



SOURCE WATER PROTECTION

Guelph/Guelph-Eramosa Tier 3 Water Budget Study

Overview

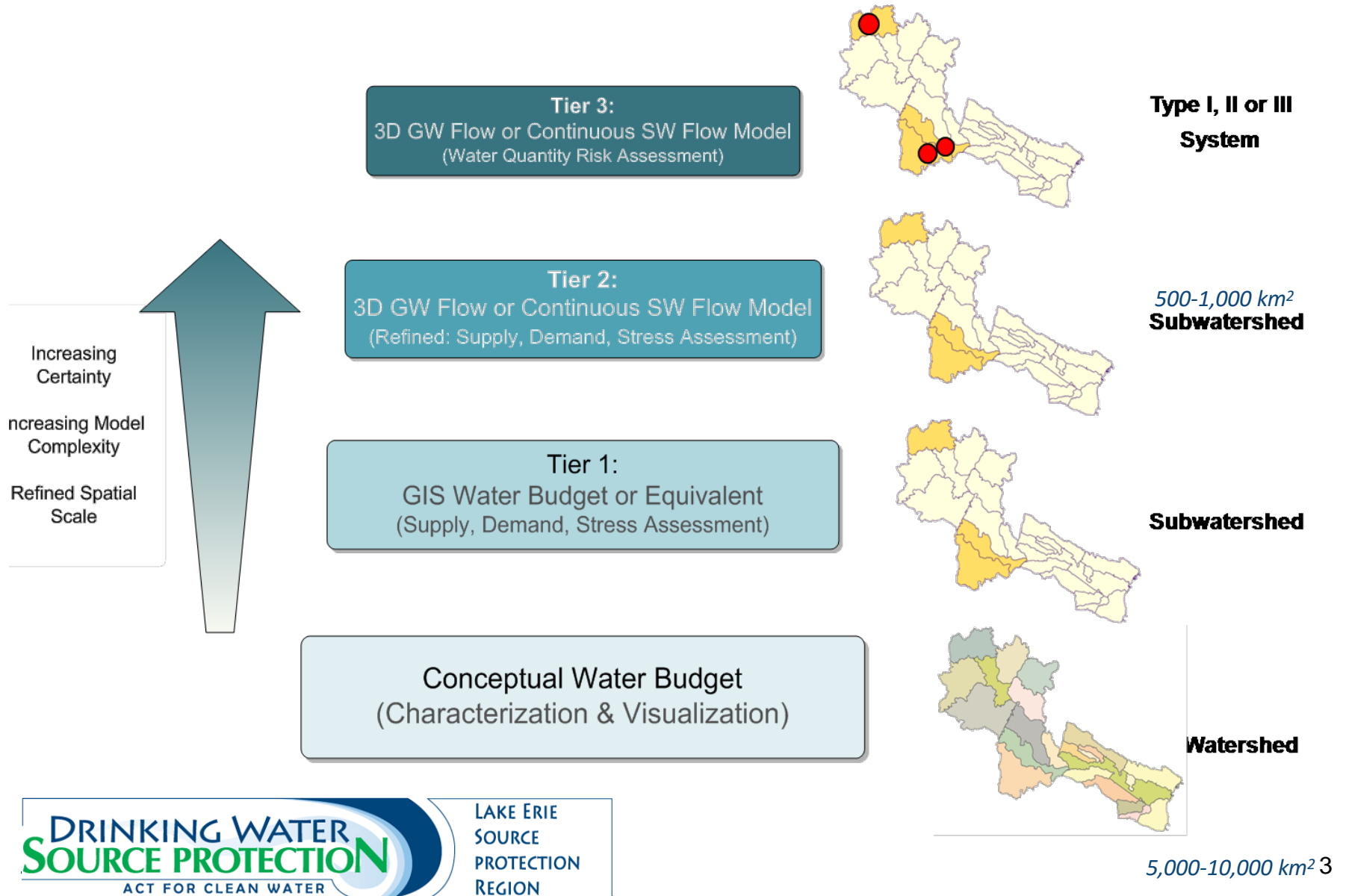
Lake Erie Region Source Protection Committee

April 6, 2017

Tier 3 and the Clean Water Act, 2006

- *Clean Water Act, 2006* established Source Protection Program to protect quality and quantity of existing and proposed municipal drinking water sources
- Water quality components of the Grand River Source Protection Plan are approved and in place since July 1, 2016
- Tier 3 Water Budget study is major piece of technical work addressing water quantity component

