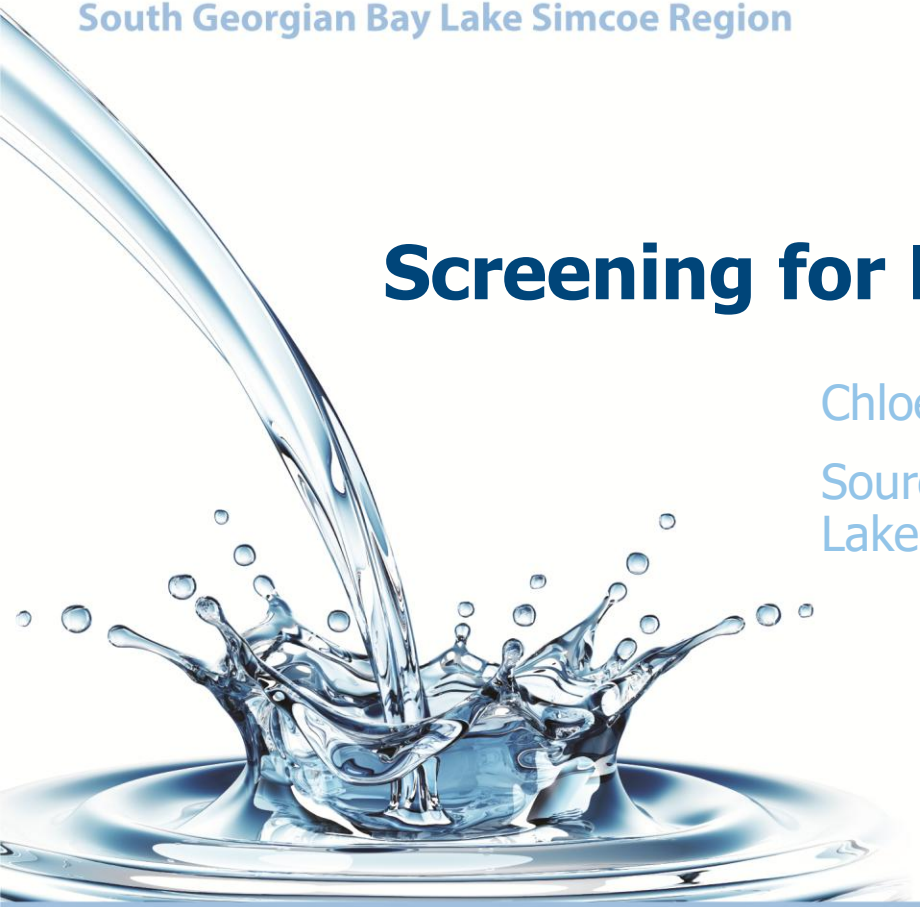
Source Water Protection
South Georgian Bay Lake Simcoe Region



Screening for Potential WHPA Updates

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Lake Simcoe Region Conservation Authority







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Keeping a WHPA Current

When Will a WHPA Expire?



- A WHPA does not have a fixed expiry date
- No regulatory requirements on updating frequency
- A WHPA remains valid until new information indicates that the existing delineation may no longer accurately represent groundwater conditions

The important question then becomes: what types of changes could justify revisiting an existing delineation?

Potential Drivers for WHPA Update



- Changes to municipal well systems
- New large groundwater takings
- New technical information
  - New geological and hydrogeological data
  - Updated groundwater models
- Significant land uses and recharge conditions
- Technical Rules methodology updates

Existing Regulatory Triggers for WHPA Updates

- Addition, removal and/or replacement of municipal wells



Identifying Potentially Outdated WHPAs



- Proactive review approach
- Develop a risk-based periodic screening process to identify systems that may warrant reassessment
- Suggested screening frequency: 10-20 years

