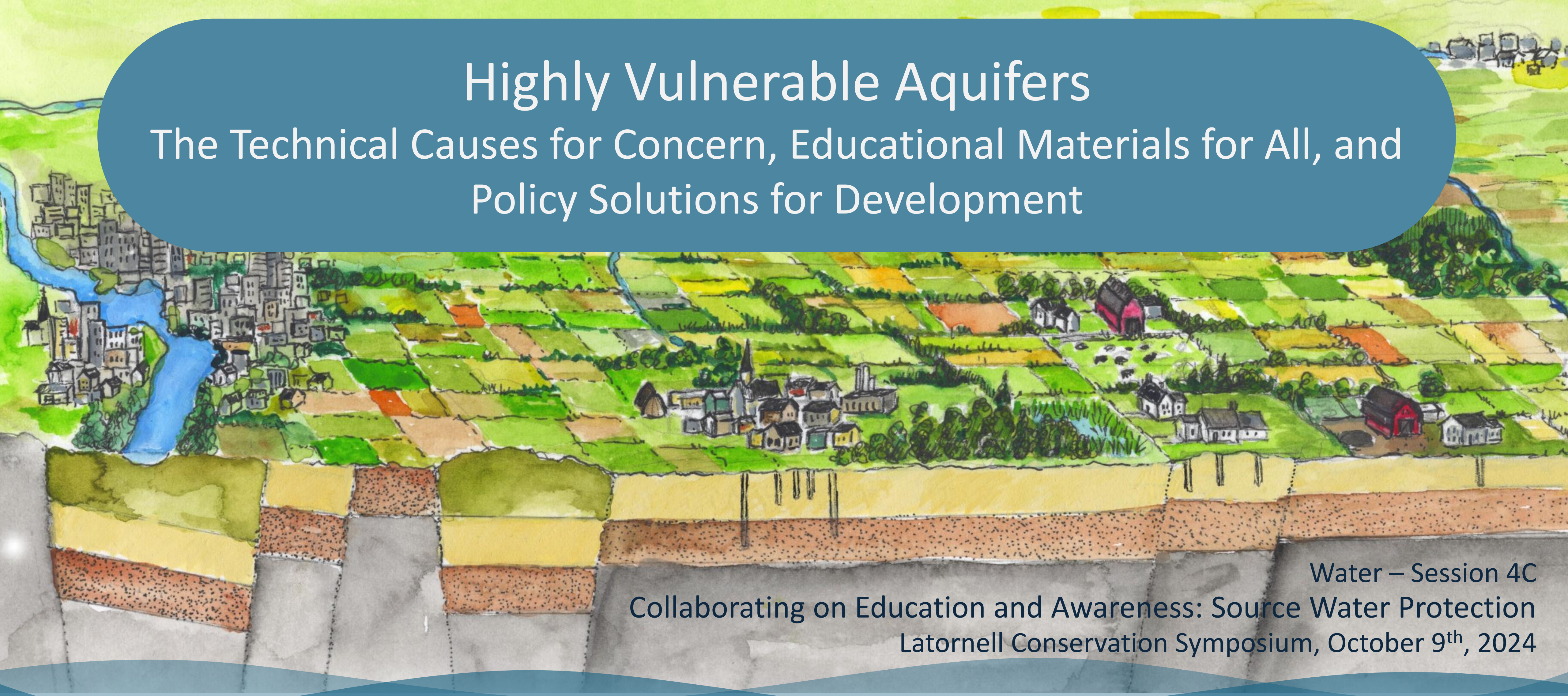
Highly Vulnerable Aquifers

The Technical Causes for Concern, Educational Materials for All, and Policy Solutions for Development



Water – Session 4C

Collaborating on Education and Awareness: Source Water Protection

Latornell Conservation Symposium, October 9th, 2024

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DRINKING WATER SOURCE PROTECTION

ACT FOR CLEAN WATER

Take a moment to consider the aquifer below your feet right now!

"Contaminants are getting into **YOUR** drinking water!"

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Overview

- What are Highly Vulnerable Aquifers? **HVA**
- Why are they important? What is the cause for concern?
- How should we better protect them?

