurred from May through August-September. Enterococcus bacteria are used as the indicator organism for marine waters, and *E. coli* bacteria are used for freshwaters. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms including bacteria and viruses that can cause gastrointestinal illnesses. Class C criteria for bacteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml." Class B criteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 64/100 ml (milliliters) or an instantaneous level of 236/100 ml." Geometric means are calculated instead of averages because measures like bacteria often have a few very large values that strongly influence the mean and make it a poor predictor.

Figure 5-2-7: Graph of E. coli (MPN/ml)

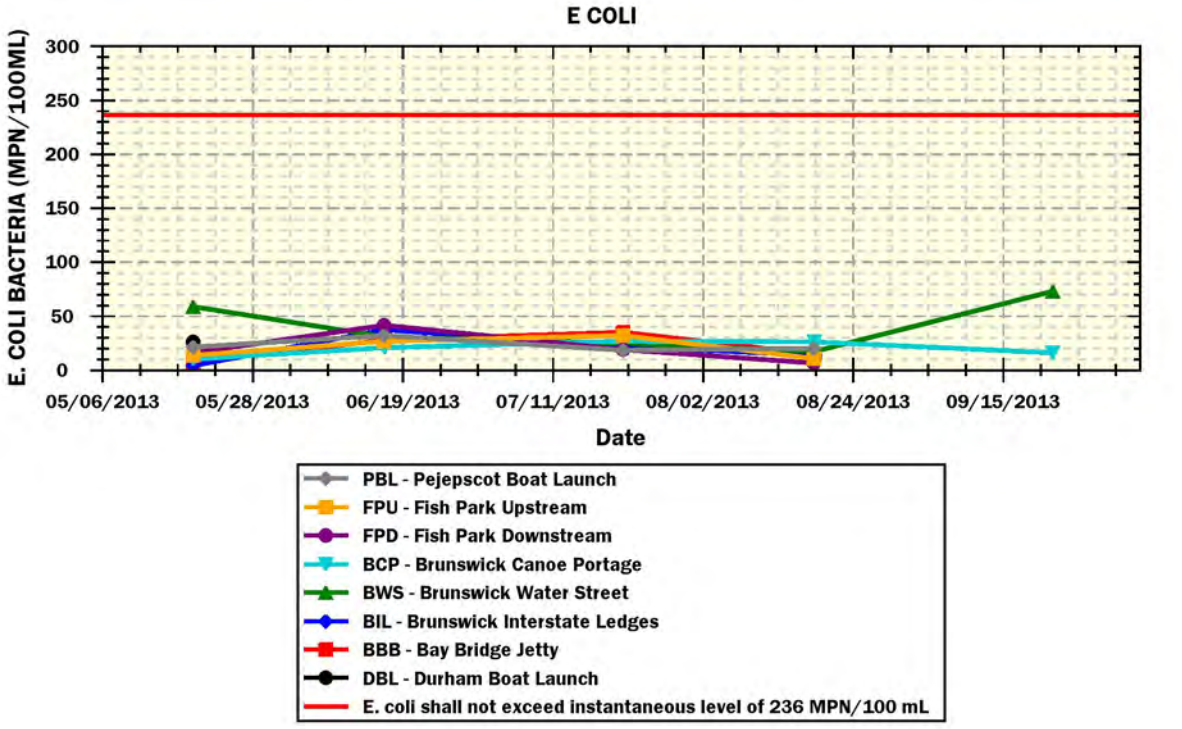


Table 5-2-6: A summary of minimum, maximum, and geometric mean values (MPN/100mL) for bacteria at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Bacteria Type	# of Samples	Minimum Value	Maximum Value	Geometric Mean
BBB	*E. coli*	4	7	35	18
BCP	*E. coli*	5	10	27	18
BIL	*E. coli*	4	4	37	14
BWS	*E. coli*	5	17	73	36
DBL	*E. coli*	1	26	26	26
FBU	*E. coli*	4	11	32	19
FPD	*E. coli*	4	6	41	17
PBL	*E. coli*	4	18	32	22

E. c oli bacteria ranged from 4/100 ml. to 73/100 ml. None of the sites had values exceeding the instantaneous criterion of 236/100 ml for both Class C and Class B. Also, none of the sites exceeded the Class C criterion for geometric mean of 126/100 ml or Class B criterion of 64/100 ml. Typically, observed high bacterial levels are associated with stormwater runoff and/or combined sewer overflows. There were significant rain events in August and September. However, none of the sampling events coincided with significant rain events.

Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Androscoggin River sites monitored by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

- Point source pollution (pollution originating from a direct discharge including wastewater treatment plant discharge, combined sewer overflows and overboard discharges).
- Non-point source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, septic systems, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry.
- Ponds and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than free-flowing waters).
- Natural effects of wetlands (such as contributing waters to a stream/river that have low dissolved oxygen levels due to the decomposition of large amounts of organic matter, respiration of abundant plant matter, and low re-aeration rates that are characteristic of many wetlands).

The following are recommendations for future monitoring:

- Some of the sites are very similar. Friends of Merrymeeting Bay might consider dropping some sites that are close to each other. They should also consider adding new sites, including streams draining to the Androscoggin River.
- Bacteria monitoring should include a mix of sampling events to include both dry and runoff events. If possible, volunteer leaders could try to collect 1-2 bacteria samples during/after rain events.
- Continue monitoring at all stations (or at least a subset of sites) to develop a long- term trend database.

Appendix A-1. 2013 water quality data for "Approved" and "Non-Approved" sites. Non-Approved sites do not yet meet official VRMP sample location criteria and/or require further inspection and review.
* Sampling depths are only reported for Tier 1 VRMP sites.
** "N" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "TSS" = total suspended solids.
Refer to Appendix A-2 for observational data and quality assurance/quality control (QA/QC) notes.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
Androscoggin River, Friends of Merrymeeting Bay - Approved Sites:																
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	5/19/2013	8:10 AM	N			15.7	88.5	8.79	52					7.3	
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	6/16/2013	7:50 AM	N			17	101.1	9.75	49					27.9	
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	7/21/2013	7:30 AM	N			25.4	93.5	8.01	71					35	
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	8/18/2013	8:00 AM	N			20.8	85.2	7.81	56					14.8	
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	5/19/2013	7:30 AM	N			15.1	90.1	9.1	75					58.3	
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	5/19/2013	7:30 AM	D											55.4	
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	6/16/2013	7:30 AM	N			16.9	101.9	9.87	86					30.9	
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	7/21/2013	7:50 AM	N			25.6	86.7	7.9	81					25	
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	8/18/2013	8:00 AM	N			20.8	88.2	8	94					17.3	
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	9/22/2013	7:00 AM	N			17.4	95.8	9.56	65					72.7	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	5/19/2013	7:45 AM	N			15.7	92.4	9.4	60					9.6	
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	6/16/2013	7:40 AM	N			16.8	93.6	8.7	48					20.3	
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	7/21/2013	7:45 AM	N			25.5	81.1	6.61	72					26.6	
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	8/18/2013	7:45 AM	N			20.8	83.2	7.56	60					25.9	
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	9/22/2013	7:15 AM	N			17.4	96.5	8.82	65					15.8	
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	9/22/2013	7:15 AM	D											20.1	

Androscoggin River, Friends of Merrymeeting Bay - Non-approved Sites:

DBL	ANDROSCOGGIN RIVER - A158 - FOMB	5/19/2013	7:10 AM	N			14.9	86	8.7	58					26.2	
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	5/19/2013	8:00 AM	N			16	90	8.9	60					4.1	
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	6/16/2013	7:55 AM	N			16.9	94.3	9.4	47					37.3	
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/21/2013	6:30 AM	N			25.6	81.5	6.6	70					21.8	
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/18/2013	7:30 AM	N			20.7	84.6	7.56	60					13.2	
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	5/19/2013	7:45 AM	N			16.1	90	9	59					16	
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	6/16/2013	7:30 AM	N			16.7	97.2	9.4	47					41.4	
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/21/2013	6:15 AM	N			25.7	72.2	6.3	71					18.7	
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	8/18/2013	7:15 AM	N			21.2	85.1	7.66	61					6.3	
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	5/19/2013	7:35 AM	N			16	90.7	9	59					13.2	
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/16/2013	7:10 AM	N			16.8	95.1	9.2	47					26.6	
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/16/2013	7:10 AM	D			16.8	95.1	9.2	47					18.7	
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	7/21/2013	6:20 AM	N			25.7	81.2	6.65	71					31.6	
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	8/18/2013	7:15 AM	N			21.2	84.6	7.66	61					10.7	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/19/2013	6:40 AM	N			15.6	88.7	8.9	61					21.1	
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/19/2013	6:40 AM	D			15.6	88.8	9	61					17.3	
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	6/16/2013	6:45 AM	N			16.5	91.8	9.1	49					31.8	
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	7/21/2013	6:00 AM	N			25.7	74.3	8.07	73					18.1	
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	8/18/2013	6:15 AM	N			20.8	84.6	7.61	64					19.9	

Appendix A-2. 2013 observational data and quality assurance/quality control (QA/QC) notes for "approved" and "non-approved" sites.
** "N" = normal environmental sample; "D" = field duplicate; "L" = lab duplicate
Refer to Appendix A-1 for water quality data

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appearance	Comments
Androscoggin River, Friends of Merrymeeting Bay - Approved Sites:															
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	5/19/2013	8:10 AM	N	BASE FLOW	MED	12.8	WADING	MOSTLY CLOUDY	BREEZE	MOSTLY CLOUDY	RIFFLE		DARKLY STAINED	WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	6/16/2013	7:50 AM	N	BASE FLOW	HIGH	18.3	WADING	CLEAR	CALM	CLEAR	RUN			EXTREMELY HIGH TIDE WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	7/21/2013	7:30 AM	N	BASE FLOW	MED	23.2	WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES.
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	8/18/2013	8:00 AM	N		LOW	17	BANK	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTE. OBSERVATIONAL DATA PARTIALLY COMPLETED.
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	5/19/2013	7:30 AM	N	BASE FLOW	MED	12.8	WADING	MOSTLY CLOUDY	BREEZE	MOSTLY CLOUDY	RIFFLE		DARKLY STAINED	WADEABLE/MID-DEPTH
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	5/19/2013	7:30 AM	D				WADING							WADEABLE/MID-DEPTH
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	6/16/2013	7:30 AM	N	BASE FLOW	HIGH	18.3	WADING	CLEAR	CALM	CLEAR	RUN		TURBID	EXTREMELY HIGH TIDE WADEABLE/MID-DEPTH
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	7/21/2013	7:50 AM	N			25.2	WADING	CLEAR	CALM	CLEAR				WADEABLE/MID-DEPTH D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. DID NOT RECORD OBSERVATIONAL DATA.
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	8/18/2013	8:00 AM	N	BASE FLOW	LOW	17.2	WADING	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTE.
WATER STREET MOORING (WSM)	ANDROSCOGGIN RIVER - A281 - VRMP	9/22/2013	7:00 AM	N	BASE FLOW	HIGH	18.2	BANK	CLOUDY, SHOWERS		CLOUDY	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTE.
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	5/19/2013	7:45 AM	N	BASE FLOW	MED	15	WADING	PARTLY CLOUDY	CALM	CLEAR, PARTLY CLOUDY	RUN		DARKLY STAINED	WADEABLE/1.5 FT BELOW SURFACE
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	6/16/2013	7:40 AM	N	BASE FLOW	HIGH		WADING	CLEAR		CLEAR	RUN		DARKLY STAINED	LOTS OF PINE POLLEN NO VERTICAL DEPTH RECORDED.
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	7/21/2013	7:45 AM	N	BASE FLOW	MED	21.4	WADING	CLEAR	CALM	CLEAR, LIGHT RAIN	RUN		DARKLY STAINED	D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. NO VERTICAL DEPTH RECORDED.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appearance	Comments
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	8/18/2013	7:45 AM	N			17		CLEAR	CALM	CLEAR				D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTE. VRMP DATASHEET NOT COMPLETED.
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	9/22/2013	7:15 AM	N	BASE FLOW	HIGH	17.5	BANK	CLOUDY, LIGHT RAIN		CLOUDY, SHOWERS	RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTE.
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	9/22/2013	7:15 AM	D				BANK							NON-WADEABLE/MID-DEPTH D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTE.

Androscoggin River, Friends of Merrymeeting Bay - Non-approved Sites:

DBL	ANDROSCOGGIN RIVER - A158 - FOMB	5/19/2013	7:10 AM	N		LOW	10	BANK	CLOUDY	CALM	CLEAR, CLOUDY	RUN			NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. OBSERVATIONAL DATA PARTIALLY COMPLETED.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	5/19/2013	8:00 AM	N		LOW	13	WADING	CLOUDY	CALM	CLEAR, CLOUDY	RUN			NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. OBSERVATIONAL DATA PARTIALLY COMPLETED.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	6/16/2013	7:55 AM	N			16.5	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	7/21/2013	6:30 AM	N			21.4	BANK	CLEAR		CLEAR, LIGHT RAIN				D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. NO VERTICAL DEPTH RECORDED. DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
BIL	ANDROSCOGGIN RIVER - A24 - FOMB	8/18/2013	7:30 AM	N	BASE FLOW	LOW	17.2	BANK	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	WADEABLE/1.5 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	5/19/2013	7:45 AM	N		LOW	12	WADING	CLOUDY	CALM	CLEAR, CLOUDY	RUN			NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. OBSERVATIONAL DATA PARTIALLY COMPLETED.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	6/16/2013	7:30 AM	N			14	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	7/21/2013	6:15 AM	N			21.4	BANK	CLEAR		CLEAR, LIGHT RAIN				D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. NO VERTICAL DEPTH RECORDED. DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FPD	ANDROSCOGGIN RIVER - A45 - FOMB	8/18/2013	7:15 AM	N	BASE FLOW	LOW	17	BANK	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	WADEABLE/MID-DEPTH D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES.
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	5/19/2013	7:35 AM	N		LOW	12	WADING	CLOUDY	CALM	CLEAR, CLOUDY	RUN			NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. OBSERVATIONAL DATA PARTIALLY COMPLETED.
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/16/2013	7:10 AM	N			14	BANK	CLEAR	CALM	CLEAR				NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	6/16/2013	7:10 AM	D				BANK							NON-WADEABLE/3 FT BELOW SURFACE DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	7/21/2013	6:20 AM	N			21.4	BANK	CLEAR		CLEAR, LIGHT RAIN				D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. NO VERTICAL DEPTH RECORDED. DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
FBU	ANDROSCOGGIN RIVER - A47 - FOMB	8/18/2013	7:15 AM	N	BASE FLOW	LOW	16.9	BANK	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/19/2013	6:40 AM	N		LOW	11.5	WADING	CLOUDY	CALM	CLEAR, CLOUDY	RUN			NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. OBSERVATIONAL DATA PARTIALLY COMPLETED.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	5/19/2013	6:40 AM	D				WADING							NON-WADEABLE/3 FT BELOW SURFACE D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. OBSERVATIONAL DATA PARTIALLY COMPLETED.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	6/16/2013	6:45 AM	N			14	WADING	CLEAR	CALM	CLEAR				WADEABLE/MID-DEPTH DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Tide Stage	Water Appearance	Comments
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	7/21/2013	6:00 AM	N			21.4	BANK	CLEAR		CLEAR, LIGHT RAIN				D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES. NO VERTICAL DEPTH RECORDED. DID NOT RECORD ANY OF THE OBSERVATIONAL DATA.
PBL	ANDROSCOGGIN RIVER - A71 - FOMB	8/18/2013	6:15 AM	N	BASE FLOW	LOW	15.2	BANK	CLEAR	CALM	CLEAR	RUN		DARKLY STAINED	NON-WADEABLE/MID-DEPTH D.O. METER- DID NOT ALLOW IT TO WARM UP FOR AT LEAST 20 MINUTES.

Section 5-2
Androscoggin River (Friends of Merrymeeting Bay)

Androscoggin River

The Androscoggin River is the third largest river in the state. It has a length of 177 miles and drainage area of 3,450 square miles (2,730 sq. mi. in Maine).[1] The headwaters are Umbagog Lake in Maine/New Hampshire. From there it flows into New Hampshire and then back into Maine through the towns of Gilead and Bethel. It continues flowing through the towns and cities of Rumford, Mexico, Dixfield, Jay, Livermore Falls, Lewiston, Auburn, Lisbon, Lisbon Falls, Durham, Brunswick, and Topsham where it joins the Kennebec River at Merrymeeting Bay.

The Androscoggin River has a long history of industrial and municipal use over the last 200 years.[1] Beginning in the early 1800s, many dams were constructed for mills, primarily in the lower part of the river. By the late 1800s, many textile and lumber mills were in operation, mostly from Lewiston to Brunswick. Pulp and paper mills that are still in operation today were established in the late 1800s in New Hampshire, Rumford, and Jay. Beginning in the late 1920s, Central Maine Power built hydroelectric dams that impounded much of the river from Lewiston to Livermore Falls. Some of these uses continue today. "Along its course to the sea, the river is repeatedly dammed. It receives discharges from industrial and municipal sources, as well as polluted runoff from a variety of sources."[2] Specific problems include mill discharges, combined sewer overflows (CSOs), dam impacts (28 dams exist), and historical sediment toxins.

The Androscoggin River is assigned Class B from the Maine/New Hampshire boundary to its confluence with the Ellis River. It is assigned Class C from the confluence with the Ellis River to Merrymeeting Bay.

Monitoring History

• The Maine DEP Biological Monitoring Program has been monitoring the lower Androscoggin River since 1984. This data is available on DEP's website.

• The lower Androscoggin River is monitored by the Friends of Merrymeeting Bay (FOMB). FOMB has been in existence since 1975 and focuses on protecting the Merrymeeting Bay watershed through research, education, advocacy, and land conservation. They have been monitoring the lower part of the Androscoggin River, tributaries to Merrymeeting Bay, and the Bay since 1999. Their monitoring has extended up the Androscoggin at times (depending on volunteers) to Livermore Falls. FOMB joined the VRMP in 2009 with an interest in bringing about water classification upgrades when possible.

[1] Maine Rivers Website- Androscoggin River Profile
[2] Androscoggin River Alliance Website-Androscoggin River slideshow

• In 2011, FOMB requested that two of the three approved sites (Water Street Mooring, WSM and Brunswick Canoe Mooring, BCM) be moved from mid-channel to shore. They submitted monitoring data from mid-channel and shore to demonstrate similarity. The Department approved relocation of these approved sites. FOMB renamed these sites Brunswick Water Street (BWS) and Brunswick Canoe Portage (BCP), respectively.

• In 2010, a water quality model to predict effect of discharges and river flows on attainment of Maine's Water Quality Standards was developed for the lower Androscoggin River by the Maine DEP. The model report and data are available on DEP's website.

Methods and Sampling Sites

Volunteers monitor the Androscoggin River at eight sites on the main stem. All of the sites are now VRMP approved sites.

Monitoring is conducted once/month from May through August-September. Monitors take measurements of water temperature and dissolved oxygen using a YSI meter. Specific conductance is measured using either a YSI meter or an Oakton EC 11+/11 Testr pen. Samples are collected for *E. coli* bacteria and transported to Bowdoin College for analysis by FOMB volunteers.

Table 5-2-1: Friends of Merrymeeting Bay sampling sites at Androscoggin River.

VRMP Site ID	Organization Site Code	Sample Location	Class
Androscoggin River-A231-VRMP	BBB	Bay Bridge Jetty	C
Androscoggin River-A281BK-VRMP	BWS	Brunswick Water Street	C
Androscoggin River-A299BK-VRMP	BCP	Brunswick Canoe Portage	C
Androscoggin River- A24-FOMB	BIL	Brunswick Interstate Ledges	C
Androscoggin River-A45-FOMB	FPD	Fish Park Downstream	C
Androscoggin River-A47-FOMB	FPU	Fish Park Upstream	C
Androscoggin River-A71-FOMB	PBL	Pejepscot Boat Launch	C
Androscoggin River-A158-FOMB	DBL	Durham Boat Launch	C

2014 Androscoggin River Sampling Sites
Friends of Merrymeeting Bay

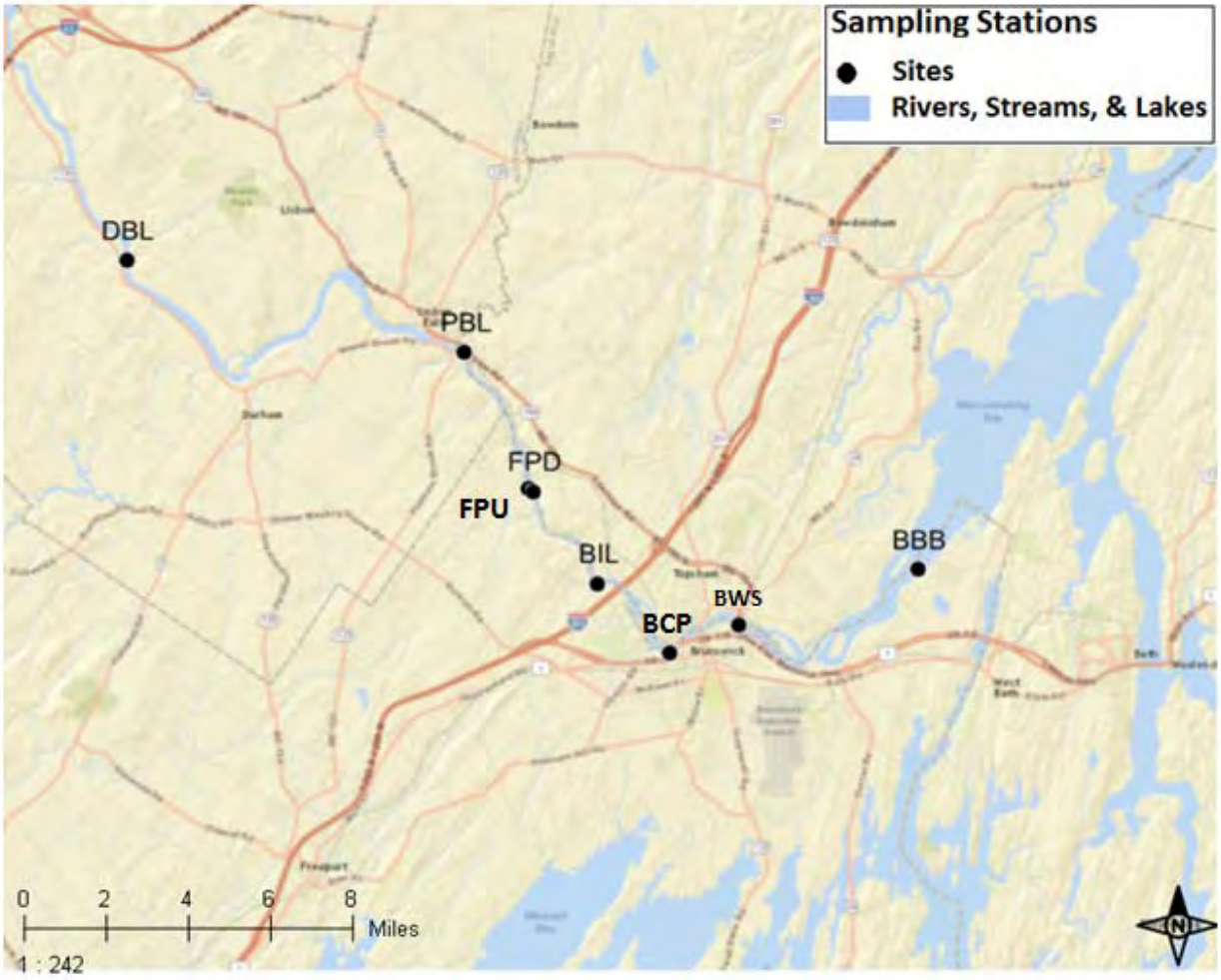


Figure 5-2-1: Map of all Friends of Merrymeeting Bay sampling sites on the Androscoggin River

Results

Refer to Appendices A-1 and A-2 in discussion of individual site data and trends.

Dissolved Oxygen

Dissolved oxygen levels are generally lowest early in the morning and then increase during the day, peaking mid to late afternoon. Monitors should try to collect some samples early in the morning. Dissolved oxygen is also affected by flow conditions and temperature. During high flow conditions, more oxygen is added to the river from the atmosphere as the water is more turbulent and there is more opportunity for mixing. If flow during the summer months is higher or lower than normal, this will affect the dissolved oxygen.

Class C criteria for dissolved oxygen are a minimum of 5 mg/l or 60 % saturation. Class B criteria for dissolved oxygen are a minimum of 7 mg/l (milligrams/liter) or 75% saturation. To meet water quality criteria, both concentration and saturation standards must be met.

2014 Results:

Dissolved oxygen (DO) was measured 6 times from May through October at the 7 sampling sites. Not all the data are reported here because some data was rejected for QA/QC reasons (no calibration value recorded). At all the sites, DO concentration was above the Class C criterion of 5 mg/l. It was also above the Class B criterion of 7 mg/l at all sites except sites BBB and BWS. It was below 7 mg/l 2 times at site BBB and 1 time at site BWS. DO percent saturation was above the Class C criterion of 60% saturation for all dates also above Class B criterion of 75% saturation for all dates. Overall sites BBB, BWS and BCP are very similar. The sites above here (BIL, FPD, FPU, and PBL) are also very similar. Dissolved oxygen was overall good to excellent.

