

RECLAMATION

Managing Water in the West

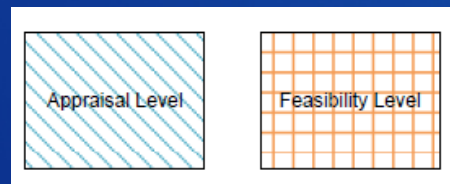
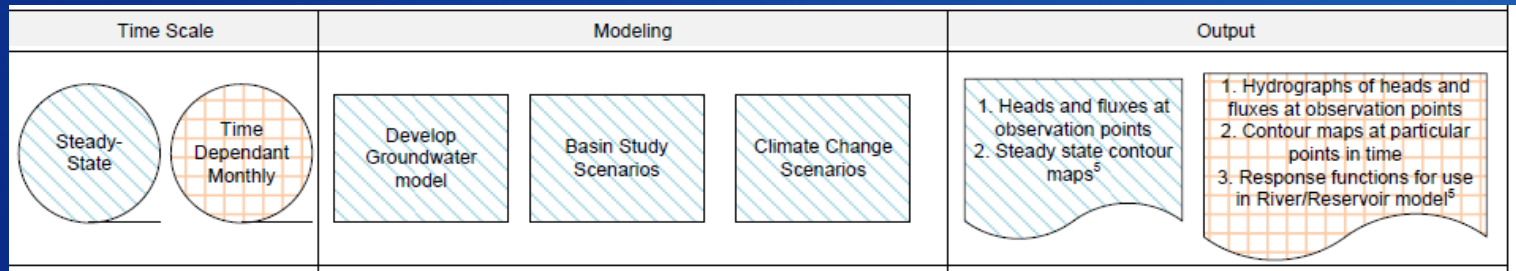
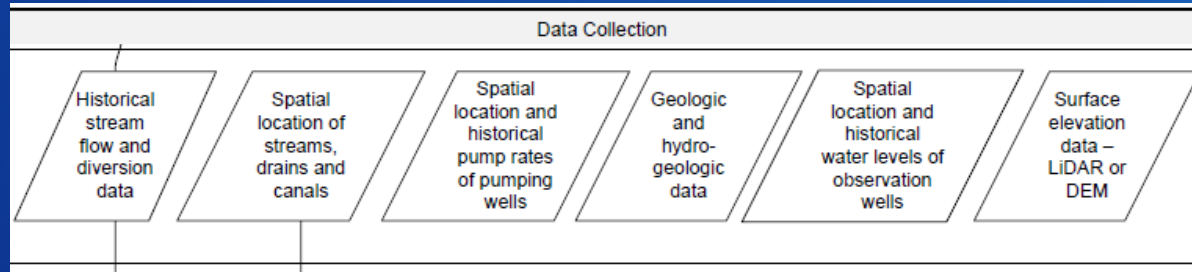
Hood River Basin Appraisal Study