Educate

Monitor

Manage

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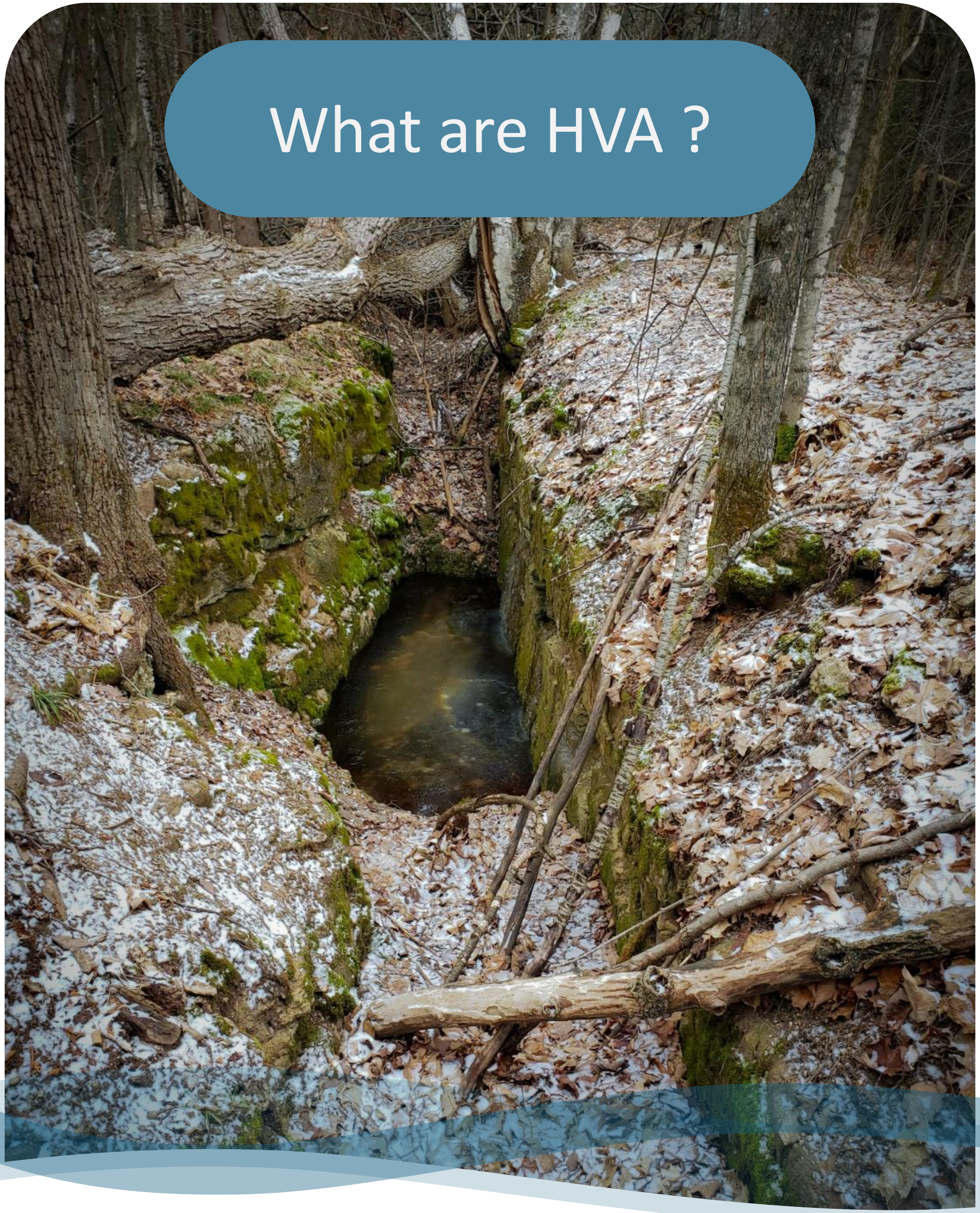
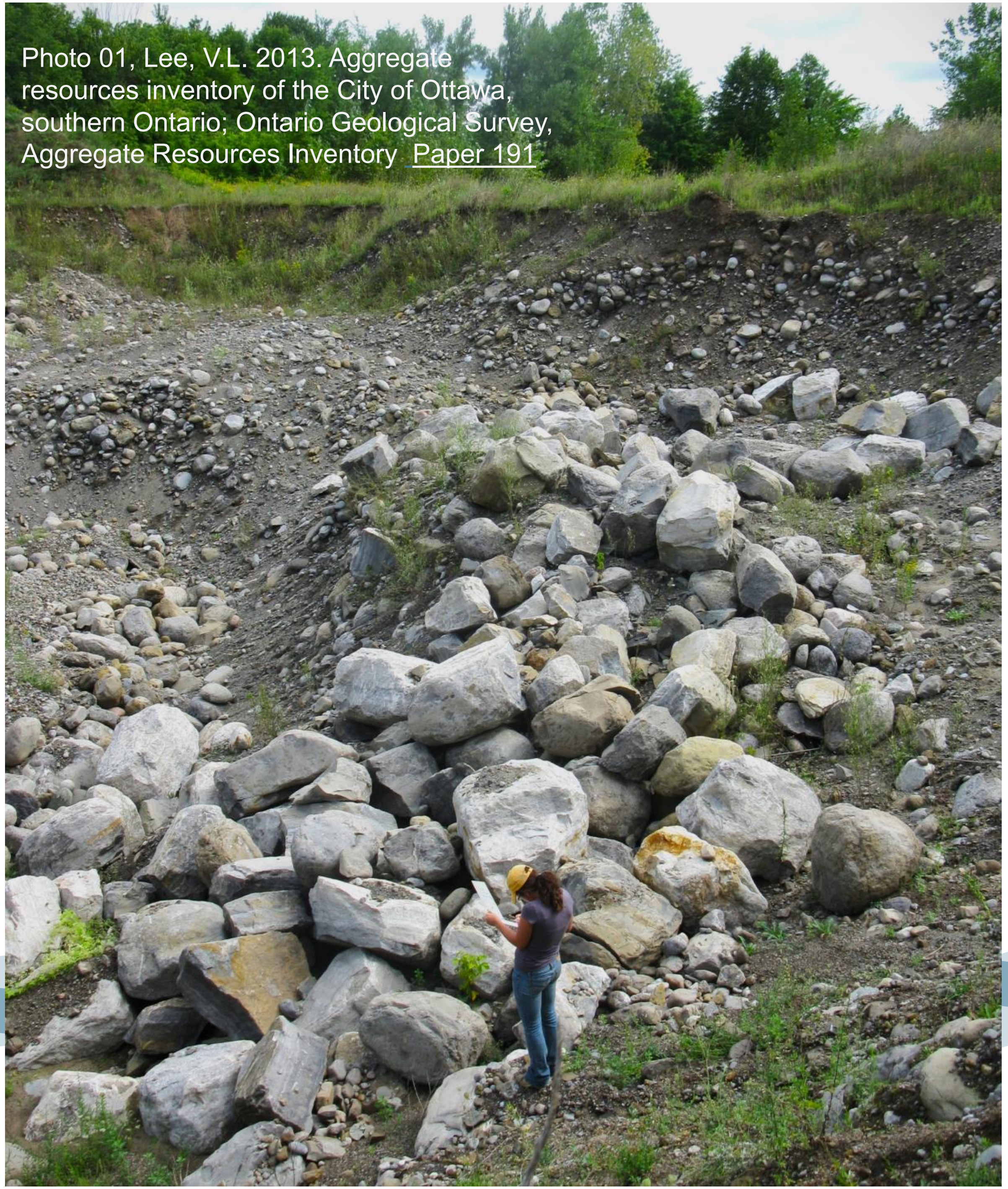
What are HVA ?



