

DRINKING WATER SOURCE PROTECTION

ACT FOR CLEAN WATER

South Georgian Bay
Lake Simcoe
Source Protection
Region

Source Water Protection: 'Semi-quantitative risk assessment'

Presentation by Don Goodyear

Latornell Symposium

November 18, 2009



DRINKING WATER SOURCE PROTECTION

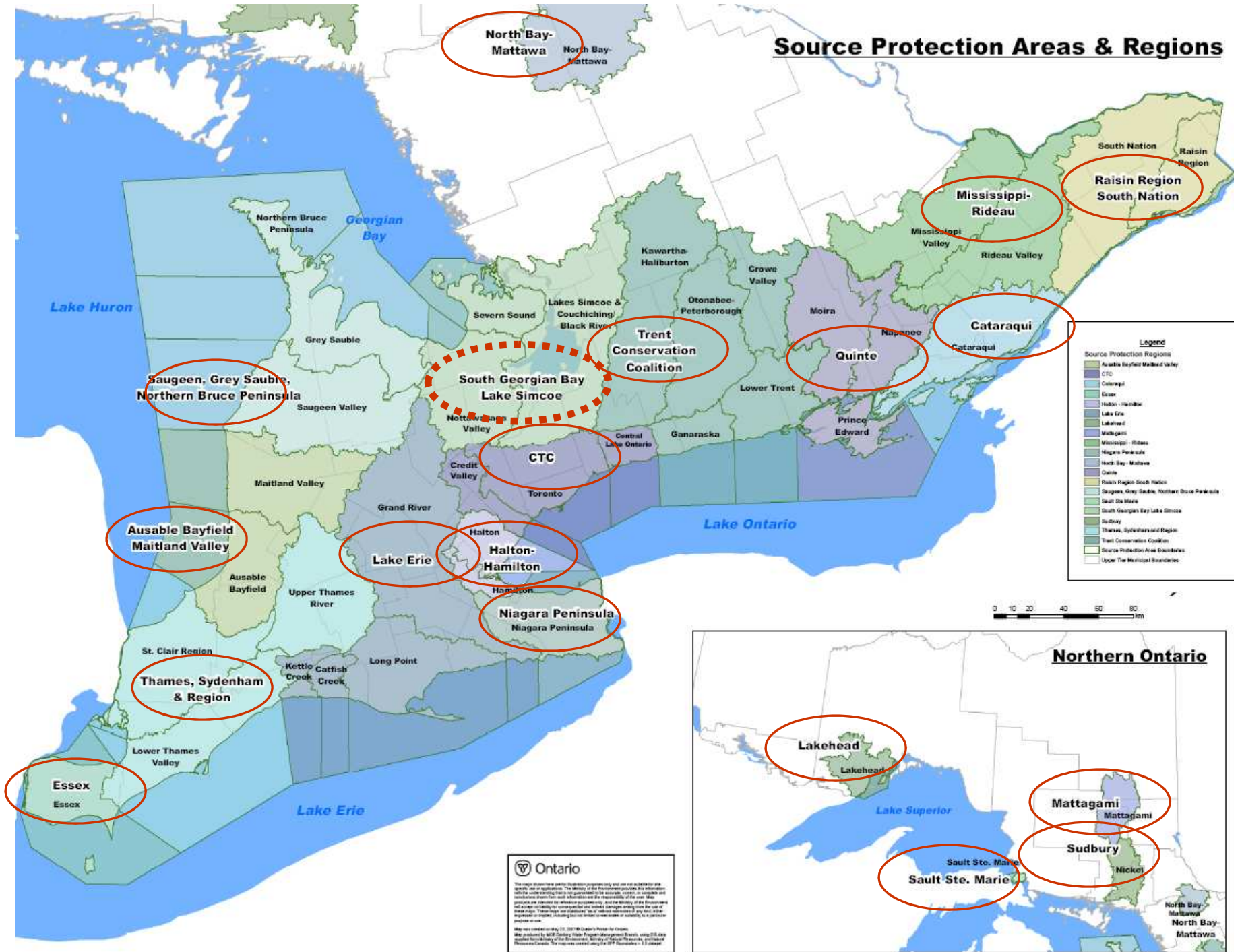
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Presentation Overview

