Water Quality Data Analysis and Review
Lower Androscoggin River
Monitoring Years 2011 - 2012

To Upgrade the Lower Section of River From Class C to Class B, Public Law 163
LD 845 An Act to Change the Classification of the Lower Androscoggin River

Prepared by Friends of Merrymeeting Bay & Applied Biomonitoring
March 29, 2012
# Table of Contents

Executive Summary .............................................................................................................. 1
Introduction .......................................................................................................................... 2
Approach ................................................................................................................................ 3
Results - *E. coli* ...................................................................................................................... 4
Results - Dissolved Oxygen ................................................................................................. 5
Habitat and Aquatic Life Criteria .......................................................................................... 5
Sampling Protocols ............................................................................................................... 6
Discussion .............................................................................................................................. 6
Recommendations ................................................................................................................. 8
Acknowledgments ............................................................................................................... 9
Appendices List .................................................................................................................... 10

## 2011 Results

*E. coli* 2011 by Station – May to September ................................................................. 11
*E. coli* 2006 - 2011 Long-term Stations – Historical Trends – April to September .......... 21
*E. coli* 2006 - 2011 Long-term Stations Combined – Historical Trends – April to September . 25
*E. coli* 2006 - 2011 – Historical Trends – Yearly Geometric Means ............................... 27
Lower Androscoggin River 2011 *E. coli* Data Tables ..................................................... 30
DO & Percent DO Saturation - 2011 by Station – May to September .............................. 35
DO 2003 - 2011 Long-term – Historical Trends – April to September .............................. 45
DO 2003 - 2011 Long-term Stations Combined – Historical Trends – April to September . 49
Lower Androscoggin River 2011 Dissolved Oxygen Data Tables ..................................... 53

## 2012 Results

*E. coli* 2012 by Station – May to September ................................................................. 60
*E. coli* 2006 - 2012 Long-term Stations – Historical Trends – April to September .......... 69
*E. coli* 2006 - 2012 Long-term Stations Combined – Historical Trends – April to September . 73
*E. coli* 2006 - 2012 – Historical Trends – Yearly Geometric Means ............................... 75
Lower Androscoggin River 2012 *E. coli* Data Tables ..................................................... 78
DO & Percent DO Saturation - 2012 by Station – May to September .............................. 82
DO 2003 - 2012 Long-term – Historical Trends – April to September .............................. 91
DO 2003 - 2012 Long-term Stations Combined – Historical Trends – April to September . 95
Lower Androscoggin River 2012 Dissolved Oxygen Data Tables ..................................... 99

Supporting Appendices ...................................................................................................... 103
Appendix 1- Public Law, Chapter 163 LD 330 ................................................................. 105
Appendix 2 - Map-Lower Androscoggin River Sample Sites .......................................... 118
Appendix 3 - Lower Androscoggin River, Aerial View Map ........................................... 120
Appendix 4 - USGS Monthly Flows, Lower Androscoggin River - Auburn ....................... 122
Appendix 5 - USGS Monthly Flows, Lower Kennebec River - North Sidney ..................... 125
Appendix 6 - Graphics Extracted from Androscoggin River VRMP 2011 Data Report ........ 128
Appendix 7 - Maine Volunteer River Monitoring Program (VRMP) Quality Assurance
    Program Plan (2009-2014) ............................................................................................. 136
Appendix 8 - Recent Letters of Support ............................................................................. 138
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times Record Editorial July 17, 2010</td>
<td>140</td>
</tr>
<tr>
<td>Brunswick Letter - 2010</td>
<td>142</td>
</tr>
<tr>
<td>Topsham Resolution - 2010</td>
<td>144</td>
</tr>
<tr>
<td>Topsham Support Letter - 2010</td>
<td>145</td>
</tr>
<tr>
<td>Lewiston Letter - 2010</td>
<td>146</td>
</tr>
<tr>
<td>Durham Letter - 2008</td>
<td>148</td>
</tr>
<tr>
<td>Auburn Sewage District - 2008</td>
<td>150</td>
</tr>
<tr>
<td>Brunswick Topsham Land Trust - 2008</td>
<td>151</td>
</tr>
<tr>
<td>Appendix 9 - NMI Studies: Economic Benefits of Clean Rivers</td>
<td>153</td>
</tr>
<tr>
<td>Appendix 10 - Applied Biomonitoring Qualifications</td>
<td>156</td>
</tr>
</tbody>
</table>
Executive Summary

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. A clean river is good for business, the environment and quality of life. An upgrade of the Androscoggin will enhance the surrounding communities, not causing an adverse impact on current industrial uses along the river since Class B conditions have been met for years in the course of “business as usual.”

DEP classification proposal submission guidelines state:

“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.”

Friends of Merrymeeting Bay (FOMB) conduct Androscoggin water quality monitoring in cooperation with DEP partly under the auspices of their Volunteer River Monitoring Program (VRMP).

The 2011 and 2012 data for E. coli and dissolved oxygen (DO) were acquired monthly. Results confirmed those of 2010 and prior years; ambient river conditions consistently exceed Class B standards for E. coli and DO.

Data continue to support FOMB’s proposed upgrade from Class C to Class B of the lower Androscoggin between Worumbo Dam and an extension of the Bath-Brunswick line across Merrymeeting Bay. Intensive sampling by DEP in 2010, supported current and past FOMB results.

FOMB requests the Committee in accordance with both statute and goal-based or aspirational DEP guidelines and the Clean Water Act, recommend a classification upgrade of this river segment to the full legislature and the legislature reclassify it as Class B.

38 M.R.S.A. § 464 (4) (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.”

****************************************************************************************************
**Introduction**

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. A clean river is good for business, the environment and quality of life. 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 in the course of “business as usual.”

DEP classification proposal submission guidelines state:

> “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.”

In accordance with LD 330 Section 24 passed in 2009, intensive and additional water quality data were collected on the lower Androscoggin from April-October of 2009 in an effort to better substantiate a classification upgrade proposal for boosting the lower river to Class B from Class C. This effort was conducted by Friends of Merrymeeting Bay (FOMB) in cooperation with DEP partly under the auspices of their Volunteer River Monitoring Program (VRMP). Sampling occurred every two weeks in 2009 and data during a damp summer with above median flows supported an upgrade to Class B.

Class B standards are defined primarily by three sets of numeric criteria, dissolved oxygen (DO) in mg/l (ppm), saturated dissolved oxygen in percent and *E. coli* bacteria in colony counts/100ml. There are also more qualitative habitat and aquatic life criteria typically evaluated by the presence, variety and type of macro-invertebrates to colonize a rock-filled basket over time. Of primary concern are the numeric criteria because the legislature has recognized the special nature of hydropower impoundments when it comes to habitat and aquatic life criteria and understands typical Class A or B community structures may not be achieved due to the impoundment while the segment still may receive the A or B classifications. With this in mind it is clear an absence of Class B type macro-invertebrates in some samples cannot prevent an upgrade.

According to Maine statutes, modeling has no bearing on the classification process §464 (4) (F) (4) which is based solely on actual ambient river conditions. In contrast to classification, modeling does play a role in relicensing (§464 (4) (D) when dischargers are to meet the river classification under minimum seven-day low flow conditions expected to take place once every ten years (known as 7Q10). The purposeful policy reason for the difference in requirements for classification and relicensing is so that water quality conditions may slowly be improved or ratcheted up. This is the goal-oriented purpose both of the Clean Water Act and Maine statute.
In our multi-year sampling efforts, *E. coli* parameters for Class B have always been met. As for the several hundred DO measurements taken over the years, only in a very few isolated instances has the measured DO dropped slightly (0.1 to 0.5) below the Class B standard. Since 2010, the first year we measured oxygen saturation, all saturation levels met the Class B standard. With reasonable application of improved treatment or BMPs we can reasonably expect 100% compliance with Class B standards and criteria. *The E. coli and dissolved oxygen data continue to support, and we recommend, a goal-based or aspirational upgrade of water quality classification from Class C to Class B for the lower Androscoggin between Worumbo Dam and Merrymeeting Bay.*

**Approach**

FOMB and Friends of Casco Bay with whom we coordinate, conduct water sampling from April to October. However, data presented here are, for the most part, limited to those collected from May to September, the period of interest to the DEP. This is the period covered by municipal waste water treatment disinfection, chlorination and de-chlorination, the period of highest human contact and the period of lowest dissolved oxygen conditions. Storm flow or CSO events are more likely outside of this period and are not included when evaluating classification standards.

In 2011, dissolved oxygen (mg/L), DO saturation (%) and *E. coli* (# colonies/100 ml) water quality data were collected between April and October. In 2012, water quality data were collected between May and October. In both years, data were collected from the eight locations in the Androscoggin River:

- **Above Worumbo dam:**
  - Durham Boat Launch (DBL)
- **Between Pejepscot and Worumbo dams:**
  - Pejepscot Boat Launch (PBL)
  - Fish Park Up [above dam] (FPU)
- **Between Brunswick-Topsham and Pejepscot dams:**
  - Fish Park Down [below dam] (FPD)
  - Brunswick Interstate Ledges (BIL)
  - Brunswick Canoe Portage (BCP)
- **Above Merrymeeting Bay at Pleasant Point:**
  - Brunswick Water St. Boat Launch (BWS)
  - Brunswick Bay Bridge (BBB)

In both 2011 and 2012, as in earlier years, only DO data were also collected at Topsham Pleasant Point (TPP) for informational purposes about Merrymeeting Bay DO levels in this area. These data were collected at varying times and tides on target days using the Winkler Titration method. This Topsham site falls within a river segment already classified as B. DO data (all values exceeding 7 ppm) were also collected in 2011 and 2012 at the Auburn Boat Launch (ABL), the upper most sampling site on the Androscoggin, in the same manner as at TPP.
However, these data are not included here because the site is well out of the proposed upgrade area.

In 2009 and 2010, additional sampling was conducted at Brunswick Canoe Mooring (BCM) [off BCP] and Water St. Mooring (WSM) [off BWS] to determine if there were differences in conditions between shore and mid-stream locations. Regression analysis of the paired 2009 and 2010 data (for both DO and \textit{E. coli}) show excellent correlations between the shore and mid-stream sampling locations. Both BWS and WSM are tidewater sites, and therefore, it is not surprising that no significant difference in monitoring results were found. Readings at BCM and BCP indicate thorough mixing above tide as well. Because these results suggested it is not necessary to collect data at both the shore and mid-stream locations for water quality measurements, measurements were only collected from shore sites in 2011 and 2012.

This distribution of sampling sites provides excellent coverage of the study area. Two sites are in tidewater above Merrymeeting Bay at Pleasant Point (BBB and BWS). Three sites are in the impoundment between the Brunswick-Topsham and Pejepscot dams (BCP, BIL, FPD), and two sites are in the short impoundment between Pejepscot and Worumbo dams (FPU, PBL). Durham Boat Launch remains the lower most site between Worumbo and Auburn Boat Launch where we have another monitor. Several of these sites have been sampled for \textit{E.coli} since 2006 and for DO since 1999. These data, along with collection dates/times, weather conditions, and other notations, were tabularized then analyzed to determine if the waterways meet the criterion to be reclassified as Class B. The main criteria for reclassification are:

<table>
<thead>
<tr>
<th></th>
<th>\textbf{Dissolved Oxygen}</th>
<th>\textbf{\textit{E. coli} (colonies /100 ml)}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>instantaneous reading (ppm); percent saturation</td>
<td>instantaneous reading; geometric mean</td>
</tr>
<tr>
<td>\textbf{Class B Criteria}</td>
<td>7; 75%</td>
<td>236; 64</td>
</tr>
<tr>
<td>\textbf{Class C Criteria}</td>
<td>5; 60%</td>
<td>236; 126</td>
</tr>
</tbody>
</table>

The following data comparisons were made:

1. \textit{E. coli} v. Class B standard
   - 2011 and 2012 data
   - historical trends (2006 through 2012)
   - Comparison of all sites
   - Yearly geometric means

2. DO v. standards (instantaneous reading and percent dissolved oxygen) for Class B
   - 2011 and 2012 data
   - historical trends (2003 through 2012)
   - Comparison of all sites
   - Yearly geometric means

\textbf{Results --\textit{E. coli}}

The \textit{E. coli} graphs show the instantaneous values and the geometric means for both the 2011 and 2012 sampling seasons. The geometric means were calculated using all data. There were only two heavy rain events within 48 hours of data collection. Both occurred on June 12, 2011; one at BWS and the other at BBB. The graphs for these sites identify the “heavy rain” data points and shows geometric means calculated with and without the values. The instantaneous data show excellent compliance with the criterion for both 2011 and 2012. No sites were out of compliance during the months of May through September with respect to instantaneous measurements.
Similarly, none of the geometric means were out of compliance. All *E. coli* data collected during the 2011 and 2012 are provided.

Historical *E. coli* data, used to evaluated trends over time, were available for three sites: Pejepscot Boat Launch, Brunswick Water Street Boat Launch, and Brunswick Bay Bridge. Four types of graphs were prepared for these data:

1. the instantaneous data for each site (one site per page),
2. instantaneous data for all sites graphed together,
3. the geometric means for each site over times (all sites on one page),
4. a summary graph showing the geometric mean by year.

The means were calculated using all available data for each monitoring year. These graphs show the majority of the instantaneous data are in compliance, with minor exceptions occurring in 2006, 2009, and 2010. None of the geometric means by station and year are out of compliance. Similarly, all of the geometric means (for both all data, and no rain event data) determined for the years 2006 through 2012 are in compliance with both the Class C and Class B criteria.

**Results – Dissolved Oxygen**

The DO graphs show both the instantaneous values and the percent saturation data for both the 2011 and 2012 sampling seasons. The instantaneous data show excellent compliance with the criterion. None of the instantaneous DO measurements or the percent saturation data in either sampling year are out of compliance.

All DO data collected for these sites during 2011 and 2012 are provided. Historical DO data, used to evaluate trends over time, were available for three sites: Durham Boat Launch, Pejepscot Boat Launch, and Topsham Pleasant Point. Note that the 2011 and 2012 Topsham Pleasant Point data were collected after the recommended time of 0800. [Note: Topsham Pleasant Pt., Brunswick Bay Bridge and Brunswick Water St. and Mooring sites are all in tidewater. These sites may not be nearly so affected by diurnal DO fluctuations as sites above Brunswick/Topsham dam may be. At these shallow tidal sites, DO could be reduced more by higher temperatures warming the water during the day, particularly at low tide, than by the more typical night-time sag.] Topsham Pleasant Pt. data are provided because this site has already been upgraded to a Class B waterway and they make a good comparison to the sites under evaluation. These graphs show nearly all instantaneous data for each site are in compliance. The exceptions occur at Durham Boat Launch (out of the upgrade area), with three non-compliance events occurring in 2003, one in fall of 2009, and one in 2010. A comparison of the DBL and PBL to a current Class B site (TPP) shows that since 2003, dissolved oxygen concentrations at these three sites have been consistently similar.

The graph comparing averages for all data by year shows that since 2003, the lower Androscoggin River has been in compliance with both Class C and Class B criteria.

**Habitat and Aquatic Life Criteria**

These criteria were evaluated for the first time in 2010 by DEP using rock baskets deployed for a month in three locations-at our Brunswick Canoe Mooring and just above and just below the Pejepscot dam. The BCM site and the site above the dam are impoundment sites while the site downstream of Pejepscot is a shallow riffle environment. As these are all run-of-the-river dams, their “impoundments” do not extend very far upstream. After identifying the macro-invertebrates who have colonized the baskets, the DEP then uses a model to predict the water Classification.
Some colonizers are more tolerant of low oxygen than others and species diversity and numbers can vary with the local habitat and chemical conditions.

While macro-invertebrates can provide quite valuable information on water quality, impoundments create very unique situations often characterized by higher levels of silt, and lower flows. The legislature recognizing this, has created in statute (§464-10) exceptional requirements for hydropower impoundments. In Class C impoundments, if Class A and B habitat and aquatic life criteria are not met but reasonable changes resulting in improvements to these criteria can be made without significantly affecting existing energy generation capacity, these changes must be achieved and maintained.

In existing Class A or B impoundments, as long as habitat and aquatic life criteria meet Class C standards (sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community), habitat characteristics and aquatic life criteria of Classes A and B are deemed to be met.

The DEP found organisms more typical of Class C in their two impoundment sites as might be expected while the riffle site (station 954) had organisms meeting a modeled Class B environment. Clearly with only three data points on a long section of river there is limited knowledge gained. We do know the impoundment type of environments as represented by the DEP station numbers 956 and 955 are but a small percentage of the segment proposed for the upgrade. Because of the language in §464-10, these results have no direct bearing on whether or not to upgrade the proposed section of river, leaving us only with the three numeric criteria: DO, % saturation and E. coli to consider.