Water Quantity Framework



Tier 1 and Tier 2 Water Budgets

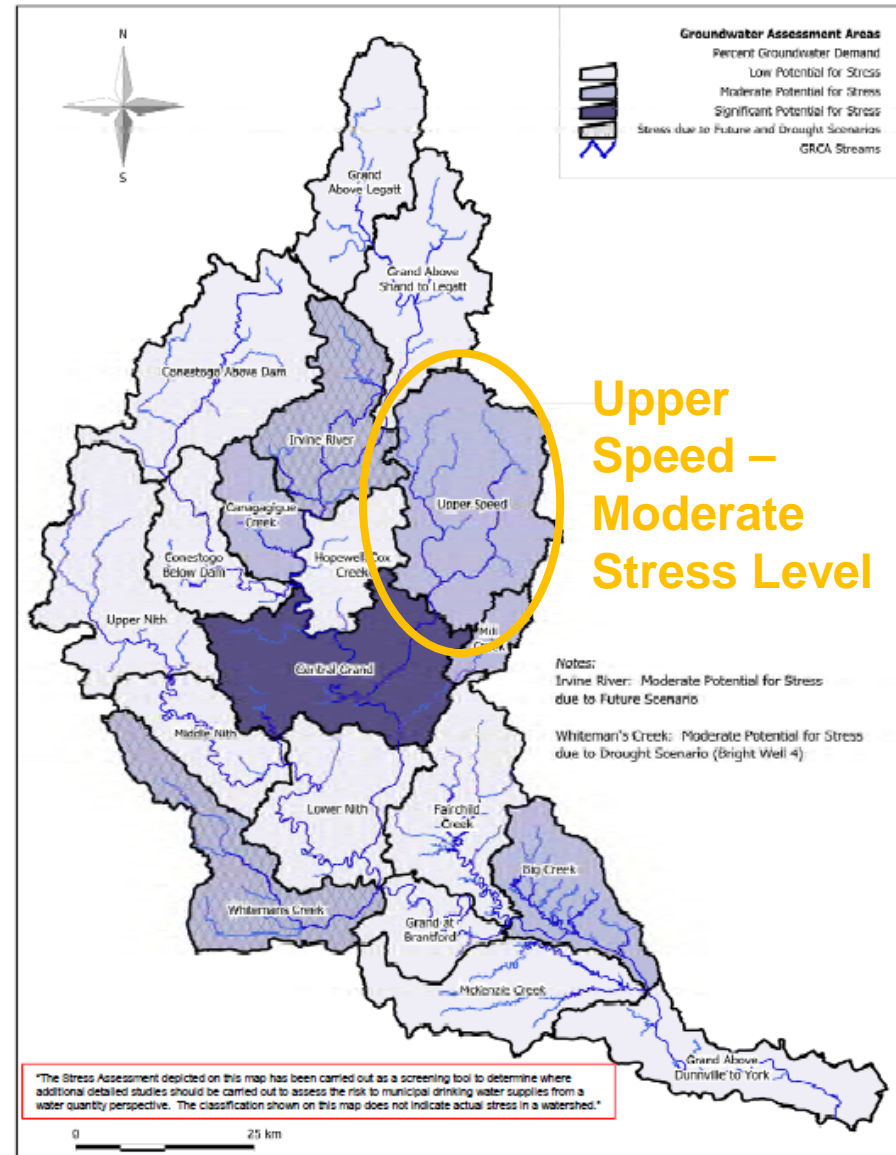
Watershed-scale studies to characterize:

- surface water
- groundwater supply
- water demand

Identify subwatersheds with moderate or significant hydrologic stress

Projects require:

- Watershed Characterization
- Water Demand Analysis
- Surface Water and Groundwater Modelling



What is a Tier 3 Water Budget Study?

- Detailed scientific study aimed at assessing the water quantity risk to current and future sources of municipal drinking water
- Uses computer model to test variety of scenarios, such as:
 - Increased municipal water needs due to growth
 - Prolonged drought
- Uses all available data to understand groundwater flow system and quantify amount of water flowing through the area.

Tier 3 Risk Assessment

Where?

