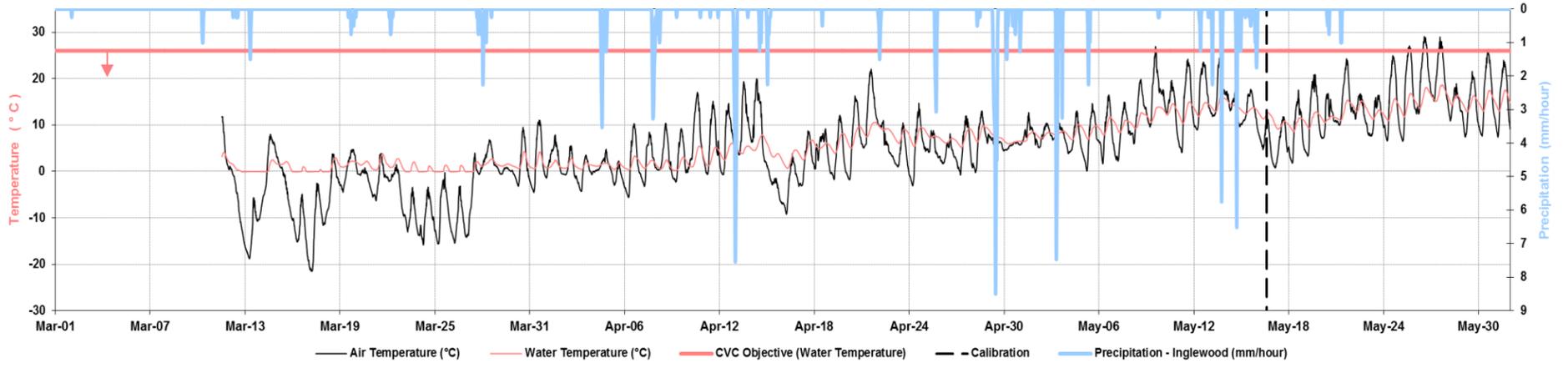


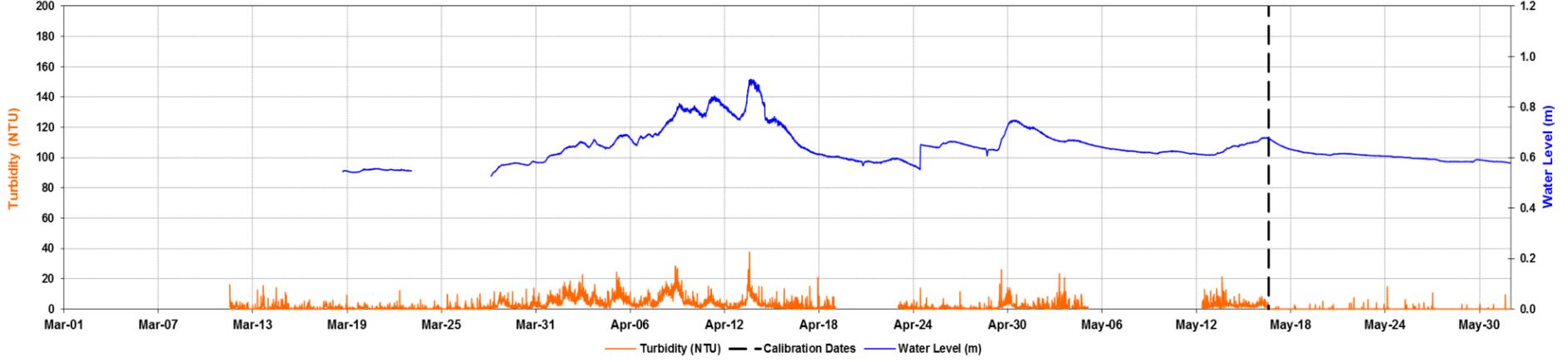
# Real-Time Water Quality: Spring 2014

## West Credit River at Belfountain Conservation Area

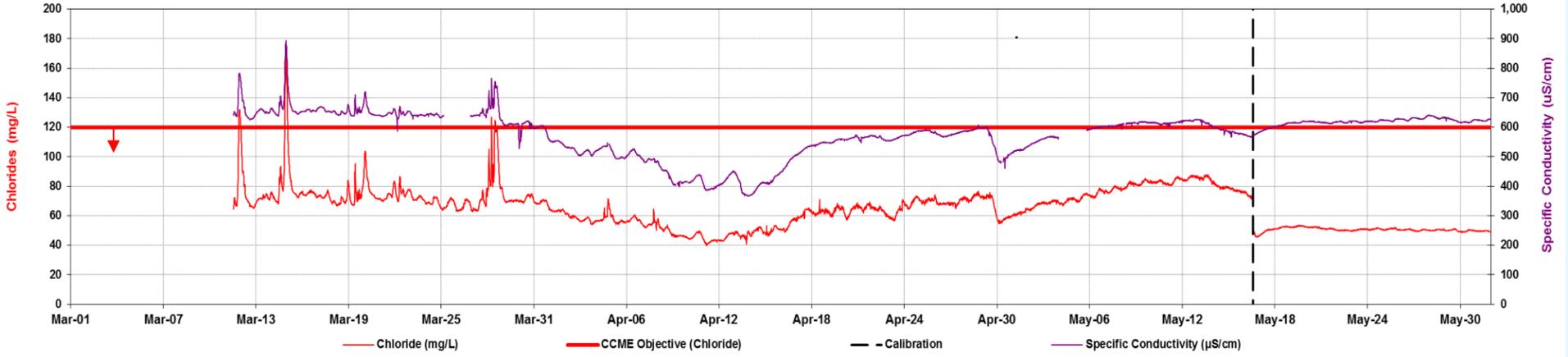
Water Temperature, Air Temperature, and Precipitation



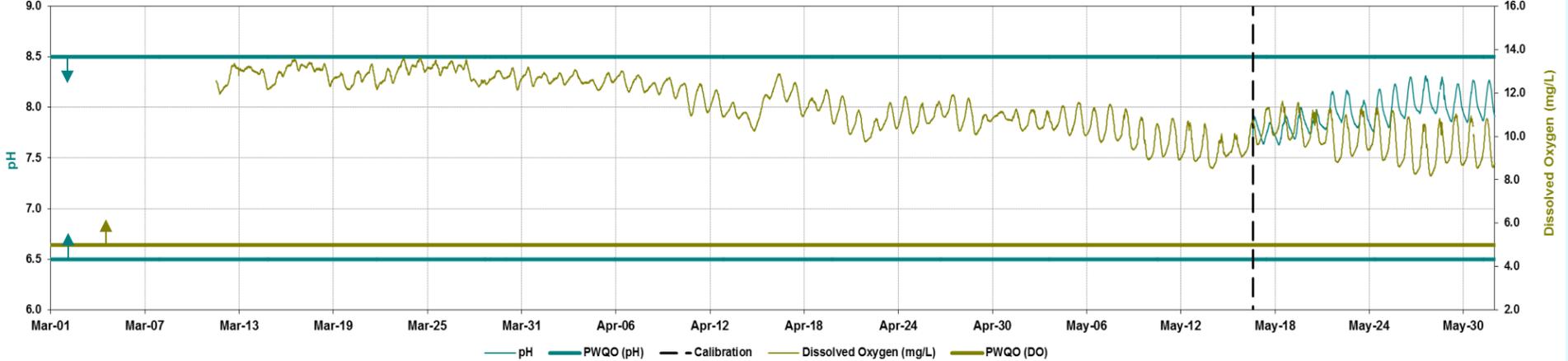
Turbidity and Water Level



Chloride and Specific Conductivity



pH and Dissolved Oxygen



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	0	0	5
Percent of Readings	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.48

**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 26°C for cold streams such as the West Credit River.

**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. The West Credit River represents a cold water fish 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

- Air temperature ranged from -21.52 °C to 29.05 °C. The maximum air temperature was observed on May 26<sup>th</sup>.
- Water temperature ranged from -0.0.7 °C to 18.67 °C.
- Air temperature dropped below freezing on 49% of the days measured this winter.
- Water temperature dropped to or below freezing on 33% of the days measured this winter.
- The river at this location was completely thawed by March 27<sup>th</sup>.
- A total of 180.75 mm of precipitation was recorded\* this spring.
- The largest precipitation event this spring saw 28.5 mm of rain fall on April 29<sup>th</sup> over 8 hours. The average precipitation event was 5.3 mm, and there were 6 events this season of 10 mm or more. An event is defined as any amount of precipitation separated by 6 hours or more.

\*Measured at the Inglewood Region of Peel precipitation gauge, roughly 5km east of the water quality station, and outside its drainage area.

### Water Level and Turbidity

- Water level increased throughout late March and early April with melting snow and precipitation, reaching its peak of 0.91 m on April 13<sup>th</sup>. It then gradually receded back to ambient levels throughout the spring, increasing only in response to rain events. Water level reached its low on March 28<sup>th</sup> before the impact on melting snow.
- Water level increased rapidly on April 24<sup>th</sup>, when flow through the dam downstream of the station was adjusted.
- Turbidity ranged from 0 NTU to 38 NTU and responded to increases in water level throughout the spring. Some of the noise in turbidity is caused by interference with or fouling of the sensor.

