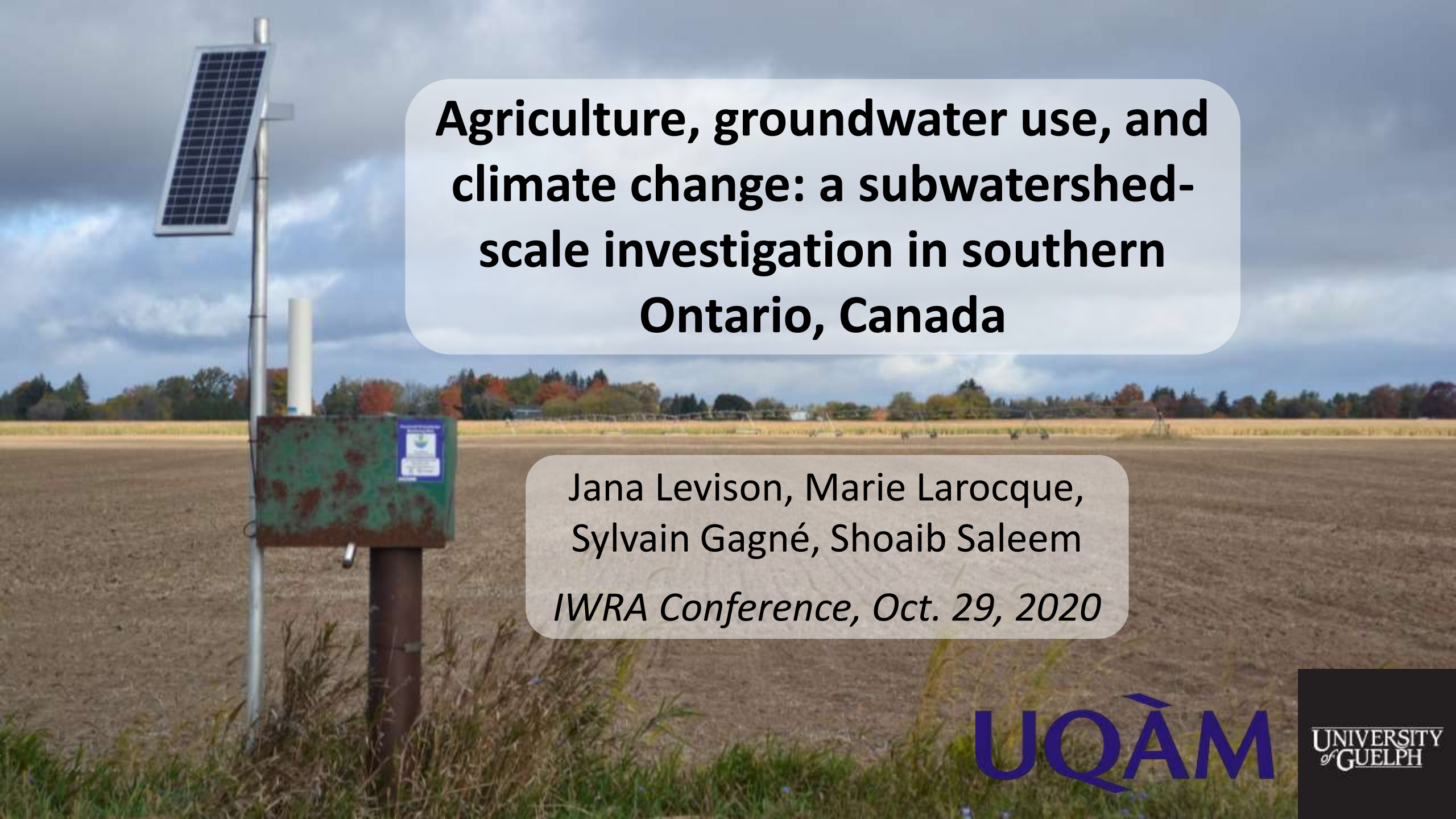


Agriculture, groundwater use, and climate change: a subwatershed-scale investigation in southern Ontario, Canada