Table 5-2-2: A summary of minimum, maximum, and average dissolved oxygen concentration values (mg/l) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
BBB	C	5	8.4	6.7	10.5	5	0
BWS	C	5	8.6	6.5	10.9	5	0
BCP	C	6	8.9	7.0	11.0	5	0
BIL	C	4	9.5	8.6	10.9	5	0
FPD	C	4	9.6	8.5	11.5	5	0
FPU	C	4	9.2	8.4	10.8	5	0
PBL	C	4	9.4	8.4	10.7	5	0

Table 5-2-3: A summary of minimum, maximum, and average dissolved oxygen saturation (%) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
BBB	C	5	94.8	80.7	103.0	60	0
BWS	C	5	96.8	84.5	108.4	60	0
BCP	C	6	90.8	83.5	104.1	60	0
BIL	C	4	96.9	91.7	108.2	60	0
FPD	C	4	99.3	92.4	114.3	60	0
FPU	C	4	96.9	91.5	107.0	60	0
PBL	C	4	96.6	91.7	105.6	60	0

Figure 5-2-2: Graph of dissolved oxygen concentrations.

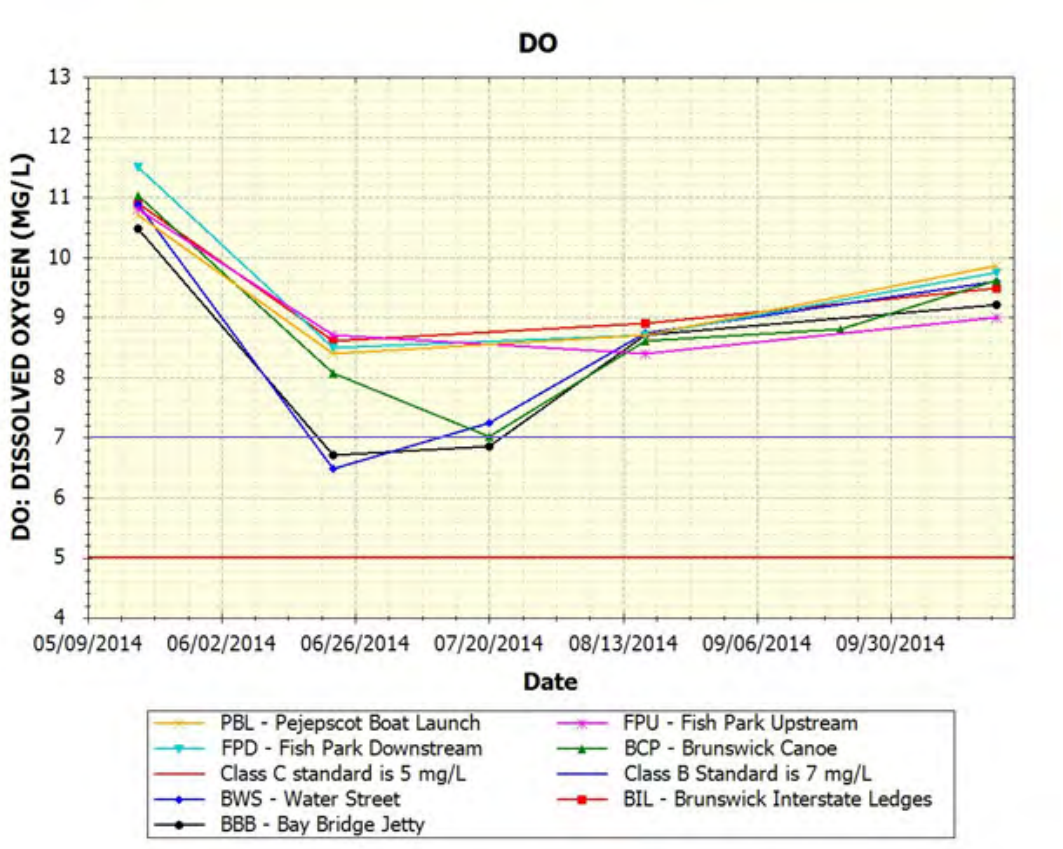
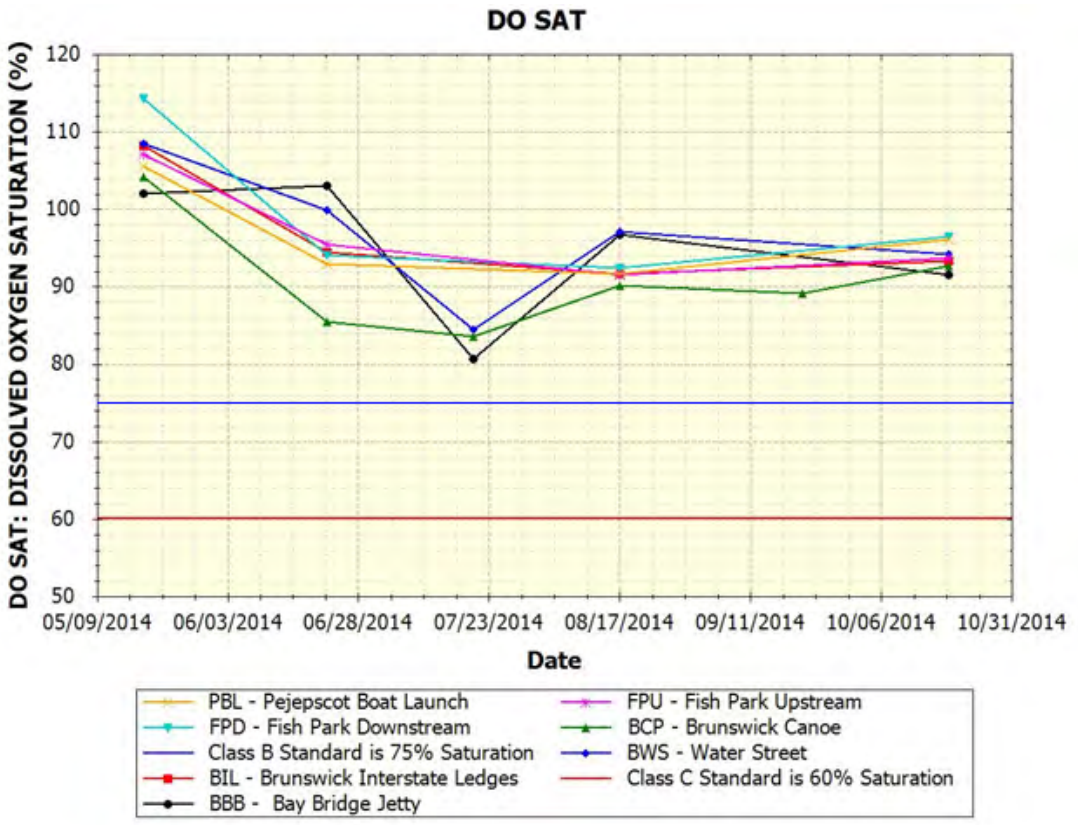


Figure 5-2-3: Graph of dissolved oxygen saturation



Water Temperature

Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23°C maximum and 19°C weekly average) or 0.3°C (0.5°F) above the temperature that would naturally occur outside a mixing zone established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4°F (2.2°C) or more than 1.5°F (0.8°C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85°F (29°C) at any point outside a mixing zone established by the Board of Environmental Protection.

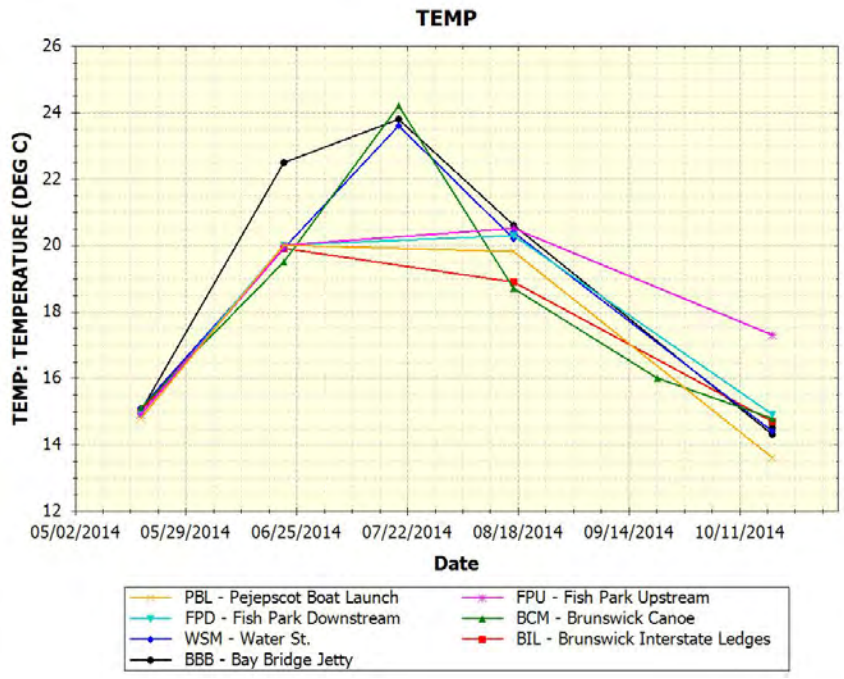
2014 Results:

Temperature at the 3 lowest sampl ing sites (BBB, BWS and BCP) were si milar with highest temperatures occurring i n July (23 °-24℃). Temperature was very simila r at the 4 sampling sites above (BIL, FPD, FPU, PBL) with highest readi ngs being around 20 ℃). Te mperature for July i s not reporte d here be cause th e data was not in cluded due to QA/ QC reasons explained in th e "Dissolved Oxygen" results. Because sa mpling only occurs monthly, it is not possible to determine how long temperatur es remained high. Since measure ments are taken close to the s urface [mid-depth (1-1.5 ft.)], it is not too surprising that temperatures can get quite warm in July and August in the large open river.

Table 5-2-4: A summary of minimum, maximum, and average water temperature (°C) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
BBB	C	5	19.3	14.5	23.8	n/a	n/a
BWS	C	5	18.7	14.4	23.6	n/a	n/a
BCP	C	6	18.1	14.8	24.2	n/a	n/a
BIL	C	4	17.1	14.7	19.9	n/a	n/a
FPD	C	4	17.5	14.9	20.3	n/a	n/a
FPU	C	4	18.2	14.9	20.5	n/a	n/a
PBL	C	4	17.1	13.6	20.0	n/a	n/a

Figure 5-2-4: Graph of temperature



Specific Conductance

Specific conductance is related to the amount of dissolved materials in the water. While there are no numerical standards, a relationship exists between conductivity and chloride which has numerical criteria. In general, streams located in urban areas tend to have high specific conductance due to polluted urban stormwater runoff. This may also in large part be due to salt buildup in surface and groundwater from road maintenance practices. Also, discharges from pulp and paper mills upstream measurably increase the conductivity of the river.

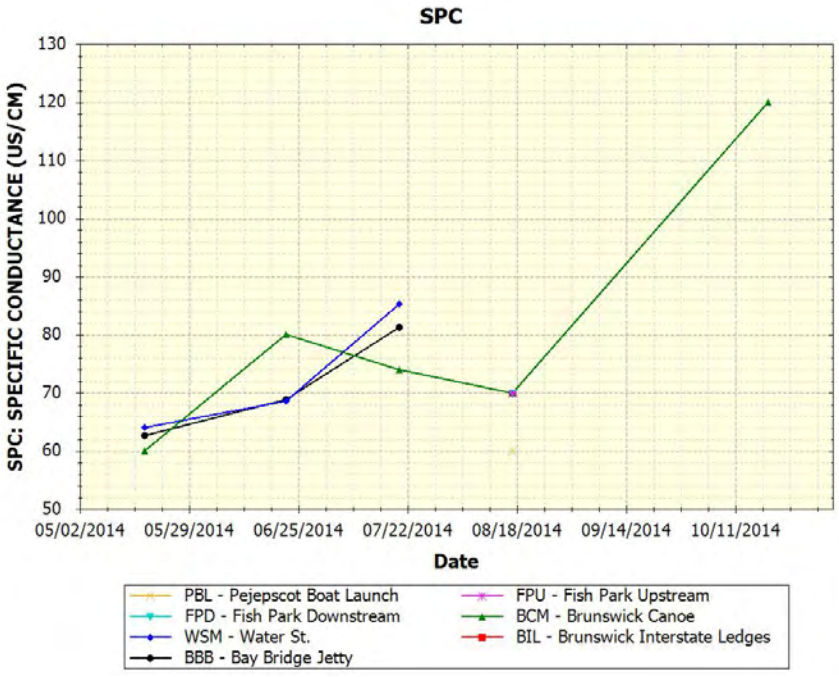
2014 Results:

Specific conductance was measu red from 1-5 time s at the sampling sites with measurements ranging fro m 60-120 µ S/cm. Overall, the values are low, but somewhat elevated from natural background values reflecting point and non-point source effects.

Table 5-2-5: A summary of minimum, maximum, and average specific conductance values (micro-ohms/cm, µS/cm) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
BBB	C	3	71	63	81	n/a	n/a
BWS	C	3	73	64	85	n/a	n/a
BCP	C	5	81	60	120	n/a	n/a
BIL	C	1	70	70	70	n/a	n/a
FPD	C	1	70	70	70	n/a	n/a
FPU	C	1	70	70	70	n/a	n/a
PBL	C	1	60	60	60	n/a	n/a

Figure 5-2-5: Graph of specific conductance



Bacteria

E. coli bacteria are used as the indicator organism for freshwater. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms including bacteria and viruses that can cause gastrointestinal illnesses. Class C criteria for bacteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml." Class B criteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 64/100 ml (milliliters) or an instantaneous level of 236/100 ml." Geometric means are calculated instead of averages because it is more appropriate to use geometric mean for something like bacteria where there may be one or more very high or low values that can skew the mean.

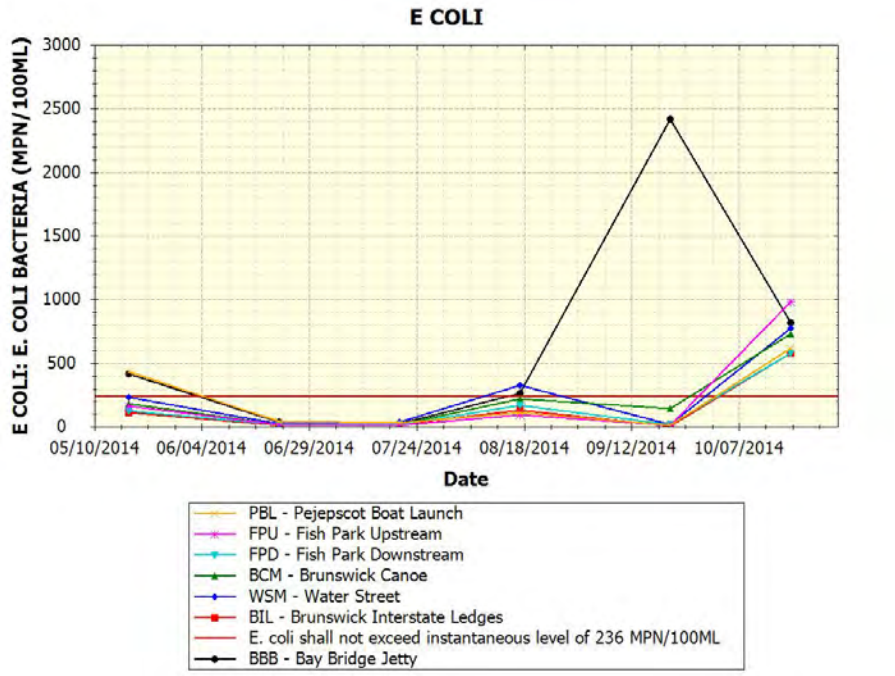
2014 Results:

Escherichia coli bacteria was sampled 6 times at the 7 sampling sites. Weather conditions included a mix of conditions including 2 dates (May & September) when there was heavy rain in the past 24 hours, 1 date when there was light rain (October) and dry conditions for July and August. Site BBB exceeded the Class B and Class C bacteria instantaneous criterion of 236 (MPN/ 100ml) on 4 out of 6 sampling dates (all dates except June & July). Site BWS exceeded these criterion in August and October. Sites BCP, BIL, FPD and FPU exceeded criterion in October only. Site PBL exceeded these criterion 2 times- May and October. The geometric mean criterion of 126 (MPN/100ml) was not exceeded at any of the sites. The Class B criterion of 64 (MPN/100ml) was exceeded at 4 of 7 sites. Site BBB is the lowest site on the river and exceeded the instantaneous criterion most often-perhaps because of its location below Brunswick. The fact that in 2014, there were exceedances may in part reflect that sampling included wet weather conditions. Typically high bacterial levels are associated with stormwater runoff and/or combined sewer overflows.

Table 5-2-6: A summary of minimum, maximum, and geometric mean values (MPN/100mL) for bacteria at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# of Observations	Geometric Mean	Minimum	Maximum	Criterion Inst/Geo	# Exceeding
BBB	C	6	239	24	2419	236/126	4
BWS	C	6	95	12	770	236/126	2
BCP	C	6	99	14	727	236/126	1
BIL	C	6	41	5	579	236/126	1
FPD	C	6	61	16	579	236/126	1
FPU	C	6	53	8	980	236/126	1
PBL	C	6	87	12	613	236/126	2

Figure 5-2-6: Graph of E. coli (MPN/ml)



Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Androscoggin River sites monitored by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

- Point source pollution (pollution originating from a direct discharge including wastewater treatment plant discharge, combined sewer overflows and overboard discharges).
- Non-point source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, septic systems, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry.
- Ponds and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than free-flowing waters).
- Natural effects of wetlands (such as contributing waters to a stream/river that have low dissolved oxygen levels due to the decomposition of large amounts of organic matter, respiration of abundant plant matter, and low re-aeration rates that are characteristic of many wetlands).

The following are recommendations for future monitoring:

- **Some of the sites are very similar. Friends of Merry meeting Bay might consider dropping some sites that are close to each other. They should also consider adding new sites, including streams draining to the Androscoggin River.**
- **Bacteria monitoring should include a mix of sampling events to include both dry and runoff events. If possible, volunteer leaders could try to collect 1-2 bacteria samples during/after rain events.**
- **Continue monitoring at all stations (or at least a subset of sites) to develop a long- term trend database. FOMB might consider sampling 2 X/month in July and August and dropping the October sampling event.**
- **Some data was not accepted because calibration values were not entered on the field sheets. Monitors should review their field sheets on each sampling date to ensure they are completed.**

Appendix A-1. 2014 water quality data for "Approved" and "Non-Approved" sites. Non-Approved sites do not yet meet official VRMP sample location criteria and/or require further inspection and review.
* Sampling depths are only reported for Tier 1 VRMP sites.
** "N" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "TSS" = total suspended solids.
Refer to Appendix A-2 for observational data and quality assurance/quality control (QA/QC) notes.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
Androscoggin River - Friends of Merrymeeting Bay: Approved Sites																
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	5/18/2014	8:05 AM	N			15	102	10.47	62.6					410.6	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	6/22/2014	8:15 AM	N			22.5	103	6.71	68.8					36.9	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	6/22/2014	8:15 AM	D											10.8	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	7/20/2014	7:45 AM	N			23.8	80.7	6.85	81.2					24.1	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	8/17/2014	7:45 AM	N			20.6	96.7	8.7						260.3	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	9/21/2014	8:20 AM	N											2419.6	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	10/19/2014	9:00 AM	N			14.5	91.5	9.2						816.4	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	10/19/2014	9:00 AM	D			14.3	93	9.4							
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	5/18/2014	8:15 AM	N			15	108.2	10.9						108.1	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	6/22/2014	8:30 AM	N			19.9	94.4	8.6						7.5	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	6/22/2014	8:30 AM	D											11.9	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	7/20/2014	8:12 AM	N											14.5	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	8/17/2014	7:35 AM	N			18.9	91.7	8.9	70					127.4	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	9/25/2014	7:45 AM	N											5.1	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	9/25/2014	7:45 AM	D											5.2	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	10/19/2014		N			14.7	93.3	9.48						579.4	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
BWS	ANDROSCOGGIN RIVER - A281 - VRMP	5/18/2014	7:25 AM	N			15.1	108.4	10.88	64					231	
BWS	ANDROSCOGGIN RIVER - A281 - VRMP	6/22/2014	7:45 AM	N			19.9	99.9	6.48	68.5					20.6	
BWS	ANDROSCOGGIN RIVER - A281 - VRMP	7/20/2014	7:15 AM	N			23.6	84.5	7.25	85.3					37.3	
BWS	ANDROSCOGGIN RIVER - A281 - VRMP	8/17/2014	7:15 AM	N			20.4	97.1	8.74						325.5	
BWS	ANDROSCOGGIN RIVER - A281 - VRMP	8/17/2014	7:15 AM	D			20.2	96.9	8.61							
BWS	ANDROSCOGGIN RIVER - A281 - VRMP	9/21/2014	7:50 AM	N											16.9	
BWS	ANDROSCOGGIN RIVER - A281 - VRMP	10/19/2014	8:40 AM	N			14.4	94.2	9.6						770.1	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	5/18/2014	7:45 AM	N			15.1	104.1	11.03	60					178.5	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	6/22/2014	7:45 AM	N			19.5	85.5	8.07	80					17.3	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	7/20/2014	8:00 AM	N			24.2	83.5	7.01	74					13.5	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	8/17/2014	7:45 AM	N			18.7	90.1	8.6	70					218.7	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	9/21/2014	7:45 AM	N			16	89.16	8.8						143.9	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	10/19/2014	7:30 AM	N			14.8	92.7	9.61	120					727	
BCP	ANDROSCOGGIN RIVER - A299 - VRMP	10/19/2014	7:30 AM	D			14.8	92.7	9.61	120					579.4	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	5/18/2014	7:50 AM	N			14.9	114.3	11.5						121	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	6/22/2014	8:00 AM	N			20	94	8.5						16.9	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	6/22/2014	8:00 AM	D											11.9	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	7/20/2014	7:38 AM	N											16.8	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	8/17/2014	7:25 AM	N			20.3	92.4	8.71	70					167	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	9/25/2014	7:12 AM	N											15.5	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	10/19/2014	6:55 AM	N			14.9	96.5	9.75						579.4	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	5/18/2014	7:35 AM	N			14.9	107	10.8						161.6	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	6/22/2014	7:40 AM	N			20	95.4	8.7						18.7	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	6/22/2014	7:40 AM	D			19.9	95.5	8.7						11.9	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	7/20/2014	7:15 AM	N											8.4	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	7/20/2014	7:15 AM	D											28.2	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	8/17/2014	7:20 AM	N			20.5	91.5	8.4	70					93.3	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	9/21/2014	6:50 AM	N											9.6	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	10/19/2014	6:40 AM	N			17.3	93.7	9						980.4	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	10/19/2014	6:40 AM	D			17.3	92.4	9.4						727	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	5/18/2014	6:55 AM	N			14.8	105.6	10.7						435.2	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	5/18/2014	6:55 AM	D			14.8	105.3	10.7						248.1	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	6/22/2014	7:10 AM	N			20	92.9	8.4						42	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	7/20/2014	6:05 AM	N											27.5	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	8/17/2014	7:00 AM	N			19.8	91.7	8.71	60					112.4	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	9/21/2014	6:12 AM	N											12.1	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	10/19/2014	5:50 AM	N			13.6	96	9.86						613.1	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)

Appendix A-2. 2014 observational data and quality assurance/quality control (QA/QC) notes for "approved" and "non-approved" sites.
** "N" = normal environmental sample; "D" = field duplicate; "L" = lab duplicate
Refer to Appendix A-1 for water quality data

