

# GWIP West Billings Project

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## Groundwater Flow Model Update

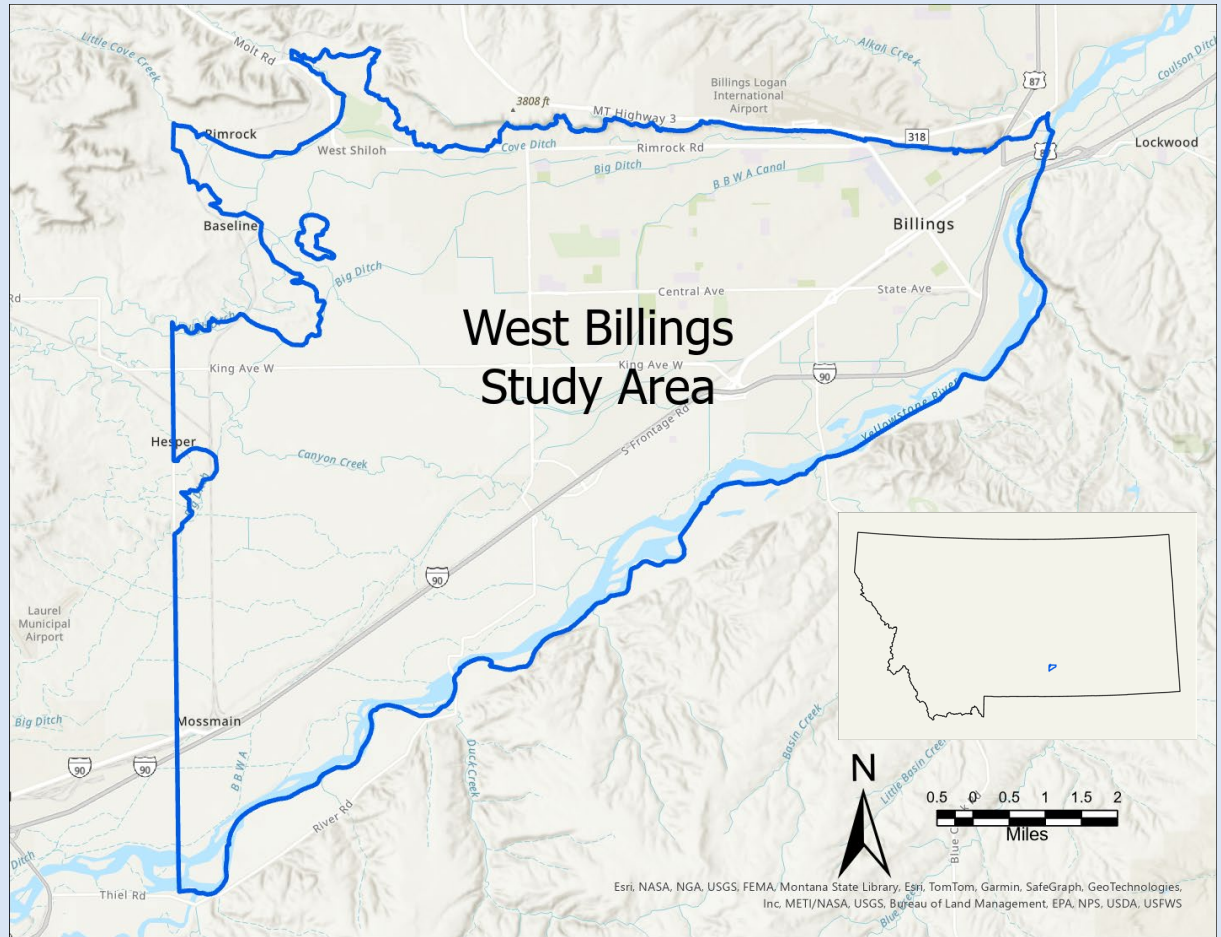


Kurt Zeiler  
Brett Oliver  
Elizabeth Meredith  
February 11, 2025



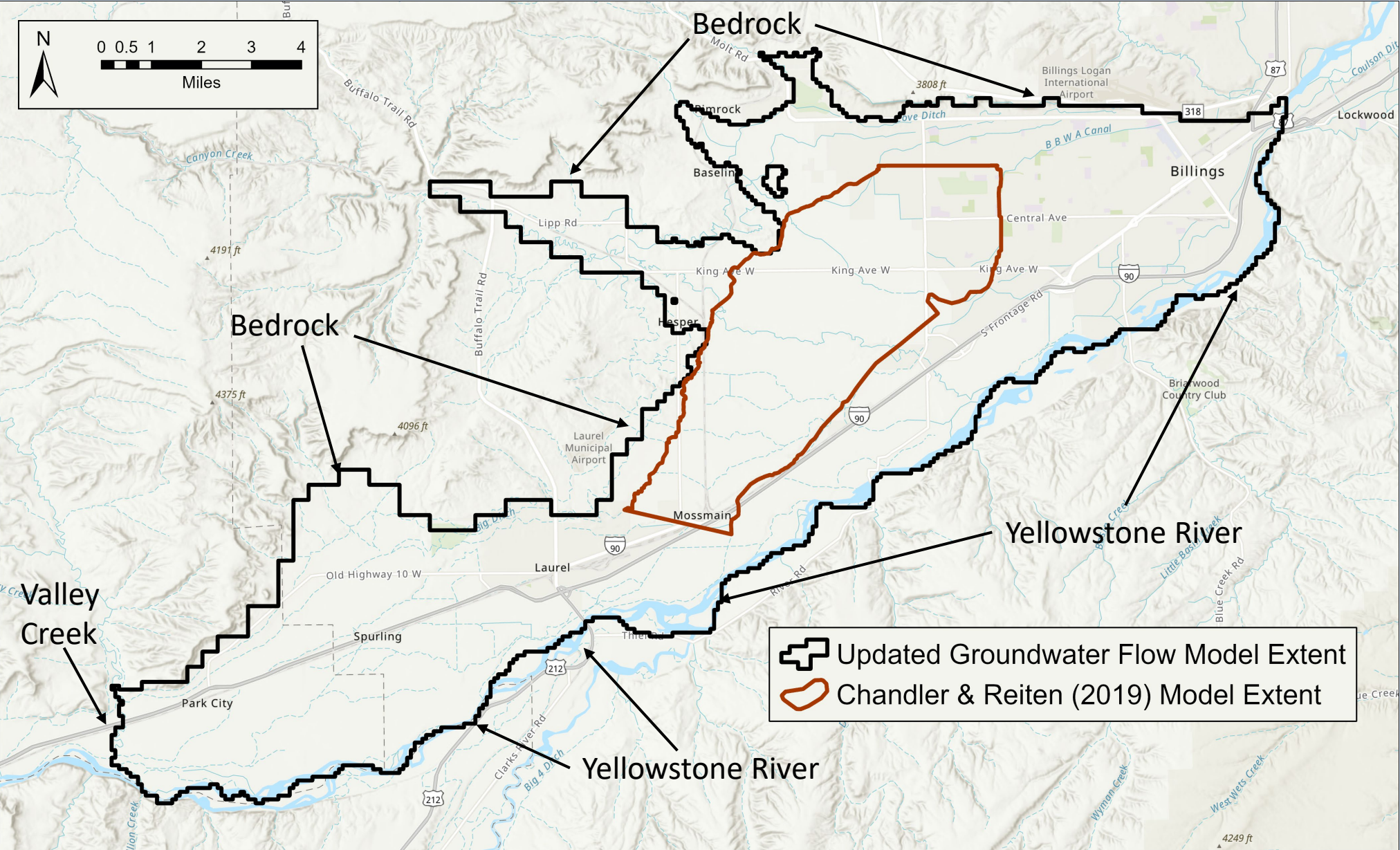
# Updated West Billings Groundwater Model