Jana Levison, Marie Larocque, Sylvain Gagné, Shoaib Saleem

IWRA Conference, Oct. 29, 2020

UQÀM

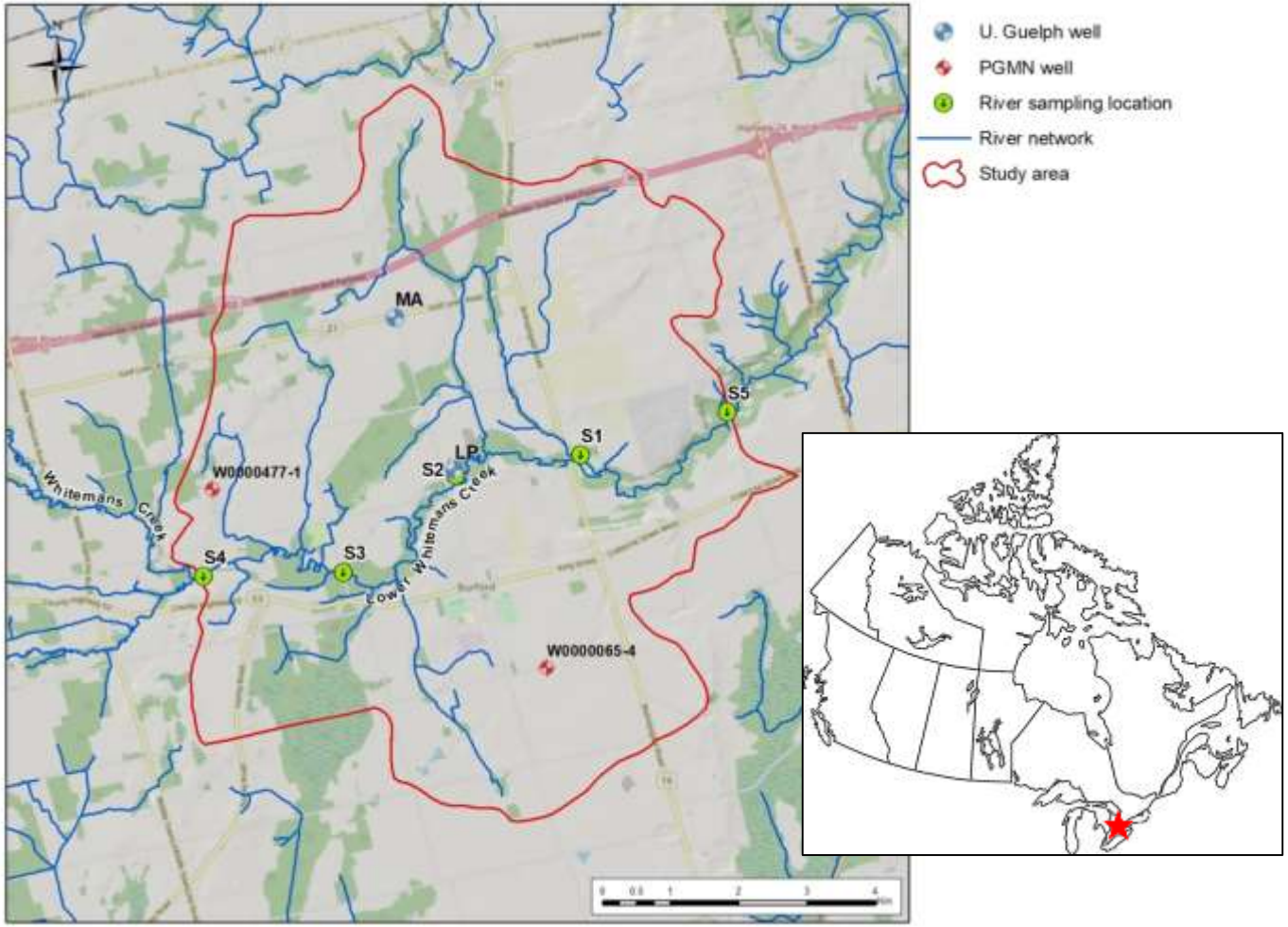
UNIVERSITY of GUELPH

Goal

Identify future opportunities and challenges for agricultural production enhanced or limited by groundwater availability in water-stressed aquifers