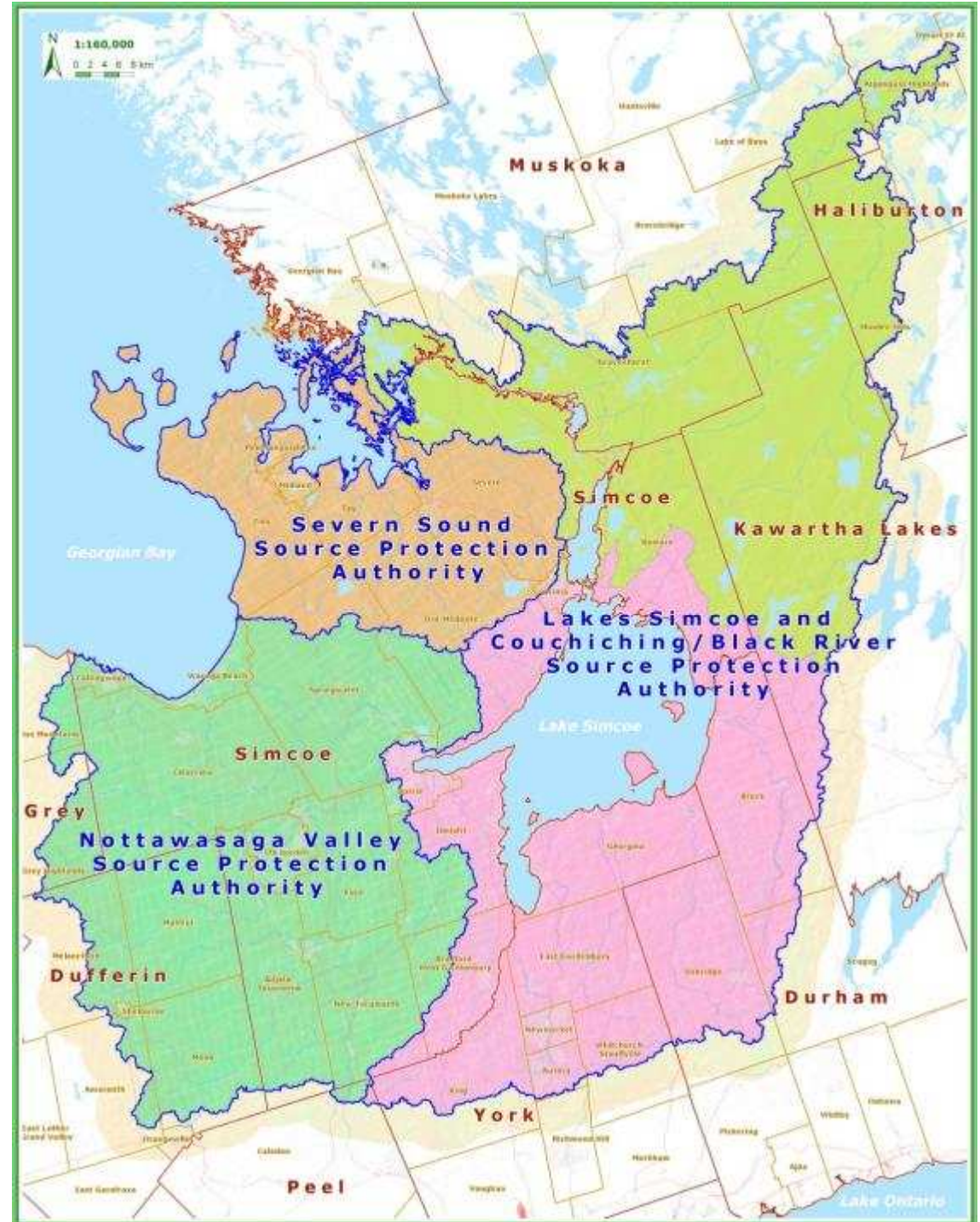
- Briefly describe the local Source Protection Region
- Provide an overview of the threats assessment process using local examples
- Convey some significant progress, and highlight some of the challenges with the process we're wrestling with

Source Protection Areas & Regions



Our Region

- 10,000 km²
- 109 Systems with 289 Wells and 15 Surface Water Intakes
- Approx. 2000 permits to take water
- 52 municipalities
 - ❖ 41 lower tier
 - ❖ 8 upper tier
 - ❖ 3 separated cities
- 3 First Nations communities