The roof of the bedrock aquifer lies bare are the ground surface protected by less than 1 ½ - 2 metres of sediment or only overlain by highly permeable sands and gravels

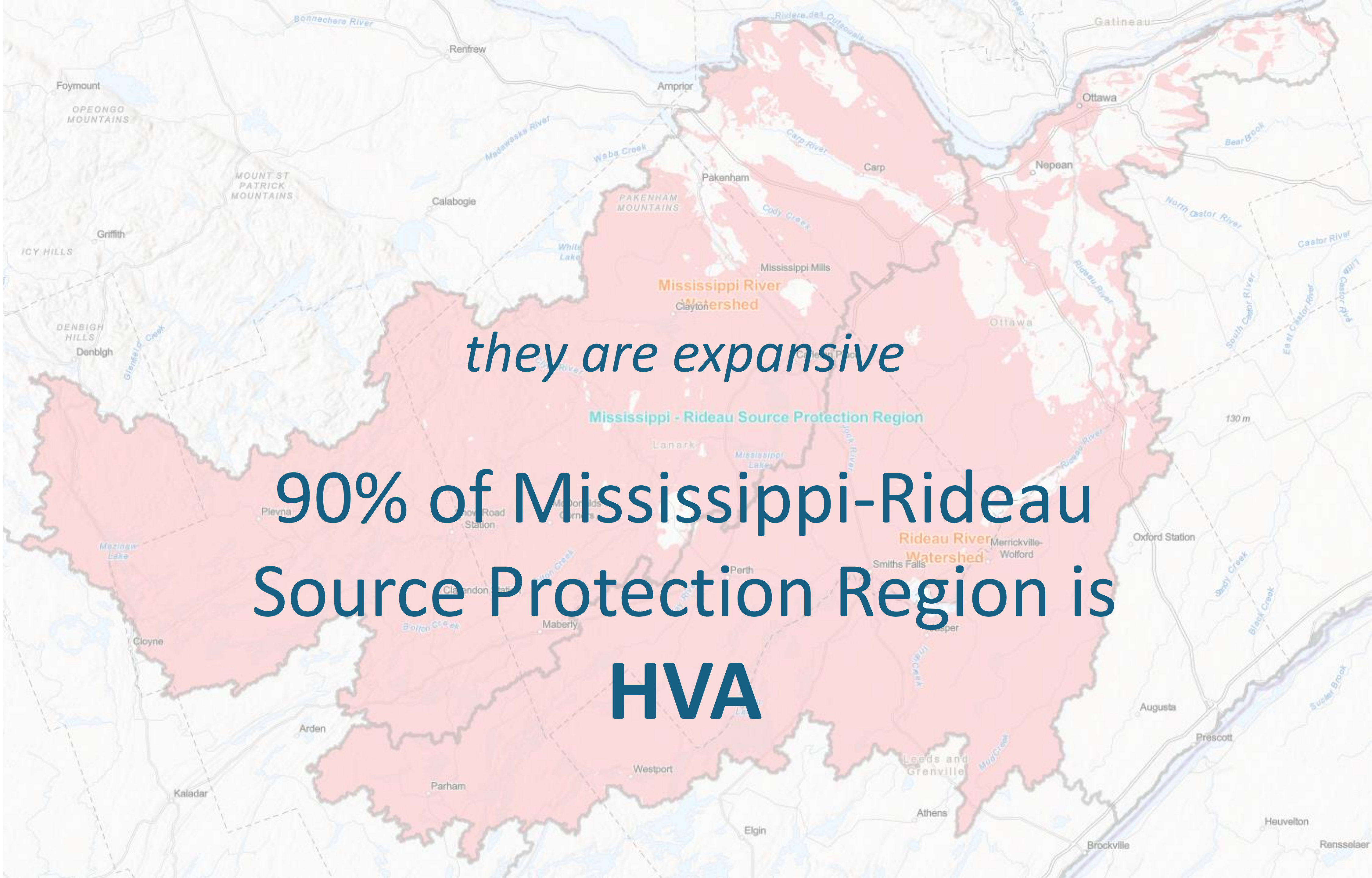
… or the sands and gravels form their own shallow aquifer



shallow water table

Why are HVA important ?

HVA are essential for the health, prosperity, and future of wide parts of Ontarian society.



they are expansive

90% of Mississippi-Rideau Source Protection Region is **HVA**

What is the cause for concern?