Lower Whitemans Creek

- 65 km^2
- 12 monitoring wells
- 5 surface water stations
- Water use conflict



Approach

Field study

- GW-SW interactions
- Annual long-term water study (1960-2017)
- Conceptual water balance

Osman (2017)

Approach

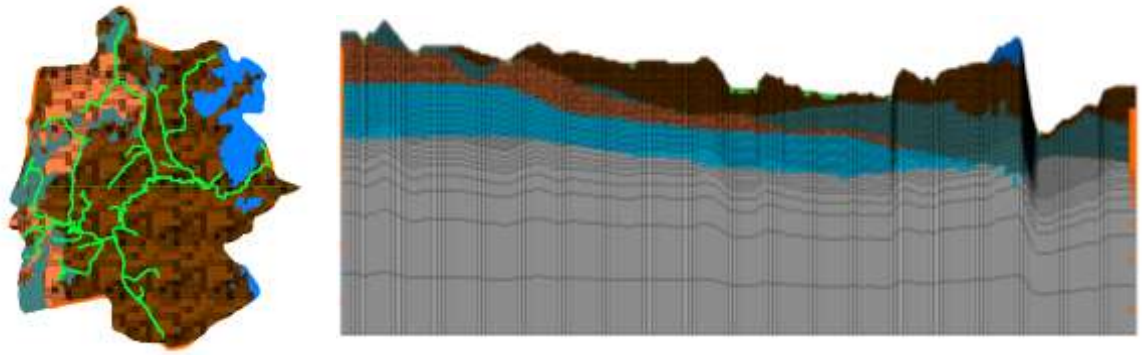
Field study

- GW-SW interactions
- Annual long-term water study (1960-2017)
- Conceptual water balance

Osman (2017)