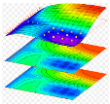
Periodic Screening Process



Comparison of pumping rates



Review of large groundwater takings



Review of updated groundwater models



Review of significant land use changes and recharge conditions

Comparison of Pumping Rates Methodology

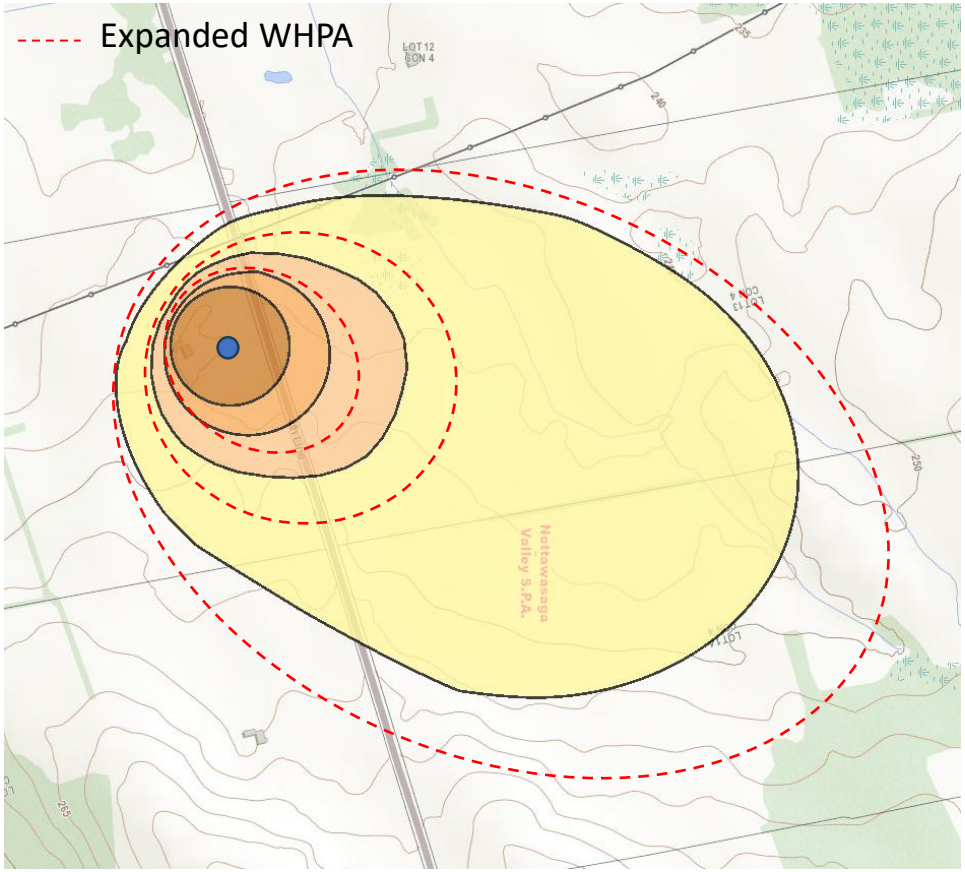


Illustration of WHPA expansion due to increased pumping rate
(Source, Innisfil, Churchill Water System, Well 3)

What happens to a WHPA when pumping rate increases in a municipal well and exceeds the WHPA modelled rate?

- More groundwater must be captured to satisfy the increased pumping demand
- The capture zone widens and/or extends farther upgradient
- Additional recharge areas or flow system may become part of the capture zone

No fixed or proportional relationship between the amount of pumping rate increase and the amount of WHPA expansion