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
Androscoggin River - Friends of Merrymeeting Bay: Approved Sites														
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	5/18/2014	8:05 AM	N	BASEFLOW	HIGH	17.6	WADING	PARTLY CLOUDY	STRONG WIND	CLEAR	RUN	MEDIUM STAINED	EXTREMELY HIGH TIDE WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	6/22/2014	8:15 AM	N	BASEFLOW	MEDIUM	22.5	WADING	CLEAR	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	6/22/2014	8:15 AM	D				WADING						WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	7/20/2014	7:45 AM	N	BASEFLOW	MEDIUM	19.7	WADING	CLOUDY	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	8/17/2014	7:45 AM	N	BASEFLOW	MEDIUM	17.5	WADING	CLOUDY	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	9/21/2014	8:20 AM	N	BASEFLOW	LOW	16.7	WADING		CALM		RUN	MEDIUM STAINED	CONCENTRATION IS ACTUALLY >2419.6. VALUE FOR USE IN GEOMETRIC MEAN., WATER VERY LOW WADEABLE/MID-DEPTH DISSOLVED OXYEN NOT ENTERED-CALIBRATION NOT ENTERED ON FIELDSHEET
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	10/19/2014	9:00 AM	N	STORMFLOW	MEDIUM	10	WADING	CLOUDY	STRONG WIND	CLOUDY	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
BAY BRIDGE JETTY (BBB)	ANDROSCOGGIN RIVER - A231 - VRMP	10/19/2014	9:00 AM	D				WADING						WADEABLE/MID-DEPTH
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	5/18/2014	8:15 AM	N			13.9	WADING	CLEAR	CALM	CLOUDY, FOGGY, HEAVY RAIN, LIGHT RAIN			NON-WADEABLE/MID-DEPTH
Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	6/22/2014	8:30 AM	N	BASEFLOW	LOW	13.5	BANK	CLEAR	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	6/22/2014	8:30 AM	D				BANK						WADEABLE/1.5 FT BELOW SURFACE
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	7/20/2014	8:12 AM	N	BASEFLOW	LOW	18.5	WADING	CLOUDY, FOGGY	CALM	CLEAR, CLOUDY, FOGGY, MOSTLY CLOUDY	RUN	MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	8/17/2014	7:35 AM	N		HIGH		WADING	CLOUDY		CLOUDY, LIGHT RAIN	RUN	DARKLY STAINED	NON-WADEABLE/MID-DEPTH
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	9/25/2014	7:45 AM	N	BASEFLOW	LOW		WADING	CLOUDY, LIGHT RAIN	CALM	CLOUDY, LIGHT RAIN, MOSTLY CLOUDY, PARTLY	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	9/25/2014	7:45 AM	D				WADING						WADEABLE/MID-DEPTH DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Brunswick Interstate Ledges (BIL)	ANDROSCOGGIN RIVER - A24 - VRMP	10/19/2014		N	BASEFLOW	LOW	6.8	WADING	CLOUDY		LIGHT RAIN		MEDIUM STAINED	WADEABLE/MID-DEPTH
Water Street(BWS)	ANDROSCOGGIN RIVER - A281 - VRMP	5/18/2014	7:25 AM	N	BASEFLOW	HIGH	17.6	WADING	PARTLY CLOUDY	STRONG WIND	CLEAR	RUN	MEDIUM STAINED	EXTREMELY HIGH TIDE WADEABLE/MID-DEPTH
Water Street(BWS)	ANDROSCOGGIN RIVER - A281 - VRMP	6/22/2014	7:45 AM	N	BASEFLOW	MEDIUM	22.5	WADING	CLEAR	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
Water Street(BWS)	ANDROSCOGGIN RIVER - A281 - VRMP	7/20/2014	7:15 AM	N	BASEFLOW	MEDIUM	19.7	WADING	CLOUDY	CALM	CLEAR	RUN	MEDIUM STAINED	WATER SCUMMY WADEABLE/MID-DEPTH
Water Street(BWS)	ANDROSCOGGIN RIVER - A281 - VRMP	8/17/2014	7:15 AM	N	BASEFLOW	MEDIUM	17.5	WADING	CLOUDY	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
Water Street(BWS)	ANDROSCOGGIN RIVER - A281 - VRMP	8/17/2014	7:15 AM	D				WADING						WADEABLE/MID-DEPTH
Water Street(BWS)	ANDROSCOGGIN RIVER - A281 - VRMP	9/21/2014	7:50 AM	N	BASEFLOW	LOW	16.7	WADING		CALM		RUN	MEDIUM STAINED	WATER VERY LOW WADEABLE/MID-DEPTH DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Water Street(BWS)	ANDROSCOGGIN RIVER - A281 - VRMP	10/19/2014	8:40 AM	N	STORMFLOW	MEDIUM	10	WADING	CLOUDY	STRONG WIND	CLOUDY	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	5/18/2014	7:45 AM	N	STORMFLOW	HIGH	17.4	WADING	CLEAR	CALM	HEAVY RAIN, MOSTLY CLOUDY, SHOWERS	RUN	DARKLY STAINED	HEAVY RAIN PRIOR TO TESTING, WATER EXTREMELY HIGH; MOVED DOWNSTREAM TO SAMPLE WADEABLE/MID-DEPTH
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	6/22/2014	7:45 AM	N	BASEFLOW	MEDIUM	15.1	WADING	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RUN	DARKLY STAINED	WADEABLE/MID-DEPTH
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	7/20/2014	8:00 AM	N	BASEFLOW	MEDIUM	18	BANK	PARTLY CLOUDY	CALM	CLEAR	RUN	MEDIUM STAINED	NON-WADEABLE/MID-DEPTH
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	8/17/2014	7:45 AM	N		HIGH		WADING	CLOUDY		CLOUDY, LIGHT RAIN	RUN	DARKLY STAINED	NON-WADEABLE/MID-DEPTH COMPLETED ZERO DO CHECK-DID NOT RECORD RESULTS
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	9/21/2014	7:45 AM	N	BASEFLOW	LOW	17	WADING	CLOUDY		CLOUDY, HEAVY RAIN, LIGHT RAIN, SHOWERS	RUN	MEDIUM STAINED	NON-WADEABLE/MID-DEPTH SAMPLE TIME ESTIMATED FROM START AND END TIME
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	10/19/2014	7:30 AM	N	BASEFLOW	LOW	12.6	WADING	CLOUDY		CLOUDY	RUN	MEDIUM STAINED	LOTS OF GULLS AROUND WADEABLE/MID-DEPTH
BRUNSWICK CANOE PORTAGE (BCP)	ANDROSCOGGIN RIVER - A299 - VRMP	10/19/2014	7:30 AM	D				WADING						LOTS OF GULLS AROUND WADEABLE/MID-DEPTH
Fish Park Downstream (FPD)	ANDROSCOGGIN RIVER - A45 - VRMP	5/18/2014	7:50 AM	N			13.9	BANK	CLEAR	CALM	CLOUDY, FOGGY, HEAVY RAIN, LIGHT RAIN			NON-WADEABLE/MID-DEPTH
Fish Park Downstream (FPD)	ANDROSCOGGIN RIVER - A45 - VRMP	6/22/2014	8:00 AM	N	BASEFLOW	LOW	13.5	WADING	CLEAR	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
Fish Park Downstream (FPD)	ANDROSCOGGIN RIVER - A45 - VRMP	6/22/2014	8:00 AM	D				WADING						WADEABLE/1.5 FT BELOW SURFACE
Fish Park Downstream (FPD)	ANDROSCOGGIN RIVER - A45 - VRMP	7/20/2014	7:38 AM	N	BASEFLOW	LOW	18.5	BANK	CLOUDY, FOGGY	CALM	CLEAR, CLOUDY, FOGGY, MOSTLY CLOUDY	RUN	MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Fish Park Downstream (FPD)	ANDROSCOGGIN RIVER - A45 - VRMP	8/17/2014	7:25 AM	N		HIGH	19.8	BANK	CLOUDY	CALM	CLOUDY, LIGHT RAIN	RUN	DARKLY STAINED	NON-WADEABLE/MID-DEPTH
Fish Park Downstream (FPD)	ANDROSCOGGIN RIVER - A45 - VRMP	9/25/2014	7:12 AM	N	BASEFLOW	LOW		WADING	CLOUDY, LIGHT RAIN	CALM	CLOUDY, LIGHT RAIN, MOSTLY CLOUDY, PARTLY CLOUDY	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Fish Park Downstream (FPD)	ANDROSCOGGIN RIVER - A45 - VRMP	10/19/2014	6:55 AM	N	BASEFLOW	LOW	6.8	WADING	CLOUDY		LIGHT RAIN		MEDIUM STAINED	WADEABLE/MID-DEPTH
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	5/18/2014	7:35 AM	N			13.9	BANK	CLEAR	CALM	CLOUDY, FOGGY, HEAVY RAIN, LIGHT RAIN			NON-WADEABLE/MID-DEPTH
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	6/22/2014	7:40 AM	N	BASEFLOW	LOW	13.5	WADING	CLEAR	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	6/22/2014	7:40 AM	D				WADING						WADEABLE/MID-DEPTH
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	7/20/2014	7:15 AM	N	BASEFLOW	LOW	18.5	WADING	CLOUDY, FOGGY	CALM	CLEAR, CLOUDY, FOGGY, MOSTLY CLOUDY	RUN	MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	7/20/2014	7:15 AM	D				WADING						WADEABLE/1.5 FT BELOW SURFACE DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	8/17/2014	7:20 AM	N		HIGH	19.8	BANK	CLOUDY	CALM	CLOUDY, LIGHT RAIN	RUN	DARKLY STAINED	NON-WADEABLE/MID-DEPTH
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	9/21/2014	6:50 AM	N	BASEFLOW	LOW		WADING	CLOUDY, LIGHT RAIN	CALM	CLOUDY, LIGHT RAIN, MOSTLY CLOUDY, PARTLY CLOUDY	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	10/19/2014	6:40 AM	N	BASEFLOW	LOW	6.8	WADING	CLOUDY		LIGHT RAIN		MEDIUM STAINED	WADEABLE/MID-DEPTH
Fish Park Upstream (FPU)	ANDROSCOGGIN RIVER - A47 - VRMP	10/19/2014	6:40 AM	D				WADING						WADEABLE/MID-DEPTH

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - VRMP	5/18/2014	6:55 AM	N			13.9	WADING	CLEAR	CALM	CLOUDY, FOGGY, HEAVY RAIN, LIGHT RAIN			WADEABLE/MID-DEPTH
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - VRMP	5/18/2014	6:55 AM	D				WADING						WADEABLE/MID-DEPTH
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - VRMP	6/22/2014	7:10 AM	N	BASEFLOW	LOW	13.5	WADING	CLEAR	CALM	CLEAR	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - VRMP	7/20/2014	6:05 AM	N	BASEFLOW	LOW	18.5	WADING	CLOUDY, FOGGY	CALM	CLEAR, CLOUDY, FOGGY, MOSTLY CLOUDY	RUN	MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - VRMP	8/17/2014	7:00 AM	N		HIGH		WADING	CLOUDY		CLOUDY, LIGHT RAIN	RUN	DARKLY STAINED	NON-WADEABLE/MID-DEPTH
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - VRMP	9/21/2014	6:12 AM	N	BASEFLOW	LOW		WADING	CLOUDY, LIGHT RAIN	CALM	CLOUDY, LIGHT RAIN, MOSTLY CLOUDY, PARTLY CLOUDY	RUN	MEDIUM STAINED	WADEABLE/MID-DEPTH DISSOLVED OXYGEN NOT ENTERED-CALIBRTATION VALUE NOT ENTERED ON FIELDSHEET.
Pejepscot Boat Launch (PBL)	ANDROSCOGGIN RIVER - A71 - VRMP	10/19/2014	5:50 AM	N	BASEFLOW	LOW	6.8	WADING	CLOUDY		LIGHT RAIN		MEDIUM STAINED	WADEABLE/MID-DEPTH

Section 5-2
Androscoggin River (Friends of Merrymeeting Bay)

Androscoggin River

The Androscoggin River is the third largest river in the state. It has a length of 177 miles and drainage area of 3,450 square miles (2,730 sq. mi. in Maine).[1] The headwaters are Umbagog Lake in Maine/New Hampshire. From there it flows into New Hampshire and then back into Maine through the towns of Gilead and Bethel. It continues flowing through the towns and cities of Rumford, Mexico, Dixfield, Jay, Livermore Falls, Lewiston, Auburn, Lisbon, Lisbon Falls, Durham, Brunswick, and Topsham where it joins the Kennebec River at Merrymeeting Bay.

The Androscoggin River has a long history of industrial and municipal use over the last 200 years.[1] Beginning in the early 1800s, many dams were constructed for mills, primarily in the lower part of the river. By the late 1800s, many textile and lumber mills were in operation, mostly from Lewiston to Brunswick. Pulp and paper mills that are still in operation today were established in the late 1800s in New Hampshire, Rumford, and Jay. Beginning in the late 1920s, Central Maine Power built hydroelectric dams that impounded much of the river from Lewiston to Livermore Falls. Some of these uses continue today. "Along its course to the sea, the river is repeatedly dammed. It receives discharges from industrial and municipal sources, as well as polluted runoff from a variety of sources."[2] Specific problems include mill discharges, combined sewer overflows (CSOs), dam impacts (28 dams exist), and historical sediment toxins.

The Androscoggin River is assigned Class B from the Maine/New Hampshire boundary to its confluence with the Ellis River. It is assigned Class C from the confluence with the Ellis River to Merrymeeting Bay.

Monitoring History

• The Maine DEP Biological Monitoring Program has been monitoring the lower Androscoggin River since 1984. This data is available on DEP's website.

• The lower Androscoggin River is monitored by the Friends of Merrymeeting Bay (FOMB). FOMB has been in existence since 1975 and focuses on protecting the Merrymeeting Bay watershed through research, education, advocacy, and land conservation. They have been monitoring the lower part of the Androscoggin River, tributaries to Merrymeeting Bay, and the Bay since 1999. Their monitoring has extended up the Androscoggin at times (depending on volunteers) to Livermore Falls. FOMB joined the VRMP in 2009 with an interest in bringing about water classification upgrades where possible.

[1] Maine Rivers Website- Androscoggin River Profile
[2] Androscoggin River Alliance Website-Androscoggin River slideshow

• In 2011, FOMB requested that two of the three approved sites (Water Street Mooring, WSM and Brunswick Canoe Mooring, BCM) be moved from mid-channel to shore. They submitted monitoring data from mid-channel and shore to demonstrate similarity. The Department approved relocation of these approved sites. FOMB renamed these sites Brunswick Water Street (BWS) and Brunswick Canoe Portage (BCP), respectively.

• In 2010, a water quality model to predict effect of discharges and river flows on attainment of Maine's Water Quality Standards was developed for the lower Androscoggin River by the Maine DEP. The model report and data are available on DEP's website.

Methods and Sampling Sites

Volunteers monitor the Androscoggin River at eight sites on the main stem. All of the sites are now VRMP approved sites.

Monitoring is conducted once/month from May through September-October. Monitors take measurements of water temperature and dissolved oxygen using a YSI meter. Specific conductance is measured using either a YSI meter or an Oakton EC 11+/11 Testr pen. Samples are collected for *E. coli* bacteria and transported to Bowdoin College for analysis by FOMB volunteers using the IDEXX Colilert system.

Table 5-2-1: Friends of Merrymeeting Bay sampling sites at Androscoggin River.

VRMP Site ID	Organization Site Code	Sample Location	Class
Androscoggin River-A231-VRMP	BBB	Bay Bridge Jetty	C
Androscoggin River-A281-VRMP	BWS	Brunswick Water Street	C
Androscoggin River-A299-VRMP	BCP	Brunswick Canoe Portage	C
Androscoggin River- A24-FOMB	BIL	Brunswick Interstate Ledges	C
Androscoggin River-A45-FOMB	FPD	Fish Park Downstream	C
Androscoggin River-A47-FOMB	FPU	Fish Park Upstream	C
Androscoggin River-A71-FOMB	PBL	Pejepscot Boat Launch	C
Androscoggin River-A158-FOMB	DBL	Durham Boat Launch	C

Androscoggin River Sampling Sites
Friends of Merrymeeting Bay

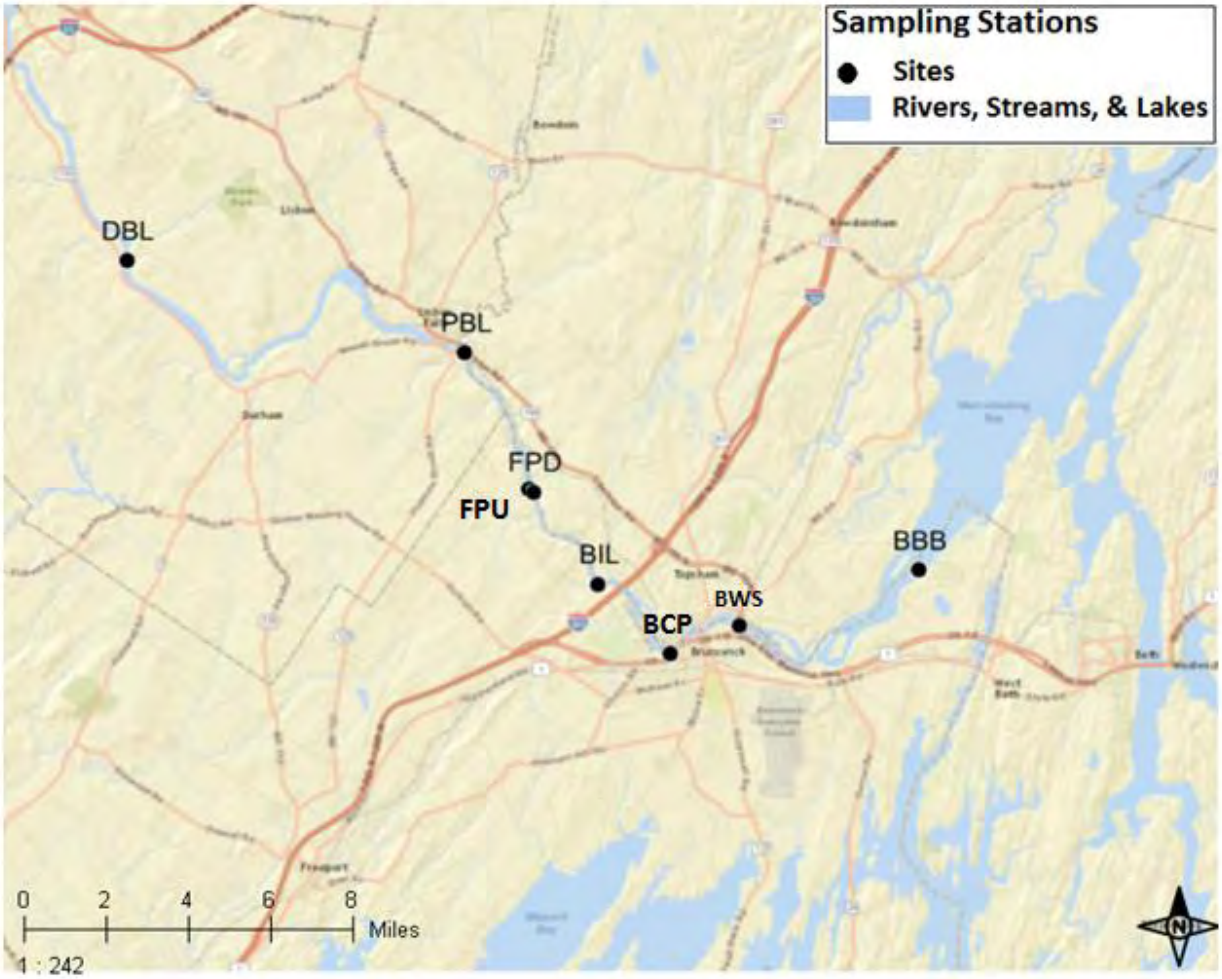


Figure 5-2-1: Map of all Friends of Merrymeeting Bay sampling sites on the Androscoggin River

Results

Refer to Appendix A-1 for discussion of individual site data and trends.

Dissolved Oxygen

Dissolved oxygen levels are generally lowest early in the morning and then increase during the day, peaking mid to late afternoon. Monitors should try to collect some samples early in the morning. Dissolved oxygen is also affected by flow conditions and temperature. During high flow conditions, more oxygen is added to the river from the atmosphere as the water is more turbulent and there is more opportunity for mixing. If flow during the summer months is higher or lower than normal, this will affect the dissolved oxygen.

Class C criteria for dissolved oxygen are a minimum of 5 mg/l or 60 % saturation. Class B criteria for dissolved oxygen are a minimum of 7 mg/l (milligrams/liter) or 75% saturation. To meet water quality criteria, both concentration and saturation standards must be met.

2015 Results:

Dissolved oxygen (DO) was measured 6 times from May through October at 7 sampling sites. At all the sites, DO concentration was above the Class C criterion of 5 mg/l. It was also at or above the Class B criterion of 7 mg/l at all sites. Dissolved oxygen percent saturation was above the Class C criterion of 60% saturation for all dates and also above Class B criterion of 75% saturation for all dates. Overall sites BBB, BWS and BCP are very similar. The sites above here (BIL, FPD, FPU, and PBL) are also very similar. Dissolved oxygen was overall excellent.

Table 5-2-2: A summary of minimum, maximum, and mean dissolved oxygen concentration values (mg/l) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Not Meeting Criterion
BBB	C	6	8.5	7.0	9.8	5	0
BWS	C	6	8.9	7.2	11.0	5	0
BCP	C	7	8.4	7.0	10.2	5	0
BIL	C	6	8.7	7.4	10.2	5	0
FPD	C	6	8.8	7.4	10.4	5	0
FPU	C	6	8.8	7.3	10.2	5	0
PBL	C	6	8.9	7.5	10.3	5	0

Table 5-2-3: A summary of minimum, maximum, and mean dissolved oxygen saturation (%) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Not Meeting Criterion
BBB	C	6	88.7	83.7	96.7	60	0
BWS	C	6	94.0	86.7	98.6	60	0
BCP	C	7	90.7	83.7	97.0	60	0
BIL	C	6	92.4	86.3	97.0	60	0
FPD	C	6	93.8	88.2	98.0	60	0
FPU	C	6	93.4	87.3	97.5	60	0
PBL	C	6	94.0	89.4	96.8	60	0

