Section 5-6
Mousam River (Mousam and Kennebunk Rivers Alliance)

Mousam River

The Mousam River is 23 miles long and originates at Square Pond which flows to Mousam Lake in Shapleigh. From Mousam Lake, the River flows through the towns of Alfred and Sanford to Estes Lake. The Littlefield River and Middle Branch River flow into Estes Lake from the north. From Estes Lake, Mousam River continues through the town of Kennebunk before discharging to the Gulf of Maine at Parsons Beach. Back Creek (tidal creek) enters the Mousam River near the mouth. The river is dammed at several places along its route including at Mill Pond and No. 1 Pond in Sanford, Estes Lake and Old Falls Pond.

Water quality in the Mousam River was impacted historically by industrial and commercial use related to mills in the towns of Sanford and Kennebunk (Baker, 1999). Today, water quality impacts are caused in large part by stormwater runoff associated with increasing development of the watershed and high levels of impervious surfaces in the town centers of Sanford and Kennebunk. Water quality is also impacted by several point source discharges to the main stem. In addition, the industrial legacy of the ten dams on the main stem of the river may also contribute to degraded water quality.

According to Maine's statutory Water Classification System, the Mousam River Basin has designations listed below.[1] Below head of tide, the river is Class SB.

A. Mousam River, main stem.

(1) From the outlet of Mousam Lake to a point located 0.5 miles above Mill Street in Springvale – Class B.

(2) From a point located 0.5 mile above Mill Street in Springvale to its confluence with Estes Lake – Class C.

(3) From the outlet of Estes Lake to tidewater – Class B.

B. Mousam River, tributaries – Class B.

Monitoring History

• In 2001 the Maine DEP TMDL report identified a 3.7 mile segment of the Mousam River, located from the Route 4 bridge to Estes Lake, as not attaining Class C standards due to dissolved oxygen concentration. This segment is included on Maine's 303(d) list for both point and non-point sources. Maine DEP lists a 9.9 mile segment of the river in Sanford from the Route 224 bridge to Estes Lake as impaired for toxics.

[1] http://www.mainelegislature.org/legis/statutes/38/title38sec467.html

• The Maine DEP Biological Monitoring Program has been monitoring the river since 1995. This data is available on DEP's website.

• The Mousam and Kennebunk Rivers Alliance (MKA) began in 2009 with assistance from the Wells National Estuarine Research Reserve (NERR) and Maine Rivers for the purpose of monitoring the Kennebunk and Mousam rivers. MKA joined the Volunteer River Monitoring Program in 2009.

• MKA added two sites in 2010 to bracket the sewage outfall upstream and downstream in Sanford. Two additional sites in Sanford were added in 2012.

Methods and Sampling Sites

Mousam Kennebunk Alliance has eleven sites on the mainstem. Four tributary sites are located on the Middle Branch, Littlefield River and Back Creek. All sites are freshwater except sites MOUR04 and BC02. Previous reports have identified Station MOUR35 as Class SB, but it has since been determined that this site is just above the hydraulic head of tide and is freshwater. All of the Mousam River sites are VRMP approved.

Monitoring is conducted biweekly from June through September. Monitors take measurements of water temperature and dissolved oxygen using a YSI meter. Specific conductance is measured using an Oakton EC 11+/11 Testr pen and salinity is measured at the tidal sites. Grab samples for *E. coli* collected at the freshwater sites and Enterococcus bacteria at the tidal sites. Bacteria samples are transported to Nelson Labs for analysis.

Table 5-6-1: Mousam and Kennebunk Rivers Alliance sampling sites for the Mousam River.

Main Stem Sites (Ordered from upstream to downstream)				
VRMP Site ID	**Organization Site Code**	**Sample Location**	**River Mile**	**Class**
SMU290	MOUR290	Headwaters	25.6	B
SMU280	MOUR280	S Curve Road	24.6	B
SMU250	MOUR250	Behind YMCA	21.6	C
SMU232	MOUR232	High Street/Weaver Dr	19.7	C
SMU204	MOUR204	Off Route 4	16.9	C
SMU163	MOUR163	New Dam Road	12.8	C
SMU144	MOUR144	Whicher's Hill Road	10.9	B
SMU80	MOUR80	Mill Street	4.6	B
SMU39	MOUR39	Berry Ct.	0.5	B

SMU35	MOUR35	Roger's Pond	0.1	B
SMU04	MOUR04	Route 9 Bridge	0.4	SB
Tributary Sites				
Middle Branch Mousam River SMUMB58	MOURMB58	Mast Road	6.9	B
Middle Branch Mousam River SMUMB33	MOURMB33	Swett's Bridge	4.4	B
Littlefield River SMUMBLR18	LR18	Back Road	2.2	B
Back Creek SMUBC02	BC02	Above Parson's Beach	0.2	SB

Mousam River Sampling Sites, Entire Watershed
Mousam and Kennebunk Rivers Alliance

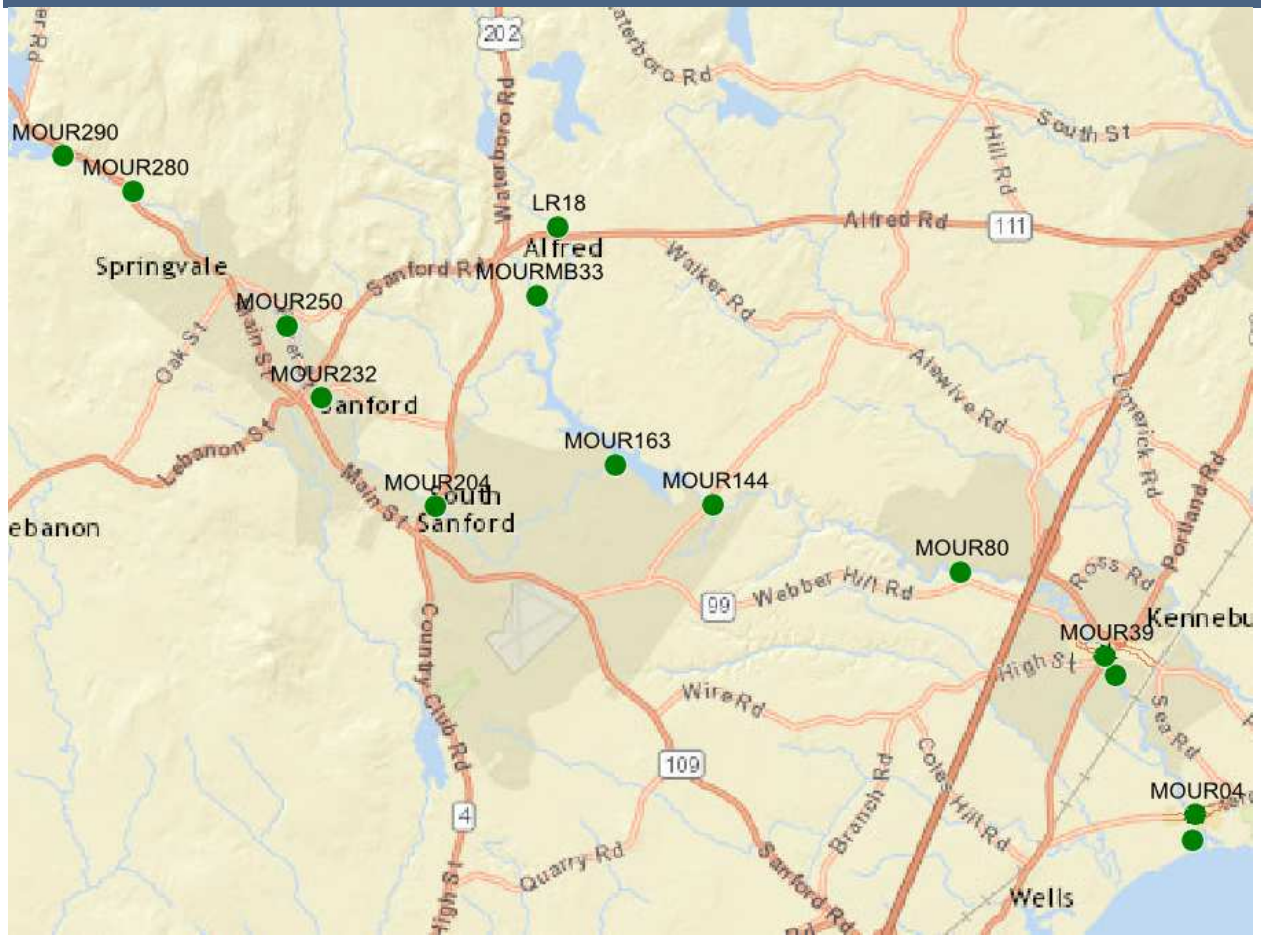


Figure 5-6-1: Map of Mousam and Kennebunk Rivers Alliance sampling sites on Mousam River. Mainstem and tributary sites are differentiated by coloration.

Results

For the purpose of discussion, the sampling stations are divided into three groups; Upper Main Stem (MOUR290, MOUR280, MOUR250, MOUR232, MOUR204), Lower Main Stem (MOUR163, MOUR144, MOUR80, MOUR39, MOUR35, MOUR04) and Tributaries (MOUR-LR18, MOUR-MB58, MOUR-MB33, MOUR-BC02). Refer to appendices A-1 and A-2 in discussion of individual site data and trends.