Comparison of Pumping Rates Methodology

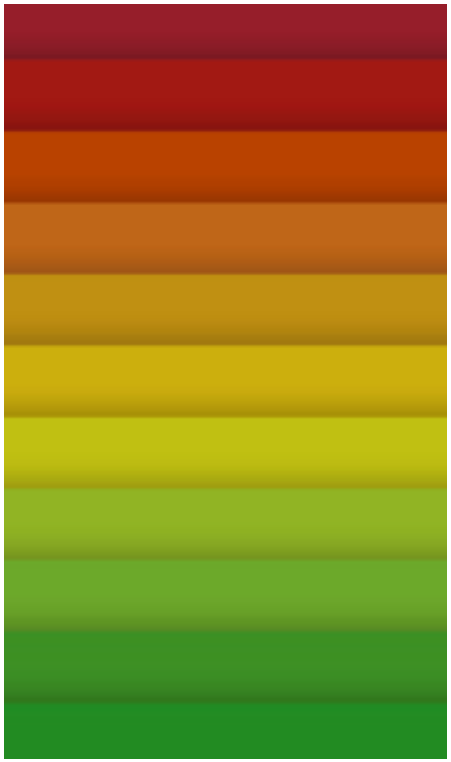
Data Collection

- A list of municipal wells
- PTTW info, permitted taking rates, 2020 actual water taking rates, and 2051 projected taking rates
- Modelled pumping rates for WHPA delineation
  - Original WHPA delineation – 2004/2005
  - 2010 WHPA updates
  - More recent WHPA updates
  - PTTW average rate or projected long term rate was commonly used, instead of PTTW max rate

Comparison of Pumping Rates Methodology

Risk Assessment

- High Risk
  - WHPA modelled rate ≤ 2020 actual taking rate
- Medium Risk
  - WHPA modelled rate > 2020 actual taking
  - WHPA modelled rate ≤ 2051 projected taking rate
- Low Risk
  - WHPA modelled rate > 2051 projected taking rate



Comparison of Pumping Rates Methodology

Additional Considerations

- Comparison of combined modelled rates with combined actual taking rates for multiple wells in the same pumping sink/wellfield
- Potential pumping interference between nearby municipal wells due to pumping rate increase

Identification of systems at risk

- High Risk
- Medium Risk

Comparison of Pumping Rates Methodology

Further review of high/medium-risk water systems

- Higher priority (Very High/Medium+)
  - Policies apply outside WHPA-A, and potential for new threats exist
  - Potential for DNAPLs in expanded WHPA-C
  - Official plan identifies potential for riskier land use in the future
- Less concerned (High/Medium)
  - Policies only apply in WHPA-A
  - Little chance of DNAPLs in an expanded WHPA-C

Comparison of Pumping Rates Preliminary Findings

2 Water systems rated “Very High” risk

- NVCA, Essa, Angus, Mill St. Well
- LSRCA, Ramara, Val Harbour, Wells 1, 2&3

Action Plan

- *Bring to municipalities’ attention, with a recommended WHPA update plan*
- *Support municipalities on planning and implementing WHPA update work*

Comparison of Pumping Rates Preliminary Findings

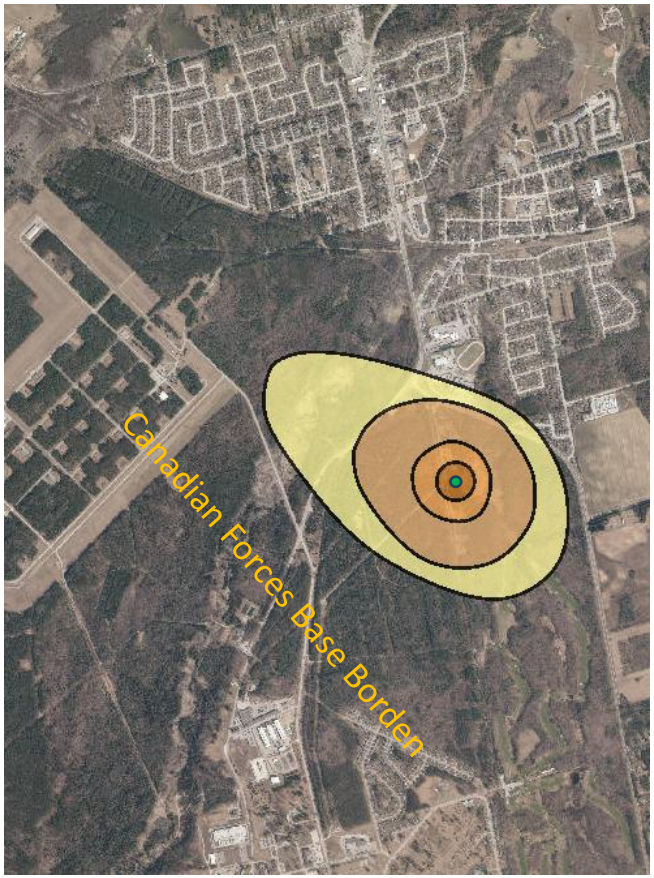
4 Water systems rated “High” risk

- NVCA, Essa, Thornton, Wells 1 &2
- NVCA, Springwater, Snow Valley, Wells 1 & 2
- SSEA, Springwater, Hillsdale, Wells 2&3
- LSRCA, Severn, Severn Easte Well

