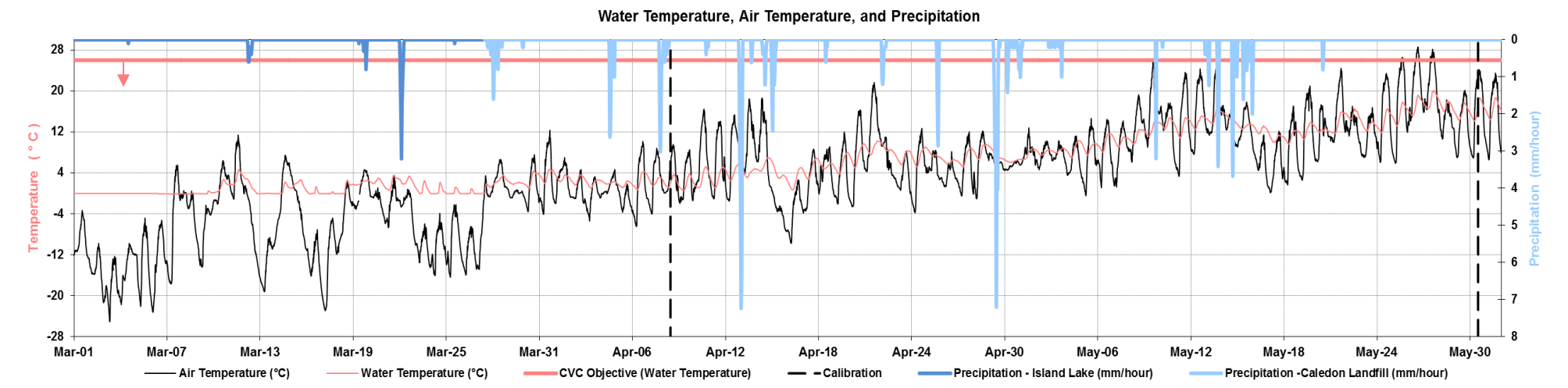
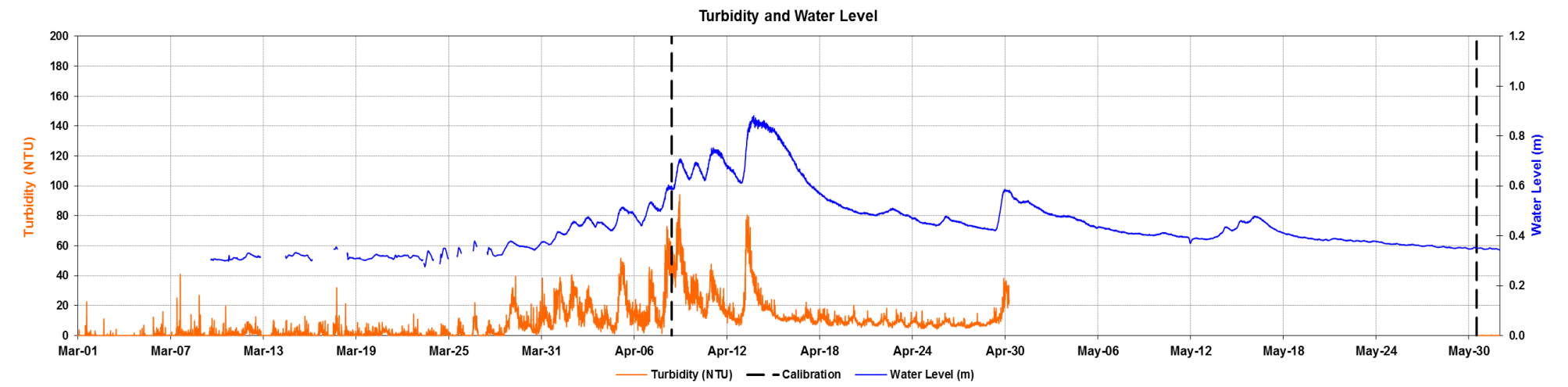
