

## Section 3-2

### Androscoggin River (Friends of Merrymeeting Bay)

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

#### Results

##### *E. coli Bacteria*

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

##### *Specific Conductance*

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

##### *Dissolved Oxygen*

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

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

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

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

### *Water Temperature*

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

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

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



## **Discussion**

### *E. coli Bacteria*

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

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

### *Dissolved Oxygen*

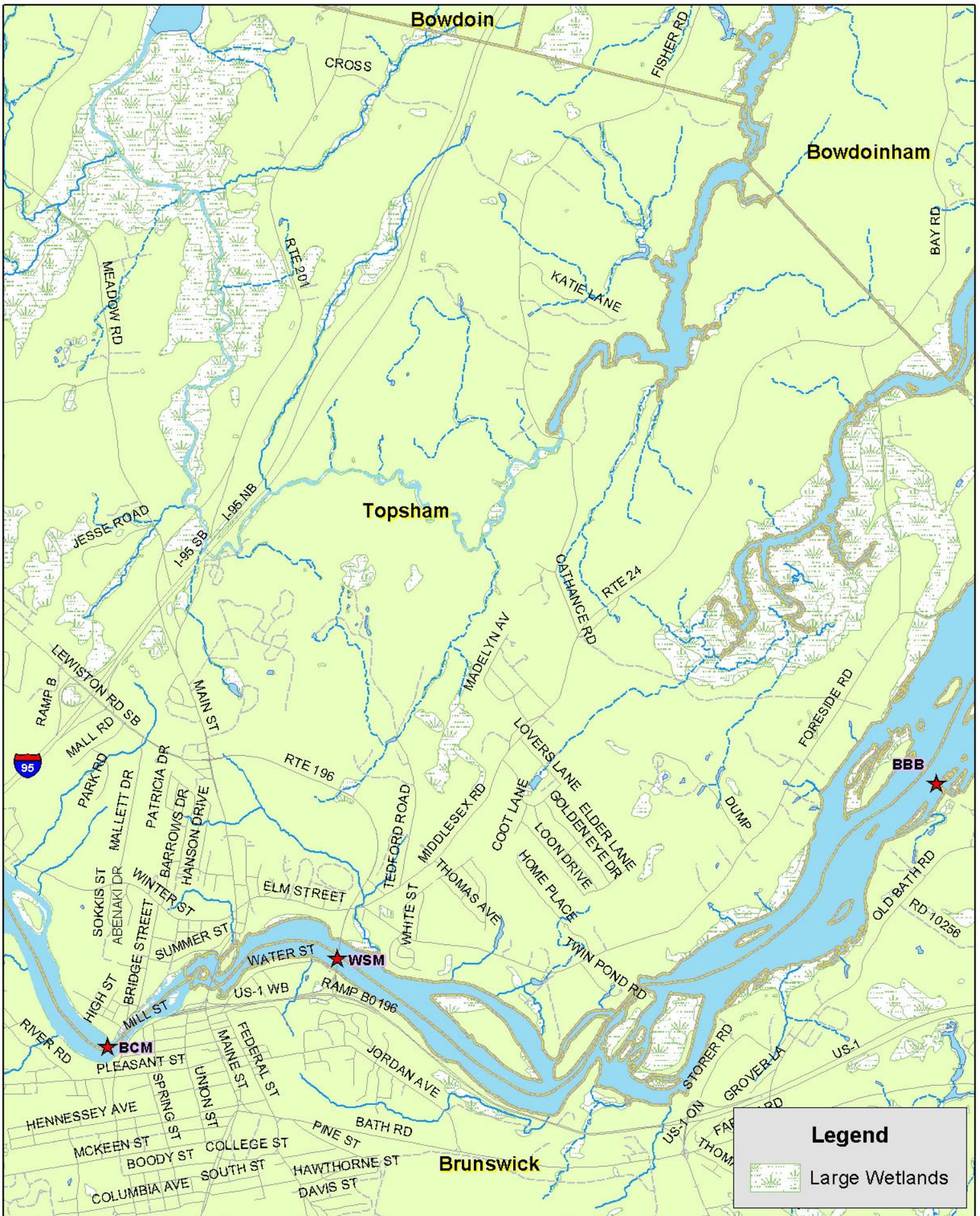
Dissolved oxygen levels did vary with depth at sites BCM and WSM, though the differences were only about 0.1 to 0.2 mg/L from near the river surface down to near the bottom of the river. Given that weather patterns vary from year to year, greater differences in D. O. levels over depth profiles may be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

### *Sources of Pollution and Other Stresses to the River*

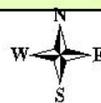
There are numerous sources of pollution and other stresses to the Androscoggin River watershed in the region sampled by the Friends of Merrymeeting Bay that could potentially have an impact on water quality. Some of those sources of pollution and stress in the densely populated and heavily developed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