Two types of graphs are provided in this report to look at water quality data. The first type of graph is a longitudinal profile graph, which depicts main stem sites according to their position (river mile) on the river (the larger the river mile, the more upstream the sampling station is). A box and whisker diagram depicts the range of data observed at each station during the course of the sampling season (The box represents the range of the middle 50% of values, the whiskers represent the minimum and maximum extremes, and the line connects the median values at each station). The longitudinal profile plot is useful for showing general water quality trends and can be helpful in identifying the location of specific influences. The second type of graph is a time series graph, which shows the temporal/seasonal trends of water quality data associated with each station. Time series graphs are useful in assessing the relative influence of external factors (e.g., weather) on water quality trends.

Dissolved Oxygen

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

Class B criteria for dissolved oxygen are a minimum of 7 mg/l (milligrams/liter) or 75% saturation. Class C criteria for dissolved oxygen are a minimum of 5 mg/l or 60 % saturation. To meet water quality criteria, both concentration and saturation standards must be met. The Class SB standard is 85% saturation (no specific concentration standard).

2015 Results:

The upper Mousam River mainstem sites which includes sites MOUR-290, MOUR-280, MOUR-250, MOUR-232, MOUR-204 and MOUR-163 all met dissolved oxygen criteria for both concentration and percent saturation on all dates. Four of these sites are Class C which has a lower criteria of 5 mg/l and 60% saturation. Sites MOUR-250 and MOUR-232 (which are Class C) met the Class B criteria. The middle mainstem Mousam River sites includes sites MOUR-144, MOUR-80, MOUR-39, and MOUR-35; and tributaries MOURMB-33 and LR-18. The mainstem site MOUR-80 did not meet Class B criteria for concentration and percent saturation on 1 date in September. The tributary site MOURMB-33 did not criteria on 4 of 6 sample dates for the July-September period. Site LR-18 did not meet criteria on any of the 6 sample dates. All of the values for LR-18 were low with dissolved oxygen concentration ranging from 3.5-5.5 mg/l and percent saturation ranging from 41.8-58.6 percent. This site is consistently very low every year and is likely naturally prone to low DO. The tidal sites are MOUR-04 and BC-02. Site MOUR-04 did not meet

the Class SB criteria for percent saturation for 1 date in early August. Overall, the dissolved oxygen for the upper Mousam sites is excellent. The middle mainstem sites are excellent except for the tributary sites which are fair to poor. The tidal sites are good to excellent.

The longitudinal DO profiles show a general declining trend in the middle portion of the river, with some recovery near the bottom end of the river. The middle portion of the river is characterized by a fair amount of urban development around Sanford and then a slower moving section of river with a fair amount of wetland area. Both of these factors are likely to contribute to the general DO sag in the middle portion of the river.

The monitors did a decent job of getting out to sites earlier in the day (before 8:00 am) and should continue to try and do so. Afternoon is the time of day when plant photosynthesis peaks, and DO is at the highest level during any 24-hour period. Supplemental afternoon monitoring could be beneficial to help assess the root cause of non-attainment sites.

Table 5-6-2: A summary of minimum, maximum, and mean dissolved oxygen concentration (mg/l) values for Mousam and Kennebunk Rivers Alliance monitoring sites on the Mousam River.

Main Stem Sites (Ordered from upstream to downstream)							
Site	**Class**	**# Sample Points**	**Mean**	**Minimum**	**Maximum**	**Criterion**	**# Not Meeting Criterion**
MOUR-290	B	4	8.0	7.6	8.1	7	0
MOUR-280	B	4	7.8	7.4	8.3	7	0
MOUR-250	C	4	8.4	7.9	8.7	5	0
MOUR-232	C	4	8.3	7.9	8.8	5	0
MOUR-204	C	6	7.4	6.8	8.2	5	0
MOUR-163	C	6	7.2	6.4	8.4	5	0
MOUR-144	B	6	8.0	7.3	9.0	7	0
MOUR-80	B	8	7.6	6.6	8.5	7	1
MOUR-39	B	8	7.7	7.2	8.9	7	0
MOUR-35	B	8	8.4	7.9	9.4	7	0
MOUR-04	SB	8	8.7	7.0	10.5	n/a	n/a
Tributary Sites							
MOURMB-33	B	6	7.2	5.6	9.2	7	4
LR-18	B	6	4.6	3.5	5.5	7	6
BC-02	SB	2	8.8	8.5	9.2	n/a	n/a

Table 5-6-3: A summary of minimum, maximum, and mean dissolved oxygen saturation (%) values for Mousam and Kennebunk Rivers Alliance monitoring sites on the Mousam River.

Main Stem Sites (Ordered from upstream to downstream)							
Site	**Class**	**# Sample Points**	**Mean**	**Minimum**	**Maximum**	**Criterion**	**# Not Meeting Criterion**
MOUR-290	B	4	92.8	88.9	96.0	75	0
MOUR-280	B	4	89.0	86.1	94.1	75	0
MOUR-250	C	4	93.8	91.2	96.1	60	0
MOUR-232	C	4	95.4	93.7	97.6	60	0
MOUR-204	C	6	85.0	77.5	89.5	60	0
MOUR-163	C	6	79.6	74.0	84.5	60	0
MOUR-144	B	6	90.6	78.5	95.4	75	0
MOUR-80	B	8	87.7	72.4	93.6	75	1
MOUR-39	B	8	86.8	77.8	94.5	75	0
MOUR-35	B	8	95.6	85.6	100.6	75	0
MOUR-04	SB	8	91.4	78.1	101.0	85	1
Tributary Sites							
MOURMB-33	B	6	73.1	55.8	85.9	75	4
LR-18	B	6	51.5	41.8	58.6	75	6
BC-02	SB	2	87.0	85.0	89.0	85	0

Figure 5-6-2: Graph of dissolved oxygen concentrations on the main stem by river mile.

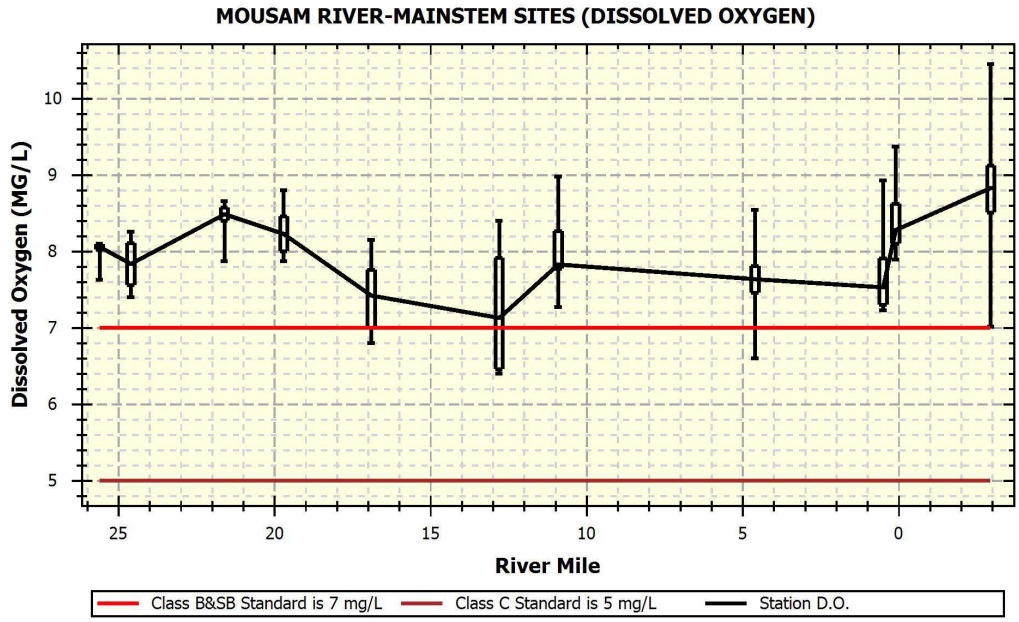


Figure 5-6-3: Graph of dissolved oxygen concentrations on the upper main stem.

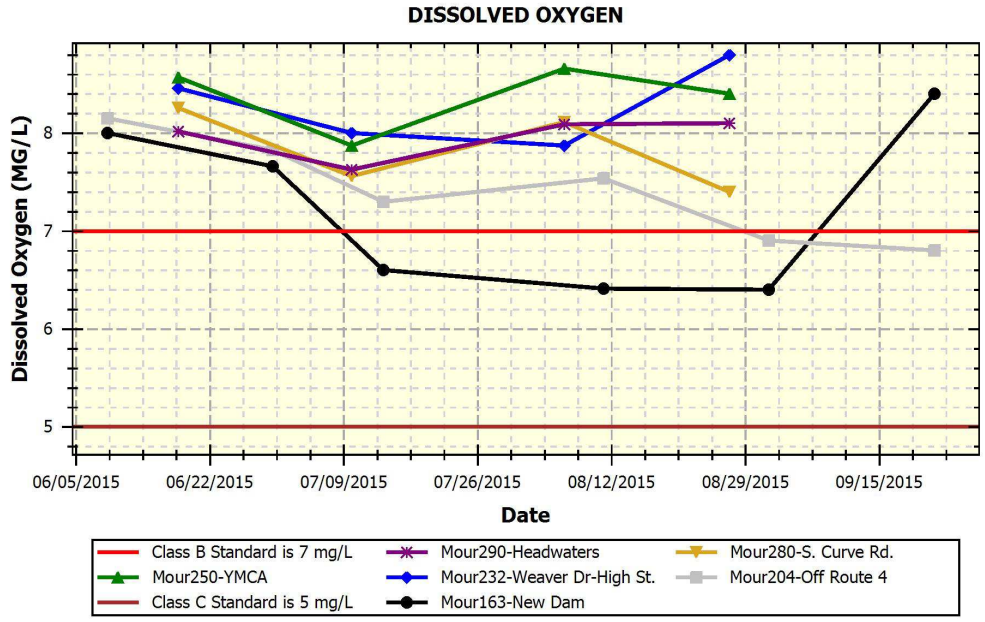


Figure 5-6-4: Graph of dissolved oxygen concentrations on the middle main stem and tributaries.

