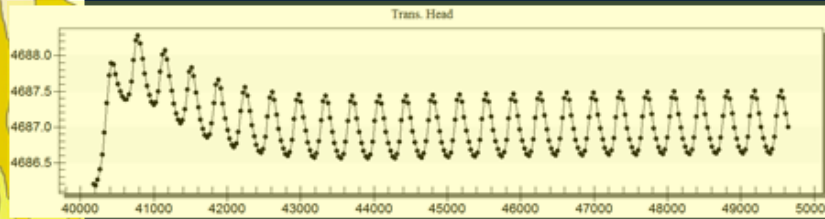
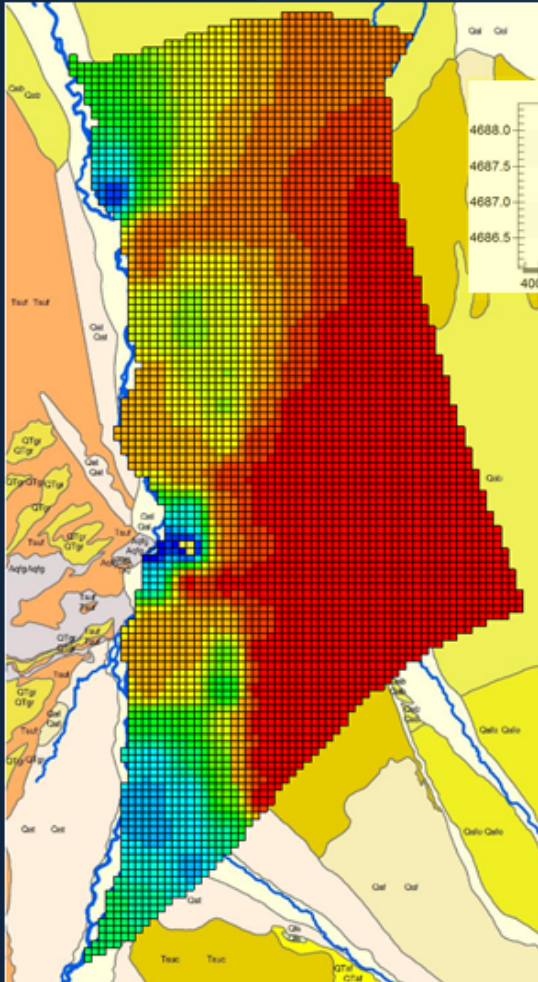