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

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



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



0 0.25 0.5 1 Miles

## VRMP 2009 Pilot Year Data Androscoggin River (Friends of Merrymeeting Bay)

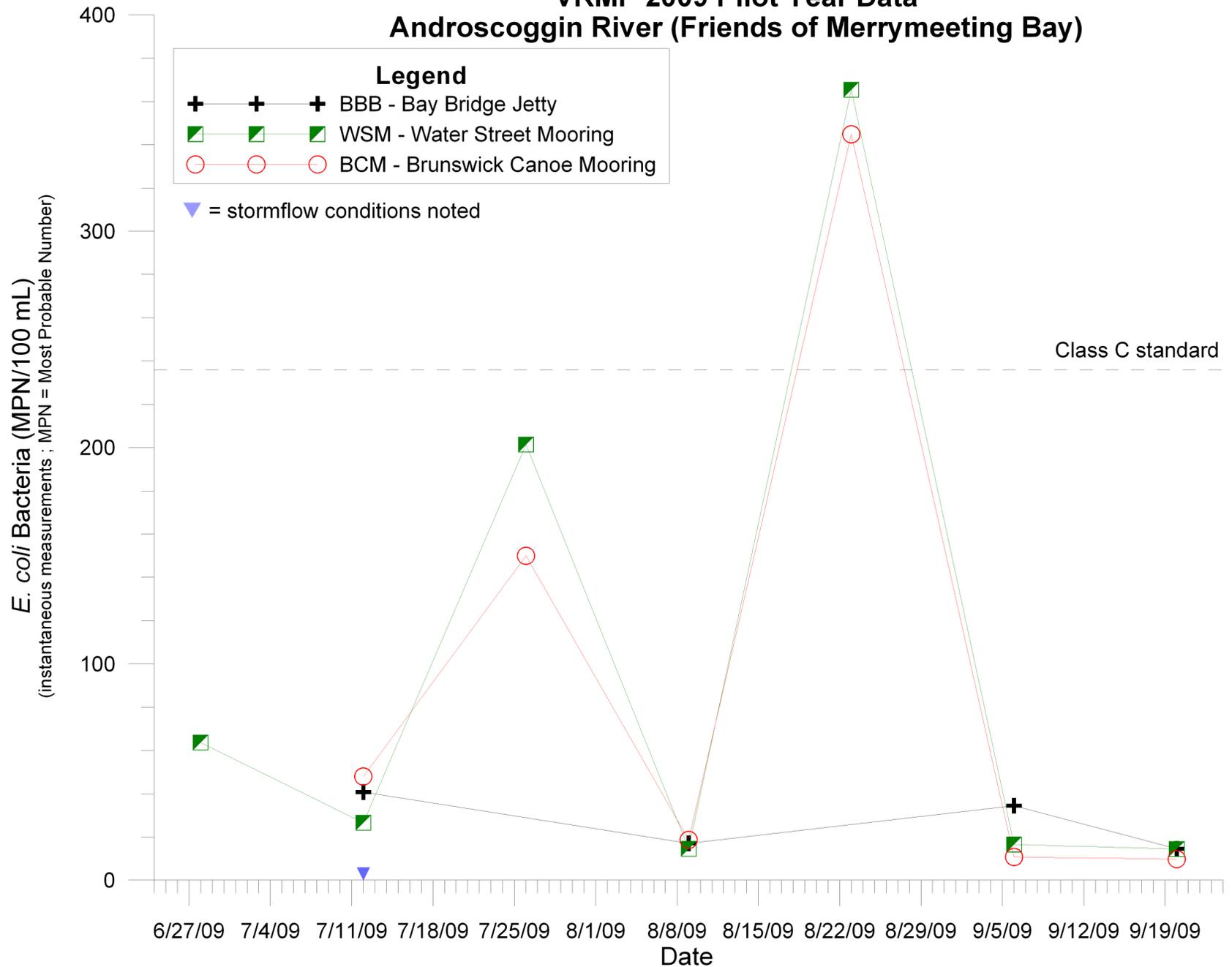


Figure 3-2-1. *E. coli* bacteria concentrations at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

### VRMP 2009 Pilot Year Data Androscoggin River (Friends of Merrymeeting Bay)

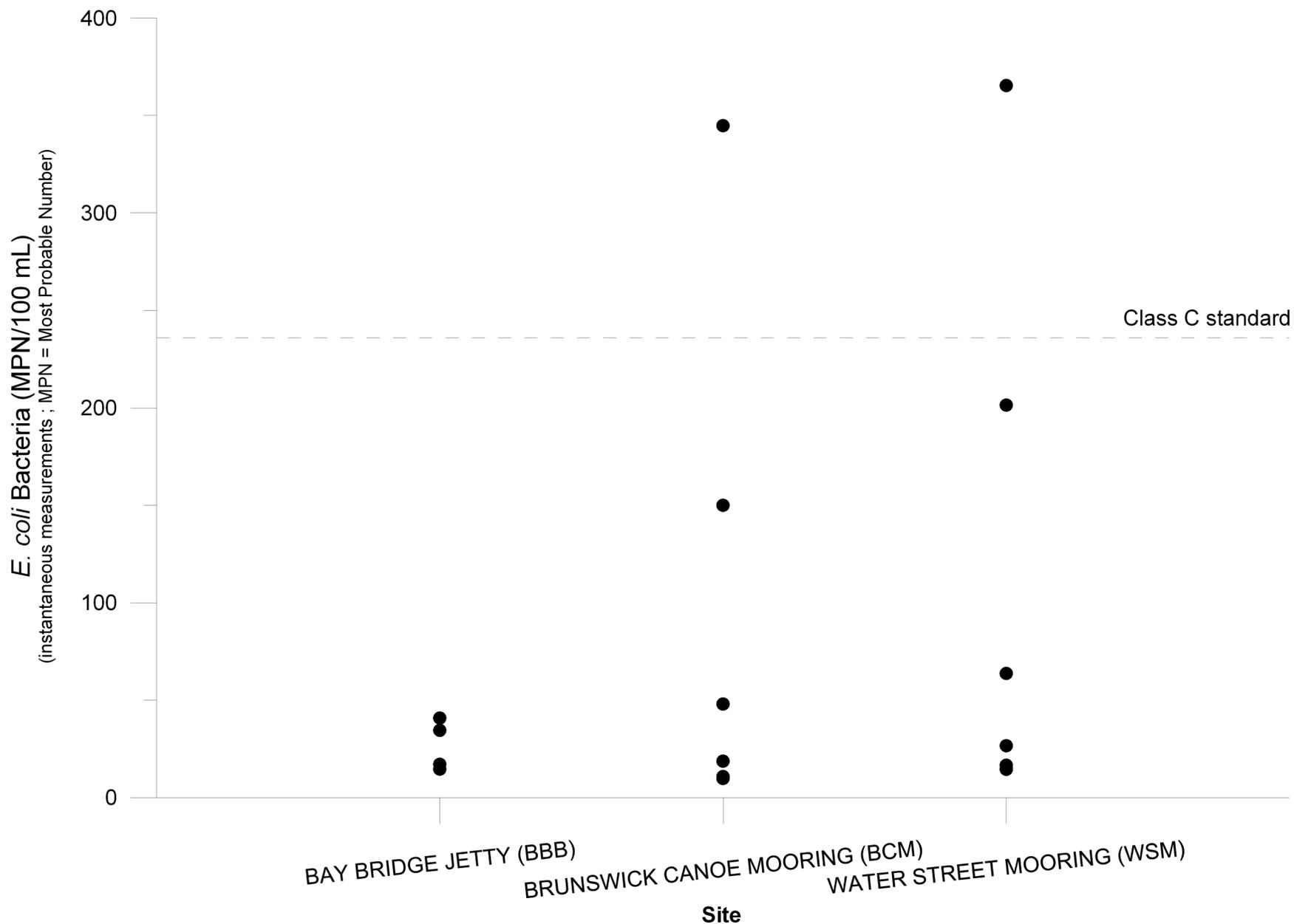


Figure 3-2-2. *E. coli* bacteria concentrations at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