Groundwater Modeling



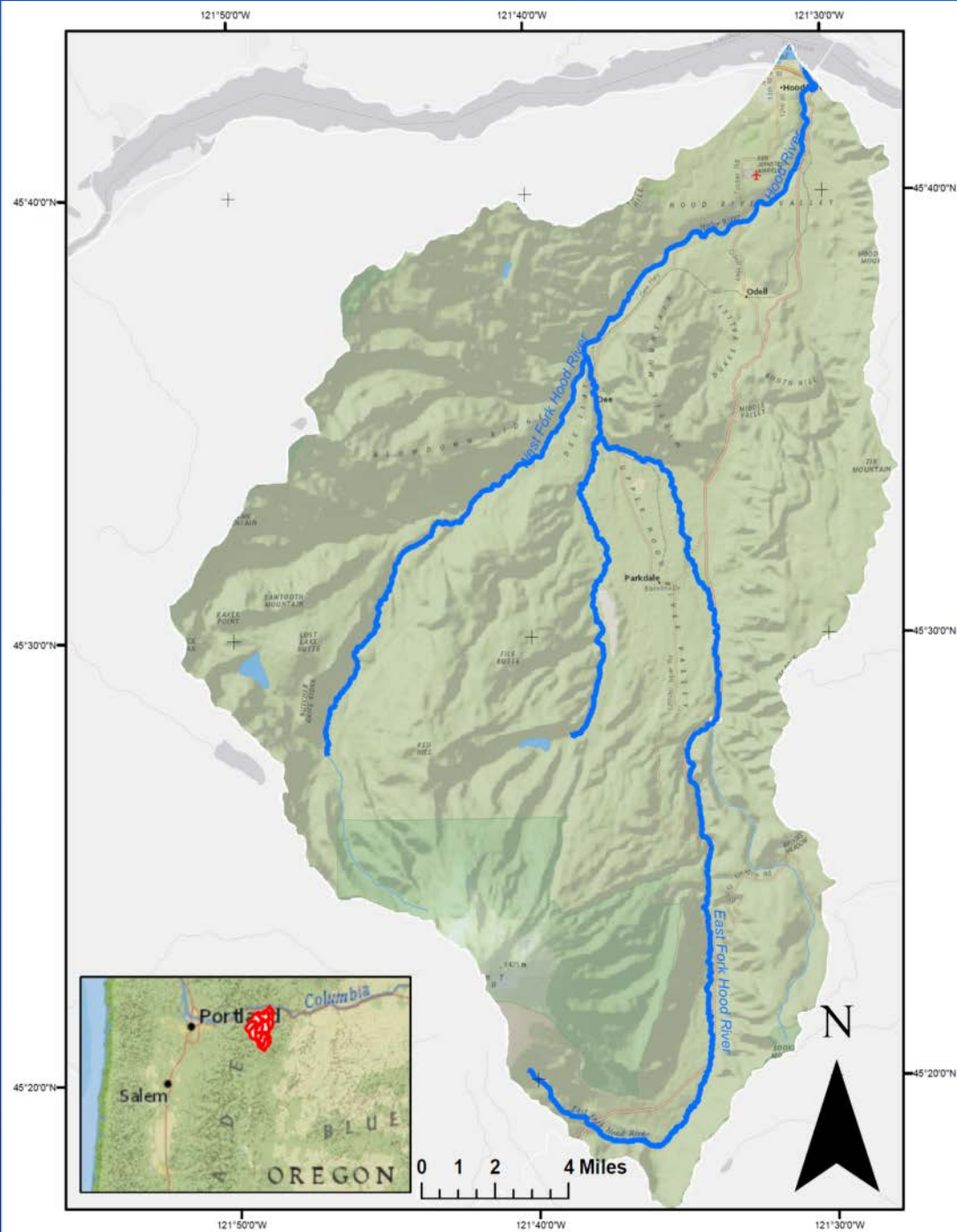
U.S. Department of the Interior
Bureau of Reclamation