**Sampling Protocols**

In 2012 and all past sampling years FOMB volunteers have trained annually in cooperation with Friends of Casco Bay (FOCB) utilizing DO training and sampling protocols from the FOCB EPA Quality Assurance Program Plan (QAPP). Since 2009, FOMB Androscoggin volunteers also participated in and qualified under the DEP Volunteer River Monitoring Program (VRMP) trainings. Under the VRMP Sampling Assurance Plan (SAP), FOMB also followed VRMP Quality Assurance/Quality Control (QA/QC) protocols for sampling and lab procedures in analysis of bacteria samples.

Sampling is accomplished at all sites by wading, using an extension pole or a throw bottle. Winkler titration kits or YSI85 meters are used for DO and the meter can also measure saturation. We use the IDEXX Colilert system for E. coli.

Standard QA/QC procedures included duplicate sampling by all monitors, lab splits and lab blanks. Multiple split bacteria sample analyses were conducted with Brunswick Wastewater Treatment Plant. Splits showed no significant differences.

**Discussion**

Water quality data collected since 2003 for the lower Androscoggin River clearly show a trend of improved quality. Since 2003 the data have met the Class C criteria, and the data collected in both 2011 and 2012 show excellent compliance with Class B standards. Excluding heavy precipitation events, E. coli data show excellent compliance with Class B standards, even without excluding the heavy rain events experienced in 2011. There were no heavy rain events in 2012. Isolated exceptions over the years could indicate unusual anthropogenic sources (i.e. mechanical failure or spill) or as was the case in 2009, record high temperatures. DO samples meet or exceed the Class B standard in all but two or three isolated samples (during record-
breaking heat or unusually low flows) where they fall just 0.1 to 0.5 below the standard. DO saturation meets the Class B standard all of the time. Ambient river conditions are very clearly exceeding Class B minimums. As we noted to the Board on 10/2/08:

“The water quality of the Androscoggin sections proposed for an upgrade, exceeds the current classification standards and meet those of Class B. This request to upgrade from C to B is supported by the State antidegradation statute:

38 M.R.S.A. § 464 (4) (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.”

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 economically benefit the communities of the area and will not adversely impact current industrial uses considering Class B conditions have been met for years in the course of “business as usual.” While higher discharge limits exist for a number of licensees, these artificially high numbers can not be used to create a ceiling on water quality improvements that prevents reclassification to higher levels already obtained by actual conditions.

In 2010 we had the low river flows and high air and water temperatures the DEP has been saying were necessary to get a true picture of river quality under adverse conditions. As stated previously, neither 7Q10 conditions nor discharge modeling are part of classification or reclassification considerations-only actual water conditions. As a wastewater plant operator remarked to us last year, usually the river conditions yielding poor DO levels yield the lowest bacteria levels and when conditions support highest levels of bacteria, they also create the highest levels of oxygen. FOMB data have shown Class B compliance for E. coli and DO under high and low flows, cool and hot temperatures and various tidal stages.

That licensees are not discharging at licensed limits is irrelevant according to current water quality law. As mentioned above, these limits are artificially high (and should be lowered) but regardless, two conditions could cause maximum discharges: 1) Drastic increases in municipal growth which are not going to happen anytime soon under current economic conditions and 2) Extreme storm flows, in which case high E. coli levels under CSO conditions are not counted against classification while DO levels will be quite high from the increased aeration and typically cooler water and air temperatures.

In 1999 the DEP used FOMB DO data to support an upgrade of the Kennebec. At that time E. coli criteria were not met by the Augusta Wastewater Treatment Plant. Still, Class B conditions were considered close enough to be “reasonably attainable”. The DEP and BEP chose to recommend an upgrade and essentially gave the plant until 2009 to meet the standards for Class B. FOMB data show this section of the Androscoggin nearly always well within Class B. If the Committee or Board’s concerns are eliminating the occasional outlier data, this certainly seems to be reasonably attainable with minimal cost and effort--perhaps more so than the Kennebec at the time of that upgrade.

The following paragraph is a legal analysis, part of an upgrade recommendation submitted to the BEP and written by the Conservation Law Foundation on 10/2/2008:
The following paragraph is a legal analysis, part of an upgrade recommendation submitted to the BEP and written by the Conservation Law Foundation on 10/2/2008:

The Department’s refusal to recommend an upgrade 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 Committee’s [or Board’s] analysis must be based on existing water quality—not hypothetical modeling with point sources operating at maximum licensed discharge. Indeed, the Committee [or 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)(I)(d).

In fact, note the Departments continued bias against the Androscoggin as illustrated in their report on 2011 sampling [Chapter 5-1]. The following is illustrative of how they studiously avoid in charts and text, mentioning the river actually meets Class B conditions. Bolding is FOMB.

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 (7.0 mg/l). Site BWS was similar with lowest readings in mid-July (8.3 mg/l) and mid-August (7.7). 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 5.0mg/l [or Class B standard of 7 mg/l]. Dissolved oxygen saturation ranged from 82%-115% and did not go below the Class C standard of 60% [or Class B standard of 75%].

**Recommendations**

1. Modeling, maximum loading and 7Q10 conditions cannot by statute be used to determine classification. **Classifications must by statute be based on actual water quality.** There is no substitute for years of field data in determining ambient river conditions. Outlier data should not determine water classification. We recommend the BEP and legislature properly use classification statutes not re-licensing statutes to determine the Androscoggin upgrade reclassification.

2. A cleaner Androscoggin is supported by riverside communities because it is good for business, the environment and improves quality of life for all. We recommend the BEP and legislature utilize along with statutory requirements, the goal-based or aspirational nature of Maine’s Water Quality Classification System and US Clean Water Act.

3. The Department’s Classification Upgrade Proposal submission guidelines state:

   “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.”

Intense sampling of the lower Androscoggin shows water conditions have mostly met Class B DO standards since 2004. The most recent data clearly support the reclassification of this waterway. All data collected since 2006 support an upgrade that
will be good for the economy, environment and quality of life. **We recommend a statute and goal-based upgrade of water quality classification from Class C to Class B for the lower Androscoggin between Worumbo Dam and Merrymeeting Bay.**

4. **A Legal Opinion:** Excerpt from Conservation Law Foundation BEP Comments 10/2/2008

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.

**Acknowledgements**

This work could not have been done without the assistance of many. Thanks to 2011 and 2012 Androscoggin volunteer monitors, trainers, data entry and laboratory analysts: Sarah Cowperthwaite, Melinda and Ken Emerson, Ed Friedman, Ruth Innes, Kathleen McGee, Nancy Murphy, Richard Nickerson, Diane and Douglas Richmond, Jeff Sebell, Kermit Smyth, and Helen Watts.

Thanks also to John Lichter and the Bowdoin College Environmental Studies department for lab space, Jennifer Nicholson, and Greg Thulen of the Brunswick Sewer District (wastewater treatment plant) for cooperating on QA/QC, property owner Josh Francis for access at BIL, Sandra Salazar of Applied Biomonitoring for analyses and reporting, Mary Ellen Dennis of the DEP for VRMP training and QAPP (or SAP-Sampling & Analysis Plan) preparation, Peter Milholland, Mike Doan and Friends of Casco Bay for training, Dave Jefferson and Bill Dungey at IDEXX and finally, Bath Savings Institution for funding our IDEXX Colilert system.
Appendices

Appendix 1 – Public Law, Chapter 163 LD 330
Appendix 2 – Map-Lower Androscoggin River Sample Sites
Appendix 3 – Lower Androscoggin River, Aerial View Map
Appendix 4 – USGS Monthly Flows, Lower Androscoggin River - Auburn
Appendix 5 – USGS Monthly Flows, Lower Kennebec River - North Sidney
Appendix 6 – DEP Charts,
Appendix 7 – FOMB DEP SAP, 2010-2014 Final
Appendix 8 – Recent Letters of Support:
  Times Record Editorial July 17, 2010
  Brunswick-2010
  Topsham Resolution-2010
  Topsham Support letter-2010
  Lewiston-2010
  Durham-2008
  Auburn Sewage District-2008
  Brunswick Topsham Land Trust-2008
Appendix 9 - NMI Studies: Economic Benefits of Clean Rivers
Appendix 10 – Applied Biomonitoring Qualifications
Water Quality Data Analysis and Review
Lower Androscoggin River
2011
E. coli 2011 by Station
May to September
Lower Androscoggin River 2011 *E. coli* (IDEXX) Durham Boat Launch (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 43.2 colonies/100 ml (*Meets criterion*)

**Instantaneous Criterion** = <236 colonies/100 ml

**Geo Mean Criterion** = <64 colonies/100 ml
Lower Androscoggin River 2011 *E. coli* (IDEXX) Pejepscot Boat Launch (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 29.6 colonies/100 ml (*Meets criterion*)

Instantaneous Criterion = <236 colonies/100 ml

Geo Mean Criterion = <64 colonies/100 ml
Lower Androscoggin River 2011 *E. coli* (IDEXX) Fish Park Above Dam (May - Sep)

**Class B Evaluation Criterion:**
- geometric mean \(\leq 64\) colonies/100 ml
- instantaneous value \(\leq 236\) colonies/100 ml

\[\text{Geo Mean Criterion } = \text{<64 colonies/100 ml}\]

\[\text{Instantaneous Criterion } = \text{<236 colonies/100 ml}\]

- geometric mean all data: 20.2 colonies/100 ml (*Meets criterion*)
Lower Androscoggin River 2011 *E. coli* (IDEXX) Fish Park Below Dam (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

<table>
<thead>
<tr>
<th>Date</th>
<th>IDEXX E. coli (IDEXX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/7</td>
<td>20.3</td>
</tr>
<tr>
<td>6/11</td>
<td>55.7</td>
</tr>
<tr>
<td>7/16</td>
<td>70.3</td>
</tr>
<tr>
<td>7/23</td>
<td>27.3</td>
</tr>
<tr>
<td>9/17</td>
<td>22.8</td>
</tr>
</tbody>
</table>

Geo Mean Criterion = <64 colonies/100 ml

Instantaneous Criterion = <236 colonies/100 ml (Meets criterion)
Lower Androscoggin River 2011 *E. coli* (IDEXX) Brunswick Interstate Ledges (May - Sep)

Class B Evaluation Criterion: geometric mean \(\leq 64\) colonies/100 ml

instantaneous value \(\leq 236\) colonies/100 ml

\(\geq\) geometric mean all data: 31.1 colonies/100 ml *(Meets criterion)*

Instantaneous Criterion = <236 colonies/100 ml)

Geo Mean Criterion = <64 colonies/100 ml)
Lower Androscoggin River 2011 E. coli (IDEXX) Brunswick Canoe Portage (May – Sep)

Class B Evaluation Criterion: geometric mean \( \leq 64 \) colonies/100 ml
Instantaneous value \( \leq 236 \) colonies/100 ml

\( = \) geometric mean all data: 40.9 colonies/100 ml (Meets criterion)

Instantaneous Criterion = <236 colonies/100 ml
Geo Mean Criterion = <64 colonies/100 ml
Lower Androscoggin River 2011 *E. coli* (IDEXX) Brunswick Water St. Boat Launch (May - Sep)

**Class B Evaluation Criterion:**
- geometric mean $\leq 64$ colonies/100 ml
- instantaneous value $\leq 236$ colonies/100 ml

- = geometric mean all data: 48.1 colonies/100 ml *(Meets criterion)*
- = geometric mean eliminating 1 heavy rain event: 36.9 colonies/100 ml *(Meets criterion)*

**Instantaneous Criterion** = $<$236 colonies/100 ml)

**Geo Mean Criterion** = $<$64 colonies/100 ml)
Lower Androscoggin River 2011 *E. coli* (IDEXX) Brunswick Bay Bridge (May - Sep)

**Class B Evaluation Criterion:** geometric mean \(\leq 64\) colonies/100 ml

- instantaneous value \(\leq 236\) colonies/100 ml

\[\text{IDEXX E. coli (# colonies/100 ml)}\]

- geometric mean all data: 41.4 colonies/100 ml (*Meets criterion*)
- geometric mean eliminating 1 heavy rain event: 30.4 colonies/100 ml (*Meets criterion*)

**Instantaneous Criterion** = \(<236\) colonies/100 ml

**Geo Mean Criterion** = \(<64\) colonies/100 ml

Heavy Rain Event: 142.1 colonies/100 ml

Dates:
- 5/7, 5/14, 5/21, 5/28, 6/4, 6/11, 6/18, 6/25, 7/2, 7/9, 7/16, 7/23, 7/30, 8/6, 8/13, 8/20, 8/27, 9/3, 9/10, 9/17, 9/24, 10/1
E. coli 2006 - 2011 Long-term Stations
Historical Trends
April to September
Pejepscot Boat Landing *E. coli* 2006 - 2011 (Apr - Sep; no heavy rain data)

Class B Instantaneous Criterion: ≤236 colonies/100 ml
Brunswick Water Street Boat Launch *E. coli* 2006 - 2011 (Apr - Sep; no heavy rain data)

Class B Instantaneous Criterion: \( \leq 236 \) colonies/100 ml
Brunswick Bay Bridge *E. coli* 2006 - 2011 (Apr - Sep; no heavy rain data)

**Class B Instantaneous Criterion:**
≤236 colonies/100 ml
E. coli 2006 - 2011 Long-term Stations Combined Historical Trends April to September
Lower Androscoggin River - E. coli 2006 to 2011 (Apr - Sep; no heavy rain data)

Class B Instantaneous Criterion: ≤236 colonies/100 ml
E. coli 2006 - 2011
Historical Trends
Yearly Geometric Means
Lower Androscoggin River - *E. coli* GeoMeans by Station (Apr - Sep; no heavy rain events) 2006 - 2011

Class B Geometric Mean Criterion: ≤64 colonies/100 ml

- Pejepscot Boat Landing (PBL)
- Brunswick Water Street (BWS)
- Brunswick Bay Bridge (BBB)
Lower Androscoggin River 2011 *E. coli* Data Tables
### Lower Androscoggin River 2011

**E. coli Monthly Measurements**

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>Sample Type</th>
<th>ALL DATA IDEXX</th>
<th>ALL DATA w/ MEANS FOR REPLICATE SAMPLES</th>
<th>NO APR OR OCT IDEXX DATA (Means for reps used)</th>
<th>NO OCT IDEXX DATA (Means for reps used)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Durham Boat Launch (DBL)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>04/18/11</td>
<td>0700</td>
<td>clear</td>
<td>HEAVY</td>
<td>monthly</td>
<td>78.9</td>
<td>69.6 APR DATA ELIM</td>
<td>69.6</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>05/15/11</td>
<td>0815</td>
<td>overcast</td>
<td>moderate</td>
<td>monthly</td>
<td>106.3</td>
<td>106.3 106.3 106.3</td>
<td>106.3</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>06/12/11</td>
<td>0700</td>
<td>overcast</td>
<td>drizzle</td>
<td>monthly</td>
<td>42.2</td>
<td>42.2 42.2 42.2</td>
<td>42.2</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>07/17/11</td>
<td>0810</td>
<td>clear</td>
<td>monthly</td>
<td>71</td>
<td>71 71 71 71</td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>08/14/11</td>
<td>0810</td>
<td>overcast</td>
<td>monthly</td>
<td>28.1</td>
<td>28.1 28.1 28.1</td>
<td>28.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>09/18/11</td>
<td>0815</td>
<td>overcast</td>
<td>monthly</td>
<td>16.9</td>
<td>16.9 16.9 16.9</td>
<td>16.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>10/10/11</td>
<td>0910</td>
<td>overcast</td>
<td>h</td>
<td>monthly</td>
<td>101.7</td>
<td>101.7 OCT DATA ELIM</td>
<td>OCT DATA ELIM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Geomean DBL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>54.1</td>
<td>52.3 43.2 46.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pejepscot Boat Launch (PBL)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>04/18/11</td>
<td>0630</td>
<td>clear</td>
<td>monthly</td>
<td>106.7</td>
<td>106.7 APR DATA ELIM</td>
<td>106.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>05/15/11</td>
<td>0650</td>
<td>overcast</td>
<td>light</td>
<td>monthly</td>
<td>52.9</td>
<td>52.05 52.05</td>
<td>52.05</td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>05/15/11</td>
<td>0650</td>
<td>overcast</td>
<td>light</td>
<td>replicate</td>
<td>51.2</td>
<td>50.4 50.4 50.4</td>
<td>50.4</td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>06/12/11</td>
<td>0625</td>
<td>overcast</td>
<td>medium</td>
<td>monthly</td>
<td>50.4</td>
<td>50.4 50.4 50.4</td>
<td>50.4</td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>07/17/11</td>
<td>0640</td>
<td>clear</td>
<td>monthly</td>
<td>16.3</td>
<td>16.3 16.3 16.3</td>
<td>16.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>08/14/11</td>
<td>0645</td>
<td>clear</td>
<td>monthly</td>
<td>12.1</td>
<td>12.1 12.1 12.1</td>
<td>12.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>09/18/11</td>
<td>0720</td>
<td>clear</td>
<td>monthly</td>
<td>56.5</td>
<td>44.15 44.15 44.15</td>
<td>44.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>09/18/11</td>
<td>0720</td>
<td>clear</td>
<td>replicate</td>
<td>31.8</td>
<td>31.8</td>
<td>31.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL</td>
<td>10/16/11</td>
<td>0810</td>
<td>overcast</td>
<td>heavy</td>
<td>monthly</td>
<td>218.7</td>
<td>218.7 OCT DATA ELIM</td>
<td>OCT DATA ELIM</td>
<td></td>
</tr>
<tr>
<td><strong>Geomean PBL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>47.0</td>
<td>47.3 29.6 36.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CRITERIA**