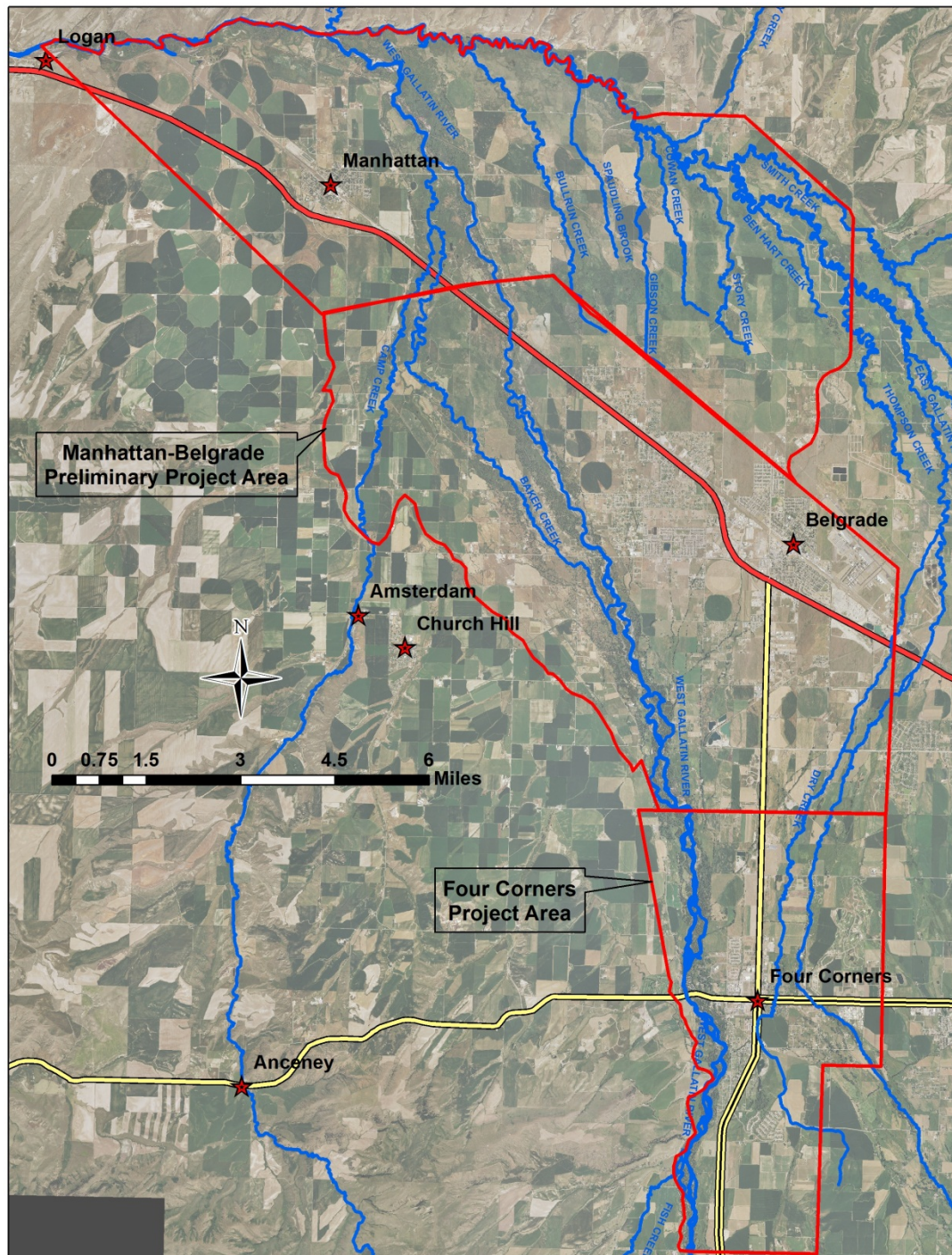
**Gallatin Valley
GWIP Projects Update
2014 Spring Water Meeting
April 9, 2014**

