

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

Kennebunk River

The Kennebunk River is 15 miles long and originates at Kennebunk Pond in Lyman. The East Outlet becomes Lords Brook which joins Carlise Brook to form the Kennebunk River. The river continues flowing through Arundel and Kennebunk before discharging to the Gulf of Maine in Kennebunkport at Goochs Beach. Other major tributaries include Duck Brook and Ward Brook.

The statutory class of the Kennebunk River and tributaries is Class B. Below head of tide, the river is Class SB. The primary impacts to the river are from development, recreational use and agriculture. Kennebunk River is listed by DEP as impaired for bacteria.

Monitoring History

- The Maine DEP Biological Monitoring Program has been monitoring the river since 1995. Monitoring data has been collected on the mainstem as well as Carlise Brook, Lords Brook and Ward Brook. This data is available on DEP's website.
- The Mousam and Kennebunk River 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.
- In 2012, MKA partnered with the DEP TMDL Streams staff to monitor bacteria in Duck Brook. The report is available from DEP.

Methods and Sampling Sites

Volunteers monitor the Kennebunk River at five sites on the mainstem and on site on Ward Brook. Two sites are below head of tide and four are freshwater sites. All of the sites are VRMP approved sites.

Monitoring is conducted biweekly from June to 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* are collected at the freshwater sites and Enterococcus bacteria at the tidal sites.

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

VRMP Site ID	Organization Site Code	Sample Location	Class
Kennebunk River-SKE11-VRMP	KB-01	Route 9 Bridge	SB
Kennebunk River-SKE35-VRMP	KB-02	Durrell's Bridge	SB
Kennebunk River-SKE66-VRMP	KB-03	Route 1 Bridge	B
Kennebunk River-SKE103-VRMP	KB-04	Downing Road	B
Kennebunk River-SKE148-VRMP	KB-05	Perkins Lane	B
Ward Brook-SKEWD04-VRMP	KB-03A	Emmons Road	B

Kennebunk River Sampling Sites Mousam and Kennebunk Rivers Alliance

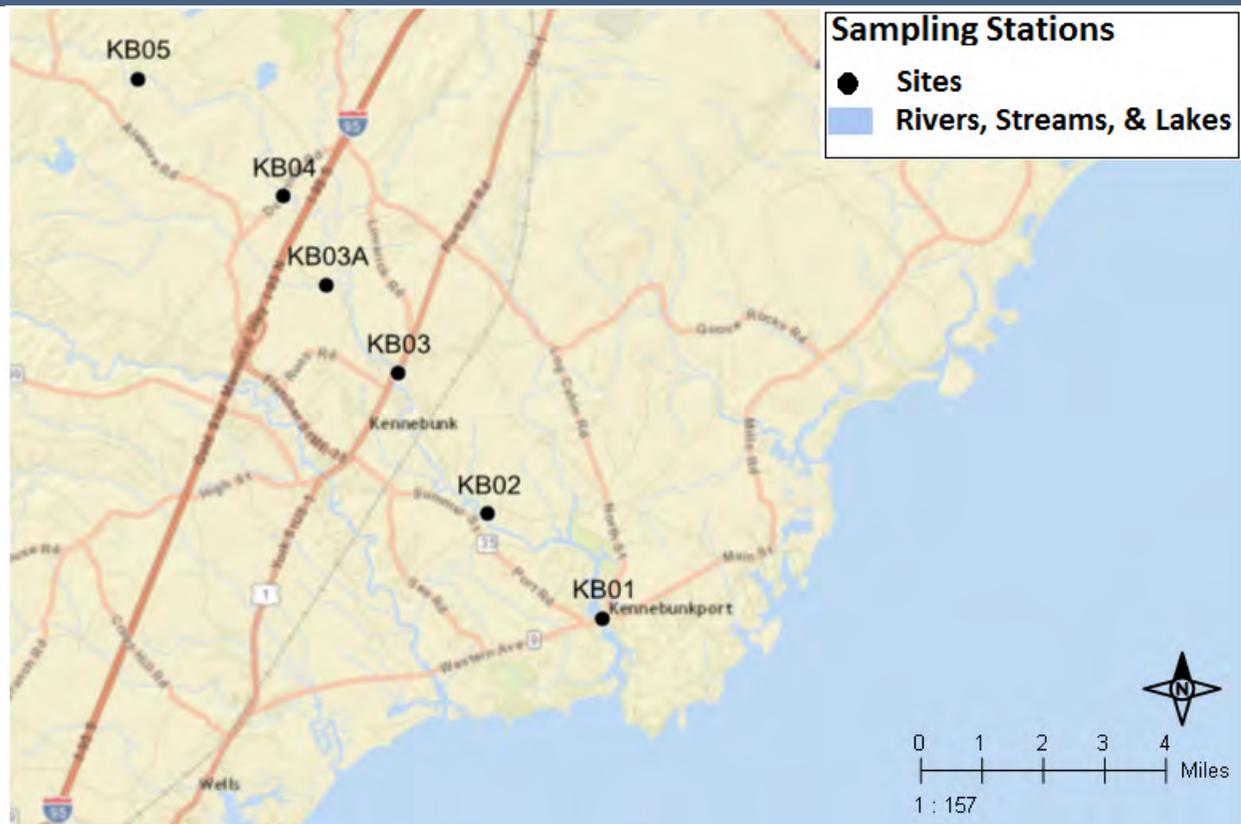


Figure 5-5-1: Map of Mousam and Kennebunk Rivers Alliance sampling sites on the Kennebunk River.