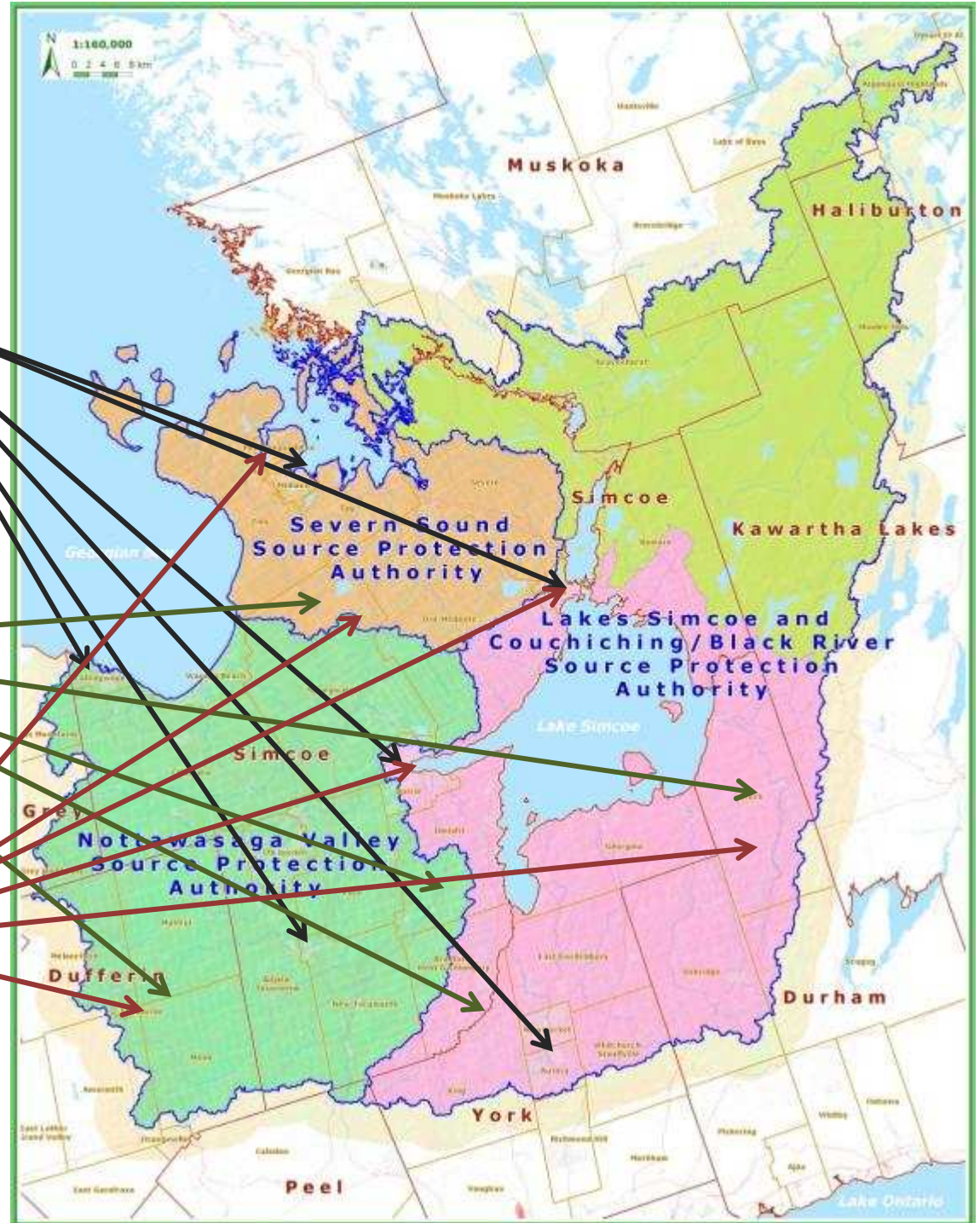


Our Region

Urban centers

Rural / agricultural

Water quality concerns



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Drinking Water Threats

- Waste Disposal Site
- Sewage Storage and Disposal
- Application of Agricultural Source Material (ASM)
- Storage of ASM
- Management of ASM
- Application of Non-ASM
- Storage of Non-ASM
- Application of Fertilizer
- Storage of Fertilizer
- Application of Pesticide
- Storage of Pesticide
- Application of Road Salt
- Storage of Road Salt
- Storage of Snow
- Storage of Fuel
- Storage of dense non-aqueous phase liquid (DNAPL)
- Storage of organic solvent
- Management of de-icing runoff

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Vulnerable Areas

Significant
Recharge areas



Highly Vulnerable
Aquifers

Intake Protection
Zones



Wellhead
Protection Areas

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Water Quality Risk Assessment