Action Plan

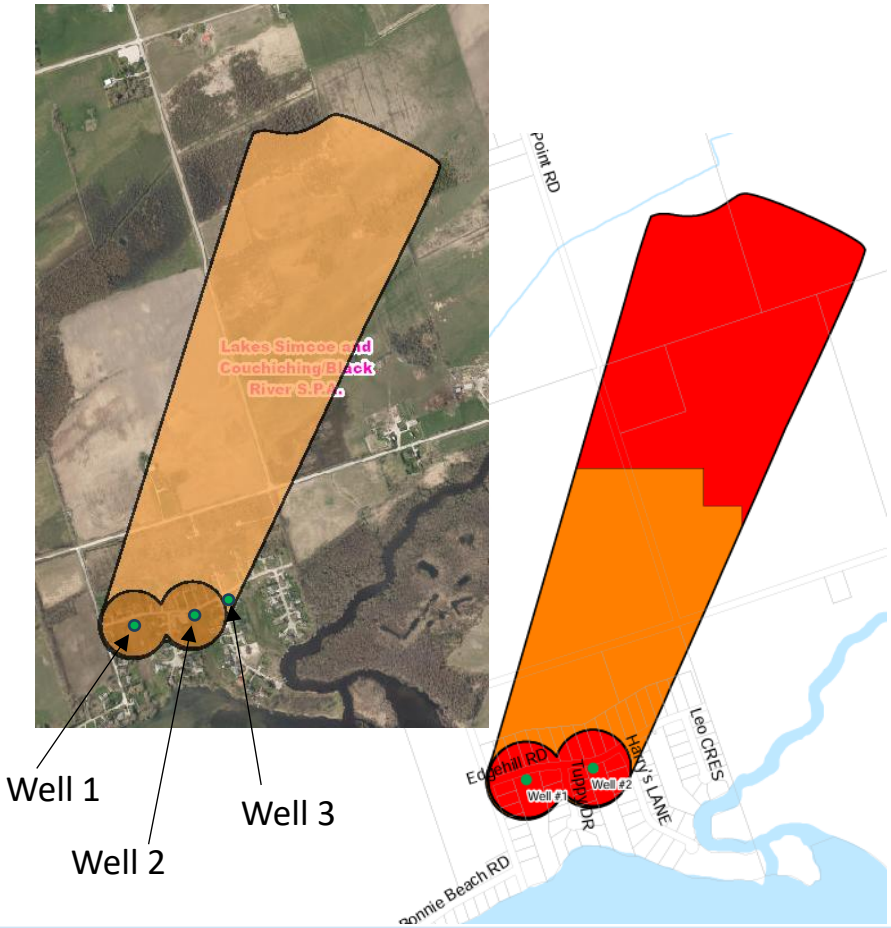
- *Bring to municipalities’ attention*
- *Let/assist municipalities resolve if they see a fit*

Comparison of Pumping Rates
Preliminary Findings – VH Risk Water Systems
NVCA, Essa, Angus, Mill St.