- **GeoMean:** \( \leq 64/100 \text{ ml} \)
- **Instantaneous Measurement:** \( \leq 236/100 \text{ ml} \)

**Units of Measurement:** MPN colonies/100 ml
### Lower Androscoggin River 2011

**E. coli Monthly Measurements**

**CRITERIA**

GeoMean: \( \leq 64/100 \text{ ml} \)

Instantaneous Measurement: \( \leq 236/100 \text{ ml} \)

Units of Measurement: MPN colonies/100 ml

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>Sample Type</th>
<th>ALL DATA</th>
<th>ALL DATA w/ MEANS FOR REPLICATE SAMPLES</th>
<th>NO APR OR OCT IDEXX DATA (Means for reps used)</th>
<th>NO OCT IDEXX DATA (Means for reps used)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fish Park Up (FPU)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU</td>
<td>04/18/11</td>
<td>0730</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>110</td>
<td>110 APR DATA ELIM</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>FPU</td>
<td>05/15/11</td>
<td>0720</td>
<td>overcast</td>
<td></td>
<td>monthly</td>
<td>13.4</td>
<td>13.4</td>
<td>13.4</td>
<td>13.4</td>
</tr>
<tr>
<td>FPU</td>
<td>06/12/11</td>
<td>0732</td>
<td>overcast</td>
<td></td>
<td>monthly</td>
<td>48.8</td>
<td>45.8</td>
<td>45.8</td>
<td>45.8</td>
</tr>
<tr>
<td>FPU</td>
<td>06/12/11</td>
<td>0735</td>
<td>overcast</td>
<td></td>
<td>replicate</td>
<td>42.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU</td>
<td>07/17/11</td>
<td>0710</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>90.6</td>
<td>68.5</td>
<td>68.5</td>
<td>68.5</td>
</tr>
<tr>
<td>FPU</td>
<td>07/17/11</td>
<td>0710</td>
<td>clear</td>
<td></td>
<td>replicate</td>
<td>46.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU</td>
<td>08/14/11</td>
<td>0705</td>
<td>ptly cloudy</td>
<td></td>
<td>monthly</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
</tr>
<tr>
<td>FPU</td>
<td>09/18/11</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>10.9</td>
<td>10.9</td>
<td>10.9</td>
<td>10.9</td>
</tr>
<tr>
<td>FPU</td>
<td>10/16/11</td>
<td>0835</td>
<td>overcast heavy</td>
<td></td>
<td>monthly</td>
<td><strong>461.1</strong></td>
<td><strong>504.3</strong> OCT DATA ELIM</td>
<td><strong>OCT DATA ELIM</strong></td>
<td><strong>OCT DATA ELIM</strong></td>
</tr>
<tr>
<td>FPU</td>
<td>10/16/11</td>
<td>0835</td>
<td>overcast heavy</td>
<td></td>
<td>replicate</td>
<td><strong>547.5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geomean FPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>55.2</strong></td>
<td><strong>40.8</strong></td>
<td><strong>20.2</strong></td>
<td><strong>26.8</strong></td>
</tr>
</tbody>
</table>

| **Fish Park Down (FPD)** |         |             |          |             |             |          |                                        |                                               |                                 |
| FPD       | 04/18/11| 0745        | clear    |             | monthly     | 69.1      | 69.1 APR DATA ELIM                      | 69.1                                          |                                 |
| FPD       | 05/15/11| 0730        | overcast | light rain | monthly     | 20.3      | 20.3                                    | 20.3                                          | 20.3                                           |
| FPD       | 06/12/11| 0745        | overcast |             | monthly     | 55.7      | 55.7                                    | 55.7                                          | 55.7                                           |
| FPD       | 07/17/11| 0725        | clear    |             | monthly     | 70.3      | 70.3                                    | 70.3                                          | 70.3                                           |
| FPD       | 08/14/11| 0720        | clear    |             | monthly     | 8.4       | 8.4                                     | 8.4                                           | 8.4                                            |
| FPD       | 09/18/11| 0755        | clear    |             | monthly     | 22.8      | 22.8                                    | 22.8                                          | 22.8                                           |
| FPD       | 10/16/11| 0850        | overcast |             | monthly     | **325.5** | **325.5** OCT DATA ELIM | **OCT DATA ELIM**                             | **OCT DATA ELIM** |
|           |         |             |          |             |             |          |                                        |                                               |                                 |
| Geomean FPD |       |             |          |             |             | **44.4** | **44.4**                                | **27.3**                                      | **31.9**                                     |
### Lower Androscoggin River 2011

**E. coli** Monthly Measurements

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>Sample Type</th>
<th>ALL DATA IDEXX</th>
<th>ALL DATA w/ MEANS FOR REPPLICATE SAMPLES</th>
<th>NO APR OR OCT IDEXX DATA (Means for reps used)</th>
<th>NO OCT IDEXX DATA (Means for reps used)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brunswick Interstate Ledges (BIL)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL</td>
<td>04/18/11</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>111.2</td>
<td>111.2</td>
<td>APR DATA ELIM</td>
<td>111.2</td>
</tr>
<tr>
<td>BIL</td>
<td>05/15/11</td>
<td>0755</td>
<td>overcast</td>
<td>light</td>
<td>monthly</td>
<td>35.9</td>
<td>35.9</td>
<td>35.9</td>
<td>35.9</td>
</tr>
<tr>
<td>BIL</td>
<td>06/12/11</td>
<td>0805</td>
<td>overcast</td>
<td></td>
<td>monthly</td>
<td>53.7</td>
<td>53.7</td>
<td>53.7</td>
<td>53.7</td>
</tr>
<tr>
<td>BIL</td>
<td>07/17/11</td>
<td>0755</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>61.3</td>
<td>61.3</td>
<td>61.3</td>
<td>61.3</td>
</tr>
<tr>
<td>BIL</td>
<td>08/14/11</td>
<td>0800</td>
<td>overcast</td>
<td>sprinkle</td>
<td>monthly</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
</tr>
<tr>
<td>BIL</td>
<td>08/14/11</td>
<td>0815</td>
<td>overcast</td>
<td>sprinkle</td>
<td>replicate</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL</td>
<td>09/18/11</td>
<td>0815</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>25.3</td>
<td>25.3</td>
<td>25.3</td>
<td>25.3</td>
</tr>
<tr>
<td>BIL</td>
<td>10/16/11</td>
<td>0905</td>
<td>overcast</td>
<td>heavy</td>
<td>monthly</td>
<td>517.2</td>
<td>517.2</td>
<td>OCT DATA ELIM</td>
<td>OCT DATA ELIM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brunswick Canoe Portage (BCP)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP</td>
<td>04/18/11</td>
<td>0745</td>
<td>overcast</td>
<td>heavy</td>
<td>monthly</td>
<td>116</td>
<td>116</td>
<td>APR DATA ELIM</td>
<td>116</td>
</tr>
<tr>
<td>BCP</td>
<td>05/15/11</td>
<td>0745</td>
<td>overcast</td>
<td></td>
<td>monthly</td>
<td>27.5</td>
<td>27.5</td>
<td>27.5</td>
<td>27.5</td>
</tr>
<tr>
<td>BCP</td>
<td>06/12/11</td>
<td>0800</td>
<td>overcast</td>
<td></td>
<td>monthly</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>BCP</td>
<td>07/17/11</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>83.9</td>
<td>83.9</td>
<td>83.9</td>
<td>83.9</td>
</tr>
<tr>
<td>BCP</td>
<td>07/17/11</td>
<td>0750</td>
<td>clear</td>
<td>mid-depth</td>
<td>monthly</td>
<td>56.3</td>
<td>56.3</td>
<td>56.3</td>
<td>56.3</td>
</tr>
<tr>
<td>BCP</td>
<td>08/13/11</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>monthly</td>
<td>9.6</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
</tr>
<tr>
<td>BCP</td>
<td>08/13/11</td>
<td>0800</td>
<td>clear</td>
<td>replicate</td>
<td></td>
<td>5.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP</td>
<td>09/18/11</td>
<td>0820</td>
<td>overcast</td>
<td></td>
<td>monthly</td>
<td>20.3</td>
<td>20.3</td>
<td>20.3</td>
<td>20.3</td>
</tr>
<tr>
<td>BCP</td>
<td>10/16/11</td>
<td>0800</td>
<td>overcast</td>
<td>heavy</td>
<td>monthly</td>
<td>686.7</td>
<td>686.7</td>
<td>OCT DATA ELIM</td>
<td>OCT DATA ELIM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Geomean</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44.9</td>
<td>55.8</td>
<td>31.1</td>
<td>38.5</td>
</tr>
<tr>
<td>BCP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>46.0</td>
<td>58.5</td>
<td>34.6</td>
<td>41.1</td>
</tr>
</tbody>
</table>

**CRITERIA**

GeoMean: ≤ 64/100 ml

Instantaneous Measurement: ≤ 236/100 ml

Units of Measurement: MPN colonies/100 ml
<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>Sample Type</th>
<th>ALL DATA</th>
<th>ALL DATA w/ MEANS FOR REPLICATE SAMPLES</th>
<th>NO APR OR OCT IDEXX DATA (Means for reps used)</th>
<th>NO OCT IDEXX DATA (Means for reps used)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brunswick Water St. (BWS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>04/18/11</td>
<td>0820</td>
<td>clear</td>
<td>monthly</td>
<td>139.6</td>
<td>139.6</td>
<td>APR DATA ELIM</td>
<td>98.9</td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>05/15/11</td>
<td>0900</td>
<td>fog/haze</td>
<td>light</td>
<td>39.9</td>
<td>39.9</td>
<td>39.9</td>
<td>39.9</td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>06/12/11</td>
<td>1000</td>
<td>overcast</td>
<td>heavy</td>
<td>185</td>
<td>137.9</td>
<td>137.9</td>
<td>137.9</td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>06/12/11</td>
<td>1000</td>
<td>overcast</td>
<td>heavy</td>
<td>90.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>07/17/11</td>
<td>0840</td>
<td>clear</td>
<td>monthly</td>
<td>75.9</td>
<td>75.9</td>
<td>75.9</td>
<td>75.9</td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>08/14/11</td>
<td>0800</td>
<td>overcast</td>
<td>monthly</td>
<td>24.3</td>
<td>24.3</td>
<td>24.3</td>
<td>24.3</td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>09/18/11</td>
<td>0820</td>
<td>clear</td>
<td>monthly</td>
<td>25.3</td>
<td>25.3</td>
<td>25.3</td>
<td>25.3</td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>10/16/11</td>
<td>0730</td>
<td>overcast</td>
<td>heavy</td>
<td>456.9</td>
<td>456.9</td>
<td>OCT DATA ELIM</td>
<td>OCT DATA ELIM</td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geomean BWS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>81.8</td>
<td>77.2</td>
<td>48.1</td>
<td>57.4</td>
</tr>
<tr>
<td><strong>Brunswick Bay Bridge (BBB)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>04/18/11</td>
<td>0735</td>
<td>pty cloudy</td>
<td>heavy</td>
<td>209.8</td>
<td>209.8</td>
<td>APR DATA ELIM</td>
<td>209.8</td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>05/15/11</td>
<td>0745</td>
<td>overcast</td>
<td>moderate</td>
<td>37.9</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>05/15/11</td>
<td>0745</td>
<td>overcast</td>
<td>moderate</td>
<td>34.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>06/12/11</td>
<td>0750</td>
<td>downpour</td>
<td>heavy</td>
<td>142.1</td>
<td>142.1</td>
<td>142.1</td>
<td>142.1</td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>07/17/11</td>
<td>0755</td>
<td>clear</td>
<td>monthly</td>
<td>42.2</td>
<td>42.2</td>
<td>42.2</td>
<td>42.2</td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>08/14/11</td>
<td>0750</td>
<td>overcast</td>
<td>monthly</td>
<td>21.8</td>
<td>21.8</td>
<td>21.8</td>
<td>21.8</td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>09/18/11</td>
<td>0750</td>
<td>pty overcast</td>
<td>monthly</td>
<td>25.9</td>
<td>25.9</td>
<td>25.9</td>
<td>25.9</td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>10/16/11</td>
<td>0920</td>
<td>overcast</td>
<td>heavy</td>
<td>816.4</td>
<td>816.4</td>
<td>OCT DATA ELIM</td>
<td>OCT DATA ELIM</td>
<td></td>
</tr>
<tr>
<td>Geomean BBB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72.3</td>
<td>79.9</td>
<td>41.4</td>
<td>54.3</td>
</tr>
</tbody>
</table>
Dissolved Oxygen & Percent DO Saturation - 2011
by Station
May to September
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Durham Boat Launch (May - Sep)

Class B Evaluation Criterion: dissolved oxygen $\geq 7$ mg/L (ppm)
percent DO saturation $> 75$

= DO Value meets DO CRITERION of $\geq 7$ mg/L
= Percent Dissolved Oxygen; all values meet criterion

Class B DO Criterion: $\geq 7$ mg/L
Class B % DO Criterion: $\geq 75\%$
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Pejepscot Boat Launch (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

= DO Value meets DO CRITERION of ≥ 7 mg/L

= Percent Dissolved Oxygen; all values meet criterion

Class B % DO Criterion: ≥ 75 %


Dissolved Oxygen (ppm)

% Dissolved Oxygen Saturation

Class B
DO Criterion: ≥7 mg/L

95.2
85.2
87.9
93.2
89.8

8.05
7.2
7.9
8.55

81x40
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Fish Park Up (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

= DO Value meets DO CRITERION of ≥ 7 mg/L
= Percent Dissolved Oxygen; all values meet criterion

Class B %
DO Criterion:
≥75 %

Class B DO Criterion:
ge7 mg/L


Dissolved Oxygen (ppm)

% Dissolved Oxygen Saturation
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Fish Park Down (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

= DO Value meets DO CRITERION of ≥ 7 mg/L
= Percent Dissolved Oxygen; all values meet criterion

Dissolved Oxygen (ppm)


DO Criterion: ≥7 mg/L

DO Value meets DO CRITERION of ≥ 7 mg/L

Dissolved Oxygen & Percent DO Saturation


When

DO Criterion:

≥75 %

DO Value meets DO CRITERION of ≥ 7 mg/L
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Brunswick Interstate Ledges (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

- Blue = DO Value meets DO CRITERION of ≥ 7 mg/L
- Green = Percent Dissolved Oxygen; all values meet criterion

Class B DO Criterion: ≥ 7 mg/L
Class B % DO Criterion: ≥ 75%

Dissolved Oxygen (ppm)

<table>
<thead>
<tr>
<th>Date</th>
<th>Dissolved Oxygen (ppm)</th>
<th>Percent Dissolved Oxygen %</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/15/2011</td>
<td>10.2</td>
<td>95.2</td>
</tr>
<tr>
<td>6/12/2011</td>
<td>7.9</td>
<td>85.3</td>
</tr>
<tr>
<td>7/17/2011</td>
<td>7.0</td>
<td>84.5</td>
</tr>
<tr>
<td>8/14/2011</td>
<td>7.5</td>
<td>89.1</td>
</tr>
<tr>
<td>9/18/2011</td>
<td>8.5</td>
<td>89.9</td>
</tr>
</tbody>
</table>
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Brunswick Canoe Portage (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation ≥ 75%

- DO Value meets DO CRITERION of ≥ 7 mg/L
- Percent Dissolved Oxygen; all values meet criterion

Class B DO Criterion: ≥7 mg/L

Class B %
DO Criterion: ≥75 %


Dissolved Oxygen (ppm)
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Brunswick Water St. (May - Sep)

Class B Evaluation Criterion: dissolved oxygen $\geq 7$ mg/L (ppm)
percent DO saturation $\geq 75$

- DO Value meets DO CRITERION of $\geq 7$ mg/L
- Percent Dissolved Oxygen; all values meet criterion
Lower Androscoggin River 2011 Dissolved Oxygen & Percent DO Saturation
Brunswick Bay Bridge (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation ≥ 75%

- Blue = DO Value meets DO CRITERION of ≥ 7 mg/L
- Green = Percent Dissolved Oxygen; all values meet criterion

Class B %
DO Criterion: ≥75%

Class B DO Criterion: ≥7 mg/L

Dissolved Oxygen (ppm)