Appraisal Level Study Details



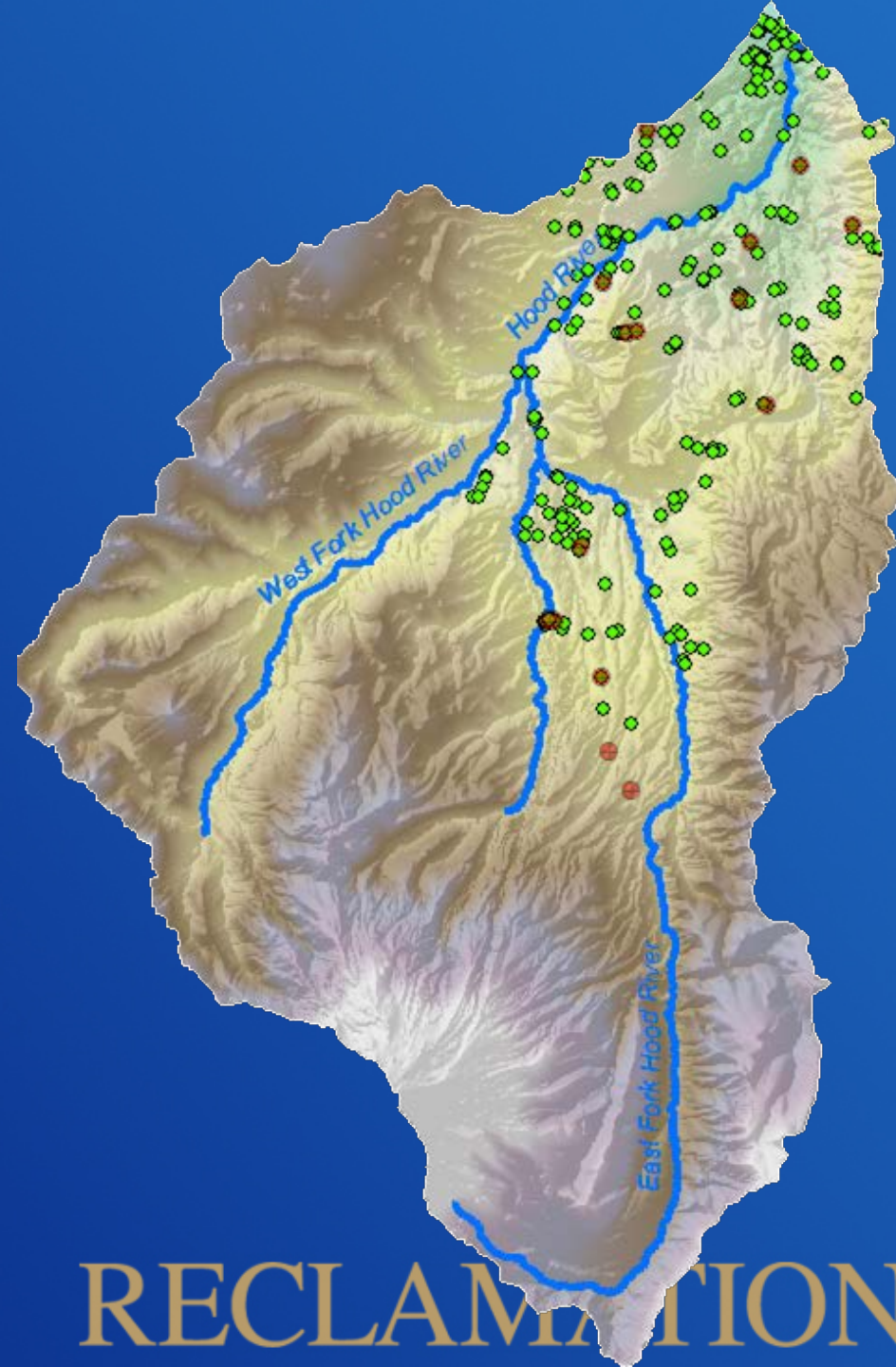
Study Area

- Hood River basin



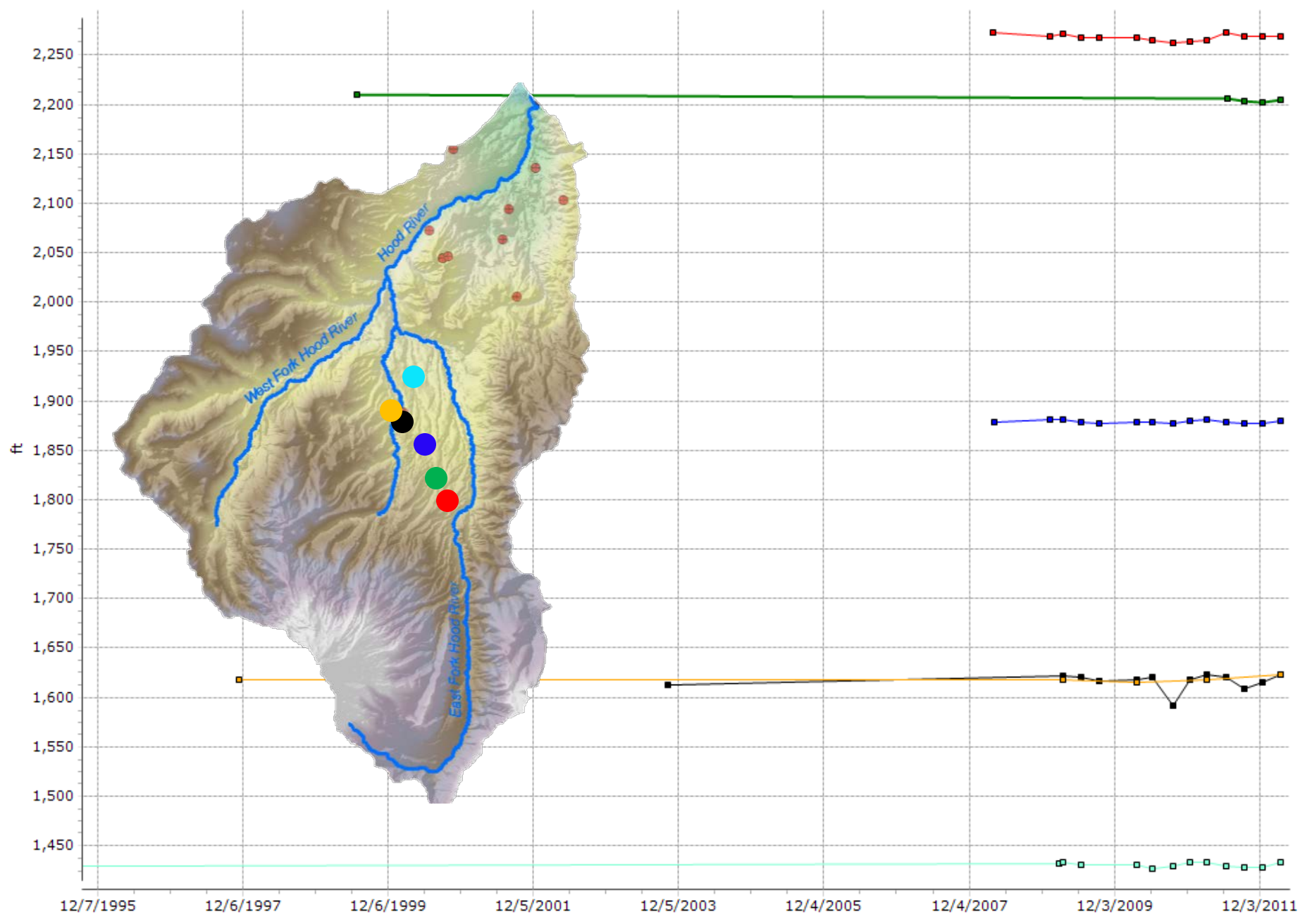
Available Data

- 14 OWRD wells (⊕)
 - Well logs and sporadic water level data
- 293 Hood River County wells (●)
 - Well logs only