- HVA are **vulnerable** to contamination (rapid recharge)
- There are numerous known and emerging **threats**
- The **risks** from threats is very **poorly understood**

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- Aquifers are extremely difficult and often impossible to **clean-up**
- **HVA** are the primary source for 100, 000s (unregulated) private drinking water systems in Ontario
- Aquifers **feed** all of our permanent **water bodies,** including along surface water intake zones for municipal supplies

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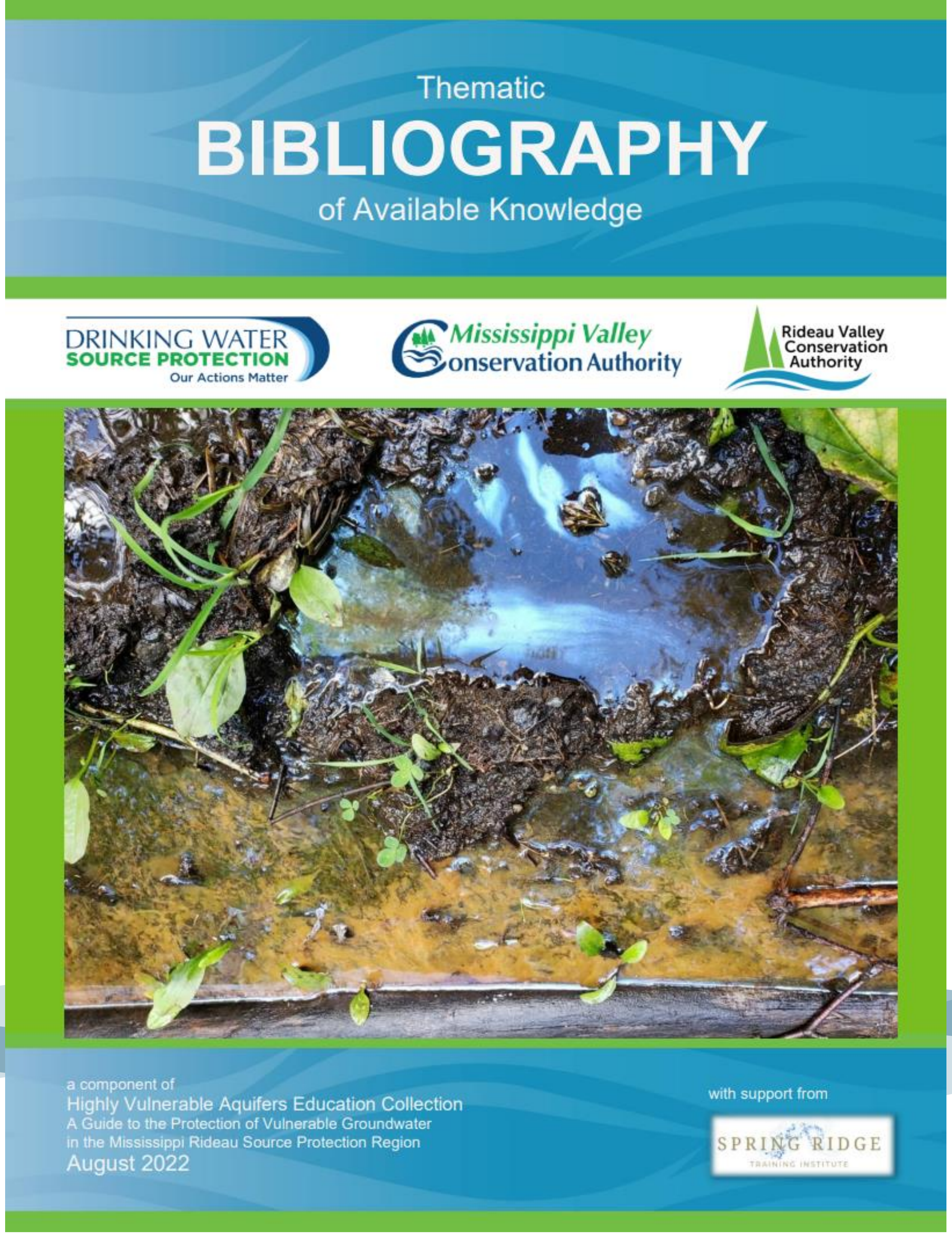
What themes are included?

- **Public Health**
- **Local Hydrogeology**
- Source Water Protection
- Provincial Policy
- Provincial Guidance



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What can we do?

