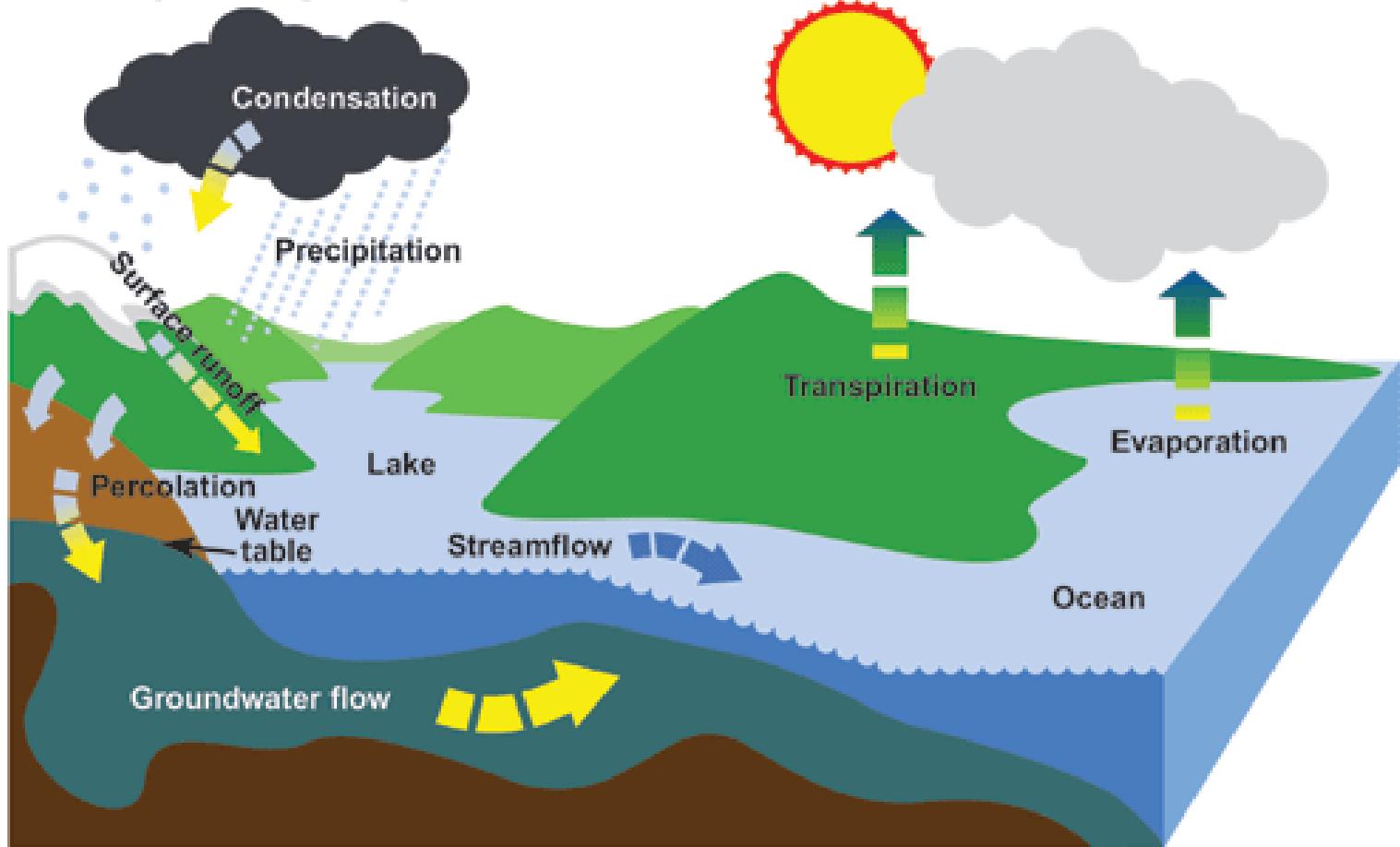


The Inspection Process for Public Water Supply Wells: Safeguarding your Groundwater Resource

Dorothea Hanchar
Groundwater Resources Manager
Water Resources Management Division
Environment and Conservation

What is Groundwater?

The hydrologic cycle

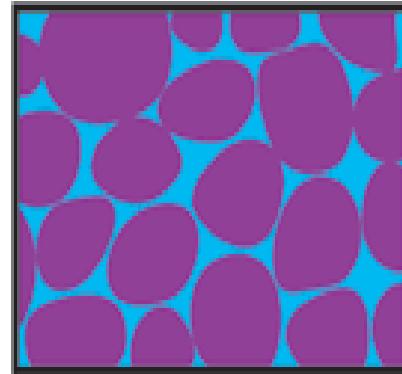


Source: Environment Canada

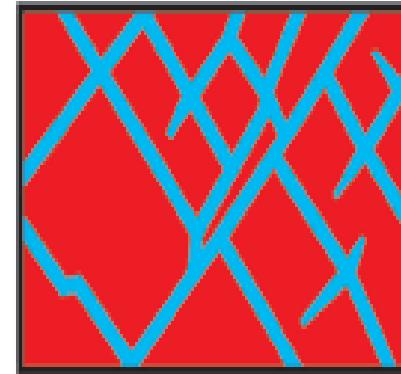
What is Groundwater? (con't)