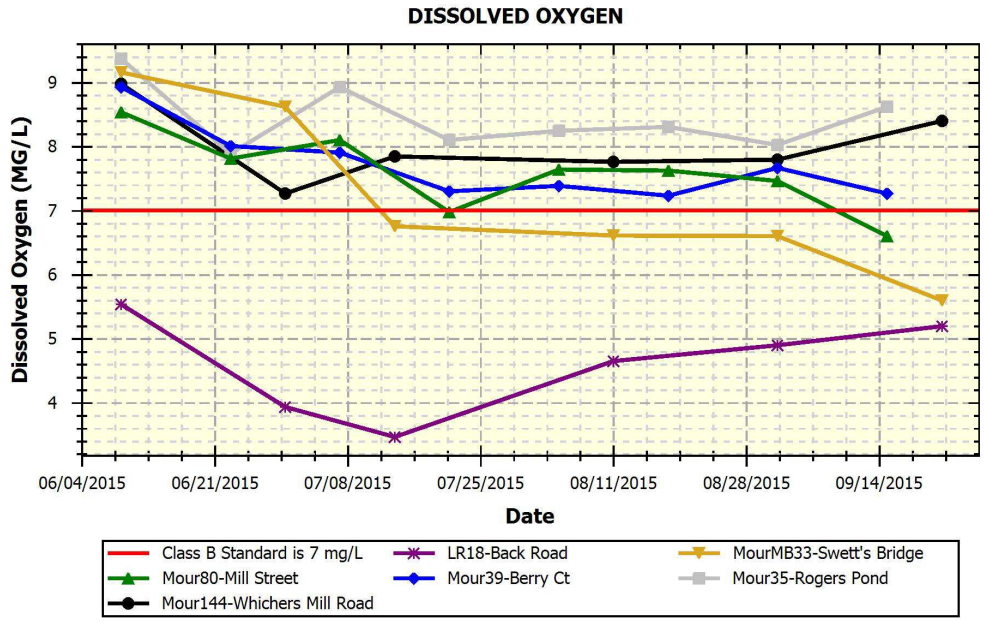


Figure 5-6-5: Graph of dissolved oxygen concentrations on the tidal sites.

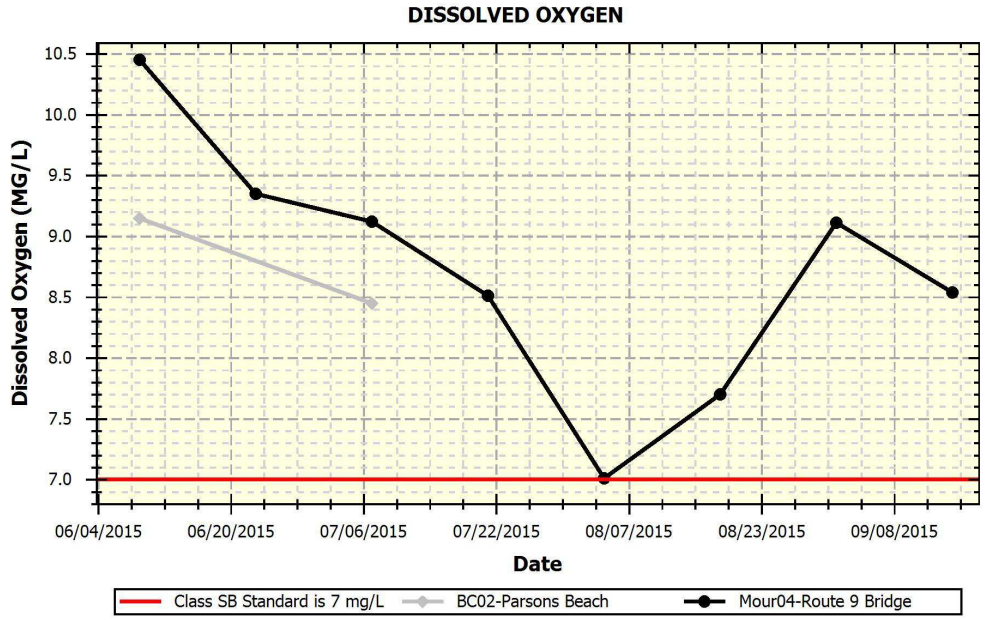


Figure 5-6-6: Graph of dissolved oxygen saturation on the main stem by river mile.

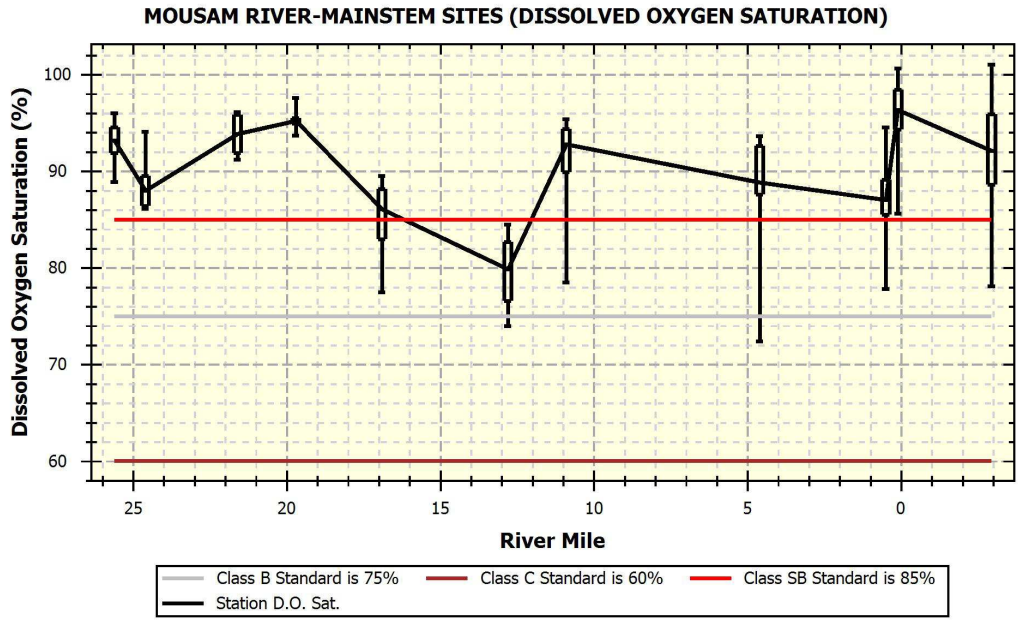


Figure 5-6-7: Graph of dissolved oxygen saturation on the upper main stem.

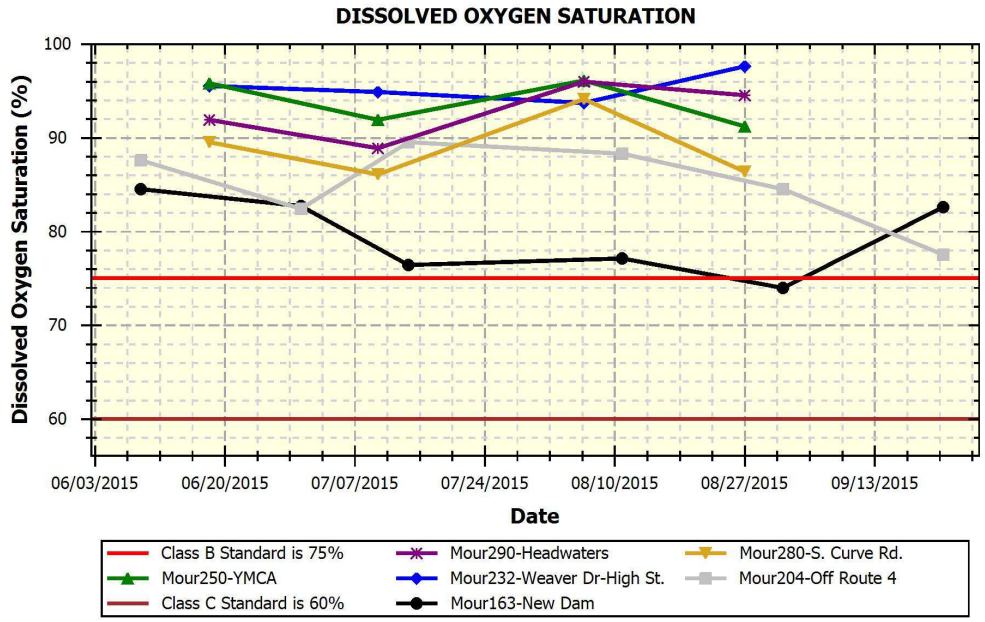


Figure 5-6-8: Graph of dissolved oxygen saturation on the middle main stem and tributaries.