% Dissolved Oxygen Saturation

<table>
<thead>
<tr>
<th>Date</th>
<th>DO Value</th>
<th>DO Saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/15/2011</td>
<td>10.6</td>
<td>98.7</td>
</tr>
<tr>
<td>6/12/2011</td>
<td>8.4</td>
<td>84.9</td>
</tr>
<tr>
<td>7/17/2011</td>
<td>7.12</td>
<td>85.3</td>
</tr>
<tr>
<td>8/14/2011</td>
<td>7.23</td>
<td>91.9</td>
</tr>
<tr>
<td>9/18/2011</td>
<td>8.82</td>
<td></td>
</tr>
</tbody>
</table>
Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)

= DO Value meet DO CRITERION of ≥ 7 mg/L;
All values meet criterion

Note: TPP data are included for informational purposes only about Merrymeeting Bay DO levels in this area. TPP data were collected at varying times and tides on target days using the Winkler Titration method. This Topsham site falls within a river segment already classified as B.
Dissolved Oxygen 2003 - 2011
Long-term Historical Trends
April to September
Durham Boat Launch Dissolved Oxygen: 2003 - 2011 (Apr - Sep)

Class B Criterion: ≥7 mg/L
Pejepscot Boat Launch Dissolved Oxygen: 2003 - 2011 (Apr - Sep)

Class B Criterion: ≥ 7 mg/L
Topsham Pleasant Point Dissolved Oxygen: 2003 - 2011 (Apr - Sep)

Dissolved Oxygen (mg/L)

Class B Criterion: ≥7 mg/L

= data collected after 0800 am
Dissolved Oxygen 2003 - 2011
Long-term Historical Trends Stations Combined
April to September
Lower Androscoggin River - Dissolved Oxygen 2003 to 2011 (Apr - Sep)
Topsham Pleasant Point, Durham Boat Launch, Pejepscot Boat Launch

Class B Criterion: ≥7 mg/L
Dissolved Oxygen 2003 - 2011
Historical Trends
Yearly Geometric Means
2003 -2011
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 2011 = all sites monitored
Lower Androscoggin River 2011 Dissolved Oxygen Data Tables
<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Durham Boat Launch (DBL)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>04/18/11</td>
<td>0700</td>
<td>clear</td>
<td>HEAVY</td>
<td>14.5</td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>04/18/11</td>
<td>0700</td>
<td>clear</td>
<td>HEAVY</td>
<td>14.5</td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>05/15/11</td>
<td>0815</td>
<td>overcast</td>
<td>moderate</td>
<td>9.2</td>
<td>9.2</td>
<td>9.2</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>05/15/11</td>
<td>0810</td>
<td>clear</td>
<td>HEAVY</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>06/12/11</td>
<td>0700</td>
<td>overcast</td>
<td>drizzle</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>07/17/11</td>
<td>0810</td>
<td>clear</td>
<td>HEAVY</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>08/14/11</td>
<td>0810</td>
<td>overcast</td>
<td>HEAVY</td>
<td>8.2</td>
<td>8.2</td>
<td>8.2</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>09/10/11</td>
<td>0910</td>
<td>overcast</td>
<td>h</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GeoMean DBL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.85</td>
<td>9.12</td>
<td>8.12</td>
<td>8.12</td>
<td>102.2</td>
</tr>
</tbody>
</table>

<p>| <strong>Pejepscot Boat Launch (PBL)</strong>                |         |             |         |             |                   |                                                 |                                                 |                                                 |                                                 |
| PBL     | 04/18/11 | 0630        | clear   | HEAVY      | 14.2              | 14.2               |                                                 |                                                 |                                                 |                                                 |
| PBL     | 05/15/11 | 0650        | overcast| light     | 10.2              | 10.2               | 10.2                                           | 10.2                                           |                                                 |                                                 |
| PBL     | 05/15/11 | 0650        | overcast| medium    | 8.05              | 8.05               | 8.05                                           | 8.05                                           |                                                 |                                                 |
| PBL     | 06/12/11 | 0625        | overcast| medium    | 7.2               | 7.2                | 7.2                                            | 7.2                                            |                                                 |                                                 |
| PBL     | 07/17/11 | 0640        | clear   | HEAVY      | 7.9               | 7.9                | 7.9                                            | 7.9                                            |                                                 |                                                 |
| PBL     | 08/14/11 | 0645        | clear   | HEAVY      | 8.6               | 8.55               | 8.55                                           | 8.55                                           |                                                 |                                                 |
| PBL     | 09/18/11 | 0720        | clear   | HEAVY      | 8.5               |                    |                                                 |                                                 |                                                 |                                                 |
| PBL     | 10/16/11 | 0810        | overcast| heavy     | 10.4              |                    |                                                 |                                                 |                                                 |                                                 |
| <strong>GeoMean PBL</strong>                               |         |             |         |             | 9.29              | 9.27                                           | 8.32                                           | 8.32                                           | 94.4                                           |</p>
<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPU</td>
<td>04/18/11</td>
<td>0730</td>
<td>clear</td>
<td></td>
<td>14.4</td>
<td>14.4</td>
<td>10.1</td>
<td>10.1</td>
<td>8.68</td>
</tr>
<tr>
<td>FPU</td>
<td>05/15/11</td>
<td>0720</td>
<td>overcast</td>
<td></td>
<td>10.1</td>
<td>10.1</td>
<td>10.1</td>
<td>10.1</td>
<td>95.5</td>
</tr>
<tr>
<td>FPU</td>
<td>06/12/11</td>
<td>0732</td>
<td>overcast</td>
<td></td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>85.3</td>
</tr>
<tr>
<td>FPU</td>
<td>06/12/11</td>
<td>0735</td>
<td>overcast</td>
<td></td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>85.3</td>
</tr>
<tr>
<td>FPU</td>
<td>07/17/11</td>
<td>0710</td>
<td>clear</td>
<td></td>
<td>7.35</td>
<td>7.23</td>
<td>7.23</td>
<td>7.23</td>
<td>86.3</td>
</tr>
<tr>
<td>FPU</td>
<td>07/17/11</td>
<td>0710</td>
<td>clear</td>
<td></td>
<td>7.1</td>
<td>7.1</td>
<td>7.1</td>
<td>7.1</td>
<td>92.8</td>
</tr>
<tr>
<td>FPU</td>
<td>08/14/11</td>
<td>0705</td>
<td>ptyly cloudy</td>
<td></td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>90.2</td>
</tr>
<tr>
<td>FPU</td>
<td>09/18/11</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>100.3</td>
</tr>
<tr>
<td>FPU</td>
<td>10/16/11</td>
<td>0835</td>
<td>overcast</td>
<td>heavy</td>
<td>10.5</td>
<td>10.45</td>
<td>8.21</td>
<td>8.21</td>
<td>91.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GeoMean FPU 8.48</td>
<td>8.55</td>
<td>8.21</td>
<td>8.21</td>
<td>91.6</td>
</tr>
<tr>
<td>FPD</td>
<td>04/18/11</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>14.9</td>
<td>14.9</td>
<td>10.3</td>
<td>10.3</td>
<td>114.5</td>
</tr>
<tr>
<td>FPD</td>
<td>05/15/11</td>
<td>0730</td>
<td>overcast</td>
<td>light rain</td>
<td>10.3</td>
<td>10.3</td>
<td>7.9</td>
<td>7.9</td>
<td>96</td>
</tr>
<tr>
<td>FPD</td>
<td>06/12/11</td>
<td>0745</td>
<td>overcast</td>
<td></td>
<td>7.9</td>
<td>7.9</td>
<td>7.9</td>
<td>7.9</td>
<td>85.3</td>
</tr>
<tr>
<td>FPD</td>
<td>07/17/11</td>
<td>0725</td>
<td>clear</td>
<td></td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>86</td>
</tr>
<tr>
<td>FPD</td>
<td>08/14/11</td>
<td>0720</td>
<td>clear</td>
<td></td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>90.5</td>
</tr>
<tr>
<td>FPD</td>
<td>09/18/11</td>
<td>0755</td>
<td>clear</td>
<td></td>
<td>8.4</td>
<td>8.4</td>
<td>8.4</td>
<td>8.4</td>
<td>90.1</td>
</tr>
<tr>
<td>FPD</td>
<td>10/16/11</td>
<td>0850</td>
<td>overcast</td>
<td>Heavy Rain</td>
<td>11.2</td>
<td>11.2</td>
<td>8.19</td>
<td>8.19</td>
<td>107</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GeoMean FPD 8.63</td>
<td>8.63</td>
<td>8.19</td>
<td>8.19</td>
<td>92.2</td>
</tr>
</tbody>
</table>
### Lower Androscoggin River 2011

**Dissolved Oxygen**

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample</th>
<th>Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>Dissolved Oxygen (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brunswick Interstate Ledges (BIL)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL</td>
<td>04/18/11</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td></td>
<td>14.05</td>
<td>14.05</td>
<td></td>
<td>115.2</td>
<td></td>
</tr>
<tr>
<td>BIL</td>
<td>05/15/11</td>
<td>0755</td>
<td>overcast</td>
<td>light</td>
<td></td>
<td>10.2</td>
<td>10.2</td>
<td>10.2</td>
<td>10.2</td>
<td>95.2</td>
</tr>
<tr>
<td>BIL</td>
<td>06/12/11</td>
<td>0805</td>
<td>overcast</td>
<td></td>
<td></td>
<td>7.9</td>
<td>7.9</td>
<td>7.9</td>
<td>7.9</td>
<td>85.3</td>
</tr>
<tr>
<td>BIL</td>
<td>07/17/11</td>
<td>0755</td>
<td>clear</td>
<td></td>
<td></td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>84.5</td>
</tr>
<tr>
<td>BIL</td>
<td>08/14/11</td>
<td>0800</td>
<td>overcast</td>
<td>sprinkle</td>
<td></td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>89.1</td>
</tr>
<tr>
<td>BIL</td>
<td>08/14/11</td>
<td>0815</td>
<td>overcast</td>
<td>sprinkle</td>
<td></td>
<td>7.5</td>
<td></td>
<td></td>
<td>89.1</td>
<td></td>
</tr>
<tr>
<td>BIL</td>
<td>09/18/11</td>
<td>0815</td>
<td>clear</td>
<td></td>
<td></td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>89.9</td>
</tr>
<tr>
<td>BIL</td>
<td>10/16/11</td>
<td>0905</td>
<td>overcast</td>
<td>heavy</td>
<td></td>
<td>11</td>
<td>11</td>
<td></td>
<td>105</td>
<td></td>
</tr>
<tr>
<td><strong>GeoMean BIL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>8.41</strong></td>
<td><strong>8.57</strong></td>
<td><strong>8.15</strong></td>
<td><strong>8.15</strong></td>
<td><strong>90.9</strong></td>
</tr>
</tbody>
</table>

| **Brunswick Canoe Portage (BCP)** |          |        |        |         |             |                         |                                               |                                                 |                                                        |
| BCP           | 04/18/11 | 0745   | overcast | heavy  |             | 15.26                    | 15.26                                        |                                                 | 115.3                                                |
| BCP           | 05/15/11 | 0745   | overcast |        |             | 10.68                    | 10.68                                        | 10.68                                           | 10.68                                              | 97.8                                               |
| BCP           | 06/12/11 | 0800   | overcast |        |             | 7.96                     | 7.96                                         | 7.96                                            | 7.96                                              | 82.8                                               |
| BCP           | 07/17/11 | 0745   | clear  |         |             | 7.2                      | 7.2                                          | 7.2                                             | 7.2                                                | 86.4                                               |
| BCP           | 07/17/11 | 0750   | clear  |         |             | 7.2                      |                                               |                                                 | 86.4                                                |
| BCP           | 08/13/11 | 0800   | clear  |         |             | 11.48                    | 11.48                                        | 11.48                                           | 11.48                                              | 134.7                                              |
| BCP           | 09/18/11 | 0820   | overcast |        |             | 8.62                     | 8.62                                         | 8.62                                            | 8.62                                              | 90.9                                               |
| BCP           | 10/16/11 | 0800   | overcast | heavy  |             | 11.61                    | 11.61                                        |                                                 | 113                                                 |
| **GeoMean BCP** |         |        |        |         |             | **9.7**                   | **10.1**                                     | **9.0**                                         | **9.0**                                             | **101.6**                                          |
### Lower Androscoggin River 2011 Dissolved Oxygen

**Dissolved Oxygen Class B Criteria:**
- **DO (mg/L):** \( \geq 7 \) ppm
- **Saturation:** \( \geq 75\% \)

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brunswick Water St. (BWS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS</td>
<td>04/18/11</td>
<td>0820</td>
<td>clear</td>
<td></td>
<td>13.7</td>
<td>13.7</td>
<td></td>
<td></td>
<td>107.1</td>
</tr>
<tr>
<td>BWS</td>
<td>05/15/11</td>
<td>0900</td>
<td>fog/haze</td>
<td>light</td>
<td>10.6</td>
<td>10.6</td>
<td>10.6</td>
<td>10.6</td>
<td>98.7</td>
</tr>
<tr>
<td>BWS</td>
<td>06/12/11</td>
<td>1000</td>
<td>overcast</td>
<td>heavy</td>
<td>9.3</td>
<td>9.3</td>
<td>9.3</td>
<td>9.3</td>
<td>100.1</td>
</tr>
<tr>
<td>BWS</td>
<td>07/17/11</td>
<td>0840</td>
<td>clear</td>
<td></td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>100.2</td>
</tr>
<tr>
<td>BWS</td>
<td>08/14/11</td>
<td>0800</td>
<td>overcast</td>
<td></td>
<td>7.85</td>
<td>7.85</td>
<td>7.85</td>
<td>7.85</td>
<td>91</td>
</tr>
<tr>
<td>BWS</td>
<td>09/18/11</td>
<td>0820</td>
<td>clear</td>
<td></td>
<td>8.9</td>
<td>8.9</td>
<td>8.9</td>
<td>8.9</td>
<td>92.4</td>
</tr>
<tr>
<td>BWS</td>
<td>10/16/11</td>
<td>0730</td>
<td>overcast</td>
<td>heavy</td>
<td>10.75</td>
<td>10.75</td>
<td></td>
<td></td>
<td>103.5</td>
</tr>
<tr>
<td><strong>GeoMean BWS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>9.76</strong></td>
<td><strong>9.76</strong></td>
<td><strong>8.94</strong></td>
<td><strong>8.94</strong></td>
<td><strong>98.9</strong></td>
</tr>
<tr>
<td><strong>Brunswick Bay Bridge (BBB)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>04/18/11</td>
<td>0735</td>
<td>ptly cloudy</td>
<td>heavy</td>
<td>13.52</td>
<td>13.52</td>
<td></td>
<td></td>
<td>107.4</td>
</tr>
<tr>
<td>BBB</td>
<td>05/15/11</td>
<td>0745</td>
<td>overcast</td>
<td>moderate</td>
<td>10.6</td>
<td>10.6</td>
<td>10.6</td>
<td>10.6</td>
<td>98.7</td>
</tr>
<tr>
<td>BBB</td>
<td>05/15/11</td>
<td>0745</td>
<td>overcast</td>
<td>moderate</td>
<td>10.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB</td>
<td>06/12/11</td>
<td>0750</td>
<td>downpour</td>
<td>heavy</td>
<td>8.4</td>
<td>8.4</td>
<td></td>
<td></td>
<td>90.9</td>
</tr>
<tr>
<td>BBB</td>
<td>07/17/11</td>
<td>0755</td>
<td>clear</td>
<td></td>
<td>7.12</td>
<td>7.12</td>
<td></td>
<td></td>
<td>84.9</td>
</tr>
<tr>
<td>BBB</td>
<td>08/14/11</td>
<td>0750</td>
<td>overcast</td>
<td></td>
<td>7.23</td>
<td>7.23</td>
<td></td>
<td></td>
<td>85.3</td>
</tr>
<tr>
<td>BBB</td>
<td>09/18/11</td>
<td>0750</td>
<td>ptly overcast</td>
<td></td>
<td>8.82</td>
<td>8.82</td>
<td></td>
<td></td>
<td>91.9</td>
</tr>
<tr>
<td>BBB</td>
<td>10/16/11</td>
<td>0920</td>
<td>overcast</td>
<td>heavy</td>
<td>10.15</td>
<td>10.15</td>
<td></td>
<td></td>
<td>98.5</td>
</tr>
<tr>
<td><strong>GeoMean BBB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>9.36</strong></td>
<td><strong>9.19</strong></td>
<td><strong>8.34</strong></td>
<td><strong>8.33</strong></td>
<td><strong>93.6</strong></td>
</tr>
</tbody>
</table>
**Lower Androscoggin River 2011**

**Dissolved Oxygen**

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topsham Pleasant Point (TPP)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPP</td>
<td>4/16/2010</td>
<td>1000</td>
<td></td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPP</td>
<td>5/14/2010</td>
<td>1000</td>
<td></td>
<td></td>
<td>10.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPP</td>
<td>6/12/2010</td>
<td>820</td>
<td></td>
<td></td>
<td>8.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPP</td>
<td>7/17/2010</td>
<td>1400</td>
<td></td>
<td></td>
<td>7.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPP</td>
<td>8/13/2010</td>
<td>830</td>
<td></td>
<td></td>
<td>7.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPP</td>
<td>9/19/2010</td>
<td>910</td>
<td></td>
<td></td>
<td>8.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPP</td>
<td>10/17/2010</td>
<td>1030</td>
<td></td>
<td></td>
<td>11.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GeoMean TPP** 9.16

