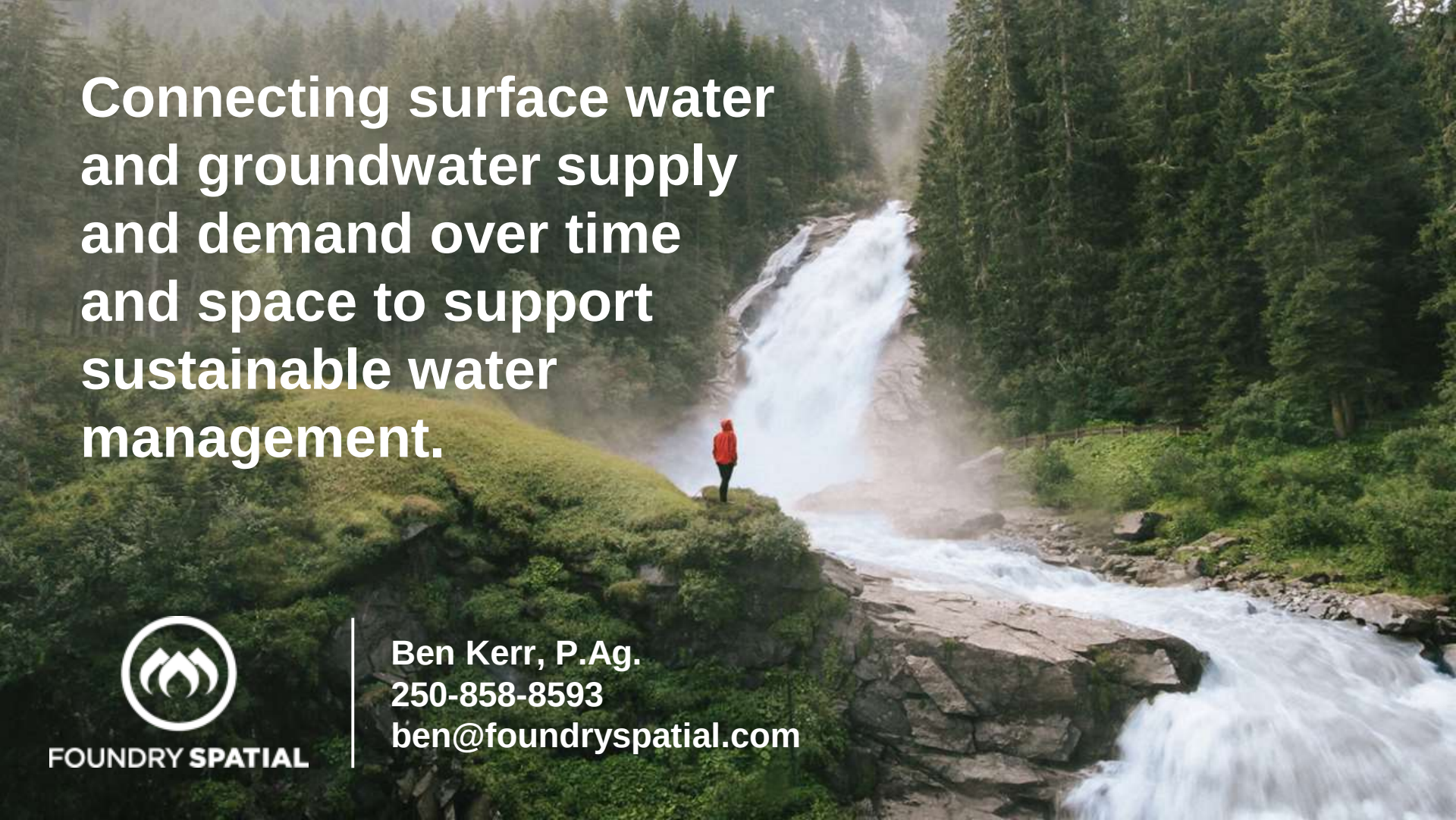