Main types of porosity

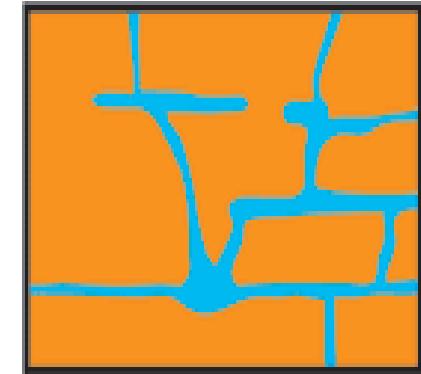
Sand and gravel



Igneous rocks



Limestone



Intergranular

Crevice

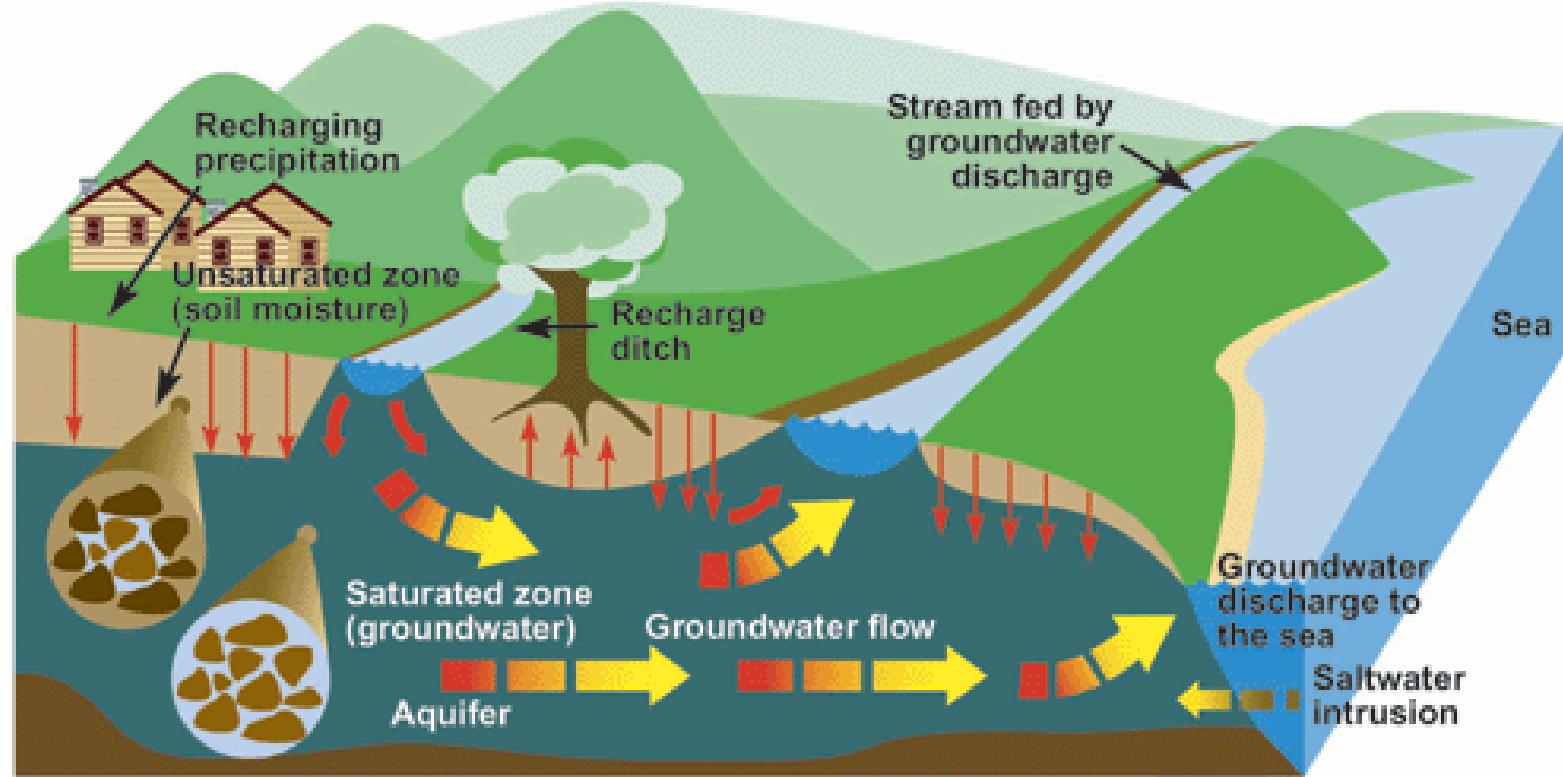
Solution

Where groundwater can be found. It fills the spaces between sand grains, in rock crevices, and in limestone openings.

Source: Environment Canada

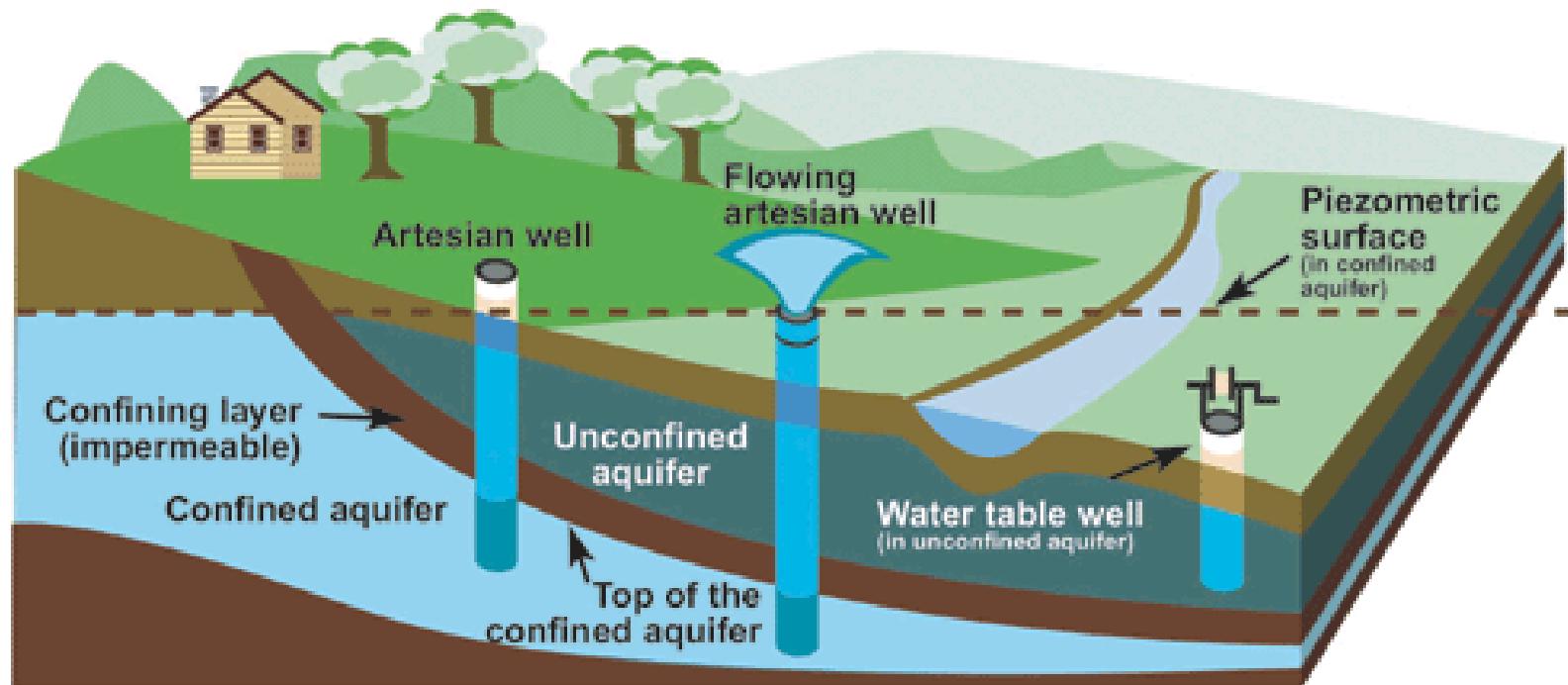
What is Groundwater? (con't)