*TPP data are included for informational purposes only about Merrymeeting Bay DO levels in this area. TPP data were collected at varying times and tides on target days using the Winkler Titration method. This Topsham site falls within a river segment already classified as B.
Water Quality Data Analysis and Review
Lower Androscoggin River
2012
E. coli 2012 by Station
May to September
Lower Androscoggin River 2012 *E. coli* (IDEXX) Durham Boat Launch (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 31.6 colonies/100 ml *(Meets criterion)*

Instantaneous Criterion = <236 colonies/100 ml)

Geo Mean Criterion = <64 colonies/100 ml)
Lower Androscoggin River 2012 *E. coli* (IDEXX) Pejepscot Boat Launch (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 27.2 colonies/100 ml *(Meets criterion)*
Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 20.2 colonies/100 ml (Meets criterion)
Lower Androscoggin River 2012 *E. coli* (IDEXX) Fish Park Below Dam (May - Sep)

Class B Evaluation Criterion: geometric mean $\leq 64$ colonies/100 ml
instantaneous value $\leq 236$ colonies/100 ml

- geometric mean all data: 21.4 colonies/100 ml *(Meets criterion)*

Instantaneous Criterion $= <236$ colonies/100 ml)

Geo Mean Criterion $= <64$ colonies/100 ml)
Lower Androscoggin River 2012 *E. coli* (IDEXX) Brunswick Interstate Ledges (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 20.0 colonies/100 ml *(Meets criterion)*
Lower Androscoggin River 2012 *E. coli* (IDEXX) Brunswick Canoe Portage (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml
instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 20.0 colonies/100 ml *(Meets criterion)*

Instantaneous Criterion = <236 colonies/100 ml)

Geo Mean Criterion = <64 colonies/100 ml)

2012 Collection Date

- 5/12
- 5/19
- 5/26
- 6/2
- 6/9
- 6/16
- 6/23
- 6/30
- 7/7
- 7/14
- 7/21
- 7/28
- 8/4
- 8/11
- 8/18
- 8/25
- 9/1
- 9/8
- 9/15
- 9/22
- 9/29

Geo Mean Criterion = 20.0 colonies/100 ml

IDEXX *E. coli* (# colonies/100 ml)
Lower Androscoggin River 2012 *E. coli* (IDEXX) Brunswick Water St. Boat Launch (May - Sep)

Class B Evaluation Criterion: geometric mean ≤ 64 colonies/100 ml

instantaneous value ≤ 236 colonies/100 ml

= geometric mean all data: 31.0 colonies/100 ml *(Meets criterion)*
Lower Androscoggin River 2012 *E. coli* (IDEXX) Brunswick Bay Bridge (May - Sep)

**Class B Evaluation Criterion:**
- geometric mean $\leq 64$ colonies/100 ml
- instantaneous value $\leq 236$ colonies/100 ml

- = geometric mean all data: 39.4 colonies/100 ml *(Meets criterion)*

**Instantaneous Criterion = <236 colonies/100 ml)**

**Geo Mean Criterion = <64 colonies/100 ml)**

2012 Collection Date

<table>
<thead>
<tr>
<th>Date</th>
<th>0</th>
<th>50</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/12</td>
<td>9.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

68
E. coli 2006 - 2012 Long-term Stations
Historical Trends
April to September
Pejepscot Boat Landing *E. coli* 2006 - 2012 (Apr - Sep; no heavy rain data)

Class B Instantaneous Criterion: ≤236 colonies/100 ml
Brunswick Water Street Boat Launch *E. coli* 2006 - 2012 (Apr - Sep; no heavy rain data)

Class B Instantaneous Criterion: \( \leq 236 \) colonies/100 ml
Brunswick Bay Bridge *E. coli* 2006 - 2012 (Apr - Sep; no heavy rain data)

Class B Instantaneous Criterion:
≤236 colonies/100 ml
E. coli 2006 - 2012 Long-term Stations Combined
Historical Trends
April to September
Lower Androscoggin River - E. coli 2006 to 2012 (Apr - Sep; no heavy rain data)

Class B Instantaneous Criterion: ≤236 colonies/100 ml
E. coli 2006 - 2012
Historical Trends
Yearly Geometric Means
Lower Androscoggin River - *E. coli* GeoMeans by Station (Apr - Sep; no heavy rain events) 2006 - 2012

Class B Geometric Mean Criterion:
\[ \leq 64 \text{ colonies/100 ml} \]
FOMB Lower Androscoggin E. coli 2006 to 2012

Geometric means by Year (Apr - Sep)

E. coli (# colonies/100 ml)

- All Data
- No Heavy Rain Event
- Class B
- Class C

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

2006 2007 2008 2009 2010 2011 2012
Lower Androscoggin River 2012 *E. coli* Data Tables
<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>Sample Type</th>
<th>Sample Type</th>
<th>Criteria: GeoMean ≤ 64/100 ml or Instant ≤ 236/100 ml</th>
<th>Criteria: GeoMean ≤ 64/100 ml or Instant ≤ 236/100 ml</th>
<th>Criteria: GeoMean ≤ 64/100 ml or Instant ≤ 236/100 ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durham Boat Launch (DBL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ALL DATA</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td>NO OCT IDEXX DATA (Means for reps used)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL 05/19/12</td>
<td>0730</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>29.2</td>
<td>29.2</td>
<td>29.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL 06/17/12</td>
<td>0700</td>
<td>fog/haze</td>
<td>monthly</td>
<td></td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL 07/22/12</td>
<td>0700</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>24.3</td>
<td>24.3</td>
<td>24.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL 09/16/12</td>
<td>0715</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>32.3</td>
<td>38.65</td>
<td>38.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL 09/16/12</td>
<td>0715</td>
<td>clear</td>
<td>replicate</td>
<td></td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBL 10/07/12</td>
<td>0555</td>
<td>fog</td>
<td>monthly</td>
<td></td>
<td>31.7</td>
<td>31.7</td>
<td>31.7</td>
<td>OCT DATA ELIM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geomean DBL</td>
<td>31.6</td>
<td>30.5</td>
<td>30.2</td>
<td></td>
</tr>
<tr>
<td>Pejepscot Boat Launch (PBL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ALL DATA</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td>NO OCT IDEXX DATA (Means for reps used)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 05/20/12</td>
<td>0700</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>22.8</td>
<td>18.65</td>
<td>18.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 05/20/12</td>
<td>0700</td>
<td>clear</td>
<td>replicate</td>
<td></td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 06/17/12</td>
<td>0700</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>28.5</td>
<td>28.5</td>
<td>28.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 07/22/12</td>
<td>0705</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>95.9</td>
<td>95.9</td>
<td>95.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 08/17/12</td>
<td>0700</td>
<td>clear</td>
<td>med P before monthly</td>
<td></td>
<td>110</td>
<td>110</td>
<td>110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 09/16/12</td>
<td>0655</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>13.4</td>
<td>12.75</td>
<td>12.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 09/16/12</td>
<td>0655</td>
<td>clear</td>
<td>replicate</td>
<td></td>
<td>12.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL 10/17/12</td>
<td>0705</td>
<td>clear</td>
<td>fog; light P before monthly</td>
<td></td>
<td>18.7</td>
<td>18.7</td>
<td>18.7</td>
<td>OCT DATA ELIM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geomean PBL</td>
<td>27.2</td>
<td>33.2</td>
<td>37.2</td>
<td></td>
</tr>
<tr>
<td>Fish Park Up (FPU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ALL DATA</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td>NO OCT IDEXX DATA (Means for reps used)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 05/20/12</td>
<td>0730</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>16</td>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 06/17/12</td>
<td>0725</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>26.6</td>
<td>24.2</td>
<td>24.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 06/17/12</td>
<td>0725</td>
<td>clear</td>
<td>replicate</td>
<td></td>
<td>21.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 07/22/12</td>
<td>0730</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>32.3</td>
<td>32.3</td>
<td>32.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 08/17/12</td>
<td>0720</td>
<td>clear</td>
<td>p - med monthly</td>
<td></td>
<td>54.6</td>
<td>54.6</td>
<td>54.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 09/16/12</td>
<td>0720</td>
<td>clear</td>
<td>monthly</td>
<td></td>
<td>6.3</td>
<td>6.3</td>
<td>6.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 10/07/12</td>
<td>0725</td>
<td>clear</td>
<td>p - light monthly</td>
<td></td>
<td>16</td>
<td>16.55</td>
<td>OCT DATA ELIM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU 10/07/12</td>
<td>0725</td>
<td>clear</td>
<td>p - light replicate</td>
<td></td>
<td>17.1</td>
<td>17.1</td>
<td>OCT DATA ELIM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geomean FPU</td>
<td>20.2</td>
<td>19.9</td>
<td>21.2</td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td>Date</td>
<td>Sample Time</td>
<td>Weather</td>
<td>Adversities</td>
<td>Sample Type</td>
<td>Sample Type</td>
<td>Sample Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------</td>
<td>-------------</td>
<td>---------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td>NO OCT IDEXX DATA (Means for reps used)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MPN colonies/ 100mgl</td>
<td>MPN colonies/ 100mgl</td>
<td>MPN colonies/ 100mgl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish Park Down (FPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MpN colonies/ 100mgl</td>
<td>MpN colonies/ 100mgl</td>
<td>MpN colonies/ 100mgl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 05/20/12</td>
<td>0745</td>
<td>clear</td>
<td>monthly</td>
<td>17.3</td>
<td>17.3</td>
<td>17.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 06/17/12</td>
<td>0740</td>
<td>clear</td>
<td>monthly</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 07/22/12</td>
<td>0745</td>
<td>clear</td>
<td>monthly</td>
<td>28.2</td>
<td>27.55</td>
<td>27.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 07/22/12</td>
<td>0745</td>
<td>clear</td>
<td>replicate</td>
<td>26.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 08/17/12</td>
<td>0730</td>
<td>clear</td>
<td>monthly</td>
<td>83.6</td>
<td>83.6</td>
<td>83.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 09/16/12</td>
<td>0730</td>
<td>clear</td>
<td>monthly</td>
<td>9.7</td>
<td>9.7</td>
<td>9.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 10/07/12</td>
<td>0745</td>
<td>clear</td>
<td>monthly</td>
<td>9.7</td>
<td>9.7</td>
<td>9.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geomean FPD</td>
<td>21.4</td>
<td>20.6</td>
<td>23.9</td>
<td></td>
</tr>
<tr>
<td>Brunswick Interstate Ledges (BIL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 05/20/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>5.2</td>
<td>5.2</td>
<td>5.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 06/17/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>18.5</td>
<td>18.5</td>
<td>18.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 07/22/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>27.9</td>
<td>27.9</td>
<td>27.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 08/17/12</td>
<td>0755</td>
<td>clear</td>
<td>monthly</td>
<td>70.6</td>
<td>75.35</td>
<td>75.35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 08/17/12</td>
<td>0755</td>
<td>clear</td>
<td>replicate</td>
<td>80.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 09/16/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>6.3</td>
<td>6.3</td>
<td>6.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 10/07/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>13.2</td>
<td>13.2</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geomean BIL</td>
<td>20.0</td>
<td>16.0</td>
<td>16.6</td>
<td></td>
</tr>
<tr>
<td>Brunswick Canoe Portage (BCP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 05/20/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>8.6</td>
<td>8.6</td>
<td>8.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 06/17/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>20.1</td>
<td>22.1</td>
<td>22.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 06/17/12</td>
<td>0800</td>
<td>clear</td>
<td>replicate</td>
<td>24.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 07/22/12</td>
<td>0745</td>
<td>clear</td>
<td>monthly</td>
<td>25.9</td>
<td>25.9</td>
<td>25.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 08/19/12</td>
<td>0805</td>
<td>clear</td>
<td>monthly</td>
<td>70.6</td>
<td>70.6</td>
<td>70.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 09/16/12</td>
<td>0715</td>
<td>clear</td>
<td>monthly</td>
<td>7.4</td>
<td>9.15</td>
<td>9.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 10/07/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>10.9</td>
<td>10.9</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geomean BCP</td>
<td>18.0</td>
<td>18.1</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td>Date</td>
<td>Sample Time</td>
<td>Weather</td>
<td>Adversities</td>
<td>Sample Type</td>
<td>Sample Type</td>
<td>Sample Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>-------------</td>
<td>---------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Water St. (BWS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS 05/20/12</td>
<td>0700</td>
<td>clear</td>
<td>monthly</td>
<td>14.8</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS 06/17/12</td>
<td>0745</td>
<td>clear</td>
<td>monthly</td>
<td>27.2</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS 07/22/12</td>
<td>0800</td>
<td>clear</td>
<td>monthly</td>
<td>40.4</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS 07/22/12</td>
<td>0800</td>
<td>replicate</td>
<td></td>
<td>52.8</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS 08/19/12</td>
<td>0745</td>
<td>clear</td>
<td>monthly</td>
<td>101.4</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS 09/16/12</td>
<td>0750</td>
<td>clear</td>
<td>monthly</td>
<td>11.9</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWS 10/07/12</td>
<td>0900</td>
<td>clear</td>
<td>monthly</td>
<td>26.5</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Bay Bridge (BBB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB 05/20/12</td>
<td>0815</td>
<td>clear</td>
<td>monthly</td>
<td>9.7</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB 06/17/12</td>
<td>0730</td>
<td>clear</td>
<td>monthly</td>
<td>30.7</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB 07/22/12</td>
<td>0750</td>
<td>pt cloudy</td>
<td>monthly</td>
<td>35</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB 08/19/12</td>
<td>0735</td>
<td>clear</td>
<td>monthly</td>
<td>77.6</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB 09/16/12</td>
<td>0745</td>
<td>clear</td>
<td>monthly</td>
<td>52</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB 10/07/12</td>
<td>0840</td>
<td>overcast</td>
<td>monthly</td>
<td>59.1</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBB 10/07/12</td>
<td>0840</td>
<td>replicate</td>
<td></td>
<td>59.1</td>
<td>MPN colonies/ 100mgl</td>
<td>ALL DATA IDEXX</td>
<td>ALL DATA WITH MEANS FOR REPLICATE SAMPLES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Criteria:**
- **GeoMean ≤ 64/100 ml or Instant ≤ 236/100 ml**

**Geomean**
- **BWS** 31.0
- **BBB** 39.4

**Mean Value**
- **Bolded Red Text = VALUE EXCEEDS CRITERIA**

**Sample Type**
- **ALL DATA**
- **NO OCT IDEXX DATA** (Means for reps used)
Dissolved Oxygen & Percent DO Saturation - 2012
by Station
May to September
<table>
<thead>
<tr>
<th>Date</th>
<th>Dissolved Oxygen (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/20/2012</td>
<td>9.4</td>
</tr>
<tr>
<td>6/17/2012</td>
<td>8.7</td>
</tr>
<tr>
<td>7/22/2012</td>
<td>7.2</td>
</tr>
<tr>
<td>8/17/2012</td>
<td>9.7</td>
</tr>
</tbody>
</table>

**Class B Evaluation Criterion:** dissolved oxygen \( \geq 7 \text{ mg/L} \) (ppm)  
percent DO saturation > 75%  

- **DO Value** meets DO CRITERION of \( \geq 7 \text{ mg/L} \)  
- **Percent Dissolved Oxygen:** No %DO Data collected for this station

**Class B DO Criterion:** \( \geq 7 \text{ mg/L} \)
Lower Androscoggin River 2012 Dissolved Oxygen & Percent DO Saturation
Pejepscot Boat Launch (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

- DO Value meets DO CRITERION of ≥ 7 mg/L
- Percent Dissolved Oxygen; all values meet criterion
Lower Androscoggin River 2012 Dissolved Oxygen & Percent DO Saturation
Fish Park Up (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

= DO Value meets DO CRITERION of ≥ 7 mg/L
= Percent Dissolved Oxygen; all values meet criterion
Lower Androscoggin River 2012 Dissolved Oxygen & Percent DO Saturation
Fish Park Down (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

- **DO Value meets DO CRITERION of ≥ 7 mg/L**
- **Percent Dissolved Oxygen; all values meet criterion**

Class B % DO Criterion:
≥75 %

<table>
<thead>
<tr>
<th>Date</th>
<th>Dissolved Oxygen (ppm)</th>
<th>% Dissolved Oxygen Saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/20/2012</td>
<td>9.5</td>
<td>97.0</td>
</tr>
<tr>
<td>6/17/2012</td>
<td>8.6</td>
<td>94.0</td>
</tr>
<tr>
<td>7/22/2012</td>
<td>7.5</td>
<td>91.2</td>
</tr>
<tr>
<td>8/17/2012</td>
<td>7.7</td>
<td>87.7</td>
</tr>
<tr>
<td>9/16/2012</td>
<td>8.4</td>
<td>89.7</td>
</tr>
</tbody>
</table>
Lower Androscoggin River 2012 Dissolved Oxygen & Percent DO Saturation
Brunswick Interstate Ledges (May - Sep)