- Strong municipal desire to know and do more
- HVAs are listed as 1 of the 4 vulnerable areas protected under the *Clean Water Act, 2006*
  - Non-legally binding policies only (not mandatory)
- EDU-6-NLB

Highly Vulnerable Education Collection

An interactive storymap, educational videos, helpful action sheets, and more!
Learn about our vulnerable groundwater and how to protect it here.

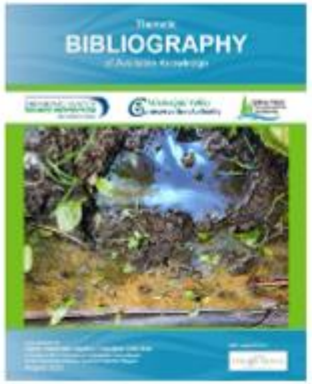
Overview

Story Map

Videos

Action Sheets

Bibliography



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Link: M-R SWP Highly Vulnerable Aquifer Education Collection

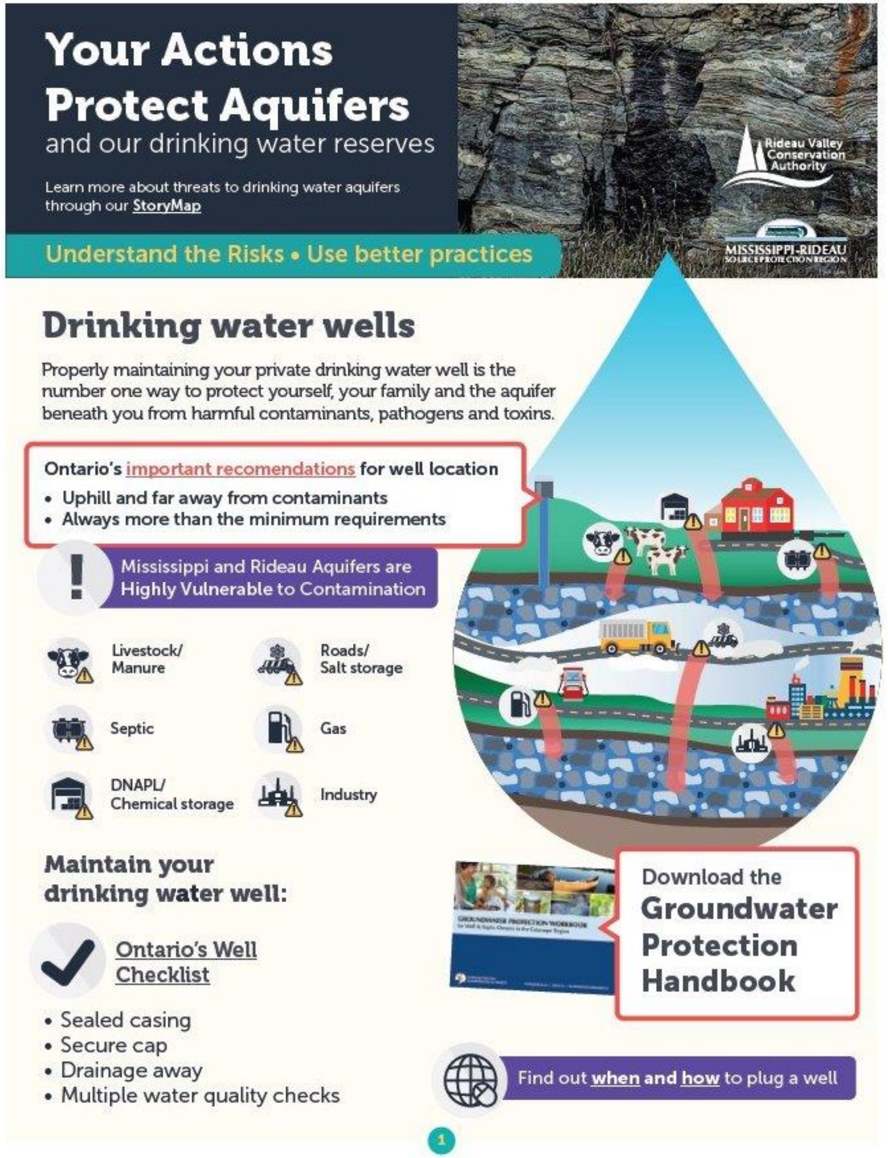
Videos

- 3 videos developed by Spring Ridge Training Institute:
    1. Introduction to HVAs
    2. A Summary of Current Research on Highly Vulnerable Aquifers
    3. Highly Vulnerable Aquifers: Geology, Policy and Protection

