
Guidance for Drinking Water Systems: Ground Water Assessment and Treatment

BC Ground Water Association

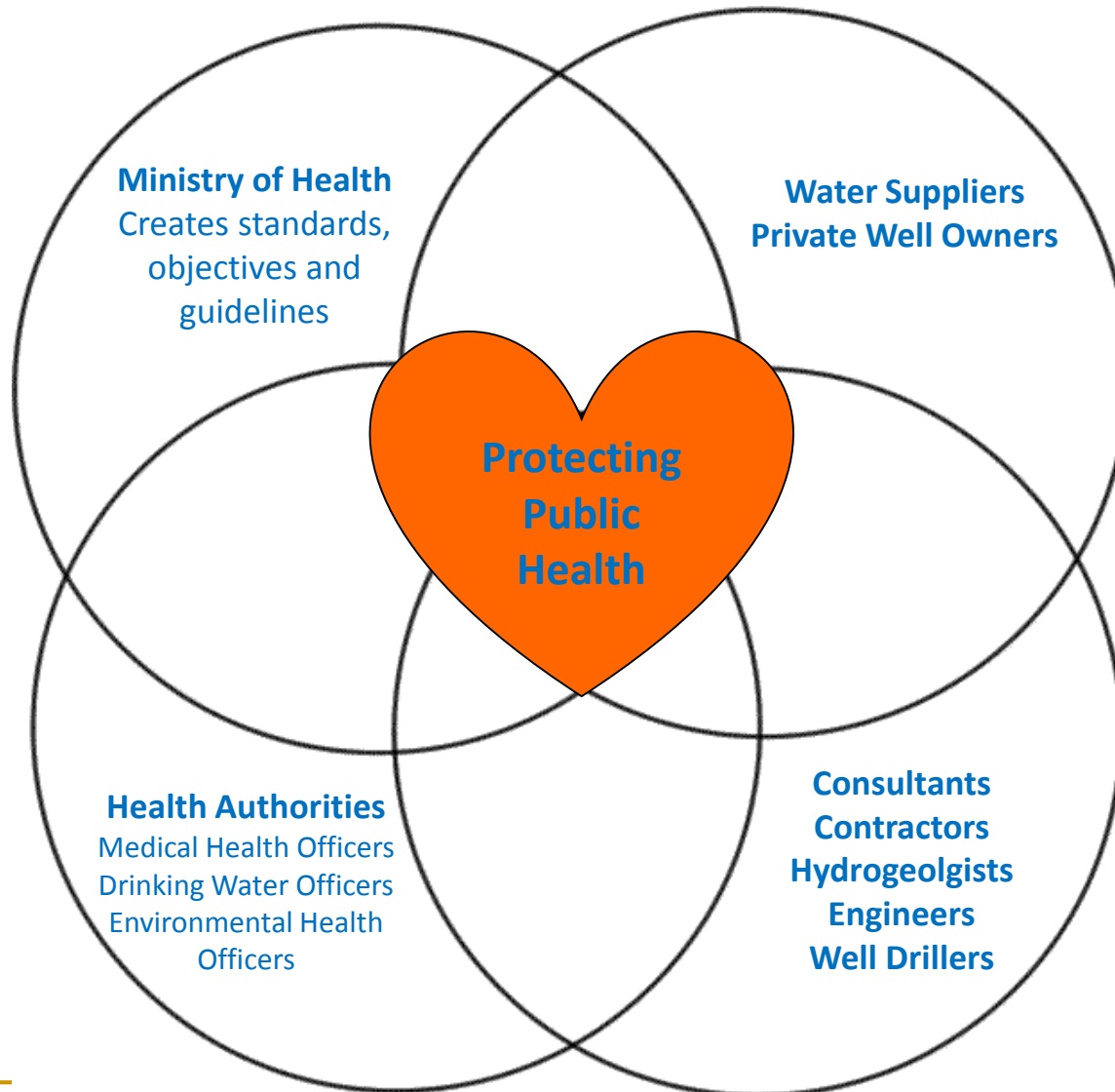
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Responsibility



Relevance

- Protection of public health begins with the well
- Provincial guidance must be considered by the DWO
- Proper well siting can help to avoid hazards
- Well logs provide valuable information
- Every component of a water system is part of the multi-barrier approach