Significant threat

In a vulnerable area

= High level of risk



Significant threat

In an area of low vulnerability

= Low level of risk



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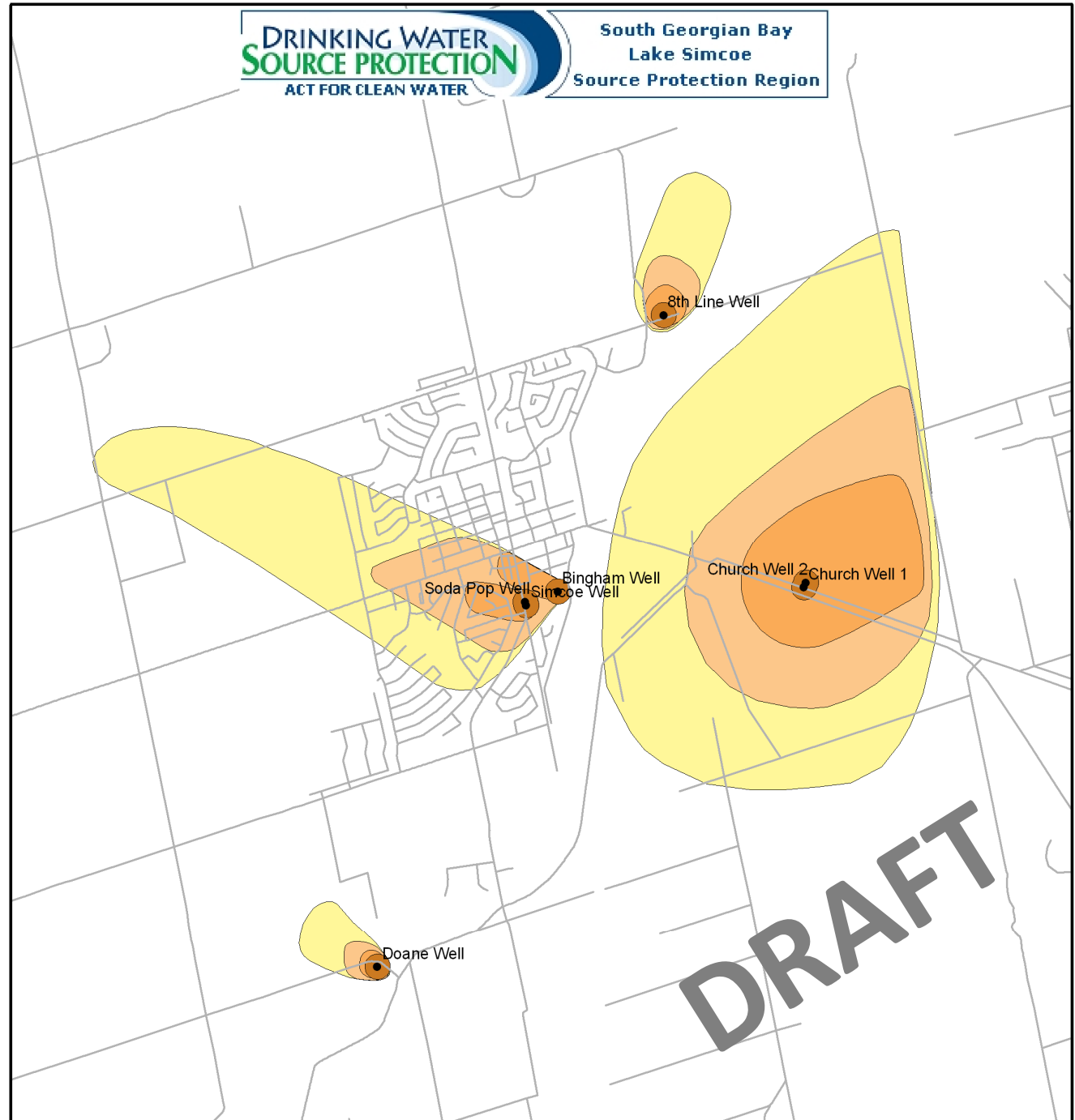
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How Vulnerable is your Vulnerable Area?

- Delineate vulnerable area (WHPA)
- Rate Vulnerability
- Consider Vulnerability Increase (transport pathways)
- Assign Vulnerability Scores

Wellhead Protection Areas

Bradford



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Municipal Wells – Simcoe/Soda Pop/Bingham Wells

Municipal Well:	Soda Pop	Bingham	Simcoe
Constructed:	1967	1948	1930
Aquifer:	Bradford Aquifer	West Gwillimbury Aquifer	
Depth (m):	82.0	28.6	33.8
Maximum Taking (m³/day):	786	589	1047
Static Water Level (m below ground):	5.6	8.2	4.9

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Municipal Wells – Church Wells

Municipal Well:	NO. 1	NO. 2
Constructed:	1968	1975
Aquifer:	Bradford Aquifer	
Depth (m):	90.2	89.3
Maximum Taking (m³/day):	1637	4912
Static Water Level (m below ground):	6 (1968)	13 (1975)