Results

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

Dissolved Oxygen

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

Class B criteria for dissolved oxygen are a minimum of 7 mg/l (milligrams/liter) or 75% saturation. To meet water quality criteria, both concentration and saturation criteria must be met. Class SB criteria for dissolved oxygen is 85% saturation.

2014 Results:

Dissolved oxygen (DO) was measured 7-8 times at each sampling site. At the freshwater sites, Class B criterion of 7 mg/l concentration and percent saturation of 75% saturation were met on all sampling dates. At the tidal sites, the Class SB criterion of 85% saturation was met for all sampling dates at site KB-01, and for 6 of 8 sampling dates for site KB-02. Overall, dissolved oxygen was excellent for the freshwater sites and good to excellent for the tidal sites. The monitors did obtain some early morning measurements (before 8:00 am). Since one monitoring team does all the sites, it is difficult to get to all the sites early.

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

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
KB-01	SB	8	10.1	9.2	11.6	n/a	n/a
KB-02	SB	8	8.2	7.2	9.0	n/a	n/a
KB-03	B	7	9.4	8.4	10.4	7	0
KB-03A	B	8	8.5	7.7	9.6	7	0
KB-04	B	8	8.4	7.4	9.5	7	0
KB-05	B	8	9.2	8.4	10.2	7	0

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

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
KB-01	SB	8	103.4	91.1	117.6	85	0
KB-02	SB	8	89.5	81.9	97.8	85	2
KB-03	B	7	99.2	93.5	111.2	75	0
KB-03A	B	8	89.0	78.0	99.8	75	0
KB-04	B	8	87.6	80.9	95.5	75	0
KB-05	B	8	96.1	89.5	104.1	75	0

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

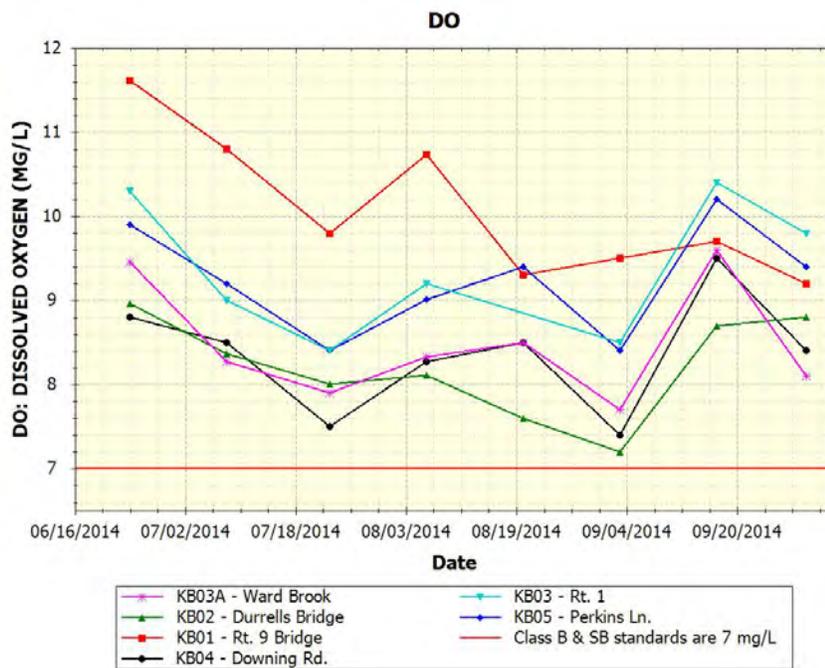
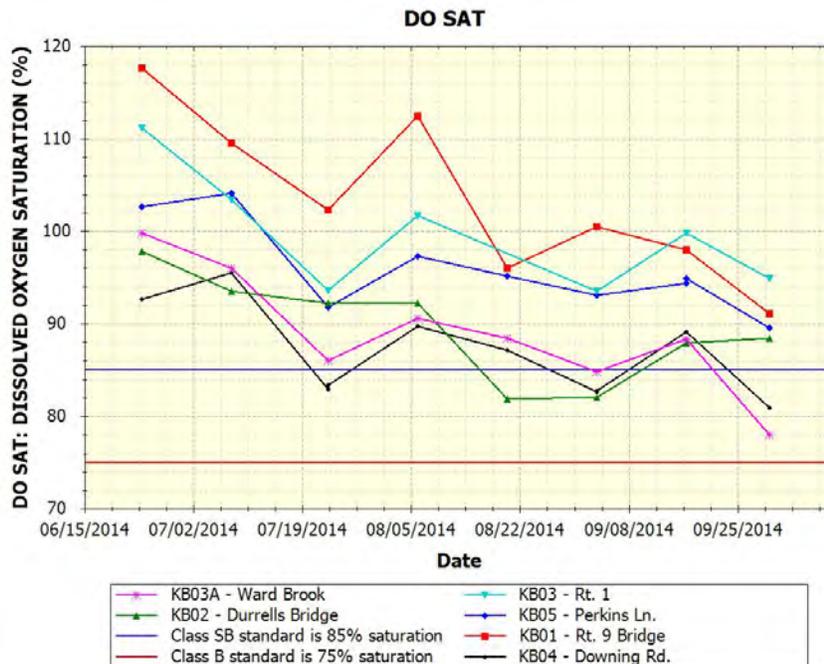