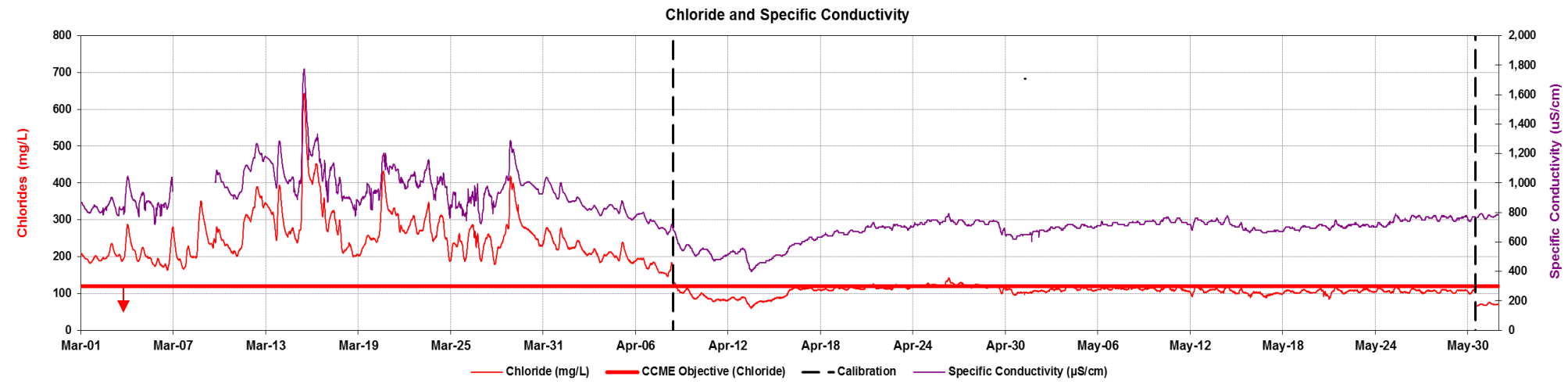
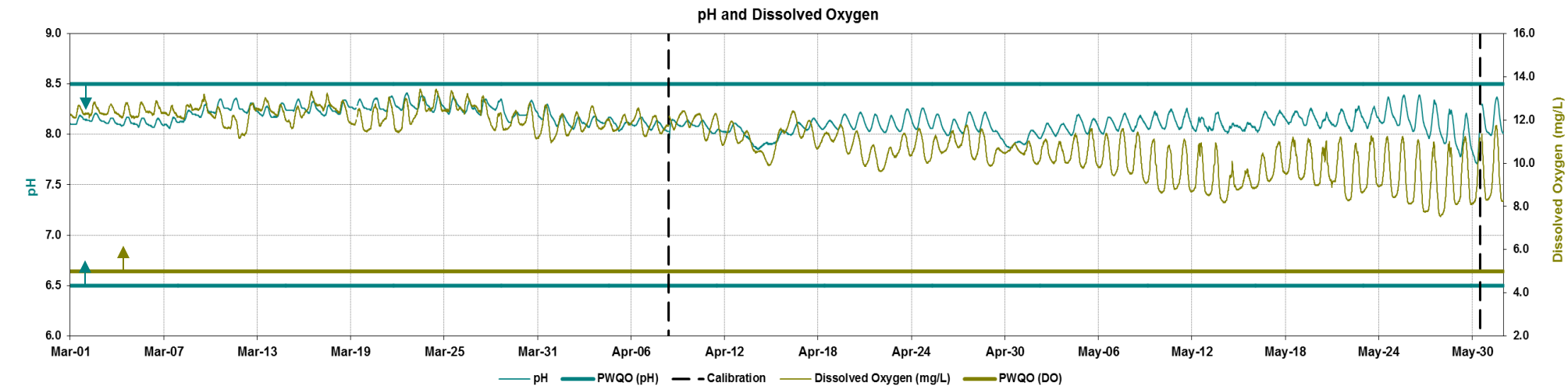
Real-Time Water Quality: Spring 2014