Legislation

■ Public Health Act

- ❑ Health Hazards Regulation – 30 m setback of well from probable source of contamination

■ Drinking Water Protection Act

- ❑ Drinking Water Protection Regulation
- ❑ Drinking water must be “potable”:
 - meets the standards prescribed by regulation, and is safe to drink and fit for domestic purposes without further treatment

■ Guidance

- ❑ to clarify provincial legislation, promote best practices, and provide transparency and consistency



Two Guidance Documents

Guidance Document for Determining Ground Water at Risk of Containing Pathogens (GARP), version 2

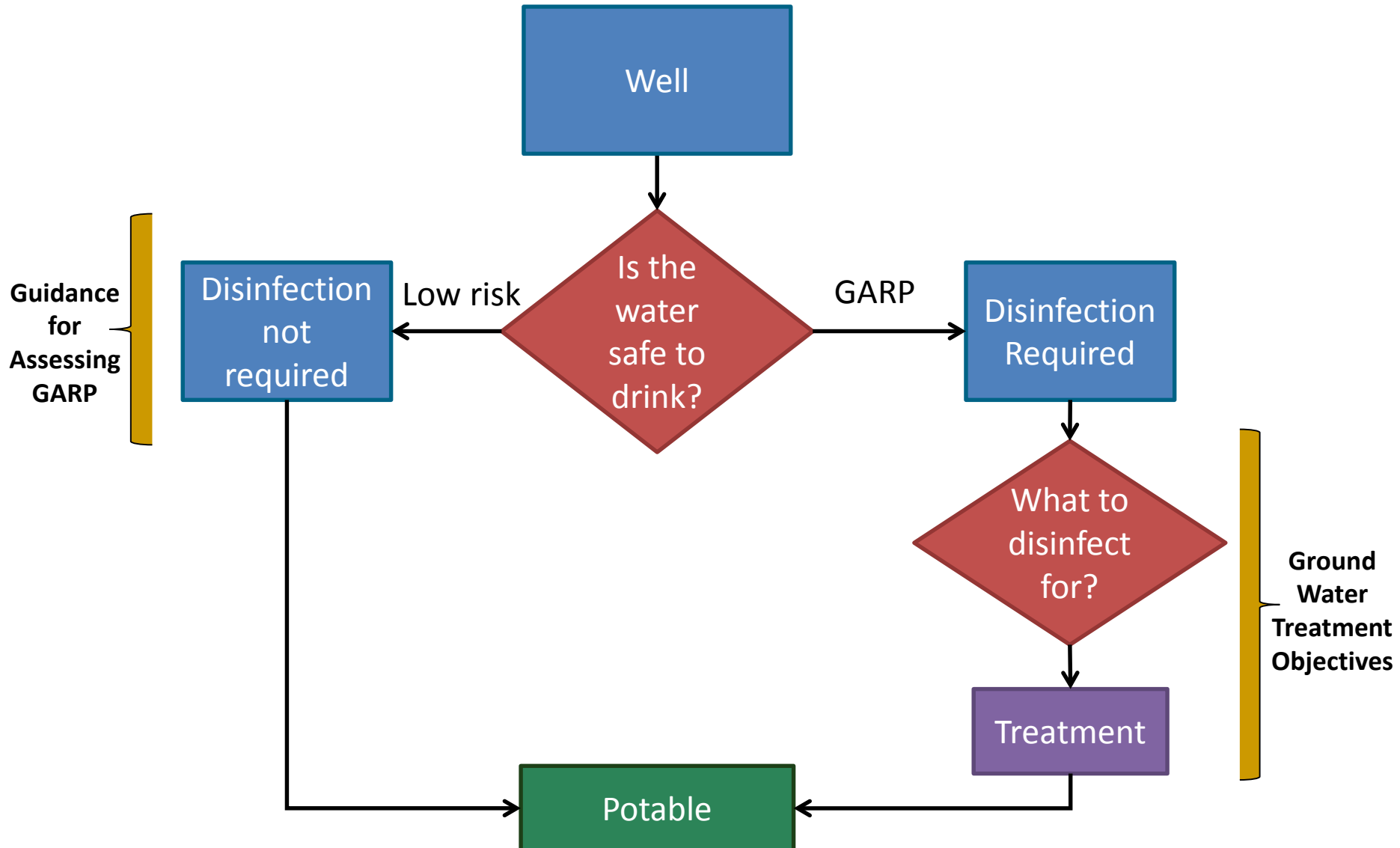
- ❑ “GARP Assessment”
- ❑ To be posted on our website very soon

Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia, Version 1

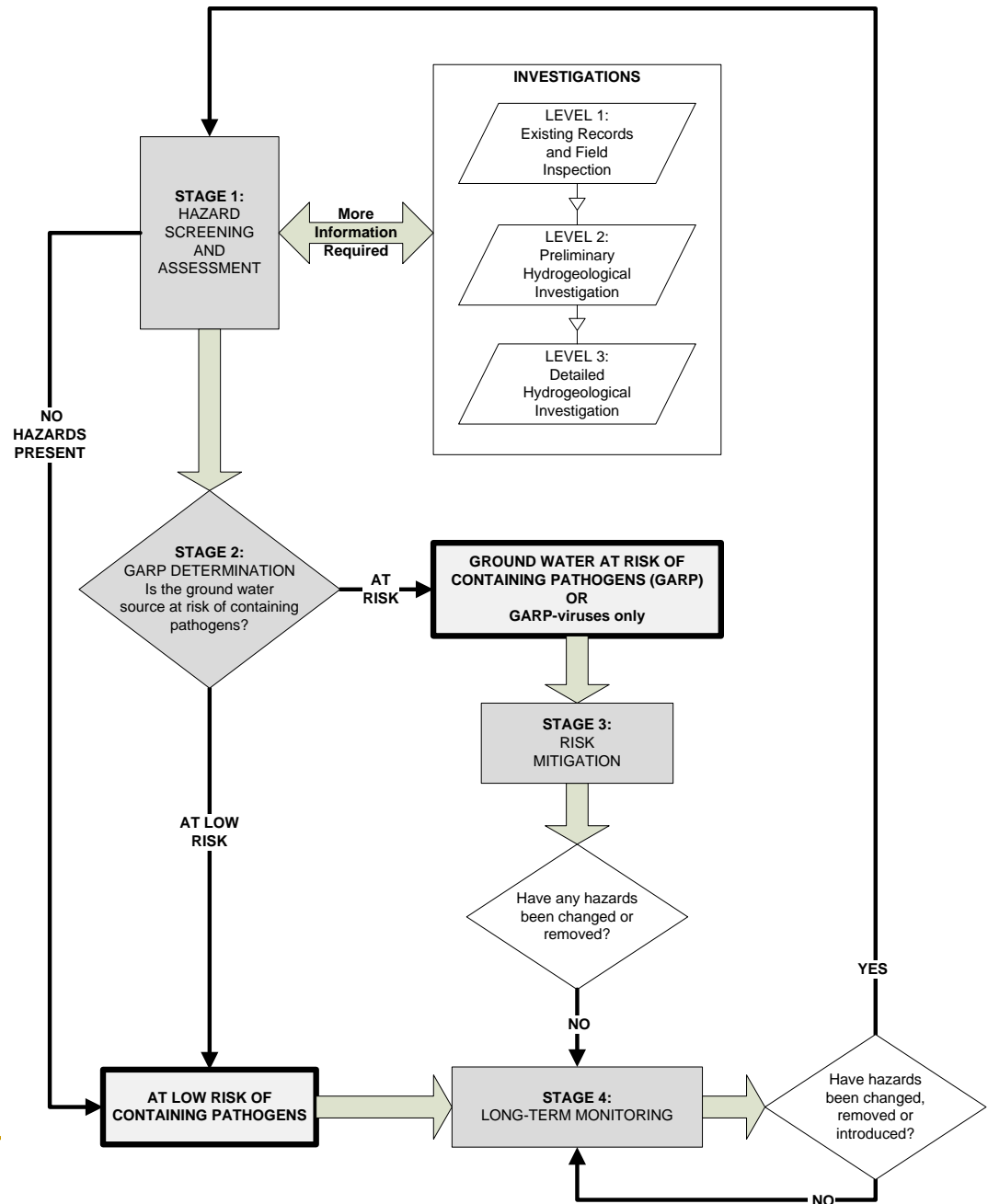
- ❑ “Ground Water Treatment Objectives” or “GWTO”
- ❑ Early in 2016