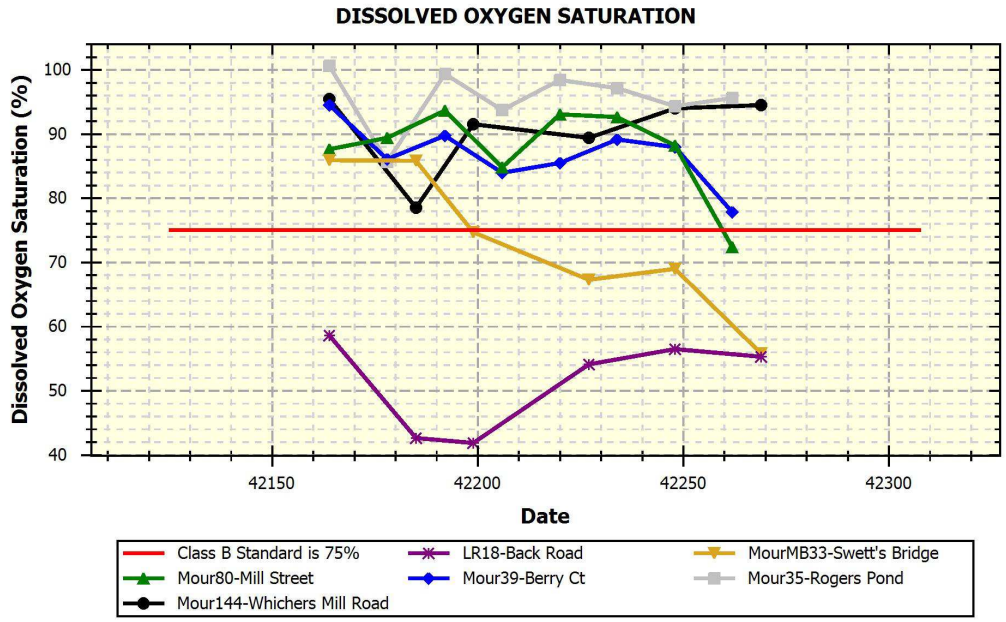
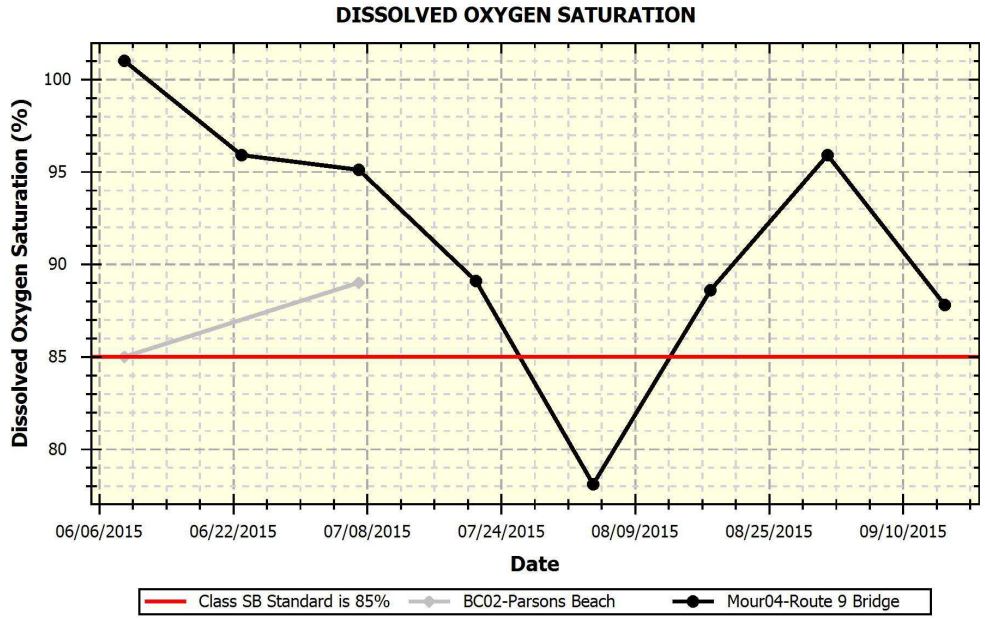


Figure 5-6-9: Graph of dissolved oxygen saturation on the tidal sites.



Water Temperature

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

2015 Results:

Mean temperature on the mainstem sites ranged from 20.7 ˚-23.6 ˚C and maximum temperature ranged from 21.9 ˚-26.1 ˚C. Temperature remained above 20.0 ˚C for the July-August period at all the mainstem sites. The fairly high temperatures may reflect that there are a number of impoundments. The tributary site LR-18 was similar to the main stem, while site MOURMB-33 was cooler with mean temperature of 16.7 ˚C and temperature did not get above 20.0 ˚C. There are only 2 sample points early in the season for tidal site BC-02. Tidal site MOUR-04 had a mean temperature of 18.7 ˚C and temperature rose above 20.0 ˚C in August. Overall, temperatures are high for most of the sites.

Table 5-6-4: A summary of minimum, maximum, and mean water temperature (°C) values for Mousam and Kennebunk Rivers Alliance monitoring sites on the Mousam River.

Main Stem Sites (Ordered from upstream to downstream)							
Site	**Class**	**# Sample Points**	**Mean**	**Minimum**	**Maximum**	**Criterion**	**# Exceeding Criterion**
MOUR-290	B	4	22.2	20.5	23.5	n/a	n/a
MOUR-280	B	4	21.0	19.2	21.9	n/a	n/a
MOUR-250	C	4	22.7	19.8	24.1	n/a	n/a
MOUR-232	C	4	23.6	21.1	25.2	n/a	n/a
MOUR-204	C	6	22.1	18.6	25.8	n/a	n/a
MOUR-163	C	6	20.7	18.1	23.4	n/a	n/a
MOUR-144	B	6	21.2	17.9	23.4	n/a	n/a
MOUR-80	B	8	22.3	18.1	26.1	n/a	n/a
MOUR-39	B	8	21.3	17.3	24.3	n/a	n/a
MOUR-35	B	8	21.2	17.6	24.2	n/a	n/a
MOUR-04	SB	8	18.7	14.0	22.1	n/a	n/a

Tributary Sites							
MOURMB-33	B	6	16.7	14.5	19.9	n/a	n/a
LR-18	B	6	21.1	18.3	24.4	n/a	n/a
BC-02	SB	2	15.4	13.6	17.2	n/a	n/a

Figure 5-6-10: Graph of temperature on the main stem by river mile.

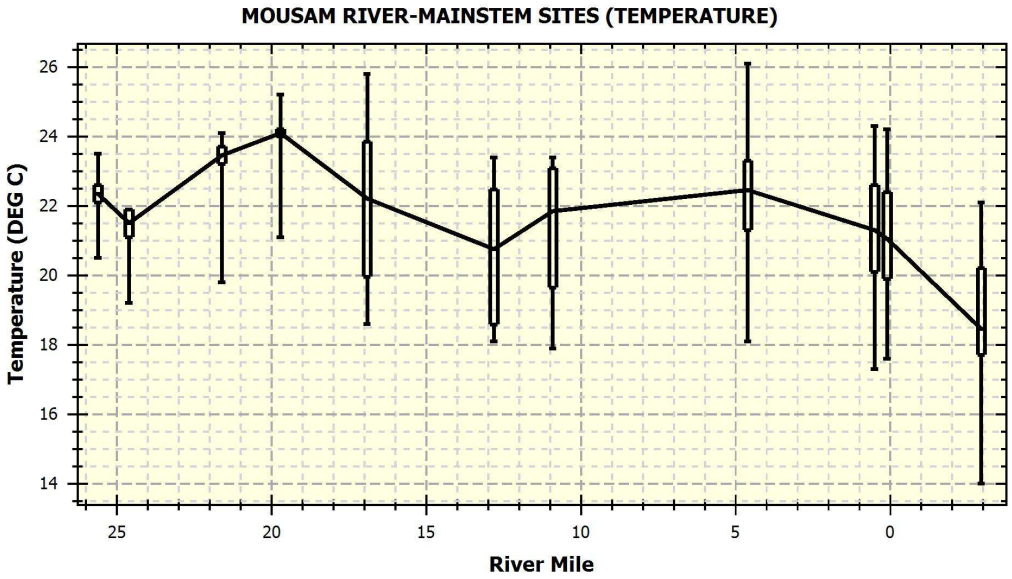


Figure 5-6-11: Graph of temperature on the upper main stem.

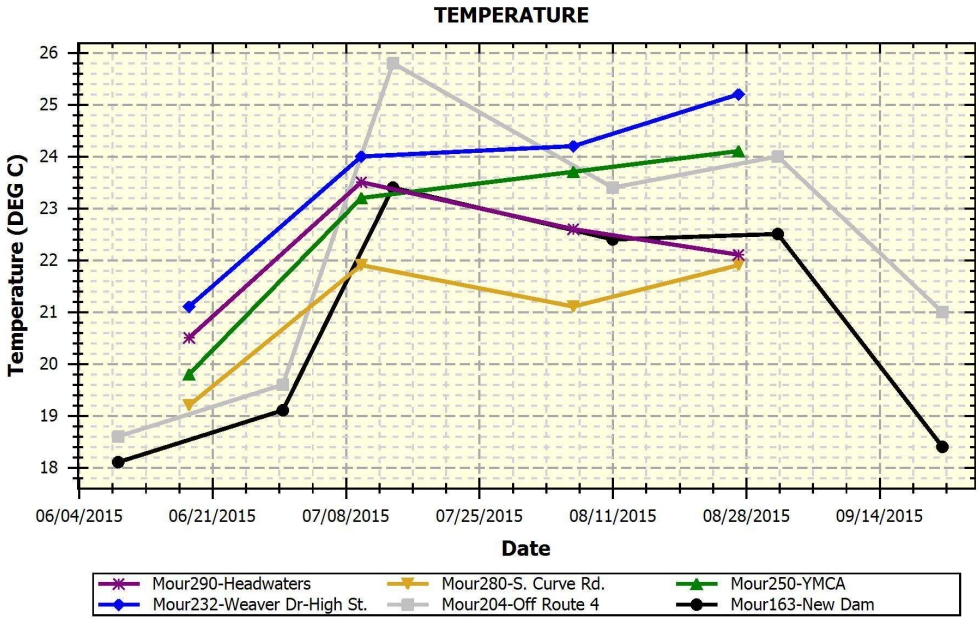


Figure 5-6-12: Graph of temperature on the middle main stem and tributaries.