- Developing an updated groundwater flow model for the West Billings Study Area
  - Expanded model area
  - Focus primarily on area between 80<sup>th</sup> St West and Shiloh Rd
  - Updating to latest version of USGS MODFLOW groundwater modeling software



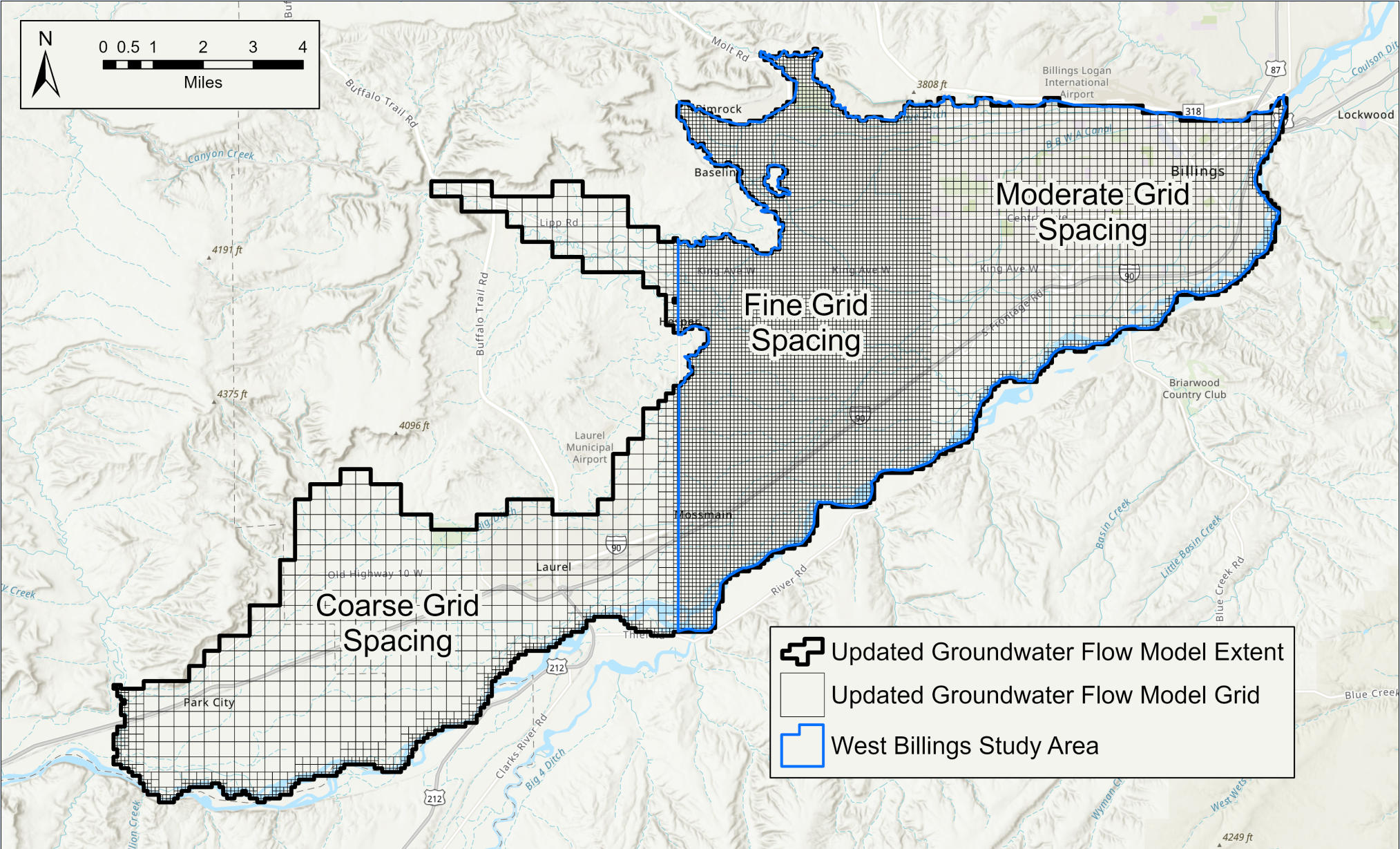


# West Billings GW Model Expansion



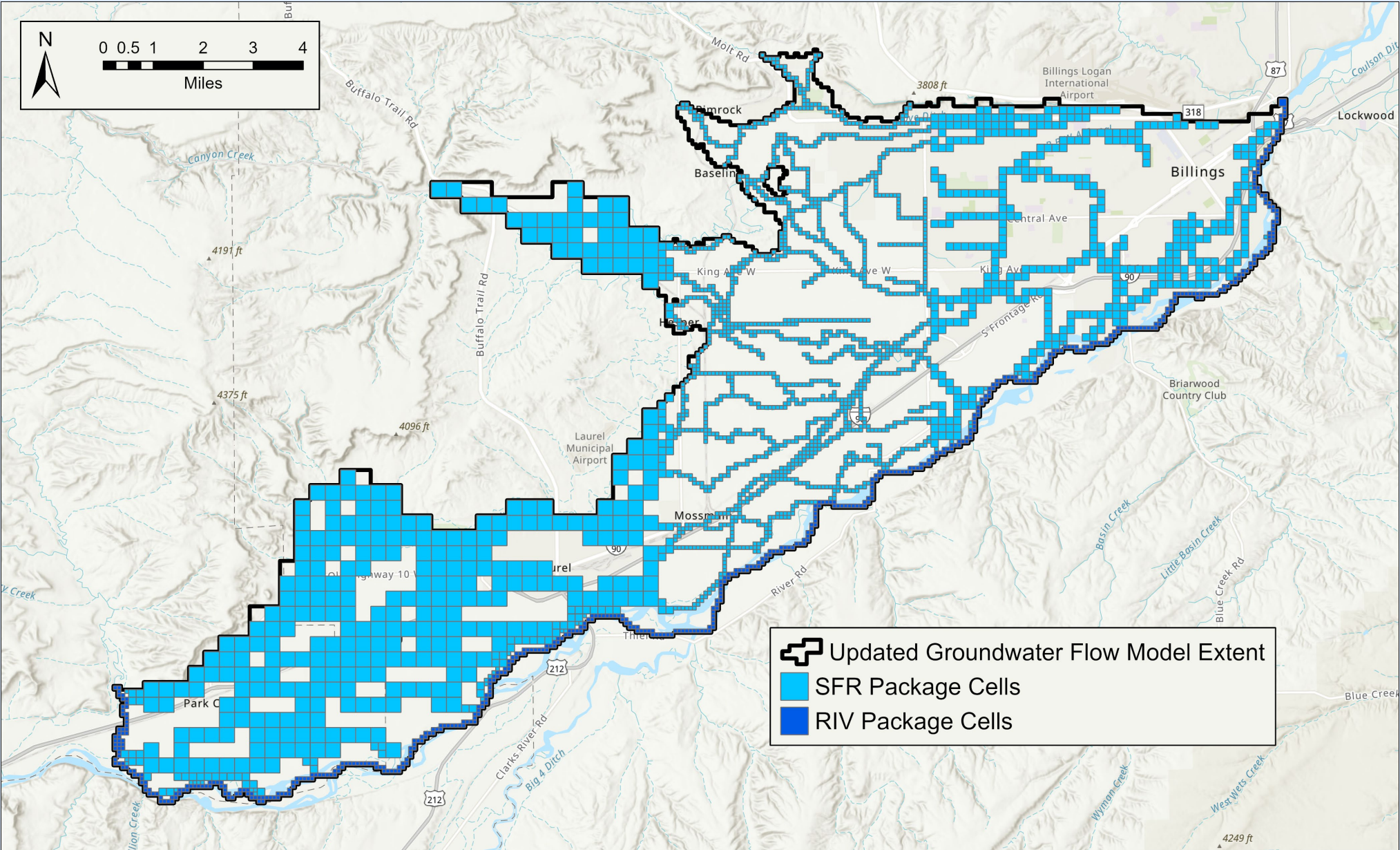


# West Billings GW Model Grid



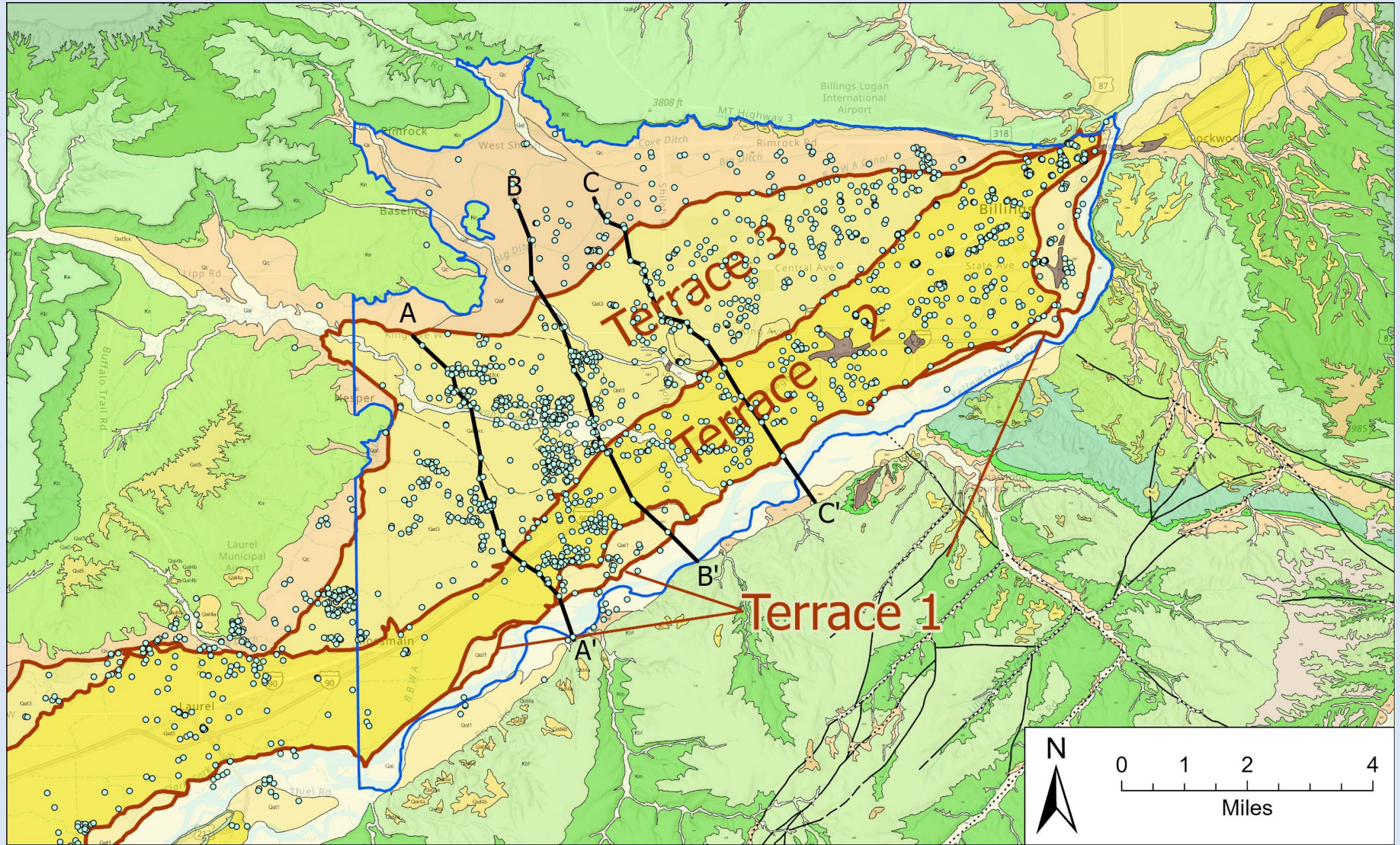


# West Billings GW Model – SW Interaction



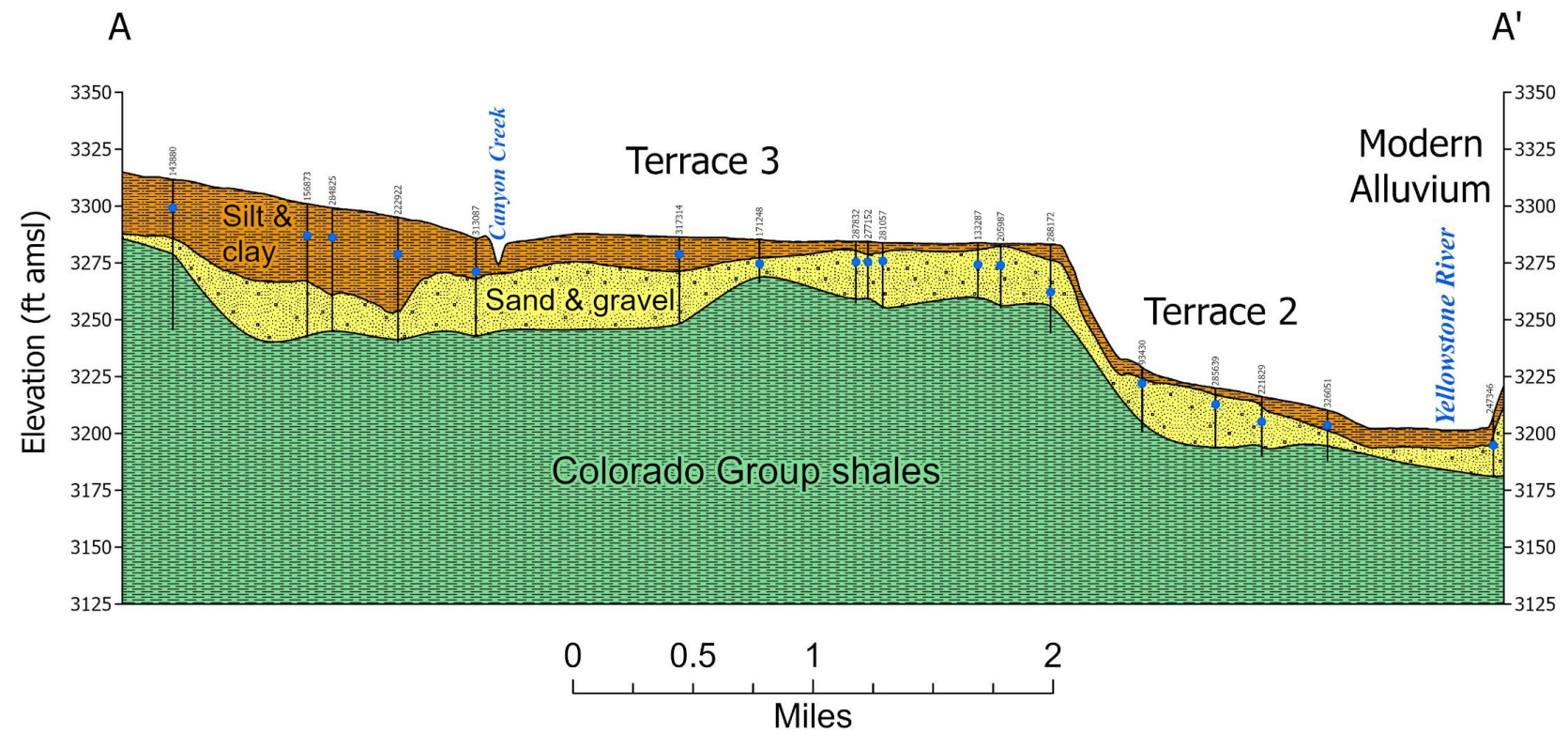