## VRMP 2009 Pilot Year Data Androscoggin River (Friends of Merrymeeting Bay)

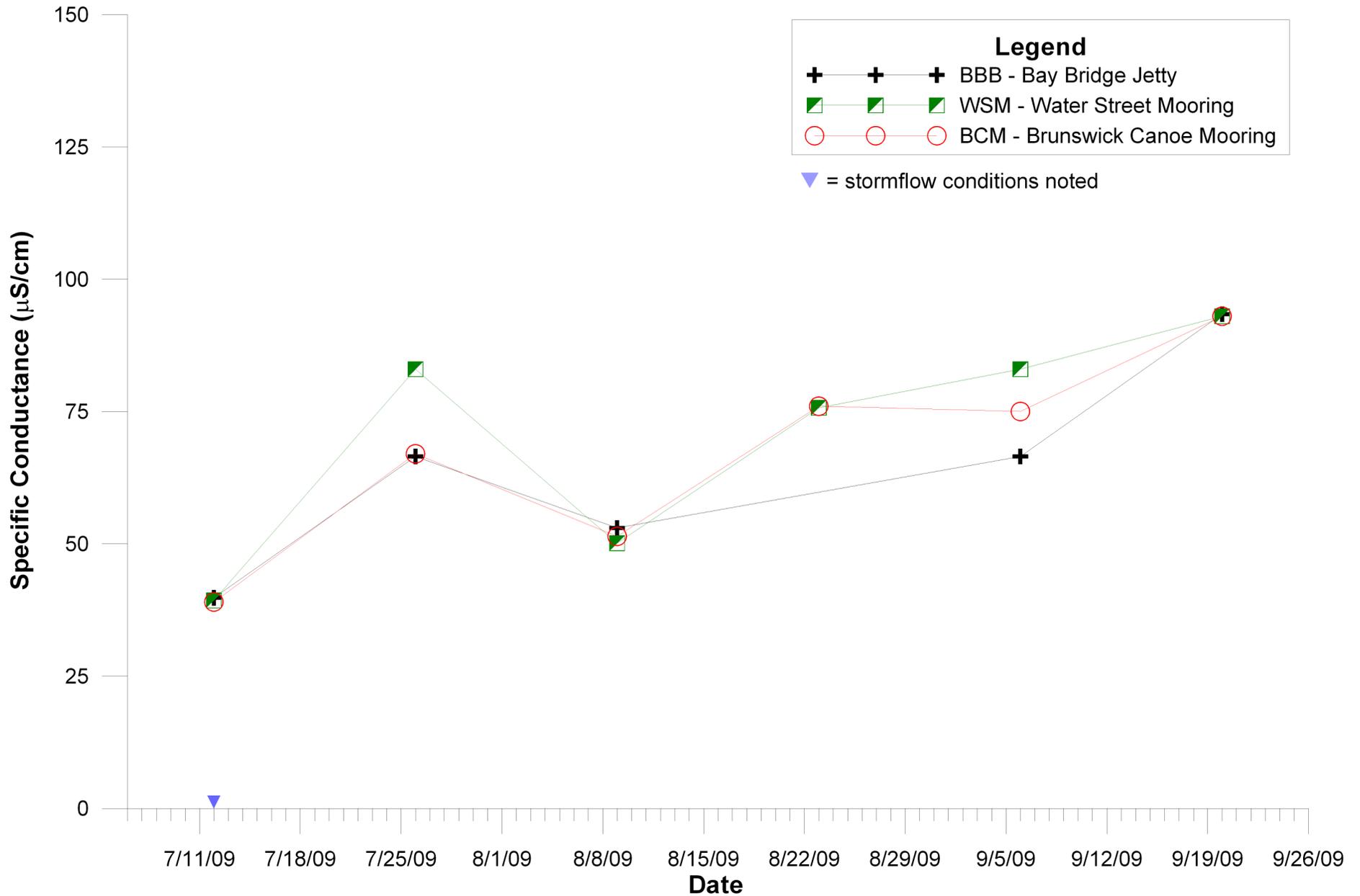


Figure 3-2-3. Specific conductance at Friends of Merrymeeting Bay monitoring sites on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Bay Bridge Jetty (BBB)**