Figure 5-2-2: Graph of dissolved oxygen concentrations-lower sites

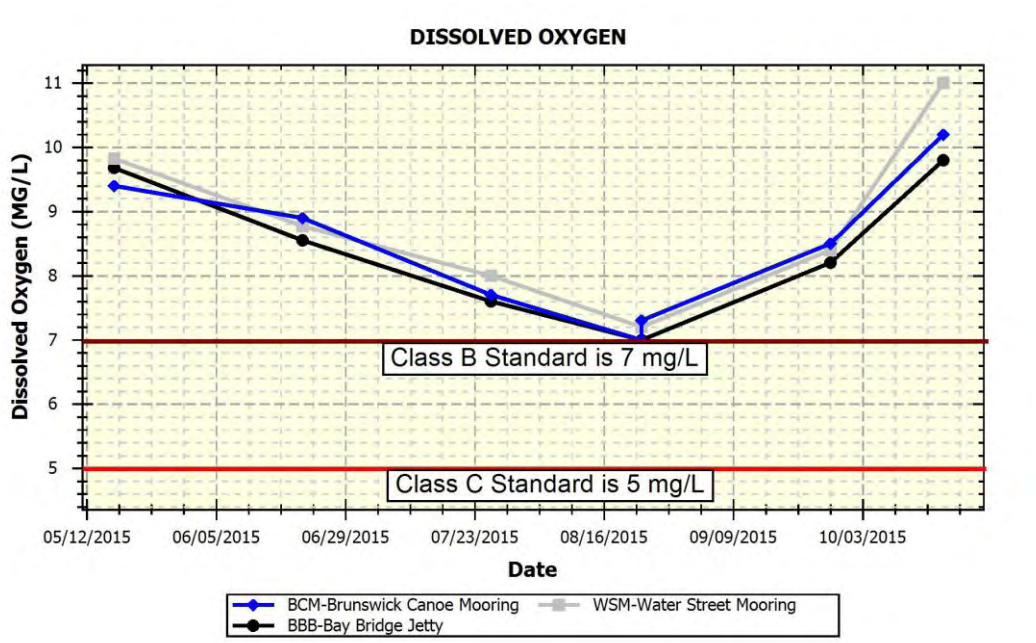


Figure 5-2-3: Graph of dissolved oxygen concentrations-upper sites

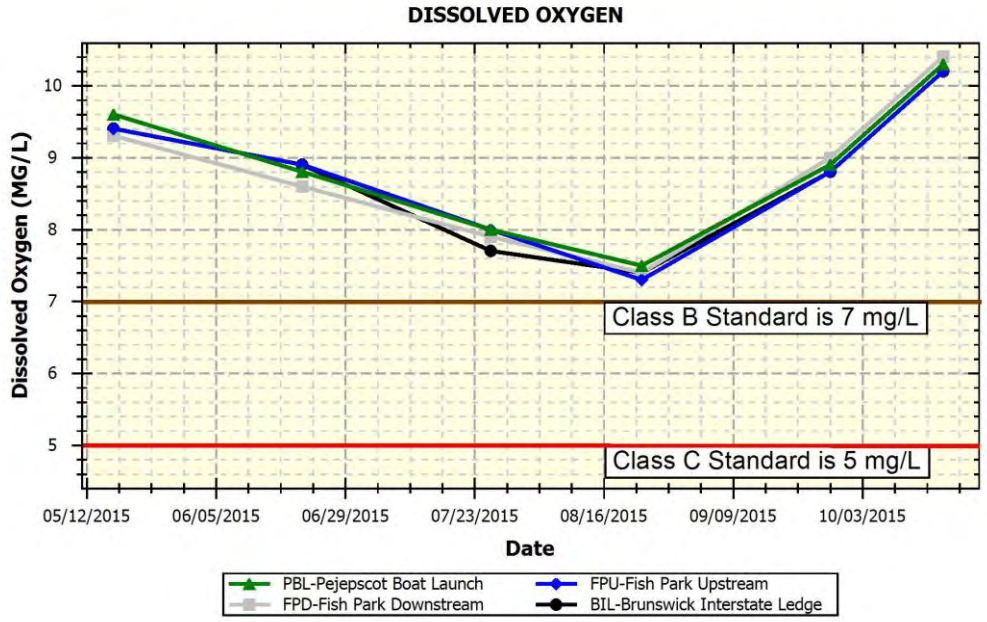


Figure 5-2-4: Graph of dissolved oxygen saturation-lower sites

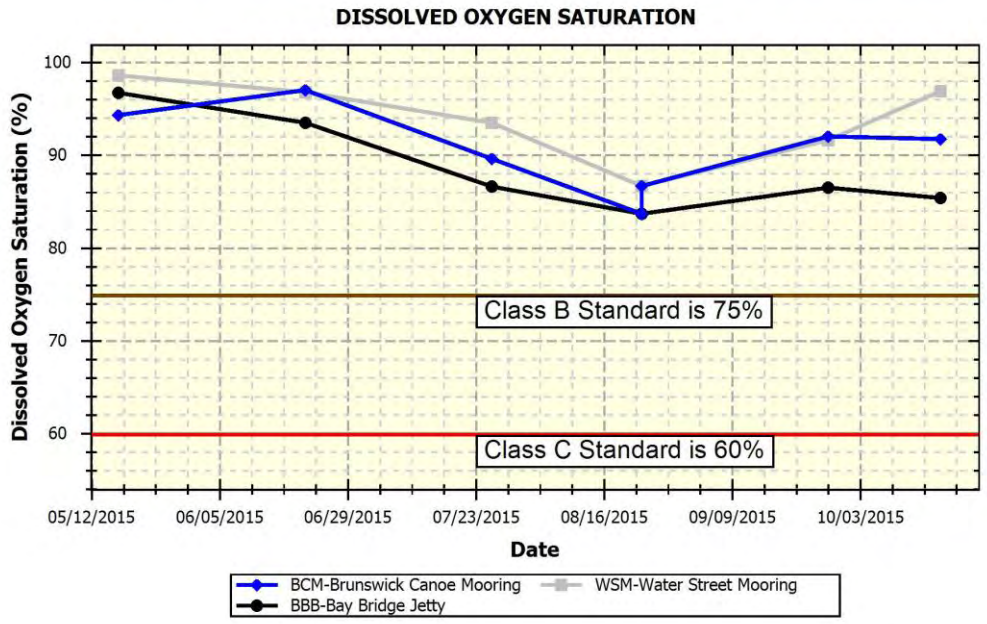
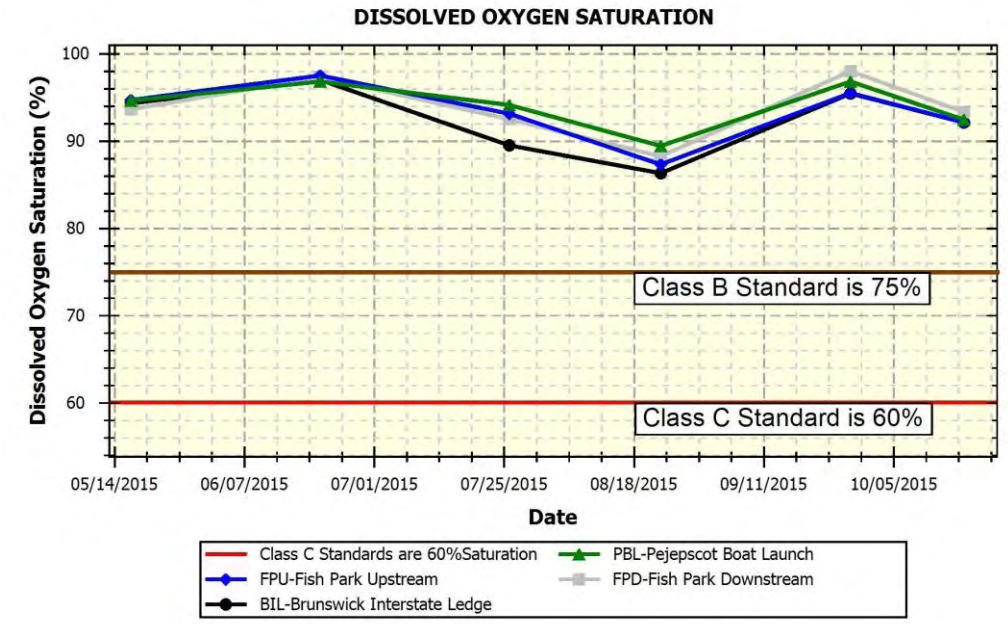


Figure 5-2-5: Graph of dissolved oxygen saturation-upper sites



Water Temperature

Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23°C maximum and 19°C weekly average) or 0.3°C (0.5°F) above the temperature that would naturally occur outside a mixing zone established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4°F (2.2°C) or more than 1.5°F (0.8°C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85°F (29°C) at any point outside a mixing zone established by the Board of Environmental Protection.

2015 Results:

Temperature at the 3 lowest sampling sites (BBB, BWS and BCP) were similar with highest temperatures occurring in July and August (22˚-24˚C). Temperature was very similar at the 4 sampling sites above (BIL, FPD, FPU, PBL) with highest readings occurring in July and August also (20˚-24˚ C). Because sampling only occurs monthly, it is not possible to determine how long temperatures remained high. Since measurements are taken close to the surface [mid-depth (1-1.5 ft.)], it is not too surprising that temperatures can get quite warm in July and August in the large open river.

Table 5-2-4: A summary of minimum, maximum, and mean water temperature (°C) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Exceeding Criterion
BBB	C	6	18.0	8.9	24.3	n/a	n/a
BWS	C	6	18.3	9.8	24.5	n/a	n/a
BCP	C	7	19.0	10.4	24.1	n/a	n/a
BIL	C	6	18.7	10.1	24.1	n/a	n/a
FPD	C	6	18.9	10.6	24.3	n/a	n/a
FPU	C	6	18.9	10.8	24.2	n/a	n/a
PBL	C	6	18.8	11.1	24.3	n/a	n/a

Figure 5-2-6: Graph of temperature-lower sites

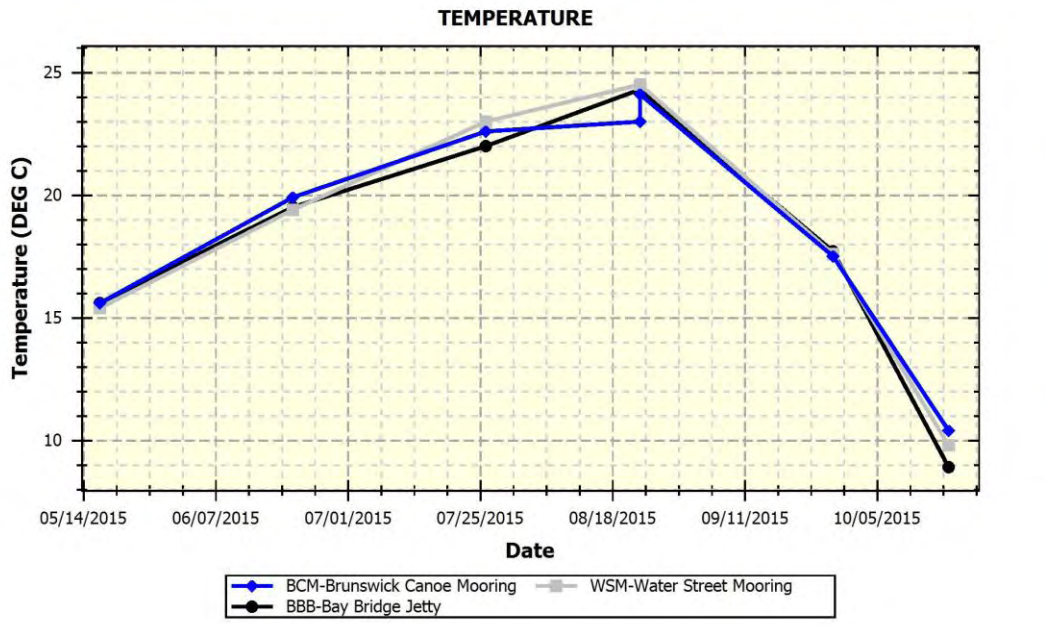
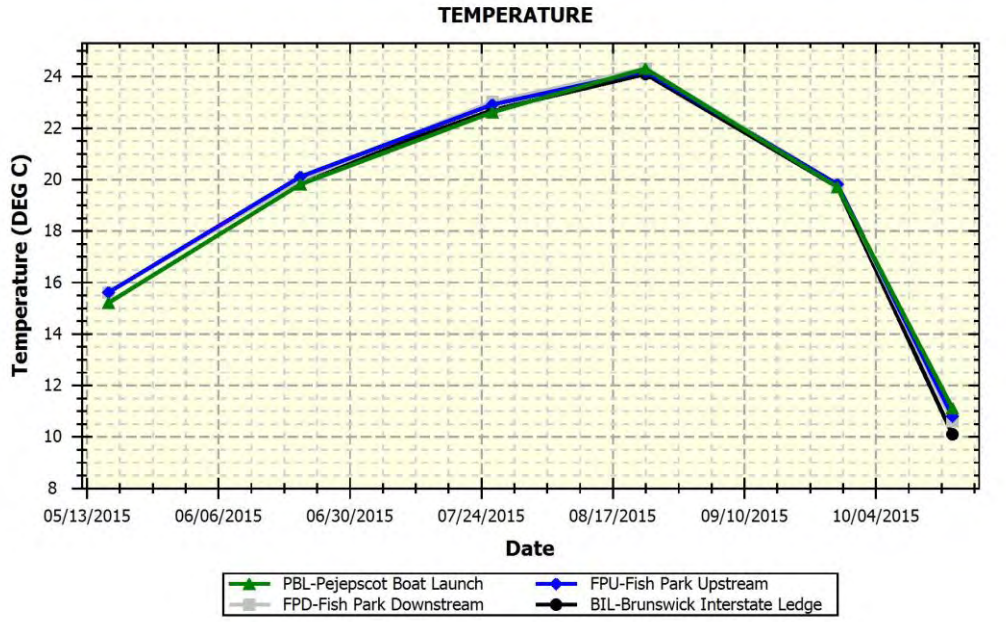


Figure 5-2-7: Graph of temperature-upper sites



Specific Conductance

Specific conductance is related to the amount of dissolved materials in the water. While there are no numerical standards, a relationship exists between conductivity and chloride which has numerical criteria. In general, streams located in urban areas tend to have high specific conductance due to polluted urban stormwater runoff. This may also in large part be due to salt buildup in surface and groundwater from road maintenance practices. Also, discharges from pulp and paper mills upstream measurably increase the conductivity of the river.

2015 Results:

Specific conductance was measured from May through October at the sampling sites with measurements ranging from 50-170 µS/cm. Overall, the mean values are low, but values are somewhat elevated later in the season reflecting point and non-point source effects. Specific conductance overall is good.

Table 5-2-5: A summary of minimum, maximum, and mean specific conductance values (micro-ohms/cm, µS/cm) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Exceeding Criterion
BBB	C	6	110	70	160	n/a	n/a
BWS	C	6	112	60	170	n/a	n/a
BCP	C	7	103	60	160	n/a	n/a
BIL	C	6	88	50	140	n/a	n/a
FPD	C	6	90	50	140	n/a	n/a
FPU	C	6	88	50	140	n/a	n/a

PBL	C	6	97	60	140	n/a	n/a

Figure 5-2-8: Graph of specific conductance-lower sites

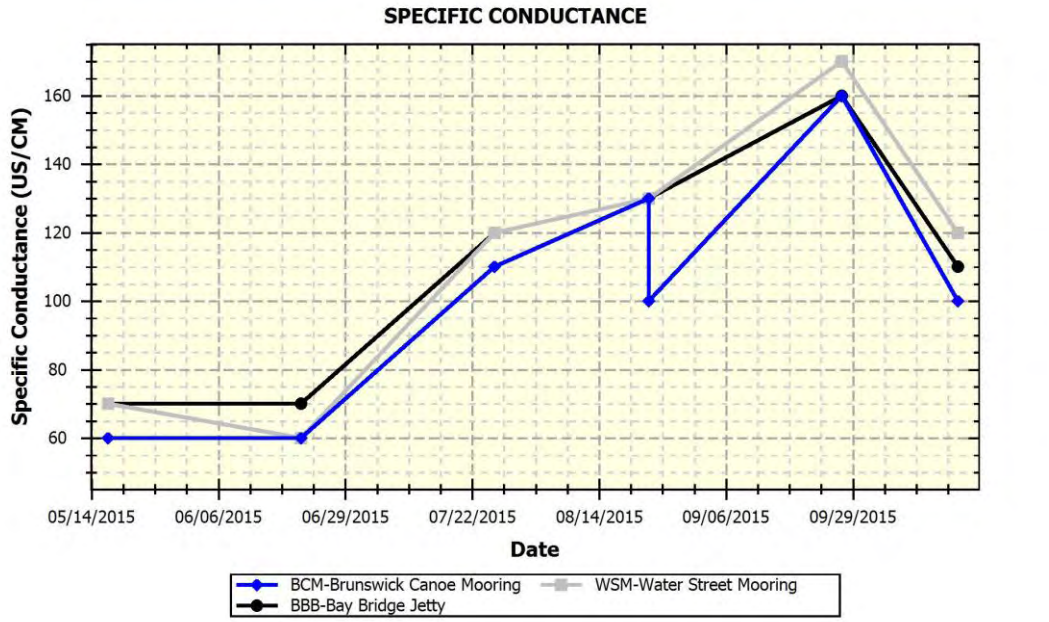
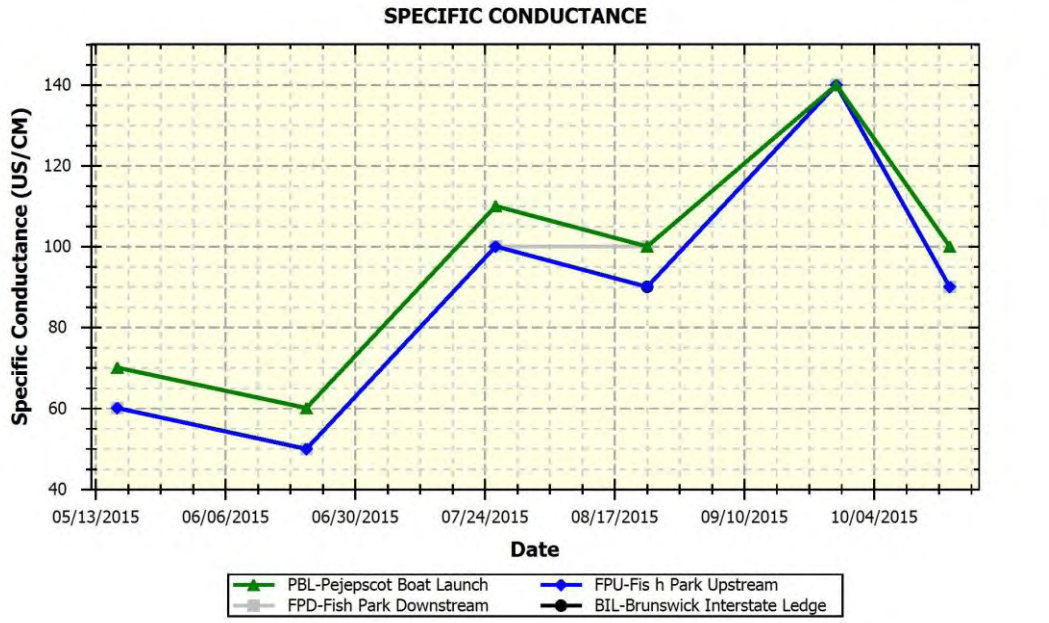


Figure 5-2-9: Graph of specific conductance-upper sites



Bacteria

E. coli bacteria are used as the indicator organism for freshwater. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms including bacteria and viruses that can cause gastrointestinal illnesses. Class C criteria for bacteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml." Class B criteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 64/100 ml (milliliters) or an instantaneous level of 236/100 ml." Geometric means are calculated instead of averages because it is more appropriate to use geometric mean for something like bacteria where there may be one or more very high or low values that can skew the mean.

2015 Results:

Escherichia coli bacteria was sampled from May through October at 7 sampling sites. Weather conditions included a mix of conditions with one date where there was heavy rain in the previous 24 hours (June), showers (May and October), and light rain-cloudy-clear for the remaining months (July, August, September). Five of seven sites exceeded the Class B and Class C bacteria instantaneous criterion of 236 (MPN/100ml) one time. The exceedances all occurred in October. The Class C geometric mean criterion of 126 (MPN/100ml) was not exceeded at any of the sites. The Class B geometric mean criterion of 64 (MPN/100ml) was not exceeded at any of the sites. Interestingly the exceedances all occurred in October and not in June when there was a heavy rain event. This could reflect that the system gets flushed out over the winter-spring period and then bacteria levels increase as the season progresses. Typically high bacterial levels are associated with stormwater runoff and/or combined sewer overflows. FOMB suggests that high bacteria levels also may reflect the seasonal September cessation of chlorine inputs by wastewater treatment plants along the river. Because bacteria counts are typically lower in colder water, treatment plants are only required to chlorinate May-Spetember. Overall, bacteria levels are good.

Table 5-2-6: A summary of minimum, maximum, and geometric mean values (MPN/100mL) for bacteria at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Geometric Mean	Minimum	Maximum	Criterion Inst/Geo	# Exceeding Criterion
BBB	C	6	17	1	291	236/126	1
BWS	C	6	23	3	238	236/126	1
BCP	C	7	25	6	222	236/126	0
BIL	C	6	16	4	192	236/126	0
FPD	C	6	14	4	206	236/126	0
FPU	C	6	15	3	276	236/126	1
PBL	C	6	49	13	291	236/126	1
DBL	C	6	21	6	579	236/126	1

Figure 5-2-10: Graph of E. coli (MPN/ml)-lower sites

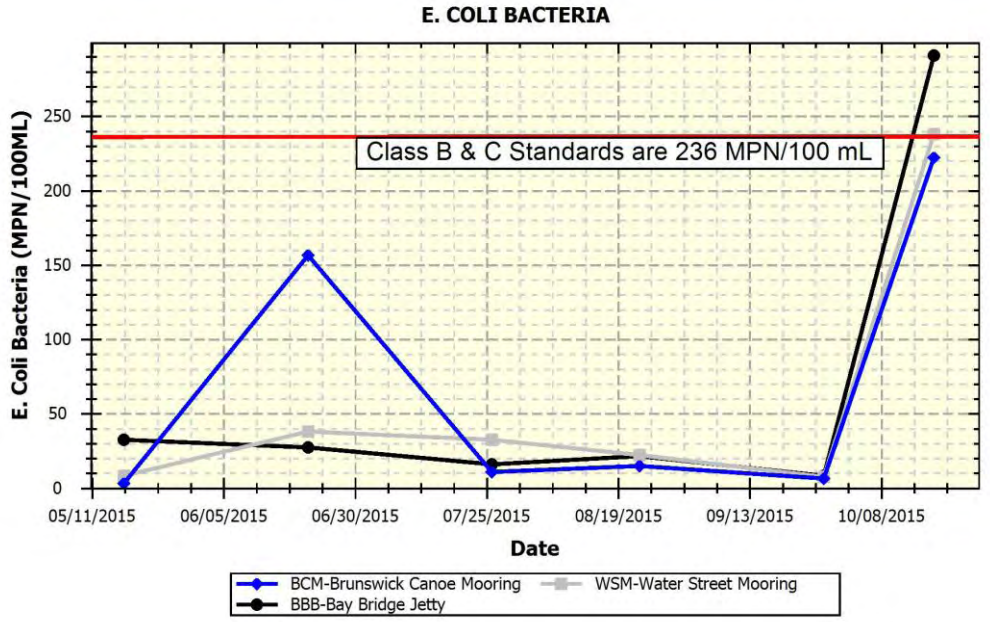
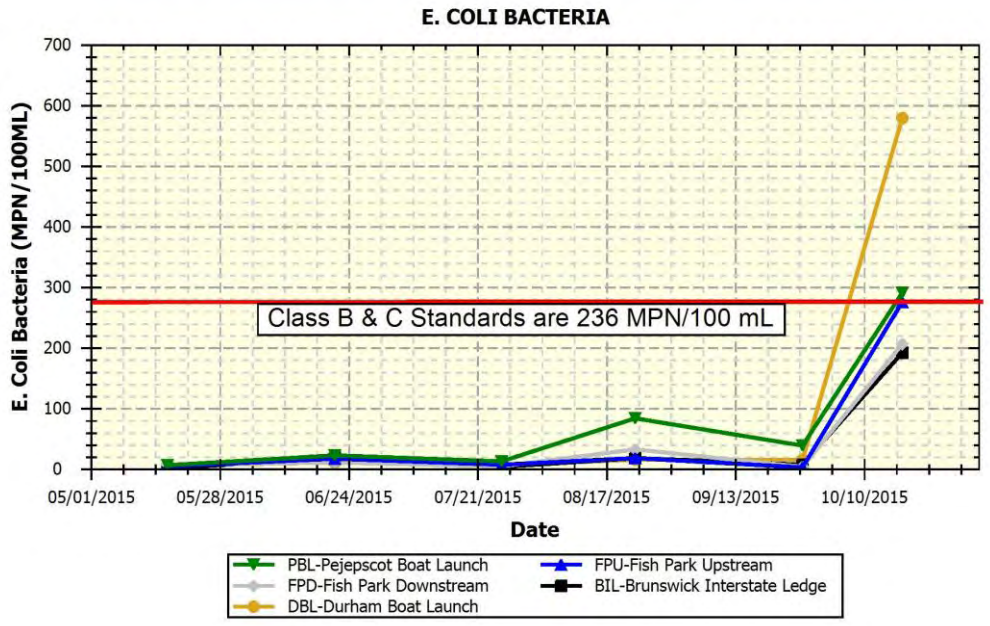


Figure 5-2-10: Graph of E. coli (MPN/ml)-upper sites



Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Androscoggin River sites monitored by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

- Point source pollution (pollution originating from a direct discharge including wastewater treatment plant discharge, combined sewer overflows and overboard discharges).
- Non-point source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, septic systems, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry.
- Ponds and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than free-flowing waters).
- Natural effects of wetlands (such as contributing waters to a stream/river that have low dissolved oxygen levels due to the decomposition of large amounts of organic matter, respiration of abundant plant matter, and low re-aeration rates that are characteristic of many wetlands).

The following are recommendations for future monitoring:

- **Some of the sites are very similar. Friends of Merrymeeting Bay might consider dropping some sites that are close to each other. They should also consider adding new sites, including streams draining to the Androscoggin River.**
- **Bacteria monitoring should continue to include a mix of sampling events to include both dry and runoff events. If possible, volunteer leaders could try to collect 1-2 bacteria samples during/after rain events.**
- **Continue monitoring at all stations (or at least a subset of sites) to develop a long- term trend database. FOMB might consider sampling 2 X/month in July and August.**

Appendix A-1. 2011 water quality data for "Approved" and "Non-Approved" sites. Non-Approved sites do not yet meet official VRMP sample location criteria and/or require further inspection and review.
* Sampling depths are only reported for Tier 1 VRMP sites.
** "N/A" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "Turb" = turbidity; "TSS" = total suspended solids"
Refer to Appendix A-2 for observational data and quality assurance/quality control (QA/QC) notes.

