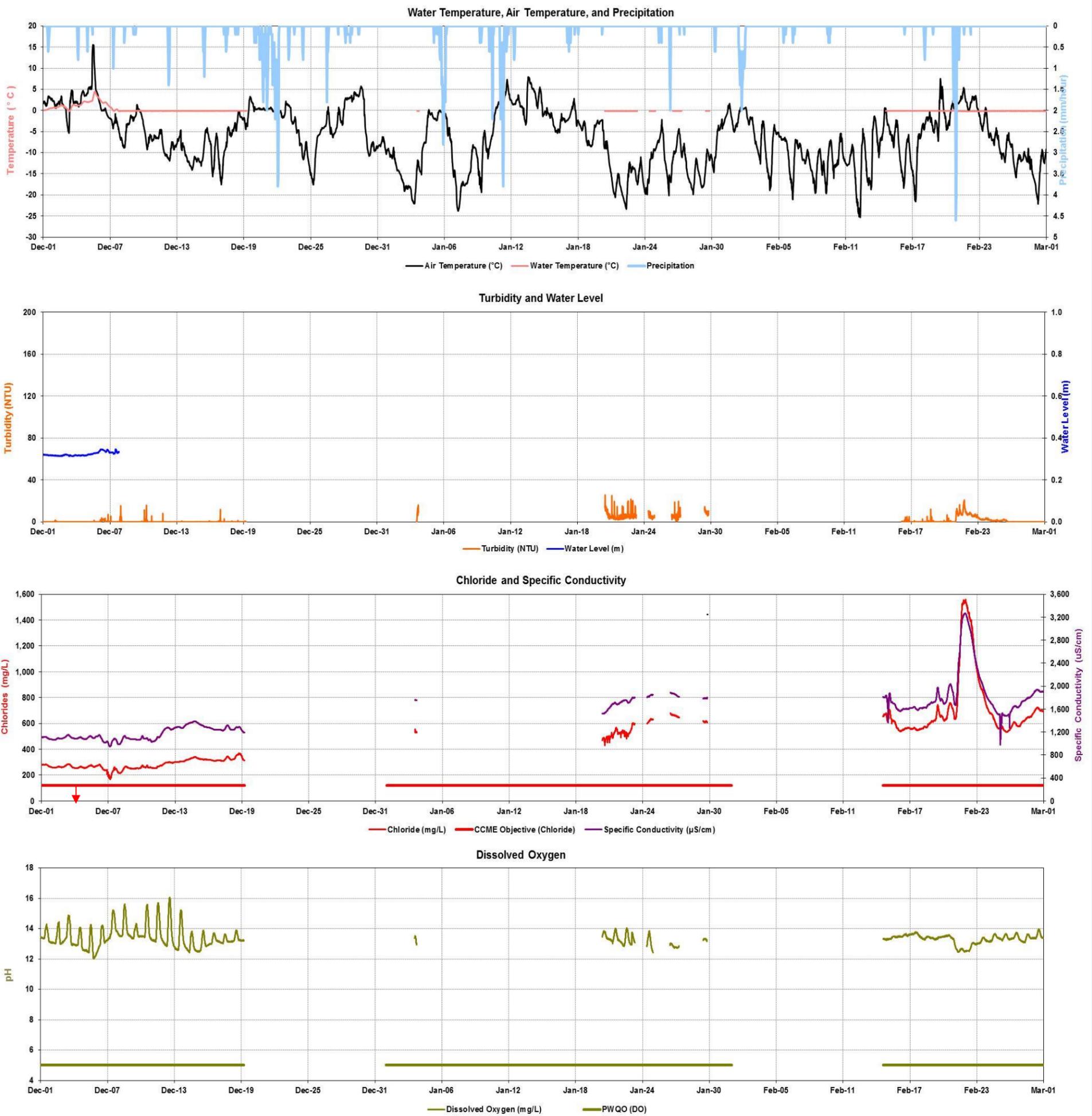


Real-Time Water Quality: Winter 2014

Huttonville Creek at Lionhead Golf and Country Club



↑ ↓ Coloured arrows indicate whether the given parameter should be above or below the indicated Water Quality Objective. Objective may be off-scale for some graphs.