Journey from GW to potable water



GARP Assessment



GARP Assessment – Overview

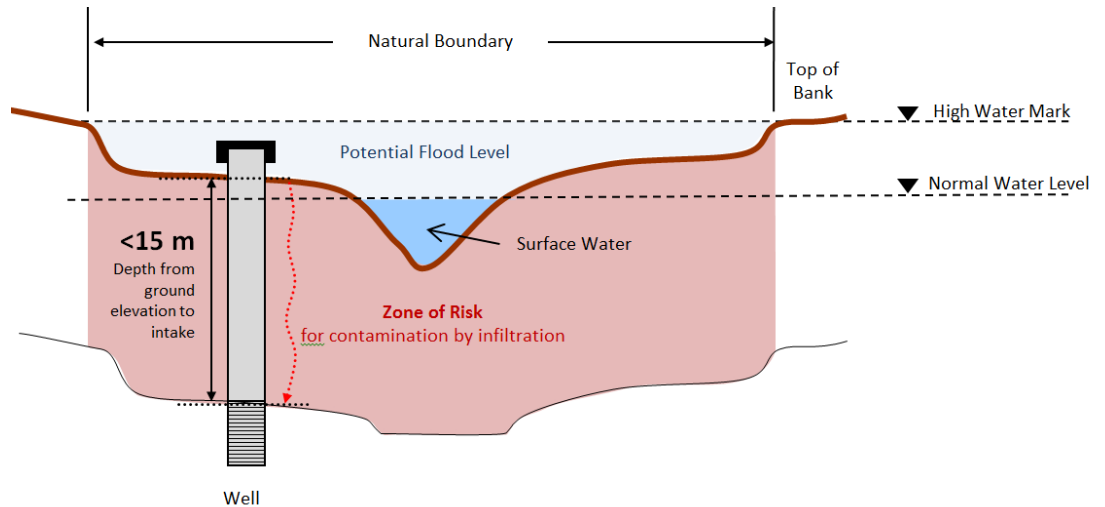
- Assessment is based on 13 hazards divided into 4 categories:
 1. Water Quality Results
 - *E. coli* and turbidity
 2. Well Location
 - Risk of flooding and connection to surface water
 3. Well Construction
 - Ground Water Protection Regulation
 4. Aquifer Type and Setting
 - Shallow wells and vulnerable aquifers
- hazard screening checklist used to note presence/absence
- assessment of those hazards present
- Training is coming!



GARP Assessment – Well Location

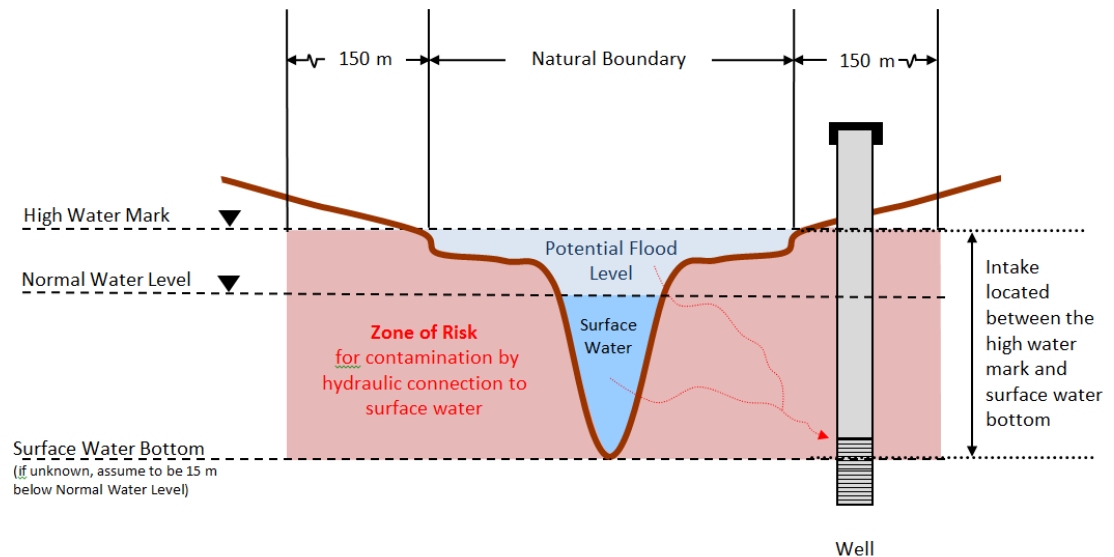
Risk of flooding

- intake depth less than 15 m below ground surface
- within a natural boundary of surface water or a flood prone area