Groundwater flow



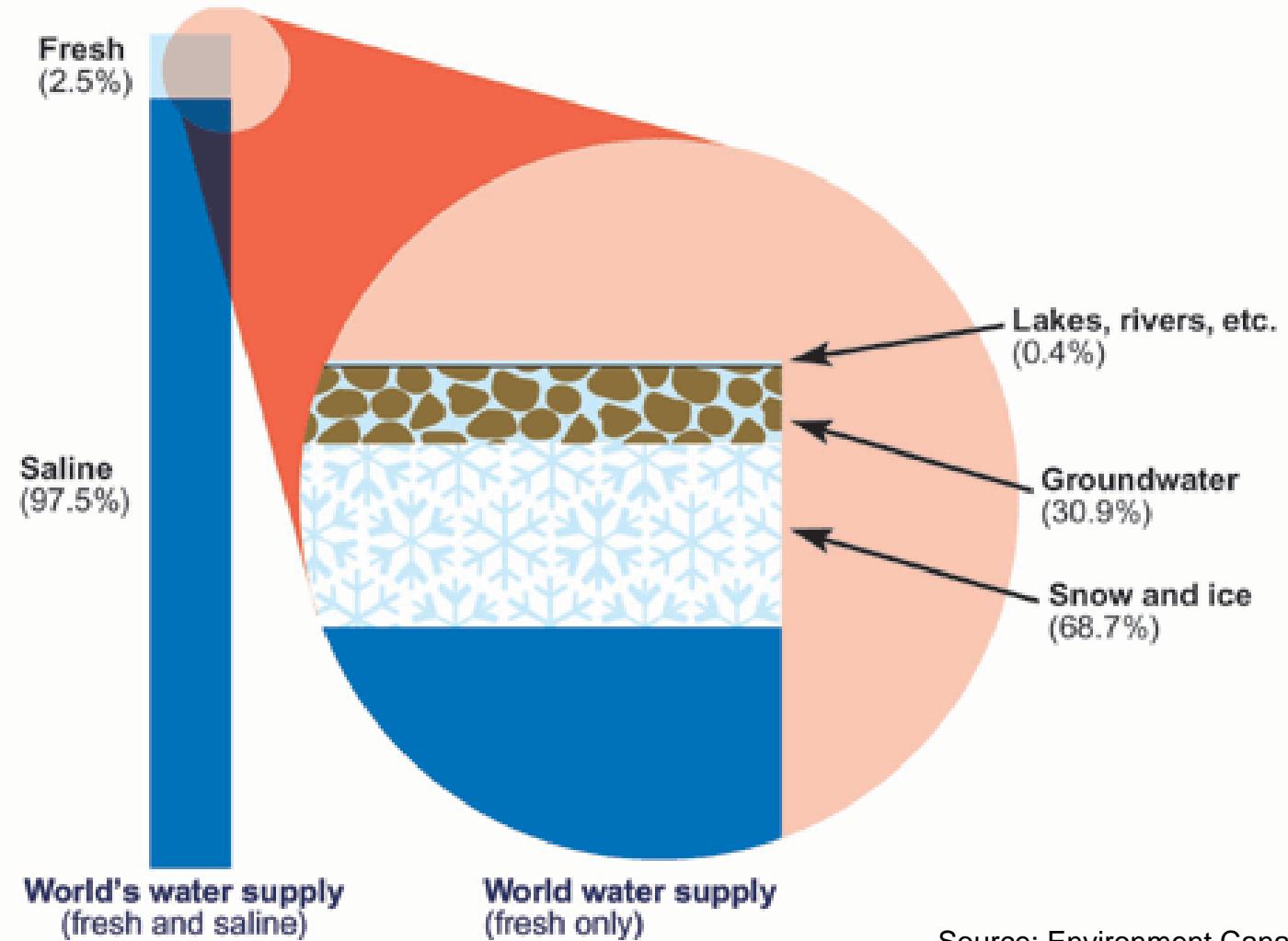
What is Groundwater? (con't)

Aquifers and wells



What is Groundwater? (con't)