Groundwater Vulnerability

Bradford

AQUIFER VULNERABILITY INDEX

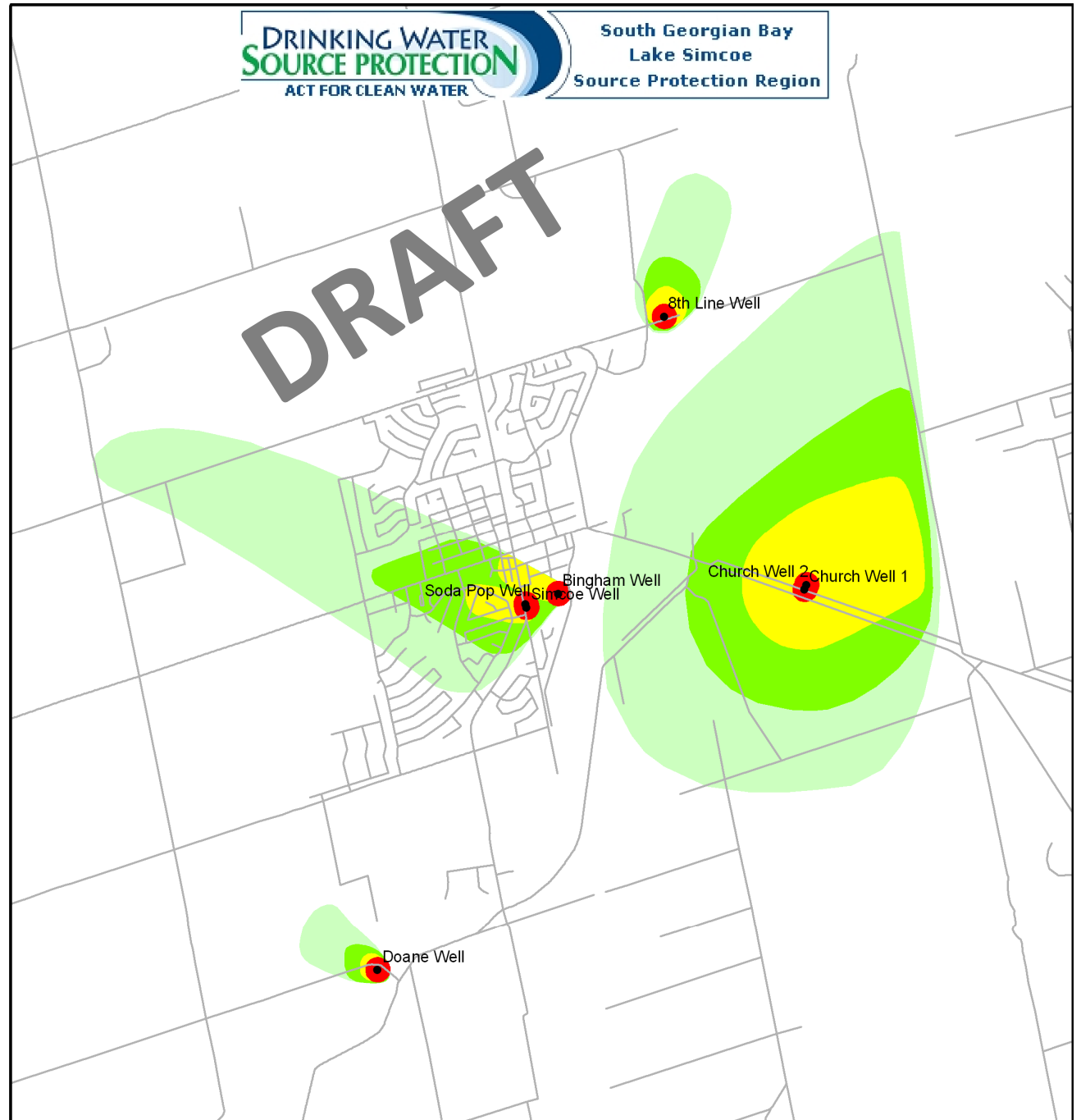
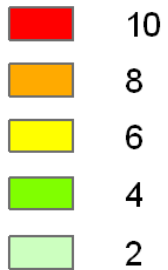
- High
- Medium
- Low



Vulnerability Score – Bradford

• MUNICIPAL WELLS

VULNERABILITY SCORING





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How nasty is your Threat?

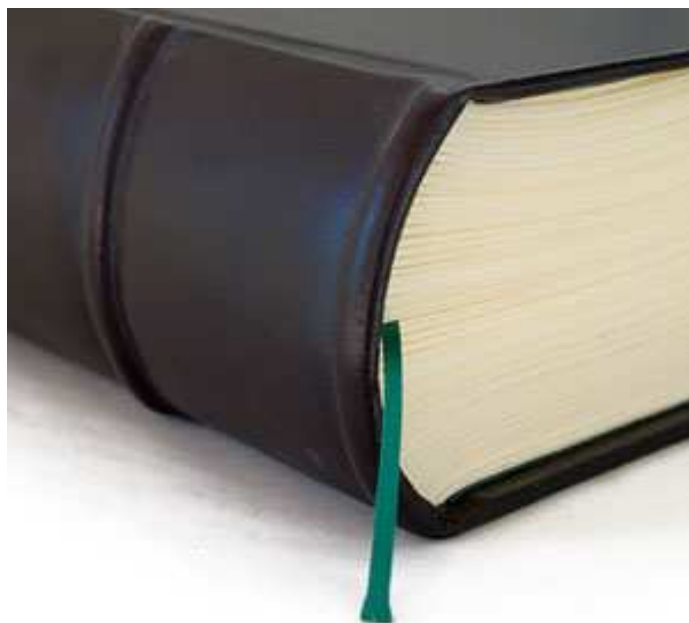
- Likelihood of release
- Volume
- Mobility
- Toxicity

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Handy Look-up Tables to assess 'activities'

