



<b>PROJECT NAME:</b> 2017/2018 Alpine Lakes Drinking Water Quality Monitoring	<b>SAMPLING DATE:</b> 5/10/2018
<b>MICHAEL BAKER FIELD PERSONNEL:</b> A. Smith & B. Brooks	<b>SUBMITTED BY:</b> S. Eklund
<b>UMIAQ FIELD PERSONNEL:</b> Roy Baldwin	<b>PROJECT CODE:</b> 163657
<b>SAMPLE LOCATIONS:</b> Lake L9312 & Lake L9313	<b>WEATHER:</b> 25°F, 25-30 mph wind

## 1. MONITORING EVENT DETAILS

The Alpine Lakes Drinking Water Quality Monitoring was coordinated to coincide with the 2018 Colville River Delta Spring Breakup field program. At 06:00 AM on May 10, Ms. Smith and Mr. Brooks attended UMIAQ's daily health and safety meeting. UMIAQ and Michael Baker personnel traveled to Lake L9313 via Hägglund and began taking water quality measurements at 11:00 AM and began surveying the water surface elevation (WSE) at 11:45 AM. Following sampling at Lake L9313, UMIAQ and Michael Baker personnel traveled to Lake L9312 via Hägglund and began taking water quality measurements at 12:30 PM and began surveying the WSE at 1:15 PM.

Ice thickness, snow depth, total water depth, freeboard, temperature, salinity, conductivity, dissolved oxygen (DO), pH, and turbidity measurements were collected at the deepest location in each lake, identified from previous monitoring events. Specific conductance (SC) was calculated using water temperature and conductivity. All measurements were made from below the ice surface to the lake bottom at a maximum of two-foot intervals. Water surface elevations at each sampling location were surveyed using local control established by UMIAQ.

In-situ water quality parameters were recorded using an YSI 6920 meter. The water quality meter was calibrated for conductivity and pH before leaving for the field, and DO parameters were checked for accuracy prior to sampling.

## 2. LAKE L9312 RESULTS

At Lake L9312, SC ranged from a minimum of 306 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) at a depth of 11 feet to a maximum of 318  $\mu\text{S}/\text{cm}$  at a depth of 6 feet; average SC was 311  $\mu\text{S}/\text{cm}$ . Salinity was constant throughout the water column at 0.1 parts per thousand (ppt). DO ranged from 110.0 percent (%) at a depth of 11 feet to 131.9% at a depth of 6 feet; average DO was 125.2%.

The pH was consistent throughout the water column at 6.9. Turbidity ranged from a minimum of -0.9 Nephelometric Turbidity Units (NTU) at depths of 6 and 7 feet to a maximum of -0.5 NTU at a depth of 11 feet; average turbidity was -0.8 NTU.

## 3. LAKE L9313 RESULTS

At Lake L9313, SC ranged from a minimum of 680  $\mu\text{S}/\text{cm}$  at a depth of 8 feet to a maximum of 712  $\mu\text{S}/\text{cm}$  at a depth of 5 feet; average SC was 692  $\mu\text{S}/\text{cm}$ . Salinity was constant throughout the water column at 0.3 parts per thousand (ppt). DO ranged from 75.0% at a depth of 6 and 7 feet to 76.0% at a depth of 8 feet; average DO was 75.5%.

The pH ranged from a minimum of 6.3 at a depth of 8 feet to a maximum of 6.4 at depths of 5, 6, and 7 feet; average pH was 6.3. Turbidity ranged from a minimum of 0.0 NTU at a depth of 5 feet to a maximum of 0.6 NTU at a depth of 8 feet; average turbidity was 0.3 NTU.

This concludes sampling for the 2017/2018 Alpine Lakes Drinking Water Quality program.



Table 1: Water Quality Parameters at Lake L9312 and Lake L9313

Location & Time	Water Surface Elevation (ft BPMSL)	Water Depth (ft)	Ice Thickness (ft)	Snow Depth (ft)	Freeboard (ft)	Sample Depth (ft)	Temp (°C)	Conductivity (µS/cm)	Specific Conductance (µS/cm)	DO (mg/L)	DO (% Saturation)	Salinity (ppt)	pH (SU)	Turbidity (NTU)	
<b>Lake L9312</b> N70°19'52.2" W150°56'59.9" 12:30 PM	7.3	12.0	5.2	0.0	0.5	1	-	-	-	-	-	-	-	-	
						2	-	-	-	-	-	-	-	-	-
						3	-	-	-	-	-	-	-	-	-
						4	-	-	-	-	-	-	-	-	-
						5	-	-	-	-	-	-	-	-	-
						6	0.7	166	318	19.02	131.9	0.1	6.9	-0.9	
						7	1.6	169	312	18.32	131.9	0.1	6.9	-0.9	
						8	-	-	-	-	-	-	-	-	
						9	2.4	172	309	17.55	126.9	0.1	6.9	-0.7	
						10	-	-	-	-	-	-	-	-	
						11	3.0	174	306	15.01	110.0	0.1	6.9	-0.5	
						12	-	-	-	-	-	-	-	-	
						13	-	-	-	-	-	-	-	-	
						14	-	-	-	-	-	-	-	-	
<b>Lake L9313</b> N70°20'28.1" W150°56'31.5" 11:00 AM	6.0	9.0	4.8	0.2	0.3	1	-	-	-	-	-	-	-	-	
						2	-	-	-	-	-	-	-	-	
						3	-	-	-	-	-	-	-	-	
						4	-	-	-	-	-	-	-	-	
						5	0.0	363	712	11.06	75.9	0.3	6.4	0.0	
						6	1.1	368	692	10.72	75.0	0.3	6.4	0.3	
						7	1.7	373	686	10.39	75.0	0.3	6.4	0.3	
						8	2.1	375	680	10.52	76.0	0.3	6.3	0.6	
						9	-	-	-	-	-	-	-	-	
						10	-	-	-	-	-	-	-	-	
						11	-	-	-	-	-	-	-	-	
						12	-	-	-	-	-	-	-	-	

Notes:

- (1) All sample location coordinates referenced to NAD83 datum.
- (2) Time shown indicates the start of the measurement.
- (3) Elevation of water surface in sample hole correlates to British Petroleum Mean Sea Level (BPMSL).
- (4) Water depth is the distance from the water surface in the sample hole to the bottom of the lake.
- (5) Freeboard is the distance from the top of ice to the water surface, negative indicates a water level above ice.
- (6) Sample depth is measured from the water surface.
- (7) Specific conductance (referenced to 25°C) was obtained using a conversion coefficient of 0.0196 based on empirical data.
- (8) Temperature measurements have an accuracy of +/- 0.2°C.
- (9) Negative turbidity is possible if the sampled water is less turbid than the calibration standard. These values can be interpreted as 0 NTU.