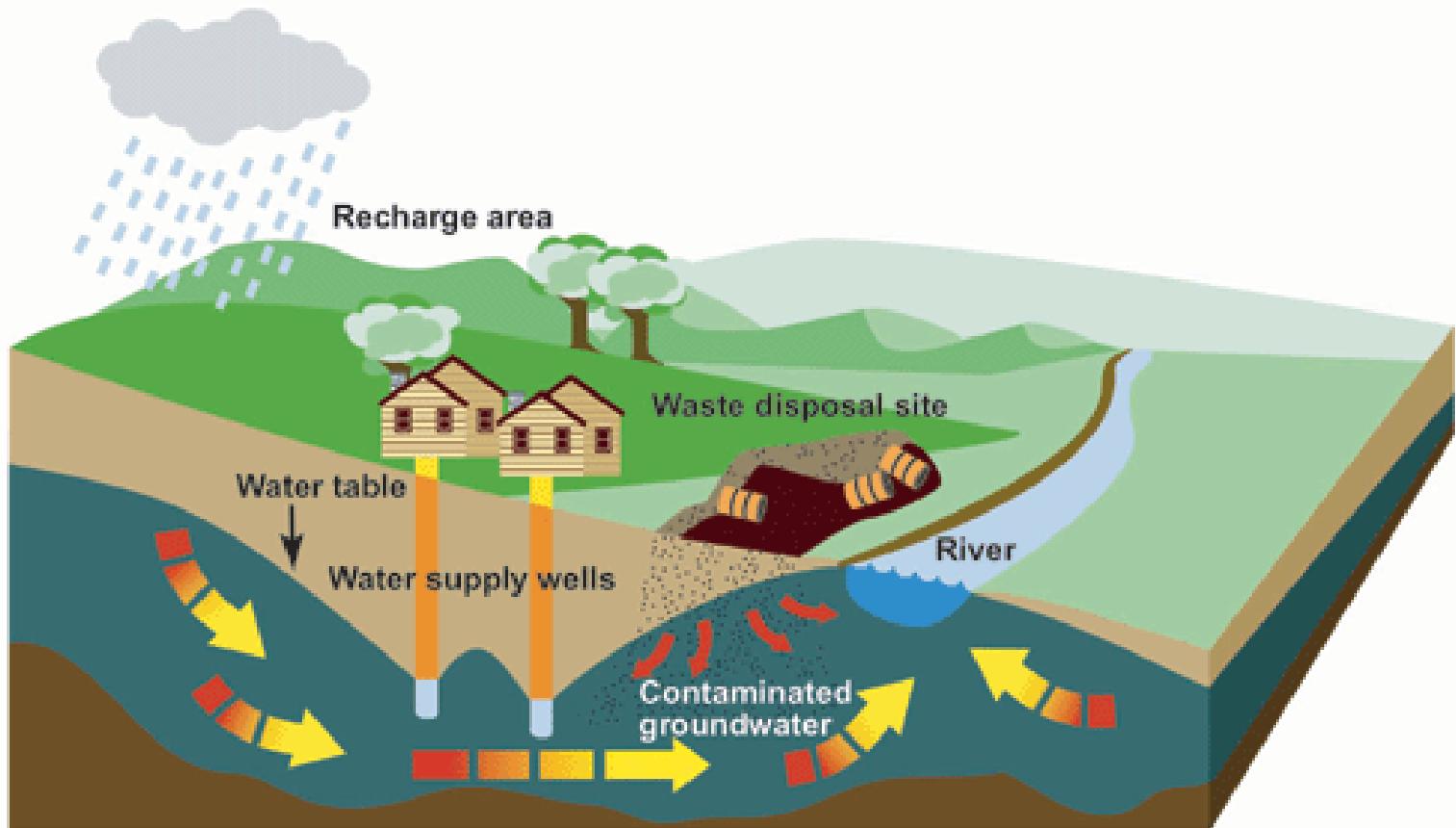
Groundwater and the world's freshwater supply