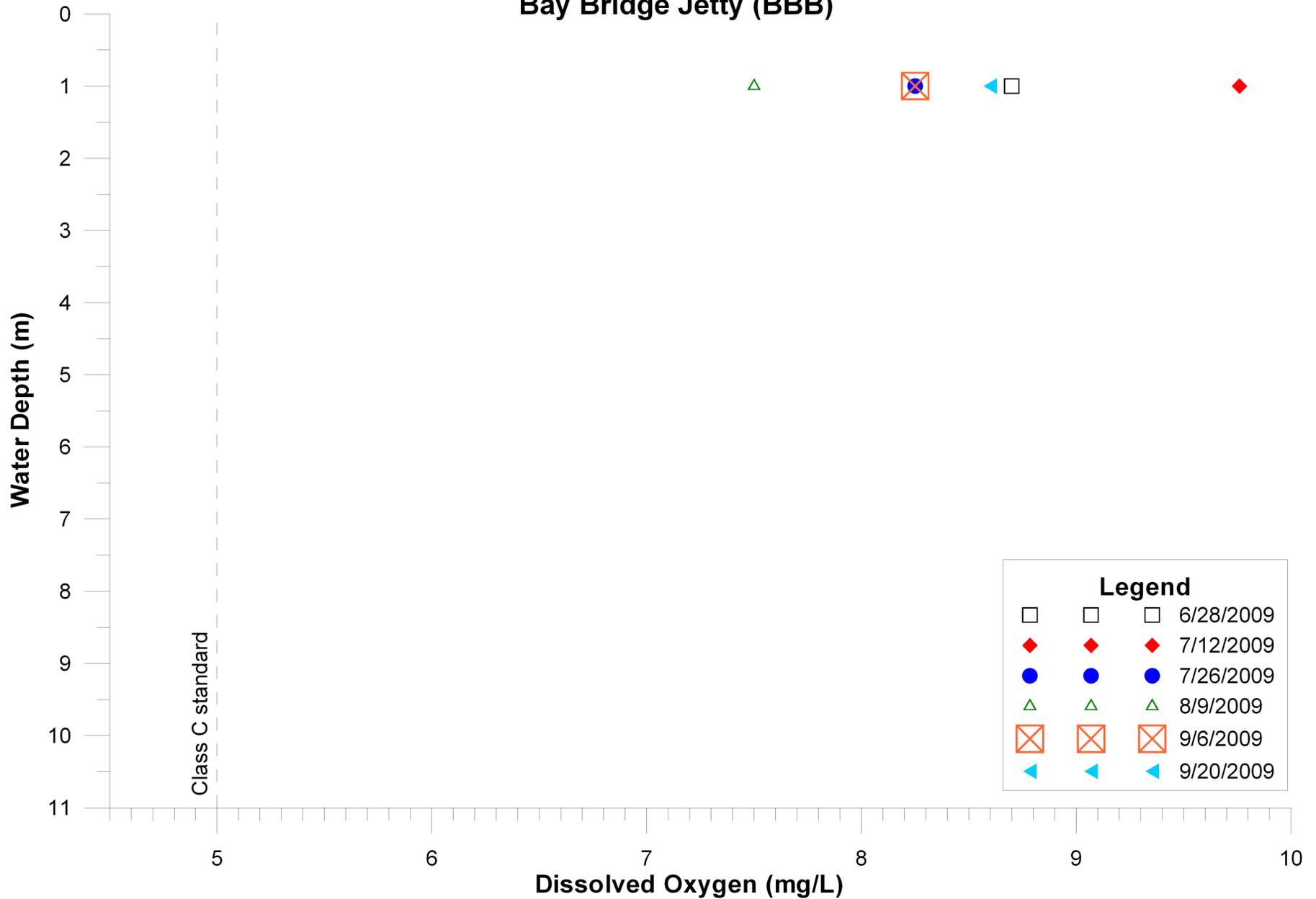


Figure 3-2-4. Dissolved oxygen concentrations at Friends of Merrymeeting Bay monitoring site "BBB" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Bay Bridge Jetty (BBB)**

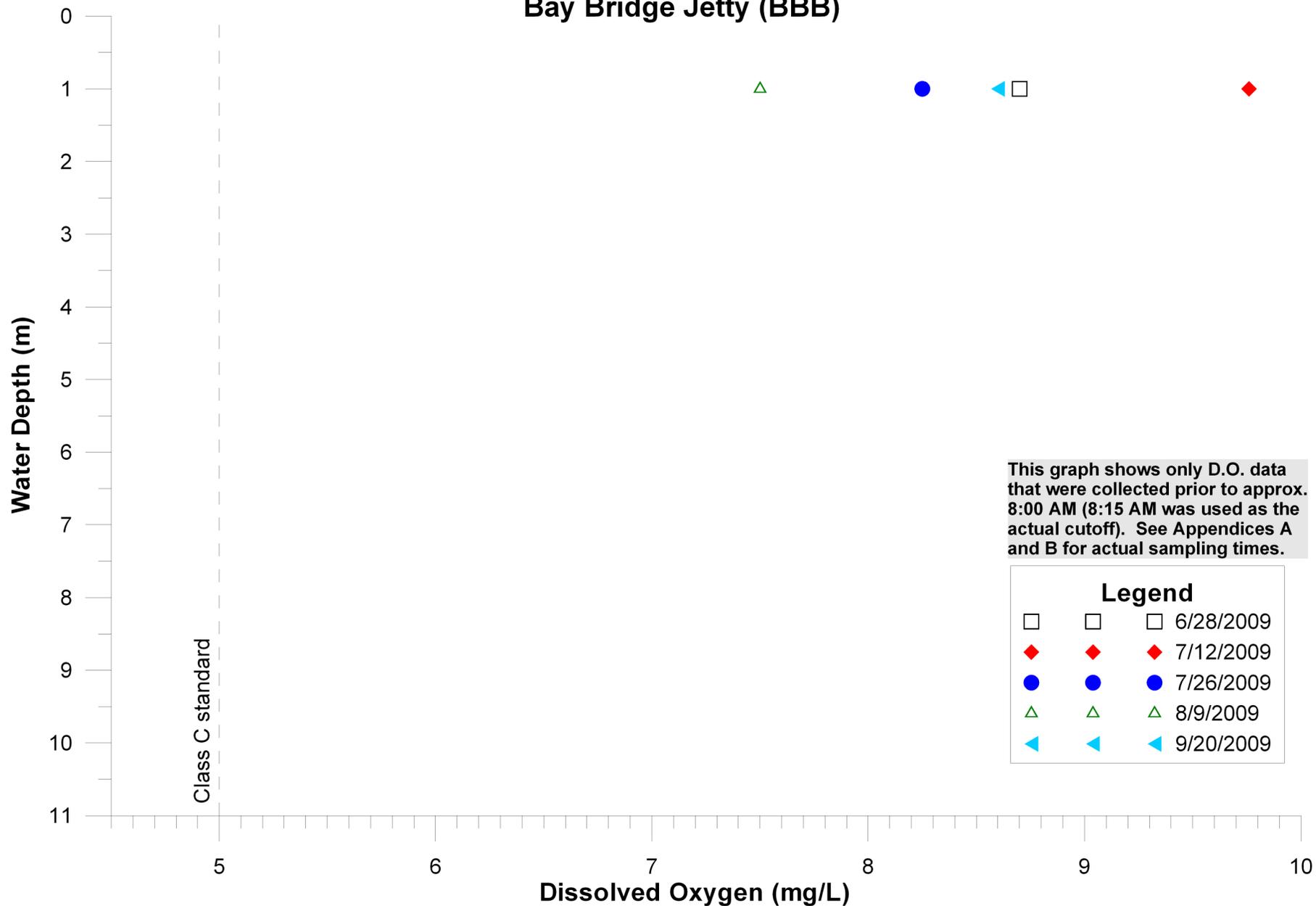


Figure 3-2-5. Early morning dissolved oxygen concentrations at Friends of Merrymeeting Bay site "BBB" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Bay Bridge Jetty (BBB)**