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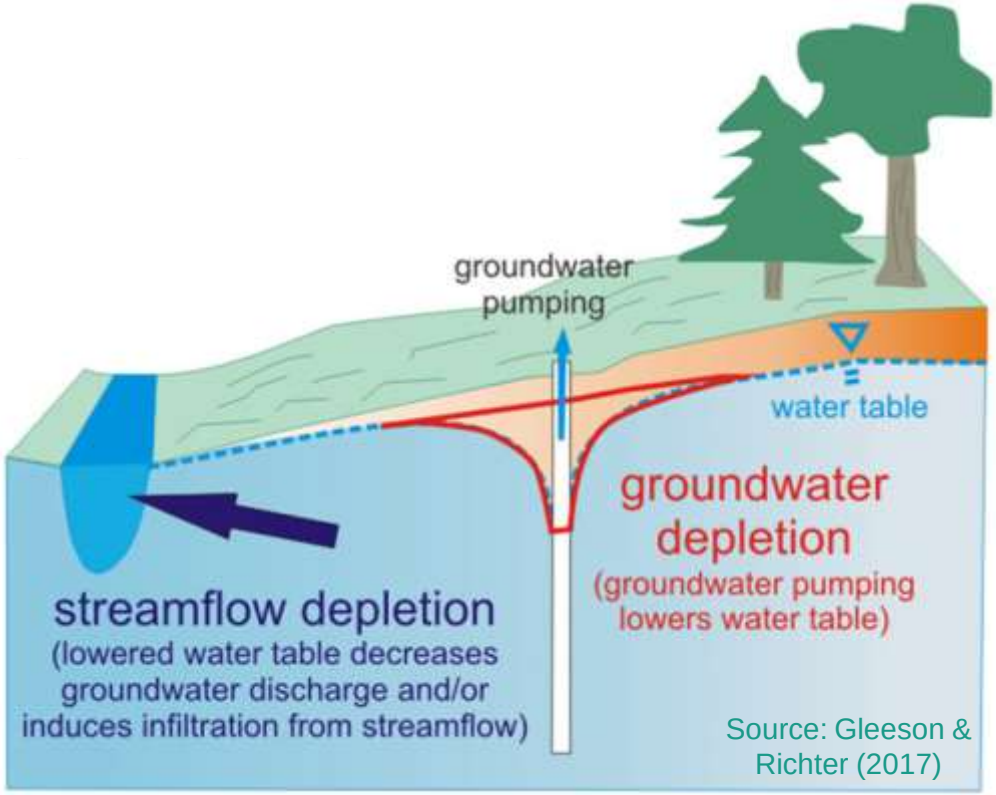