Figure 5-5-3: Graph of dissolved oxygen saturation

Water Temperature

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

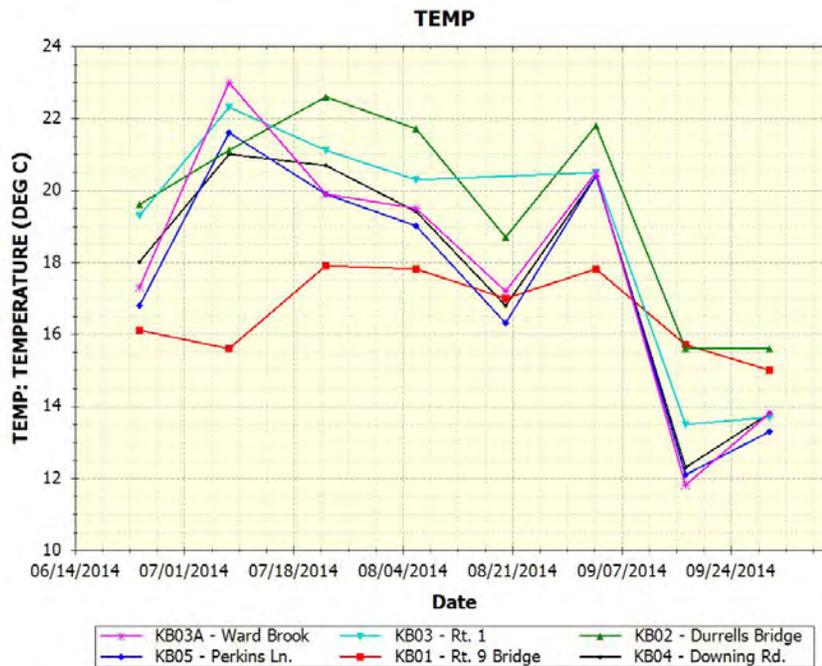
2014 Results:

Temperature at the freshwater sites were all similar with the exception of site KB-03 which was generally always 1-2°C higher than the other freshwater sites. The highest temperatures occurred in early July. Generally, temperature at site KB-03 was fair and the other sites good. Temperature at tidal site KB-01 was low with all temperatures below 18°C. Site KB-02 generally always had the highest temperatures-the mean temperature here was 19.6°C.

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

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
KB-01	SB	8	16.6	15.0	17.9	n/a	n/a
KB-02	SB	8	19.6	15.6	22.6	n/a	n/a
KB-03	B	7	18.7	13.5	22.3	n/a	n/a
KB-03A	B	8	17.9	11.8	23.0	n/a	n/a
KB-04	B	8	17.8	12.3	21.0	n/a	n/a
KB-05	B	8	17.4	12.1	21.6	n/a	n/a

Figure 5-5-4: Graph of water temperature



Specific Conductance

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

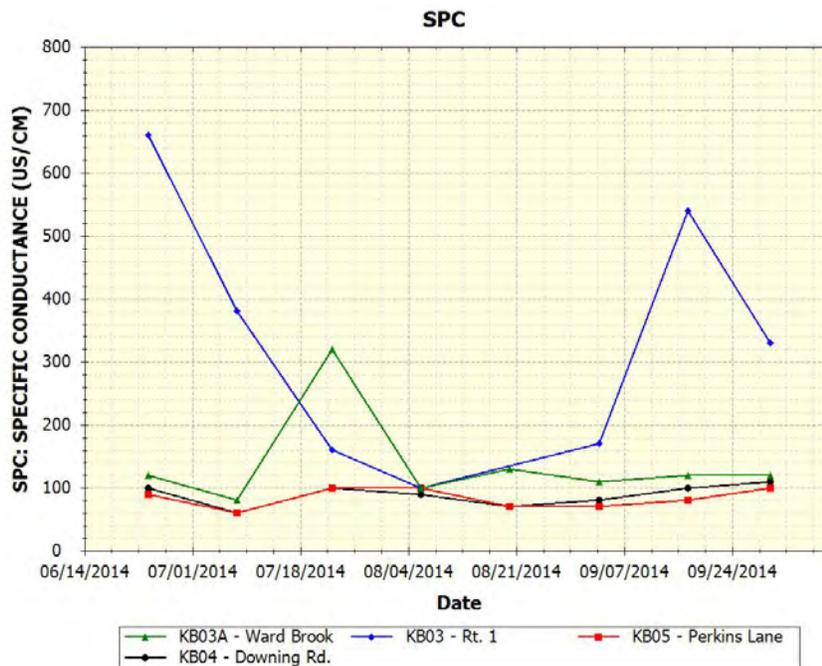
2014 Results:

Specific conductance at the freshwater sites KB-03A, KB-04, and KB-05 were similar and values here were low with the exception of 1 date (KB-03A-320 $\mu\text{S}/\text{cm}$). Specific conductance at site KB-03 was high on 4 of 7 sampling dates. The reasons for the high values here are unknown.