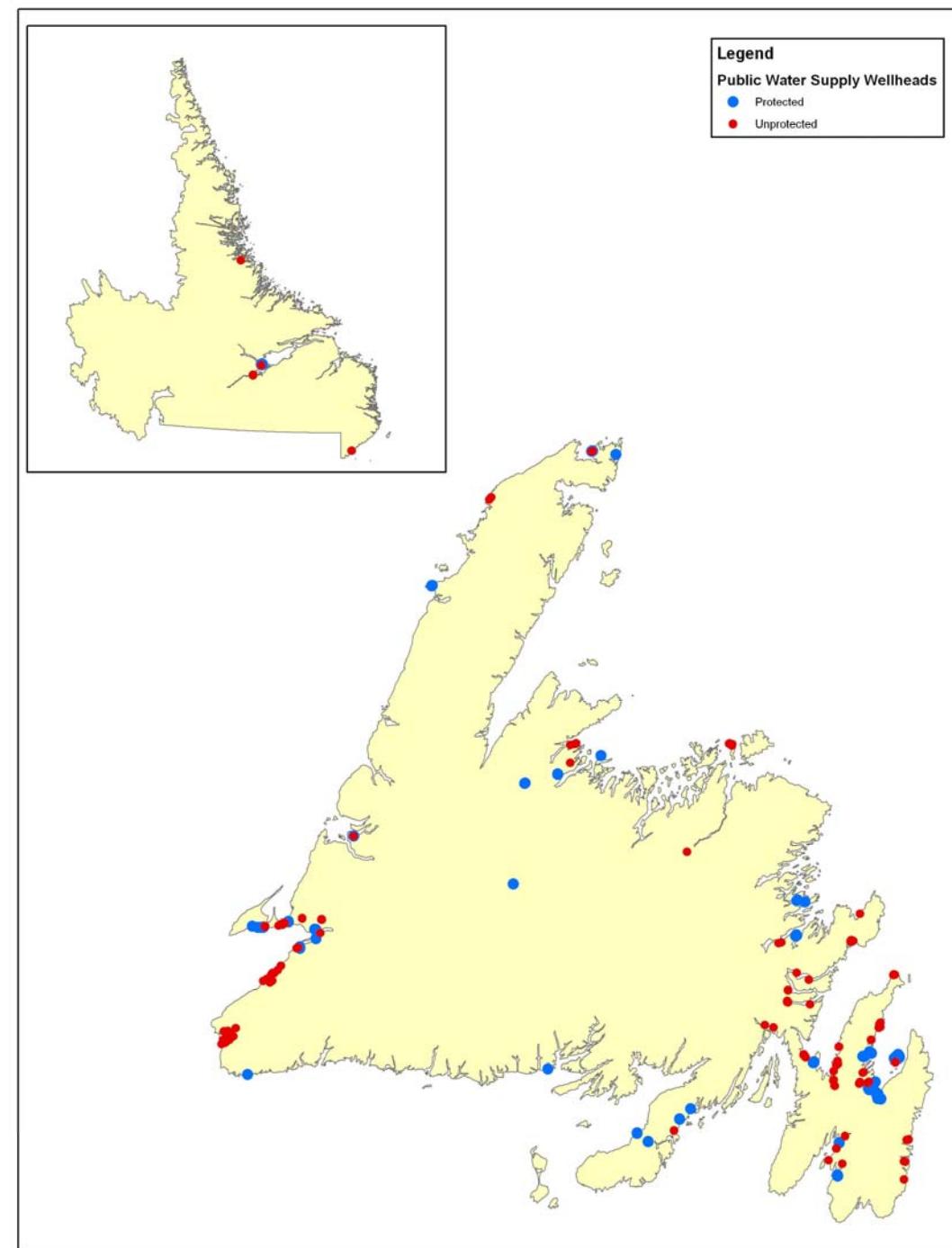


Source: Environment Canada

How is Groundwater Susceptible?

Groundwater contamination from a waste disposal site





Groundwater for Public Supply

- 198 water systems from groundwater in Newfoundland and Labrador-

Eastern Region: 109

Central Region: 22

Western Region: 60

Labrador: 7

- Single wells to complex well fields
- Over 300 wells total
- (*Total number of surface water systems: 305*)

Groundwater Use

- Nearly 1/3 of the population uses groundwater, mostly from domestic wells
- ~41,000 served by public water supplies from groundwater
- Over 10% of served population

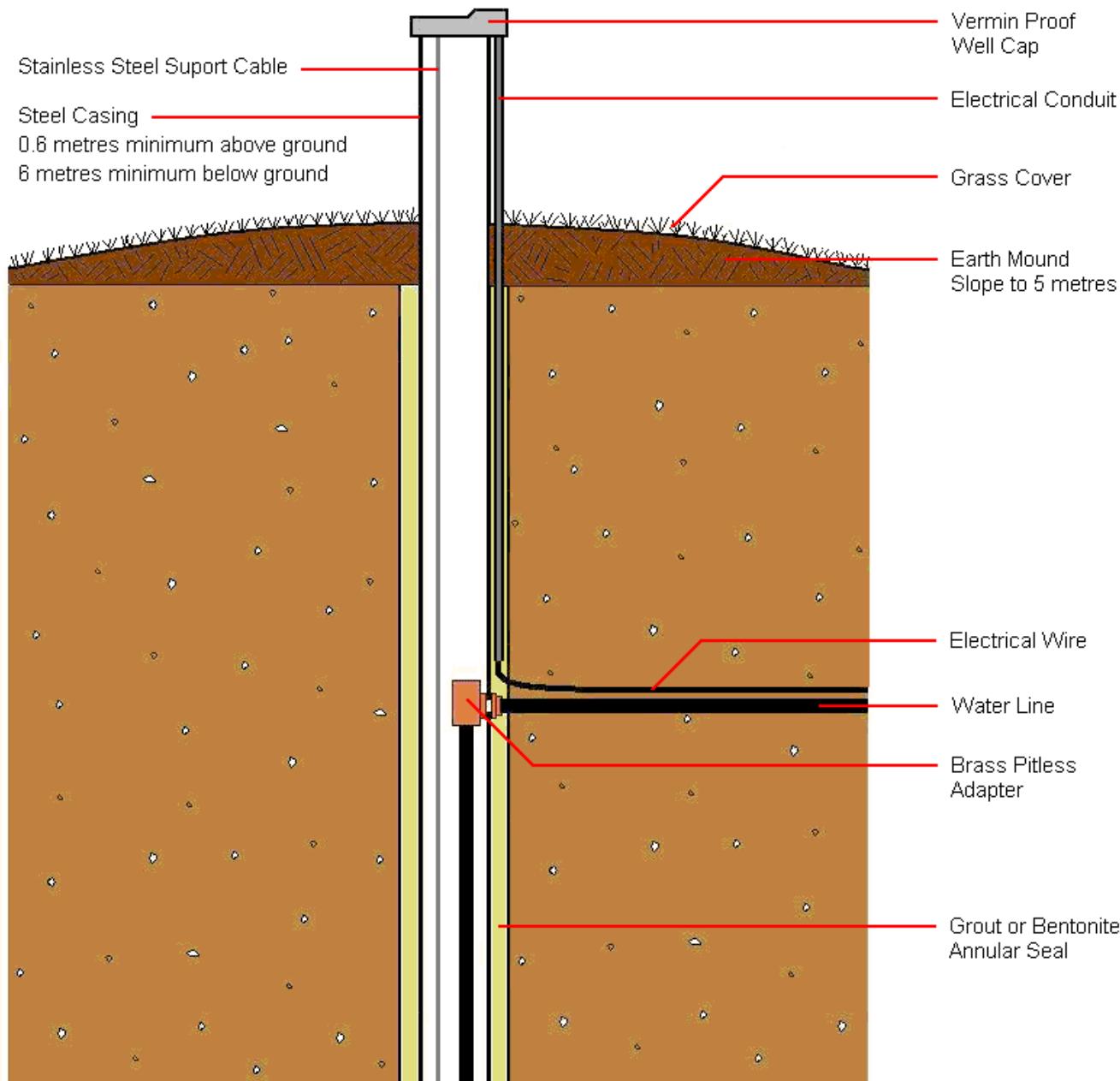
Wellhead Inspections

- Staff of the Groundwater Section
- Encouraged for all new wells
- At least every two years
- Revisit “problem” wells more frequently