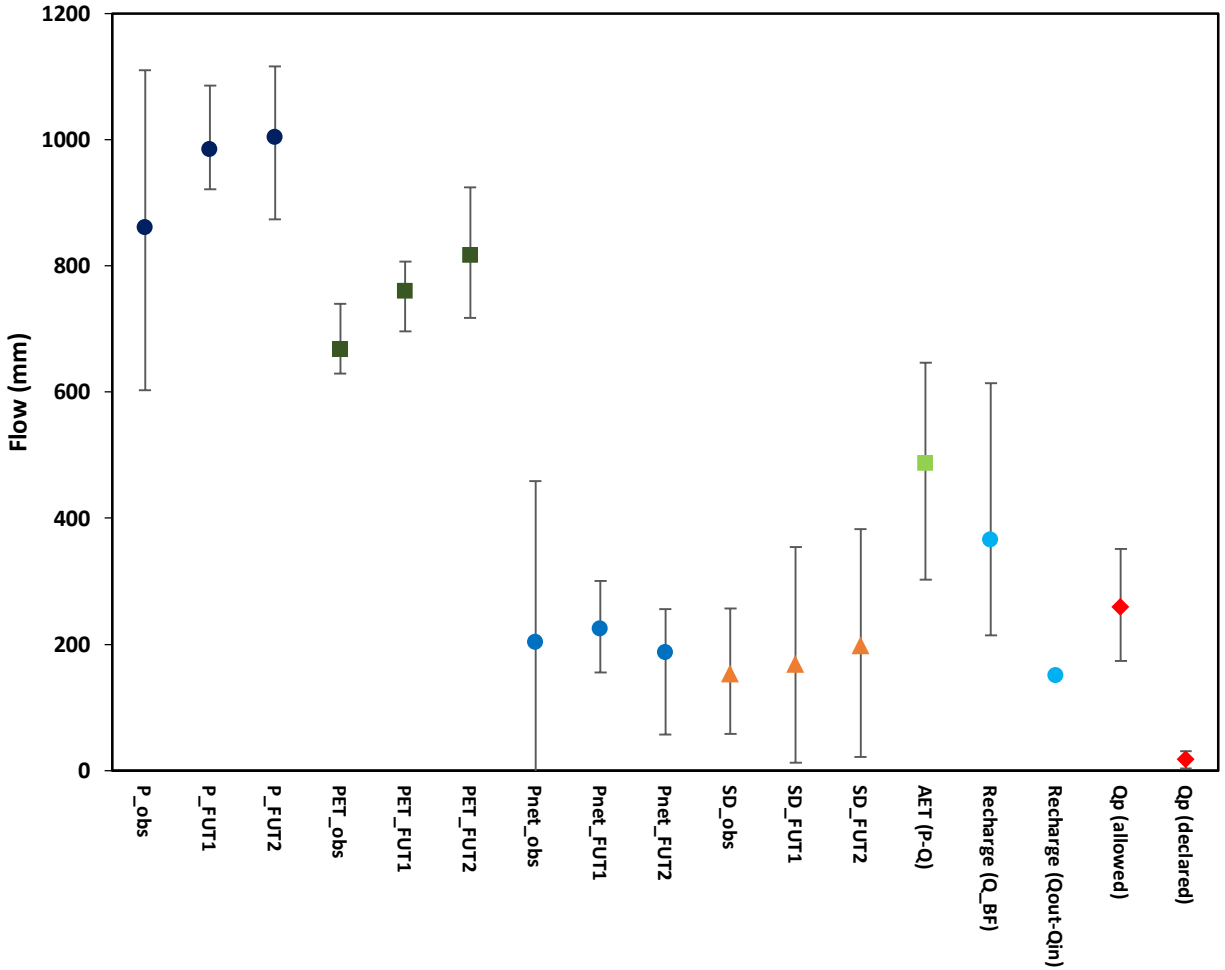
Integrated modelling

- SWAT-MODFLOW
- 10 climate change scenarios (until 2070)