Table 5-5-5: A summary of minimum, maximum, and specific conductance ($\mu\text{S}/\text{cm}$) values at Mousam and Kennebunk Rivers Alliance monitoring sites on the Kennebunk River and tributary.

Site	Class	# of Observations	Average	Minimum	Maximum	Criterion	# Exceeding
KB-01	SB	n/a				n/a	n/a
KB-02	SB	n/a				n/a	n/a
KB-03	B	7	334	100	660	n/a	n/a
KB-03A	B	8	138	80	320	n/a	n/a
KB-04	B	8	89	60	110	n/a	n/a
KB-05	B	8	84	60	100	n/a	n/a

Figure 5-5-5: Graph of specific conductance



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 Sept 30th, *E. 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 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 average 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

2014 Results:

For the freshwater sites, only 1 sampling event at site KB-03A exceeded the Class B bacteria instantaneous criterion of 236 MPN/100 ml. The sample was collected on 6/24/14 during baseflow conditions. Sites KB-03, KB-03A and KB-04 all exceeded the geometric mean criterion of 64 MPN/100 ml. Although there was only 1 high value, bacteria was elevated enough to exceed the geometric mean criterion. Site KB-05 did not exceed either bacteria criterion. For the tidal sites, the Class SB instantaneous criterion of 54 MPN/100ml. was exceeded 1 time at site KB-01 and 2 times at site KB-02. The geometric mean criterion of 8 MPN/100 ml was exceeded at both sites. All of the samples were collected during baseflow conditions. The fact that all but one site exceeded the geometric mean criterion suggests that there may be sources that are not runoff related. This would include wildlife and/or human sources.

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

Site	Class	Type	# of Observations	Geometric Mean	Minimum	Maximum	Criterion Inst/Geo	# Exceeding
KB-01	SB	Entero	5	42	10	75	54/8	1
KB-02	SB	Entero	7	100	10	285	54/8	2
KB-03	B	<i>E. coli</i>	8	109	45	186	236/64	0
KB-03A	B	<i>E. coli</i>	8	183	22	921	236/64	1
KB-04	B	<i>E. coli</i>	8	142	70	214	236/64	0
KB-05	B	<i>E. coli</i>	8	58	17	140	236/64	0

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

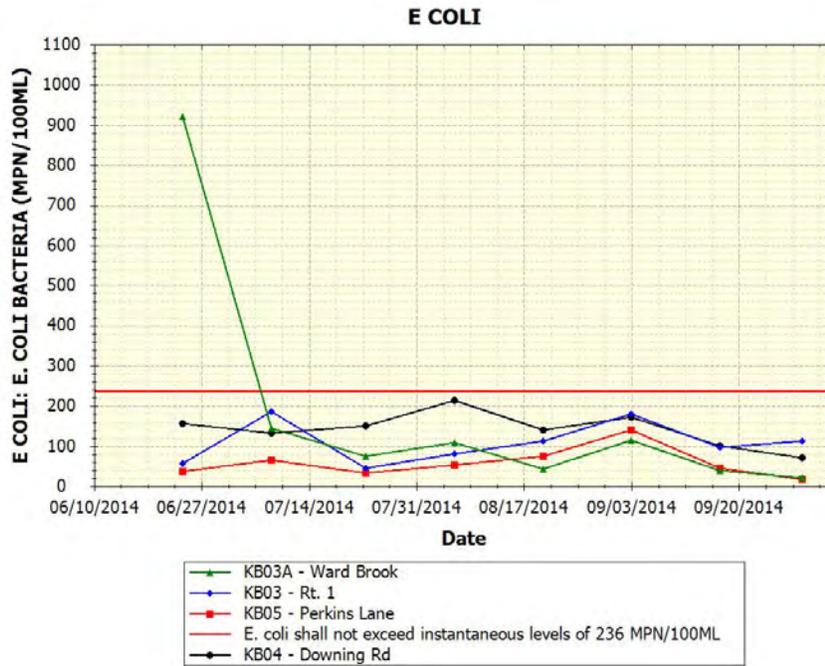
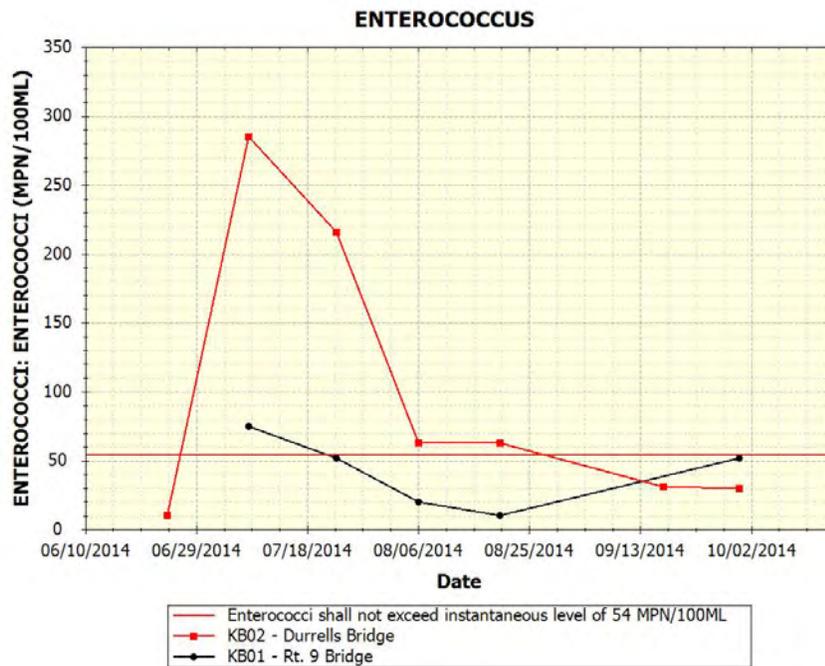