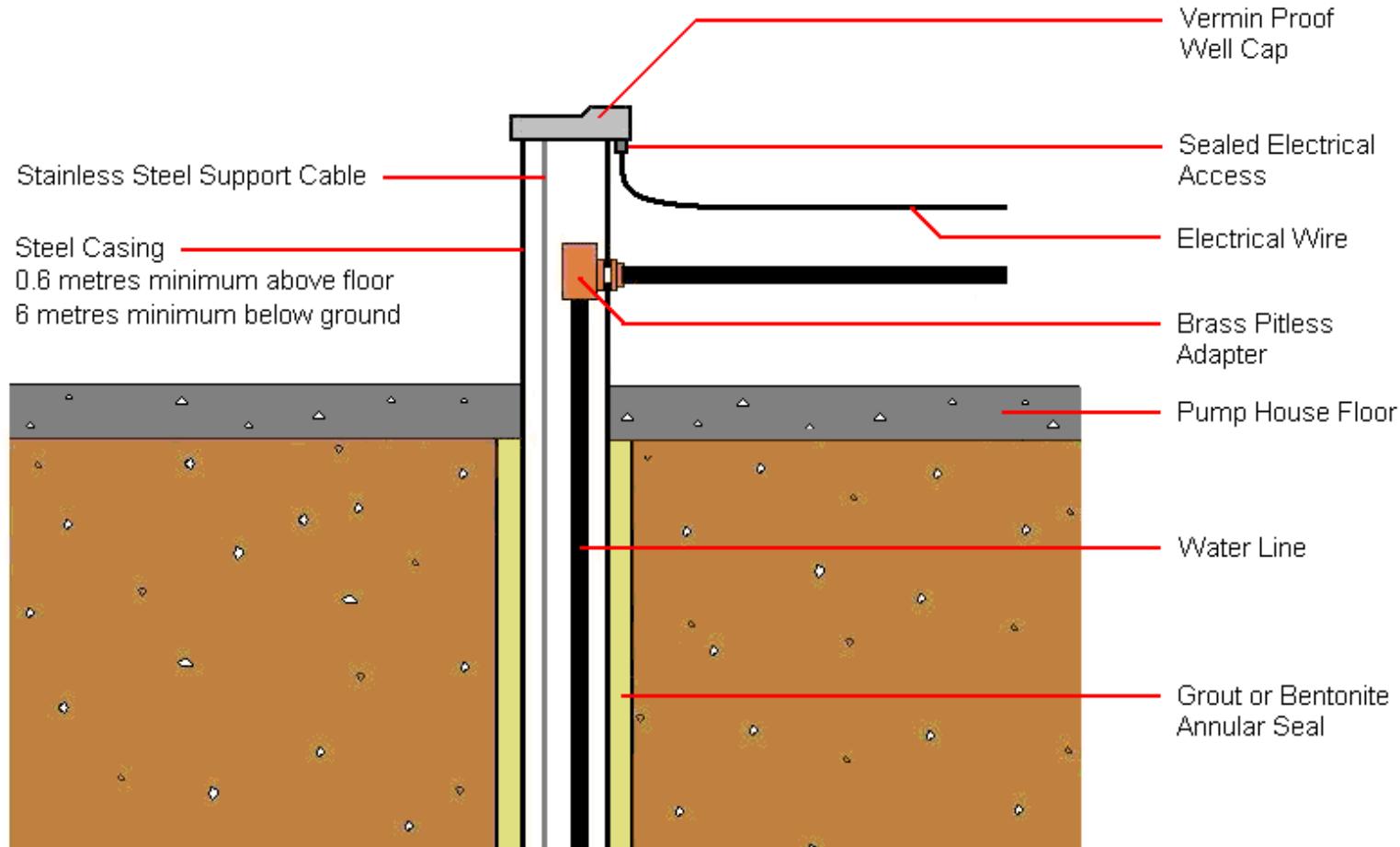
What is involved in a wellhead inspection?

- Visual inspection of ten construction elements
- Ensure well construction adequate for groundwater protection