- Tier 2 Assessment
Moderate or Significant stress

Goal:

- Assess the ability to meet future water quantity needs under scenarios:
 1. increased demand
 2. projected land development
 3. drought conditions
- Highly detailed numerical models

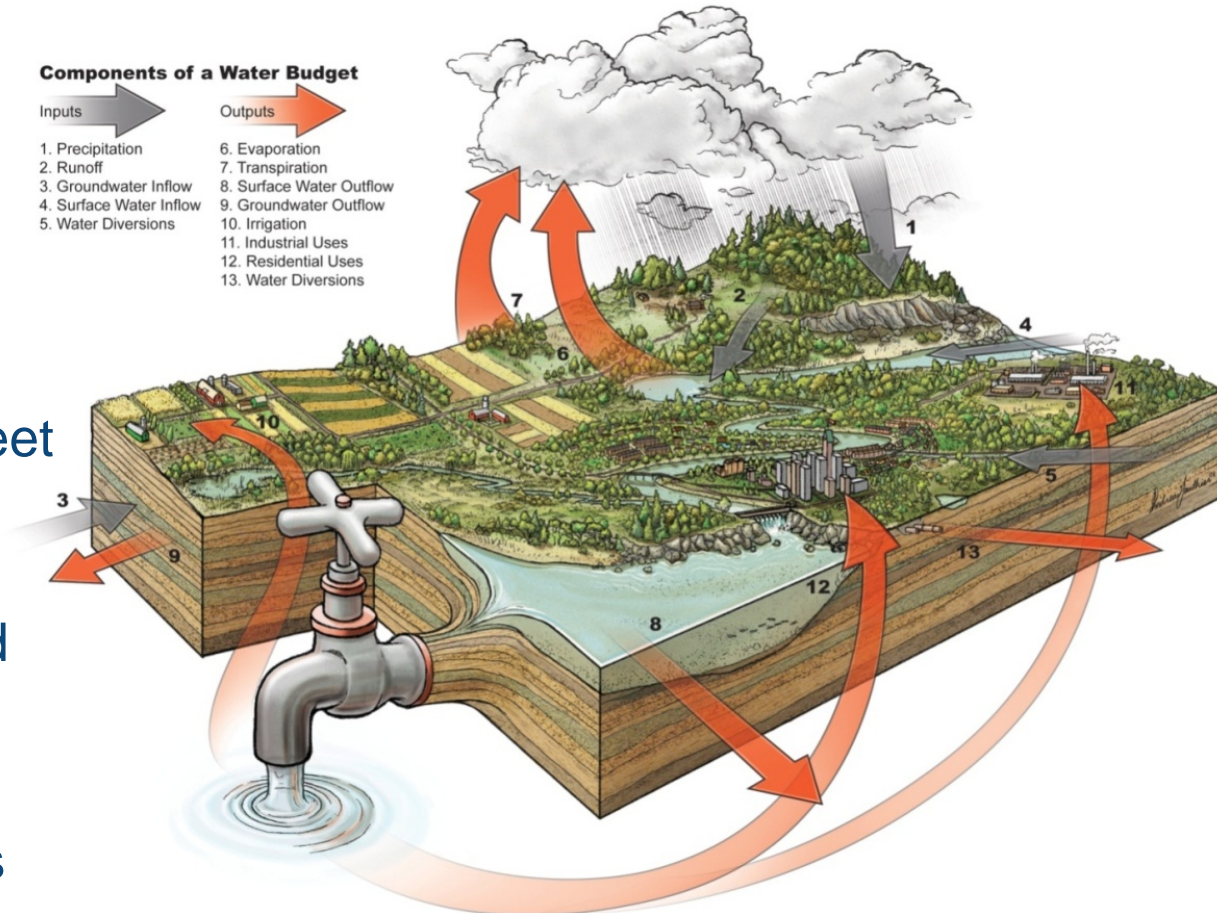
Components of a Water Budget

Inputs

1. Precipitation
2. Runoff
3. Groundwater Inflow
4. Surface Water Inflow
5. Water Diversions

Outputs

6. Evaporation
7. Transpiration
8. Surface Water Outflow
9. Groundwater Outflow
10. Irrigation
11. Industrial Uses
12. Residential Uses
13. Water Diversions



Focus shifts from subwatershed analysis to wellhead / intake analysis.