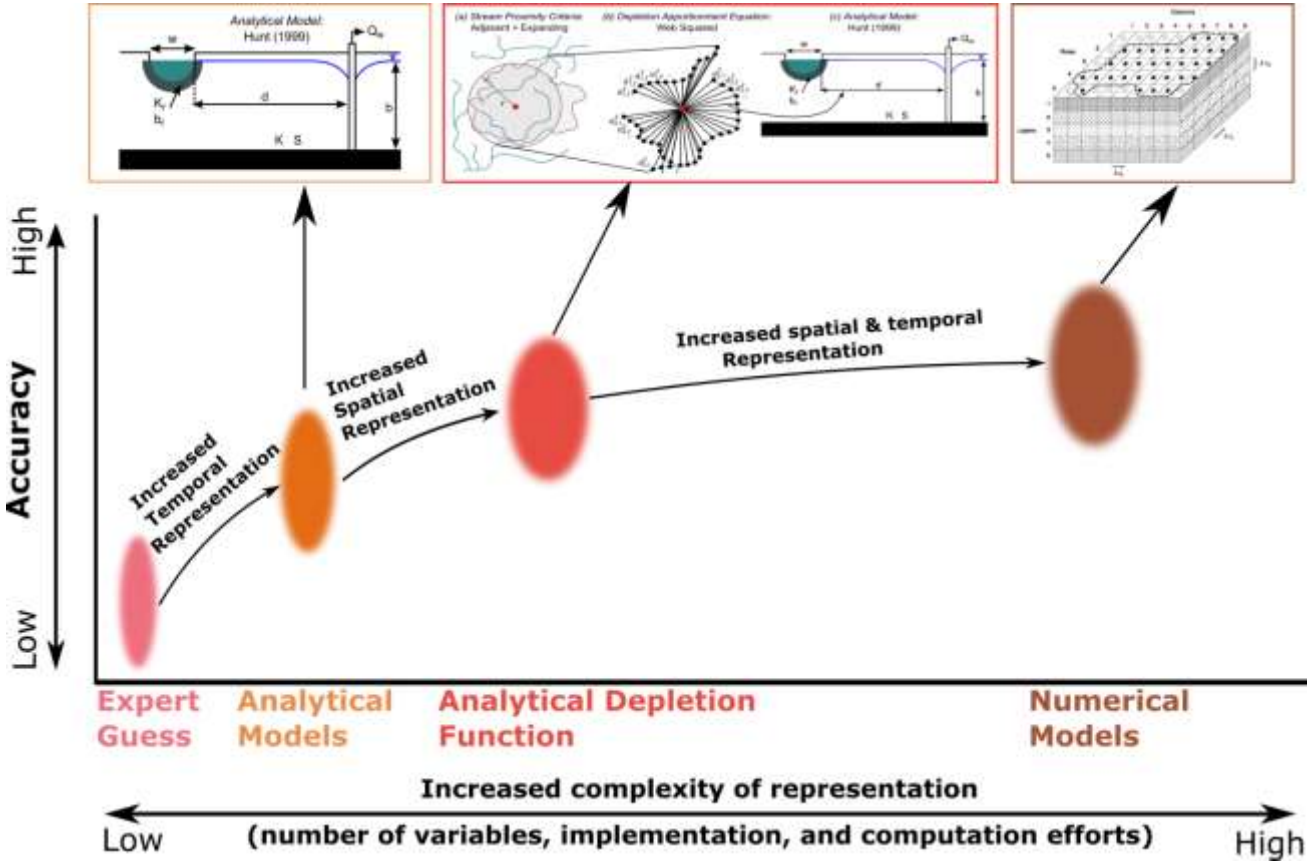
Streamflow Depletion