Seasonal Exceedance of Water Quality Objectives

	Water Temperature			Dissolved Oxygen		pH		Chloride
	Cold	Mixed	Warm	Cold	Warm	Lower limit	Upper limit	Upper limit
Objective/Guideline	26 °C	28 °C	30 °C	5 mg/L	4 mg/L	6.5	8.5	120 mg/L
Number of Days	0	0	0	0	0	No Data	No Data	44
Percent of Readings	0.00	0.00	0.00	0.0	0.00	No Data	No Data	100.00

- Water Temperature** Aquatic organisms, especially fish, are sensitive to extreme highs in river water temperature. If the water temperature exceeds CVC's maximum objective, fish will suffer. CVC has set an absolute maximum water temperature objective of no greater than 36°C for cold water streams such as Huttonville Creek.
- Water Level** The water level at each site is essential to translate parameter concentrations to loadings. Water level also allows us to determine when a rain event has occurred and how fast the water level increased, and returned to normal during and after a storm, respectively.
- Dissolved Oxygen** Aquatic habitats need sufficient oxygen in water to survive and thrive. DO fluctuates over a diurnal cycle; high during the day and lower during the night, and with temperature (colder water holds more oxygen). Provincial Water Quality Objective for cold water fish is greater than 5 mg/L, and for warm water fish is greater than 4mg/L. Huttonville Creek represents a cold water habitat.
- Turbidity** Turbidity is a measurement of water clarity. A high turbidity indicates the presence of solids, sediments, or pollutants. Turbidity is used to estimate total suspended solid concentration.
- Specific Conductivity** Conductivity measures the ability of water to pass an electrical current. Higher conductivity indicates a higher concentration of salts and other ions in the water.
- Chloride** Chlorides are often elevated in highly urbanized areas as a result of road salt application and the drainage of swimming pools, or water softeners. The CCME guideline for chlorides is 120mg/L.
- pH** pH level is a measurement of the acidity or alkalinity of water. The pH scale ranges from 0 to 14. Extreme levels of both alkalinity and acidity can be detrimental to aquatic life. The MOE has set a Provincial Water Quality Objective of in between 6.5 and 8.5 units.

Water Temperature, Air Temperature, and Daily Precipitation

- Water temperature ranged from -0.23°C to 4.48°C.*¹
- The river likely remained frozen for the entire season from December 8th onwards, although data are not available to confirm this.
- Air temperature dropped below freezing on 90% of the days measured this season*².
- At this location*, on December 20th, 21st, and 22nd as part of the “ice storm” in Southern Ontario, 38.6mm of rain, snow, and freezing rain (snow water equivalent) was recorded.
- A total of 156.8mm of precipitation (snow water equivalent) was recorded this season.*²

*¹These values apply only to the time period for which data are available.

*² Recorded at the CVC head office climate station, 5km from the station and outside of its drainage area.

Water Level and Turbidity

- In early December, water level was around 0.3m. Water level data were removed from December 8th onwards when the creek froze and ice formation was skewing readings.
- Turbidity remained low for the entire season and peaked at just over 20 NTU.

Chloride and Specific Conductivity

- Chloride ranged from 168.2mg/L to 1,560mg/L and peaked on February 22nd following a large precipitation event.
- Increases in chloride and specific conductivity occur when road salt is washed into the creek after application and when temperatures increase allowing salt-rich snow to melt and flow into the creek. Concentrations will then revert to their ambient levels.

pH and Dissolved Oxygen

- Dissolved oxygen ranged from 12.03mg/L to 16.06mg/L this winter, staying above the 4mg/L Provincial Water Quality Objective (PWQO) 100% of the time.
- pH values were unreliable during this deployment period, due to sensor error, and were removed.

Quality Control Issues

- This station suffered from greater data loss due to power issues this winter than the other stations for several reasons:
 - Due to its location on a golf course, this station is impossible to visit during the winter in order to clear snow off the solar panel.
 - Due to the nature and orientation of the bridge within the golf course, the solar panel is not facing south for optimal sun exposure.
 - This station contains a bubbler for the measuring of accurate water level data. This equipment draws more power than the pressure level sensors at the other stations.



Figure 1: Hydrolab being removed for re-calibration on November 11th, 2013.

Questions or Comments?

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Deployment Information

- Deployment Period: November 11th, 2013 to April 17th, 2014 (157 days):
- Monitoring equipment used:
 - Water quality parameters: Hydrolab DS5X
 - Air Temperature: CVC head office ET station
 - Water Level: Sutron bubbler
 - Precipitation: CVC head office climate station