**Presented by:
Tom Michalek**



**Ground Water
Investigation
Program**



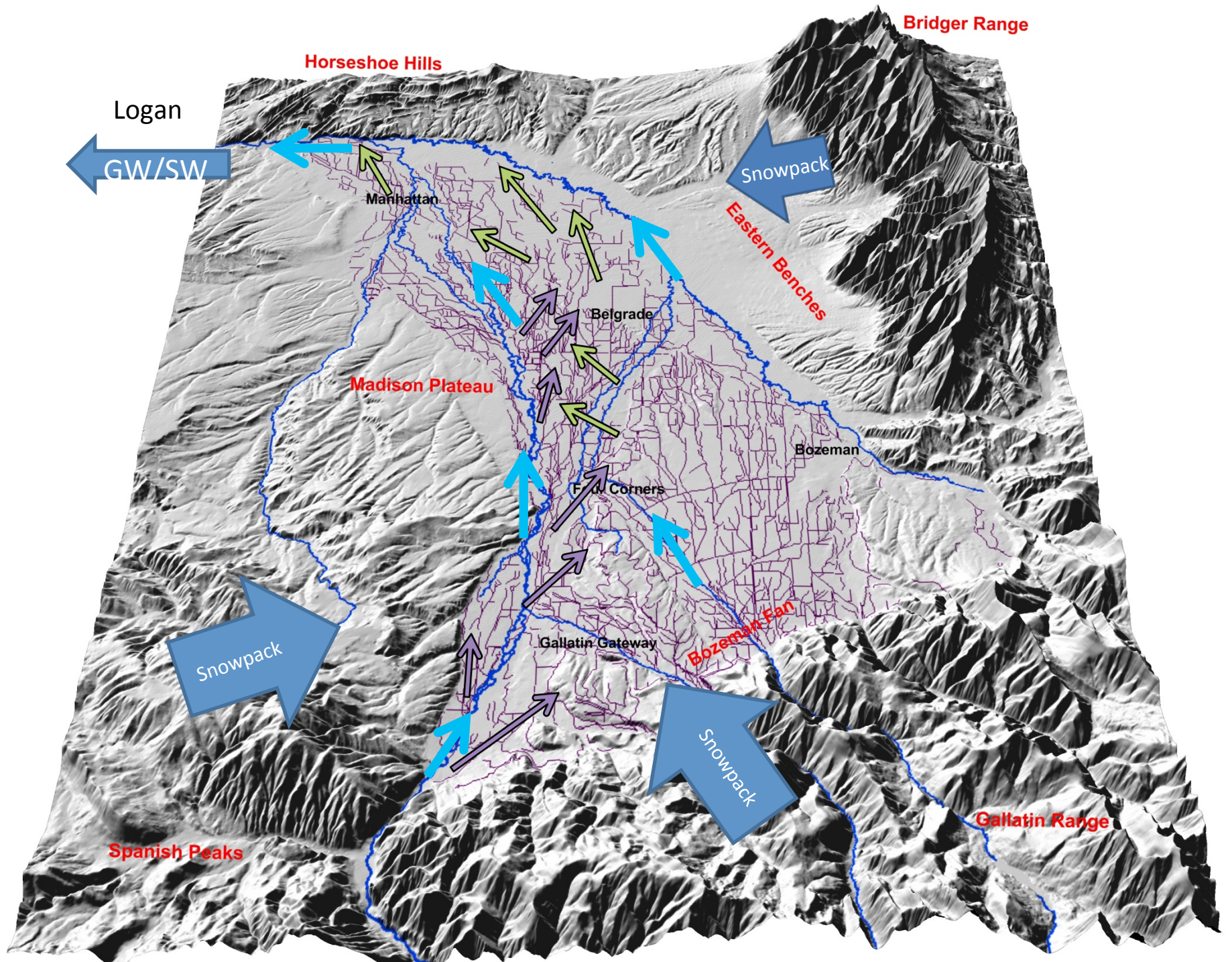


Four Corners Study Area:
 Start 2009
 Completion Spring 2013
 Published reports 2014

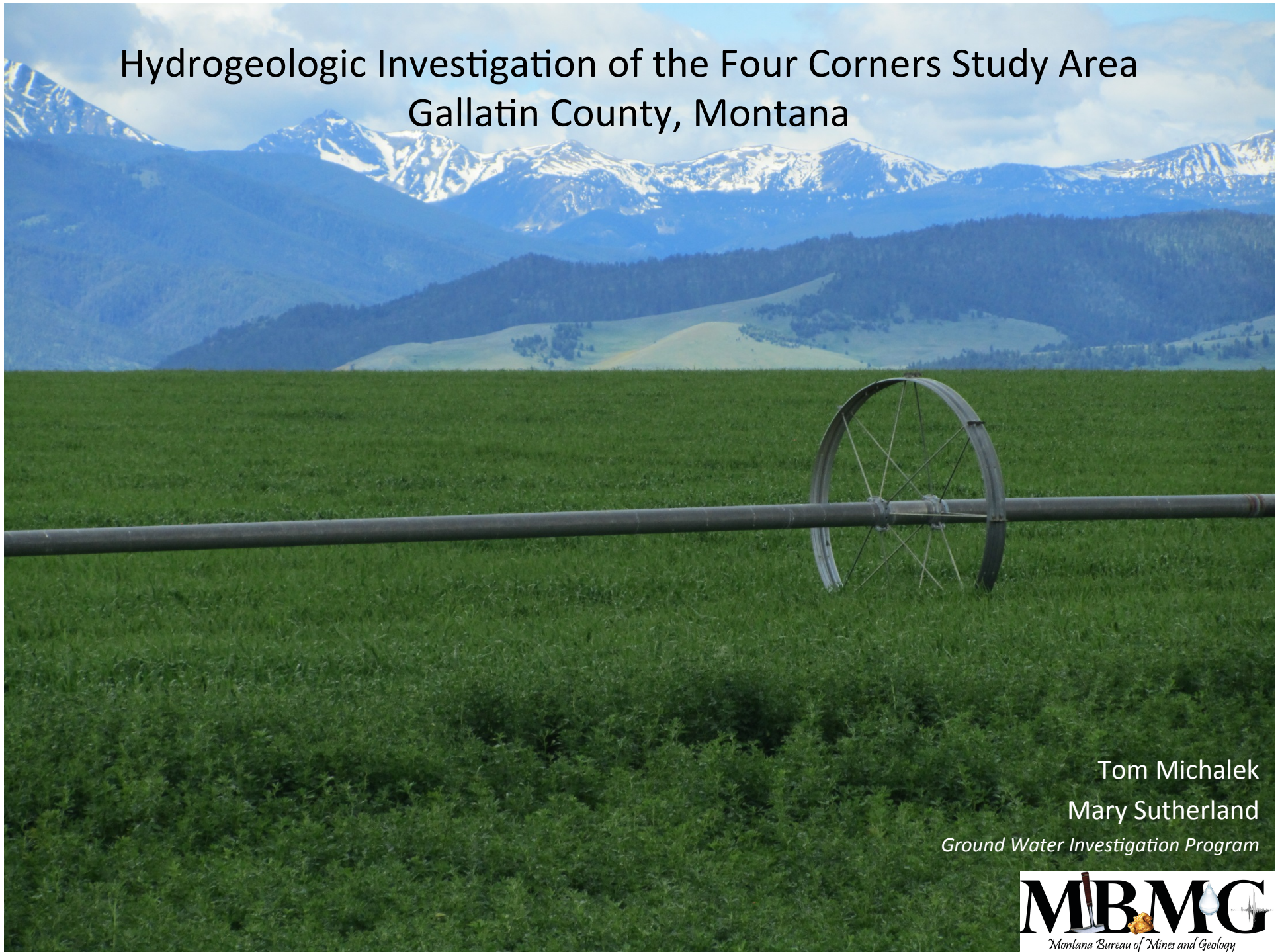
Belgrade/Manhattan Study
 Area: Start 2009
 Combined with Manhattan 2012
 Reports by the end of 2014