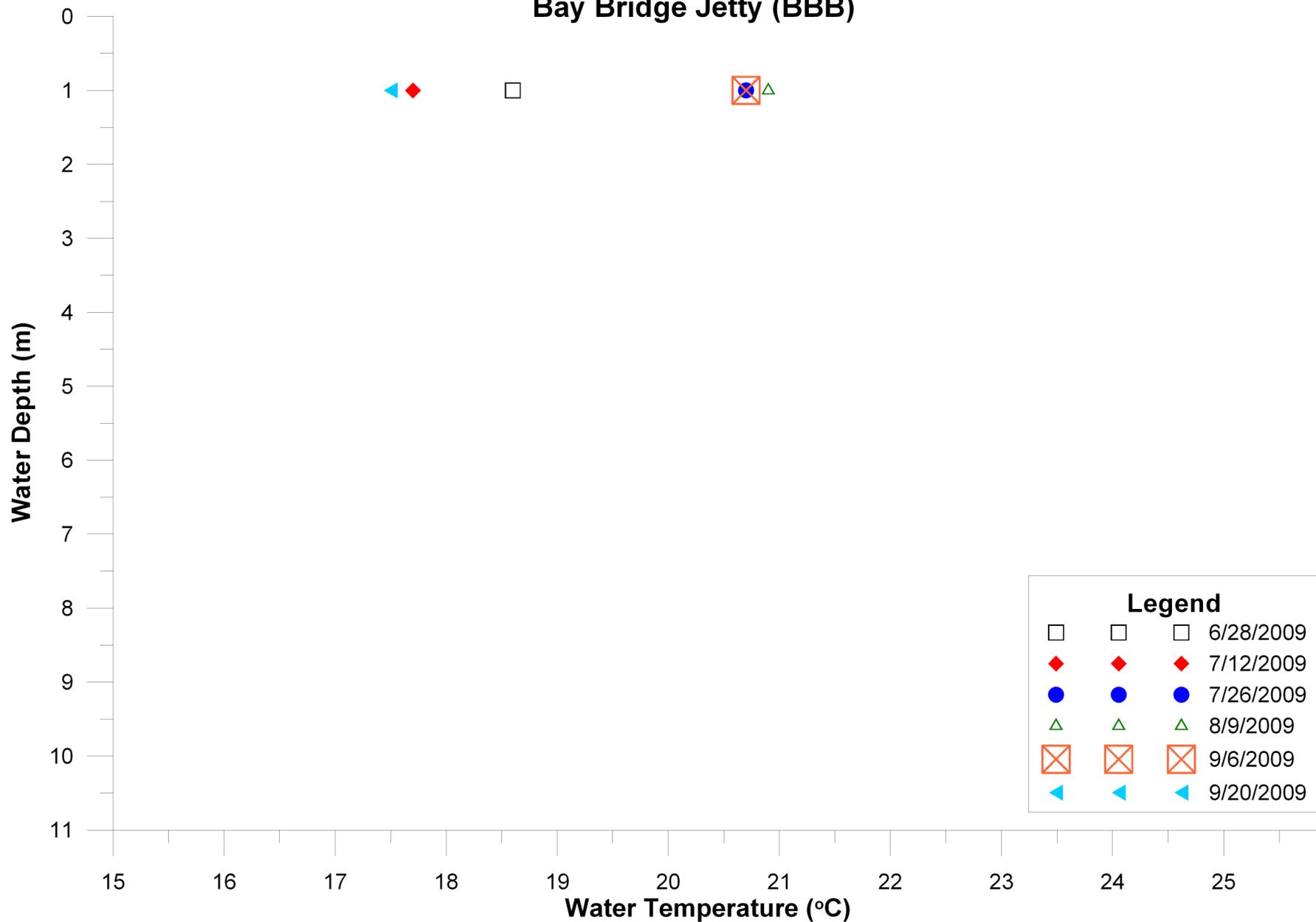


Figure 3-2-6. Water temperatures at Friends of Merrymeeting Bay monitoring site "BBB" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Brunswick Canoe Mooring (BCM)**

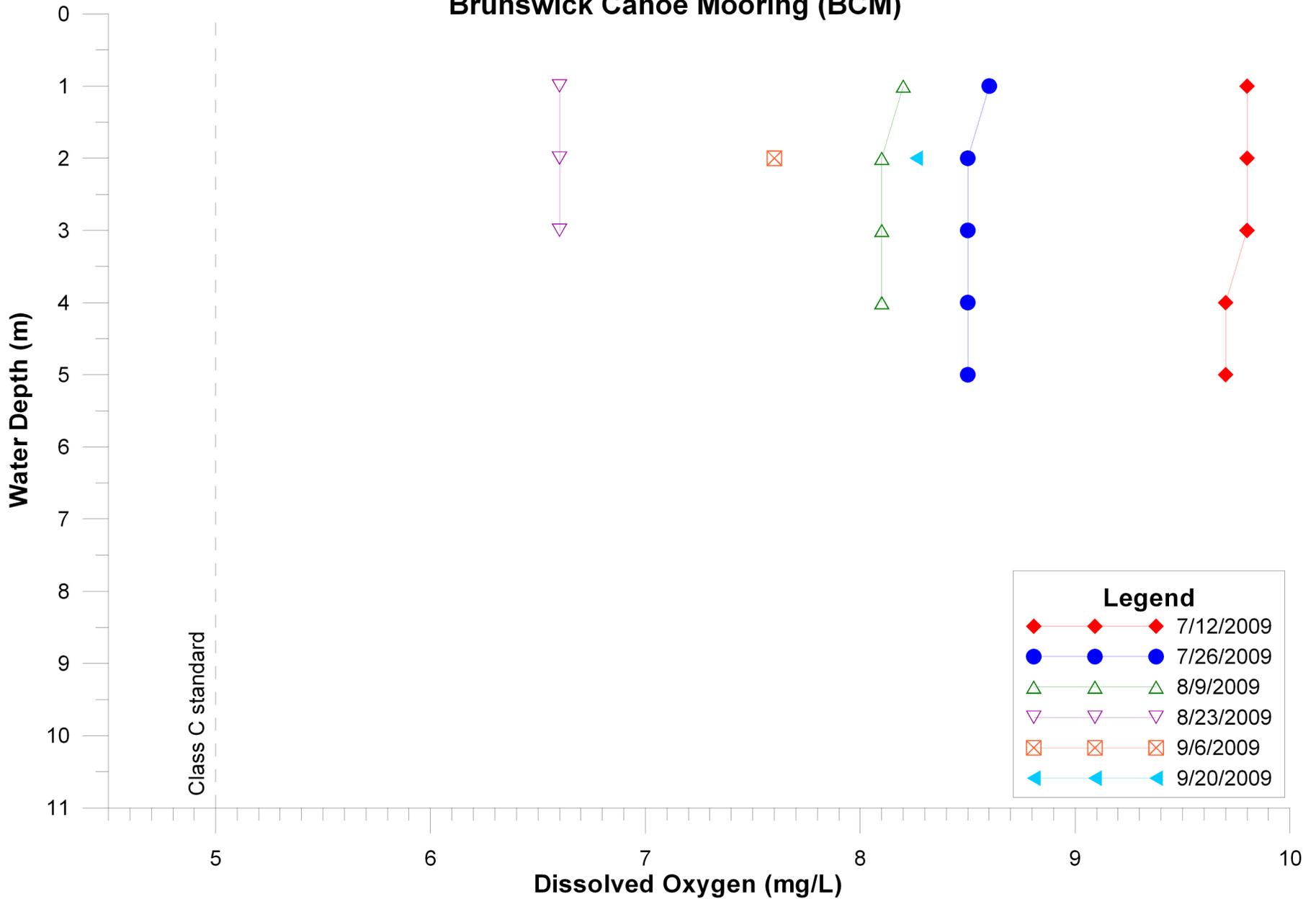


Figure 3-2-7. Dissolved oxygen concentrations at Friends of Merrymeeting Bay monitoring site "BCM" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Brunswick Canoe Mooring (BCM)**