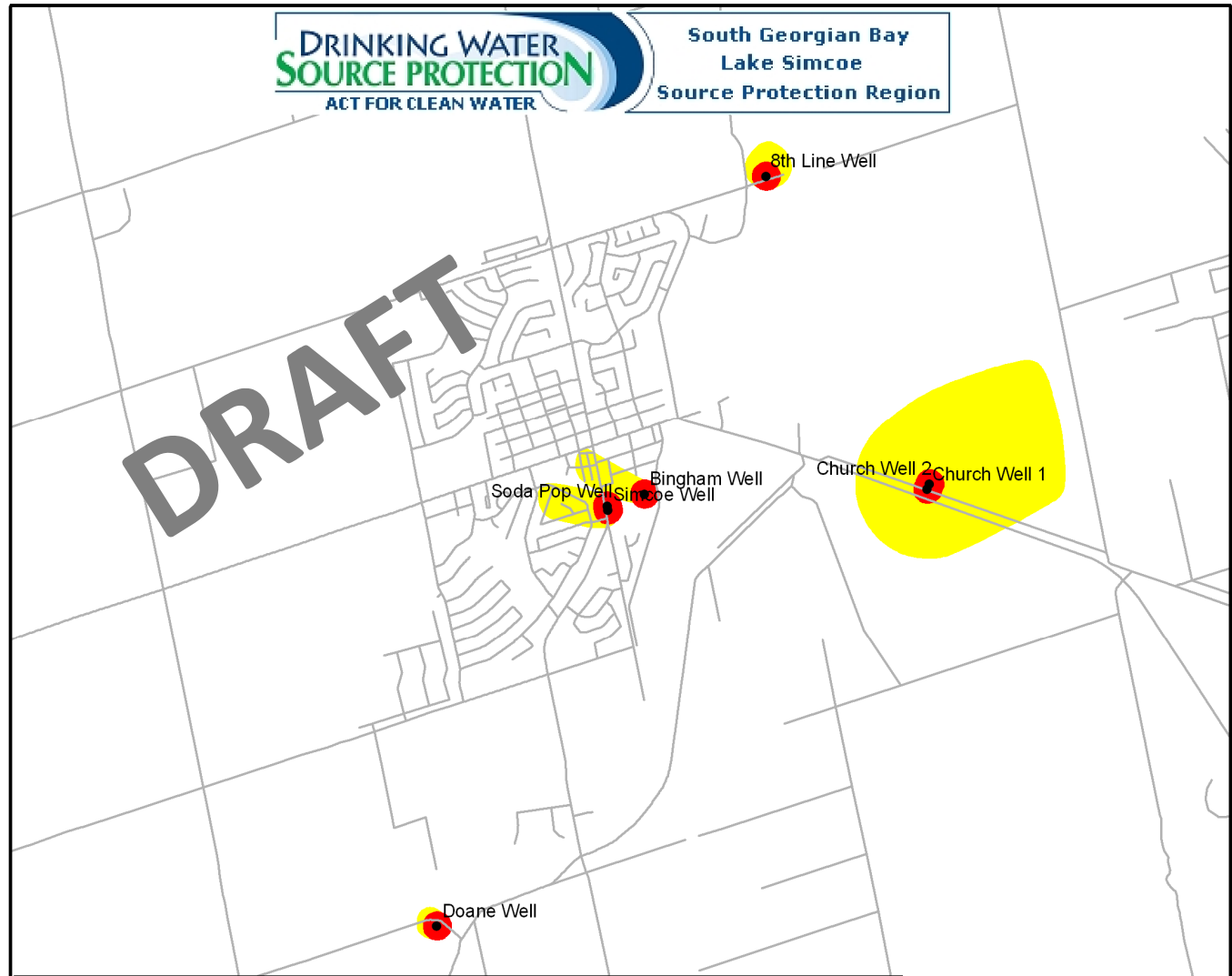


Modified from Taylor, 2009

TABLE 1 – DRINKING WATER THREATS - CHEMICALS

Under the following CIRCUMSTANCES:	Areas Within Vulnerable Area	Threat is Significant in Areas with a Vulnerability Score of:	Threat is Moderate in Areas with a Vulnerability Score of:	Threat is Low in Areas with a Vulnerability Score of:
Column 2	Column 3	Column 4	Column 5	Column 6
. The storage of a DNAPL if a portion, but not all, of the storage is below grade. . A spill of the DNAPL may result in the presence of Tetrachloroethylene (PCE) in groundwater or surface water.	IPZ-1, IPZ-2, IPZ-3, and WHPA-E	10	7.2 - 9	4.8 - 7
	WHPA-A, WHPA-B, WHPA-C, WHPA-C1	2 - 10		
	WHPA-D			6
	HVA			6
	SGRA			6
. The storage of a DNAPL if a portion, but not all, of the storage is below grade. . A spill of the DNAPL may result in the presence of Trichloroethylene or another NAPL that could degrade to Trichloroethylene in groundwater or surface water.	IPZ-1, IPZ-2, IPZ-3, and WHPA-E	10	7.2 - 9	4.8 - 7
	WHPA-A, WHPA-B, WHPA-C, WHPA-C1	2 - 10		
	WHPA-D			6
	HVA			6
	SGRA			6
. The storage of a DNAPL if a portion, but not all, of the storage is below grade. . A spill of the DNAPL may result in the presence of Vinyl chloride or another NAPL that could degrade to vinyl chloride in groundwater or surface water.	IPZ-1, IPZ-2, IPZ-3, and WHPA-E	10	7 - 9	4.8 - 6.4
	WHPA-A, WHPA-B, WHPA-C, WHPA-C1	2 - 10		
	WHPA-D			6
	HVA			6
	SGRA			6