Big Sky Study Area:
 Start June 2013
 Complete 2015

Future Gallatin Valley Projects?



Hydrogeologic Investigation of the Four Corners Study Area Gallatin County, Montana



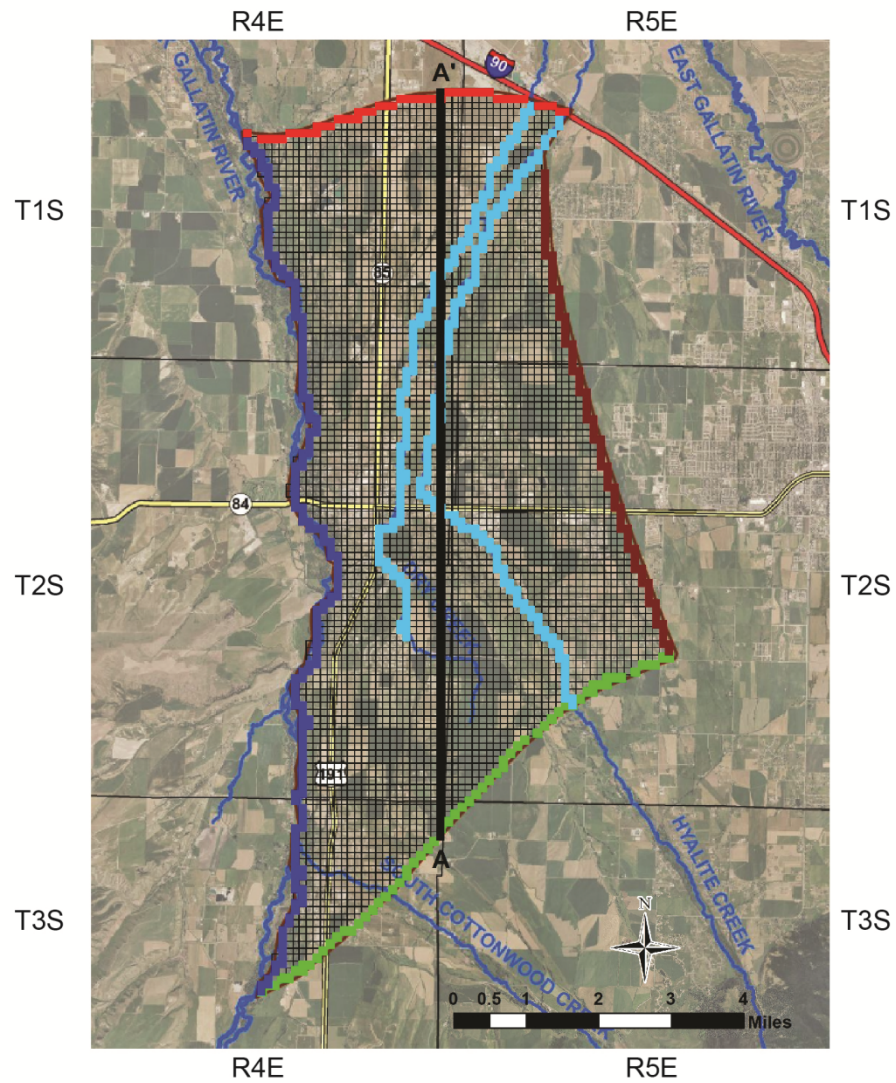
Tom Michalek
Mary Sutherland
Ground Water Investigation Program