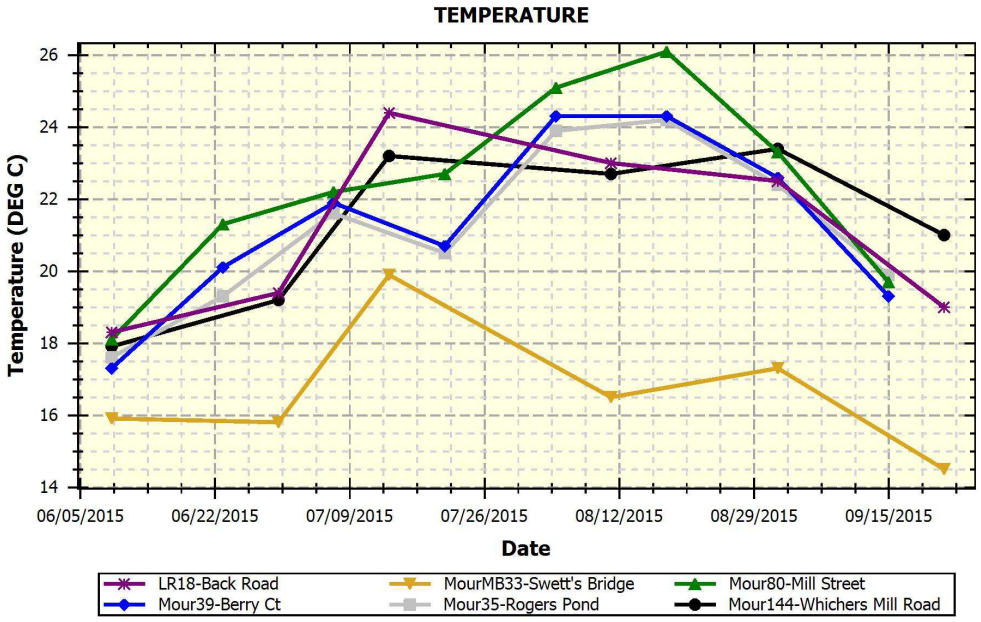
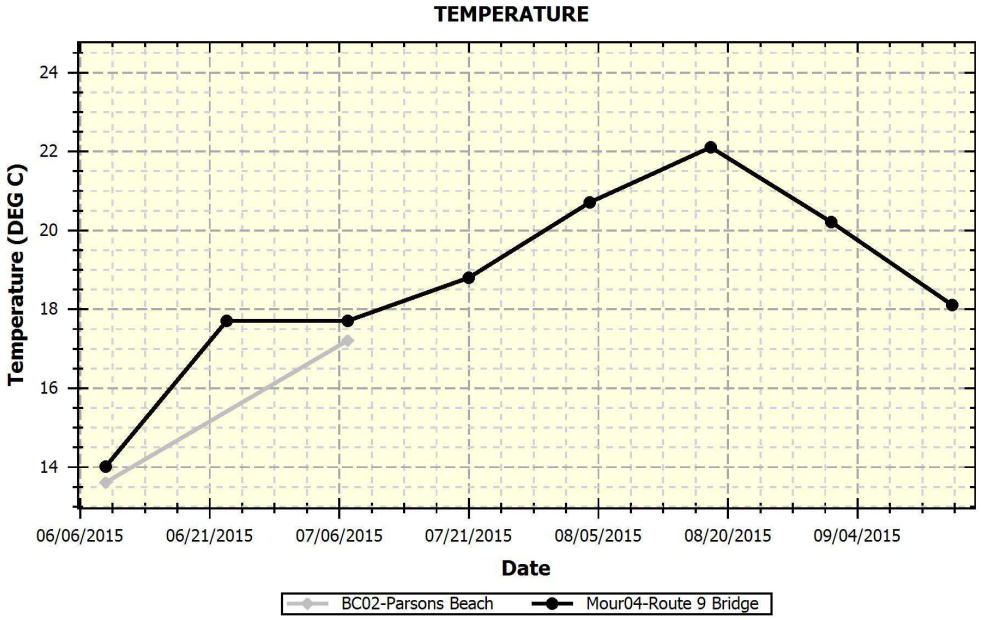


Figure 5-6-13: Graph of temperature on the tidal sites.



Specific Conductance

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

2015 Results:

Specific conductance at all the sites ranged from 80-260 µS/cm. The values for the upper part of the river (MOUR-290 to MOUR-232) were low while sites MOUR-204 to MOUR-163 were slightly higher. The middle mainstem sites were all similar and overall slightly higher than the upper mainstem sites. The tributary site MOURMB-33 was overall slightly high, while tributary site LR-18 was fairly low. Overall, specific conductivity is slightly high for all sites except the upper part of the mainstem and tributary LR-18. Specific conductivity is overall good.

Table 5-6-5: A summary of minimum, maximum, and mean specific conductivity (ms/cm) values for Mousam and Kennebunk Rivers Alliance monitoring sites on the Mousam River.

Main Stem Sites (Ordered from upstream to downstream)							
Site	**Class**	**# Sample Points**	**Mean**	**Minimum**	**Maximum**	**Criterion**	**# Exceeding Criterion**
MOUR-290	B	4	83	80	90	n/a	n/a
MOUR-280	B	4	90	80	100	n/a	n/a
MOUR-250	C	4	105	100	110	n/a	n/a
MOUR-232	C	4	118	110	120	n/a	n/a
MOUR-204	C	6	207	170	240	n/a	n/a
MOUR-163	C	6	162	130	210	n/a	n/a
MOUR-144	B	6	173	140	200	n/a	n/a
MOUR-80	B	8	159	140	190	n/a	n/a
MOUR-39	B	8	163	150	170	n/a	n/a
MOUR-35	B	8	169	150	180	n/a	n/a
MOUR-04	SB	Tidal	-	-	-	-	-
Tributary Sites							
MOURMB-33	B	6	190	80	260	n/a	n/a
LR-18	B	6	125	110	140	n/a	n/a
BC-02	SB	Tidal	-	-	-	-	-

Figure 5-6-14: Graph of specific conductance on the main stem by river mile.

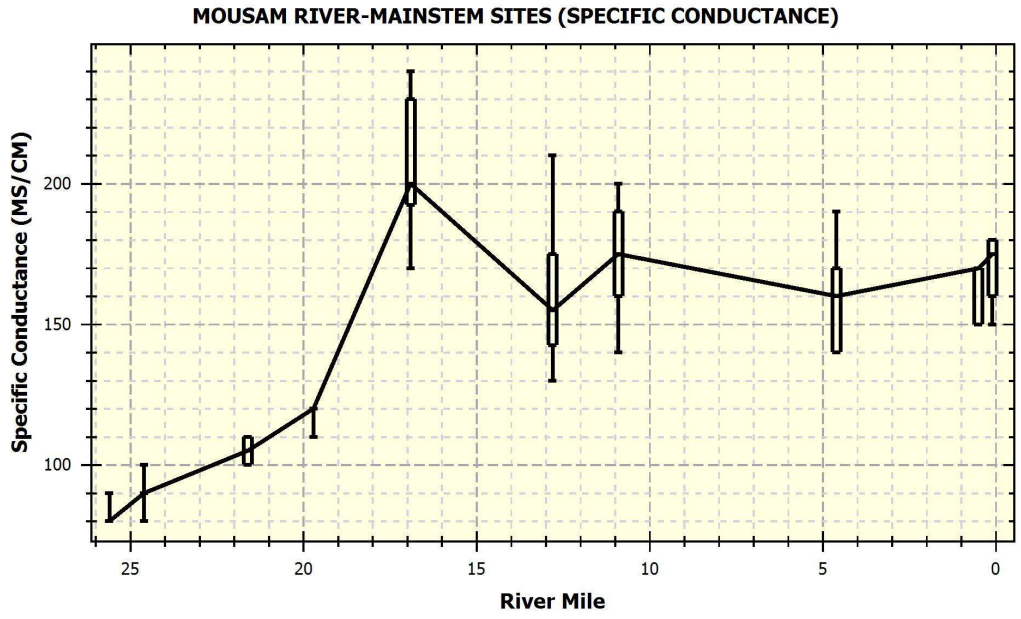


Figure 5-6-15: Graph of specific conductance on the upper main stem.