Link: https://www.mrsourcewater.ca/en/hva-videos

Action Sheets

- 5 different topics
- Focuses on Best Management Practices



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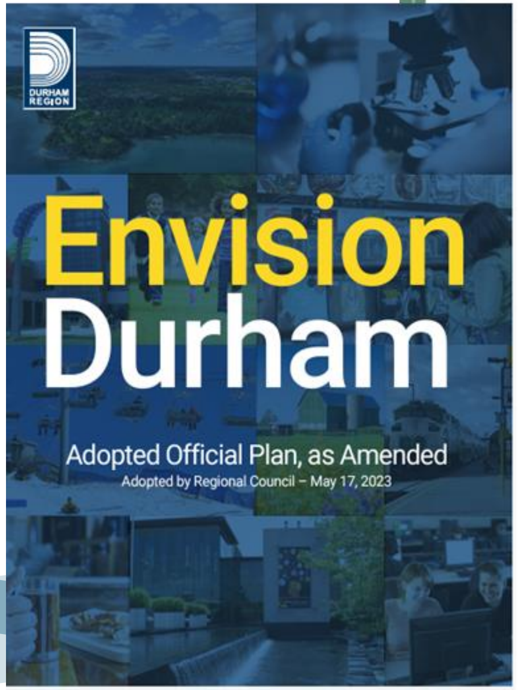
Communication Plan and Rollout

- www.mrsourcewater.ca
- 10-week social media campaign
- Press releases and newsletters
- Shared within municipal networks
- Presentations
  - Municipal Working Groups
  - Ontario Water Works Association
  - Local septic contractors
  - Planning staff
  - Conservation Ontario: Project Managers and Communication professionals

Other Tools to Manage Risk?

- Envision Durham, the Region of Durham's Official Plan, includes policies and mapping for the protection of highly vulnerable aquifers.
  - Policies 7.5.18 to 7.5.24
  - Map 2g



Aquifer Vulnerability

Vulnerable aquifers are those that are particularly susceptible to contamination. For example, from road salt, manure, pesticides, and leaching chemicals and fluids. The Clean Water Act and Oak Ridges Moraine Conservation Plan identify the locations of vulnerable aquifers and outline policies for their protection that municipalities and the province must implement.

It is the policy of Council to:

7.5.18 Identify highly vulnerable aquifers across the region and areas of high aquifer vulnerability on the Oak Ridges Moraine, shown on Map 2g. Additional areas may be identified through updates to source water protection plans or watershed studies.

7.5.19 Require that area municipalities detail highly vulnerable aquifers and areas of high aquifer vulnerability within their official plans, the location and boundaries of which shall be refined through the preparation of watershed plans or similar studies.

7.5.20 Protect highly vulnerable aquifers and areas of high aquifer vulnerability, when considering new development or site alteration by implementing the relevant requirements of the applicable source water protection plan and by prohibiting uses considered to be high risk to groundwater, as identified in Table 3 outside of designated Urban Areas. A hydrogeological investigation may also be required to assess whether other uses not included in Table 3 will be a potential risk to groundwater within highly vulnerable aquifers and areas of high aquifer vulnerability thereby requiring potential prohibitions, restrictions and/or mitigation.

7.5.21 Require a containment management plan for applications to permit high-risk land uses within in a highly vulnerable aquifer or area of high aquifer vulnerability.

7.5.22 Encourage the use of best management practices for existing land uses considered to be high risk to groundwater or those that involve the handling and/or storage of Dense Non-Aqueous Phase Liquid or Organic Solvents that are located within highly vulnerable aquifers or areas of high aquifer vulnerability.