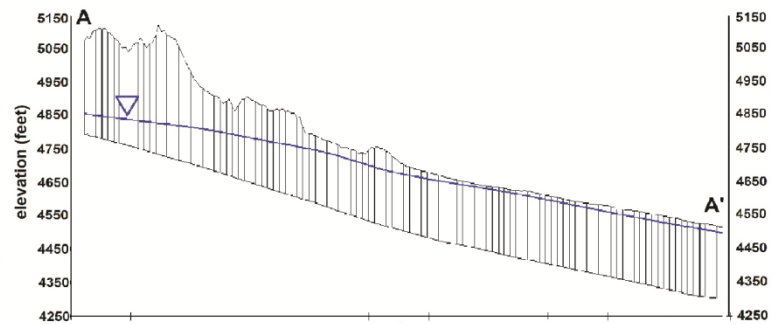
Objectives

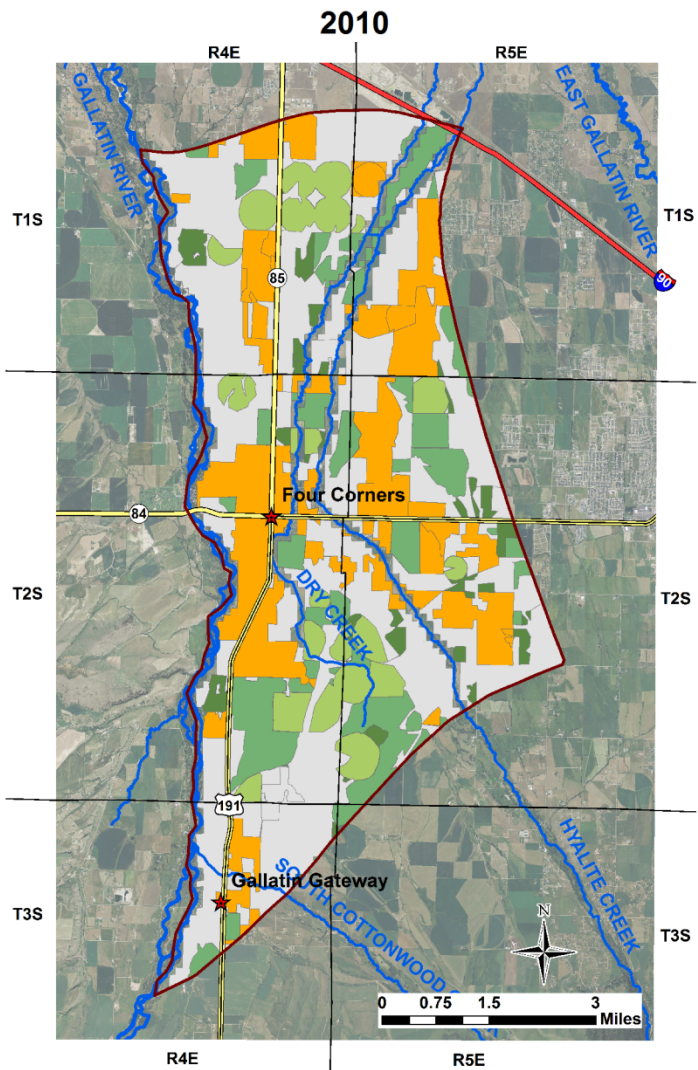
- Determine the extent of alteration to the groundwater system in the Four Corners Area over the last 60 years.
- Correlate groundwater changes to land use conversion.
- Document the effects of irrigation and canal leakage on groundwater recharge.
- Evaluate likely effects of future changes and development.



