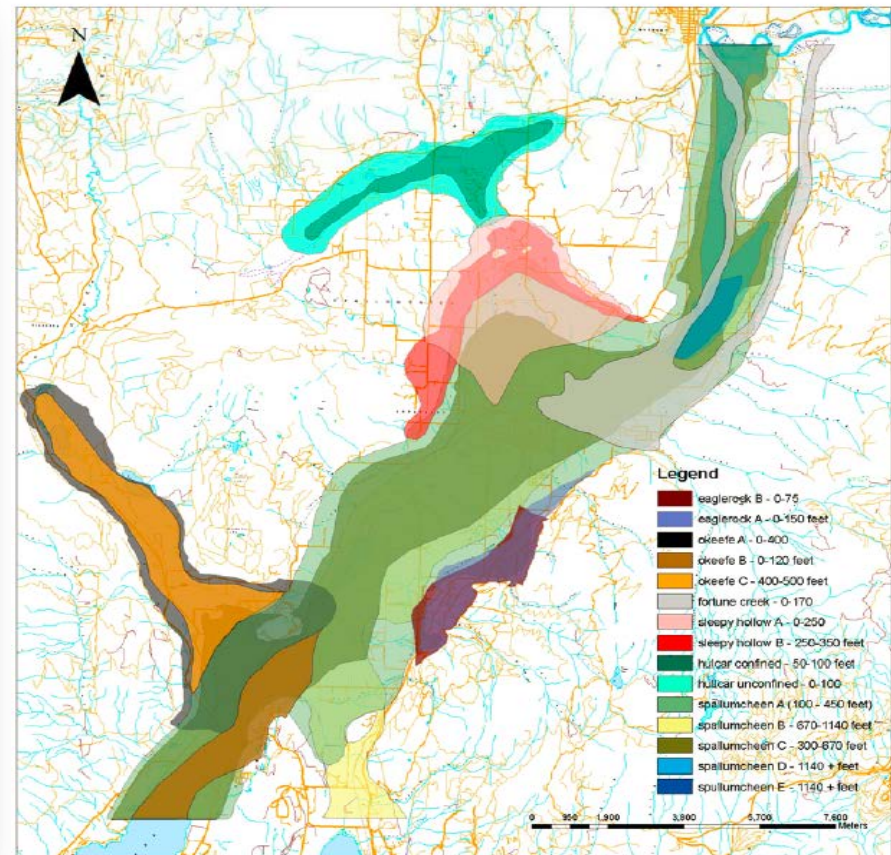
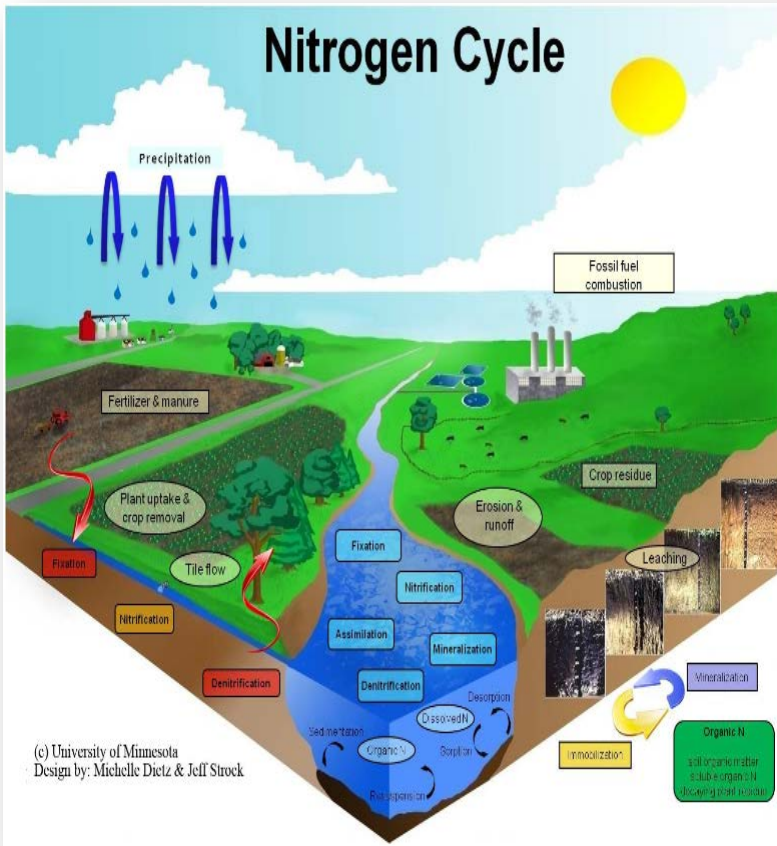


