

Info Sheet Understanding Water Quality in the SEAWA Watershed 2018—1

Water quality refers to the suitability of water for an intended use. Good quality water is safe for **drinking**, **protection of aquatic life** (fish and other organisms living in water), **agricultural use** (irrigation of crops and livestock watering), and **aesthetics and recreation**.

Water quality is determined by measuring a set of chemical, biological, physical, and radiological characteristics of water, and comparing these with established provincial and federal guidelines. Guideline values depend on the intended use of the water:

Environmental Quality Guidelines for Alberta Surface Waters 2014

Canadian Drinking Water Quality Guidelines

Canadian Environmental Quality Guidelines

Canadian Water Quality Guidelines for the Protection of Aquatic Life

Some Measured Water Quality Variables:

Chemical: nutrients (phosphorus, nitrogen), heavy metals (cadmium, mercury, lead, arsenic), pesticides, pharmaceuticals, hormone analogs, dissolved oxygen, dissolved metals and salts (sodium, magnesium, calcium, manganese), Biological and Chemical Oxygen Demand (BOD, COD), pH, dissolved organics

Biological: bacteria (fecal coliforms – *E. coli*), parasites (*Cryptosporidium*, *Giardia*), Microcystin Toxins (Blue Green Algae), chlorophyll.

Physical: Temperature, colour, turbidity, electrical conductance, odour

Radiological: uranium (There are uranium deposits in southern AB)

Accelerated nutrient enrichment of lakes and reservoirs (often by phosphorous), leads to the condition called **eutrophication**. This condition promotes the growth of blue-green algae (*Cyanobacteria*) that can release toxin into the water.

Alberta Environment and Parks (AEP) and Alberta Health Services has information on the trophic status of Alberta lakes.

Regular water quality monitoring is key to compliance with guidelines, and the management of health risks to users.

AEP regularly monitors water levels, and quality at certain locations in rivers, streams, lakes, and reservoirs throughout the province.

Water levels and flows influence water quality. High flows may increase turbidity (cloudiness) but can also dilute concentrations of contaminants.

Stream levels and discharge are recorded for the South Saskatchewan River (SSR) at Medicine Hat, and Seven Persons Ross, Bullshead, Gros Ventre, and Boxelder Creeks.

Water quality is influenced by many factors such as climate/hydrology, landscape/topography, geology/bedrock, and land use (human activities).

Through the Long-Term River Network monitoring, water quality is monitored at the station upstream of Medicine Hat.

Water Quality Guideline Examples:

Aquatic Life:

Dissolved oxygen – Early life stages 6 mg/L; Other stages of life 5.5 mg/L.

Drinking Water:

E. coli - none detectable/100 ml

Livestock watering:

MCPA (pesticide) - 25 µg/L.

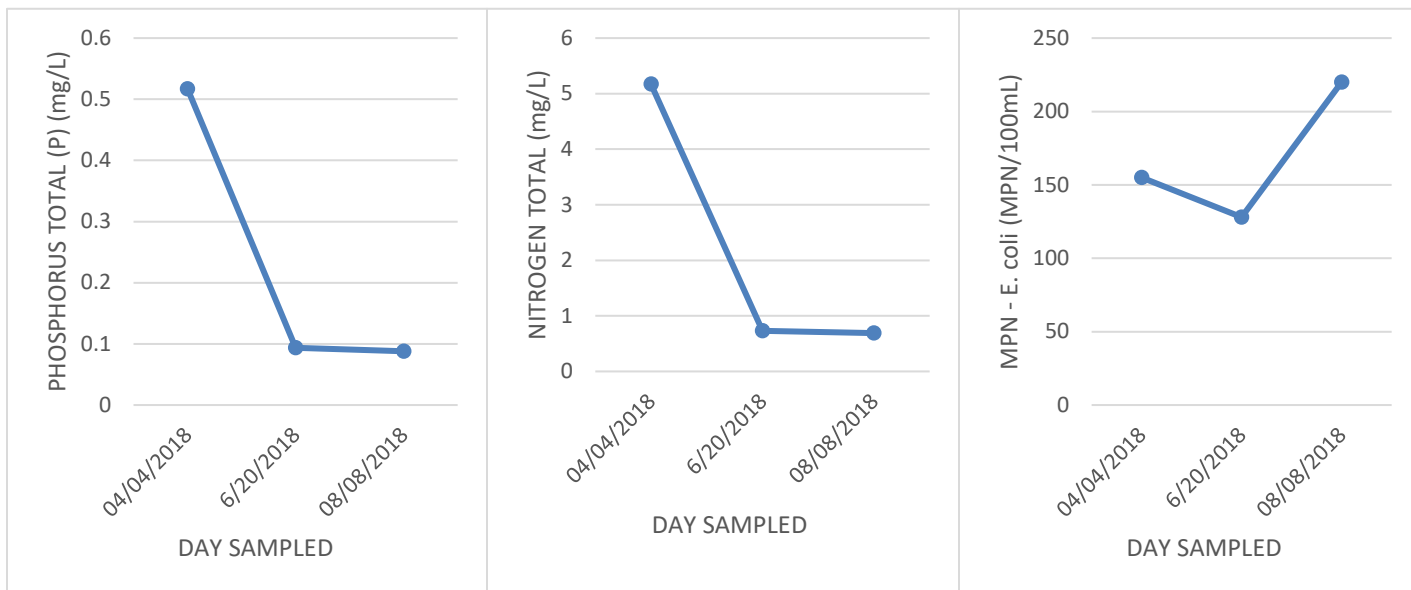
Crop irrigation:

E. coli - 100 (number)/100 ml.

Recreation:

Clarity of water should be sufficient for the user to estimate depths and see subsurface hazards.

Water Quality information over time is compiled and summarized as graphs (examples below). Summarizing information shows patterns that provide awareness about water quality issues or potential issues, and direction towards management actions.



Total Phosphorus concentration (mg/L), Total Nitrogen concentration (mg/L), and *E. coli* concentration (MPN/100mL) at different times in the Seven Persons Creek at Medicine Hat. Lines show changes in concentrations throughout Spring to late Summer. Data was averaged between two city sites. It is generally accepted that total phosphorus concentrations greater than 0.05 mg/L may pose a risk of eutrophication.



Blue-green algae (*Cyanobacteria*). Photo taken at the Bullshead Reservoir following an Alberta Health Services advisory on August 3, 2018.

Water Quality Information Online:

Federal Water Quality Guidelines
<http://ceqg-rcqe.ccme.ca>

Alberta Water Data, Reports, Guidelines and Legislation
<http://aep.alberta.ca/water>

Uranium in Alberta
<http://ags.aer.ca/uranium>

River Levels Throughout Alberta
www.rivers.alberta.ca

Blue-green algae
<https://myhealth.alberta.ca/Alberta/Pages/blue-green-algae.aspx>

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Riparian Areas Assessment & Restoration in the Seven Persons Creek Watershed Project
 Watershed Resiliency and Restoration Program