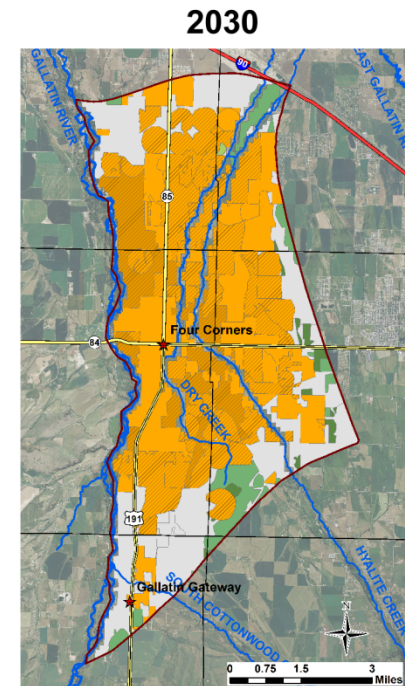
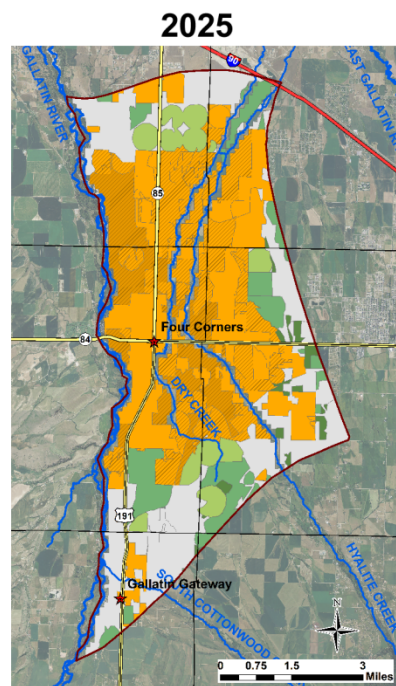
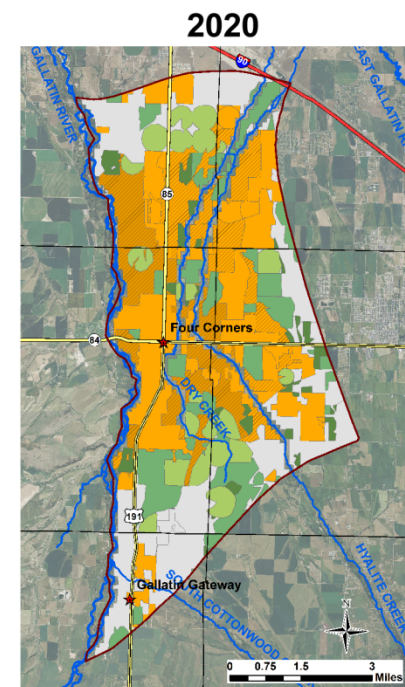
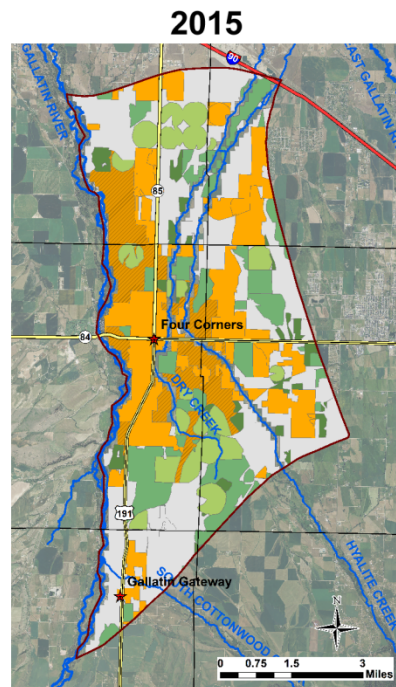
Legend