- Pumping ‘captures’ groundwater that would have discharged into a stream and/or induces infiltration from the stream into the aquifer



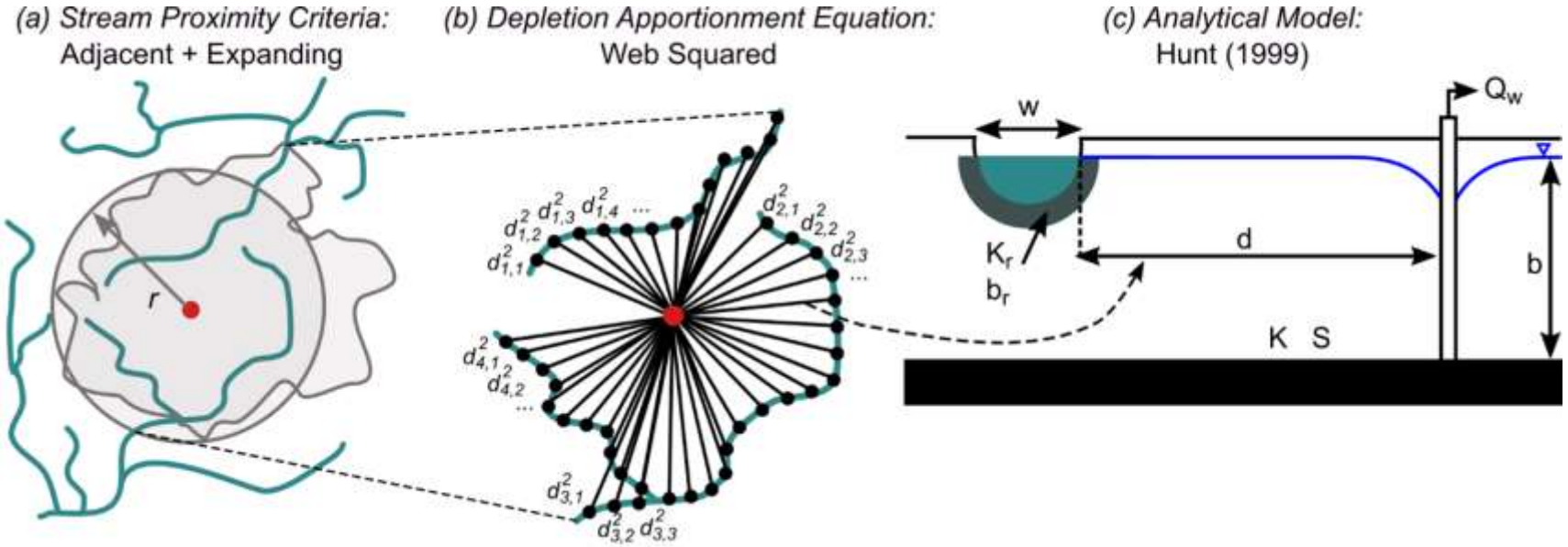
Estimation Approaches

- Guess!
- Analytical
- Numerical
- Statistical / ML
- Observation
- **Analytical Depletion Function**



From Li et al 2020

Analytical Depletion Function



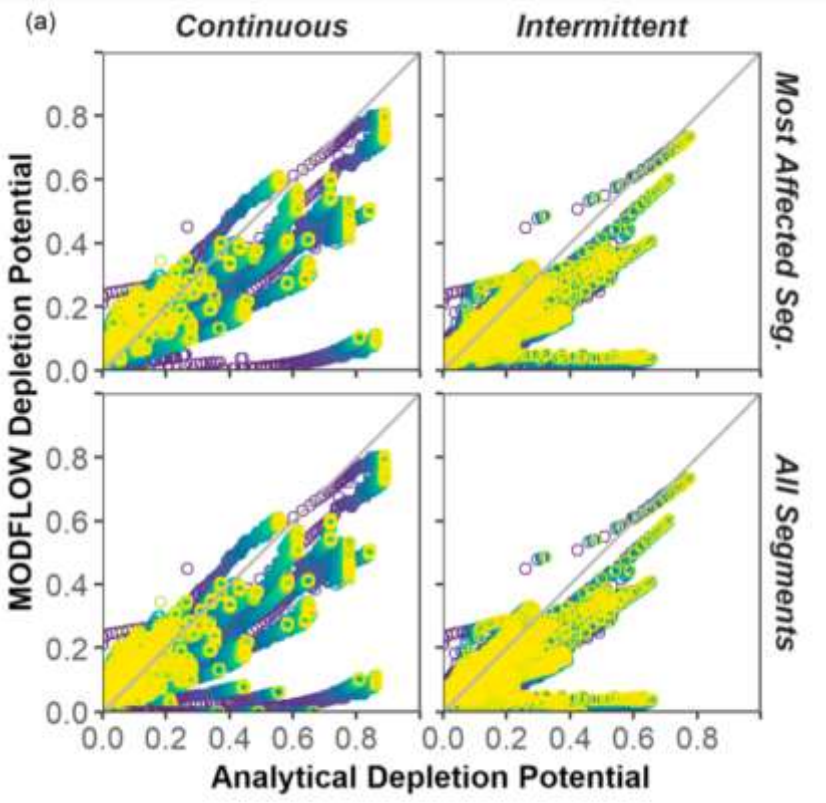
From Zipper et al 2018

Analytical Depletion Function Evaluations

- **vs uncalibrated numerical model** (British Columbia, California)
- **vs calibrated numerical model** created for purposes other than streamflow depletion (SFD) (British Columbia)
- **vs coupled SW/GW model** for SFD (California)
- **vs calibrated numerical model** for SFD, for interstate compact (Colorado/Kansas)