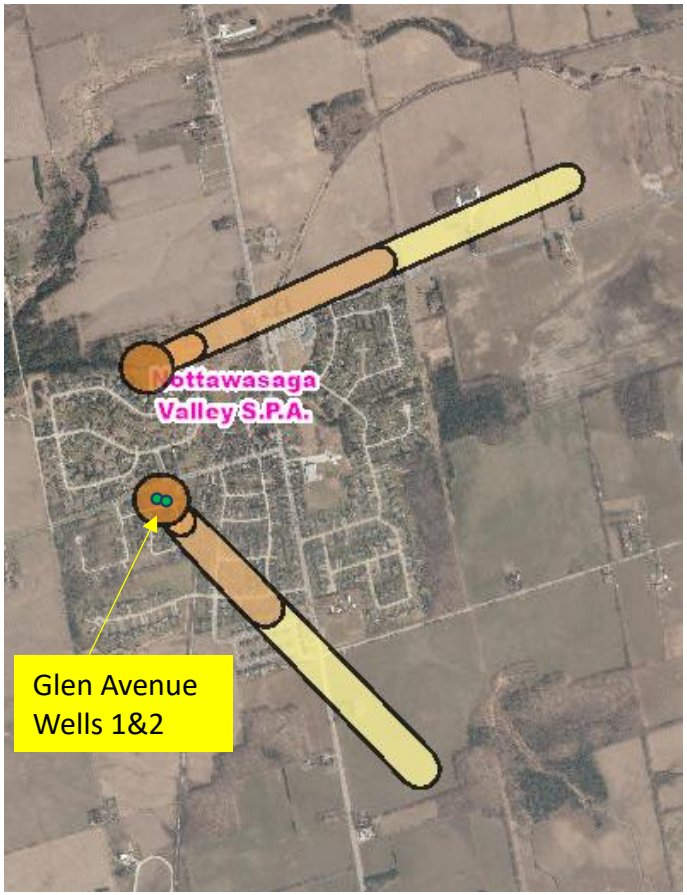
- Single well in wellfield
- 2020 actual taking rate (21.80 L/s) exceeded WHPA modelled rate (12.77 L/s, 2004) by 71%
- VS distribution: A=10; B=6
- Land use
  - WHPA C, forested, rural residential
  - WHPA D, forested, but includes CFB Borden
- Land use Plans
  - Rural, residential, plus CFB Borden

Comparison of Pumping Rates Preliminary Findings – VH Risk Water Systems LSRCA-Ramara-Val Harbour



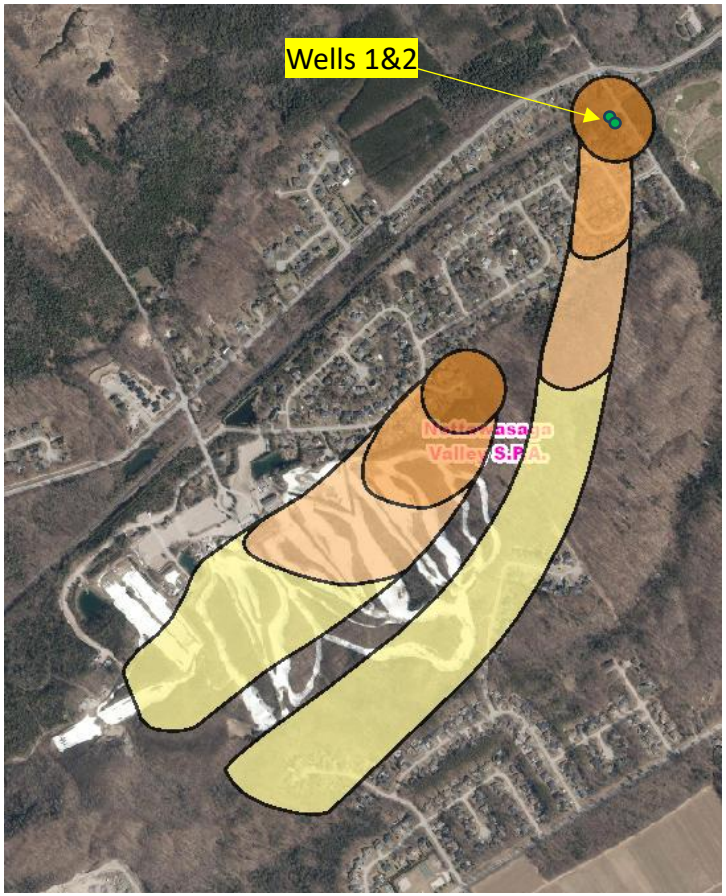
- Three bedrock wells
  - WHPA modelled based on Wells 1&2; Well 3 was added to WHPA without updates
- WHPA-A and B only, no WHPA-C or D – steady state capture zone within 2-year ToT
- 2020 actual taking (0.34 L/s) exceeded WHPA modelled rate (0.33 L/s, 2005)
- VS distribution: A=10; B=10/8
- Current land use : largely agricultural
- Land use plans: agricultural