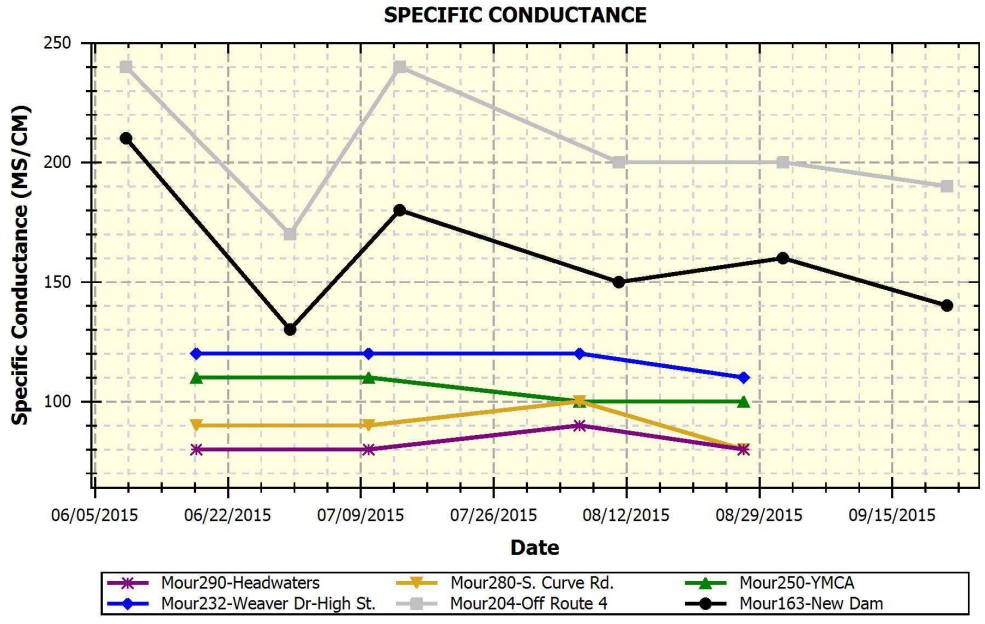
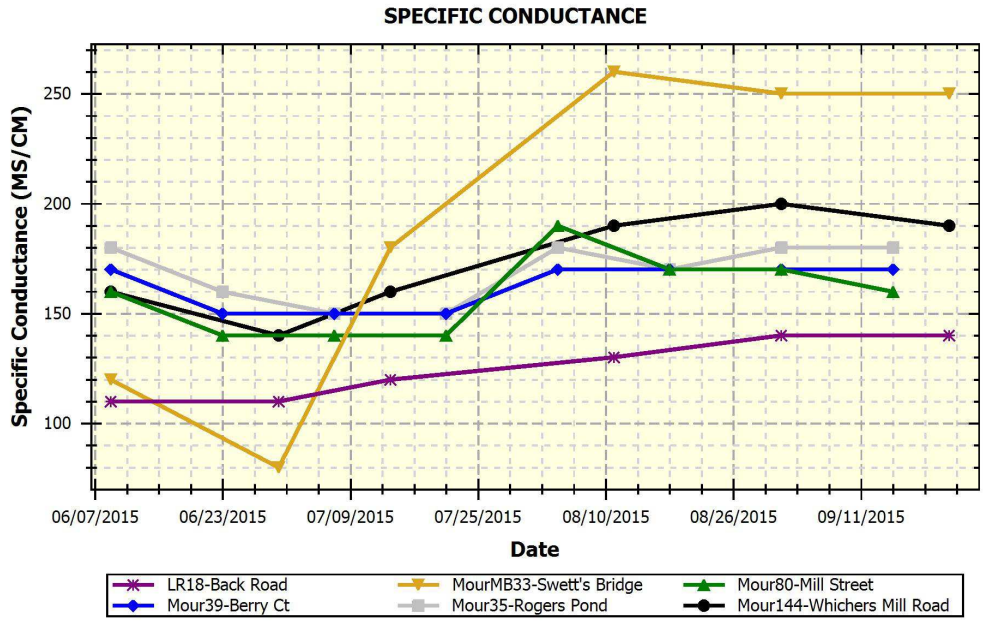


Figure 5-6-16: Graph of specific conductance on the middle main stem and tributaries.



Bacteria

Enterococcus bacteria are used as the indicator organism for marine waters and *E. coli* bacteria are used for freshwaters. While these types of bacteria are not pathogens, their presence in the water may indicate the presence of other organisms including bacteria and viruses that can cause gastrointestinal illnesses. Monitoring should include at least 6 samples and include a mix of dry and storm event sampling.

Class B criteria for bacteria are as follows: "Between May 15th and September 30th, the number of Escherichia Coli of human and domestic origin shall not exceed a geometric mean of 64/100 ml (milliliters) or an instantaneous level of 236/100 ml." Class C criteria are: "Between May 15th and September 30th, the number of Escherichia coli of human and domestic origin shall not exceed a geometric mean of 126/100 ml (milliliters) or an instantaneous level of 236/100 ml." "Class SB criteria are as follows: "Between May 15th and September 30th, the numbers of enterococcus bacteria of human and domestic animal origin in these waters may not exceed a geometric mean of 8 per 100 milliliters or an instantaneous level of 54 per 100 milliliters." Geometric means are calculated instead of averages because it is more appropriate to use this calculation for something like bacteria where there may be one or more very high or low values that can skew the mean.

2015 Results:

On the freshwater sites, bacteria was overall low. None of the freshwater sites exceeded the instanteous criterion of 126 MPN/100ml. Sites MOUR-39 and MOUR-35 exceeded the geomean criteria slightly. Tidal site MOUR-04 exceeded the instanteous criterion of 54 MPN/100ml on 4 of 8 sampling dates and site MOUR-BC02 exceeded this criterion on 2 of 3 sampling dates. Site MOUR-04 also exceeded the geomean criterion of 8 MPN/100ml. No samples were collected following any significant rain events, so lack of any really high results may be due to this fact. Overall, bacteria was low at the freshwater sites and fair at the tidal sites.

Table 5-6-6: A summary of minimum, maximum, and geometric means for bacteria (MPN/100 mL) values for Mousam and Kennebunk Rivers Alliance monitoring sites on the Mousam River.

Main Stem Sites (Ordered from upstream to downstream)								
Site	**Class**	**# Sample Points**	**Type**	**Min**	**Max**	**Geometric Mean**	**Criterion Inst/Geo**	**# Exceeding Criterion**
MOUR290	B	-	*E. Coli*	-	-	-	236/64	-
MOUR280	B	-	*E. Coli*	-	-	-	236/64	-
MOUR250	C	-	*E. Coli*	-	-	-	236/126	-
MOUR232	C	-	*E. Coli*	-	-	-	236/126	-
MOUR204	C	7	*E. Coli*	4	137	12	236/126	0
MOUR163	C	7	*E. Coli*	34	184	58	236/126	0
MOUR144	B	7	*E. Coli*	2	45	7	236/64	0
MOUR80	B	8	*E. Coli*	6	44	17	236/64	0
MOUR39	B	8	*E. Coli*	36	196	66	236/64	0
MOUR35	B	8	*E. Coli*	44	206	83	236/64	0
MOUR-04	SB	8	*Entero*	20	250	76	54/8	4
Tributary Sites								
MOURMB-33	B	7	*E. Coli*	28	225	74	236/64	0
MOUR-LR18	B	7	*E. Coli*	15	131	34	236/64	0
MOUR-BC02	SB	3	*Entero*	10	148	*	54/8	2

*Not enough sample points to calculate geomean

Figure 5-6-17: Graph of bacteria on the main stem by river mile.

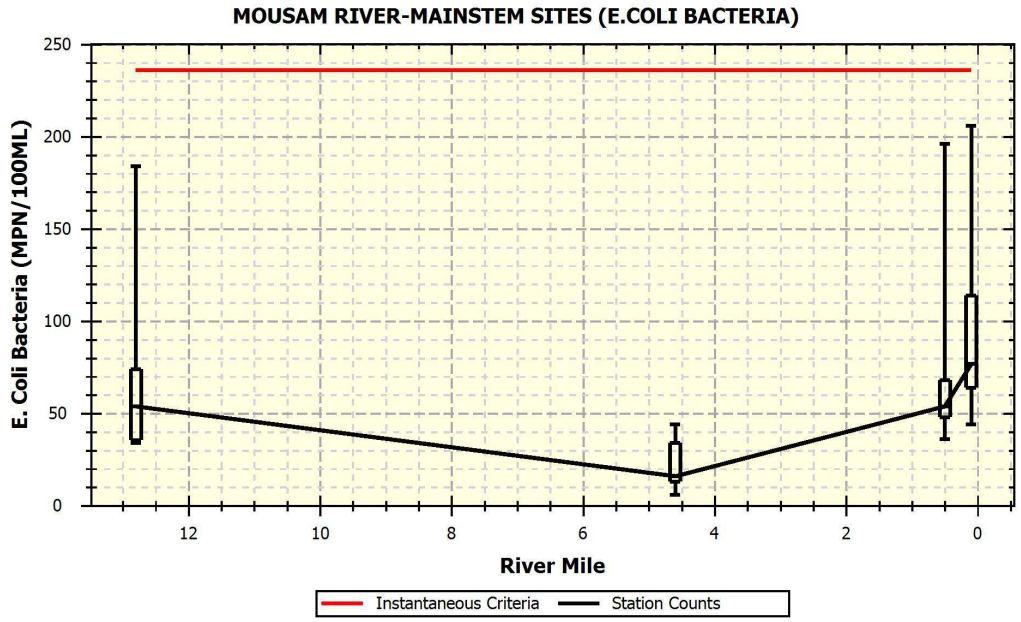


Figure 5-6-18: Graph of *E.coli* on the upper main stem.

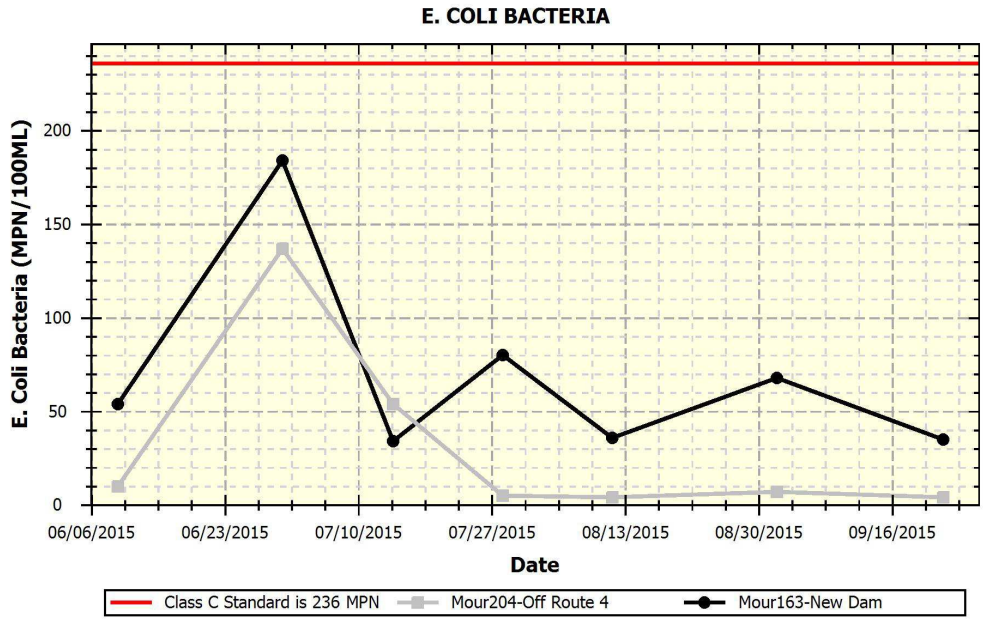


Figure 5-6-19: Graph of *E.Coli* on the middle main stem and tributaries.