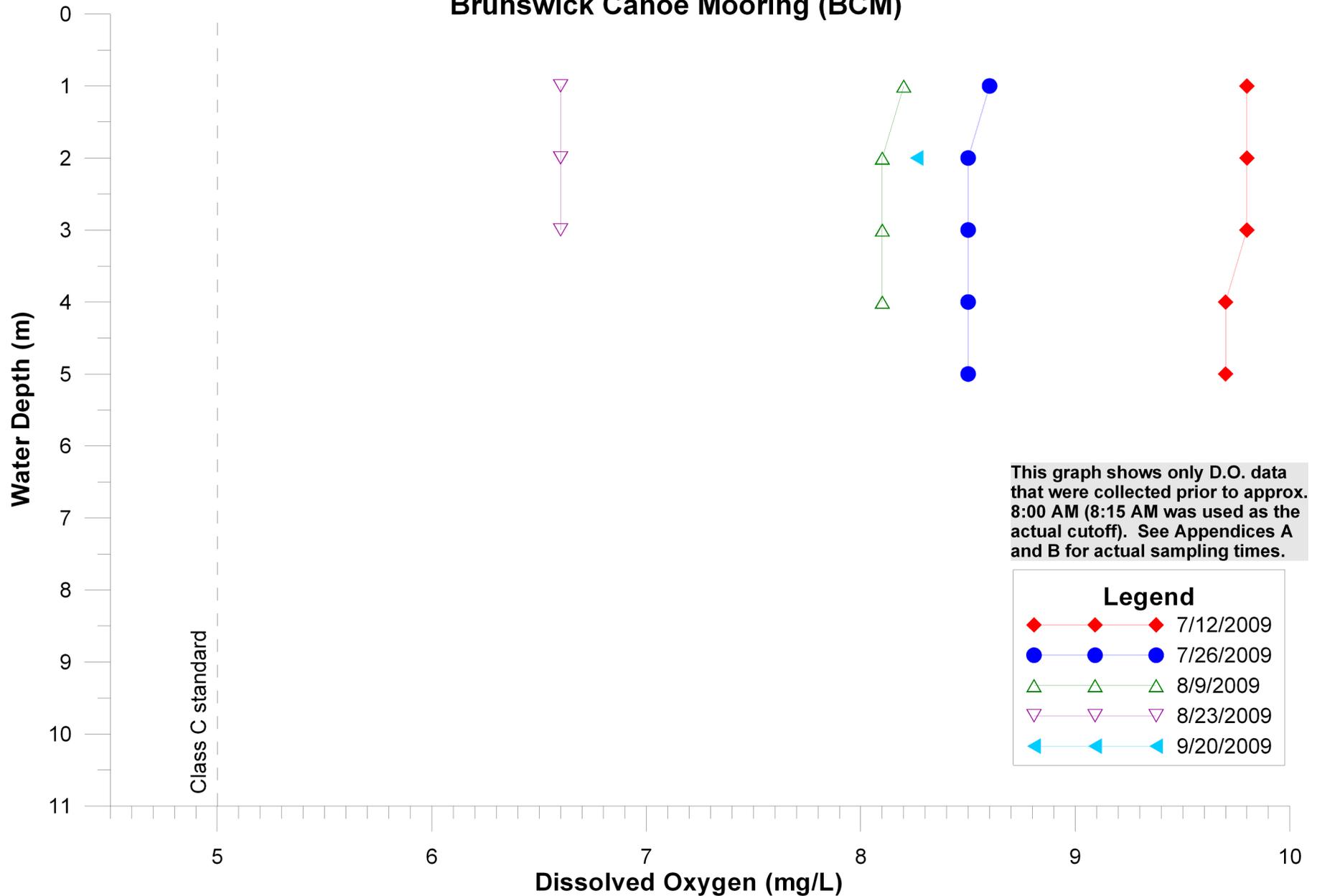


Figure 3-2-8. Early morning dissolved oxygen concentrations at Friends of Merrymeeting Bay site "BCM" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Brunswick Canoe Mooring (BCM)**