Class B DO Criterion: ≥7 mg/L

Class B % DO Criterion: ≥75%

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

= DO Value meets DO CRITERION of ≥ 7 mg/L
= Percent Dissolved Oxygen; all values meet criterion
Lower Androscoggin River 2012 Dissolved Oxygen & Percent DO Saturation
Brunswick Canoe Portage (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation ≥ 75%

Class B DO Criterion: ≥7 mg/L
Class B % DO Criterion: ≥75%

= DO Value meets DO CRITERION of ≥ 7 mg/L
= Percent Dissolved Oxygen; all values meet criterion
Lower Androscoggin River 2012 Dissolved Oxygen & Percent DO Saturation
Brunswick Water St. (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation ≥ 75%

Class B DO Criterion: ≥7 mg/L

Class B % DO Criterion: ≥75%

DO Value meets DO CRITERION of ≥ 7 mg/L

Percent Dissolved Oxygen; all values meet criterion
Lower Androscoggin River 2012 Dissolved Oxygen & Percent DO Saturation
Brunswick Bay Bridge (May - Sep)

Class B Evaluation Criterion: dissolved oxygen ≥ 7 mg/L (ppm)
percent DO saturation > 75%

ADO Criterion: ≥7 mg/L
Class B % DO Criterion: ≥75%

DO Value meets DO CRITERION of ≥ 7 mg/L
Percent Dissolved Oxygen; all values meet criterion
Dissolved Oxygen 2003 - 2012
Long-term Historical Trends
April to September
Durham Boat Launch Dissolved Oxygen: 2003 - 2012 (Apr - Sep)

Class B Criterion: ≥7 mg/L

Dissolved Oxygen (mg/L)
Pejepscot Boat Launch Dissolved Oxygen: 2003 - 2012 (Apr - Sep)

Dissolved Oxygen (mg/L)

Class B Criterion: ≥7 mg/L
Topsham Pleasant Point Dissolved Oxygen: 2003 - 2012 (Apr - Sep)

Dissolved Oxygen (mg/L)

Class B Criterion: ≥7 mg/L

=data collected after 0800 am
Dissolved Oxygen 2003 - 2012
Long-term Historical Trends Stations Combined
April to September
Lower Androscoggin River - Dissolved Oxygen 2003 to 2012 (Apr - Sep)
Topsham Pleasant Point, Durham Boat Launch, Pejepscot Boat Launch

Class B Criterion: ≥7 mg/L
Dissolved Oxygen 2003 - 2012
Historical Trends
Yearly Geometric Means
2003 - 2012
Yearly DO Geometric Means for Lower Androscoggin River vs Class B & C Standards

Yearly DO GeoMean
Class B Standard (7 ppm)
Class C Standard (5 ppm)

(For 2003 through 2008 Sites = Topsham Pleasant Pt., Pejepscot Boat Launch & Durham Boat Launch. For 2009 through 2012 = all sites monitored)
Lower Androscoggin River 2012 Dissolved Oxygen Data Tables
### Dissolved Oxygen Class B Criteria:

- Dissolved Oxygen (DO) \( \geq 7 \text{ ppm (mg/L)} \)
- Saturation \( \geq 75\% \)

#### Percent DO

<table>
<thead>
<tr>
<th>Site</th>
<th>All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Data</td>
</tr>
<tr>
<td></td>
<td>DO (mg/L)</td>
</tr>
</tbody>
</table>

### Durham Boat Launch (DBL)

<table>
<thead>
<tr>
<th>DBL</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBL</td>
<td>05/19/12</td>
<td>0730</td>
<td>clear</td>
<td></td>
<td>9.4</td>
<td>9.4</td>
<td>9.4</td>
<td>9.4</td>
</tr>
<tr>
<td>DBL</td>
<td>06/17/12</td>
<td>0700</td>
<td>fog/haze</td>
<td></td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
</tr>
<tr>
<td>DBL</td>
<td>07/22/12</td>
<td>0700</td>
<td>clear</td>
<td></td>
<td>7.2</td>
<td>7.2</td>
<td>7.2</td>
<td>7.2</td>
</tr>
<tr>
<td>DBL</td>
<td>09/16/12</td>
<td>0715</td>
<td>clear</td>
<td></td>
<td>9.7</td>
<td>9.7</td>
<td>9.7</td>
<td>9.7</td>
</tr>
<tr>
<td>DBL</td>
<td>10/07/12</td>
<td>0555</td>
<td>fog</td>
<td></td>
<td>8.4</td>
<td>8.4</td>
<td>none collected</td>
<td>none collected</td>
</tr>
</tbody>
</table>

**GeoMean DBL** 8.62 8.62 8.68 8.68

### Pejepscot Boat Launch (PBL)

<table>
<thead>
<tr>
<th>PBL</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBL</td>
<td>05/20/12</td>
<td>0700</td>
<td>clear</td>
<td></td>
<td>9.6</td>
<td>9.6</td>
<td>9.6</td>
<td>9.6</td>
</tr>
<tr>
<td>PBL</td>
<td>05/20/12</td>
<td>0700</td>
<td>clear</td>
<td></td>
<td>9.6</td>
<td>9.6</td>
<td>9.6</td>
<td>9.6</td>
</tr>
<tr>
<td>PBL</td>
<td>06/17/12</td>
<td>0700</td>
<td>clear</td>
<td></td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
</tr>
<tr>
<td>PBL</td>
<td>07/22/12</td>
<td>0705</td>
<td>clear</td>
<td></td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
</tr>
<tr>
<td>PBL</td>
<td>08/17/12</td>
<td>0700</td>
<td>clear med P before</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>87.6</td>
</tr>
<tr>
<td>PBL</td>
<td>09/16/12</td>
<td>0655</td>
<td>clear</td>
<td></td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
</tr>
<tr>
<td>PBL</td>
<td>09/16/12</td>
<td>0655</td>
<td>clear</td>
<td></td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
</tr>
<tr>
<td>PBL</td>
<td>10/17/12</td>
<td>0705</td>
<td>clear fog; light P before</td>
<td>9.1</td>
<td>9.1</td>
<td>9.1</td>
<td>9.1</td>
<td>97.8</td>
</tr>
</tbody>
</table>

**GeoMean PBL** 8.57 8.33 8.33 8.33 93.4

### Fish Park Up (FPU)

<table>
<thead>
<tr>
<th>FPU</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPU</td>
<td>05/20/12</td>
<td>0730</td>
<td>clear</td>
<td></td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
</tr>
<tr>
<td>FPU</td>
<td>06/17/12</td>
<td>0725</td>
<td>clear</td>
<td></td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
</tr>
<tr>
<td>FPU</td>
<td>06/17/12</td>
<td>0725</td>
<td>clear</td>
<td></td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
</tr>
<tr>
<td>FPU</td>
<td>07/22/12</td>
<td>0730</td>
<td>clear</td>
<td></td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
</tr>
<tr>
<td>FPU</td>
<td>08/17/12</td>
<td>0720</td>
<td>clear p - med</td>
<td>7.5</td>
<td>7.80</td>
<td>7.80</td>
<td>7.80</td>
<td>88.1</td>
</tr>
<tr>
<td>FPU</td>
<td>09/16/12</td>
<td>0720</td>
<td>clear</td>
<td></td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
</tr>
<tr>
<td>FPU</td>
<td>10/07/12</td>
<td>0725</td>
<td>clear p - light</td>
<td>9.1</td>
<td>9.1</td>
<td>9.1</td>
<td>9.1</td>
<td>91.7</td>
</tr>
<tr>
<td>FPU</td>
<td>10/07/12</td>
<td>0725</td>
<td>clear p - light</td>
<td>9.1</td>
<td>9.1</td>
<td>9.1</td>
<td>9.1</td>
<td>91.7</td>
</tr>
</tbody>
</table>

**GeoMean FPU** 8.39 8.26 8.07 8.07 91.3
## Dissolved Oxygen Class B Criteria:

- **Dissolved Oxygen (DO)**: \( \geq 7 \) ppm (mg/L) 
- **Saturation**: \( \geq 75\% \)

### Fish Park Down (FPD)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPD 05/20/12</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
<td>97.0</td>
</tr>
<tr>
<td>FPD 06/17/12</td>
<td>0740</td>
<td>clear</td>
<td></td>
<td>8.6</td>
<td>8.6</td>
<td>8.6</td>
<td>8.6</td>
<td>94.0</td>
</tr>
<tr>
<td>FPD 07/22/12</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>91.2</td>
</tr>
<tr>
<td>FPD 07/22/12</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>7.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPD 08/17/12</td>
<td>0730</td>
<td>clear</td>
<td></td>
<td>7.5</td>
<td>7.5</td>
<td>7.7</td>
<td>7.7</td>
<td>87.7</td>
</tr>
<tr>
<td>FPD 09/16/12</td>
<td>0730</td>
<td>clear</td>
<td></td>
<td>8.1</td>
<td>8.1</td>
<td>8.4</td>
<td>8.4</td>
<td>89.7</td>
</tr>
<tr>
<td>FPD 10/07/12</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>9.1</td>
<td>9.1</td>
<td></td>
<td></td>
<td>93.2</td>
</tr>
</tbody>
</table>

**GeoMean FPD**: 8.03

### Brunswick Interstate Ledges (BIL)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIL 05/20/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
<td>97.1</td>
</tr>
<tr>
<td>BIL 06/17/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>94.9</td>
</tr>
<tr>
<td>BIL 07/22/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
<td>89.7</td>
</tr>
<tr>
<td>BIL 08/17/12</td>
<td>0755</td>
<td>clear</td>
<td></td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>87.7</td>
</tr>
<tr>
<td>BIL 08/17/12</td>
<td>0755</td>
<td>clear</td>
<td></td>
<td>7.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIL 09/16/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>88.7</td>
</tr>
<tr>
<td>BIL 10/07/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>9.1</td>
<td>9.1</td>
<td></td>
<td></td>
<td>89.8</td>
</tr>
</tbody>
</table>

**GeoMean BIL**: 8.01

### Brunswick Canoe Portage (BCP)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>ALL DATA DO (mg/L)</th>
<th>ALL DATA WITH MEANS FOR REPLICATE SAMPLES (mg/L)</th>
<th>NO APR OR OCT DO DATA (mg/L) (Means for reps used)</th>
<th>NO APR OR OCT DO DATA - HEAVY RAIN DATA ELIMINATED (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCP 05/20/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>101.1</td>
</tr>
<tr>
<td>BCP 06/17/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>8.7</td>
<td>90.7</td>
</tr>
<tr>
<td>BCP 06/17/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>8.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCP 07/22/12</td>
<td>0745</td>
<td>clear</td>
<td></td>
<td>7.1</td>
<td>7.1</td>
<td>7.1</td>
<td>7.1</td>
<td>83.4</td>
</tr>
<tr>
<td>BCP 08/19/12</td>
<td>0805</td>
<td>clear</td>
<td></td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
<td>86.6</td>
</tr>
<tr>
<td>BCP 09/16/12</td>
<td>0715</td>
<td>clear</td>
<td></td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>85.1</td>
</tr>
<tr>
<td>BCP 10/07/12</td>
<td>0800</td>
<td>clear</td>
<td></td>
<td>8.52</td>
<td>8.52</td>
<td></td>
<td></td>
<td>84.7</td>
</tr>
</tbody>
</table>

**GeoMean BCP**: 8.2
### Dissolved Oxygen Class B Criteria:

- **DO**: \( \geq 7 \text{ ppm (mg/L)} \)
- **Saturation**: \( \geq 75\% \)

#### Brunswick Water St. (BWS)

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>All Data DO (mg/L)</th>
<th>All Data with Means for Replicate Samples (mg/L)</th>
<th>No APR or Oct DO Data (mg/L) (Means for reps used)</th>
<th>No APR or Oct DO Data - Heavy Rain Data Eliminated (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWS 05/20/12</td>
<td>0700 clear</td>
<td>9.96</td>
<td>9.96</td>
<td>9.96</td>
<td>9.96</td>
<td>9.96</td>
<td>9.96</td>
<td>102.7</td>
<td></td>
</tr>
<tr>
<td>BWS 06/17/12</td>
<td>0745</td>
<td>8.6</td>
<td>8.6</td>
<td>8.6</td>
<td>8.6</td>
<td>8.6</td>
<td>8.6</td>
<td>88.3</td>
<td></td>
</tr>
<tr>
<td>BWS 07/22/12</td>
<td>0800 clear</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>100.1</td>
<td></td>
</tr>
<tr>
<td>BWS 08/19/12</td>
<td>0745</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>87.6</td>
<td></td>
</tr>
<tr>
<td>BWS 09/16/12</td>
<td>0750 clear</td>
<td>8.14</td>
<td>8.14</td>
<td>8.14</td>
<td>8.14</td>
<td>8.14</td>
<td>8.14</td>
<td>88.1</td>
<td></td>
</tr>
<tr>
<td>BWS 10/07/12</td>
<td>0900 clear</td>
<td>10.7</td>
<td>10.7</td>
<td>10.7</td>
<td>10.7</td>
<td>10.7</td>
<td>10.7</td>
<td>105.4</td>
<td></td>
</tr>
</tbody>
</table>

**GeoMean BWS**: 8.78

#### Brunswick Bay Bridge (BBB)

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Sample Time</th>
<th>Weather</th>
<th>Adversities</th>
<th>All Data DO (mg/L)</th>
<th>All Data with Means for Replicate Samples (mg/L)</th>
<th>No APR or Oct DO Data (mg/L) (Means for reps used)</th>
<th>No APR or Oct DO Data - Heavy Rain Data Eliminated (mg/L) (Means for reps used)</th>
<th>Percent DO All Data Collected, Including Replicate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBB 05/20/12</td>
<td>0815 clear</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>99.9</td>
<td></td>
</tr>
<tr>
<td>BBB 06/17/12</td>
<td>0730</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>86.1</td>
<td></td>
</tr>
<tr>
<td>BBB 07/22/12</td>
<td>0750 pt cloudy</td>
<td>7.25</td>
<td>7.25</td>
<td>7.25</td>
<td>7.25</td>
<td>7.25</td>
<td>7.25</td>
<td>87.2</td>
<td></td>
</tr>
<tr>
<td>BBB 08/19/12</td>
<td>0735 clear</td>
<td>7.22</td>
<td>7.22</td>
<td>7.22</td>
<td>7.22</td>
<td>7.22</td>
<td>7.22</td>
<td>83.5</td>
<td></td>
</tr>
<tr>
<td>BBB 09/16/12</td>
<td>0745 clear</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
<td>84.8</td>
<td></td>
</tr>
<tr>
<td>BBB 10/07/12</td>
<td>0840 overcast</td>
<td>10.33</td>
<td>10.33</td>
<td>10.33</td>
<td>10.33</td>
<td>10.33</td>
<td>10.33</td>
<td>103.5</td>
<td></td>
</tr>
</tbody>
</table>

**GeoMean BBB**: 8.30

---

- **Bolded Text** = MEAN VALUE
- **Red Text** = VALUE DOES NOT MEET CRITERIA

**Values**

- **Dissolved Oxygen (DO)**
- **Saturation**

**Units**

- **mg/L** (milligrams per liter)
List of Appendices

Appendix 1- Public Law, Chapter 163 LD 330 ...................................................... 105
Appendix 2 - Map-Lower Androscoggin River Sample Sites .................................. 118
Appendix 3 - Lower Androscoggin River, Aerial View Map .................................. 120
Appendix 4 - USGS Monthly Flows, Lower Androscoggin River - Auburn .................. 122
Appendix 5 - USGS Monthly Flows, Lower Kennebec River - North Sidney ............... 125
Appendix 6 - Graphics Extracted from Androscoggin River VRMP 2011 Data Report .... 128
Appendix 7 - Maine Volunteer River Monitoring Program (VRMP) Quality Assurance
    Program Plan (2009-2014) ........................................................................ 136
Appendix 8 - Recent Letters of Support ................................................................. 138
    Times Record Editorial July 17, 2010 ............................................................. 140
    Brunswick Letter - 2010 .............................................................................. 142
    Topsham Resolution - 2010 .......................................................................... 144
    Topsham Support Letter - 2010 ...................................................................... 145
    Lewiston Letter - 2010 ................................................................................. 146
    Durham Letter - 2008 .................................................................................. 148
    Auburn Sewage District - 2008 .................................................................... 150
    Brunswick Topsham Land Trust - 2008 ........................................................ 151
Appendix 9 - NMI Studies: Economic Benefits of Clean Rivers ................................ 153
Appendix 10 - Applied Biomonitoring Qualifications .............................................. 156
Appendix I
Public Law, Chapter 163 LD 330
(Lower Androscoggin is Section 24)
An Act To Change the Classification of Certain Waters of the State

Be it enacted by the People of the State of Maine as follows:

Sec. 1. 38 MRSA §467, sub-$1, ¶C, as amended by PL 2003, c. 317, §2, is further amended to read:

C. Androscoggin River, Upper Drainage; that portion within the State lying above the river's most upstream crossing of the Maine-New Hampshire boundary - Class A unless otherwise specified.