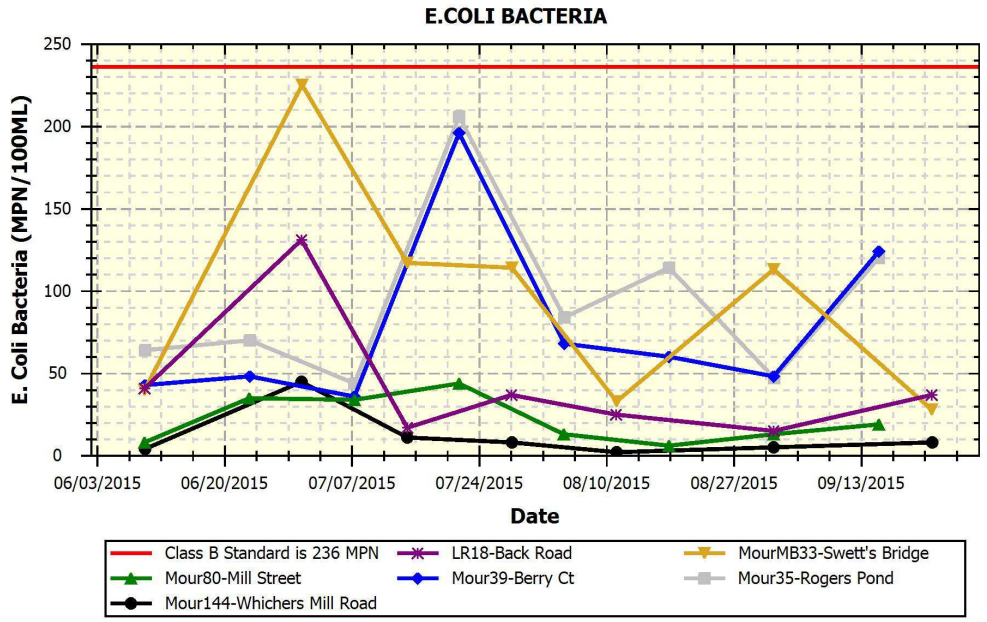
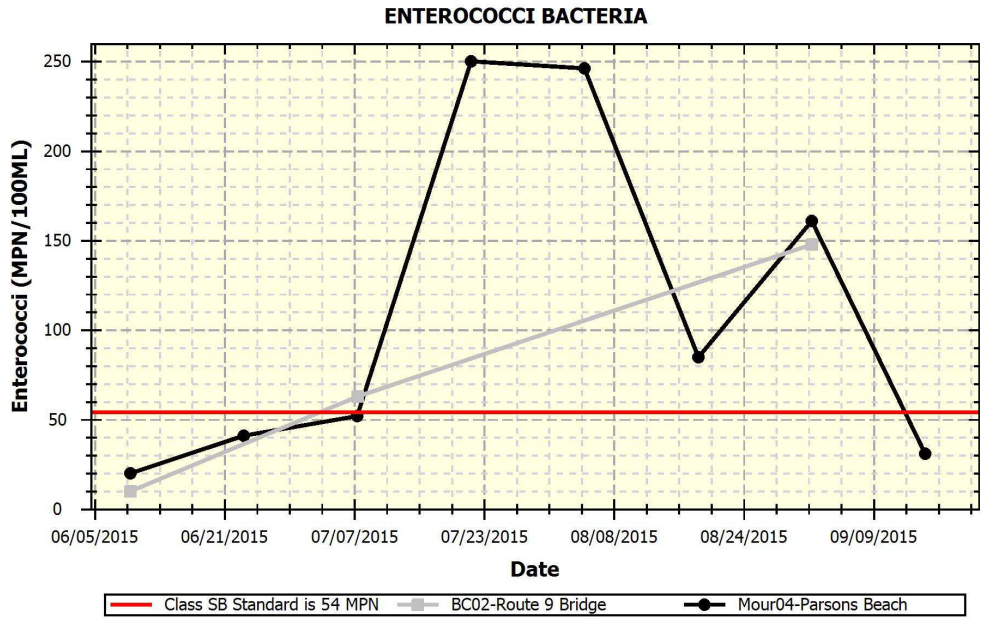


Figure 5-6-20: Graph of Enterococcus on the tidal sites.



Discussion and Recommendations

There are numerous sources of pollution and other stresses to the Mousam River and tributary sites monitored by the Mousam and Kennebunk Rivers Alliance that could potentially have an impact on water quality. Some of those sources of pollution and stress may include:

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

The following are recommendations for future monitoring:

- **Overal dissolved oxygen was good at most of the sites this year. Perhaps this is due to better flows at least early in the season. Site LR-01 consistently continues to be low. It should be monitored throughout the season and further investigation made as to whether this is natural. Factors contributing to low dissolved oxygen may include low flow and the site being below extensive wetlands. Occasional mid to late afternoon sampling would help to discriminate whether this is potentially naturally low dissolved oxygen.**
- **Monitoring should continue to focus on early morning (before 8:00 am) sampling to best document potential dissolved oxygen problems. Over a 24 hour period, the lowest readings occur in the early morning and highest readings in mid to late afternoon. This occurs because oxygen is used up during the night due to plant respiration and during the day, plant life is photosynthesizing. This is particularly important during the summer months of July through early September when temperatures are warmest and dissolved oxygen tends to be at the lowest levels. Ideally, all DO monitoring should be conducted before 8:00 am. Later day monitoring is not likely to represent critical conditions, which makes it difficult to assess the overall river condition.**
- **Bacteria sampling should include sampling during both dry and wet weather conditions. Monitoring should try to include 1-2 storm event samples. This is important to calculate an accurate geometric mean value.**
- **Continue monitoring at all stations to continue building this long term trend database.**

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

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
Mousam River, Littlefield River, Back Creek-Kennebunk-Mousam Alliance: Approved Sites																
BC-02	BACK CREEK - SMUBC02 - VRMP	6/9/2015	9:17 AM	NA			13.6	85.0	9.2							10
BC-02	BACK CREEK - SMUBC02 - VRMP	6/9/2015	9:17 AM	L												30
BC-02	BACK CREEK - SMUBC02 - VRMP	7/7/2015	8:48 AM	NA												63
BC-02	BACK CREEK - SMUBC02 - VRMP	7/7/2015	8:48 AM	L												41
BC-02	BACK CREEK - SMUBC02 - VRMP	7/7/2015	8:49 AM	NA			17.2	89.0	8.5							
BC-02	BACK CREEK - SMUBC02 - VRMP	9/1/2015	8:45 AM	NA												148
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	6/9/2015	7:42 AM	NA			18.3	58.6	5.5	110						
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	6/9/2015	7:45 AM	NA											41	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	6/9/2015	7:45 AM	L											44	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	6/30/2015	7:25 AM	NA			19.4	42.6	3.9	110					131	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	6/30/2015	7:25 AM	L											135	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	7/14/2015	9:03 AM	NA			24.4	41.8	3.5	120					17	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	7/28/2015	7:51 AM	NA											37	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	7/28/2015	7:51 AM	L											46	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	8/11/2015	7:15 AM	NA			23.0	54.1	4.7	130						
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	8/11/2015	7:22 AM	NA											25	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	8/11/2015	7:22 AM	L											24	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	9/1/2015	6:35 AM	NA			22.5	56.5	4.9	140					15	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	9/1/2015	6:35 AM	L											20	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	9/22/2015	10:25 AM	NA			19.0	55.3	5.2	140						
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	9/22/2015	10:30 AM	NA											37	
LR-18	LITTLEFIELD RIVER - SMUMBLR18 - VRMP	9/22/2015	10:30 AM	L											33	
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	6/9/2015	7:57 AM	NA			15.9	85.9	9.2	120						
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	6/9/2015	7:59 AM	NA											40	
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	6/30/2015	7:45 AM	NA			15.8	85.8	8.6	80					225	
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	7/14/2015	9:18 AM	NA			19.9	74.7	6.8	180					117	
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	7/14/2015	9:18 AM	D			19.9	73.3	6.7	190						
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	7/28/2015	8:07 AM	NA											114	
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	8/11/2015	7:31 AM	NA											33	
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	8/11/2015	7:35 AM	NA			16.5	67.3	6.6	260						
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	8/11/2015	7:35 AM	D			16.5	67.1	6.6	260						
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	9/1/2015	6:50 AM	NA			17.3	69.0	6.6	250					113	
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	9/22/2015	10:40 AM	NA			14.5	55.8	5.6	250						
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	9/22/2015	10:40 AM	D			14.5	56.1	5.6	250						
MOUSMB-33	MIDDLE BRANCH MOUSAM RIVER - SMUMB33 - VRMP	9/22/2015	10:44 AM	NA											28	
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	6/9/2015	9:00 AM	NA			14.0	101.0	10.5							20
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	6/23/2015	9:05 AM	NA			17.7	95.9	9.4							41
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	6/23/2015	9:05 AM	L												63
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	7/7/2015	8:35 AM	NA												52
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	7/7/2015	8:40 AM	NA			17.7	95.1	9.1							