# West Billings GW Model - Geology





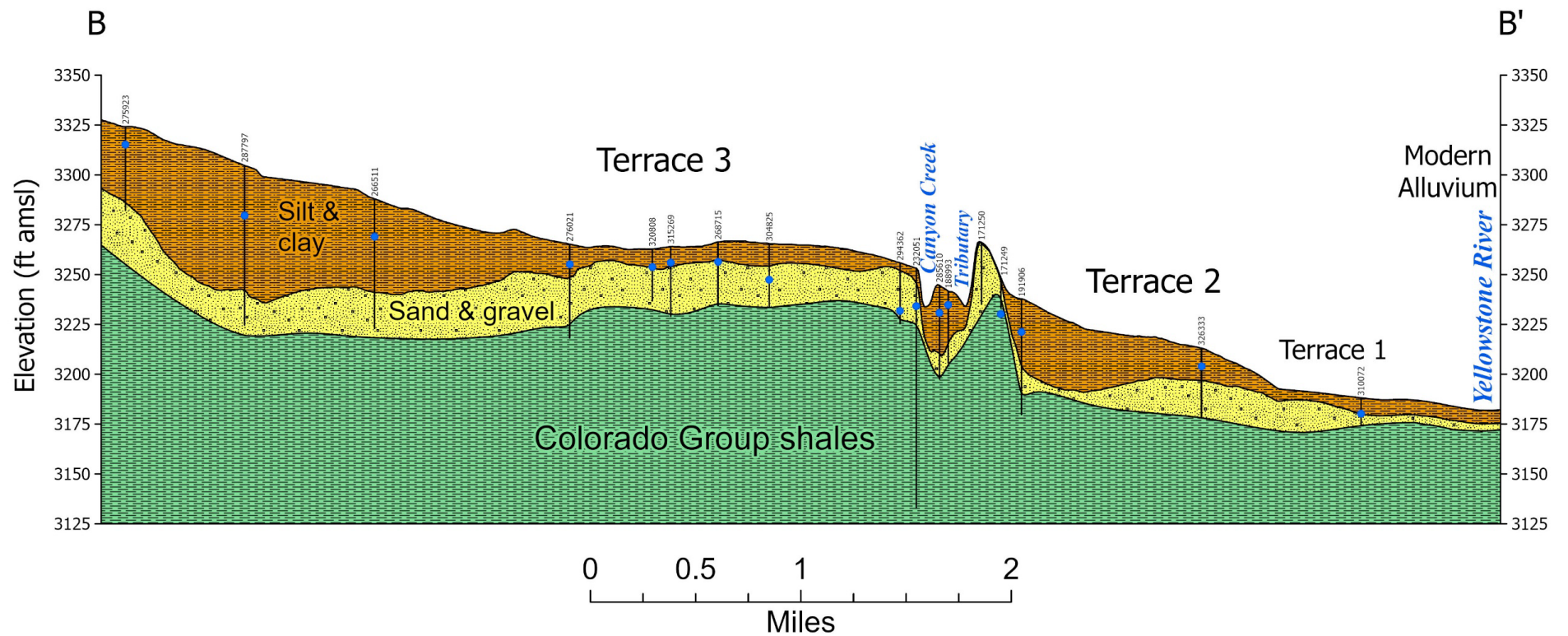
# West Billings GW Model - Geology



Vertical Exaggeration = 50X

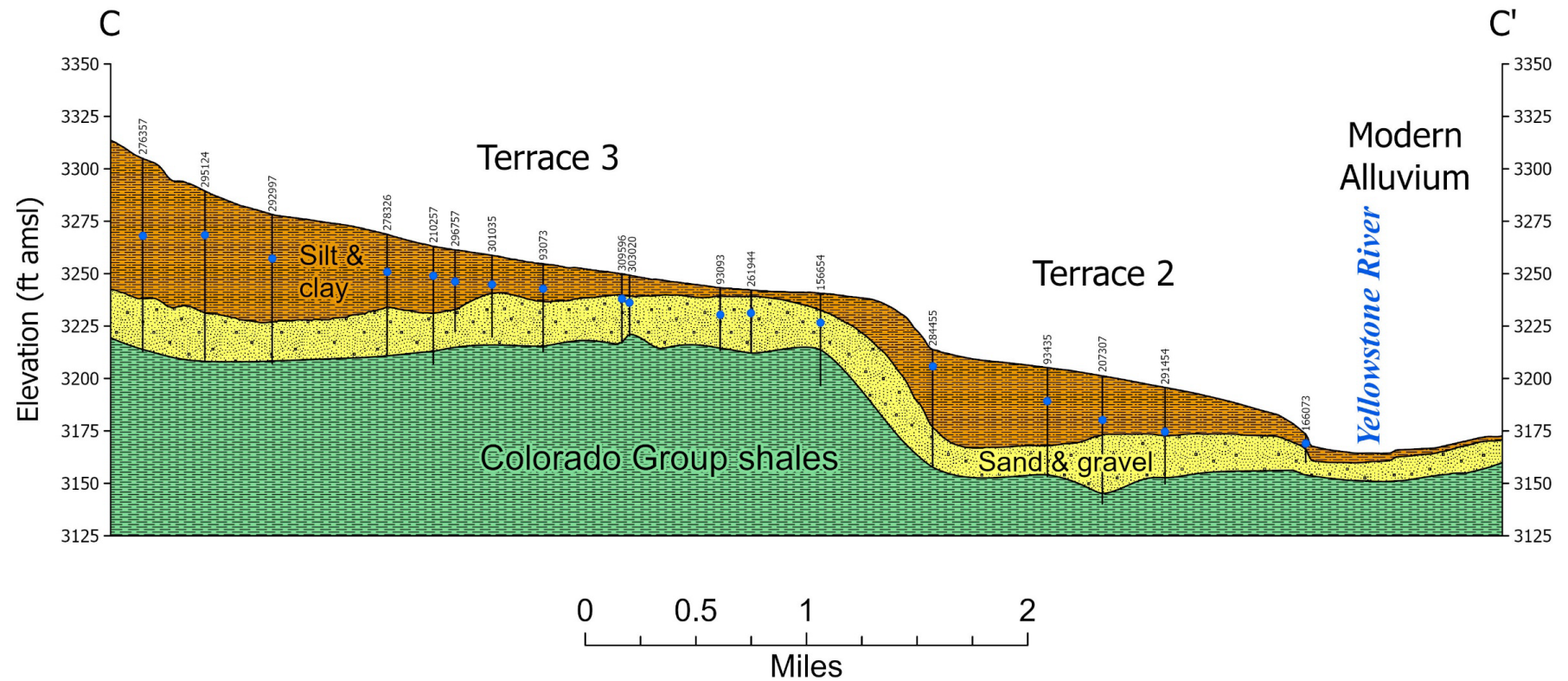


# West Billings GW Model - Geology



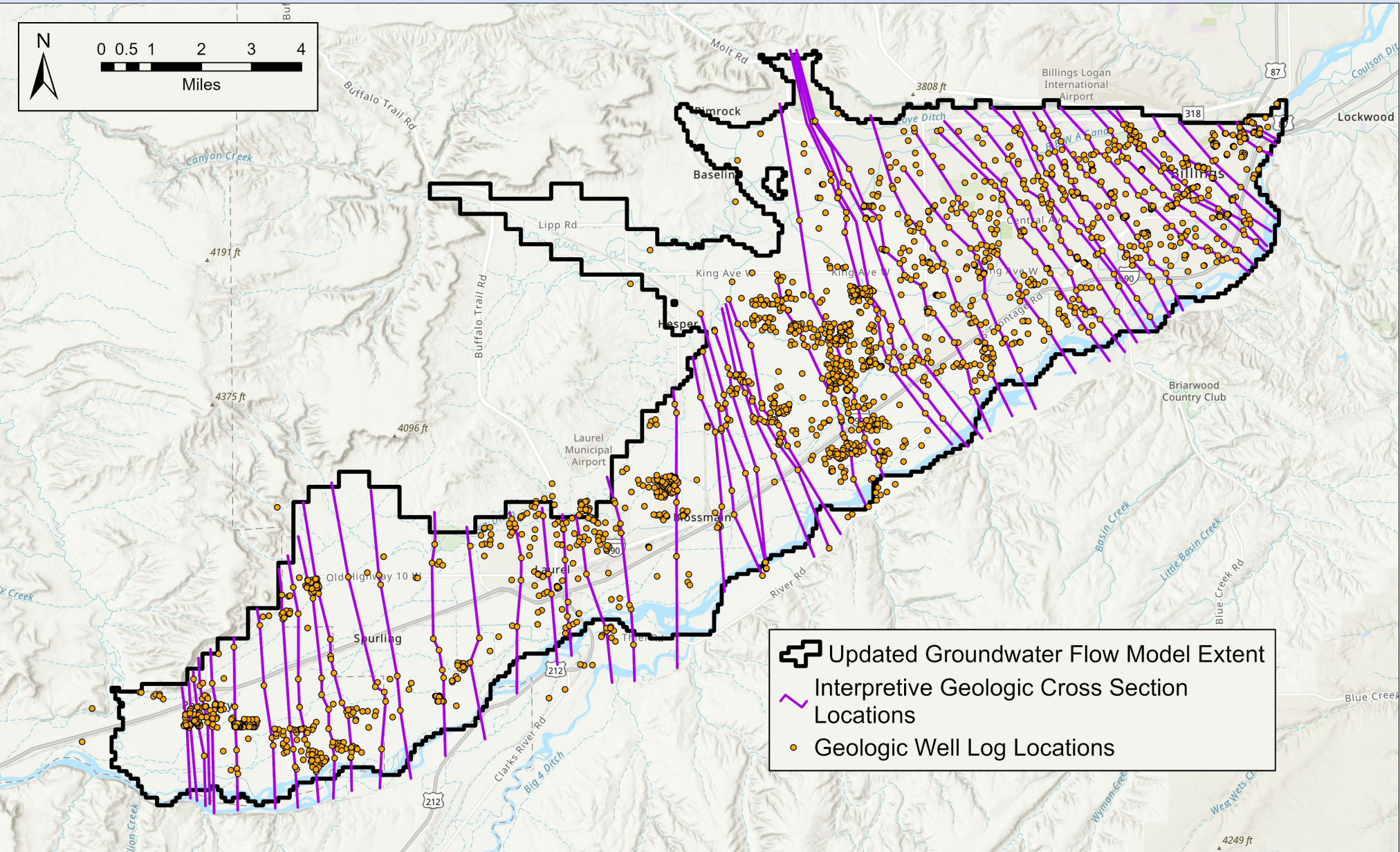