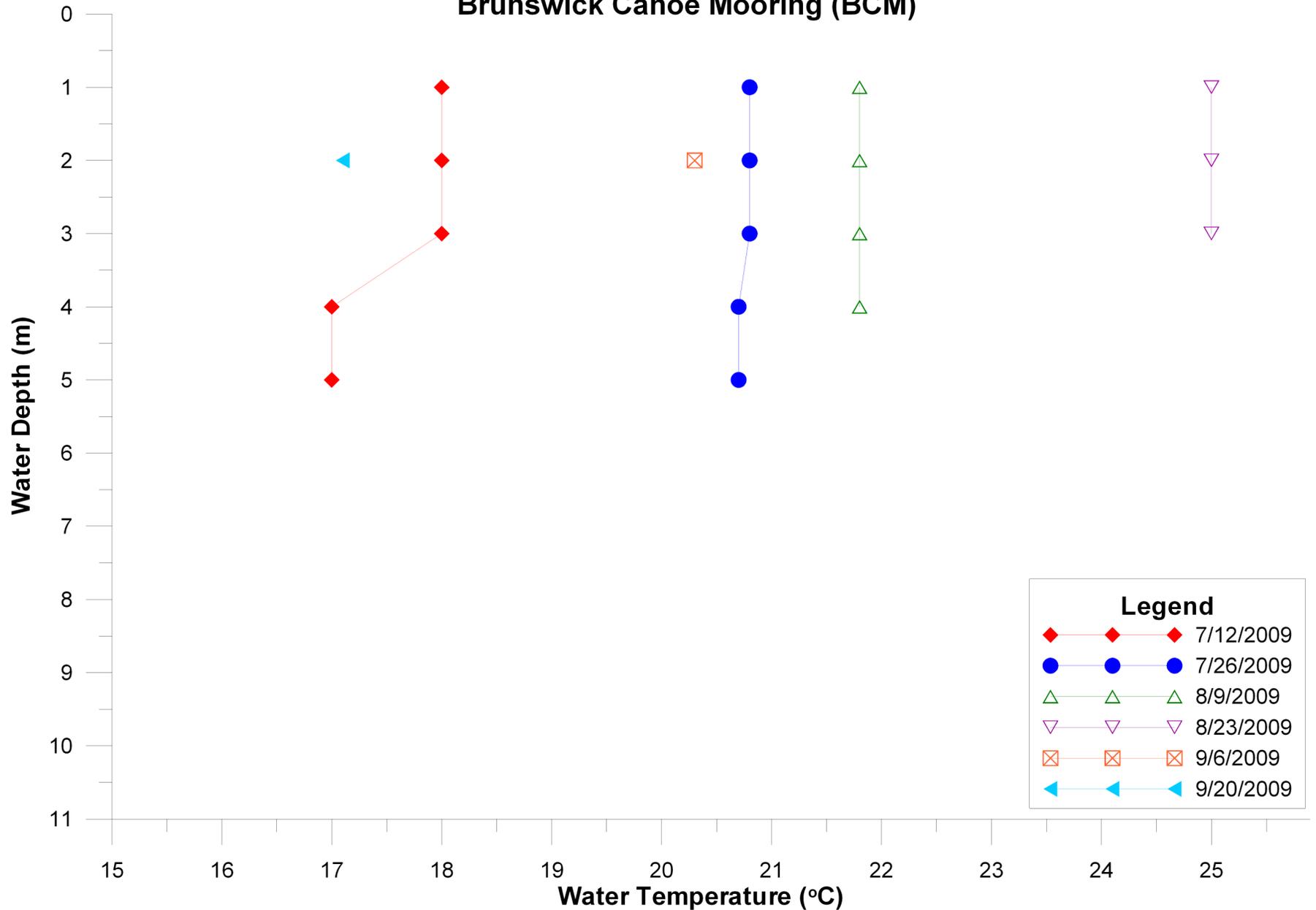


Figure 3-2-9. Water temperatures at Friends of Merrymeeting Bay monitoring site "BCM" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Water Street Mooring (WSM)**

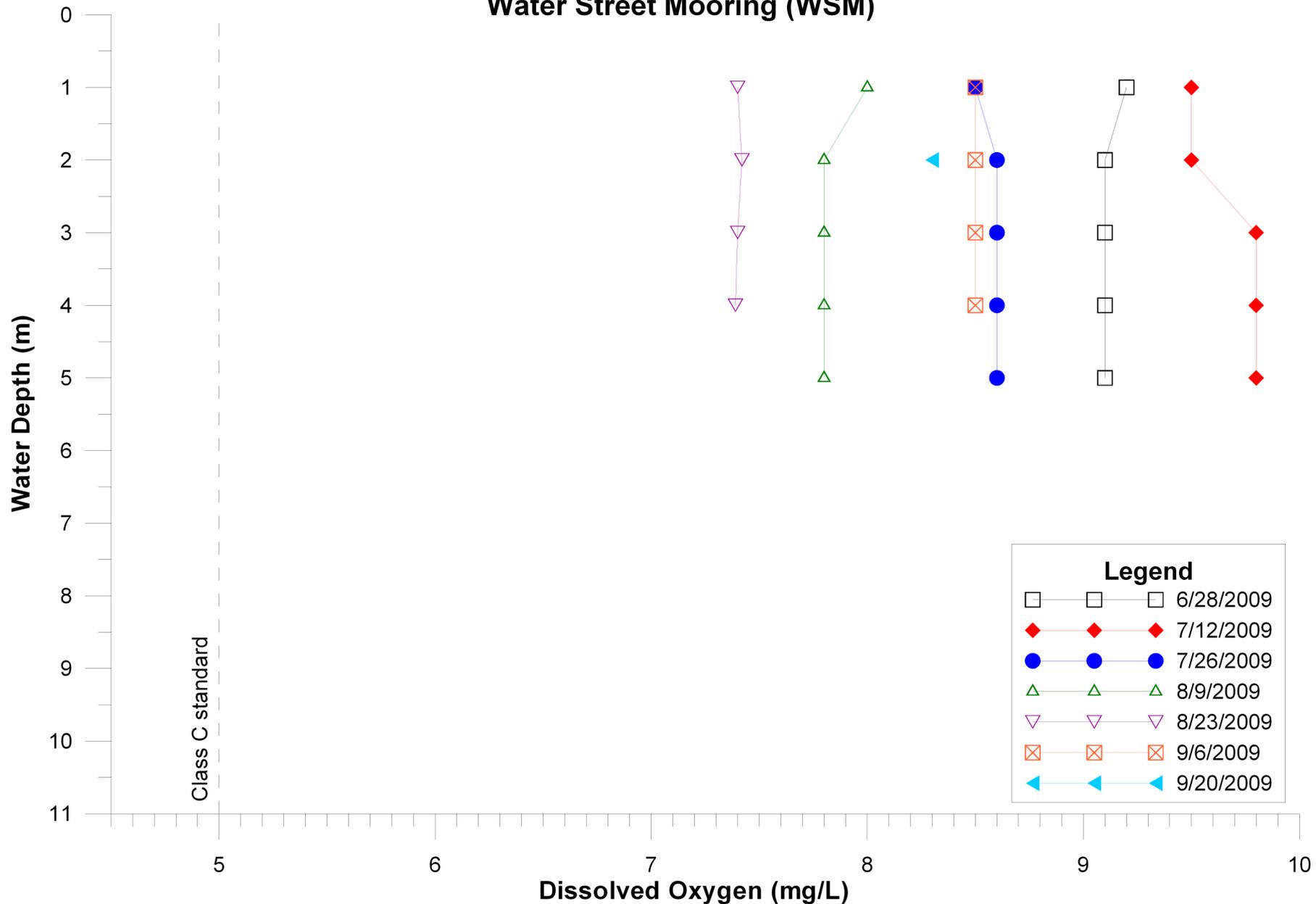


Figure 3-2-10. Dissolved oxygen concentrations at Friends of Merrymeeting Bay monitoring site "WSM" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Water Street Mooring (WSM)**