Figure 5-5-8: Graph of Enterococcus (MPN/ml)



Discussion and Recommendations

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

The following are recommendations for future monitoring:

- The monitors should continue to include early morning measurements for dissolved oxygen. It is important to get some values early in the morning (before 8:00 am), particularly during the warmer summer months. 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.
- The VRMP, Healthy Beaches Program staff, DEP monitoring staff, Wells NERR staff and volunteers should continue to work on bacteria monitoring. Efforts should continue on tracking down potential sources. Healthy Beaches should perhaps continue with bacteria sampling at the sites below head of tide to provide some continuity there.
- Bacteria sampling should include samples obtained during both baseflow and storm events.
- Investigate the high specific conductance values at site KB-03.
- Continue monitoring at all stations to develop a long term trend database.

Appendix A-1. 2014 water quality data for "Approved" and "Non-Approved" sites. Non-Approved sites do not yet meet official VRMP sample location criteria and/or require further inspection and review.

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

** "N" = normal environmental sample ; "D" = field duplicate; "D.O." = dissolved oxygen; "Spec. Cond" = specific conductance; "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)	Turbidity (NTU)	Total Diss. Solids (MG/L)	** TSS (MG/L)	E Coli Bacteria (MPN/100ML)	Enterococci (MPN/100ML)
Kennebunk River - Mousam-Kennebunk Alliance : Approved Sites																
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	6/24/2014	10:40 AM	N			18	92.6	8.8	100					157	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/8/2014	10:45 AM	N			21	95.5	8.5	60					132	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/23/2014	8:30 AM	N			20.7	82.9	7.5	100					150	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/23/2014	8:30 AM	D			20.7	83.3	7.5	100						
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/23/2014	8:35 AM	D											201	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	8/6/2014	7:45 AM	N			19.4	89.7	8.27	90					214	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	8/20/2014	9:30 AM	N			16.8	87.1	8.5	70					140	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/3/2014	9:25 AM	N			20.4	82.7	7.4	80					172	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/3/2014	9:25 AM	D			20.4	82.6	7.4	80					145	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/17/2014	9:25 AM	N			12.3	89.1	9.5	100					101	
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/30/2014	9:20 AM	N			13.8	80.9	8.4	110					70	
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	6/24/2014	8:45 AM	N			16.1	118	11.62			30				U<10
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	6/24/2014	8:45 AM	L												U<10
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/8/2014	9:10 AM	N			15.6	110	10.8			23				
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/8/2014	9:20 AM	N												75
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/8/2014	9:20 AM	L												73
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/23/2014	7:05 AM	N			17.9	102	9.8			30				52
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/23/2014	7:05 AM	L												120
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/6/2014	9:05 AM	N			17.8	113	10.73			30				20
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:10 AM	N			17	96	9.3			30				10
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:10 AM	L												10
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:10 AM	D			17	96	9.3			30				
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:35 AM	D												31
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/3/2014	8:05 AM	N			17.8	101	9.5			30				U<10
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/3/2014	8:05 AM	L												U<10
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/17/2014	8:00 AM	N			15.7	98	9.7			31				U<10
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/30/2014	8:05 AM	N			15	91.1	9.2			30				52
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/30/2014	8:05 AM	L												41
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	6/24/2014	11:00 AM	N			16.8	103	9.9	90					37	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	7/8/2014	11:00 AM	N			21.6	104	9.2	60					64	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	7/23/2014	8:50 AM	N			19.9	91.8	8.4	100					33	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	8/6/2014	7:25 AM	N			19	97.3	9.01	100					52	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	8/20/2014	9:45 AM	N			16.3	95.1	9.4	70					74	