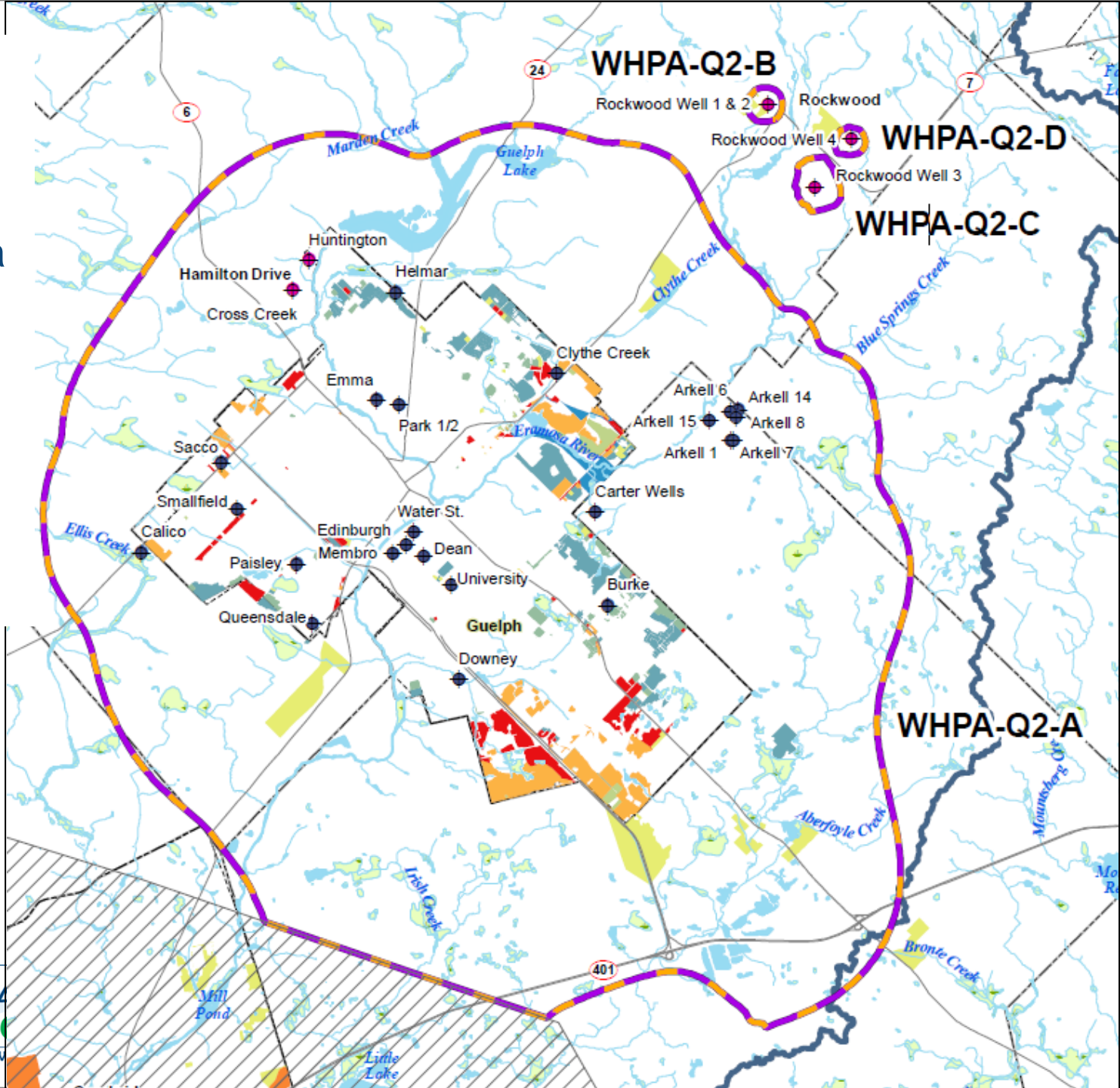
Tier 3 Results

- The City of Guelph's and Guelph/Eramosa Township's wells can meet current needs
- The City's Queensdale municipal well is predicted to not be able to meet future needs under normal climate conditions and during prolonged drought.
- Water Quantity Wellhead Protection Area (WHPA-Q) and Water Quantity Intake Protection Zone (IPZ-Q) are assigned a **significant risk level**