Comparison Results

- Similar estimates of streamflow depletion with lower data and computational costs
- ADF suitable for determining:
  - Which stream will be most affected by pumping?
  - What will the impact be on that stream?
- Perform best in flatter terrain, with wells located within a few km of streams



From Zipper et al 2019

Applications

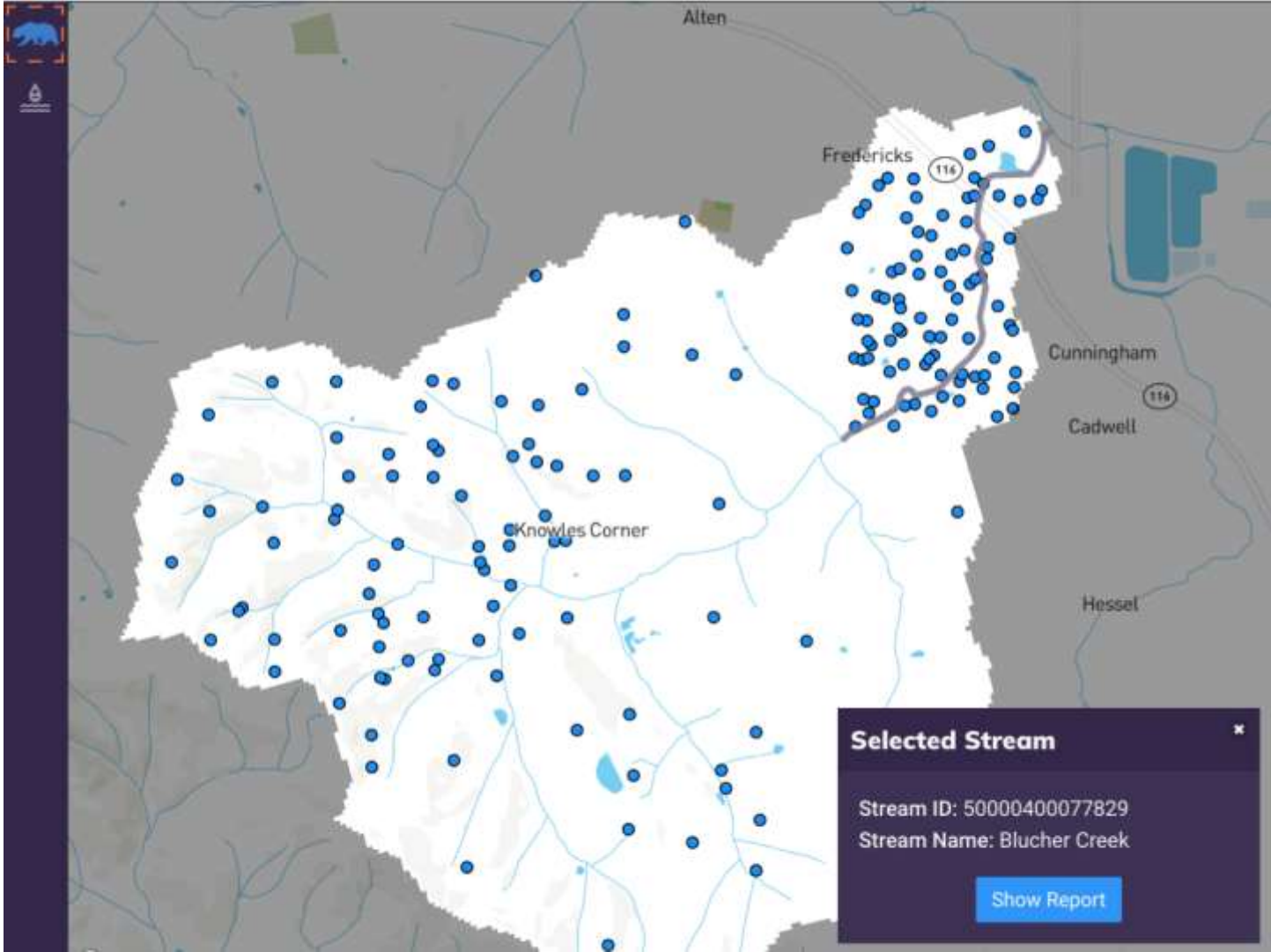
- **Best suited for screening level evaluation of impacts from existing or new proposed wells**
- **Ability to implement in decision-support tools can amplify the benefits of speed and simplicity (and transparency)**