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
Androscoggin River-Friends of Merrymeeting Bay: Approved Sites																
DBL	ANDROSCOGGIN RIVER - A158 - VRMP	5/17/2015		NA											6.3	
DBL	ANDROSCOGGIN RIVER - A158 - VRMP	6/21/2015		NA											10.8	
DBL	ANDROSCOGGIN RIVER - A158 - VRMP	6/21/2015		D											18.5	
DBL	ANDROSCOGGIN RIVER - A158 - VRMP	7/26/2015		NA											7.5	
DBL	ANDROSCOGGIN RIVER - A158 - VRMP	8/23/2015		NA											16.1	
DBL	ANDROSCOGGIN RIVER - A158 - VRMP	9/27/2015		NA											15.8	
DBL	ANDROSCOGGIN RIVER - A158 - VRMP	10/18/2015		NA											579.4	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	5/17/2015	7:30 AM	NA			15.6	96.7	9.7	70					32.7	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	6/21/2015	7:00 AM	NA			19.5	93.5	8.6	70					27.5	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	7/26/2015	7:00 AM	NA			22.0	86.6	7.6	120					16	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	7/26/2015	7:00 AM	D											16	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	8/23/2015	7:00 AM	NA			24.3	83.7	7.0	130					21.6	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	9/27/2015	8:00 AM	NA			17.7	86.5	8.2	160					8.3	
BBB	ANDROSCOGGIN RIVER - A231 - VRMP	10/18/2015	7:50 AM	NA			8.9	85.4	9.8	110					290.9	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	5/17/2015	7:45 AM	NA			15.6	94.3	9.4	60					1	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	5/17/2015	7:45 AM	D			15.6		9.4						4.1	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	6/21/2015	8:00 AM	NA			20.0	97.0	8.9	50					19.7	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	7/26/2015	7:38 AM	NA			22.7	89.5	7.7	100					4.1	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	8/23/2015	8:00 AM	NA			24.1	86.3	7.4	90					18.5	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	9/27/2015	7:40 AM	NA			19.7	95.4	8.8	140					7.4	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	10/18/2015	7:30 AM	NA			10.1	92.1	10.2	90					191.8	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	5/17/2015	8:00 AM	NA			15.4	98.6	9.8	70					8.4	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	6/21/2015	6:15 AM	NA			19.4	96.8	8.8	60					37.9	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	7/26/2015	8:00 AM	NA			23.0	93.5	8.0	120					32.7	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	8/23/2015	6:35 AM	NA			24.5	86.7	7.2	130					22.1	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	8/23/2015	6:35 AM	D											27.5	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	9/27/2015	7:40 AM	NA			17.6	91.6	8.4	170					7.4	
WSM	ANDROSCOGGIN RIVER - A281 - VRMP	10/18/2015	7:25 AM	NA			9.8	96.9	11.0	120					238.2	
BCM	ANDROSCOGGIN RIVER - A299 - VRMP	5/17/2015	8:00 AM	NA			15.6	94.3	9.4	60					3.1	
BCM	ANDROSCOGGIN RIVER - A299 - VRMP	6/21/2015	8:15 AM	NA			19.9	97.0	8.9	60					156.5	
BCM	ANDROSCOGGIN RIVER - A299 - VRMP	7/26/2015	8:00 AM	NA			22.6	89.6	7.7	110					10.9	
BCM	ANDROSCOGGIN RIVER - A299 - VRMP	8/23/2015	6:10 AM	NA			23.0	83.7	7.0	130						
BCM	ANDROSCOGGIN RIVER - A299 - VRMP	8/23/2015	8:15 AM	NA			24.1	86.7	7.3	100					14.8	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
BCM	ANDROSCOGGIN RIVER - A299 - VRMP	9/27/2015	7:15 AM	NA			17.5	92.0	8.5	160					6.3	
BCM	ANDROSCOGGIN RIVER - A299 - VRMP	10/18/2015	7:00 AM	NA			10.4	91.7	10.2	100					222.4	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	5/17/2015	7:30 AM	NA			15.6	93.6	9.3	60					7.4	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	6/21/2015	7:45 AM	NA			20.0	97.3	8.6	50					10.9	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	7/26/2015	7:05 AM	NA			23.0	92.5	7.9	100					5.2	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	8/23/2015	7:45 AM	NA			24.3	88.2	7.4	100					33.1	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	9/27/2015	7:10 AM	NA			19.8	98.0	9.0	140					4.1	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	10/18/2015	6:55 AM	NA			10.6	93.3	10.4	90					206.4	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	10/18/2015	6:55 AM	D											191.8	
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	5/17/2015	7:15 AM	NA			15.6	94.7	9.4	60					5.2	
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	6/21/2015	7:30 AM	NA			20.1	97.5	8.9	50					17.3	
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	7/26/2015	6:40 AM	NA			22.9	93.1	8.0	100					7.4	
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	8/23/2015	7:15 AM	NA			24.2	87.3	7.3	90					18.1	
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	8/23/2015	7:15 AM	D											25.9	
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	9/27/2015	6:48 AM	NA			19.8	95.5	8.8	140					3	
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	9/27/2015	6:48 AM	D			19.8	95.5	8.8	140						
FBU	ANDROSCOGGIN RIVER - A47 - VRMP	10/18/2015	6:40 AM	NA			10.8	92.1	10.2	90					275.5	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	5/17/2015	6:45 AM	NA			15.2	94.6	9.6	70					6.3	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	6/21/2015	6:45 AM	NA			19.8	96.8	8.8	60					22.5	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	6/21/2015	6:45 AM	D			19.8	96.8	8.8	60					18.7	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	7/26/2015	6:00 AM	NA			22.6	94.1	8.0	110					13.2	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	7/26/2015	6:00 AM	D			22.6	94.1	8.0	110					18.9	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	8/23/2015	6:45 AM	NA			24.3	89.4	7.5	100					83.9	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	9/27/2015	6:15 AM	NA			19.7	96.8	8.9	140					39.3	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	10/18/2015	6:10 AM	NA			11.1	92.4	10.3	100					290.9	

Section 5-2
Androscoggin River (Friends of Merrymeeting Bay)

Androscoggin River

The Androscoggin River is the third largest river in the state of Maine. It has a length of 177 miles and drainage area of 3,450 square miles (2,730 sq. mi. in Maine).[1] The Androscoggin River's headwaters are Umbagog Lake in Maine/New Hampshire. From there it flows into New Hampshire and then back into Maine through the towns of Gilead and Bethel. It continues flowing through the towns and cities of Rumford, Mexico, Dixfield, Jay, Livermore Falls, Lewiston, Auburn, Lisbon, Lisbon Falls, Durham, Brunswick, and Topsham where it joins the Kennebec River at Merrymeeting Bay.

The Androscoggin River has a long history of industrial and municipal use over the last 200 years.[1] Beginning in the early 1800s, many dams were constructed for mills, primarily in the lower part of the river. By the late 1800s, many textile and lumber mills were in operation, mostly from Lewiston to Brunswick. Pulp and paper mills that are still in operation today were established in the late 1800s in New Hampshire, Rumford, and Jay. Beginning in the late 1920s, Central Maine Power built hydroelectric dams that impounded much of the river from Lewiston to Livermore Falls. Some of these uses continue today. "Along its course to the sea, the river is repeatedly dammed. It receives discharges from industrial and municipal sources, as well as polluted runoff from a variety of sources."[2] Specific problems include mill discharges, combined sewer overflows (CSOs), dam impacts (28 dams exist), and historical sediment toxins.

The Androscoggin River is assigned Class B from the Maine/New Hampshire boundary to its confluence with the Ellis River. It is assigned Class C from the confluence with the Ellis River to Merrymeeting Bay.

Friends of Merrymeeting Bay (FOMB) is a nonprofit organization that focuses on the lower part of the Androscoggin River and other waterbodies draining into Merrymeeting Bay. FOMB has been in existence since 1975 and focuses on protecting the Merrymeeting Bay watershed through research, education, advocacy, and land conservation.

[1] Maine Rivers Website- Androscoggin River Profile
[2] Androscoggin River Alliance Website- Androscoggin River slideshow

Monitoring History

• The Maine Department of Environmental Protection's (DEP) Biological Monitoring Program has been monitoring the lower Androscoggin River since 1984. This data is available on DEP's website.

• The lower Androscoggin River is monitored by Friends of Merrymeeting Bay (FOMB). They have been monitoring the lower part of the Androscoggin River, tributaries to Merrymeeting Bay, and the Bay since 1999. Their monitoring has extended up the Androscoggin at times (depending on volunteers) to Livermore Falls. FOMB joined the VRMP in 2009 with an interest in bringing about water classification upgrades where possible.

• In 2011, FOMB requested that two of the three approved sites (Water Street Mooring, WSM and Brunswick Canoe Mooring, BCM) be moved from mid-channel to shore. They submitted monitoring data from mid-channel and shore to demonstrate similarity. The Department approved relocation of these approved sites. FOMB renamed these sites Brunswick Water Street (BWS) and Brunswick Canoe Portage (BCP), respectively.

• In 2010, a water quality model to predict the effect of discharges and river flows on attainment of Maine's Water Quality Standards was developed for the lower Androscoggin River by the Maine DEP. The model report and data are available on DEP's website.

Methods and Sampling Sites

Volunteers monitor the Androscoggin River at eight sites on the main stem. All of the sites are now VRMP approved sites. In 2016, FOMB added site Island View Lane (IVL) to replace site Bay Bridge Jetty (BBB).

Monitoring is conducted once a month from May through September-October. Monitors take measurements of water temperature and dissolved oxygen using a YSI meter. Specific conductance is measured using either a YSI meter or an Oakton EC 11+/11 Testr pen. Samples are collected for *E. coli* bacteria and transported to Bowdoin College for analysis by FOMB volunteers using the IDEXX Colilert system.

Table 5-2-1: Friends of Merrymeeting Bay sampling sites at Androscoggin River, listed from upstream to downstream.

VRMP Site ID	Organization Site Code	Sample Location	Class
Androscoggin River-A149-VRMP	DBN	Durham Boat New	C
Androscoggin River-A71-VRMP	PBL	Pejepscot Boat Launch	C
Androscoggin River-A47-VRMP	FPU	Fish Park Upstream	C
Androscoggin River-A45-VRMP	FPD	Fish Park Downstream	C
Androscoggin River-A24-VRMP	BIL	Brunswick Interstate Ledges	C
Androscoggin River-A06-VRMP	BCP	Brunswick Canoe Portage	C
Androscoggin River-A-09-VRMP	BWS	Brunswick Water Street	C
Androscoggin River-A-45-VRMP	IVL	Island View Lane	C

Androscoggin River Sampling Sites
Friends of Merrymeeting Bay

Figure 5-2-1: Map of all Friends of Merrymeeting Bay sampling sites on the Androscoggin River.

Results

Refer to Appendix A-1 for discussion of individual site data and trends.

Dissolved Oxygen

Dissolved oxygen levels are generally lowest early in the morning and then increase during the day, peaking mid to late afternoon. Monitors should try to collect some samples early in the morning. Dissolved oxygen is also affected by flow conditions and temperature. During high flow conditions, more oxygen is added to the river from the atmosphere as the water is more turbulent and there is more opportunity for mixing. If flow during the summer months is higher or lower than normal, this will affect the dissolved oxygen.

Class C criteria for dissolved oxygen are a minimum of 5 mg/l or 60% saturation. Class B criteria for dissolved oxygen are a minimum of 7 mg/l (milligrams/liter) or 75% saturation. To meet water quality criteria, both concentration and saturation standards must be met.

2016 Results

Dissolved oxygen (DO) was measured two to six times from May through October at eight sampling sites. At all the sites, DO concentration was above the Class C criterion of 5 mg/l. It was also above the Class B criterion of 7 mg/l at all sites. Dissolved oxygen percent saturation was above the Class C criterion of 60% saturation for all dates and also above Class B criterion of 75% saturation for all dates. Overall sites BCP, BWS and IVL are very similar to each other. The sites upstream (BIL, DBN, FPD, FPU, and PBL) are also very similar. Dissolved oxygen was excellent overall.

Table 5-2-2: A summary of minimum, maximum, and mean dissolved oxygen concentration values (mg/l) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Not Meeting Criterion
DBN	C	2	8.1	7.5	8.6	5	0
PBL	C	6	8.7	7.6	10.1	5	0
FPU	C	6	8.6	7.7	10.1	5	0
FPD	C	6	8.6	7.7	9.9	5	0
BIL	C	6	8.6	7.8	9.9	5	0
BCP	C	6	8.7	7.1	10.5	5	0
BWS	C	6	9.0	7.5	10.6	5	0
IVL	C	6	8.8	7.5	10.3	5	0

Table 5-2-3: A summary of minimum, maximum, and mean dissolved oxygen saturation (%) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Not Meeting Criterion
DBN	C	2	91.8	90.5	93.0	60	0
PBL	C	6	93.5	86.7	98.3	60	0
FPU	C	6	93.8	88.4	101.0	60	0
FPD	C	6	93.7	90.4	99.4	60	0
BIL	C	6	93.6	89.5	99.5	60	0
BCP	C	6	94.3	86.2	104.9	60	0
BWS	C	6	97.6	90.9	105.3	60	0
IVL	C	6	94.3	88.9	102.8	60	0

Figure 5-2-2: Graph of dissolved oxygen concentrations - Lower sites.

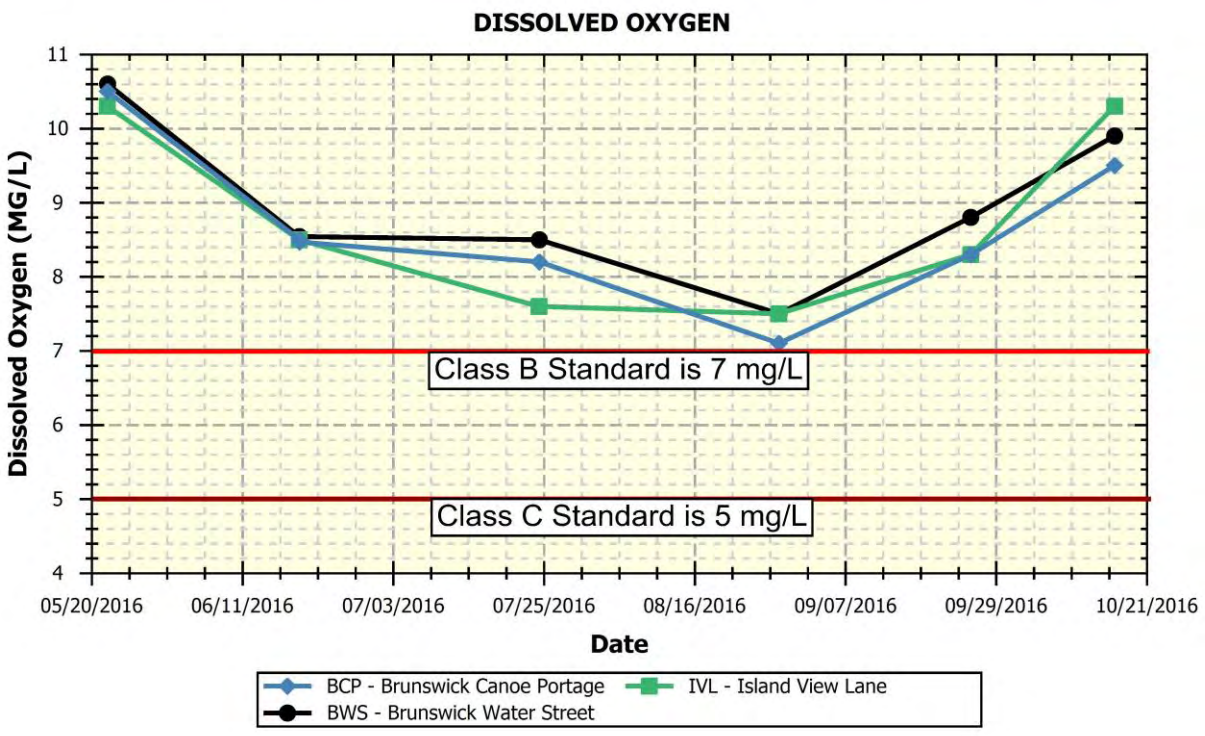


Figure 5-2-3: Graph of dissolved oxygen concentrations - Upper sites.

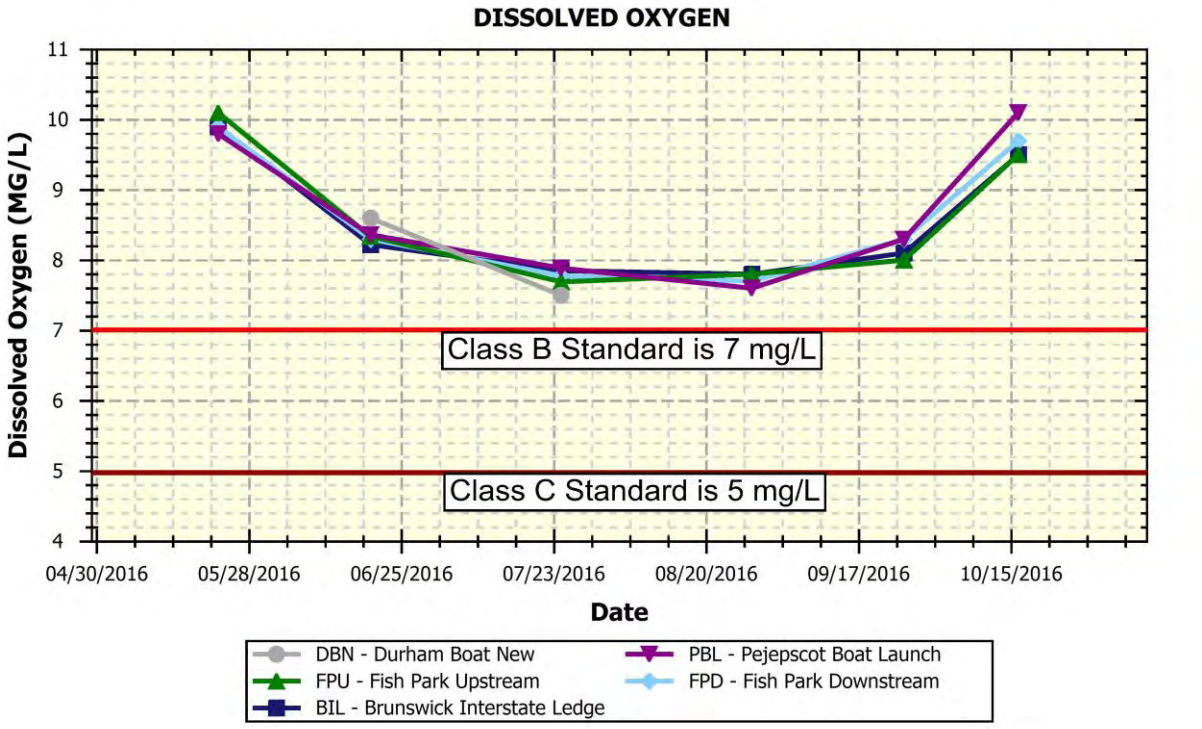


Figure 5-2-4: Graph of dissolved oxygen saturation - Lower sites.

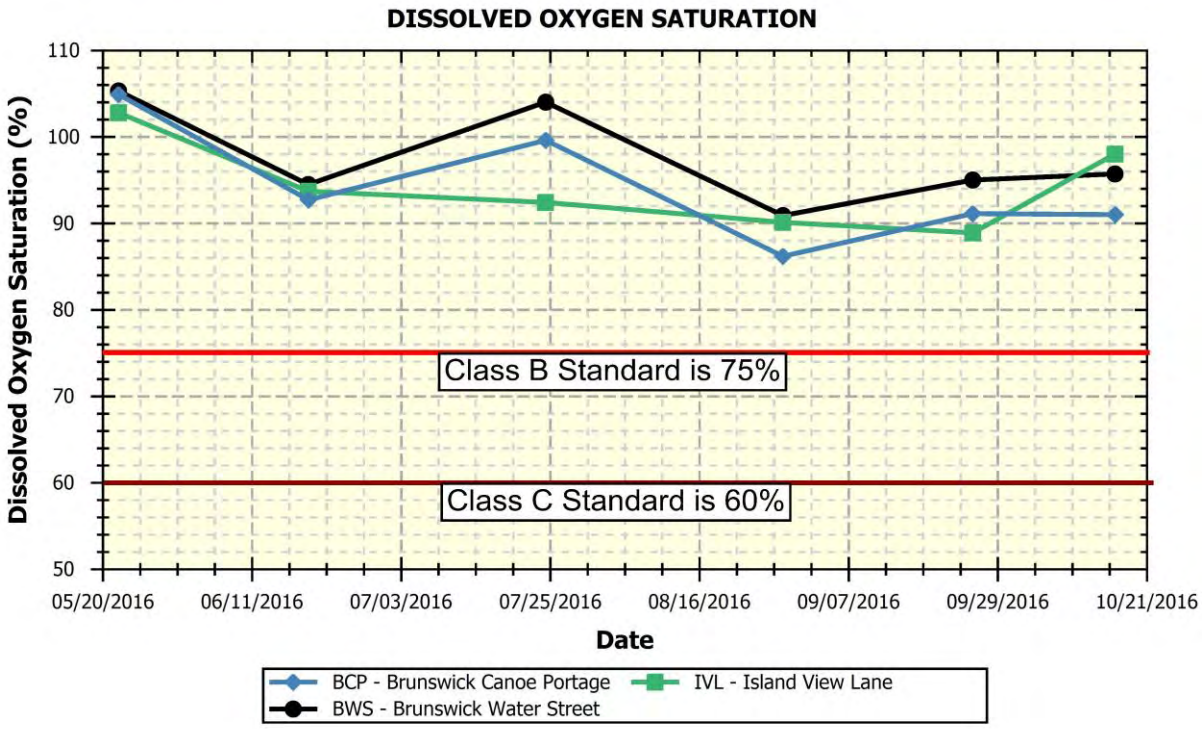
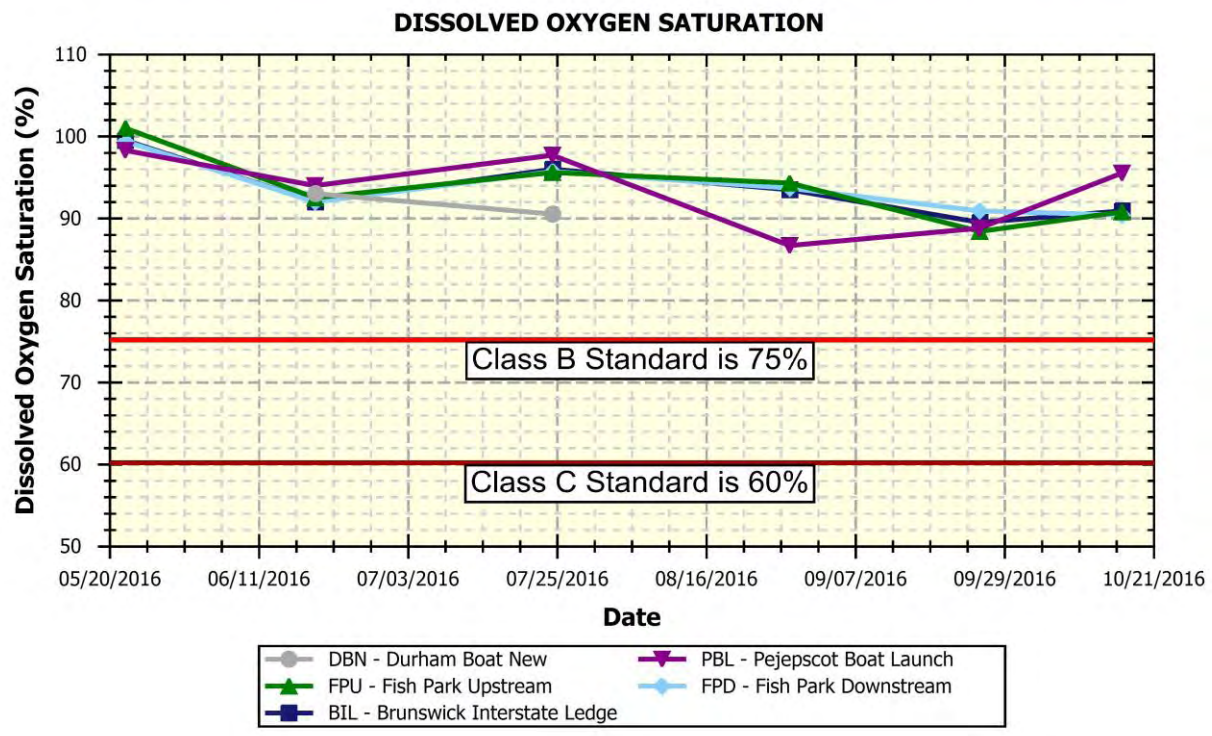


Figure 5-2-5: Graph of dissolved oxygen saturation - Upper sites.



Water Temperature

Maine's Regulations Relating to Temperature (06-096 CMR Chapter 582) require that discharge of pollutants not raise the temperature of any river and stream above the EPA criteria for indigenous species (23 °C maximum and 19 °C weekly average) or 0.3 °C (0.5°F) above the temperature that would naturally occur outside a mixing zone established by the Board of Environmental Protection. Pollutant is defined in statute as many things including dirt and heat. For tidal waters, discharge of pollutants may not raise the temperature more than 4 °F (2.2 °C) or more than 1.5 °F (0.8 °C) from June 1 to September 1, and may not cause the temperature of any tidal waters to exceed 85 °F (29 °C) at any point outside a mixing zone established by the Board of Environmental Protection.

2016 Results

Temperatures at the three lowest sampling sites (BCP, BWS and IVL) were similar with highest temperatures occurring in July and August (24˚ - 25˚ C). Temperature was similar at the five sampling sites above (BIL, FPD, FPU, IVL, and PBL) with highest readings occurring in July and August also (23˚ - 26˚ C). Since measurements are taken close to the surface [mid-depth (1 - 1.5 ft.)], it is not surprising that temperatures can get quite warm in July and August in the large open river.

Table 5-2-4: A summary of minimum, maximum, and mean water temperature (°C) values at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Exceeding Criterion
DBN	C	2	22.2	19.2	25.1	n/a	n/a
PBL	C	6	19.0	13.3	24.5	n/a	n/a
FPU	C	6	19.0	9.9	25.1	n/a	n/a
FPD	C	6	18.5	9.6	25.0	n/a	n/a
BIL	C	6	19.6	10.1	25.6	n/a	n/a
BCP	C	6	19.4	13.0	24.5	n/a	n/a
BWS	C	6	19.4	13.0	24.9	n/a	n/a
IVL	C	6	19.2	13.0	24.0	n/a	n/a

Figure 5-2-6: Graph of temperature - Lower sites.