WHPA-Q

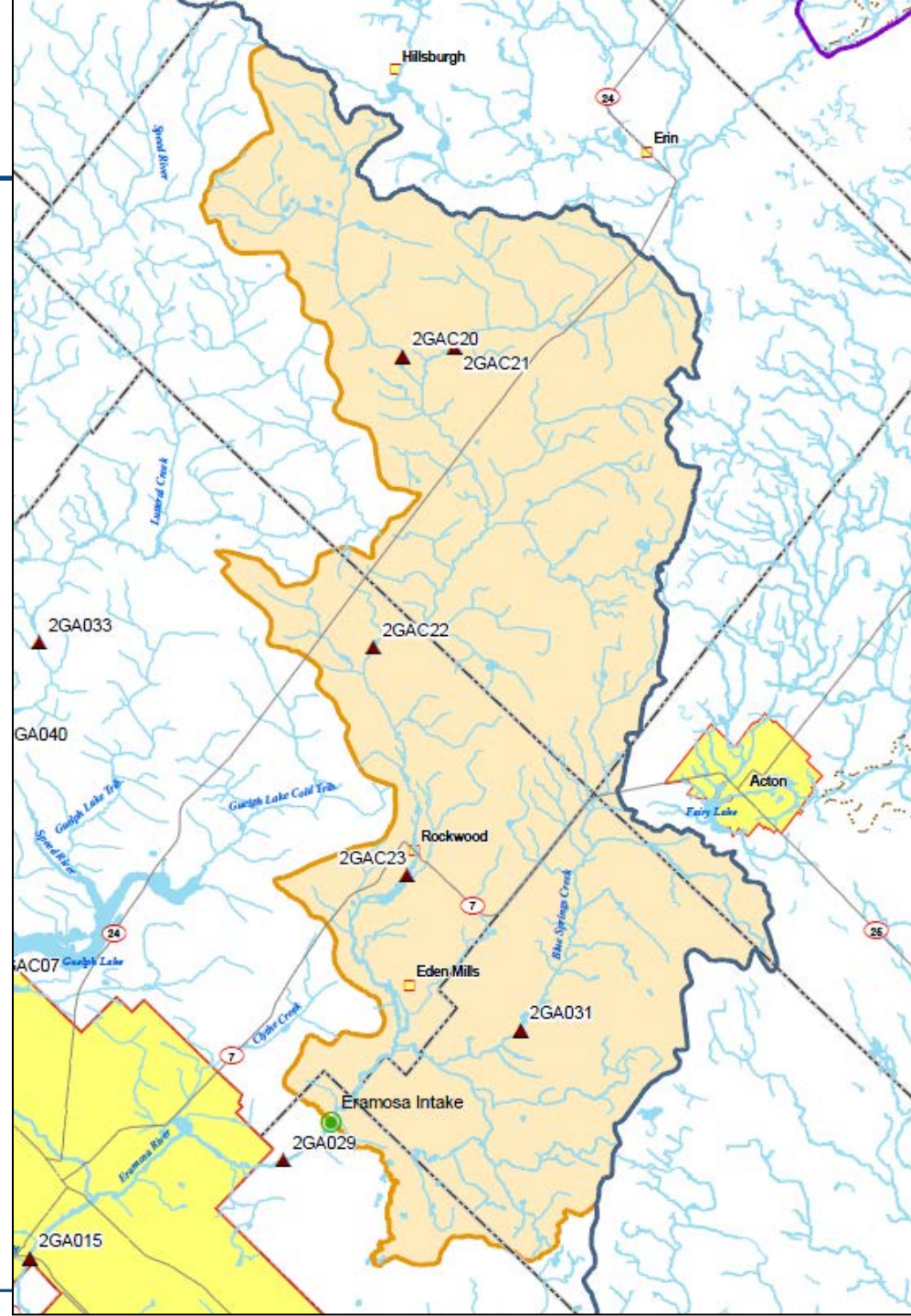
For City of Guelph and Guelph/Eramosa Township (Hamilton Drive Wells)

Assigned *significant* risk level



IPZ-Q

- Area upstream of the surface water intake on the Eramosa River
- Risk level was adopted from WHPA-Q because of interconnection through Arkell System
- Assigned *significant* risk level



Peer Review

- Tier 3 study was peer reviewed on behalf of the province by a team of highly qualified third party technical experts working in both academia and private consulting
- Local municipalities participated as municipal peer reviewers and provided comments
- Provincial peer reviewers deemed model “fit for purpose” and MOECC accepted Tier 3 study results
- Addressing outstanding concerns could be considered in future work plans

What do Tier 3 study results mean?

- Need to look closely at all existing and new water takings within WHPA-Q-A and IPZ-Q to evaluate their contribution to water quantity stress in the area.
- These water takings include:
 - Municipal wells and intakes
 - Permitted takings
- Need to look at activities that reduce groundwater recharge

Next Steps

- Undertake Risk Management Measures Evaluation Process
 - Evaluate and determine water takings with greatest impact on municipal supplies
 - Exploring effective risk management measures (e.g., optimised pumping, water loss management, water conservation)
- Process will help guide development of Source Protection Plan policies
- Process will be collaborative project amongst municipal partners and the Lake Erie Region

Conclusion

- Tier 3 Water Budget provides state of the art tool (Tier 3 Model) to develop sustainable groundwater management solutions that will benefit everyone
- Lake Erie Region committed to moving forward in collaborative fashion to protect water for everyone