Foundry Spatial Water Framework

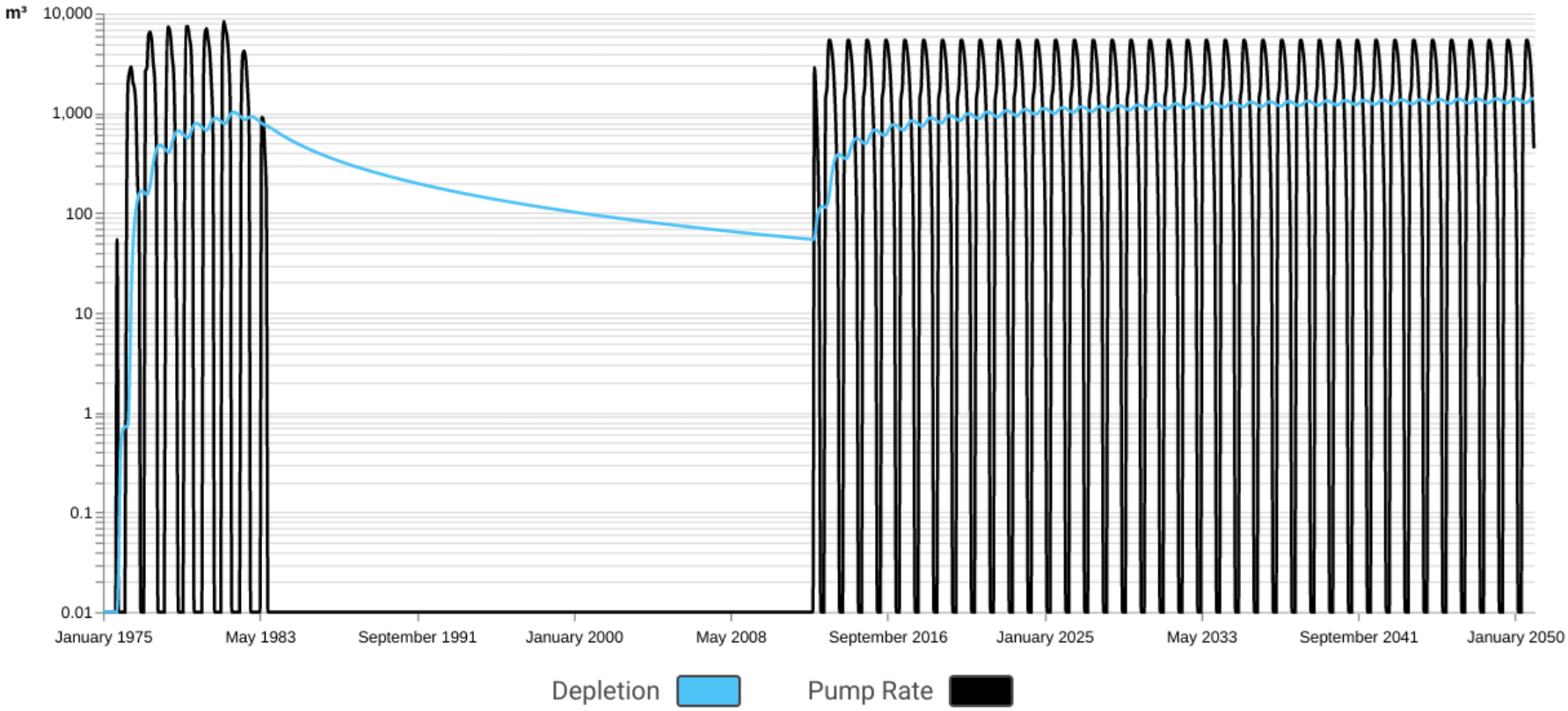
Web-DSS

Investigation Pathways:

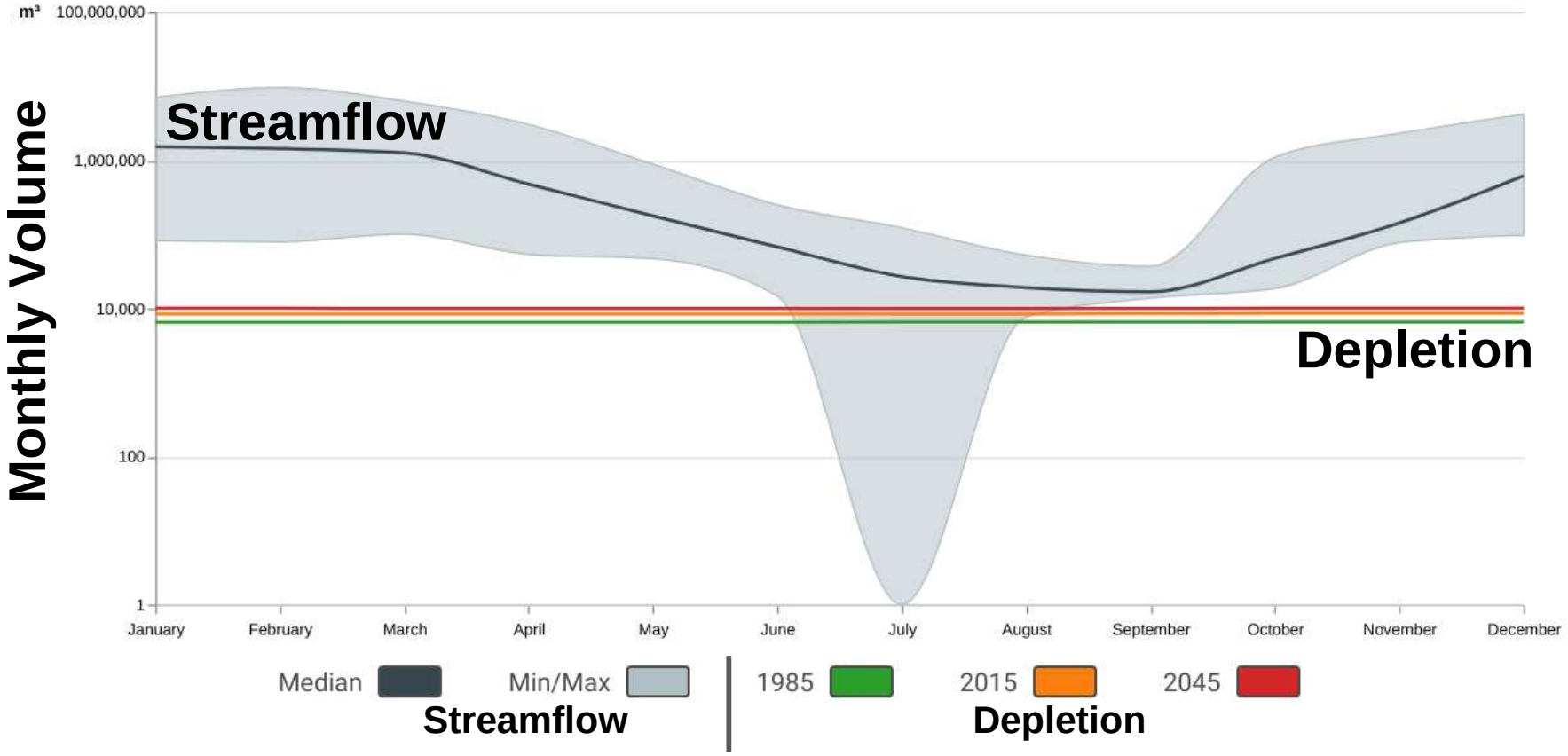
- Stream
- Well
- Aquifer



Pumping and associated depletion over time



Past / Present / Future Depletion from all wells



Thank you!

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