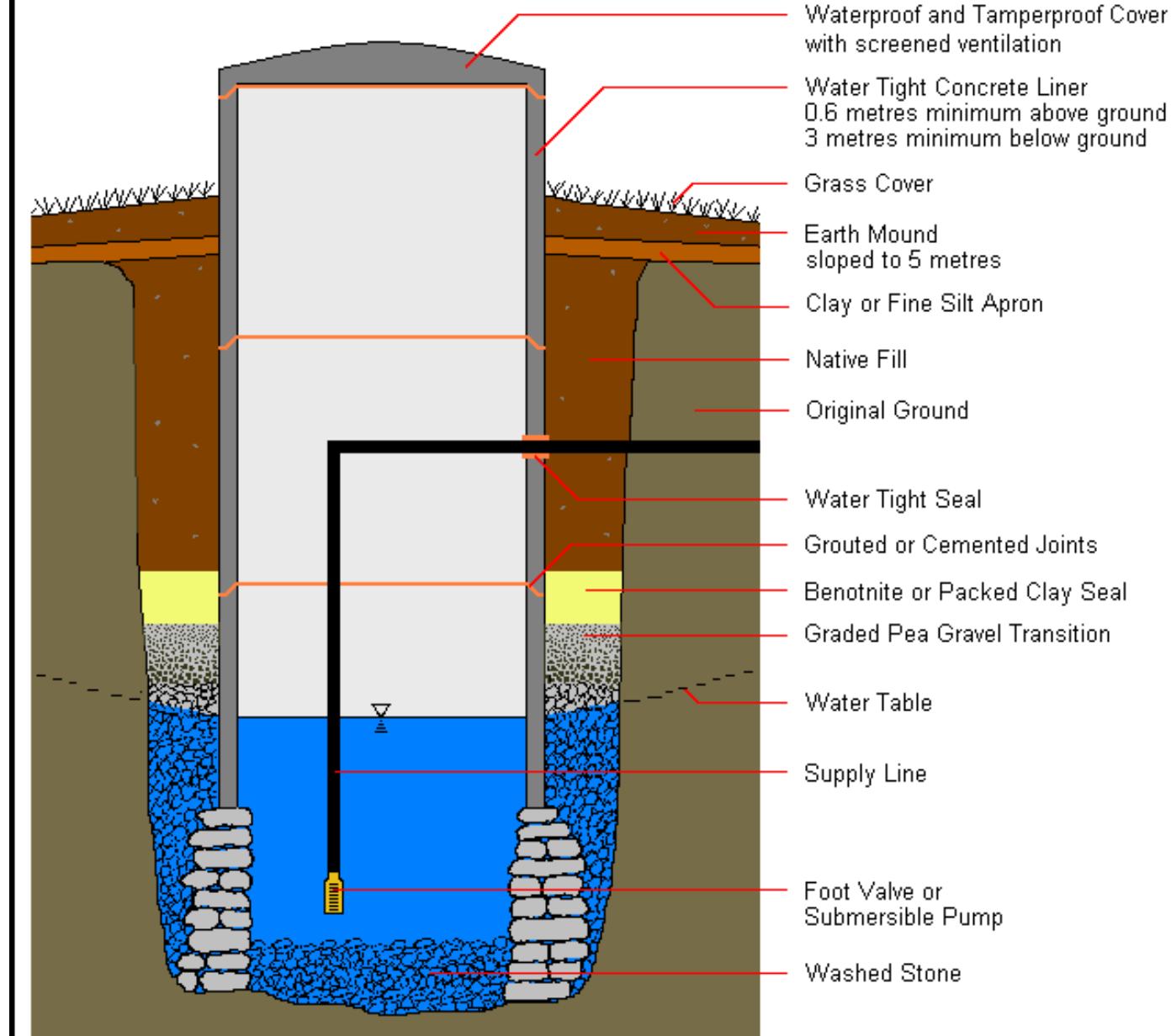
Properly Finished Wellhead Outside



Properly Finished Wellhead Inside Pump House



Properly Constructed Dug Well



“Well annulus not properly backfilled/sealed”

- Space between casing and drill hole
- Sealed with impervious clay or cement grout
- Must be grouted from bottom of well casing to surface
- Well casing must be of sufficient length to prevent contamination of water in the well.

“Area surrounding the well not properly sloped”

- Graded in all directions – to a distance of 5 metres
- Prevents water from ponding around wellhead
- Graded to an elevation AT LEAST 0.6 metres above highest known surface water level



“Well buried or located such that it is not accessible”

- Well casing must extend at least 0.6 metres above finished grade.
- If casing needs to be extended, section must be welded
- Weld must be continuous
- Pitless adapter should be used
- Vermin-proof well cap!

“Wellhead finished too close to the ground surface or pump house floor”

- Well casing must extend at least 0.6 metres above finished grade.
- If casing needs to be extended, section must be welded
- Weld must be continuous
- Pitless adapter should be used
- Vermin-proof well cap!





“Well located too near or inside a building”

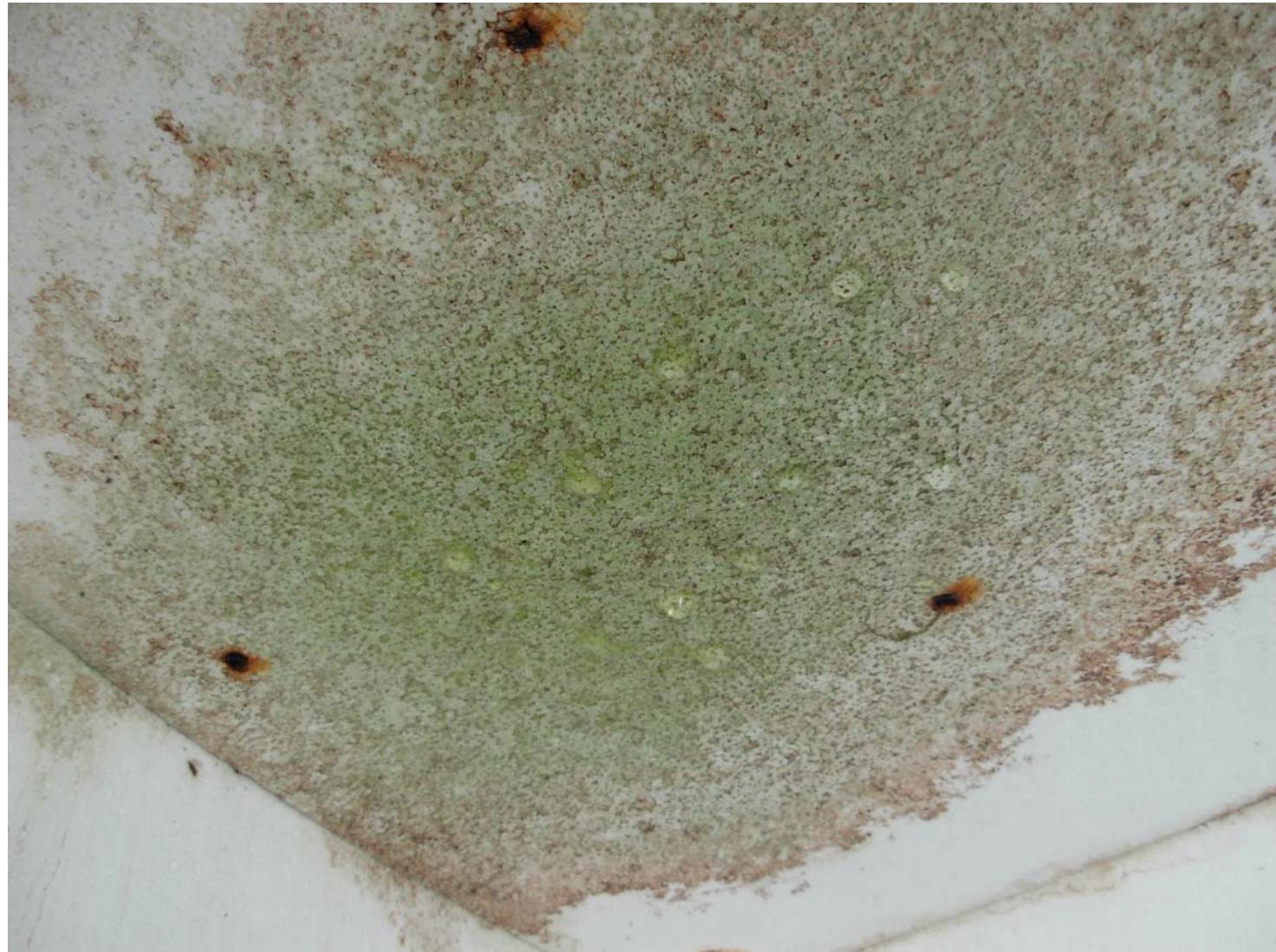
- A well should never be located in a building, unless:
 - Site of well allows for easy and complete access
 - Well must be finished exactly as well located outside