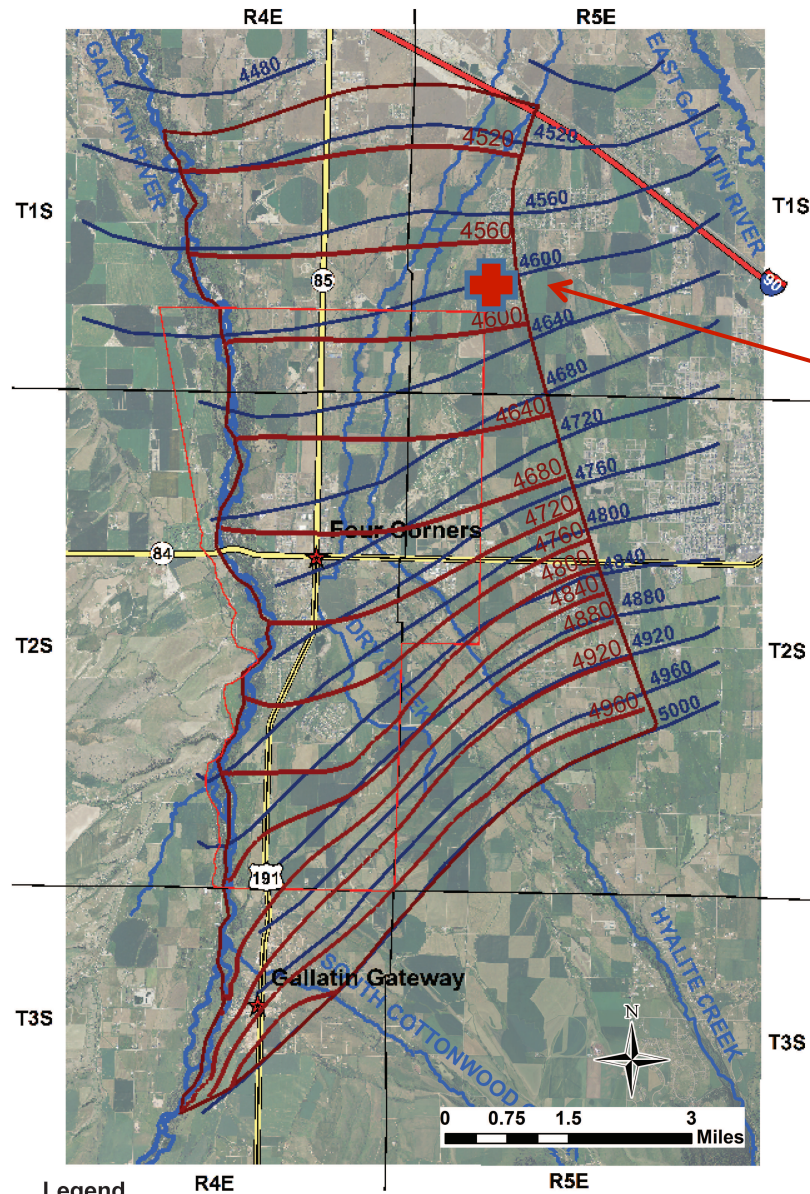
-  Model Boundary
-  Numeric model grid
-  No-flow boundary
-  Specified flux boundary
-  River boundary (RIV)
-  Stream package (STR)
-  Constant head boundary (CHD)









- Legend**
- Groundwater wells
 - ▭ Model Boundary
 - ▭ Areas of recharge due to canal irrigation leakage
 - ▭ Areas of recharge due to flood irrigation
 - ▭ Areas of recharge due to sprinkler irrigation
 - ▭ Areas of recharge due to pivot irrigation
 - ▭ Areas of discharge due to urbanization/development
 - ▭ Areas of discharge due to simulated urbanization/development





Water table
could drop
30 to 40 feet

Legend

-  Model Boundary
-  Study Area Boundary
-  Scenario 3e modeled potentiometric contours (ft)
-  2010 potentiometric contours (ft)

Use of Model:

- Look at past changes
 - *Some change (but not as much as would be expected)*
- Estimate future changes
 - *Could cause significant change in water availability*
- Baseline model for future applicants
 - *Saves time and money in application process*

Limitations of Models:

- Good data = better model
 - *No model is perfect*
- Non-unique
 - *Other models may be reasonable*
- Not final product
 - *Can and should be revised/verified with new information*