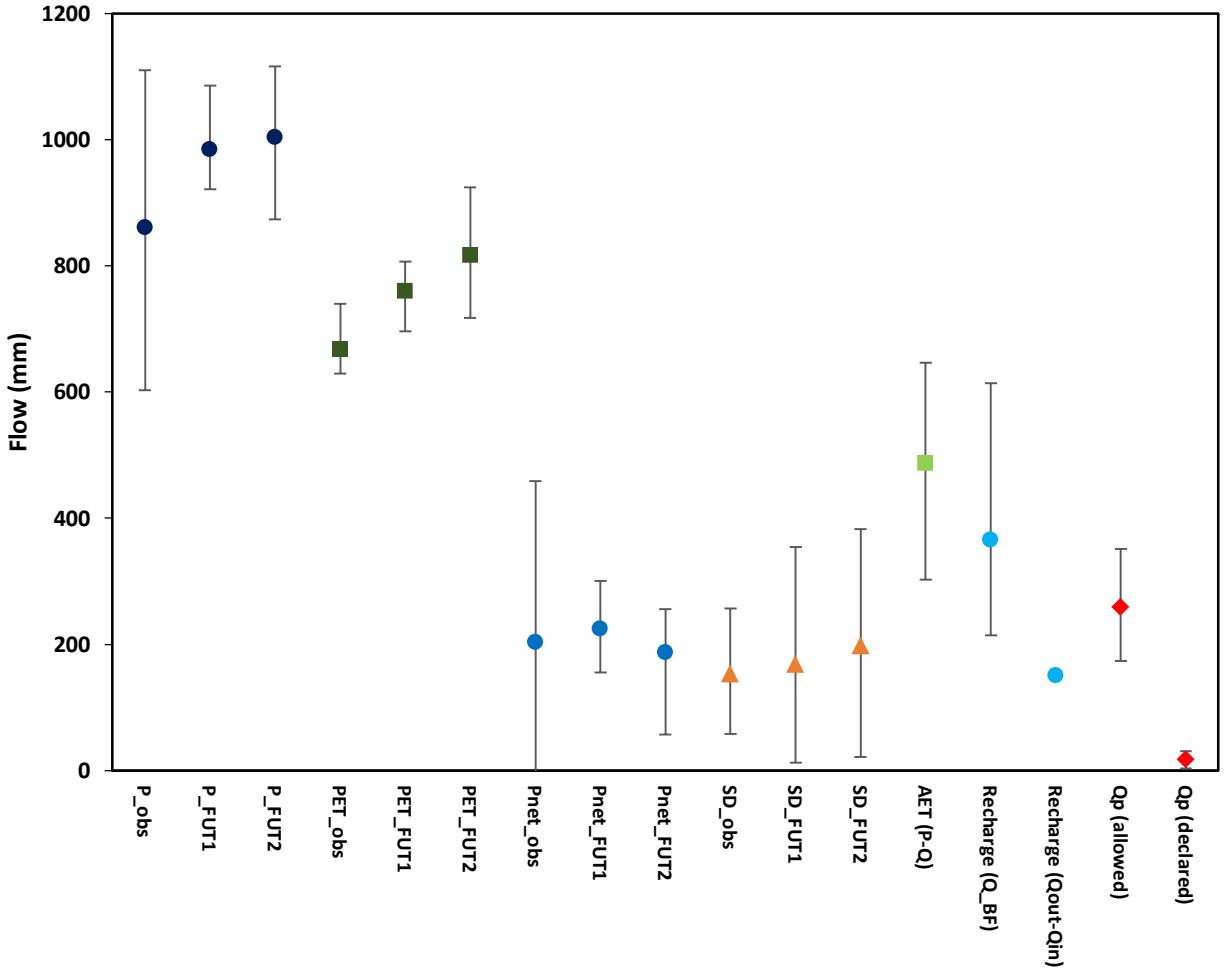


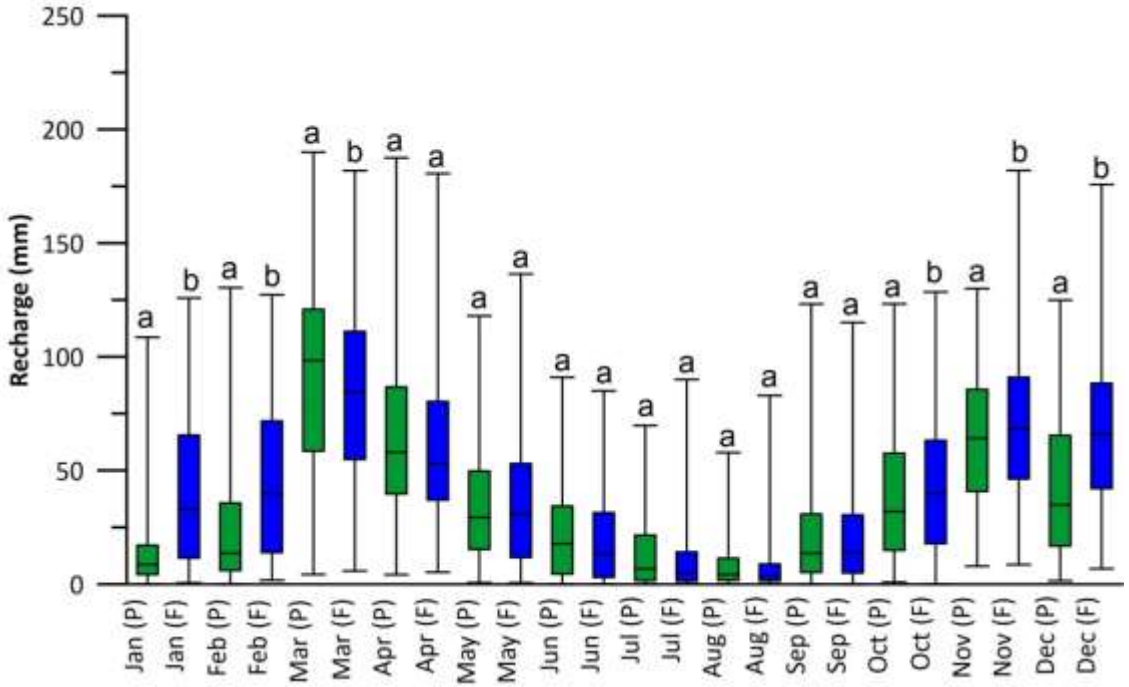
Larocque et al. (2019)