   (1) Cupsuptic River and its tributaries - Class AA.

   (2) Kennebago River and its tributaries except for the impoundment of the dam at Kennebago Falls - Class AA.

   (3) Rapid River, from a point located 1,000 feet downstream of Middle Dam to its confluence with Umbagog Lake - Class AA.

   (4) Magalloway River and tributaries above Aziscohos Lake in Lynchton Township, Parmachenee Township and Bowmantown Township - Class AA.

   (4-A) Abbott Brook and its tributaries in Lincoln Plantation - Class AA.

   (5) Little Magalloway River and tributaries in Parmachenee Township and Bowmantown Township - Class AA.

   (6) Long Pond Stream in Rangeley - Class AA.

   (7) Dodge Pond Stream in Rangeley - Class AA.

Sec. 2. 38 MRSA §467, sub-$1, ¶D, as amended by PL 2003, c. 317, §3, is further amended to read:

D. Androscoggin River, minor tributaries - Class B unless otherwise specified.

   (1) All tributaries of the Androscoggin River that enter between the Maine-New Hampshire boundary in Gilead and its confluence with, and including, the Ellis River and that are not otherwise classified - Class A.

   (2) Bear River - Class AA.

   (3) Sabattus River from Sabattus Lake to limits of the Lisbon urban area - Class C.
(4) Webb River - Class A.

(5) Swift River, and its tributaries, above the Mexico-Rumford boundary - Class A.

(6) Nezinscot River, east and west branches above their confluence in Buckfield - Class A.

(7) Wild River in Gilead, Batchelders Grant - Class AA.

(8) Aunt Hannah Brook and its tributaries in Dixfield - Class A.

**Sec. 3.** 38 MRSA §467, sub-¶4, ¶A, as amended by PL 2003, c. 317, §6 and affected by §25, is further amended to read:

A. Kennebec River, main stem.

(1) From the east outlet of Moosehead Lake to a point 1,000 feet below the lake - Class A.

(2) From the west outlet of Moosehead Lake to a point 1,000 feet below the lake - Class A.

(3) From a point 1,000 feet below Moosehead Lake to its confluence with Indian Pond - Class AA.

(4) From Harris Dam to a point located 1,000 feet downstream from Harris Dam - Class A.

(5) From a point located 1,000 feet downstream from Harris Dam to its confluence with the Dead River - Class AA.

(6) From its confluence with the Dead River to the confluence with Wyman Lake, including all impoundments - Class A.

(7) From the Wyman Dam to its confluence with the impoundment formed by the Williams Dam - Class A.

(8) From the confluence with the Williams impoundment to the Route 201A bridge in Anson-Madison, including all impoundments - Class A.

(9) From the Route 201A bridge in Anson-Madison to the Fairfield-Skowhegan boundary, including all impoundments - Class B.

(10) From the Fairfield-Skowhegan boundary to its confluence with Messalonskee Stream, including all impoundments - the Shawmut Dam - Class C.

(10-A) From the Shawmut Dam to its confluence with Messalonskee Stream, excluding all impoundments - Class B.
(a) Waters impounded by the Hydro-Kennebec Dam and the Lockwood Dam in Waterville-Winslow - Class C.

(11) From its confluence with Messalonskee Stream to the Sidney-Augusta boundary, including all impoundments - Class B.

(12) From the Sidney-Augusta boundary to the Father John J. Curran Bridge in Augusta, including all impoundments - Class B.

(13) From the Father John J. Curran Bridge in Augusta to a line drawn across the tidal estuary of the Kennebec River due east of Abagadasset Point - Class B. Further, the Legislature finds that the free-flowing habitat of this river segment provides irreplaceable social and economic benefits and that this use must be maintained. Further, the license limits for total residual chlorine and bacteria for existing direct discharges of wastewater to this segment as of January 1, 2003 must remain the same as the limits in effect on that date and must remain in effect until June 30, 2009 or upon renewal of the license, whichever comes later. Thereafter, license limits for total residual chlorine and bacteria must be those established by the department in the license and may include a compliance schedule pursuant to section 414-A, subsection 2.

(14) From a line drawn across the tidal estuary of the Kennebec River due east of Abagadasset Point, to a line across the southwesterly area of Merrymeeting Bay formed by an extension of the Brunswick-Bath boundary across the bay in a northwesterly direction to the westerly shore of Merrymeeting Bay and to a line drawn from Chop Point in Woolwich to West Chop Point in Bath - Class B. Further, the Legislature finds that the free-flowing habitat of this river segment provides irreplaceable social and economic benefits and that this use must be maintained.

Sec. 4. 38 MRSA §467, sub-§4, ¶I, as repealed and replaced by PL 1989, c. 228, §2, is amended to read:

I. Kennebec River, minor tributaries - Class B unless otherwise specified.

(1) All minor tributaries entering above Wyman Dam that are not otherwise classified - Class A.

(2) All tidal portions of tributaries entering between Edwards Dam and the Sidney-Vassalboro-Augusta town line and a line drawn across the tidal estuary of the Kennebec River due east of Abagadasset Point - Class C, unless otherwise specified.

(a) Eastern River from head of tide to its confluence with the Kennebec River - Class C.

(3) Cold Stream, West Forks Plantation - Class AA.

(4) Moxie Stream, Moxie Gore, below a point located 1,000 feet downstream of the Moxie...
Pond dam - Class AA.

(5) Austin Stream and its tributaries above the highway bridge of Route 201 in the Town of Bingham - Class A.

Sec. 5. 38 MRSA §467, sub-§7, ¶E, as amended by PL 1999, c. 277, §11, is further amended to read:

E. Piscataquis River Drainage.

(1) Piscataquis River, main stem.

   (a) From the confluence of the East Branch and the West Branch to the Route 15 bridge in Guilford - Class A.

   (b) From the Route 15 bridge in Guilford to the Maine Central Railroad bridge in Dover-Foxcroft - Class B.

   (c) From the Maine Central Railroad bridge in Dover-Foxcroft to its confluence with the Penobscot River - Class B.

(2) Piscataquis River, tributaries - Class B unless otherwise specified.

   (a) Except as otherwise provided, East and West Branches of the Piscataquis River and their tributaries above their confluence near Blanchard - Class A.

   (b) East Branch of the Piscataquis River from 1,000 feet below Shirley Pond to its confluence with the West Branch - Class AA.

   (c) Pleasant River, East Branch and its tributaries - Class A.

   (d) Pleasant River, West Branch, from the outlet of Fourth West Branch Pond to its confluence with the East Branch - Class AA.

   (e) Pleasant River, West Branch tributaries - Class A.

   (f) Sebec River and its tributaries above Route 6 in Milo - Class A.

   (g) West Branch of the Piscataquis River from 1,000 feet below West Shirley Bog to its confluence with the East Branch - Class AA.
(h) Black Stream - Class A.

(i) Cold Stream - Class A.

(j) Kingsbury Stream - Class A.

(k) Schoodic Stream - Class A.

(l) Scutaze Stream - Class A.

(m) Sebois Stream, including East and West Branches, and tributaries - Class A.

(n) Alder Stream and its tributaries - Class A.

Sec. 6. 38 MRSA §467, sub-$7, ¶F, as amended by PL 2003, c. 317, §13, is further amended to read:

F. Penobscot River, minor tributaries - Class B unless otherwise specified.

(1) Cambolasse Stream (Lincoln) below the Route 2 bridge - Class C.

(2) Great Works Stream (Bradley) and its tributaries above the Route 178 bridge - Class A.

(3) Kenduskeag Stream (Bangor) below the Bullseye Bridge - Class C.

(4) Mattanawcook Stream (Lincoln) below the outlet of Mattanawcook Pond - Class C.

(5) Olamon Stream and its tributaries above the bridge on Horseback Road - Class A.

(6) Passadumkeag River and its tributaries - Class A, unless otherwise specified.

(a) Passadumkeag River from the Pumpkintown Dam to its confluence with the Penobscot River - Class AA.

(b) Ayers Brook - Class AA.

(7) Souadabscook Stream above head of tide - Class AA.

(7-A) Souadabscook Stream, tributaries of - Class B, unless otherwise specified.
(a) West Branch Souadabscook Stream (Hampden, Newburgh) - Class A.

(b) Brown Brook (Hampden) - Class A.

(8) Sunkhaze Stream and its tributaries - Class AA.

(9) Birch Stream - Class A.

(10) Hemlock Stream - Class A.

(11) Mattamiscontis Stream and its tributaries - Class A.

(12) Medunkeunk Stream - Class A.

(13) Rockabema Stream - Class A.

(14) Salmon Stream - Class A.

(15) Salmon Stream in Winn - Class A.

(16) Little Salmon Stream in Medway - Class A.

(17) Narrimissic River in Bucksport and Orland, including all impoundments - Class B.

Sec. 7. 38 MRSA §467, sub-§9, ¶B, as amended by PL 1991, c. 499, §16, is further amended to read:

B. Presumpscot River, tributaries - Class A unless otherwise specified.

(1) All tributaries entering below the outlet of Sebago Lake - Class B.

(2) Crooked River and its tributaries, except as otherwise provided, excluding existing impoundments and excluding that area of the river previously impounded at Scribners Mill - Class AA.

(3) Stevens Brook (Bridgton) - Class B.

(4) Mile Brook (Casco) - Class B.

Sec. 8. 38 MRSA §467, sub-§12, ¶B, as amended by PL 2003, c. 317, §15, is further amended to read:

B. Saco River, tributaries, those waters lying within the State - Class B unless otherwise specified.

(1) All tributaries entering above the confluence of the Ossipee River lying within the State
and not otherwise classified - Class A.

(2) Wards Brook (Fryeburg) - Class C.

(3) Buff Brook (Waterboro) - Class A.

(4) Ossipee River Drainage, those waters lying within the State - Class B unless otherwise specified.

   (a) Emerson Brook in Parsonsfield - Class A.

   (b) South River and its tributaries (Parsonsfield), those waters lying within the State - Class A.

Sec. 9. 38 MRSA §467, sub-§13, ¶A, as repealed and replaced by PL 1989, c. 764, §14, is amended to read:

A. St. Croix River, main stem.

   (1) Except as otherwise provided, from the outlet of Chiputneticook Lakes to its confluence with the Woodland Lake impoundment, those waters lying within the State - Class A.

   (2) Those waters impounded in the Grand Falls Flowage including those waters between Route 1 (Princeton and Indian Township) and Black Cat Island - Class B.

   (3) Woodland Lake impoundment - Class C.

   (4) From the Woodland Dam to tidewater, those waters lying within the State, including all impoundments - Class C.

Sec. 10. 38 MRSA §467, sub-§15, ¶C, as amended by PL 2003, c. 317, §17, is further amended to read:

C. Aroostook River Drainage.

   (1) Aroostook River, main stem.

      (a) From the confluence of Millinocket Stream and Munsungan Stream to the Route 11 bridge - Class AA.

      (b) From the Route 11 bridge to the Sheridan Dam - Class B.
(c) From the Sheridan Dam to its confluence with Presque Isle Stream, including all impoundments - Class B.

(d) From its confluence with Presque Isle Stream to a point located 3.0 miles upstream of the intake of the Caribou water supply, including all impoundments - Class C.

(e) From a point located 3.0 miles upstream of the intake of the Caribou water supply to a point located 100 yards downstream of the intake of the Caribou water supply, including all impoundments - Class B.

(f) From a point located 100 yards downstream of the intake of the Caribou water supply to the international boundary, including all impoundments - Class C.

(2) Aroostook River, tributaries, those waters lying within the State - Class A unless otherwise specified.

(a) All tributaries of the Aroostook River entering below the confluence of the Machias River that are not otherwise classified - Class B.

(b) Little Machias River and its tributaries - Class A.

(c) Little Madawaska River and its tributaries, including Madawaska Lake tributaries above the Caribou-Connor Township line - Class A.

(d) Machias River, from the outlet of Big Machias Lake to the Aroostook River - Class AA.

(e) Millinocket Stream, from the outlet of Millinocket Lake to its confluence with Munsungan Stream - Class AA.

(f) Munsungan Stream, from the outlet of Little Munsungan Lake to its confluence with Millinocket Stream - Class AA.

(g) Presque Isle Stream and its tributaries above the Mapleton-Presque Isle town line - Class A.

(h) St. Croix Stream from its confluence with Hall Brook in T.9, R.5, W.E.L.S. to its confluence with the Aroostook River - Class AA.
(j) Squa Pan Stream from the outlet of Squa Pan Lake to its confluence with the Aroostook River - Class C.

(k) Limestone Stream from the Long Road bridge to the Canadian border - Class C.


(m) Gardner Brook and its tributaries (T.14 R.5 W.E.L.S., T.13 R.5 W.E.L.S., Wade) - Class A.

Sec. 11. 38 MRSA §467, sub-§15, ¶F, as amended by PL 2003, c. 317, §18, is further amended to read:

F. St. John River, minor tributaries, those waters lying within the State - Class A unless otherwise specified.

(1) Except as otherwise classified, all minor tributaries of the St. John River entering below the international bridge in Fort Kent, those waters lying within the State - Class B.

(2) Baker Branch, from the headwaters at the St. John Ponds to its confluence with the Southwest Branch - Class AA.

(3) Big Black River, from the international boundary to its confluence with the St. John River - Class AA.

(4) Northwest Branch, from the outlet of Beaver Pond in T.12, R.17, W.E.L.S. to its confluence with the St. John River - Class AA.

(5) Prestile Stream from its source to Route 1A in Mars Hill - Class A.

(6) Southwest Branch, from a point located 5 miles downstream of the international boundary to its confluence with the Baker Branch - Class AA.

(7) Violette Stream and its tributaries, from its source to the confluence with Caniba Brook - Class A.

Sec. 12. 38 MRSA §467, sub-§16, ¶B, as amended by PL 1999, c. 277, §22, is further amended to read:

B. Salmon Falls River, tributaries, those waters lying within the State - Class B unless otherwise specified.

(1) Chicks Brook (South Berwick, York) - Class A.
(2) Little River and its tributaries (Berwick, North Berwick, Lebanon) - Class A.

Sec. 13. 38 MRSA §468, sub-$1, ¶A-1 is enacted to read:

A-1. Cape Elizabeth.

(1) Trout Brook, those waters that form the town boundary with South Portland - Class C.

Sec. 14. 38 MRSA §468, sub-$1, ¶B, as repealed and replaced by PL 1989, c. 764, §21, is amended to read:

B. Portland.

(1) All minor drainages unless otherwise specified - Class C.

(2) Stroudwater River from its origin to tidewater, including all tributaries - Class B.

Sec. 15. 38 MRSA §468, sub-$1, ¶C, as repealed and replaced by PL 1989, c. 764, §21, is amended to read:

C. Scarborough.

(1) All minor drainages - Class C unless otherwise specified.

(2) Finnard Brook - Class B.

(3) Stuart Brook - Class B.

(4) Nonesuch River from the headwaters to a point 1/2 mile downstream of Mitchell Hill Road crossing - Class B.

(5) Stroudwater River from its origin to tidewater, including all tributaries - Class B.

Sec. 16. 38 MRSA §468, sub-$1, ¶D, as repealed and replaced by PL 1989, c. 764, §21, is amended to read:

D. South Portland.

(1) All minor drainages - Class C.

(2) Trout Brook downstream of the first point where the brook becomes the town boundary between South Portland and Cape Elizabeth - Class C.

Sec. 17. 38 MRSA §468, sub-$1, ¶J is enacted to read:

J. Westbrook.

(1) Long Creek, main stem - Class C.
Sec. 18. 38 MRSA §468, sub-$4, ¶D is enacted to read:

D. Bristol.

(1) Pemaquid River and its tributaries, all freshwater sections below Pemaquid Pond - Class A.

Sec. 19. 38 MRSA §468, sub-$7, ¶D is enacted to read:

D. Black Brook in Lincolnville - Class A.

Sec. 20. 38 MRSA §468, sub-$7, ¶E is enacted to read:

E. Kendall Brook in Lincolnville - Class A.

Sec. 21. 38 MRSA §468, sub-$7, ¶F is enacted to read:

F. Tucker Brook in Lincolnville - Class A.

Sec. 22. 38 MRSA §469, sub-$5, ¶B, as enacted by PL 1989, c. 764, §27, is amended to read:

B. Phippsburg.

(1) Tidal waters east of longitude 69°-50'-05" W. and west of longitude 69°-47'-00" W. - Class SA.

(2) Tidal waters of The Basin, including The Narrows east of a line drawn between 69°-51'-57" W. and 43°-48'-14” N. - Class SA.