Comparison of Pumping Rates Preliminary Findings –H Risk Water Systems NVCA, Essa, Thornton, Wells 1 &2



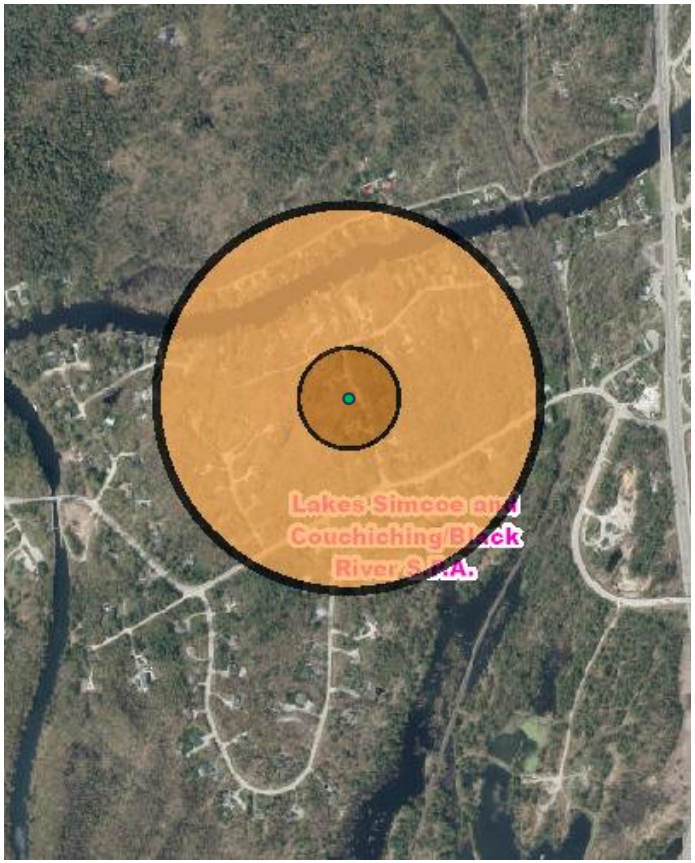
- Glen Avenue wellfield, two wells modelled as one pumping sink
- 2020 combined taking (3.69 L/s) exceeded modelled rate (2.01 L/s, 2010) by 84%
- VS distribution: A=10; B=8
- Land use:
  - WHPA C&D, largely farmlands
- Land use Plans
  - Agricultural (Essa & Innisfil)
- Likely no policy implications

Comparison of Pumping Rates
Preliminary Findings – H Risk Water Systems
NVCA, Springwater, Snow Valley Wells 1 & 2



- Two wells modelled as one pumping sink with a combined pumping rate
- 2022 combined taking (3.93 L/s) exceeded modelled rate (3.53 L/s, 2007) by 12%
- VS distribution: A=10; B=6
- WHPA C&D land use: open space, ski hill, residential
- Land use Plan: recreational open space and natural heritage
- Likely no policy implications

Comparison of Pumping Rates Preliminary Findings –H Risk Water Systems LSRCA, Severn, Severn Easte Well



- Single bedrock well, WHPA-C&D very limited
  - Fixed radius analytical model
  - Steady state capture zone reached shortly after 2-year ToT
- 2022 takings (0.181 L/s) exceeded modelled rate (0.15 L/s, 2005) by 22%
- VS distribution: A=10; B=10
- Current land use: rural residential
- Land use Plans: countryside
- Likely no policy implications

Future Screening Categories



- Review of Large Groundwater Takings
- Review of Updated Groundwater Models
- Significant Land Use Changes and Recharge Conditions

Thank you
Questions and Discussion

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DRINKING WATER SOURCE PROTECTION
SOUTH GEORGIAN BAY LAKE SIMCOE REGION