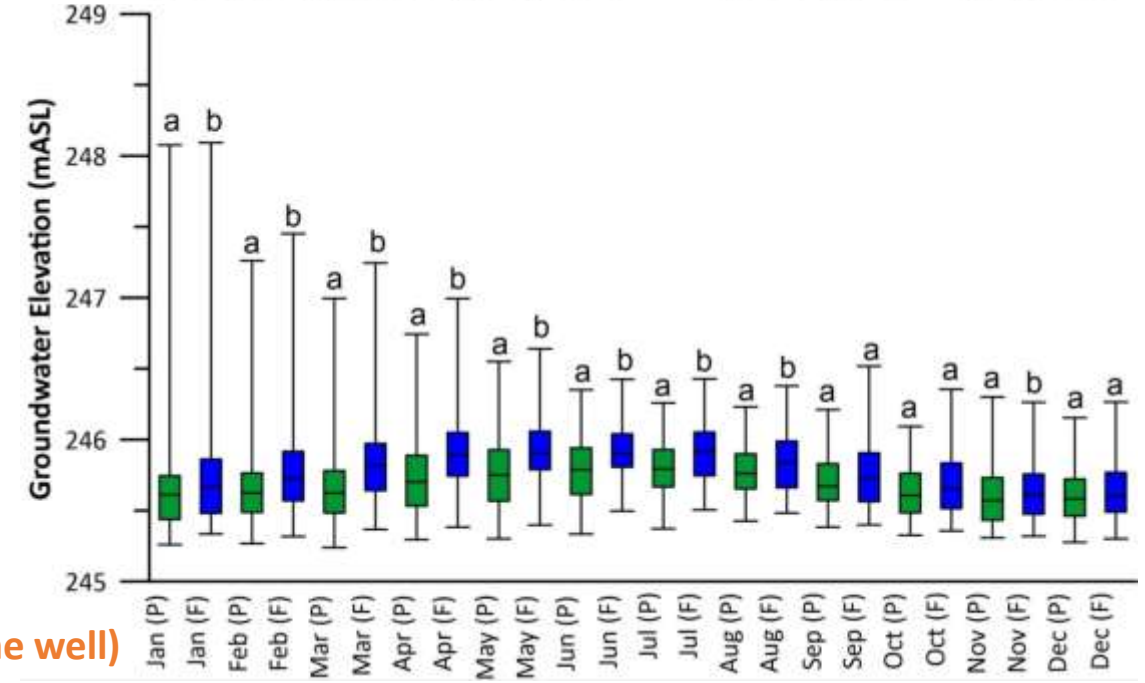
Results


1200
1000
800
600
400
200
0
Flow (mm)
P_obs
P_FUT1
P_FUT2
PET_obs
PET_FUT1
PET_FUT2
Pnet_obs
Pnet_FUT1
Pnet_FUT2
SD_obs
SD_FUT1
SD_FUT2
AET (P-Q)
Recharge (Q_BF)
Recharge (Qout-Qin)
Qp (allowed)
Qp (declared)