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)
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/3/2014	8:45 AM	L											228	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/3/2014	9:45 AM	N			20.4	93.1	8.4	70					140	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/17/2014	9:40 AM	N			12.1	94.9	10.2	80					45	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/17/2014	9:40 AM	D			12.1	94.4	10.2	90					88	
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/30/2014	9:35 AM	N			13.3	89.5	9.4	100					17	
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	6/24/2014	9:15 AM	N			19.6	97.8	8.96		19					10
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	7/8/2014	9:35 AM	N			21.1	93.5	8.36		NAN					
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	7/8/2014	9:40 AM	N												285
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	7/23/2014	7:30 AM	N			22.6	92.2	8		5					216
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	8/6/2014	8:45 AM	N			21.7	92.2	8.11		10					63
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	8/20/2014	8:35 AM	N			18.7	81.9	7.6		3					63
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	9/3/2014	8:25 AM	N			21.8	82	7.2		2					U<10
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	9/17/2014	8:25 AM	N			15.6	87.9	8.7		14					31
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	9/30/2014	8:25 AM	N			15.6	88.4	8.8		11					30
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	6/24/2014	9:55 AM	N			19.3	111	10.3	660					57	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	6/24/2014	9:55 AM	L											50	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/8/2014	10:06 AM	N			22.3	103	9	380						
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/8/2014	10:15 AM	N											186	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/8/2014	10:15 AM	L											172	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/23/2014	7:45 AM	N			21.1	93.6	8.4	160					45	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/23/2014	7:45 AM	L											62	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	8/6/2014	8:25 AM	N			20.3	102	9.2	100					80	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	8/20/2014	8:55 AM	N											113	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	8/20/2014	8:55 AM	L											113	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/3/2014	8:45 AM	N			20.5	93.5	8.5	170					179	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/17/2014	8:50 AM	N			13.5	99.8	10.4	540					96	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/30/2014	8:50 AM	N			13.7	94.9	9.8	330					112	
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/30/2014	8:50 AM	L											131	
KB-03A	WARD BROOK-SKEWD04-VRMP	6/24/2014	10:15 AM	N			17.3	99.8	9.45	120					921	
KB-03A	WARD BROOK-SKEWD04-VRMP	7/8/2014	10:30 AM	N			23	96	8.27	80					144	
KB-03A	WARD BROOK-SKEWD04-VRMP	7/23/2014	8:05 AM	N			19.9	86	7.9	320					75	
KB-03A	WARD BROOK-SKEWD04-VRMP	8/6/2014	8:10 AM	N			19.5	90.6	8.33	100					109	
KB-03A	WARD BROOK-SKEWD04-VRMP	8/20/2014	9:10 AM	N			17.2	88.4	8.5	130					43	
KB-03A	WARD BROOK-SKEWD04-VRMP	9/3/2014	9:05 AM	N			20.5	84.8	7.7	110					115	
KB-03A	WARD BROOK-SKEWD04-VRMP	9/17/2014	9:05 AM	N			11.8	88.3	9.6	120					38	
KB-03A	WARD BROOK-SKEWD04-VRMP	9/30/2014	9:00 AM	N			13.8	78	8.1	120					22	

Appendix A-2. 2014 observational data and quality assurance/quality control (QA/QC) notes for "approved" and "non-approved" sites.

** "N" = normal environmental sample; "D" = field duplicate; "L" = lab duplicate

Refer to Appendix A-1 for water quality data

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
Kennebunk River - Mousam Kennebunk Alliance														
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	6/24/2014	8:45 AM	N	BASEFLOW	HIGH	17	BRIDGE	PARTLY CLOUDY		CLEAR	RIFFLE	CLEAR	WADEABLE/1.5 FT BELOW SURFACE
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	6/24/2014	8:45 AM	L									MEDIUM STAINED	NON-WADEABLE/3 FT BELOW SURFACE
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/8/2014	9:10 AM	N	BASEFLOW	HIGH	19	BRIDGE	PARTLY CLOUDY	CALM	CLOUDY, SHOWERS	RIFFLE	CLEAR	NON-WADEABLE/MID-DEPTH
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/8/2014	9:20 AM	N										NON-WADEABLE/MID-DEPTH
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/8/2014	9:20 AM	L										
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/23/2014	7:05 AM	N	BASEFLOW	LOW	20	BRIDGE	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE	CLEAR	NON-WADEABLE/MID-DEPTH
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	7/23/2014	7:05 AM	L									MEDIUM STAINED	NON-WADEABLE/3 FT BELOW SURFACE
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/6/2014	9:05 AM	N	BASEFLOW	HIGH	20	BRIDGE	PARTLY CLOUDY, SHOWERS		CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE	MEDIUM STAINED	NO VERTICAL DEPTH RECORDED.
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:10 AM	N	BASEFLOW	HIGH	20	BRIDGE	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE		NO VERTICAL DEPTH RECORDED.
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:10 AM	L									CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:10 AM	D				BRIDGE					MEDIUM STAINED	NON-WADEABLE/MID-DEPTH
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	8/20/2014	8:35 AM	D									CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/3/2014	8:05 AM	N	BASEFLOW	MEDIUM	21	BRIDGE	CLEAR	CALM	CLEAR, CLOUDY, LIGHT RAIN, SHOWERS	RIFFLE		
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/3/2014	8:05 AM	L									CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/17/2014	8:00 AM	N	BASEFLOW	HIGH	15	BRIDGE	CLEAR	CALM	CLEAR, CLOUDY, SHOWERS	RIFFLE		