# West Billings GW Model - Geology





# West Billings GW Model - Geology



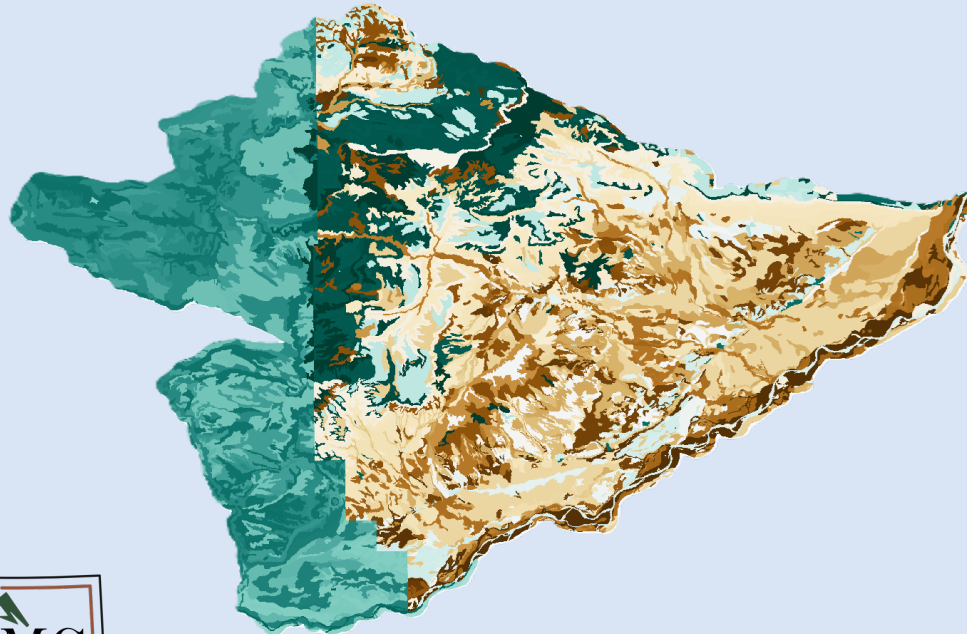


# USGS SWB2 Water Balance Model – Estimate Recharge

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## ■ Minimum inputs

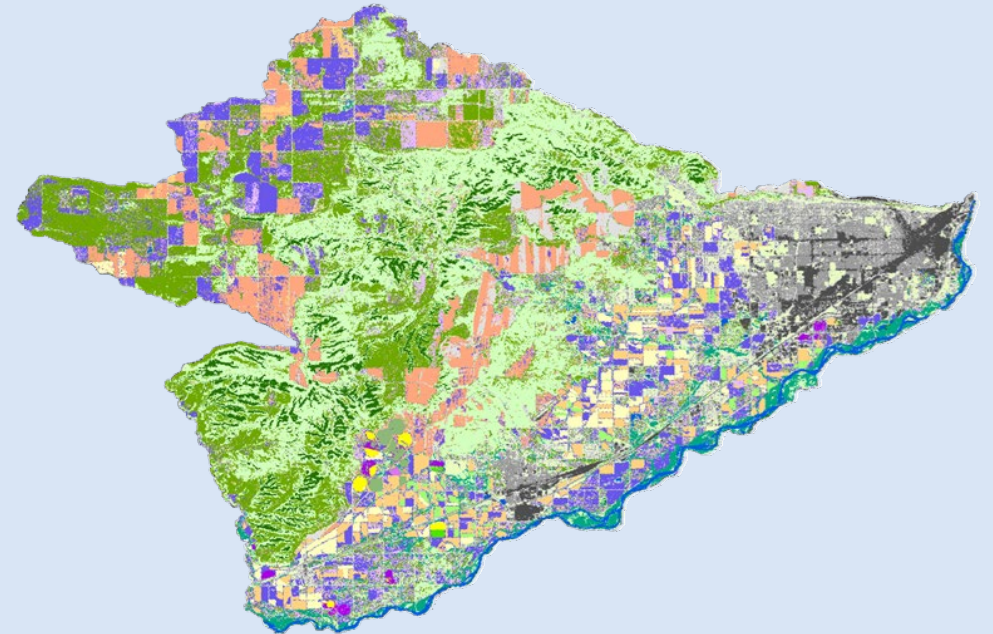
- Climate
- Land use/land cover
- Land surface flow direction – runoff routing
- Data related to ET/crop water use
- Soils



NRCS SSURGO soils data

## ■ Optional inputs

- Crop irrigation (crop-water demand)
- Impervious surface
- Storm drain capture/sewer leakage