DRAFT



Areas for Significant, Moderate, or Low Drinking Water Threats: Pathogens

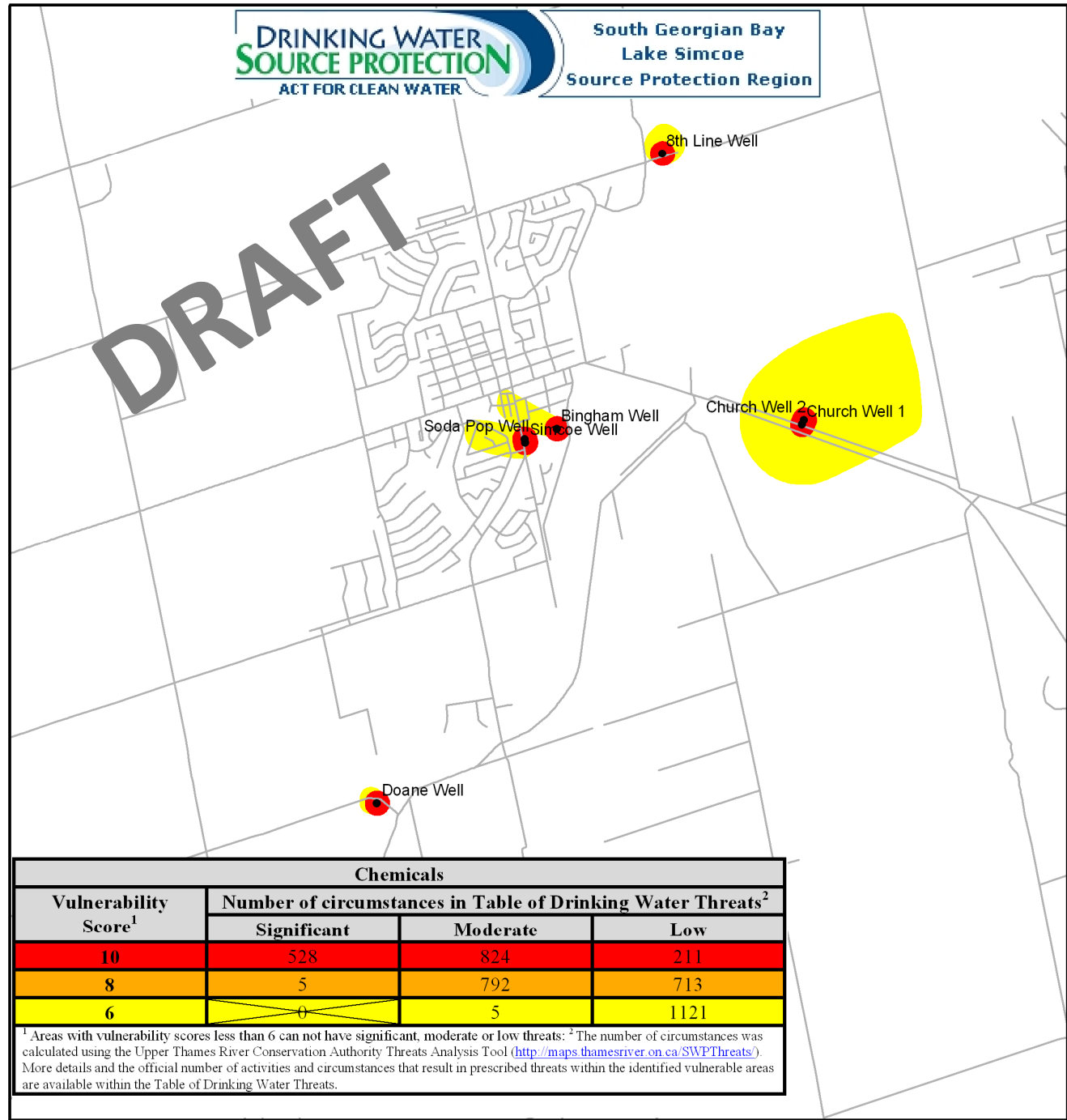
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Pathogens			
Vulnerability Score ¹	Number of circumstances in Table of Drinking Water Threats ²		
	Significant	Moderate	Low
10	50	24	0
8	0	50	24
6	0	0	50

¹ Areas with vulnerability scores less than 6 can not have significant, moderate or low threats. Pathogens are not a threat in WHPA C, C1 or D. ² The number of circumstances was calculated using the Upper Thames River Conservation Authority Threats Analysis Tool (<http://maps.thamesriver.on.ca/SVPTthreats/>). More details and the official number of activities and circumstances that result in prescribed threats within the identified vulnerable areas are available within the Table of Drinking Water Threats.