7.5.23 Encourage area municipalities to require measures that reduce salt application, which may include a salt management plan, for development within highly vulnerable aquifers and areas of high aquifer vulnerability, recognizing that maintaining public safety is paramount.

7.5.24 Encourage restrictions for the transportation of chemicals and volatile materials along haulage routes through highly vulnerable aquifers and areas of high aquifer vulnerability.

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DURHAM REGION

Other Tools to Manage Risk?

- Examples of high risk land uses are included in a table within the Official Plan.
- Hydrogeological investigations may be required to ensure proposed uses that are not listed in this table are not high risk.
- Additionally, area municipalities are encouraged to require measures to reduce salt application within highly vulnerable aquifers.

Table 3. Land Use Groups by Risk to Drinking Water

Group 1 – High Risk Land Uses

- Waste disposal sites (Environmental Protection Act, Part V):
  - untreated septage
  - tailings from mines
- Landfilling of hazardous, municipal, or solid non-hazardous industrial or commercial waste:
  - liquid industrial waste injected into a well
  - PCB waste storage
- Organic soil conditioning sites
- Auto wrecking & salvage yards
- Commercial or industrial dry cleaning of textiles & textile products
- Foundries, non-ferrous metal smelting & refining & casting operations
- Metal finishing operations:
  - electroplating
  - electrocoating
  - galvanizing
  - painting
  - application of based enamel
- Vehicle stampings
- Wood & wood product preservatior & treatment
- Bulk liquid trucking
- Local inter-municipal passenger service terminals
- Warehousing, bulk storage or retail sale of:
  - oil, natural gas & petroleum products
  - household or industrial cleaninç production
  - herbicides & fungicides
  - construction equipment
  - underground and above-ground storage tanks that are not equipped with an approved secondary containment device
- Manufacturing of:
  - petroleum products or asphalt batching (including processing)
  - motor vehicles, trucks & bus bodies, aircraft & aircraft parts
  - trailers
  - rail cars
  - mobile homes
  - ships & boats
  - industrial chemicals
  - printing inks
  - adhesives
  - small electrical appliances
  - wheels & brakes
  - leather products
  - soaps & toilet preparations
- Generation and storage of hazardous waste or liquid industrial waste
- Airports
- Schedule 3 contaminants of Ontario Regulation 347 of the Environmental Protection Act

Group 2 – Moderate Risk Land Uses

- Golf courses
- Photo developing facilities
- Printing of newspapers, packing & books
- Repair of industrial machinery
- Repair of:
  - motor vehicles
  - aircraft
  - watercraft
  - rail vehicles
  - trucks
- Storage of:
  - plastic parts for vehicles
  - telephones
  - business machines
  - plastic products
  - paper & newsprint
  - stereo equipment
  - fax machines
  - dry batteries
  - glass & glass products
  - furniture, caskets, cabinets & other wood products
  - radios & televisions
  - computing equipment
  - rubber products
  - photographic equipment
  - Agricultural equipment

Group 3 – Low Risk Land Uses

- Funeral homes & cemeteries
- Medical, health & other laboratories
- Storage, repair yards & facilities for contractors
- Asphalt paving & roofing contractor yards
- Lawn care contractors
- Machinery, equipment rental yards
- Retail sale of agricultural pesticides & herbicides
- Repair (including welding) of:
  - photographic equipment
  - watches
  - electronic equipment
  - appliances
  - furniture
  - jewelry
  - electronic motors
  - small motors
  - vending machines
  - computer equipment
- Manufacturing of:
  - textiles (including dyeing)
  - vehicle fabric accessories
  - dairy
  - processed foods & meats
  - soft drinks & alcohol
  - baked goods
  - canned goods
  - frozen foods
- Pathogenic land uses or storage of pathogenic contaminants in excess of specified quantities

Other Tools to Manage Risk?

- Add an HVA screening item to your application checklist and promote HVA protection during pre-consultation or site plan development

- Add the HVA layer to your public mapping portals to spread awareness

- Share information and resources on your social media pages

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Final Thoughts

- HVA are widespread across Ontario
- (Additional monitoring is needed)
- Additional threat and risk awareness is needed through engaging educational materials
- Implementation of provincial policy is needed through local decision-making tools.

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Thank-you

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