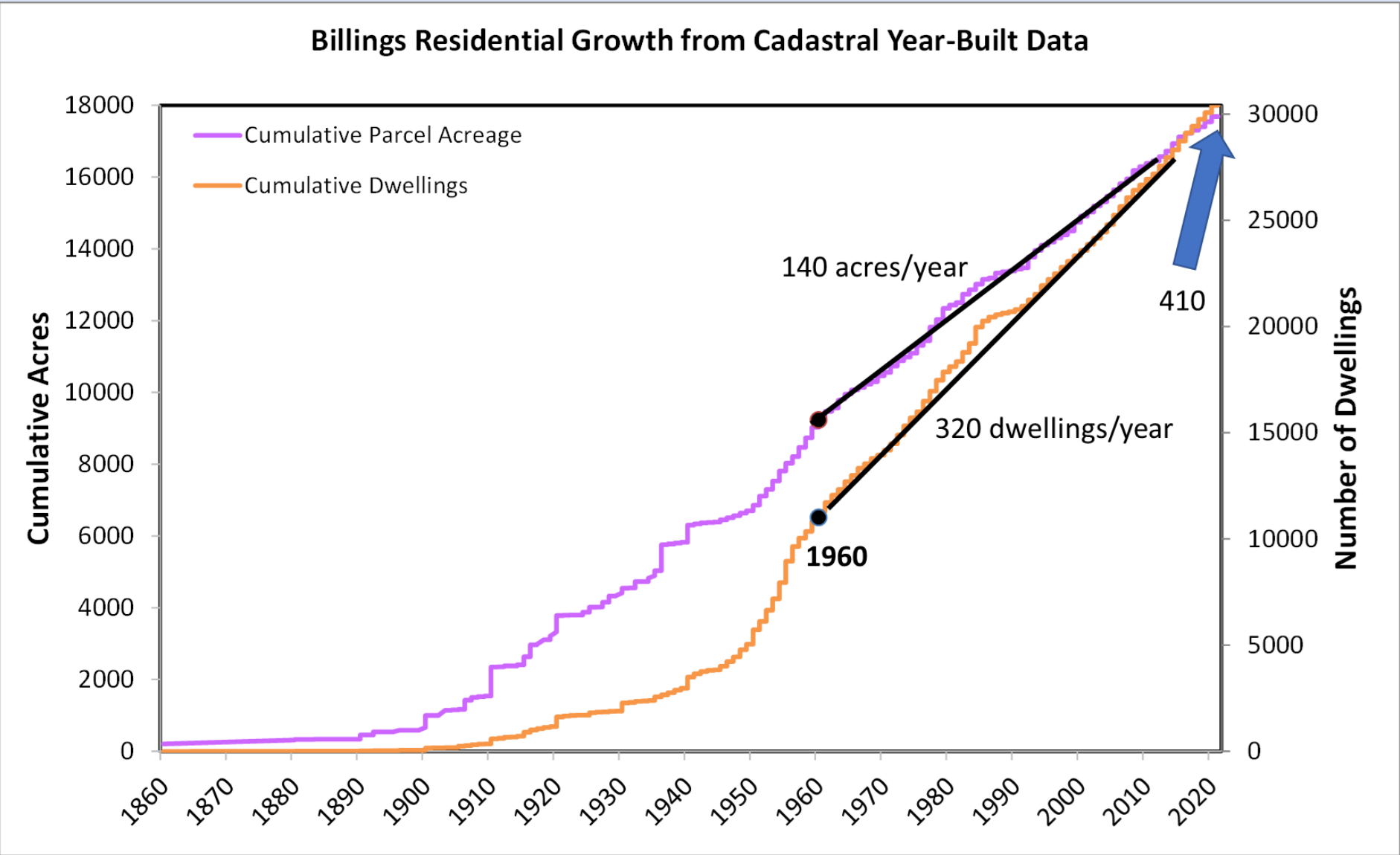


USDA Cropland Data Layer



# Potential Predictive Scenarios

- Groundwater
  - Development
  - Development
  - Removal
- Short-term
- Potential

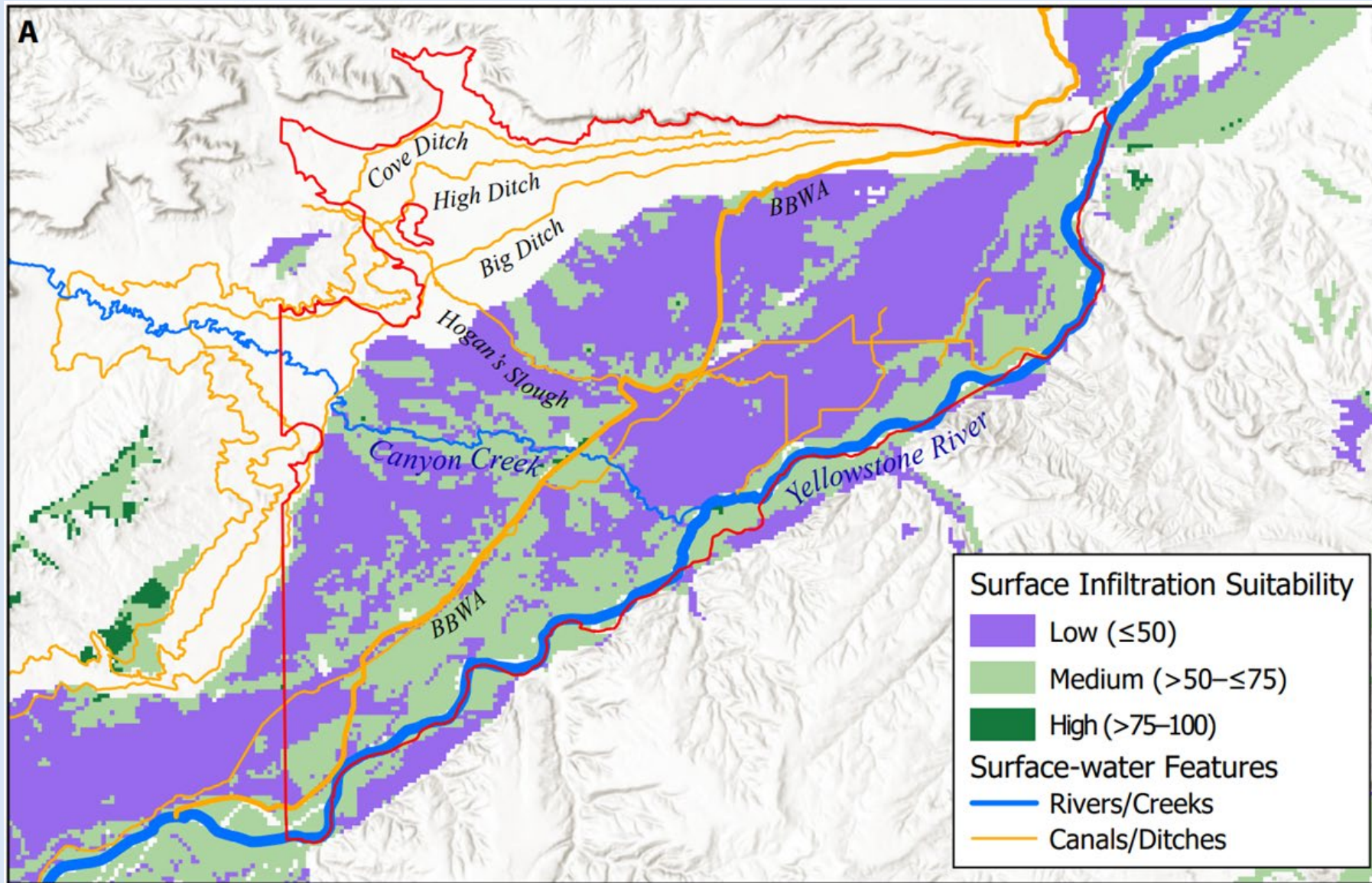


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# PRELIMINARY – MAR Study Results