# Hullcar Area Nitrates

North Okanagan Ground Water Characterization and Assessment  
North Okanagan Aquifer Mapping Project (NOAMP) Aquifer Delineations





# Introduction

**Dr. Kamran Golmohammadi**

Medical Health Officer, IHA  
Preventive Medicine Specialist, and  
Clinical Faculty at UBC Faculty of Medicine

**Rob Birtles**

Environmental Health Officer, IHA  
Team Leader, Small Water Infrastructure



# Interior Health Mandate

## Public Health Act

- Purpose: given the MHO the powers to prevent Health Hazards.
- Enables legislation on food service, public pools, bio solids...

## Drink Water Protection Act

- Purpose: Principally set out requirements for water system operators.
- Also, provides powers to investigate drink water health hazards and prevent harm to the public.



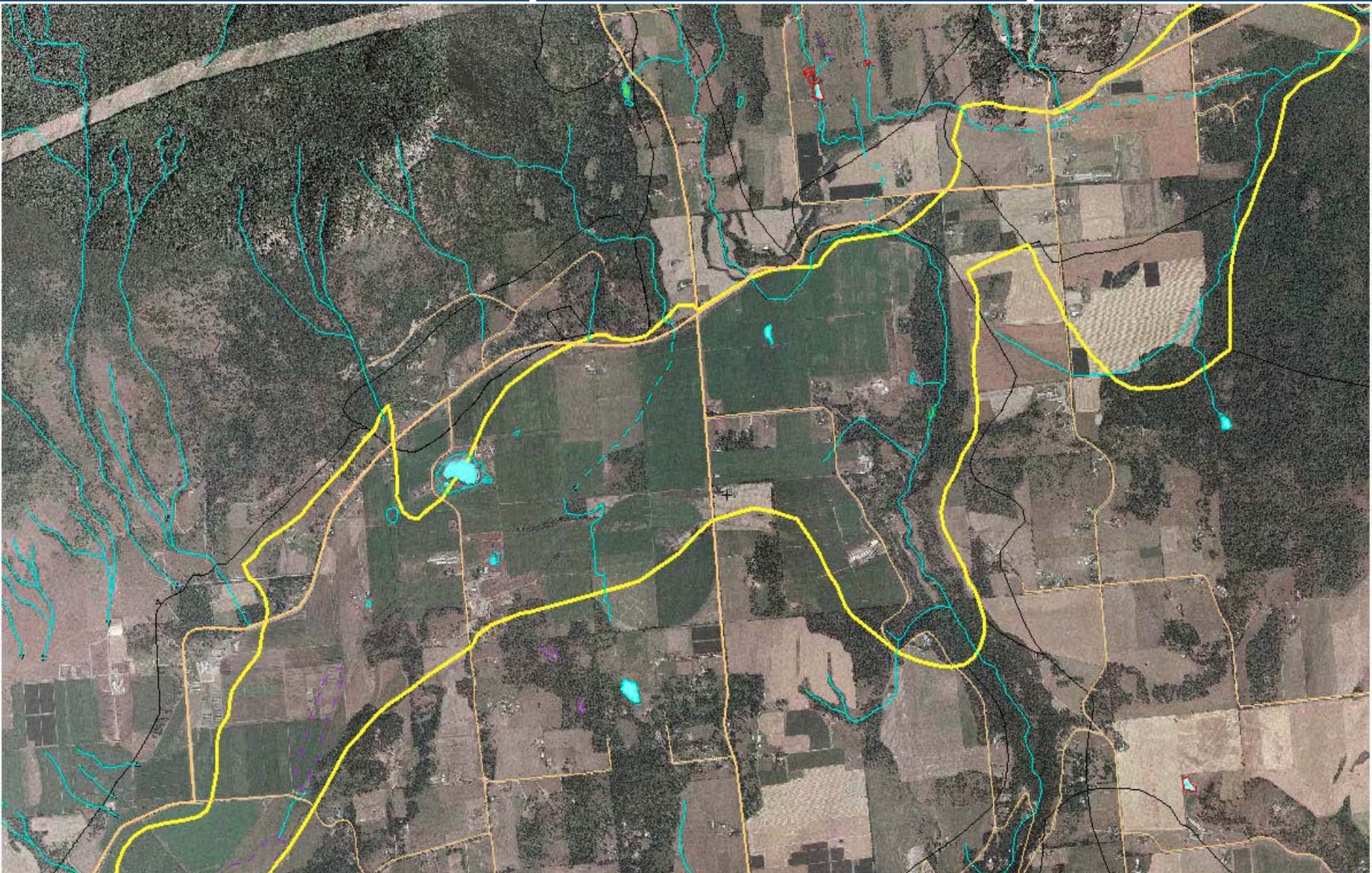


# Hullcar Area Aquifers

- The Hullcar area has two aquifers that over lay each other.
- 103 high vulnerablity ~ 14 km<sup>2</sup>, shallow
- 102 low vulnerability ~ 14 km<sup>2</sup>, deeper.