Hydraulic Connection to Surface Water

- between the high-water mark and surface water bottom, or if surface water depth unknown, less than 15 m below normal water level
- located within, or less than 150 m from the natural boundary of any water



GARP Assessment – Aquifer Type

Shallow Wells

- intake depth less than 15 m below ground surface

Vulnerable Aquifers

- highly vulnerable
 - Regional District of Nanaimo's pamphlet:
<http://www.rdn.bc.ca/cms/wpattachments/wpID2744atID4690.pdf>
- unconfined (no impermeable layer)
- Unconsolidated (e.g., gravel, sand, or silt)
- fractured bedrock aquifer

Karst



Ground Water Treatment Objectives

- If a ground water source is GARP the water must be disinfected and it must be **potable**:
 - meets the standards prescribed by regulation
 - Drinking Water Protection Regulation
 - Zero detectable *E. Coli*, fecal coliform and total coliform**
 - safe to drink and fit for domestic purposes without further treatment



**DRINKING WATER TREATMENT OBJECTIVES (MICROBIOLOGICAL)
FOR SURFACE WATER SUPPLIES IN BRITISH COLUMBIA**

VERSION 1.1 / NOVEMBER 2012

Ground Water Treatment Objectives

Filtration Exemption

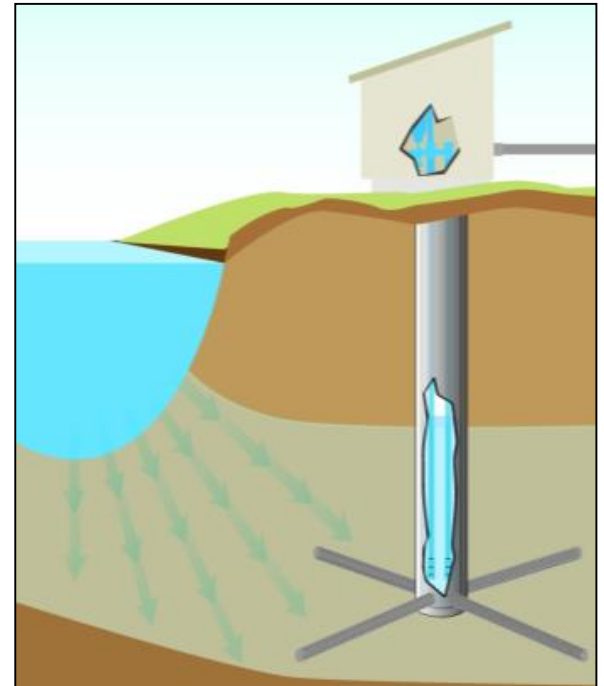
- need a minimum of two disinfections, providing 4-log reduction of viruses and 3-log reduction of Cryptosporidium and Giardia
- *E. coli* in raw water does not exceed 20/100 mL and zero *E. coli* in treated water
- average daily turbidity measured at equal intervals around 1 NTU and may not exceed 5 NTU for more than two days in a 12-month period
- the well is properly constructed and protected and a Well Protection Plan (or equivalent satisfactory to the DWO) is in place



Ground Water Treatment Objectives

Subsurface (Riverbank) Filtration

- a vertical or horizontal water supply well near a river or other water source using naturally occurring subsurface media (e.g., the riverbank) as a filter to remove particles and pathogens, micro-pollutants and other organic and inorganic compounds
- source of credit towards the 3-log removal of *Giardia* and *Cryptosporidium*
 - ❑ Well/Surface Water Separation
 - ❑ Subsurface Filtration Study
 - ❑ Demonstration of Performance



Thank you!

Questions?