Credit River at Cataract Falls









↑ ↓ 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 ºC	28 ºC	30 ºC	5 mg/L	4 mg/L	6.5	8.5	120 mg/L
Number of Days	0	0	0	0	0	0	0	53
Percent of Readings	0.00	0.00	0.00	0.0	0.00	0.00	0.00	46.81

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 upper 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 upper 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.

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Water Temperature, Air Temperature, and Daily Precipitation

- Air temperature ranged from -25.06 °C to 28.58 °C. The maximum air temperature was observed on May 26th.
- Water temperature ranged from -0.12 °C to 20.09 °C.
- Air temperature dropped below freezing on 57% of the days measured this spring.
- Water temperature dropped to or below freezing on 25% of the days measured this spring.
- The river at this location began to thaw on March 9th, and was completely thawed by March 27th.
- A total of 148.5 mm of precipitation was recorded* this season.
- The largest event this spring saw 23.8 mm of rain fall on April 29th over 10 hours. The average precipitation event was 5.5 mm, and there were 3 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 Island Lake climate station, roughly 12km north of the water quality station, and within its drainage area. And at the Caledon Landfill climate station, less than 1km away from the station, and within its drainage area.

Water Level and Turbidity

- Water level increased almost daily in response to melting snow and ice as spring set in, reaching its peak of 0.881 m on April 13th. It then began to recede back to baseflow levels, increasing only with rain events.
- Turbidity followed the same pattern, increasing with water level, and receding back to its ambient level of 1NTU during the second half of the season.

Chloride and Specific Conductivity

- Chloride ranged from 59 mg/L to 643 mg/L.
- Chloride and specific conductivity values drop from their peak in mid-March to ambient levels in mid-April as temperatures rise consistently above the freezing point, and road salt is no longer in use.

pH and Dissolved Oxygen

- Dissolved oxygen ranged from 7.52 mg/L to 13.42 mg/L this spring, staying above the 5mg/L Provincial Water Quality Objective (PWQO) 100% of the time.
- pH also remained within the PWQO of 6.5 to 8.5 for the entire season, with values ranging from 7.71 to 8.41.
- The range of dissolved oxygen and pH values began to increase in early May, as plant and algae growth began.

Quality Control Issues

- Data from the nearest precipitation station (Caledon Landfill) was not available prior to March 27th. Data from the Island Lake station was used instead.
- Turbidity values from April 30th to May 30th, reached unreasonable extremes, and were removed. This was likely caused by interference with the turbidity sensor.

Deployment Information

- Deployment period 1: October 2nd, 2013 to April 8th, 2014 (188 days)
- Deployment period 2: April 8th, 2014 to May 30th, 2014 (52 days)
- Deployment period 3: May 30th, 2014 to July 25th, 2014 (56 days)
- Monitoring equipment used:
  - Water quality parameters: Hydrolab DS5X
  - Air temperature: 5600-0025-1 thermistor
  - Water level: OTT Pressure Level Sensor
  - Precipitation (March 1st to March 27th): Island Lake climate station
  - Precipitation (March 27th to May 31st): Caledon Landfill climate station

Figure 1: Credit River upstream of station on May 30th, 2014

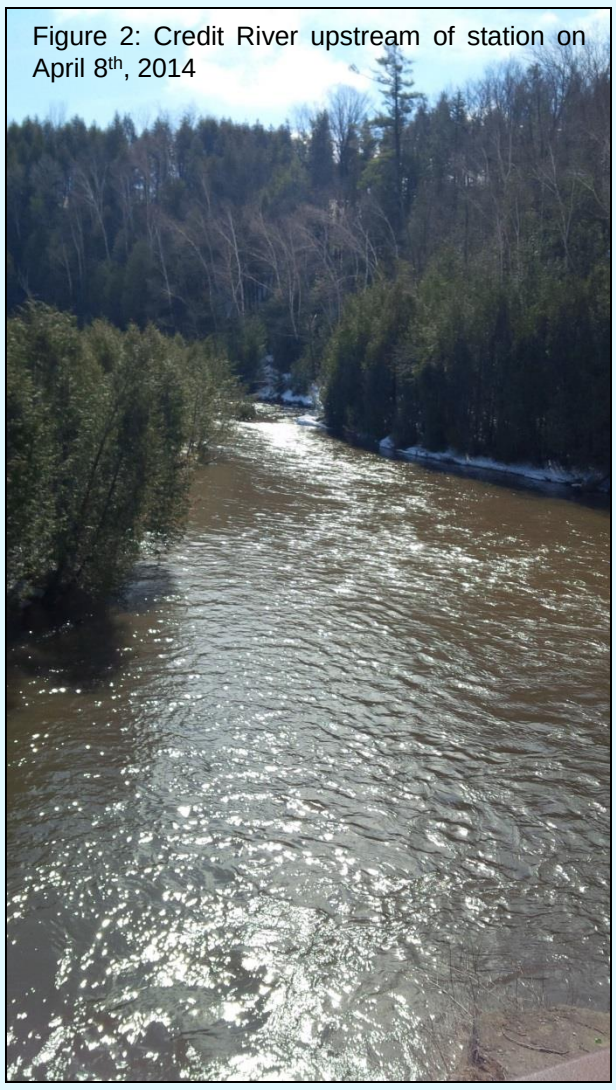

Figure 2: Credit River upstream of station on April 8th, 2014

Questions or Comments?

- Amanjot Singh, Water Quality Engineer, CVC
  (905) 670-1615 extension 267, asingh@creditvalleyca.ca
- Lorna Murison, Water Resources Technician, CVC
  (905) 670-1615 extension 408, lmurison@creditvalleyca.ca