Results

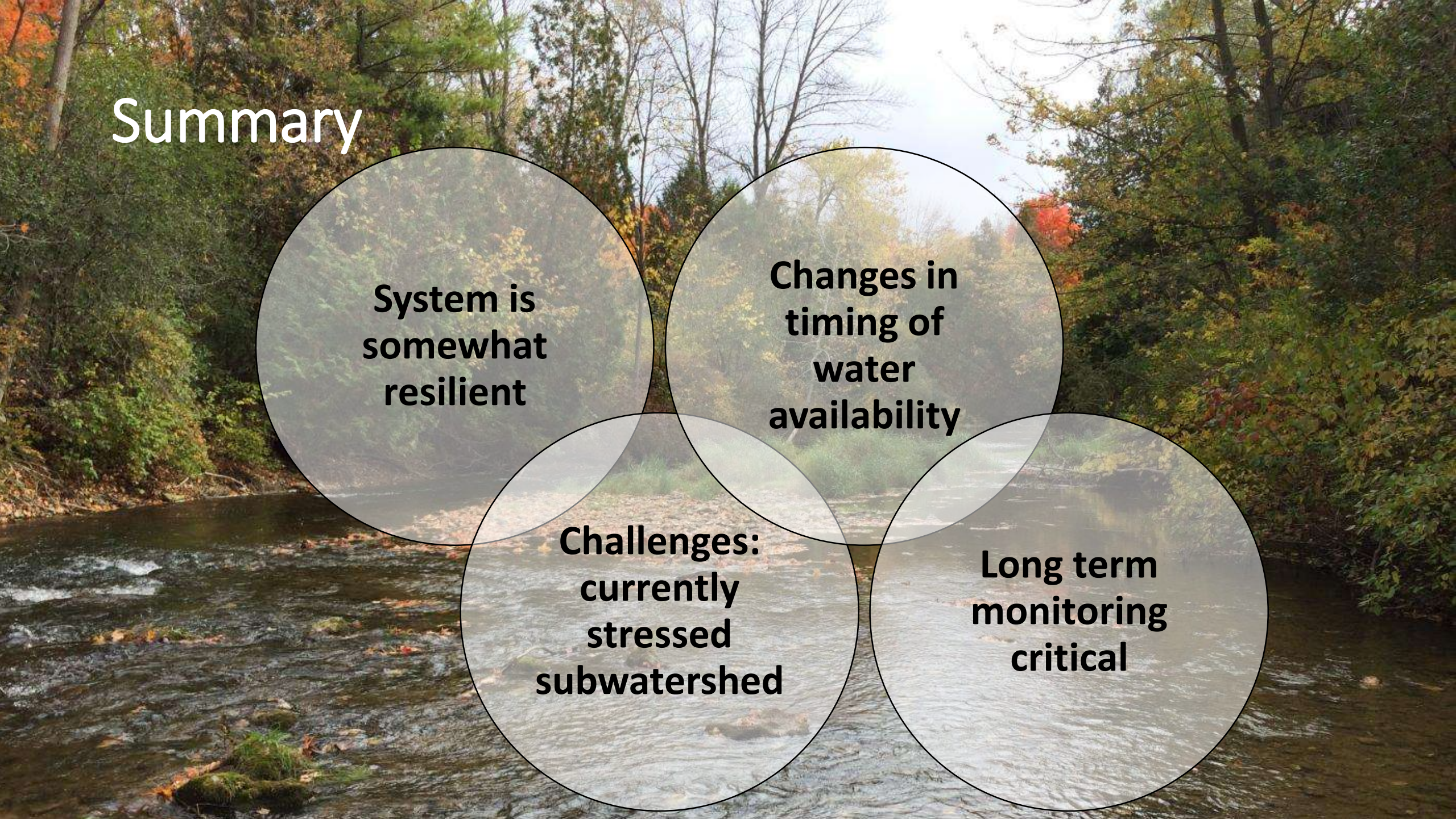






(one well)

Summary


System is somewhat resilient
Changes in timing of water availability
Challenges: currently stressed subwatershed
Long term monitoring critical

Thank you!

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Agriculture, Pêcheries et Alimentation Québec

Ontario

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Grand River Conservation Authority

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