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/30/2014	8:05 AM	N	BASEFLOW	LOW	12.78	BRIDGE	CLOUDY, MOSTLY CLOUDY	CALM	CLEAR, FOGGY, LIGHT RAIN, MOSTLY CLOUDY	RIFFLE		
KB-01	KENNEBUNK RIVER - SKE11 - VRMP	9/30/2014	8:05 AM	L									CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	6/24/2014	9:15 AM	N	BASEFLOW	MEDIUM	17	BRIDGE	PARTLY CLOUDY		CLEAR	RIFFLE		
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	7/8/2014	9:35 AM	N	BASEFLOW	HIGH	19	BRIDGE	CLEAR, PARTLY CLOUDY		CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	7/8/2014	9:40 AM	N									CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	7/23/2014	7:30 AM	N	BASEFLOW	LOW	20	BRIDGE	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE		
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	8/6/2014	8:45 AM	N	BASEFLOW	HIGH	20	BRIDGE	PARTLY CLOUDY, SHOWERS	CALM	CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE		NON-WADEABLE/3 FT BELOW SURFACE
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	8/20/2014	8:35 AM	N	BASEFLOW	HIGH	20	BRIDGE	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE		
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	9/3/2014	8:25 AM	N	BASEFLOW	MEDIUM	21	BRIDGE	CLEAR	CALM	CLEAR, CLOUDY, LIGHT RAIN, SHOWERS	RIFFLE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	9/17/2014	8:25 AM	N	BASEFLOW	MEDIUM	15	BRIDGE	CLEAR	CALM	CLEAR, CLOUDY, SHOWERS	RIFFLE		
KB-02	KENNEBUNK RIVER - SKE35 - VRMP	9/30/2014	8:25 AM	N	BASEFLOW	LOW	12.78	BRIDGE	CLOUDY, MOSTLY CLOUDY	CALM	CLEAR, FOGGY, LIGHT RAIN, MOSTLY CLOUDY	RIFFLE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	6/24/2014	9:55 AM	N	BASEFLOW	LOW	17	WADING	PARTLY CLOUDY		CLEAR	CASCADE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	6/24/2014	9:55 AM	L										
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/8/2014	10:06 AM	N	BASEFLOW	HIGH	19	WADING	CLEAR, PARTLY CLOUDY		CLEAR, PARTLY CLOUDY, SHOWERS	CASCADE	CLEAR	WADEABLE/1.5 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/8/2014	10:15 AM	N									MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/8/2014	10:15 AM	L									CLEAR	WADEABLE/1.5 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/23/2014	7:45 AM	N	BASEFLOW	LOW	20	WADING	CLEAR	CALM	CLEAR, PARTLY CLOUDY	CASCADE	CLEAR	WADEABLE/1.5 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	7/23/2014	7:45 AM	L									MEDIUM STAINED	WADEABLE/1.5 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	8/6/2014	8:25 AM	N	BASEFLOW	MEDIUM	20	WADING	PARTLY CLOUDY, SHOWERS	CALM	CLEAR, PARTLY CLOUDY, SHOWERS	CASCADE		

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	8/20/2014	8:55 AM	N									MEDIUM STAINED	SAMPLING LOCATION NOT RECORDED. NO VERTICAL DEPTH RECORDED.
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	8/20/2014	8:55 AM	L									CLEAR	WADEABLE/1.5 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/3/2014	8:45 AM	N	STORMFLOW	MEDIUM	21	WADING	CLEAR	CALM	CLEAR, CLOUDY, LIGHT RAIN, SHOWERS	CASCADE		WADEABLE/1.5 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/17/2014	8:50 AM	N	BASEFLOW	LOW	15	WADING	CLEAR	CALM	CLEAR, CLOUDY, SHOWERS	CASCADE	CLEAR	WADEABLE/MID-DEPTH
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/30/2014	8:50 AM	N	BASEFLOW	MEDIUM	12.78	WADING	CLOUDY, MOSTLY CLOUDY	CALM	CLEAR, FOGGY, LIGHT RAIN, MOSTLY CLOUDY	CASCADE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-03	KENNEBUNK RIVER - SKE66 - VRMP	9/30/2014	8:50 AM	L									MEDIUM STAINED	NON-WADEABLE/3 FT BELOW SURFACE
KB-03A	WARD BROOK-SKEWD04-VRMP	6/24/2014	10:15 AM	N	BASEFLOW	LOW	17	BRIDGE	PARTLY CLOUDY		CLEAR	RUN		
KB-03A	WARD BROOK-SKEWD04-VRMP	7/8/2014	10:30 AM	N	BASEFLOW	HIGH	19	BRIDGE	CLEAR, PARTLY CLOUDY		CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-03A	WARD BROOK-SKEWD04-VRMP	7/23/2014	8:05 AM	N	BASEFLOW	MEDIUM	20	BRIDGE	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-03A	WARD BROOK-SKEWD04-VRMP	8/6/2014	8:10 AM	N	BASEFLOW	LOW	20	BRIDGE	PARTLY CLOUDY, SHOWERS		CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE	MEDIUM STAINED	NON-WADEABLE/3 FT BELOW SURFACE
KB-03A	WARD BROOK-SKEWD04-VRMP	8/20/2014	9:10 AM	N	BASEFLOW	HIGH	20	BRIDGE	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE	MEDIUM STAINED	NON-WADEABLE/3 FT BELOW SURFACE
KB-03A	WARD BROOK-SKEWD04-VRMP	9/3/2014	9:05 AM	N	BASEFLOW	MEDIUM	21	BRIDGE	CLEAR	CALM	CLEAR, CLOUDY, LIGHT RAIN, SHOWERS	RIFFLE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-03A	WARD BROOK-SKEWD04-VRMP	9/17/2014	9:05 AM	N	BASEFLOW	LOW	15	BRIDGE	CLEAR	CALM	CLEAR, CLOUDY, SHOWERS	RIFFLE	CLEAR	NON-WADEABLE/3 FT BELOW SURFACE
KB-03A	WARD BROOK-SKEWD04-VRMP	9/30/2014	9:00 AM	N	BASEFLOW	LOW	12.78	BRIDGE	CLOUDY, MOSTLY CLOUDY	CALM	CLEAR, FOGGY, LIGHT RAIN, MOSTLY CLOUDY	RIFFLE	CLEAR	WADEABLE/MID-DEPTH
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	6/24/2014	10:40 AM	N	BASEFLOW	LOW	17	CULVERT	PARTLY CLOUDY		CLEAR	RIFFLE		
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/8/2014	10:45 AM	N	BASEFLOW	MEDIUM	19	CULVERT	CLEAR, PARTLY CLOUDY		CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE	MEDIUM STAINED	WADEABLE/MID-DEPTH
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/23/2014	8:30 AM	N	BASEFLOW	LOW	20	CULVERT	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE		
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/23/2014	8:30 AM	D				CULVERT						