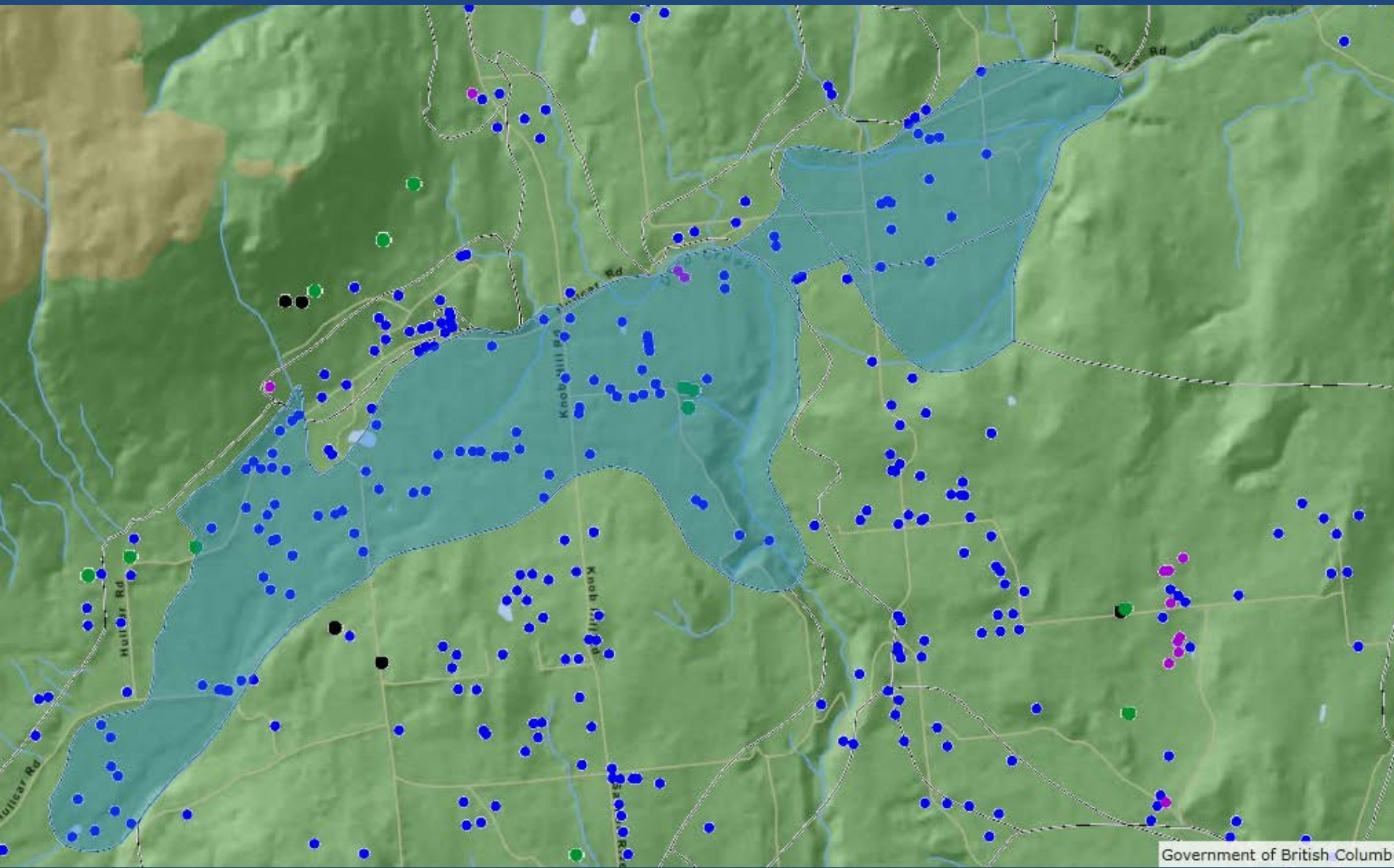


# 103Aquifer Boundary



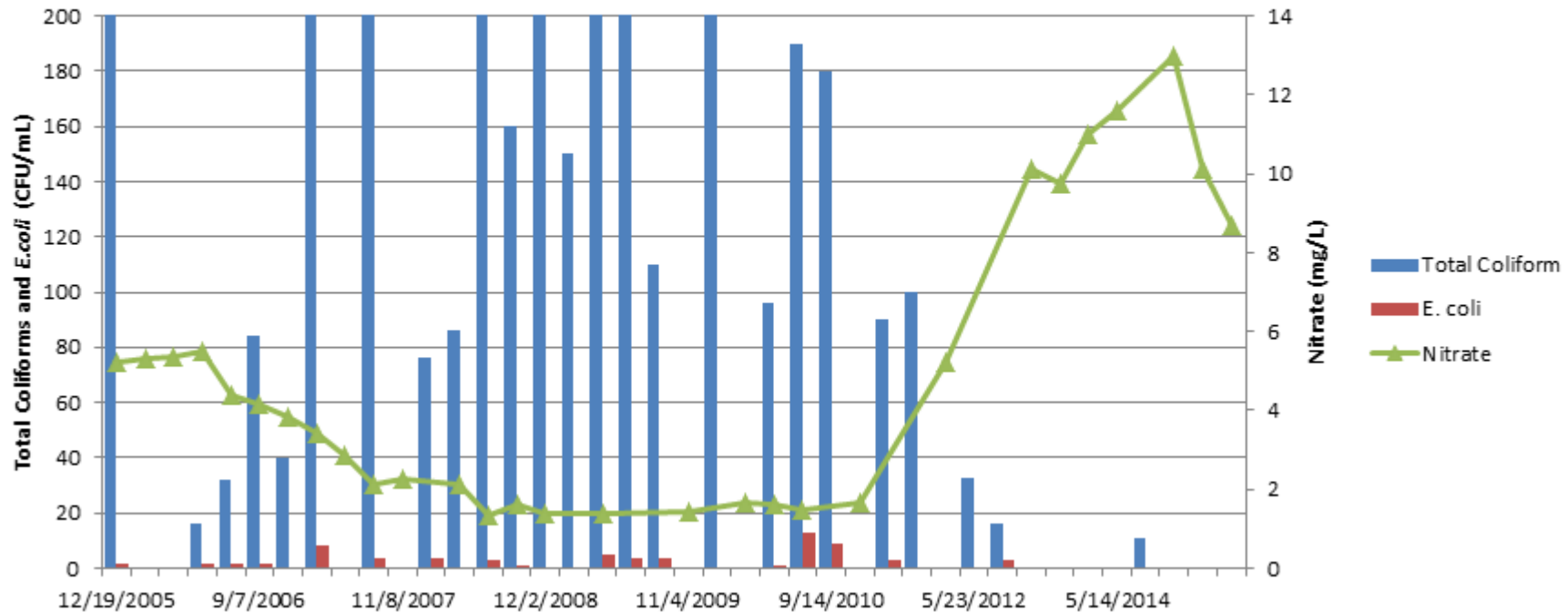


# 103 Aquifer + Hullcar Area Wells



# Hullcar Aquifer Water Quality

Bacteriological and Nitrate Data for Steele Springs WD  
2005 - 2015



# Nitrates sources

- Lawn fertilization
- Septic systems
- Atmospheric
- Farming – Crop fertilization, manure stock piling...



# Adverse Health Effects of High Nitrate Ingestion

- Short-term
- Long-term

## Short-term exposure

- Infants less than 6 months are at highest risk
- Pregnant women are also sensitive
- Those with reduced oxygen distribution capacity in their body, e.g. Anemia, Abnormal Hemoglobin, Heart Disease, and Lung Disease

# Long-term exposure

The studies in which sodium nitrate was administered either in drinking water or in diet to rodents showed that nitrate has a low chronic toxicity.