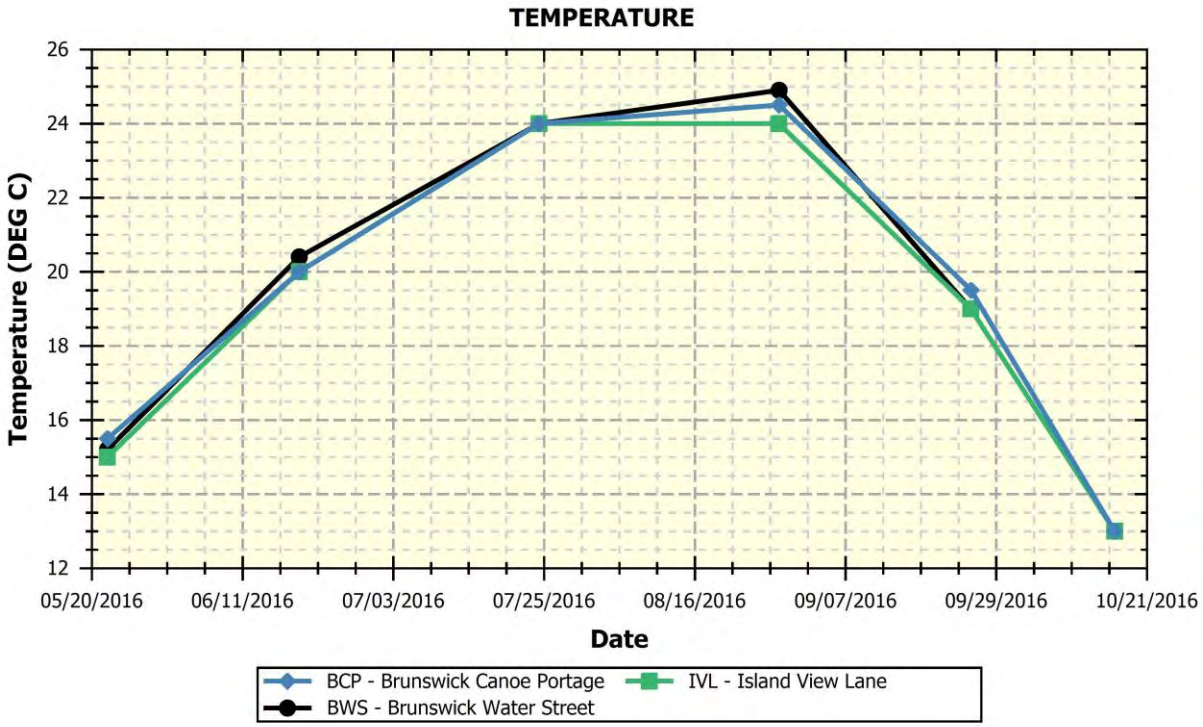
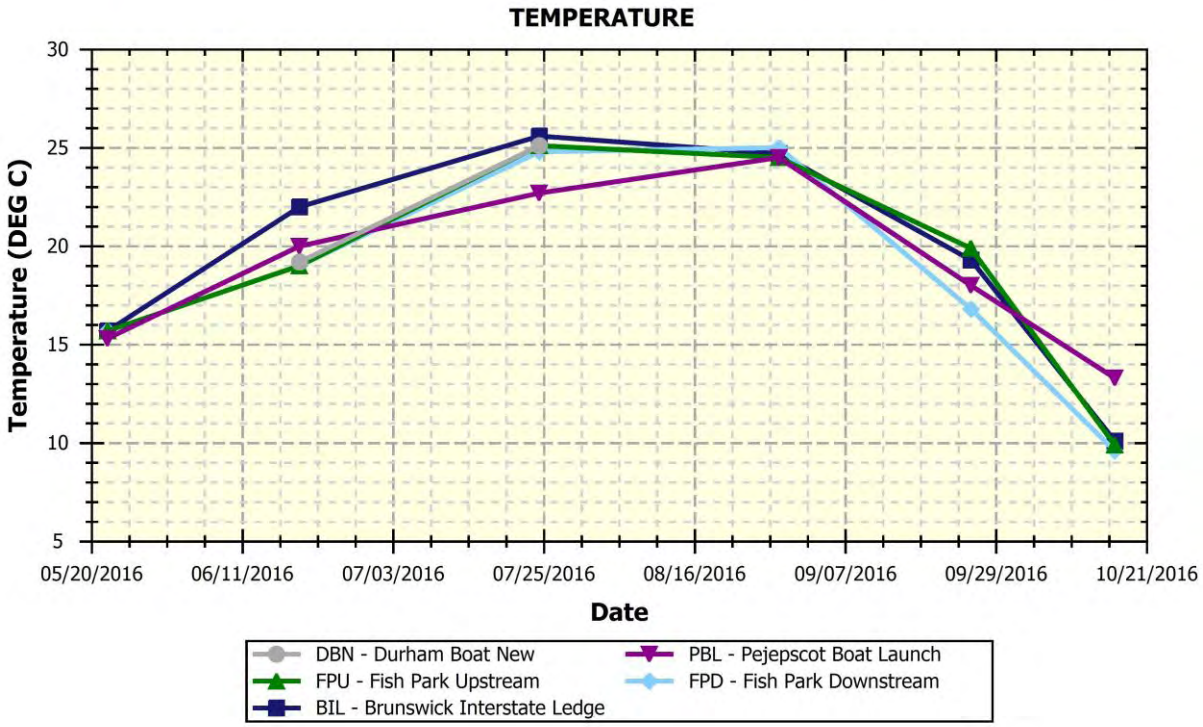


Figure 5-2-7: Graph of temperature - Upper sites.



Specific Conductance

Specific conductance is related to the amount of dissolved materials in the water. While there are no numerical standards, a relationship exists between conductivity and chloride which has numerical criteria. In general, streams located in urban areas tend to have high specific conductance due to polluted urban stormwater runoff. This may also in large part be due to salt buildup in surface and groundwater from road maintenance practices. Also, discharges from pulp and paper mills upstream measurably increase the conductivity of the river.

2016 Results

Specific conductance was measured two to six times at the sampling sites with measurements ranging from 67-165 µS/cm. Specific conductance increased as the season progressed with maximum values occurring in August when values were slightly elevated. Specific conductance overall is good.

Table 5-2-5: A summary of minimum, maximum, and mean specific conductance values (micro-ohms/cm, µS/cm) at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Mean	Minimum	Maximum	Criterion	# Exceeding Criterion
DBN	C	2	101	84	117	n/a	n/a
PBL	C	6	114	70	152	n/a	n/a
FPU	C	6	116	67	145	n/a	n/a
FPD	C	6	119	68	154	n/a	n/a
BIL	C	6	117	68	148	n/a	n/a
BCP	C	6	123	74	163	n/a	n/a
BWS	C	6	134	97	165	n/a	n/a
IVL	C	6	127	82	160	n/a	n/a

Figure 5-2-8: Graph of specific conductance - Lower sites.

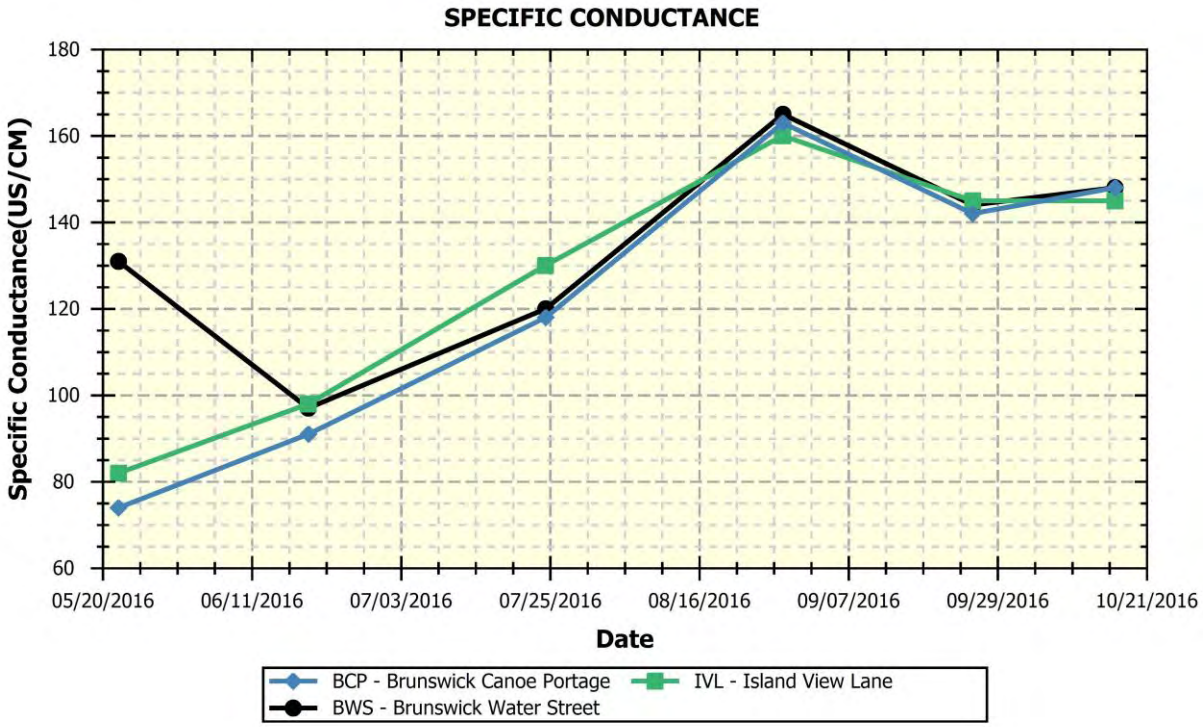
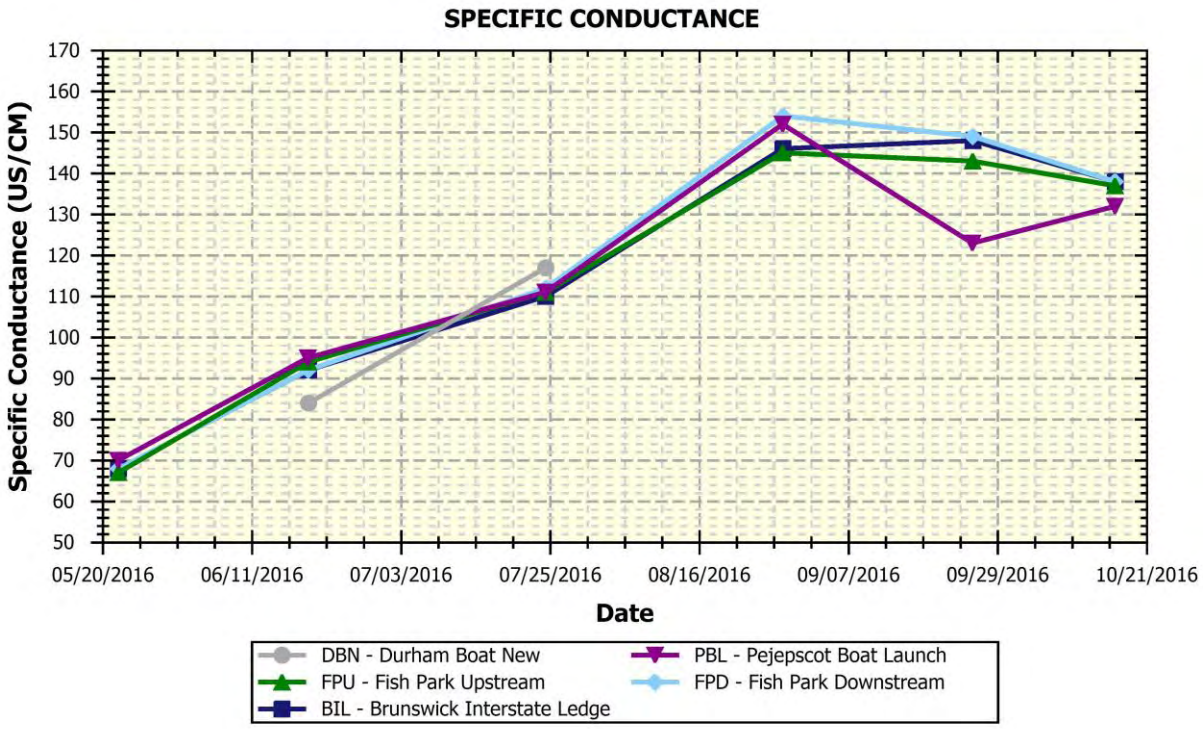


Figure 5-2-9: Graph of specific conductance - Upper sites.



Bacteria

Escherichia coli (E. coli) bacteria are used as the indicator organism for freshwater. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms, including bacteria and viruses, which can cause gastrointestinal illnesses. Class C criteria for bacteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml." Class B criteria are as follows: "Between May 15th and September 30th, the number of *Escherichia coli* of human and domestic origin shall not exceed a geometric mean of 64/100 ml (milliliters) or an instantaneous level of 236/100 ml." Geometric means are calculated instead of averages because it is more appropriate to use geometric mean for something like bacteria where there may be one or more very high or low values that can skew the mean.

2016 Results

***Escherichia coli* bacteria were sampled two to six times at eight sampling sites. Weather conditions were clear to overcast on all sample dates and previous 24 hours with the exception of the July date when there was rain the previous day. According to local Weather Underground stations, approximately 0.25-0.5" fell the day before the July sample date. None of the sample sites exceeded the Class B and Class C bacteria instantaneous criterion of 236 (MPN/100ml). The Class C geometric mean criterion of 126 (MPN/100ml) was not exceeded at any of the sites. The Class B geometric mean criterion of 64 (MPN/100ml) was not exceeded at any of the sites. Typically high bacteria levels are associated with stormwater runoff and/or combined sewer overflows. None of the sample dates coincided with any significant rainfall, which may explain why bacteria concentrations were low. FOMB suggests that high bacteria levels also may reflect the seasonal September cessation of chlorine inputs by wastewater treatment plants along the river. Because bacteria counts are typically lower in colder water, treatment plants are only required to chlorinate May - September. However in 2017, bacteria levels were only slightly elevated at two sites in October. Overall, bacteria levels are excellent for the dates that were sampled.**

Table 5-2-6: A summary of minimum, maximum, and geometric mean values (MPN/100mL) for bacteria at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

Site	Class	# Sample Points	Geometric Mean*	Minimum	Maximum	Criterion Inst/Geo	# Exceeding Criterion
DBN	C	2	17	17	20	236/126	0
PBL	C	6	19	9	72	236/126	0
FPU	C	6	8	1	16	236/126	0
FPD	C	6	7	4	17	236/126	0
BIL	C	6	9	6	23	236/126	0
BCP	C	6	8	2	17	236/126	0
BWS	C	6	16	9	31	236/126	0
IVL	C	6	24	8	82	236/126	0

***Geometric mean includes October results (beyond the criteria inclusion date range of September 30).**

Figure 5-2-10: Graph of *E. coli* (MPN/100 ml) - Lower sites.

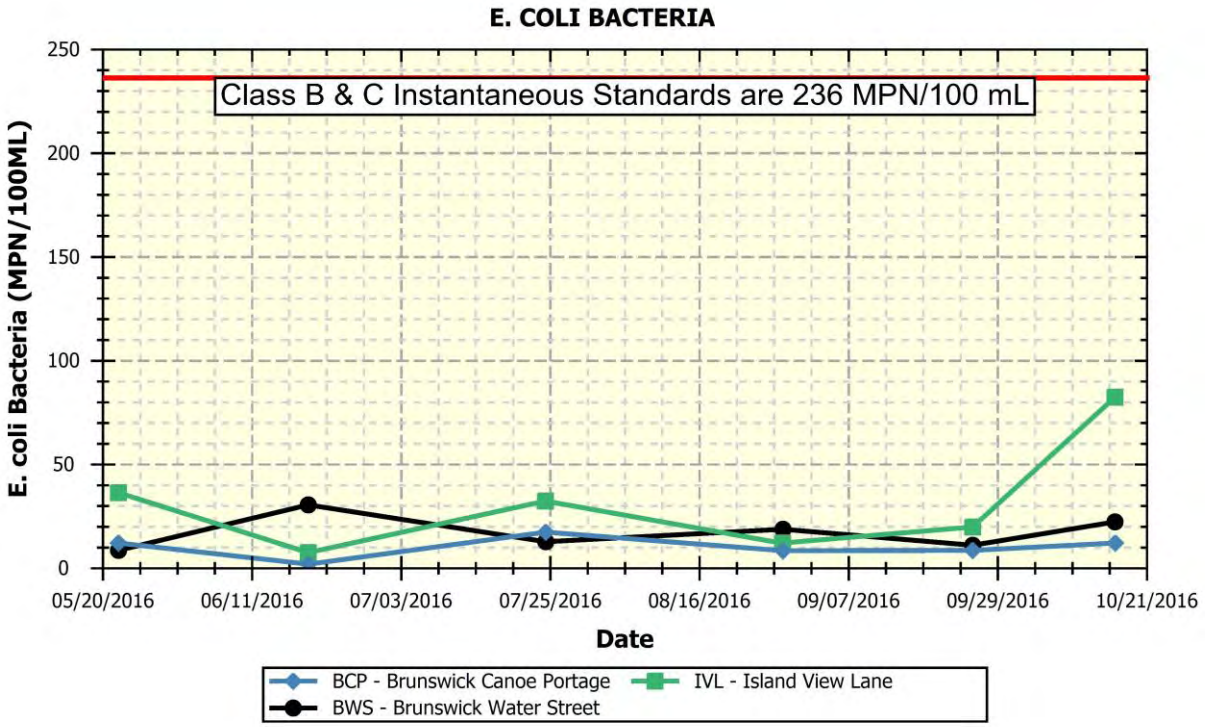
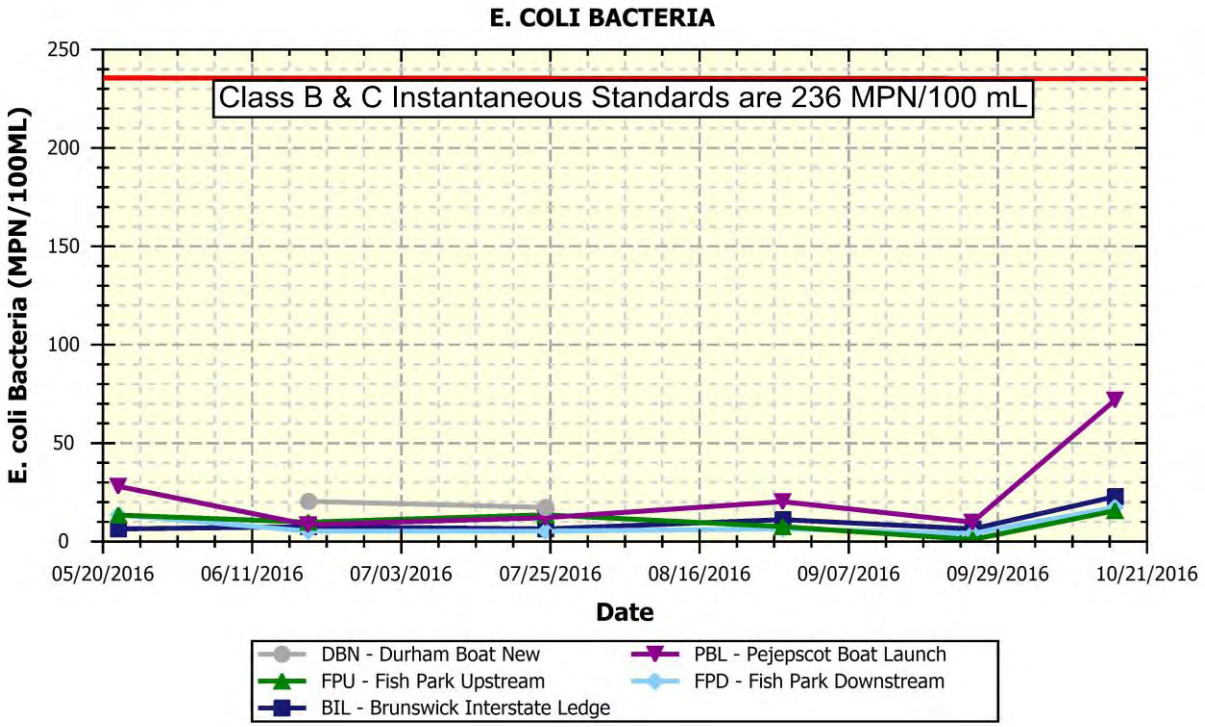


Figure 5-2-11: Graph of *E. coli* (MPN/100 ml) - Upper sites.



Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Androscoggin River sites monitored by Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

- Point source pollution (pollution originating from a direct discharge including wastewater treatment plant discharge, combined sewer overflows and overboard discharges).
- Non-point source pollution (e.g., eroded soil, fertilizers, pesticides, heavy metals, petroleum residues, road salt, septic systems, wildlife and pet feces) and polluted stormwater originating from urban impervious surfaces (e.g., streets, parking lots, driveways, rooftops), agriculture, and forestry.
- Ponds and impoundments (which often create more pond-like aquatic habitat conditions that may have higher water temperatures and lower dissolved oxygen concentrations than free-flowing waters).
- Natural effects of wetlands (such as contributing waters to a stream/river that have low dissolved oxygen levels due to the decomposition of large amounts of organic matter, respiration of abundant plant matter, and low re-aeration rates that are characteristic of many wetlands).

The following are recommendations for future monitoring:

- **Some of the sites are very similar. Friends of Merrymeeting Bay might consider dropping some sites that are close to each other. They should also consider adding new sites to include streams draining to the Androscoggin River.**
- **Bacteria monitoring should continue to include a mix of sampling events to include both dry and runoff events. If possible, volunteer leaders could try to collect one to two bacteria samples during/after rain events.**
- **Continue monitoring at all stations (or at least a subset of sites) to develop a long-term trend database. FOMB might consider sampling two times per month in July and August.**

Appendix A-1

* Sampling depths are only reported for Tier 1 VRMP sites.