Organization Site Code	VRMP Site ID	Date	Time	** Sample Type Qualifier	Flow	Stage	Air Temp (°C)	Sample Location	Current Weather	Air Condition	Past 24HR Weather	Habitat	Water Appearance	Comments
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	7/23/2014	8:35 AM	D									CLEAR	WADEABLE/MID-DEPTH
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	8/6/2014	7:45 AM	N	BASEFLOW	MEDIUM	20	CULVERT	PARTLY CLOUDY, SHOWERS	CALM	CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE		
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	8/20/2014	9:30 AM	N	BASEFLOW	HIGH	20	CULVERT	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE	CLEAR	WADEABLE/MID-DEPTH
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/3/2014	9:25 AM	N	STORMFLOW	HIGH	21	BRIDGE	CLEAR	CALM	CLEAR, CLOUDY, LIGHT RAIN, SHOWERS	RIFFLE		
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/3/2014	9:25 AM	D				BRIDGE						
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/17/2014	9:25 AM	N	BASEFLOW	LOW	15	CULVERT	CLEAR	CALM	CLEAR, CLOUDY, SHOWERS	RIFFLE	MEDIUM STAINED	WADEABLE/MID-DEPTH
KB-04	KENNEBUNK RIVER - SKE103 - VRMP	9/30/2014	9:20 AM	N	BASEFLOW	LOW	12.78	CULVERT	CLOUDY, MOSTLY CLOUDY	CALM	CLEAR, FOGGY, LIGHT RAIN, MOSTLY CLOUDY	RIFFLE	CLEAR	WADEABLE/MID-DEPTH
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	6/24/2014	11:00 AM	N	BASEFLOW	LOW	17	WADING	PARTLY CLOUDY		CLEAR	RIFFLE	CLEAR	WADEABLE/MID-DEPTH
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	7/8/2014	11:00 AM	N	BASEFLOW	HIGH	19	WADING	CLEAR, PARTLY CLOUDY		CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE		
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	7/23/2014	8:50 AM	N	BASEFLOW	LOW	20	WADING	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE	CLEAR	NON-WADEABLE/MID-DEPTH
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	8/6/2014	7:25 AM	N	BASEFLOW	LOW	20	WADING	PARTLY CLOUDY, SHOWERS	CALM	CLEAR, PARTLY CLOUDY, SHOWERS	RIFFLE	MEDIUM STAINED	NON-WADEABLE/3 FT BELOW SURFACE
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	8/20/2014	9:45 AM	N	BASEFLOW	HIGH	20	WADING	CLEAR	CALM	CLEAR, PARTLY CLOUDY	RIFFLE	CLEAR	NON-WADEABLE/MID-DEPTH
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/3/2014	8:45 AM	L									CLEAR	NON-WADEABLE/MID-DEPTH
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/3/2014	9:45 AM	N	STORMFLOW	MEDIUM	21		CLEAR	CALM	CLEAR, LIGHT RAIN, PARTLY CLOUDY, SHOWERS	RIFFLE	MEDIUM STAINED	NON-WADEABLE/MID-DEPTH
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/17/2014	9:40 AM	N	BASEFLOW	LOW	15	WADING	CLEAR	CALM	CLEAR, CLOUDY, SHOWERS	RIFFLE	MEDIUM STAINED	NO VERTICAL DEPTH RECORDED.
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/17/2014	9:40 AM	D				WADING					CLEAR	NON-WADEABLE/MID-DEPTH
KB-05	KENNEBUNK RIVER - SKE148 - VRMP	9/30/2014	9:35 AM	N	BASEFLOW	LOW	12.78	WADING	CLOUDY, MOSTLY CLOUDY	CALM	CLEAR, FOGGY, LIGHT RAIN, MOSTLY CLOUDY	RIFFLE	CLEAR	NON-WADEABLE/MID-DEPTH