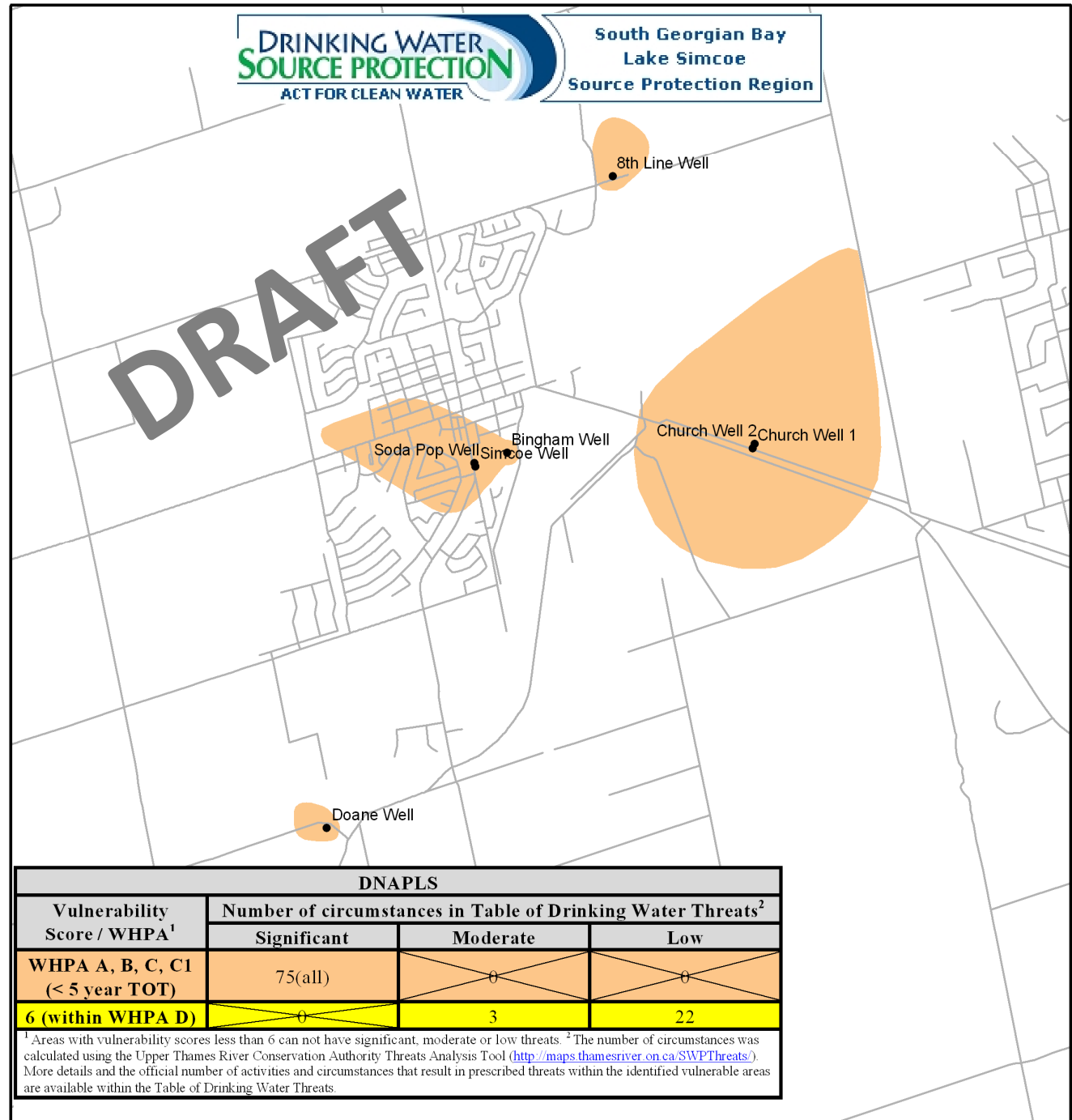
Areas for Significant, Moderate, or Low Drinking Water Threats: CHEMICALS

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Areas for Significant, Moderate, or Low Drinking Water Threats: DNAPLS

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THREATS FROM 'ISSUES'

- Raw drinking water quality evaluations
 - Exceedence of regulatory limits = issue*
 - Trend to indicate that a limit will be exceeded = issue
- Any Conditions or Activities that could contribute to an issue are Significant Drinking Water Threats

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THREATS FROM 'CONDITIONS'

- Conditions are *existing* water quality problems resulting from *historical* activity
 - e.g. Chemical in groundwater or sediments
 - Does not have to be present in drinking water
- Only Significant where Vulnerability Score > 8

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THREATS FROM 'OTHER ACTIVITIES'

- These are Activities or Circumstances that should be considered as Drinking Water Threats that are not in the Table of Drinking Water Threats.
- Determine & document appropriate Hazard Scores
- Propose to SPC for Consideration by Minister

ENUMERATE SIGNIFICANT THREATS

- Prepare Table to Enumerate Significant Drinking Water Threats
 - Count on parcel basis
 - Can be more than 1 Significant Threat per parcel
 - Significant Threats due to an Issue will be counted for each Activity for that parameter within Issues Contributing Area

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SUMMARY

- Significant Threats limited to Vulnerability Score > 8, unless DNAPL or an Identified Issue
- Fewer than anticipated number of significant threats being identified
- Private septic and heating fuel common Significant Threats (in rural communities)

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SUMMARY

- Complicated process = consultation challenge
- Implications to affected landowners unclear = consultation challenge

➤ *Timelines*

MP1

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Thank You

www.ourwatershed.ca

1 800 465 0437

Slide 26

MP1

Big pipe to lake Ontario

IJC

Relationship with MNR

What about all those water bottling facilities and how can they take water

Water levels decreasing and how that connects with municipal wells being drilled

Can't we just refill the aquifer (now that I hear it, it sounds so silly)

Site 41 – we know this one pretty well

Relationship between development and protection – likely to be a question in Barrie

Megan Price, 9/21/2009