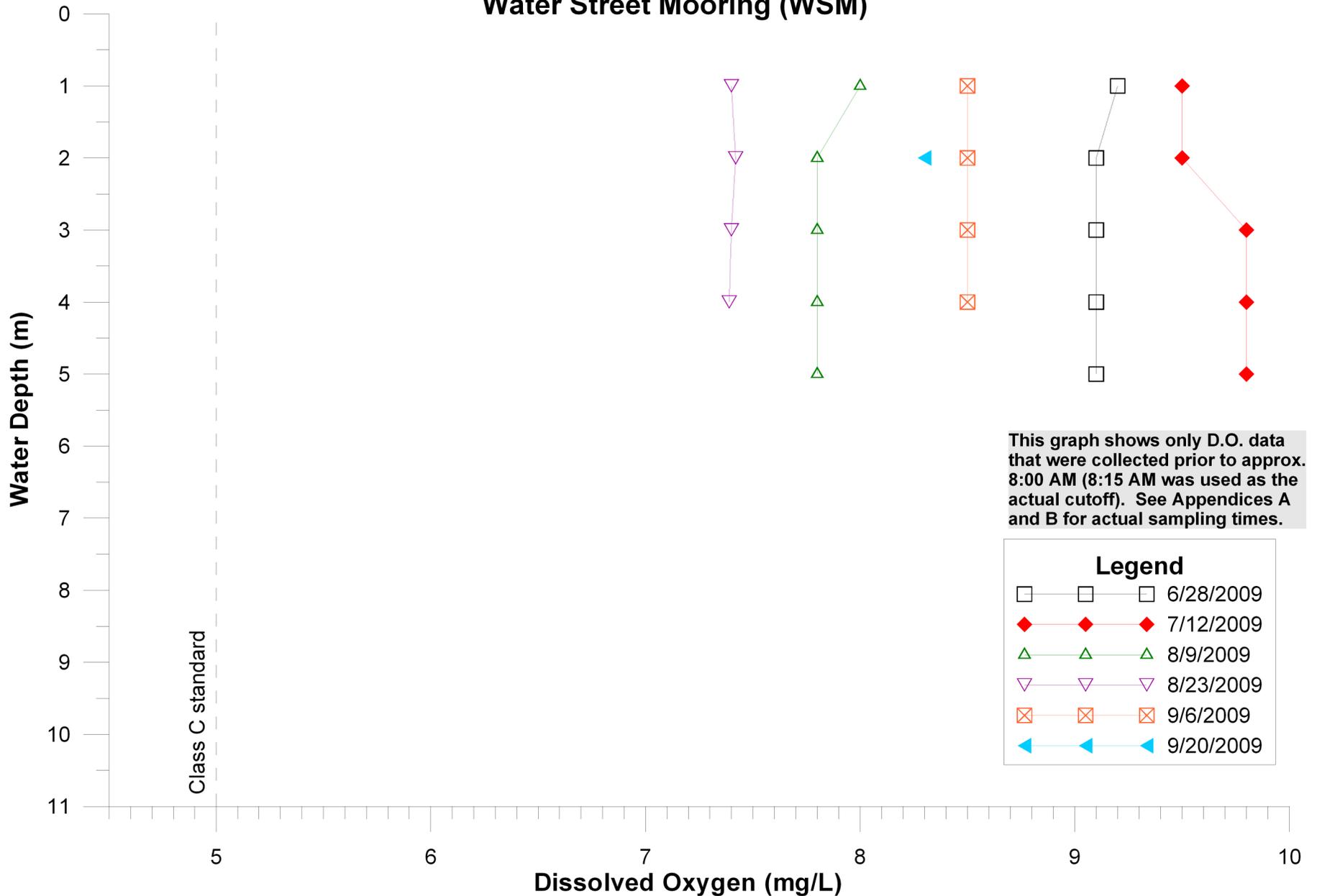


Figure 3-2-11. Early morning dissolved oxygen concentrations at Friends of Merrymeeting Bay site "WSM" on the Androscoggin River.

**VRMP 2009 Pilot Year Data  
Androscoggin River (Friends of Merrymeeting Bay)  
Water Street Mooring (WSM)**

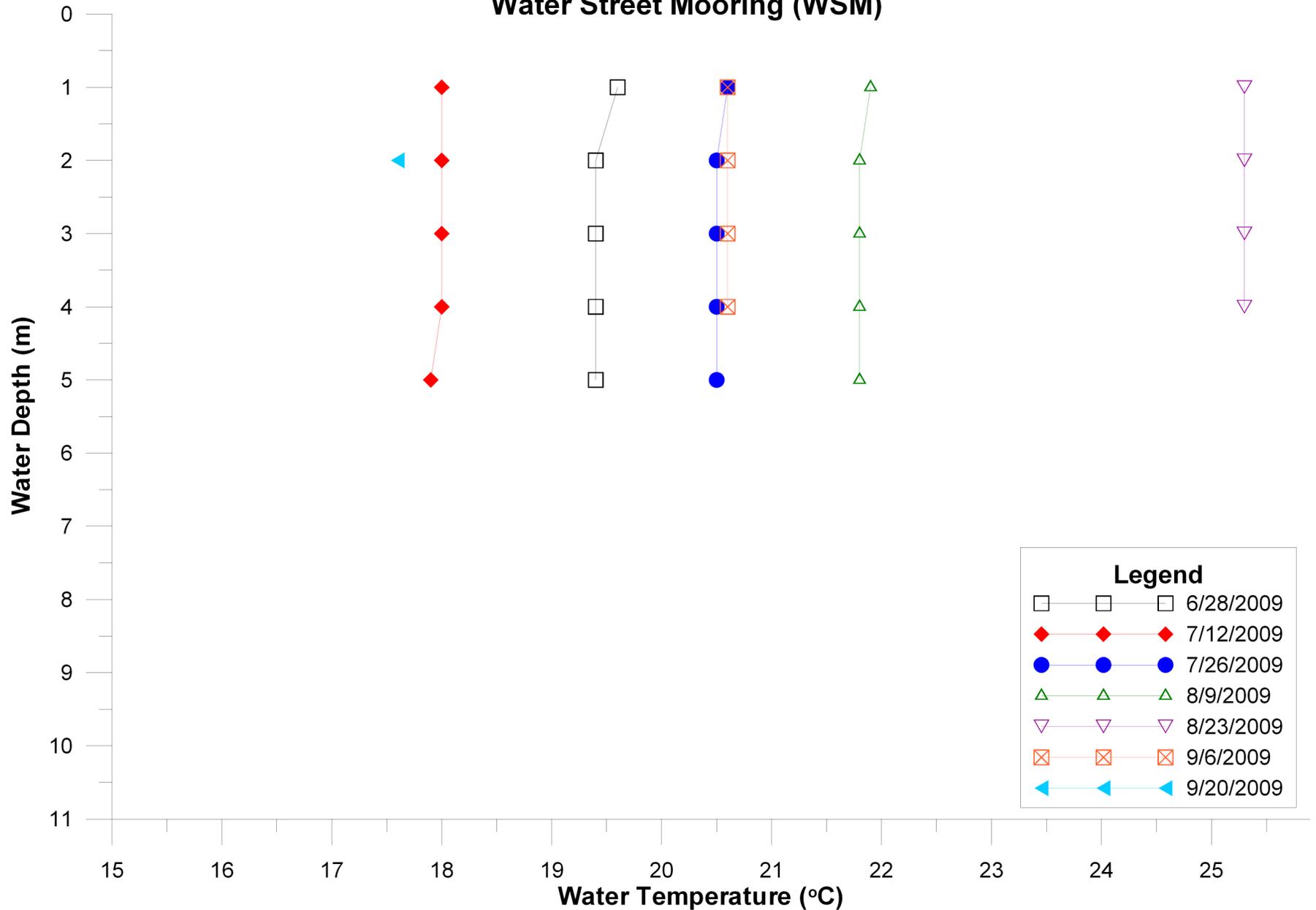


Figure 3-2-12. Water temperatures at Friends of Merrymeeting Bay monitoring site "WSM" on the Androscoggin River.