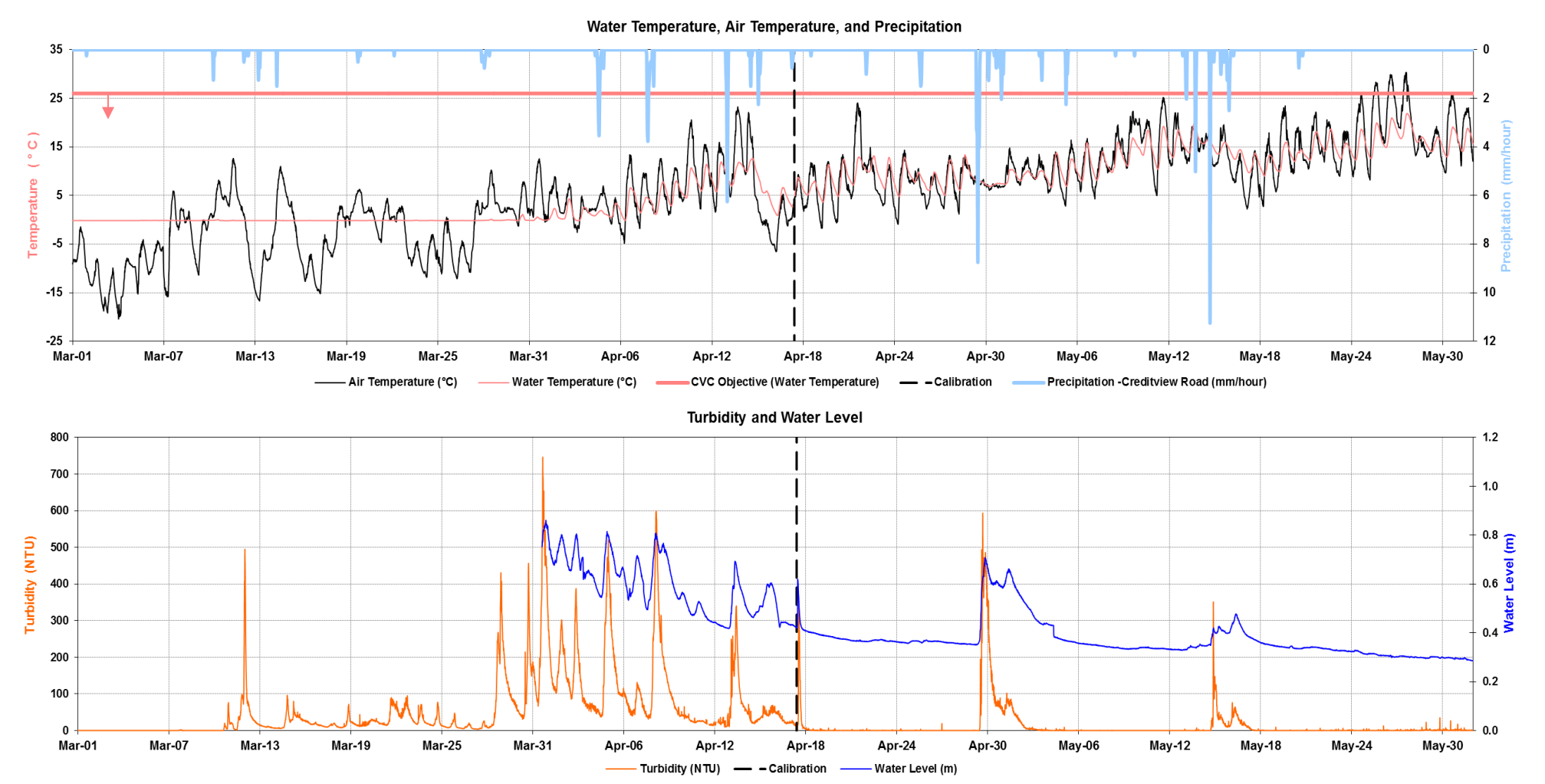
Real-Time Water Quality: Spring 2014

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 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	23	90
Percent of Readings	0.00	0.00	0.00	0.0	0.00	0	14.49	93.99

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.

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Water Temperature, Air Temperature, and Daily Precipitation

- Water temperature ranged from -0.2 °C to 21.89 °C, remaining below the upper objective of 26 °C.
- Water temperature dropped to or below freezing on 38% of the days measured this spring.
- Air temperature*[1] ranged from -20.43 °C to 30.36 °C, reaching the maximum on May 27th.
- Air temperature*[1] dropped below freezing on 42% of the days measured this spring.
- The river transitioned from frozen to thawed from March 30th to April 6th.
- A total of 139.5 mm of precipitation was recorded this season*[2].
- The largest event occurred on April 29th and saw 23.75 mm of rain fall over 6 hours. The average precipitation event was 4.8 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.

*[1]Recorded at the CVC head office ET station

*[2]Recorded at the Region of Peel's Creditview Road rain gauge

Water Level and Turbidity

- From late March, water level began to recede back to its ambient level, as input from melting snow and ice lessened. From mid-April onward, water level only increased in response to rain events.
- Turbidity follows a similar pattern and reaches its ambient levels of 0 NTU to 5 NTU in mid-April.

Chloride and Specific Conductivity

- Chloride ranged from 64 mg/L to 1987 mg/L.
- Chloride values dropped from their peak in early March to ambient levels in late March as temperatures began to rise consistently above the freezing point, and road salt is no longer in use.

pH and Dissolved Oxygen

- Dissolved oxygen ranged from 6.69 mg/L to 14.17 mg/L this spring, staying above the 5 mg/L Provincial Water Quality Objective (PWQO) 100% of the time.
- pH ranged from 7.83 to 9.00 this spring, exceeding the upper objective 14.5% of the time.
- In mid-April, as plants and algae begin to grow, producing oxygen during the day, and consuming it over night, the range of dissolved oxygen values increases. The growth of plants and algae has a similar impact on pH values.
- Dissolved oxygen values gradually decrease towards the end of May as water temperature increases. Dissolved oxygen reaches its minimum at the same time as water temperature reaches its maximum.

Quality Control Issues

- Water level data were removed until march 31st. The weight of ice on the creek had been impacting water level readings.
- Specific conductivity data at the end of the May were removed; the sensor was reporting unreasonable values.
- pH data until calibration on April 17th were removed due to sensor error.

Figure 1 : Huttonville water quality station on on April 17th

Figure 2 : Hydrolab removed for re-calibration on April 17th

Deployment Information

- Deployment Period 1: November 11th, 2013 to April 17th, 2014 (157 days)
- Deployment Period 2: April 17th, 2014 to June 26, 2014 (70 days)
- Monitoring equipment used:
  - Water quality parameters: Hydrolab DS5X
  - Air Temperature: CVC head office ET station
  - Water Level: Sutron bubbler
  - Precipitation: Region of Peel Creditview Road rain gauge

Figure 3 : Inside enclosure at Huttonville Creek; bubbler enclosure on the left, data logger enclosure on the right.

Questions or Comments?

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