** "NA" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "TSS" = total suspended solids

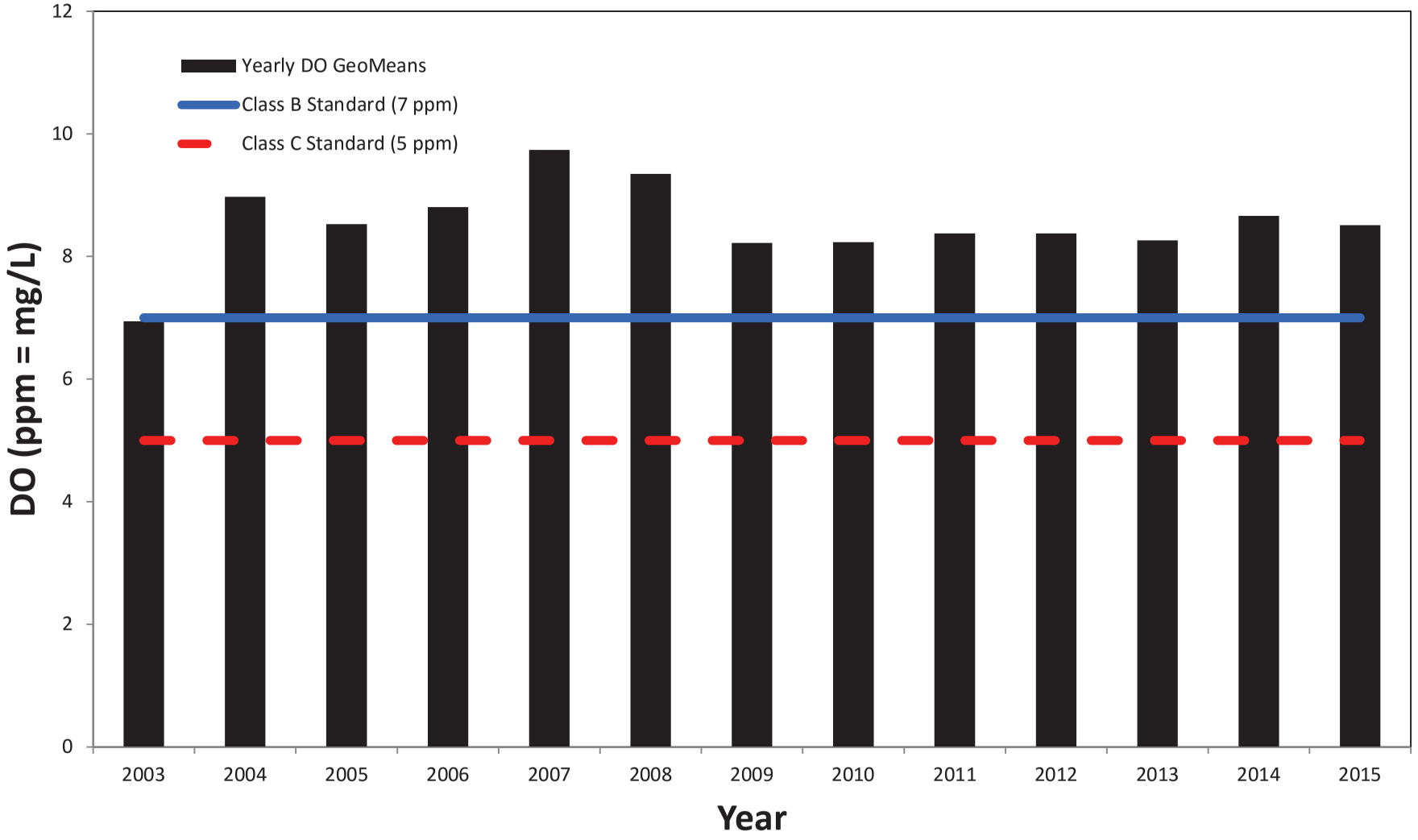
Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E. coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
Androscoggin River (lower)- Friends of Merrymeeting Bay: Approved Sites																
DBN	ANDROSCOGGIN RIVER - A149 - VRMP	6/19/2016	8:00 AM	NA			19.2	93.0	8.6	84					20.4	
DBN	ANDROSCOGGIN RIVER - A149 - VRMP	7/24/2016	7:55 AM	NA			25.1	90.5	7.5	117					17.3	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	5/22/2016	6:45 AM	NA			15.3	98.3	9.8	70					27.9	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	5/22/2016	6:45 AM	D			15.3	98.3	9.8	70					12.2	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	6/19/2016	6:30 AM	NA			20.0	94.0	8.4	95					8.5	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	7/24/2016	6:40 AM	NA			22.7	97.7	7.9	111					12	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	8/28/2016	6:15 AM	NA			24.5	86.7	7.6	152					20.1	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	9/25/2016	6:30 AM	NA			18.0	88.8	8.3	123					9.7	
PBL	ANDROSCOGGIN RIVER - A71 - VRMP	10/16/2016	6:45 AM	NA			13.3	95.5	10.1	132					71.7	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	5/22/2016	7:25 AM	NA			15.7	101.0	10.1	67					13.4	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	6/19/2016	7:10 AM	NA			19.0	92.5	8.3	94					9.8	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	7/24/2016	7:16 AM	NA			25.1	95.6	7.7	111					13.5	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	8/28/2016	6:45 AM	NA			24.5	94.3	7.8	145					7.4	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	8/28/2016	6:45 AM	D			24.5	94.7	7.7	153					7.5	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	9/25/2016	7:05 AM	NA			19.9	88.4	8.0	143					1	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	9/25/2016	7:05 AM	D			19.8	88.3	8.0	135					4.1	
FPU	ANDROSCOGGIN RIVER - A47 - VRMP	10/16/2016	7:10 AM	NA			9.9	90.8	9.5	137					15.6	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	5/22/2016	7:35 AM	NA			15.7	99.4	9.9	68					13.5	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	6/19/2016	7:38 AM	NA			19.0	92.0	8.3	92					5.2	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	7/24/2016	7:24 AM	NA			24.8	95.7	7.8	112					5.2	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	8/28/2016	7:05 AM	NA			25.0	93.7	7.7	154					6.3	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	9/25/2016	7:30 AM	NA			16.8	90.9	8.3	149					4.1	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	10/16/2016	7:25 AM	NA			9.6	90.4	9.7	138					17.3	
FPD	ANDROSCOGGIN RIVER - A45 - VRMP	10/16/2016	7:25 AM	D			10.1	95.0	9.8	139					22.1	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	5/22/2016	8:00 AM	NA			15.7	99.5	9.9	68					6.3	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	6/19/2016	8:00 AM	NA			22.0	92.0	8.2	92					7.5	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	7/24/2016	7:47 AM	NA			25.6	96.0	7.9	110					6.3	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	7/24/2016	7:47 AM	D			25.8	95.4	7.8	112					10.9	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	8/28/2016	7:40 AM	NA			24.7	93.5	7.8	146					11	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	9/25/2016	7:55 AM	NA			19.3	89.5	8.1	148					6.3	
BIL	ANDROSCOGGIN RIVER - A24 - VRMP	10/16/2016	7:50 AM	NA			10.1	90.9	9.5	138					22.8	
BCP	ANDROSCOGGIN RIVER - A06 - VRMP	5/22/2016	7:50 AM	NA			15.5	104.9	10.5	74					12.1	
BCP	ANDROSCOGGIN RIVER - A06 - VRMP	6/19/2016	7:52 AM	NA			20.0	92.7	8.5	91					2	
BCP	ANDROSCOGGIN RIVER - A06 - VRMP	6/19/2016	7:52 AM	D			20.0	92.7	8.5	91					12.1	
BCP	ANDROSCOGGIN RIVER - A06 - VRMP	7/24/2016	7:45 AM	NA			24.0	99.6	8.2	118					17.3	
BCP	ANDROSCOGGIN RIVER - A06 - VRMP	8/28/2016	7:30 AM	NA			24.5	86.2	7.1	163					8.4	
BCP	ANDROSCOGGIN RIVER - A06 - VRMP	9/25/2016	7:31 AM	NA			19.5	91.1	8.3	142					8.5	
BCP	ANDROSCOGGIN RIVER - A06 - VRMP	10/16/2016	7:32 AM	NA			13.0	91.0	9.5	148					12.1	
BWS	ANDROSCOGGIN RIVER - A-09 - VRMP	5/22/2016	7:30 AM	NA			15.2	105.3	10.6	131					8.5	
BWS	ANDROSCOGGIN RIVER - A-09 - VRMP	6/19/2016	7:23 AM	NA			20.4	94.5	8.5	97					30.5	

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E. coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
BWS	ANDROSCOGGIN RIVER - A-09 - VRMP	7/24/2016	7:20 AM	NA			24.0	104.0	8.5	120					12.8	
BWS	ANDROSCOGGIN RIVER - A-09 - VRMP	8/28/2016	7:10 AM	NA			24.9	90.9	7.5	165					18.7	
BWS	ANDROSCOGGIN RIVER - A-09 - VRMP	9/25/2016	7:18 AM	NA			19.0	95.0	8.8	144					11	
BWS	ANDROSCOGGIN RIVER - A-09 - VRMP	10/16/2016	7:12 AM	NA			13.0	95.7	9.9	148					22.3	
IVL	ANDROSCOGGIN RIVER - A-45 - VRMP	5/22/2016	6:58 AM	NA			15.0	102.8	10.3	82					36.4	
IVL	ANDROSCOGGIN RIVER - A-45 - VRMP	6/19/2016	6:50 AM	NA			20.0	93.7	8.5	98					7.5	
IVL	ANDROSCOGGIN RIVER - A-45 - VRMP	7/24/2016	6:50 AM	NA			24.0	92.4	7.6	130					32.3	
IVL	ANDROSCOGGIN RIVER - A-45 - VRMP	8/28/2016	6:45 AM	NA			24.0	90.1	7.5	160					12.1	
IVL	ANDROSCOGGIN RIVER - A-45 - VRMP	8/28/2016	6:45 AM	D											12	
IVL	ANDROSCOGGIN RIVER - A-45 - VRMP	9/25/2016	6:55 AM	NA			19.0	88.9	8.3	145					19.9	
IVL	ANDROSCOGGIN RIVER - A-45 - VRMP	10/16/2016	6:47 AM	NA			13.0	98.0	10.3	145					82.3	

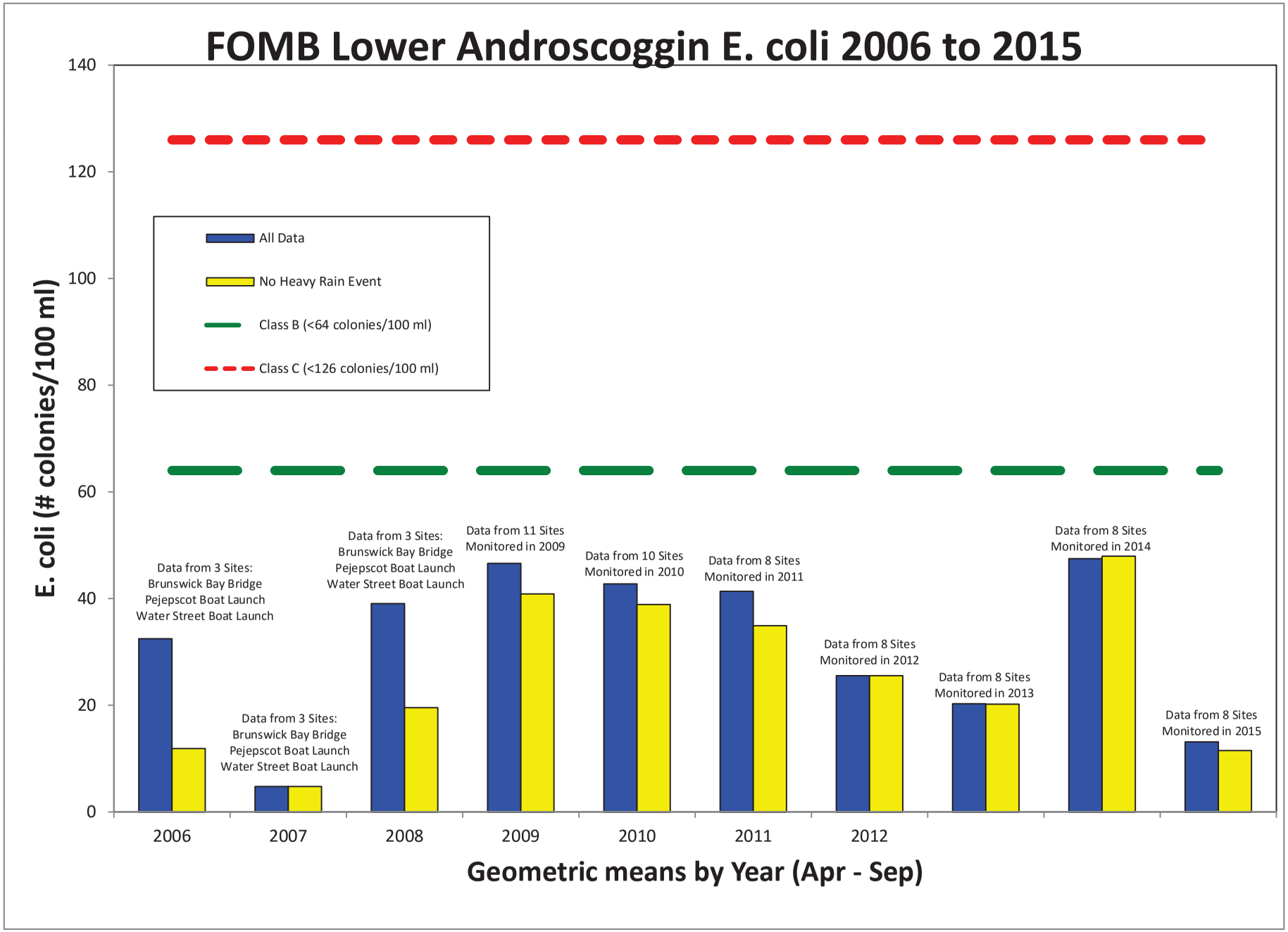
DO & E. coli

Geometric Means over Time

2003 -2015
Yearly DO Geometric Means for Lower Androscoggin River vs Class B & C Standards



(For 2003 through 2008 Sites = Topsham Pleasant Pt., Pejepscot Boat Launch & Durham Boat Launch. For 2009 through 2015 = all sites monitored)


FOMB Lower Androscoggin E. coli 2006 to 2015
E. coli (# colonies/100 ml)
140
120
100
80
60
40
20
0
All Data
No Heavy Rain Event
Class B (<64 colonies/100 ml)
Class C (<126 colonies/100 ml)
Data from 3 Sites: Brunswick Bay Bridge Pejepscot Boat Launch Water Street Boat Launch
Data from 3 Sites: Brunswick Bay Bridge Pejepscot Boat Launch Water Street Boat Launch
Data from 3 Sites: Brunswick Bay Bridge Pejepscot Boat Launch Water Street Boat Launch
Data from 11 Sites Monitored in 2009
Data from 10 Sites Monitored in 2010
Data from 8 Sites Monitored in 2011
Data from 8 Sites Monitored in 2012
Data from 8 Sites Monitored in 2013
Data from 8 Sites Monitored in 2014
Data from 8 Sites Monitored in 2015
2006
2007
2008
2009
2010
2011
2012
Geometric means by Year (Apr - Sep)

Letters of Support

(207) 784-6469 (207) 784-6460

AUBURN SEWERAGE DISTRICT

268 COURT ST. - P.O. BOX 414

AUBURN, MAINE 04212-0414

September 17, 2008

Chairman Ernest Hilton
Maine Board of Environmental Protection
17 State House Station
Augusta, ME 04333

RE: **Proposal to reclassify a portion of the Androscoggin River**

Dear Mr. Hilton and Members of the Board,

This letter is written neither in support or opposition to the proposal submitted by the Friends of Merrymeeting Bay (FOMB) to reclassify, from Class C to Class B, the lower Androscoggin River from its mouth in Merrymeeting Bay to the Durham Boat Launch or Worumbo Dam. We strongly believe FOMB should be commended for the interest and efforts to collect water quality data along this section of river with the goal of demonstrating that Class B standards are being met.

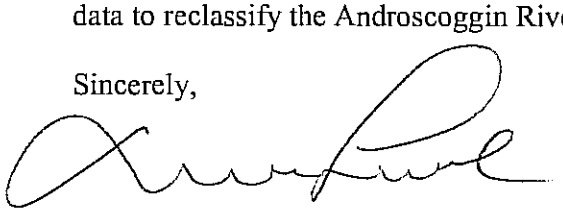
We also believe that water quality on sections of the Androscoggin River currently meet or exceed the current classification and meet those of Class B. We also believe the Board of Environmental Protection needs to give strong consideration to reclassifying portions of the Androscoggin River. To this end we believe the Maine Department of Environmental Protection should, at minimum, immediately establish a water quality monitoring program on the Androscoggin River from Merrymeeting Bay to the base of Gulf Island Dam.

The Cities of Lewiston and Auburn have invested millions of dollars in recent years in efforts to improve water quality of the Androscoggin River. In addition millions of public and private dollars have been invested in public access trails, and numerous private investments along the river are also evident. We recognize that clean rivers enhance the local economy and vitality of all communities surrounding them. A clean, healthy river attracts people, new businesses, and increases property value.

The original estimated cost of the separation improvements required in Auburn as detailed in our CSO Master Plan (prepared in 1999) was $19.2 M. Through December 31, 2007, capital improvements have exceeded $13M coming from local property taxes and sewer user fees. This investment has separated nearly 25 miles of sewers, or 81% of the projected full separation effort. Completion of the separation work in Auburn is projected for the year 2013.

On behalf of the Trustees of the Auburn Sewerage District we wish to be on record as neither supporting nor opposing the FOMB proposal to reclassify the lower Androscoggin River from Class C to Class B. We strongly urge the MDEP to immediately establish a water quality monitoring program on the Androscoggin River from Merrymeeting Bay to the base of Gulf Island Dam to be prepared with the data to reclassify the Androscoggin River from Class C to Class B in the very near future.

Sincerely,



Normand R. Lamie, P.E.
General Manager
Auburn Sewerage District

Town of Brunswick, Maine

INCORPORATED 1739

OFFICE OF THE TOWN MANAGER

DONALD H. GERRISH, MANAGER

28 FEDERAL STREET
BRUNSWICK, MAINE 04011
TELEPHONE 725-6659
FAX # 725-6663

September 17, 2008

Mr. Ernest Hilton, Chairman
Maine Board of Environmental Protection
State House Station 17
Augusta, ME 04333

Re: Reclassification of the Androscoggin River pursuant to 38 MRSA, Sections 464 and 465

Dear Mr. Hilton:

At their meeting on September 15, 2008, the Brunswick Town Council voted unanimously in support of the reclassification of the Androscoggin River from the Durham Boat launch or Worumbo Dam to its mouth at Merrymeeting Bay, from Class C to Class B, as set forth in the petition of the Friends of Merrymeeting Bay (FOMB).

Reclassification will result in the maintenance of Class B standards, which FOMB data clearly show are presently being met in this section of the river. Reclassification will provide the river with increased protection against degradation in the future, which will enable its condition to continue to improve.

As you know, classification upgrades are appropriate where it is socially or ecologically desirable to attain higher standards and when the technological and financial capacity exists to achieve those higher standards within a reasonable time. Because the river already meets Class B standards (i.e., it is clearly technologically and financially feasible to meet them), and because there is also clear social and ecological benefit from a cleaner river, the requested classification is appropriate.

The experience of other communities around the nation has shown time and again the tremendous potential for social, recreational, environmental and economic benefit from river restorations.

Therefore, on behalf of the Brunswick Town Council, we implore the Board of Environmental Protection to approve the reclassification of the Androscoggin River below Lewiston/Auburn to Class B, at your meeting now scheduled for September 18, 2008.

Your kind consideration of this request is sincerely appreciated.

Sincerely,

Donald H Gerrish
Town Manager

DHG/pf
cc: Brunswick Town Council

Town of Brunswick, Maine

INCORPORATED 1739
OFFICE OF THE TOWN MANAGER

GARY L. BROWN, MANAGER

28 FEDERAL STREET
BRUNSWICK, MAINE 04011
TELEPHONE 725-6659
FAX # 725-6663

March 2, 2010

Honorable Seth Goodall
Honorable Robert Duchesne
Natural Resources Committee
Cross State Office Building, Room 214
3 State House Station
Augusta, ME 04333

Dear Senator Goodall, Rep. Duchesne & members of the Natural Resources Committee:

At their meeting on March 1, 2010, the Brunswick Town Council decided unanimously to update their letter of support from September 15, 2008, for reclassification of the lower Androscoggin River between Durham Boat Launch or Worumbo Dam to its mouth in Merrymeeting Bay, from Class C to Class B, as proposed by Friends of Merrymeeting Bay (FOMB).

Last summer, at the request of your committee, FOMB, in cooperation with the DEP, conducted intensive water quality monitoring on this river segment, increasing from their earlier protocols both number of sample sites and sampling frequency. FOMB data gathered in 2009 supports their previous upgrade proposal, which we recommended in our 2008 letter. In that the recent more thorough data set also shows the river in attainment of Class B conditions, we have no hesitation in our continued support of the upgrade.

Reclassification will result in the maintenance of Class B standards, which FOMB data clearly show continue to be met on this river section. Reclassification will bring the river into compliance with the law [38 M.R.S.A. § 464 (F) (4) *"When the actual quality of any classified water exceeds the minimum standards of the next highest classification, that higher water quality must be maintained and protected."*], providing the river with increased protection against future degradation and enable its condition to continually improve.

As you know, classification upgrades are appropriate where it is socially or ecologically desirable to attain higher standards and when the technological and financial capacity exists to achieve those higher standards within a reasonable time. Because the river already meets Class B standards (i.e., it is clearly technologically and financially feasible to meet them) and because there are also clear social and economic benefits from a cleaner river, the requested classification is appropriate.

The experience of other communities around the nation has shown time and again the tremendous potential for social, recreational, environmental and economic benefit from river restoration.

Therefore, on behalf of the Brunswick Town Council, we implore the Natural Resources Committee to send to the full legislature as soon as possible, legislation proposing a reclassification of this lower Androscoggin river segment from Class C to Class B.

Your kind and prompt consideration of our request is sincerely appreciated.

Sincerely,

Gary L. Brown
Town Manager

cc: Brunswick Town Council
FOMB

September 16, 2008

Ernest Hilton, Chairman
Maine Board of Environmental Protection
17 State House Station
Augusta, ME 04333

Re: Reclassification of the Androscoggin River pursuant to 38 MRSA, secs. 464 and 465

Dear Chairman Hilton,

The Board of Directors of the Brunswick-Topsham Land Trust is pleased to advise you of its support for the reclassification of the Androscoggin River from the Durham Boat launch or Worumbo Dam to its mouth at Merrymeeting Bay, from Class C to Class B, as set forth in the petition of the Friends of Merrymeeting Bay (FOMB). The BTLT Board voted in favor of this reclassification at its September 15, 2008 board meeting.

Reclassification will result in the maintenance of Class B standards, which FOMB data show are presently being met in this section of the river. Because the river already meets Class B standards, the BTLT Board of Directors believes the requested reclassification is appropriate and desirable to help ensure that the Androscoggin River's water quality will continue to improve into the future.

The Androscoggin River is a significant natural resource in the communities of Brunswick and Topsham and it is important to the BTLT that its water quality and associated wildlife habitat and recreational resources remain healthy and improve into the future. The BTLT holds two easements on the banks of the Androscoggin River in Brunswick totaling 36 acres as well as 40-acre Cow Island located in the middle of the river between Brunswick and Topsham. Because of this land ownership, we are particularly vested in maintaining and improving the health of the Androscoggin River.

On a personal note, having grown up on the Androscoggin River in Turner and Auburn in the 1970s and 1980s, I can attest firsthand to how far the health of the river has come; yet, as I continue to live on the river today (now in Topsham), I am often reminded of how far it still has to go. When I am out on

(over)

108 Maine Street / Brunswick, ME 04011 / 207-729-7694 / btlt@gwi.net / www.btlt.org

the river or walking on its banks with my young children, I will frequently get questions like – "why can't we go swimming in the river" or "why can't we eat that fish". These innocent questions remind me that even though we have come so far in cleaning up this beautiful river, there is still a lot to be done.

Therefore, on behalf of the Brunswick-Topsham Land Trust Board of Directors, I would like to urge the Board of Environmental Protection to approve the reclassification of the Androscoggin River (from the Durham Boat launch or Worumbo Dam to its mouth at Merrymeeting Bay) from Class C to Class B at your meeting scheduled for September 18, 2008.

Please contact me with any questions. Your consideration of this request is sincerely appreciated.

Sincerely,

Angela Twitchell
Executive Director

CONSERVATION LAW FOUNDATION

October 2, 2008

Ernest Hilton, Chair
Maine Board of Environmental Protection
17 State House Station
Augusta, ME 04333-0017

Re: Maine Reclassification Initiative

Dear Mr. Hilton,

On behalf of the Conservation Law Foundation (CLF), I am pleased to submit these comments to supplement our testimony from the Sept. 18, 2008 hearing regarding the Maine waters reclassification initiative. CLF is a nonprofit, member-supported organization with offices in five New England states, working to protect the region's people, natural resources and communities. CLF has been involved in protection of water quality in Maine for many years, including several cases involving the waters under consideration for reclassification today.

Introduction and Legal Standards

State water quality standards are at the heart of the federal Clean Water Act's mandate to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). This is not simple precatory language: embedded within the Act and its implementing regulations (both state and federal), are a set of core principals that mandate protection of existing good water quality and continuous improvement of impaired waters. Two provisions in particular are integral to the Board of Environmental Protection's consideration of this reclassification initiative.

First is the "*Anti-Degradation*" rule, which requires that existing uses of water and water quality necessary to sustain those uses must be protected and maintained. Thus, both federal and state regulations expressly require that,

> "[w]here existing water quality standards specify designated uses less than those which are presently being attained, the state *shall* revise its standards to reflect the uses actually

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MASSACHUSETTS: 62 Summer Street, Boston, Massachusetts 02110-1016 • Phone: 617-350-0990 • Fax: 617-350-4030
NEW HAMPSHIRE: 27 North Main Street, Concord, New Hampshire 03301-4930 • 603-225-3060 • Fax: 603-225-3059
RHODE ISLAND: 55 Dorrance Street, Providence, Rhode Island 02903 • 401-351-1102 • Fax: 401-351-1130
VERMONT: 15 East State Street, Suite 4, Montpelier, Vermont 05602-3010 • 802-223-5992 • Fax: 802-223-0060

being attained." 40 C.F.R. § 131.10(i) (emphasis added). See also id. § 131.6(d); 38 M.R.S.A. § 464(4)(F)(4) (same).[1]

The equally important corollary to this rule is that a state also may not downgrade a water segment's classification if that would eliminate or impair an existing use.[2] See 40 C.F.R. § 131.10(h)(1).

The second key provision is a strict limitation on downgrading waters to remove designated (but not currently attained) uses. Thus, as a matter of law the Board may not recommend downgrading waters that fail to attain a designated use, where such use is attainable through implementation of effluent limitations or national performance standards.[3] 40 C.F.R. § 131.10(h)(2). Furthermore, the Board may only recommend downgrading of a water segment if, after conducting a Use Attainability Analysis (UAA), the Board determines that attainment is not technically or physically possible, or that more stringent controls would result in "substantial and widespread economic and social impact." Id. at § 131.10(g).

In summary, if a given water body currently meets a classification higher than its designated uses, the Board must recommend to the Legislature that the classification be upgraded. The Board may not recommend lowering a classification if attainment is possible through implementation of effluent standards or national performance standards, and may only recommend lowering standards after completion of a UAA.

Based on the above provisions and evidence that existing uses and water quality are higher than current water quality standards, CLF supports the proposed recommendations to upgrade water quality classifications of the following waters: the Basin & Narrows, Abbott Brook, Aunt Hanna Brook, the Kennebec River from the Shawmut Dam to Messalonskee Stream, tidal sections of the Kennebec River and its tributaries, Alder Stream and tributaries, Seboeis Stream and tributaries, Mattamiscontis Stream and tributaries, Souadabscook Stream and tributaries, Brown/Reed Brook, Crooked River at Scribner's Mill, South River and tributaries, Little River and tributaries, Beaver Brook and tributaries, Gardner Brook and tributaries, Violette Stream and tributaries, Pemaquid River and tributaries, Ducktrap River and tributaries, the Grand Falls Flowage, the lower Androscoggin River, and the Aroostock River.

CLF also offers the following specific comments.

---

1 "Existing uses" are defined as those uses actually attained in the water body on or after Nov. 28, 1978, whether or not they are included in the water quality standards. 40 C.F.R. § 131.3(e). "Designated uses," in contrast, are those uses specified in water quality standards whether or not they are being attained. Id. at 131.3(f).

2 Use of water for industrial processes is a legitimate designated use and can be considered in the reclassification initiative. Waste discharge and waste transport, however, are not legitimate uses under either federal or state law and may not be part of the Board's consideration. 40 C.F.R. § 131.10(a); 38 M.R.S.A. § 464(4)(F)(1)(d).