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	7/21/2015	7:23 AM	NA			18.8	89.1	8.5							
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	7/21/2015	8:23 AM	NA												250
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	8/4/2015	8:42 AM	NA												246
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	8/4/2015	8:44 AM	NA			20.7	78.1	7.0							
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	8/18/2015	8:44 AM	NA			22.1	88.6	7.7							85
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	9/1/2015	8:30 AM	NA			20.2	95.9	9.1							161
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	9/1/2015	8:30 AM	L												110
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	9/15/2015	9:00 AM	NA			18.1	87.8	8.5							31
MOUR-04	MOUSAM RIVER - SMU04 - VRMP	9/15/2015	9:00 AM	L												20
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	6/9/2015	8:26 AM	NA											4	
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	6/9/2015	8:43 AM	NA			17.9	95.4	9.0	160						
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	6/30/2015	6:45 AM	NA											45	
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	6/30/2015	8:10 AM	NA			19.2	78.5	7.3	140						
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	7/14/2015	10:10 AM	NA			23.2	91.5	7.9	160					11	
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	7/28/2015	9:04 AM	NA											8	
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	8/11/2015	8:20 AM	NA			22.7	89.4	7.8	190						
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	8/11/2015	8:24 AM	NA											2	
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	9/1/2015	7:40 AM	NA			23.4	94.0	7.8	200					5	
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	9/22/2015	11:25 AM	NA			21.0	94.5	8.4	190						
MOUR-144	MOUSAM RIVER - SMU144 - VRMP	9/22/2015	11:30 AM	NA											8	
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	6/9/2015	8:13 AM	NA			18.1	84.5	8.0	210						
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	6/9/2015	8:17 AM	NA											54	
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	6/30/2015	7:55 AM	NA			19.1	82.7	7.7	130						
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	6/30/2015	7:55 AM	D			19.1	82.8	7.7	130						
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	6/30/2015	7:58 AM	NA											184	
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	7/14/2015	9:36 AM	NA			23.4	76.4	6.6	180					34	
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	7/28/2015	8:35 AM	NA											80	
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	8/11/2015	7:46 AM	NA			22.4	77.1	6.4	150						
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	8/11/2015	7:50 AM	NA											36	
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	9/1/2015	7:10 AM	NA			22.5	74.0	6.4	160					68	
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	9/22/2015	10:47 AM	NA			18.4	82.6	8.4	140						
MOUR-163	MOUSAM RIVER - SMU163 - VRMP	9/22/2015	10:57 AM	NA											35	
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	6/9/2015	8:26 AM	NA			18.6	87.6	8.2	240						
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	6/9/2015	8:45 AM	NA											10	
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	6/30/2015	6:45 AM	NA			19.6	82.4	7.8	170						
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	6/30/2015	8:10 AM	NA											137	
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	7/14/2015	9:51 AM	NA			25.8	89.5	7.3	240					54	
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	7/28/2015	8:48 AM	NA											5	
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	8/11/2015	8:10 AM	NA											4	
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	8/11/2015	8:12 AM	NA			23.4	88.3	7.5	200						
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	9/1/2015	7:25 AM	NA			24.0	84.5	6.9	200					7	
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	9/1/2015	7:25 AM	D			24.0	84.0	6.9	200						
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	9/22/2015	11:10 AM	NA			21.0	77.5	6.8	190						
MOUR-204	MOUSAM RIVER - SMU204 - VRMP	9/22/2015	11:15 AM	NA											4	
MOUR-232	MOUSAM RIVER - SMU232-VRMP	6/18/2015	7:50 AM	NA			21.1	95.5	8.5	120						
MOUR-232	MOUSAM RIVER - SMU232-VRMP	7/10/2015	7:43 AM	NA			24.0	94.9	8.0	120						
MOUR-232	MOUSAM RIVER - SMU232-VRMP	8/6/2015	8:00 AM	NA			24.2	93.7	7.9	120						
MOUR-232	MOUSAM RIVER - SMU232-VRMP	8/27/2015	7:50 AM	NA			25.2	97.6	8.8	110						
MOUR-250	MOUSAM RIVER - SMU250 - VRMP	6/18/2015	7:30 AM	NA			19.8	95.8	8.6	110						

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
MOUR-250	MOUSAM RIVER - SMU250 - VRMP	7/10/2015	7:25 AM	NA			23.2	91.9	7.9	110						
MOUR-250	MOUSAM RIVER - SMU250 - VRMP	8/6/2015	7:40 AM	NA			23.7	96.1	8.7	100						
MOUR-250	MOUSAM RIVER - SMU250 - VRMP	8/27/2015	7:30 AM	NA			24.1	91.2	8.4	100						
MOUR-280	MOUSAM RIVER - SMU280 - VRMP	6/18/2015	7:15 AM	NA			19.2	89.5	8.3	90						
MOUR-280	MOUSAM RIVER - SMU280 - VRMP	7/10/2015	7:15 AM	NA			21.9	86.1	7.6	90						
MOUR-280	MOUSAM RIVER - SMU280 - VRMP	8/6/2015	7:20 AM	NA			21.1	94.1	8.1	100						
MOUR-280	MOUSAM RIVER - SMU280 - VRMP	8/6/2015	7:20 AM	D			21.5	93.0	8.0	100						
MOUR-280	MOUSAM RIVER - SMU280 - VRMP	8/27/2015	7:10 AM	NA			21.9	86.4	7.4	80						
MOUR-290	MOUSAM RIVER - SMU290 - VRMP	6/18/2015	7:00 AM	NA			20.5	91.9	8.0	80						
MOUR-290	MOUSAM RIVER - SMU290 - VRMP	7/10/2015	7:00 AM	NA			23.5	88.9	7.6	80						
MOUR-290	MOUSAM RIVER - SMU290 - VRMP	8/6/2015	7:05 AM	NA			22.6	96.0	8.1	90						
MOUR-290	MOUSAM RIVER - SMU290 - VRMP	8/27/2015	6:55 AM	NA			22.1	94.5	8.1	80						
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	6/9/2015	8:35 AM	NA			17.6	100.6	9.4	180					64	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	6/23/2015	8:35 AM	NA			19.3	85.6	7.9	160					70	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	7/7/2015	8:11 AM	NA											44	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	7/7/2015	8:15 AM	NA			21.6	99.3	8.9	150						
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	7/21/2015	8:01 AM	NA			20.5	93.7	8.1	150						
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	7/21/2015	8:03 AM	NA											206	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	8/4/2015	8:19 AM	NA			23.9	98.4	8.3	180					84	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	8/18/2015	8:26 AM	NA			24.2	97.1	8.3	170					114	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	9/1/2015	8:17 AM	NA			22.4	94.3	8.0	180					47	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	9/1/2015	8:17 AM	D											45	
MOUR-35	MOUSAM RIVER - SMU35 - VRMP	9/15/2015	8:38 AM	NA			19.9	95.6	8.6	180					120	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	6/9/2015	8:25 AM	NA			17.3	94.5	8.9	170					43	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	6/23/2015	8:15 AM	NA			20.1	86.1	8.0	150					48	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	7/7/2015	8:00 AM	NA											36	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	7/7/2015	8:03 AM	NA			21.9	89.7	7.9	150						
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	7/21/2015	7:45 AM	NA			20.7	83.9	7.3	150					196	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	8/4/2015	8:00 AM	NA			24.3	85.5	7.4	170						
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	8/4/2015	8:04 AM	NA											68	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	8/4/2015	8:04 AM	D											61	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	8/18/2015	8:08 AM	NA			24.3	89.1	7.2	170					60	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	9/1/2015	8:03 AM	NA			22.6	87.9	7.7	170					48	
MOUR-39	MOUSAM RIVER - SMU39 - VRMP	9/15/2015	8:20 AM	NA			19.3	77.8	7.3	170					124	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	6/9/2015	7:40 AM	NA			18.1	87.6	8.5	160					8	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	6/9/2015	7:40 AM	L											5	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	6/23/2015	7:35 AM	NA			21.3	89.4	7.8	140					35	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	7/7/2015	7:15 AM	NA											34	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	7/7/2015	7:15 AM	L											52	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	7/7/2015	7:15 AM	D											28	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	7/7/2015	7:20 AM	NA			22.2	93.6	8.1	140						
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	7/21/2015	7:04 AM	NA			22.7	84.8	7.0	140					44	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	7/21/2015	7:04 AM	L											79	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	8/4/2015	7:20 AM	NA			25.1	93.0	7.6	190					13	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	8/4/2015	7:20 AM	L											5	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	8/18/2015	7:35 AM	NA			26.1	92.6	7.6	170					6	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	9/1/2015	7:19 AM	NA											13	
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	9/1/2015	7:20 AM	NA			23.3	88.2	7.5	170						
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	9/15/2015	7:45 AM	NA			19.7	72.4	6.6	160						

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	* Sample Depth	Depth Unit	Water Temp (DEG C)	** D.O. Sat. (%)	** D.O. (MG/L)	** Spec. Cond. (US/CM)	Salinity (PPTH)	Turb-idity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/ 100ML)	Entero-cocci (MPN/ 100ML)
MOUR-80	MOUSAM RIVER - SMU80 - VRMP	9/15/2015	7:48 AM	NA											19	