Sec. 23. Report concerning procedures for reclassification. The Department of Environmental Protection shall review the current procedures for reclassification contained in the Maine Revised Statutes, Title 38, section 464, subsection 2 and suggest any changes or clarifications needed to make the procedures more consistent and efficient while maintaining a full public review process. The recommendations may include draft legislation. The report must be submitted to the Joint Standing Committee on Natural Resources by January 15, 2010 and the committee may submit legislation related to this report to the Second Regular Session of the 124th Legislature.

Sec. 24. Lower Androscoggin River water quality sampling; report; legislation. The Department of Environmental Protection, with the assistance of and in consultation with volunteer river monitors, shall establish and implement a water quality sampling program for the lower Androscoggin River from Gulf Island Dam to the line formed by the extension of the Bath-Brunswick boundary across Merrymeeting Bay in a northwesterly direction.

1. Timing. The water quality sampling program must occur during the 2009 sampling season.

2. Purpose. The purpose of the water quality sampling program implemented under this section is to allow additional water quality data to be collected to determine if the section of the Androscoggin River from Worumbo Dam in Lisbon Falls to the line formed by the extension of the Bath-Brunswick boundary across Merrymeeting Bay in a northwesterly direction meets, or can reasonably be expected
to meet, the criteria for reclassification from Class C to Class B.

3. **Reclassification procedures.** Unless the Department of Environmental Protection is unable to obtain the required monitoring data due to excessive rainfall or other unforeseen events, or unless the monitoring data indicate an upgrade is unwarranted, the department shall initiate the procedures for reclassification in accordance with the Maine Revised Statutes, Title 38, section 464, subsection 2 to upgrade the lower Androscoggin River from Worumbo Dam in Lisbon Falls to the line formed by the extension of the Bath-Brunswick boundary across Merrymeeting Bay in a northwesterly direction from Class C to Class B.

4. **Report.** By February 15, 2010, the Department of Environmental Protection shall submit a report, including recommendations and any necessary implementing legislation, in connection with the water quality sampling program required under this section to the Joint Standing Committee on Natural Resources.

5. **Legislation authorized.** The Joint Standing Committee on Natural Resources may report out legislation relating to the subject matter of this section to the Second Regular Session of the 124th Legislature.

Effective September 12, 2009
Appendix 2
Map-Lower Androscoggin River Sample Sites
Lower Androscoggin River – FOMB Sample Sites

FOMB Sampling Program

<table>
<thead>
<tr>
<th>Site</th>
<th>DO Pre-2009</th>
<th>DO/EC 2009</th>
<th>DO/EC 2010</th>
<th>DO/EC 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durham Boat Launch (DBL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pejepscot Boat Launch (PBL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish Park Up (FPU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish Park Down (FPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Water Works (BWW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Interstate Ledges (BIL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Canoe Portage (BCP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Canoe Mooring (BCM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Water St. Boat Launch (BWS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Street Mooring (WSM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunswick Bay Bridge (BBB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topsham Pleasant Pt. (TPP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Upstream Monitoring

<table>
<thead>
<tr>
<th>Site</th>
<th>DO Pre-2009</th>
<th>DO 2009</th>
<th>DO 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf Island Pond Above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gulf Island Pond Below (Bates Boathouse)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auburn Boat Launch</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 3
Lower Androscoggin River
Aerial View Map
Appendix 4
USGS Monthly Flows
Lower Androscoggin River - Auburn
Appendix 5
USGS Monthly Flows
Lower Kennebec River - North Sidney
Appendix 6
Graphics Extracted from
Androscoggin River VRMP 2011 Data Report
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.

The following graphics were extracted from this report, available at: http://www.maine.gov/dep/water/monitoring/rivers_and_streams/vrmp/reports/2010/andro-fomb-2010.pdf

These graphics do not contain the Class B standard for reclassification of Maine waters:

<table>
<thead>
<tr>
<th></th>
<th>Dissolved Oxygen instantaneous reading (ppm); percent saturation;</th>
<th>E. coli (colonies /100 ml) instantaneous reading; geometric mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class B Criteria</td>
<td>7; 75%</td>
<td>236; 64</td>
</tr>
<tr>
<td>Class C Criteria</td>
<td>5; 60%</td>
<td>236; 126</td>
</tr>
</tbody>
</table>

DEP figures based on FOMB data consistently lack indications that Class B standards are actually being met.
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 5-17. 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.
Appendix 7
Maine Volunteer River Monitoring Program (VRMP)
Quality Assurance Program Plan (2009-2014)
Maine Volunteer River Monitoring Program (VRMP)
Quality Assurance Program Plan (2009-2014)

Maine Department of Environmental Protection
Bureau of Land and Water Quality
Division of Watershed Management &
Division of Environmental Assessment

Prepared By:
Jeff Varricchione, Biologist, Division of Watershed Management
and
Lisa Vickers, Environmental Specialist, Division of Watershed Management
State of Maine, Department of Environmental Protection
312 Canco Road, Portland, Maine 04103, (207) 822-6300
June 10, 2009

Review & Approval Signatures:

Biologist, Div. of Watershed Management:______________________________                ____________
Jeffrey T. Varricchione, Maine DEP              Date

Division Director, Div. of Environmental Assessment:__________________________  ____________
David L. Courtemanch, Maine DEP              Date

Chair, QA Program/Project Plan Review Team:______________________________                ____________
Malcolm C. Burson, Maine DEP                Date

Quality Assurance Officer (USEPA):__________________________________________                ____________
Arthur Clark, US Environmental Protection Agency, Region 1              Date

Project Officer (USEPA):____________________________________________________                ____________
Jennie Bridge, US Environmental Protection Agency, Region 1              Date

[Element 1. Title and Approval Sheet] DEPLW-0984
Appendix 8
Recent Letters of Support
Recent Letters of Support
(Please click on title to link to web files)

Times Record Editorial July 17, 2011 (pdf file 58 KB)
2011 Letters of support for Andro Upgrade proposal
Brunswick (pdf file 58 KB)

Topsham Resolution (pdf file 49 KB)
Support letter (pdf file 56 KB)
Lewiston (pdf file 52 KB)

Durham (pdf file 108 KB)

Auburn Sewage District (pdf file 44 KB)
Brunswick Topsham Land Trust (pdf file 128 KB)
Another year of data, now what?

When the Maine Board of Environmental Protection rejected in February 2009 upgrading the water quality classification for the lower Androscoggin River from Class C to Class B, it gave this as its reason: "More data is needed to support a change in the classification."

Never mind that the section of the Androscoggin River from Worumbo Dam in Lisbon Falls to its mouth in Merrymeeting Bay by then had been actively monitored by well-trained volunteers of the Friends of Merrymeeting Bay for 10 years. Or that the data they collected showed that for six years the lower Androscoggin had been meeting Class B dissolved oxygen standards and "nearly always" had met Class B bacteria level standards.

"More data is needed" — which is a polite bureaucratic way of saying "Come back later ... and maybe we'll consider it then."

The BEP's refusal begs the question: Who benefits from delaying upgrading the lower Androscoggin to the Class B standard that six years of data show is already being met more often than not?

It's not the people who swim, fish, canoe or kayak on that stretch of river. They would vigorously argue in favor of a higher standard because it means the river that inspired the 1972 federal Clean Water Act is that much closer to being healthy again. They place a high value on the return of bald eagles and osprey to that stretch of river; they welcome its resurgence of fish species that once roiled its waters by the hundreds of thousands.

Nor is it the municipalities along that stretch of river, who've spent millions upgrading their sewage treatment plants and sewer lines precisely because their citizens want to do what's right for the river. Auburn, Lewiston, Durham, Topsham, Brunswick, all wrote letters of support in for Friends of Merrymeeting Bay's 2009 petition to upgrade the lower Androscoggin to a Class B river.

They were joined by Androscoggin River Alliance, Brunswick-Topsham Land Trust, Merrymeeting Audubon Society, the Conservation Law Foundation, Natural Resources Council of Maine, Friends of Casco Bay, Maine Audubon, Maine Rivers, Atlantic Salmon Foundation and a number of private citizens — all writing letters of support.

So who benefits from the Androscoggin being kept a Class C river, instead of a Class B?

Anyone with even a casual understanding of Maine history — specifically, the power the paper and pulp industries have had over the decades in guiding our environmental policies — might identify paper companies with mills upriver in Jay and Rumford as prime suspects.

But if Class B standards are currently being met — as six years of data suggested — it would mean that existing industries along the river already are meeting clean water requirements. Presumably, then, they have nothing to fear and would not have to spend additional money to accomplish the upgrade.

No matter, the BEP made its ruling and called upon citizen groups such as Friends of Merrymeeting Bay and the Department of Environmental Protection "to work cooperatively to obtain the data necessary" to justify reclassification of the lower Androscoggin to Class B standards.
Well, that’s exactly what took place last year, from April to mid-October. Friends of Merrymeeting Bay volunteers, working closely with the DEP, increased the frequency of sampling from monthly to every other week. They increased the sampling sites from three to 10.

The results verified the previous finding that the lower Androscoggin River consistently meets Class B standards for dissolved oxygen and E. coli bacteria.

What, then, are we waiting for? Isn’t the point of federal and state clean water laws to improve water quality? Shouldn’t the Department of Environmental Protection and its board be leading that charge?

Instead, they, along with the Legislature’s Natural Resources Committee, seem content to regard the lower Androscoggin “the poor stepchild of Maine’s rivers” — as Ed Friedman, chairman of Friends of Merrymeeting Bay, so aptly expressed in his testimony seeking the upgrade in 2009.

letters@timesrecord.com
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,

[Signature]

Gary L. Brown
Town Manager

cc: Brunswick Town Council
    FOMB
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 Rienteau, Chairman

James Trusiani, Vice Chair

Steve Edmondson

Sandra Consolini

Donald Russell
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
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 Merrymeeting Bay (FOMB) to reclassify 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
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,

[Signature]
Laurent F. Gilbert Sr.
Mayor
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: [Signature]

By: [Signature]

By: [Signature]
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,

[Signature]
Normand R. Lamie, P.E.
General Manager
Auburn Sewerage District
September 16, 2008

Ernest Hilton, Chairman
Maine Board of Environmental Protection
17 State House Station
Augusta, ME 04303

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 at Worumbo Dam to its mouth at Merryymeeting Bay, from Class C to Class B, as set forth in the petition of the Friends of Merryymeeting 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)
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 Worumbro 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
Appendix 9
NMI Studies - Economic Benefits of Clean Rivers
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 Spisak 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 earnest 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 $30 to $140 million1, 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 3376)
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, 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.
Appendix 10
Applied Biomonitoring Qualifications
Applied Biomonitoring is an environmental consulting firm specializing in innovative, state-of-the-art environmental monitoring and assessment services coupled with timely client communication and scientific credibility. We have conducted numerous field studies to support projects for federal regulatory agencies, state and local authorities (including Maine DEP) and private industry.

Michael H. Salazar, Principal of Applied Biomonitoring, has been a leader in state-of-the-art environmental monitoring methodology with over 30 years of experience. Michael Salazar, in collaboration with his associate Sandra Salazar, have the ability to provide clients a wide range of environmental services, including monitoring and assessment, work plan development, experimental planning and design, data analysis and interpretation, peer review, and meeting facilitation. Our primary area of expertise is analysis and interpretation of tissue, water and sediment chemistry data with respect to chemical bioavailability and associated effects on aquatic organisms.

Applied Biomonitoring is recognized as a national and international expert in characterizing and understanding the processes of bioaccumulation and associated biological effects. We are also leaders in conducting field bioassays with caged bivalves. This unique experience and expertise to design, plan, and conduct in-situ field assessments has been developed over the past 30 years by conducting more than 40 transplant studies.

In addition to services directly associated with monitoring and assessment, Applied Biomonitoring has conducted numerous peer reviews, prepared countless technical reports and guidance manuals, and provided oversight and management on many high-profile projects. Applied Biomonitoring has the unparalleled capability of conducting on-the-spot literature searches for many environmental issues. An electronic database of over 15,000 citations with an emphasis on exposure and effects measurements and assessment techniques is maintained at the Applied Biomonitoring offices.

Our primary fields of experience and expertise include:

- Work plan & criteria development
- Environmental monitoring & assessment
- Bioaccumulation & bioeffects interpretation
- In-situ field studies with caged bivalves
- Ecological risk and damage assessment
- Sediment evaluation
- Teaching & technology transfer
- Meeting facilitation
- Electronic database & literature summaries
- In-situ temperature monitoring
**Environmental Monitoring & Assessment**

Applied Biomonitoring has provided an extensive review of the EPA Region 10 Interim Sediment Quality Guidelines for tributyltin (TBT) and participated in a number of discussion groups to evaluate that document and is frequently contacted by the Seattle districts of EPA and the COE for technical guidance. We have been contracted by EPA to evaluate updates of Ambient Water Quality Criteria for TBT, cadmium, and copper, and contracted by Environment Canada to review two TBT assessment documents. As part of a project to evaluate the potential effects of ammonia for the City of Winnipeg using caged bivalves, Applied Biomonitoring conducted an intensive review of the EPA Ambient Water Quality Criteria for ammonia. Most recently, Applied Biomonitoring has focused on bivalve bioaccumulation, bioeffects, and pathways of exposure for metals. We have developed extensive working expertise on the relative differences in metal accumulation among various marine and freshwater mussel species.

**Field Bioassays, Field Monitoring and Toxicity Testing**

Applied Biomonitoring is a recognized leader in the development of *in-situ* monitoring techniques that permit synoptic collection of chemical exposure and biological effects data. Since the first pilot study conducted in 1973, Mr. Salazar has conducted 60 transplant studies using 18 marine, estuarine, and freshwater bivalve species. Results of these studies have been used by the US Navy in their risk assessment for TBT, NOAA and the US EPA in their evaluations of Superfund sites in Puget Sound, Washington; Tampa, Florida, Sault Ste. Marie, Michigan, and the Sudbury River in Massachusetts, and most recently by the Washington State Department of Natural Resources for a programmatic evaluation of herring stocks in Puget Sound.

The *in-situ* transplant approach has become a well-established monitoring tool accepted by both industry and regulatory agencies. Both Mr. and Mrs. Salazar have developed the standard protocols for conducting field studies with caged bivalves. This extensively peer reviewed document appeared for the first time in American Society for Testing and Materials (ASTM) 2001 Annual Book of Standards. The methods have also been accepted by the American Public Health Association in their Standard Methods for the Examination of Water and Wastewater, and Environment Canada for monitoring pulp and paper and mining effluents. Applied Biomonitoring has worked with scientists at Environment Canada’s St. Lawrence Center for the past 6 years to development environmental monitoring and assessment systems for endocrine disrupting chemicals. Biomarkers have been developed to quantify estrogenic effects and a benthic cage was developed to assess long-term effects under environmentally realistic conditions.

**Relevant Project List:**

- Lynn Lake Peer Review (2009)
- Duwamish River Mussel Study (2009)
- Blanchard Seafood Study (2006)
- Puget Sound Naval Shipyard Caged Mussel Study (2005)
- Devil’s Lake Canal Diversion (2005)
- Lynn Lake, Manitoba, Canada Caged Mussel Study (2004, 2005, 2009)
• Review of TBT Documents for Environment Canada (2004)
• Kennebec River, ME Caged Mussel Study (2003)
• Androscoggin River, ME Caged Mussel Study (2003)
• Santa Barbara Shell Mound Study (2003)
• Bear Creek, WA Mussel Study (2003)
• Capitol Regional District Tissue Residue Effects Database (2002)
• San Diego Bay Dietary Copper Study (2002)
• Montreal Dietary Copper Study (2002)
• Developing a Benthic Cage for Long-term, In-situ Tests with Freshwater and Marine Bivalves (2002)
• Bonney Lake Fluoride (2002)
• Assessing Acute WET Test Variability (2001)
• Assist in Sampling Plan Development and Interpret Tissue Residues of PAHs (2001)
• Port Valdez Monitoring (2001)
• Review of Interlaboratory Variability Study, EPA Short-term Chronic & Acute Whole Effluent Toxicity Test Methods (2001)
• Environmental Monitoring for Sewage Treatment Plant (2001)
• Caged Mussel Study in Augusta, ME (2000)
• Caged Clam Study at Sault Ste. Marie, MI (2000)
• Potential Toxicity and Risk to Aquatic Organisms and Human Health from Exposure to Fiberglass (2000)
• Caged Mussel Study at Cherry Point, WA (1998, 1999, 2000)
• City of Winnipeg Ammonia Study, Winnipeg, MB, Canada (1999)
• Critique of San Francisco Estuary Institute Mussel Watch (1999)
• Review of EPA Tissue Residue Effects Database (1998)
• Caged Bivalve Pilot Study at Port Alice, Vancouver Is, BC (1997)
• Caged Bivalve Pilot Study at Port Valdez, AK (1997)
• Critical Evaluation of Bivalve Mollusc Biomonitoring (1997)
• Review of EPA Ambient Water Quality Criteria for TBT (1997)