3 "Attainable" means standards or uses that can be attained by imposition of either technical- or water-quality-based effluent limits or national performance standards. 40 C.F.R. § 131.10(d).

The Lower Androscoggin River:

CLF strongly disagrees with the Department's recommendation and rationale for not upgrading this river segment. The Department has stated that proponents must provide water quality data and modeling showing "the likelihood of attainment of Class B water quality criteria at maximum licensed loads." See Reclassification Memorandum at 29. This makes no logical, legal or economic sense. First, no one operates at maximum licensed loads; rather a large buffer is generally built into all permits to avoid violations. Thus, DEP is requesting an impossible and unnecessary showing.

Second, the Department's recommendation violates the legal standard in the Clean Water Act that a state shall revise its standards to reflect uses and water quality actually being attained. 40 C.F.R. § 131.10(i). See also id. § 131.6(d); 38 M.R.S.A. § 464(4)(F). Thus, the Board's analysis must be based on *existing* water quality – not hypothetical modeling with point sources operating at maximum licensed discharge. Indeed, the Board is specifically prohibited from considering maximum licensed loads because both state and federal regulations prohibit consideration of waste discharge or transport as a designated use. 40 C.F.R. § 131.10(a); 38 M.R.S.A. § 464(4)(F)(1)(d).

Third, as many of the dischargers in this watershed have already recognized, water quality upgrades are generally good for surrounding communities. As has been shown over and over again, clean water is an economic boon. Examples abound throughout New England, including the recent revival of Boston Harbor, the Portland Waterfront, the Auburn Riverfront, and the resurgence of Merrymeeting Bay and the Kennebec River. The Androscoggin River deserves the same.

CLF believes that the data, including both dissolved oxygen levels and recreational uses, shows that existing uses in the lower Androscoggin have improved over time and that the river currently attains the higher bacteria and dissolved oxygen standards set forth in the Class B designation. As noted by the Department, it has no reason to question the data; indeed, it has relied upon data supplied by the proponent in prior reclassifications. Therefore, barring a showing that the data is invalid, the Board must recommend upgrading this section.

Aroostook River

The Department has made the same error regarding the Aroostook River. In this case, as noted in the reclassification memo, the Department has conclusively determined that existing water quality in the Aroostook River meets Class B standards. Therefore, as a matter of law the Board must recommend the upgrade: it cannot require a showing that the river also meets class B at maximum licensed loads. 40 C.F.R. § 131.10(i). See also id. §§ 131.6(d), 131.10(a); 38 M.R.S.A. § 464(4)(F). Nor, for the same reasons, can the Board or Department require a showing that the Aroostook River will also meet Class B under some future nutrient standard that has not yet been promulgated. If such a standard is promulgated prior to finalization of this process it may be considered – but, as noted before, only based on existing water quality and not upon hypothesized modeling at maximum licensed loads.

Several pages of other rivers in the proposal…

Conclusion

In closing, we wish to convey our appreciation for the opportunity to comment. CLF remains available to answer any further questions or assist as needed.

Sincerely,

Stephen F. Hinchman,
Staff Attorney, for
Conservation Law Foundation

To: Ernest Hilton, Chair
Maine Board of Environmental Protection

From: Board of Selectmen, Durham, Maine

Re: Reclassification of the Androscoggin River pursuant to 38 MRSA, secs. 464 and 465

Date: September 16, 2008

The Board of Selectmen of the Town of Durham is pleased to advise you of its enthusiastic support of the reclassification of the Androscoggin River from the Durham Boat launch or Worumbo Dam to its mouth at Merrymeeting Bay from Class C to Class B as set forth in the petition of the Friends of Merrymeeting Bay.

Reclassification will result in the maintenance of Class B standards that are presently being met in this section of the river as well as in other sections. Reclassification will also provide the river with increased protection against degradation in the future that will enable its condition to continue to improve.

As you know, upgrades to reclassification are appropriate where it is socially or ecologically desirable to attain higher standards and when the technological and financial capacity exists to achieve those higher standards within a reasonable time.

In light of the tremendous potential for social, recreational, environmental and economic benefit to be derived by the entire river valley, and in particular the Town of Durham, from an improved river, and the fact that the data shows the river presently attains Class B status, demonstrating that it is clearly technologically and financially feasible to attain Class B status, the requested reclassification is appropriate.

Therefore, on behalf of the Town of Durham, we, the Board of Selectmen, do hereby implore the Board of Environmental Protection to approve the reclassification of the Androscoggin River to Class B at your meeting now scheduled for September 18, 2008.

Your kind consideration of this request is sincerely appreciated.

Board of Selectmen
for the Town of Durham

By:_____

By:_____

By:_____

Friends of Casco Bay
Casco BAYKEEPER

Chairman Ernest Hilton
Maine Board of Environmental Protection
17 State House Station
Augusta, ME 04333

Wednesday, September 17, 2008

Dear Mr. Hilton and members of the Board,

This letter is written in support of the Friends of Merrymeeting Bay (FOMB) proposal to reclassify, from Class C to Class B, the lower Androscoggin River from its mouth in Merrymeeting Bay to the Durham Boat Launch or Worumbo Dam.

As coordinator of Friends of Casco Bay's Citizen Stewards Water Quality Monitoring Program I have had the pleasure of providing training and technical assistance to FOMB for the past nine years. At Friends of Casco Bay we approach monitoring of water quality to be the backbone of our credibility. Our well trained volunteers have provided vital, credible data to many local, state, and federal agencies since we began in 1993. Our program received EPA certification through the Quality Assurance Project Plan (QAPP) requirements in 1995. Since then we have undergone three revisions (as part of our agreement with EPA) to our QAPP in the past sixteen years thereby ensuring the validity of our data.

FOCB staff has assisted FOMB in providing training and sample collection protocol, kit preparation, and quality assurance measures as well as retraining oversight of FOMB volunteers since we began collaborating in 1999.
FOCB and FOMB volunteer monitors collect DO, pH, temperature, salinity and water clarity. Parameters monitored by FOMB volunteers also include turbidity, and coliform data.

Considering the past upgrades supported by FOMB data, their meticulous sampling and current supportive data, we believe the Board should endorse the Androscoggin proposal and recommend an upgrade of this section from C to B to the legislature. Clean rivers enhance the local economy and vitality of the communities surrounding them. A clean, healthy river attracts people, new businesses, and increases property value. An upgrade of the Androscoggin will not have an adverse impact on current industrial uses along the river since Class B conditions have been met for years, according to FOMB data.

Senator Muskie used the Androscoggin as his poster child for the Clean Water Act. Years later, it remains the poor step-child of all Maine's large rivers when it comes to clean-up efforts. The Board has an opportunity to change this and we ask you to.

Thank you for your time and consideration in this matter.

Sincerely,

Peter Milholland
Citizen Stewards Coordinator
Friends of Casco Bay

43 Slocum Drive • South Portland • Maine 04106 • tel (207) 799-8574 • fax (207) 799-7224 • keeper@cascobay.org
Improving and protecting the environmental health of Casco Bay

Lewiston
All-America City
2007

Executive Department
Laurent F. Gilbert, Sr.
Mayor

It's Happening Here!
LEWISTON · AUBURN

February 26, 2010

Senator Seth A. Goodall, (Chair)
Joint Standing Committee on Natural Resources
100 State House Station
Augusta, ME 04333-0100

RE: Reclassification of the Androscoggin River

Dear Senator Goodall:

I am writing on behalf of the City of Lewiston. In the fall of 2008, the City supported a petition submitted by Friends of Merrymeetng Bay (FOMB) to reclassify the the Androscoggin River from the Durham boat launch or Worumbo Dam to its mouth at Merrymeeting Bay from Class C to Class B.

LD 330 Section 24 passed in 2009, required additional water quality data be collected on the lower Androscoggin to substantiate and support the classification upgrade. We understand from April-October of 2009 this additional data was collected. This Friends of Merrymeeting Bay (FOMB) effort was done in cooperation with DEP partly under the auspices of their Volunteer River Monitoring Program (VRMP). We also understand a report will be presented to the Natural Resources Committee next week outlining the results of the effort. FOMB reports results of the intensive monitoring supports the previous request to upgrade this section of the Androscoggin River from Class C to Class B. More than one hundred samples were taken during the period in 2009 and the water quality results statistically support the recommendation to upgrade this section of the river.

As stated in the October 1, 2008 letter to Ernest Hilton (then Chair of the Board of Environmental Protection), The taxpayers of the City of Lewiston have invested millions of dollars into the effort to clean up the river. These investments have occurred at a time when every dollar paid by the public is increasingly difficult to part with. Those investments have come through the City's aggressive combined sewer overflow (CSO) program and the sewer user fees going directly to our jointly owned wastewater treatment plant. Not only does the City of Lewiston value the river and understand the potential benefit of this request, we have demonstrated our financial commitment to the same. It is gratifying to see the data results demonstrate our efforts are working!

Again, as stated in 2008, we further understand classification upgrades are appropriate where it is socially or ecologically desirable to attain higher standards and when the

Lewiston City Hall, 27 Pine Street, Lewiston, ME 04240-7242; Telephone: (207) 513-3121;
TTY/TDD: (207) 513-3007; Email: gilbertmayor@aol.com; Web: www.ci.lewiston.me.us

technological and financial capacity exists to achieve those higher standards within a reasonable time. Given that the river already meets Class B standards and because there is also clear social and ecological benefit from a cleaner river, the requested classification appears appropriate. The experience other communities around the nation has shown time and again the tremendous potential for social, recreational, environmental and economic benefit from river restorations.

We understand that such an upgrade request, given the current conditions that have been measured, would not require any additional financial impact, now or in the future, on the citizens of our community. If that understanding is correct on behalf of the City, we encourage the Committee to move forward with the reclassification of the Androscoggin River below Lewiston/Auburn to Class B.

Sincerely,

Laurent F. Gilbert Sr.
Mayor

Lewiston City Hall, 27 Pine Street, Lewiston, ME 04240-7242; Telephone: (207) 513-3121;
TTY/TDD: (207) 513-3007; Email: gilbertmayor@aol.com; Web: www.ci.lewiston.me.us

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All-America City
2007

Executive Department
James A. Bennett
City Administrator

Deputy City Administrator
Phil Nadeau
Assistant to the City Administrator
Lincoln Jeffers

It's Happening Here!
LEWISTON • AUBURN

October 1, 2008

Mr. Ernest Hilton, Chair
Maine Board of Environmental Protection
State House Station 17
Augusta, ME 04333

RE: Reclassification of the Androscoggin River Pursuant to 38 MRSA, Sections 464 and 465

Dear Mr. Hilton:

I am writing on behalf of the Lewiston City Council. At a recent meeting, the City was asked to support the reclassification of the Androscoggin River from the Durham boat launch or Worumbo Dam to its mouth at Merrymeeting Bay, from Class C to Class B, as set forth in the petition of the Friends of Merrymeeting Bay (FOMB).

As we understand it, reclassification will result in the maintenance of Class B standards, which FOMB data clearly show are presently being met in this section of the river. Reclassification will provide the river with increased protection against degradation in the future, which will enable its condition to continue to improve.

The taxpayers of the City of Lewiston have invested millions of dollars into the effort to clean up the river. These investments have occurred at a time when every dollar paid by the public is increasingly difficult to part with. Those investments have come through the City's aggressive combined sewer overflow (CSO) program and the sewer user fees going directly to our jointly owned wastewater treatment plant. Not only does the City of Lewiston value the river and understand the potential benefit of this request, we have demonstrated our financial commitment to the same.

We further understand that classification upgrades are appropriate where it is socially or ecologically desirable to attain higher standards and when the technological and financial capacity exists to achieve those higher standards within a reasonable time. Given that the river already meets Class B standards and because there is also clear social and ecological benefit from a cleaner river, the requested classification appears to be appropriate. The experience of other communities around the nation has shown time and again the tremendous potential for social, recreational, environmental, and economic benefit from river restorations.

It is further our understanding that such an upgrade request, given the current conditions that have been measured, would not require any additional financial impact, now or in the future, on the citizens of our community. If that assumption is correct, I, therefore, on behalf of the Lewiston City Council, encourage the Board of Environmental Protection to approve the reclassification of the Androscoggin River below Lewiston/Auburn to Class B.

Sincerely,

James A. Bennett
City Administrator

c: Lewiston Mayor & City Council

file: AndroRiverReclassification

Board of Selectmen

100 Main Street
Topsham, Maine 04086

Town of Topsham

Town office (207) 725-6821
Fax 207-725-1731

September 18, 2008

Mr. Ernest Hilton, Chair
Maine Board of Environmental Protection
#17 State House Station
Augusta, Maine 04333-0017

Re: Reclassification of the Androscoggin River pursuant to 38 MRSA, secs. 464 and 465

The Board of Selectmen of the Town of Topsham is pleased to advise you of its enthusiastic support of the reclassification of the Androscoggin River from the Durham Boat launch or Worumbo Dam to its mouth at Merrymeeting Bay from Class C to Class B as set forth in the petition of the Friends of Merrymeeting Bay. Reclassification will result in the maintenance of Class B standards which are presently being met in this section of the river as well as in other sections. Reclassification will also provide the river with increased protection against degradation in the future which will enable its condition to continue to improve.

As you know, upgrades to reclassification are appropriate where it is socially or ecologically desirable to attain higher standards and when the technological and financial capacity exists to achieve those higher standards within a reasonable time.

The Town of Topsham has experienced major and welcome development along the river, and we look forward to more. In light of the tremendous potential for social, recreational, environmental and economic benefit to be derived by the entire river valley, and in particular the Town of Topsham, from an improved river, and the fact that the data shows the river presently attains Class B status, demonstrating that it is clearly technologically and financially feasible to attain Class B status, the requested reclassification is appropriate.

Therefore, on behalf of the Town of Topsham, we, the Board of Selectmen, do hereby implore the Board of Environmental Protection to approve the reclassification of the Androscoggin River to Class B at your meeting now scheduled for September 18, 2008.

Your kind consideration of this request is sincerely appreciated.

Sincerely,

Topsham Board of Selectmen

Michelle Jones, Chair

Ron Riendeau, Vice Chair

James Trusiani

Steve Edmondson

Sandra Consolini

RESOLUTION OF THE BOARD OF SELECTMEN
OF THE TOWN OF TOPSHAM

Whereas, since 1750 Topsham has benefited from the wild power of the Androscoggin; and

Whereas, due to his love for the Androscoggin, Senator Muskie saw the need for, and is generally recognized as the Congressman most responsible for the drafting and passage of the Federal Clean Water Act; and

Whereas, sadly, the Androscoggin has not been accorded the protections of the Clean Water Act and fails to meet minimal environmental standards; and

Whereas, it is in the clear social, recreational, environmental and economic interest of the State of Maine and of the communities which are situated near to it that the Androscoggin be accorded all of the benefits and entitlements of the Clean Water Act and that the provisions of the Act be strictly enforced on behalf of the River.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF SELECTMEN OF THE TOWN OF TOPSHAM AS FOLLOWS:

The State of Maine should take all necessary actions to ensure that the Androscoggin River receives the same protection as that accorded to the other rivers in the State of Maine.

The Board of Selectmen shall support the Androscoggin River Alliance in its efforts to restore the Androscoggin to a condition which will enable the citizens of Topsham to enjoy all of the benefits which the River can provide to them. The Board shall offer this Resolution to demonstrate such support.

Adopted by the Board of Selectmen of the Town of Topsham by the vote of its members on this 4th day of February, 2010.

Ronald Riendeau, Chairman

James Trusiani, Vice Chair

Steve Edmondson

Sandra Consolini

Donald Russell

Office of the Town Manager
100 Main Street
Topsham, ME 04086

James L. Ashe
Town Manager
Phone: 207-725-5821
Fax: 207-725-1731
jashe@topshammaine.com

March 5, 2010

Senator Seth Goodall
Representative Robert Duchesne
Natural Resources Committee
Cross State Office Building, Room 214
3 State House Station
Augusta, ME 04333

Dear Sen. Goodall, Rep. Duchesne & members of the Natural Resources Committee,

At their meeting on March 4, 2010, the Topsham Selectmen decided unanimously to update their letter of support from September 18, 2008 for reclassification of the lower Androscoggin River between Durham Boat Launch or Worumbo Dam to its mouth in Merrymeeting Bay, from Class C to Class B, as proposed by Friends of Merrymeeting Bay (FOMB).

Last summer at the request of your committee, FOMB in cooperation with the DEP conducted intensive water quality monitoring on this river segment increasing from their earlier protocols both number of sample sites and sampling frequency. FOMB data gathered in 2009 supports their previous upgrade proposal which we recommended in our 2008 letter. In that the recent more thorough data set also shows the river in attainment of Class B conditions, we have no hesitation in our continued support of the upgrade.

Reclassification will result in the maintenance of Class B standards, which FOMB data clearly show continue to be met on this river section. Reclassification will bring the river into compliance with the law [38 M.R.S.A. § 464 (F) (4) *"When the actual quality of any classified water exceeds the minimum standards of the next highest classification, that higher water quality must be maintained and protected."*], providing the river with increased protection against future degradation and enable its condition to continually improve.

As you know, classification upgrades are appropriate where it is socially or ecologically desirable to attain higher standards and when the technological and financial capacity exists to achieve those higher standards within a reasonable time. Because the river already meets Class B standards (i.e., it is clearly technologically and financially feasible to meet them) and because there are also clear social and economic benefits from a cleaner river, the requested classification is appropriate.

The experience of other communities around the nation has shown time and again the tremendous potential for social, recreational, environmental and economic benefit from river restoration.

Therefore, on behalf of the Topsham Board of Selectmen, we implore the Natural Resources Committee to send to the full legislature as soon as possible, legislation proposing a reclassification of this lower Androscoggin river segment from Class C to Class B.

Your kind and prompt consideration of our request is sincerely appreciated.

Sincerely,

James Ashe
Town Manager

Cc: Topsham Board of Selectmen
FOMB

NEWS RELEASE – September 13, 2006
Northeast-Midwest Institute, Washington DC

Buffalo Area Homeowners to Benefit from River Clean-up

Contact: Nicole Mays, Northeast-Midwest Institute (202 584 3378)
Dr. John Braden, University of Illinois (217 333 5501)

Buffalo, NY. Residential property values near the Buffalo River could increase by as much as $140 million if contamination in the river is eliminated, according to a study conducted by the University of Illinois and the Northeast-Midwest Institute.

Findings of the study will be officially released September 15, 2006 at a community forum in Buffalo. The forum will be open to the public and feature a presentation by Dr. Braden concerning the results of the two-year study. Other speakers include Buffalo Mayor Byron Brown; State Senator Mark Schroeder; Mary Beth Giancarlo Ross of U.S. EPA's Great Lakes National Program Office; Abby Snyder of New York State's Department of Environmental Conservation; Jill Spisiak Jedlicka with Buffalo Niagara Riverkeeper; Helen Domske with New York Sea Grant and University at Buffalo; and Nicole Mays of the Northeast-Midwest Institute.

Pollution from past industrial and municipal discharges and disposal of waste earned the Lower Buffalo River designation as one of 43 "Great Lakes Areas of Concern (AOC)" by the International Joint Commission, the U.S.-Canadian government organization concerned with water quality. The major sources of pollution are contaminated bottom sediments and non-point source pollution. Contaminants of concern include PCBs, PAHs, heavy metals and industrial organics. PCBs (polychlorinated biphenyls) are known to affect human reproduction, fetal development, and neurological functions, and harm fish and other aquatic species.

Through a two year study, the Northeast-Midwest Institute in Washington, D.C. and economists from the University of Illinois and Georgia State University have gauged the economic value to local homeowners of clean-up of the Buffalo River AOC. The study focuses on the benefits to homeowners specifically in Buffalo, Cheektowaga, Lackawanna, Hamburg, and West Seneca, as well as Blaisdell and Sloan. The results of the study suggest that eliminating the pollution would make the area a more desirable place to live and increase property values.

Researchers collected data from housing sales in Erie County in the years 2002 through 2004, and directly surveyed 850 recent home buyers in Erie County. Results of the study of housing sales data indicate that the polluted state of the river currently is depressing single-family, owner-occupied property values by $80 to $140 million[1], or six to nine percent of the assessed residential property values in the area studied. Clean-up could be expected to raise the property values commensurately. The negative effects of the pollution appear concentrated near the river and to its south. Further to the north in Buffalo and Cheektowaga, property values seem to be affected more by other industrial areas, highways, and rail corridors than by the pollution in the Buffalo River.

These housing sales data findings were further bolstered by homeowner responses to direct surveys on their willingness to pay more for residential properties if the AOC were cleaned up. Based on the responses to the surveys, residents within five miles both north and south of the river would be willing to pay on average approximately 15% more for homes if the contaminated area were cleaned up. Relative to the median property value in the area, this translates into a $543 million addition to the assessed values of current properties.

The estimated benefits of Buffalo River clean-up generated in the study apply only to single-family residential property owners living within five miles of the river. However, preliminary analysis of multi-family properties suggests that current prices are depressed proportionately more than for single-family homes and could benefit from river cleanup. In addition, river improvements might attract new residents and businesses to the area.

The study was funded by the Great Lakes National Program Office, U.S. Environmental Protection Agency and the College of ACES, University of Illinois at Urbana-Champaign.

[1] All dollar values are expressed in year 2004 (4th quarter) purchasing power. Subsequent inflation in housing prices would increase the current dollar values.

Disclaimer: Until the methods and results described here have been reviewed by qualified scientific peers and published in the peer-reviewed literature, they must be considered preliminary. The opinions, findings, and conclusions of this study are solely those of the authors and do not necessarily reflect the views of the sponsors.

NEWS RELEASE – September 19, 2006
Northeast-Midwest Institute, Washington DC

Sheboygan Area Homeowners to Benefit from River Clean-up

Contact: Nicole Mays, Northeast-Midwest Institute (202 584 3378)
Dr. John Braden, University of Illinois (217 333 5501)

Sheboygan, WI. Residential property values near the Sheboygan River could increase by as much as $108 million if contamination in the river and neighboring land areas were eliminated, according to a study conducted by the University of Illinois and the Northeast-Midwest Institute.

Findings of the study will be officially released September 21, 2006 at a community forum in Sheboygan. The forum will be open to the public and feature a presentation by Dr. Braden concerning the results of the two-year study. Other speakers include Sheboygan Mayor Juan Perez; State Senator Joe Leibham; Marc Tuchman of U.S. EPA's Great Lakes National Program Office; James McNelly of Wisconsin's Department of Natural Resources; Jon Gumtow with the Sheboygan River Basin Partnership; and Nicole Mays of the Northeast-Midwest Institute. .

Pollution from past industrial discharges and disposal of waste earned the Sheboygan River designation as one of 43 "Great Lakes Areas of Concern (AOC)" by the International Joint Commission, the U.S.-Canadian government organization concerned with water quality. The major sources of pollution are contaminated bottom sediments and non-point source pollution. Contaminants of concern include PCBs, PAHs, and heavy metals. PCBs (polychlorinated biphenyls) are known to affect human reproduction, fetal development, and neurological functions, and harm fish and other aquatic species.

Through a two year study, the Northeast-Midwest Institute in Washington, D.C. and economists from the University of Illinois and Georgia State University have gauged the economic value to local homeowners of clean-up of the Sheboygan River AOC. The study focuses on the benefits to homeowners specifically in Sheboygan, Sheboygan Falls, Kohler, and the surrounding townships. The early results of the study suggest that eliminating the pollution in the AOC would make neighboring towns a more desirable place to live and increase property values significantly.

Researchers collected data for housing sales in Sheboygan County in the years 2002 through 2004, and directly surveyed 850 recent home buyers in Sheboygan County. Results of the study of housing sales data indicate that the polluted state of the river currently is depressing single-family, owner-occupied property values by $8 to $108 million[1], or one to seven percent of the assessed residential property values in the area studied. Clean-up could be expected to raise the property values commensurately. The negative effects of the pollution appear greatest close to the river and diminish with distance from the river, with properties east of the Waelderhaus Dam suffering the highest reduction in values.

These housing sales data findings were further bolstered by homeowner responses to direct surveys on their willingness to pay more for residential properties if the AOC were cleaned up. Based on the responses to the surveys, residents within five miles both north and south of the river would be willing to pay on average approximately 10% more for homes if the contaminated area if the area were cleaned up.

The estimated benefits of Sheboygan River AOC clean-up generated in the study apply only to single-family residential property owners living within five miles of the river, though cleanup of the AOC east of the Waelderhaus Dam would likely have a positive effect on other property types as well. Property value increases are however, only one of the ways that benefits from remediation of the Sheboygan River AOC would be realized by local residents. Clean-up might also attract new residents and businesses to the area.

The study was funded by the Great Lakes National Program Office, U.S. Environmental Protection Agency and the College of ACES, University of Illinois at Urbana-Champaign. The results are preliminary and will be refined through further analysis.

[1] All dollar values are expressed in year 2004 (4th quarter) purchasing power. Subsequent inflation in housing prices would increase the current dollar values.

Disclaimer: Until the methods and results described here have been reviewed by qualified scientific peers and published in the peer-reviewed literature, they must be considered preliminary. The opinions, findings, and conclusions of this study are solely those of the authors and do not necessarily reflect the views of the sponsors.