# Next Steps

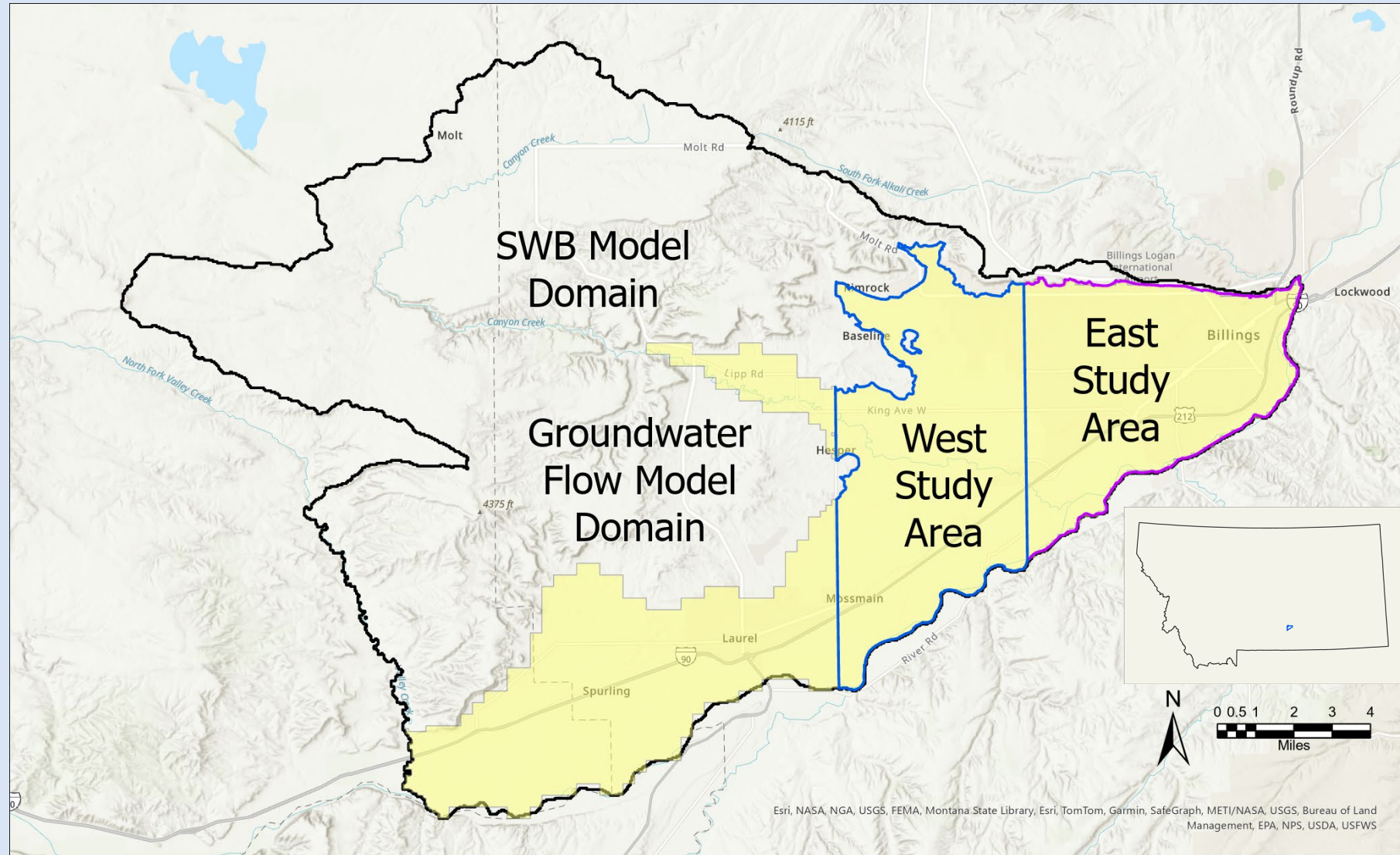
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- Model calibration
  - Measured groundwater levels
  - Measured stream/canal flows (where possible)
- Predictive scenarios
- Report & model file distribution
  
- Questions?





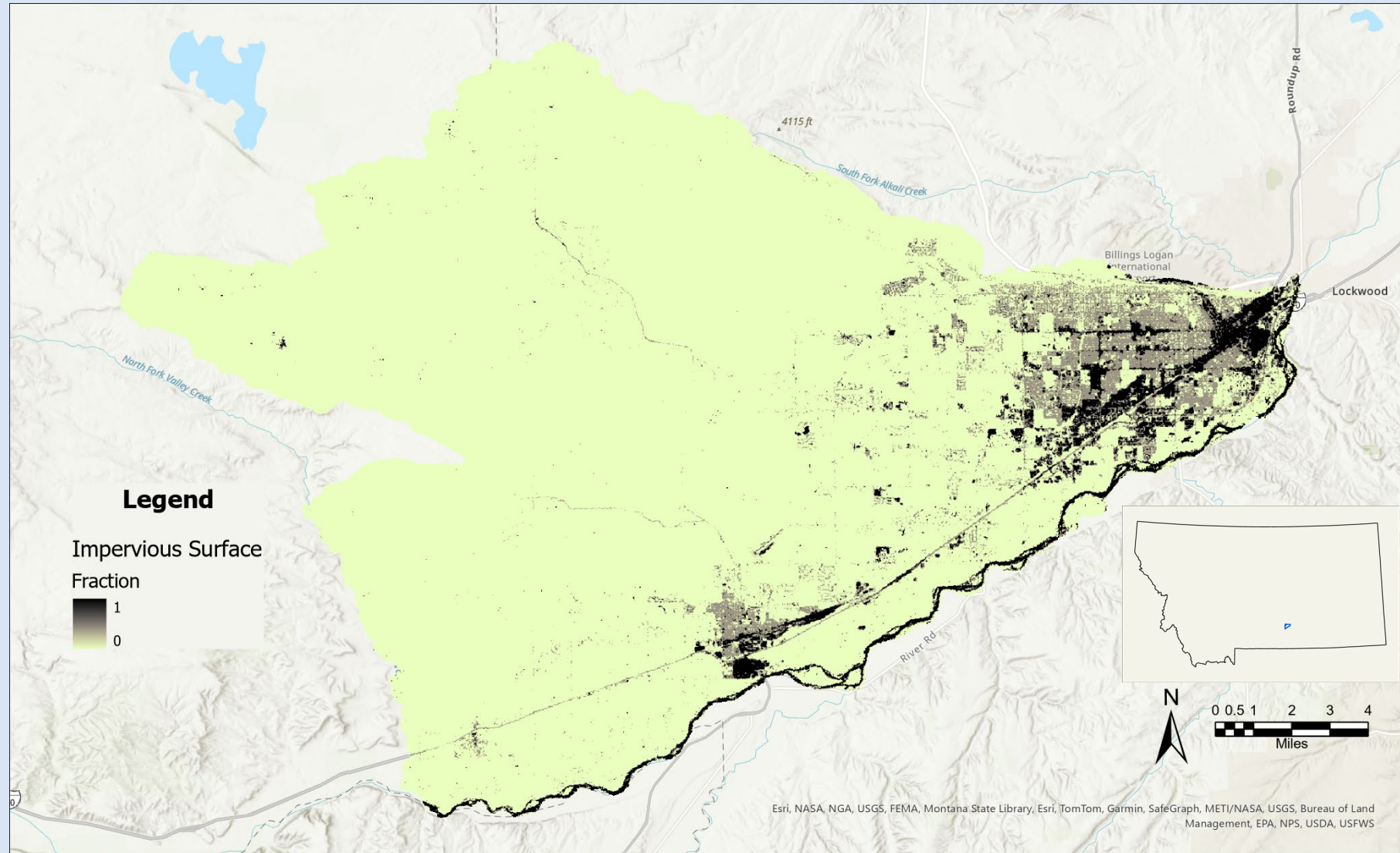
# West Billings GW Model - Recharge



*West Billings Study, Groundwater Flow, and SWB Model Areas*



# West Billings GW Model - Recharge



*Billings impervious area fractions*



# West Billings GW Model Expansion