“Well located too close to a source of contamination”

- If possible, remove contaminant source
- If not possible, be vigilant around both the well and the contamination site to reduce risk









“Wellhead not properly sealed/well cap not secure”

“Well not properly air vented”

- Use a double-vent, screened, vermin-proof well cap to properly vent and seal well





“Poor hand-pump well construction”

- Overflow or waste water from hand pump washing over base of pump
- Can return directly through well or end of casing
- Conduit for surface water infiltration

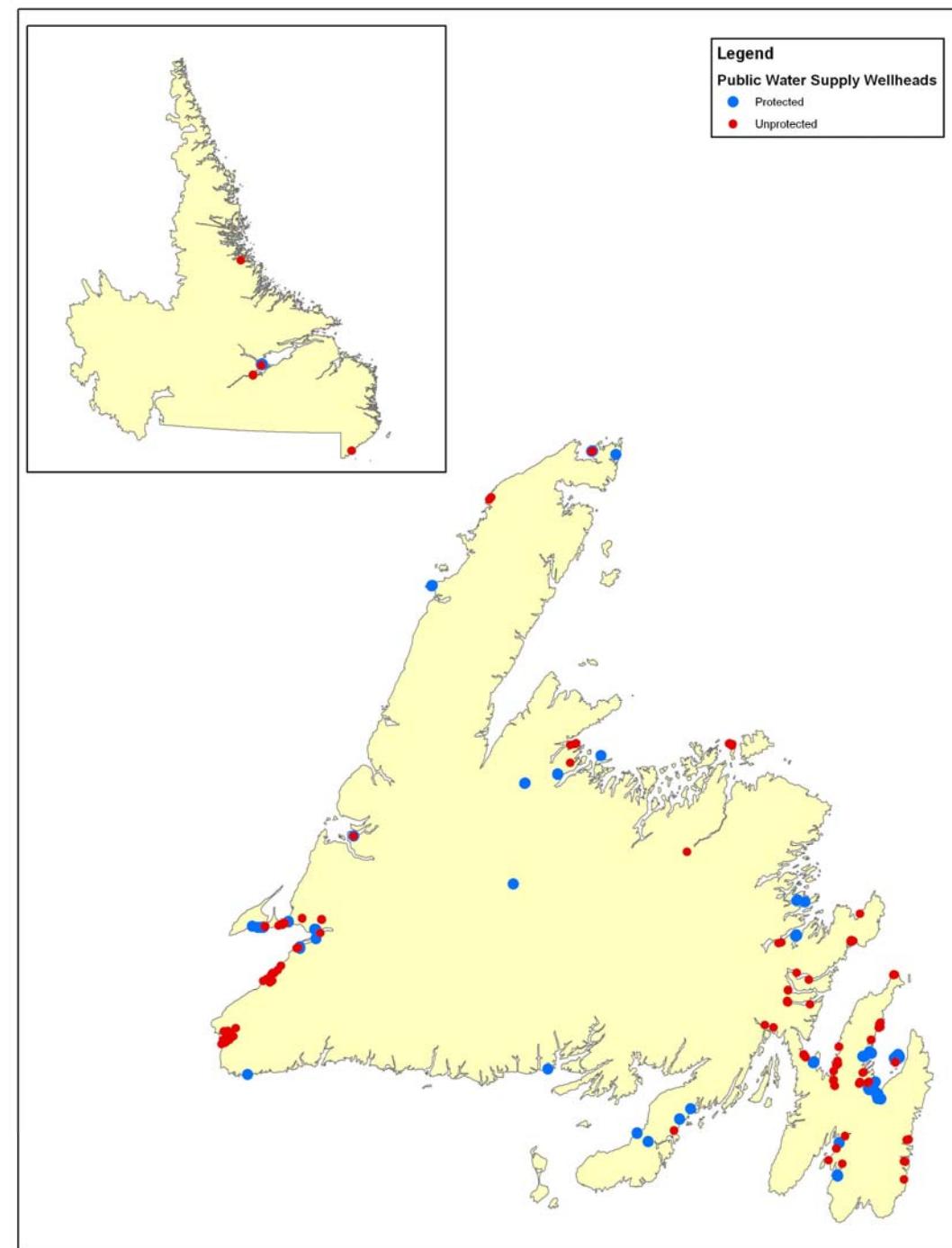
“Abandoned well near production well”

- If well no longer needed or used, it must be properly sealed
- ***Guidelines for Sealing
Groundwater Wells***
- On our Web site:

www.env.gov.nl.ca/env/Env/waterres/Forms/WRMD-Forms.asp







Public Groundwater Supply Wellhead Protection Program

- Permit application on Web site
- Fee - \$100.00
- Questions? Contact:

groundwaterinfo@gov.nl.ca

*A properly built
and maintained
well ensures clean
and safe water for
all users, and
prevents
pollutants from
entering the
drinking water
supply.*