### Chloride and Specific Conductivity

- Chloride ranged from 40 mg/L to 173 mg/L.
- In March, increases in chloride and specific conductivity occurred when road salt was washed into the river after application, and when temperatures increased allowing salt-rich snow to melt and flow into the river.
- By mid-April sudden spikes in chloride and specific conductivity had ceased, and levels returned to their ambient values.

### pH and Dissolved Oxygen

- Dissolved oxygen ranged from 8.17 mg/L to 13.64 mg/L this spring, staying above the 5mg/L Provincial Water Quality Objective (PWQO) 100% of the time.
- pH ranged from 7.63 to 8.31 this spring, staying within the PWQO range 100% of the time.
- In mid to late May the range of pH and dissolved oxygen values began to increase compared to early spring. This indicates the growth of plants and algae which consume oxygen over night and produce it during the day. The range of dissolved oxygen values in late May is relatively low, at around 3.5 mg/L indicating low productivity.

### Quality Control Issues

- Water level data were removed until March 18<sup>th</sup>, and from March 23<sup>rd</sup> to March 28<sup>th</sup> due to ice formation. This results in pressure changes which affect readings, and cannot be corrected.
- A linear drift correction was applied to chloride values from May 16<sup>th</sup> to calibration on August 27<sup>th</sup> to ensure agreement with the more accurate post-calibration values.
- Noise due to sensor interference was removed from specific conductivity values throughout the season. From May 3<sup>rd</sup> to May 5<sup>th</sup> noise could not be corrected and all specific conductivity data were removed.
- pH data were removed until May 16<sup>th</sup> due to interference with the sensor causing values to drop to unreasonable levels.

### Deployment Information

- Deployment period 1: October 2<sup>nd</sup>, 2013 to May 16<sup>th</sup>, 2014 (226 days)
- Deployment period 2: May 16<sup>th</sup>, 2014 to August 27<sup>th</sup>, 2014 (103 days)
- Monitoring equipment used:
  - Water quality parameters: Hydrolab DS5X
  - Air temperature: 5600-0025-1 thermistor
  - Water level: OTT Pressure Level Sensor
  - Precipitation: Region of Peel, Inglewood precipitation station

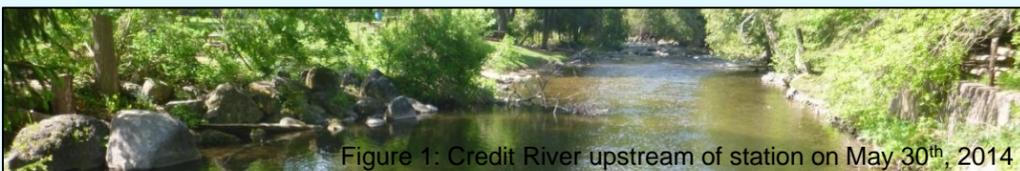


Figure 1: Credit River upstream of station on May 30<sup>th</sup>, 2014

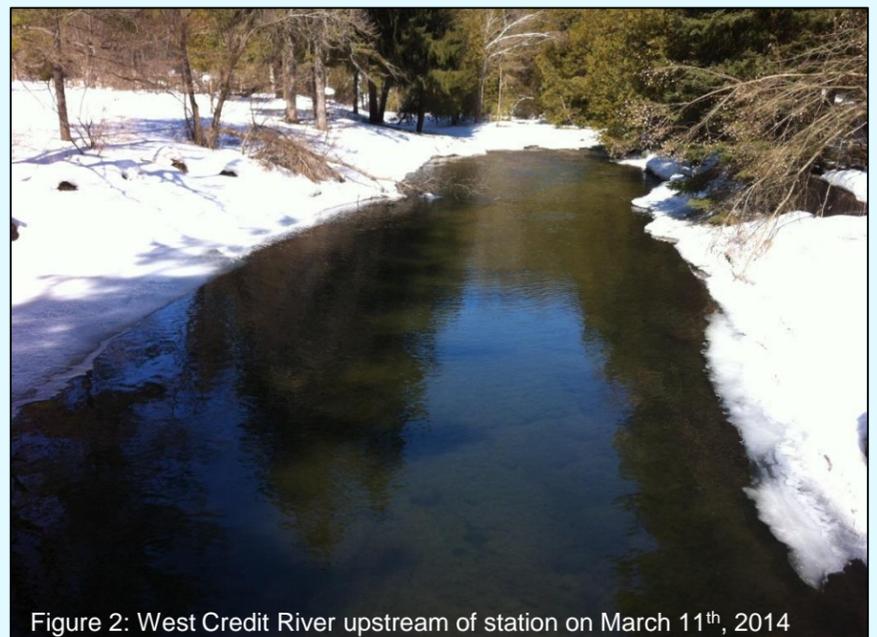


Figure 2: West Credit River upstream of station on March 11<sup>th</sup>, 2014

### Questions or Comments?

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