Health  
Canada Santé  
Canada

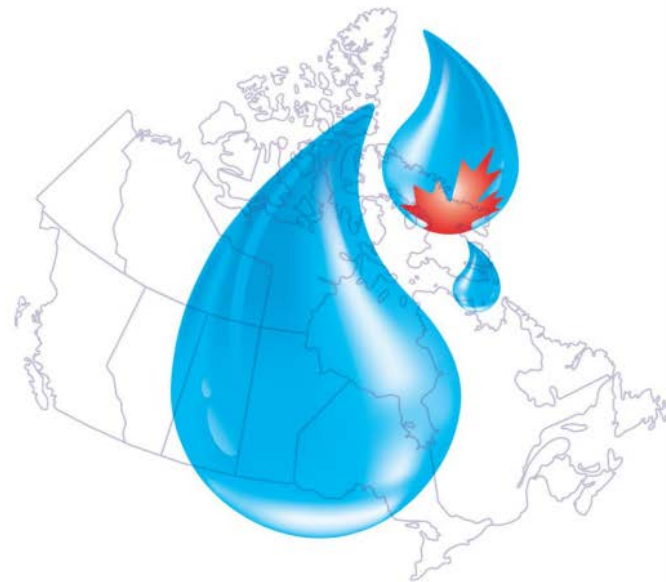
Your health and  
safety... our priority.

Votre santé et votre  
sécurité... notre priorité.

## Guidelines for Canadian Drinking Water Quality

Guideline Technical Document

### Nitrate and Nitrite



Canada



# Long-term exposure

- There is no clear evidence of carcinogenicity from nitrate or nitrite in humans.
- But cancer risk may exist under conditions of endogenous nitrosation of ingested nitrate and/or nitrite\*

*\*The International Agency for Research on Cancer (IARC) in 2010 has classified “ingested nitrate or nitrite under conditions that result in endogenous nitrosation” as probably carcinogenic to humans.*

# Common sources of Nitrate and Nitrite

- Many vegetables & fruits contain high Nitrate (200 to 2500 mg/kg), lettuce, spinach, red beets, fennel, cabbage, parsley, carrots, celery, potatoes, cucumbers, radishes and leeks (higher levels in pickled and fermented vegetables).
- Cured meat\*: High levels of nitrate and nitrite, (preservative)
  - Nitrate at levels of up to 945 mg/kg
  - Nitrite at levels of up to 64 mg/kg

*\*Health Canada has limited the amount of nitrite and nitrate that can be added to meat products to 200 mg/kg*

# In Summary

- In short-term, infants less than 6 months are at the highest risk for high nitrate ingestion.
- Our understanding of long-term health effects of high nitrate in drinking water is limited.
- Health Canada will continue to “monitor new research in this area & recommend any change to the guideline that it deems necessary”.



Thank You

Questions