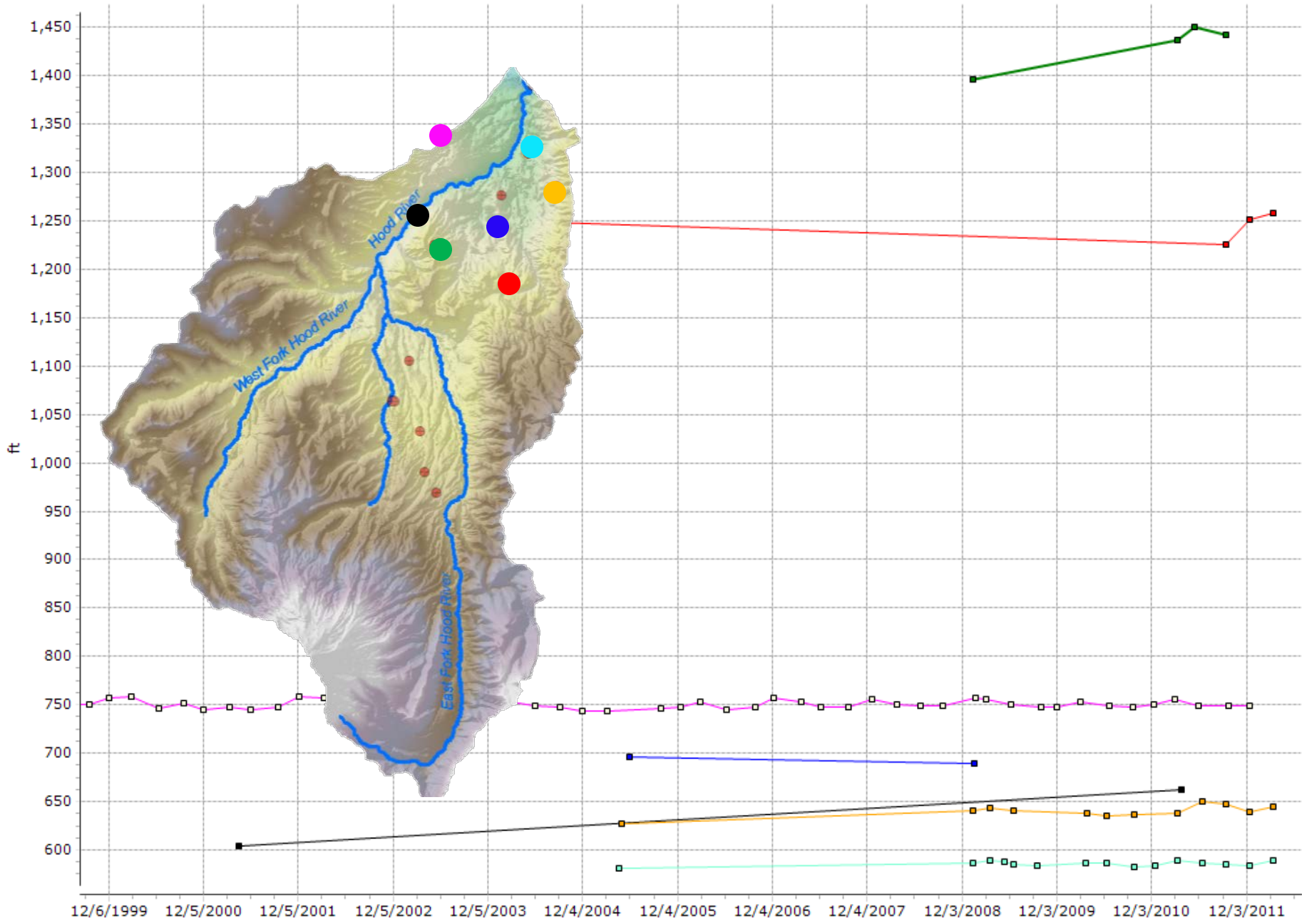


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■ HOOD 50636
 ■ HOOD 50170
 ■ HOOD 50637
 ■ HOOD 50457
 ■ HOOD 50097
 ■ HOOD 330

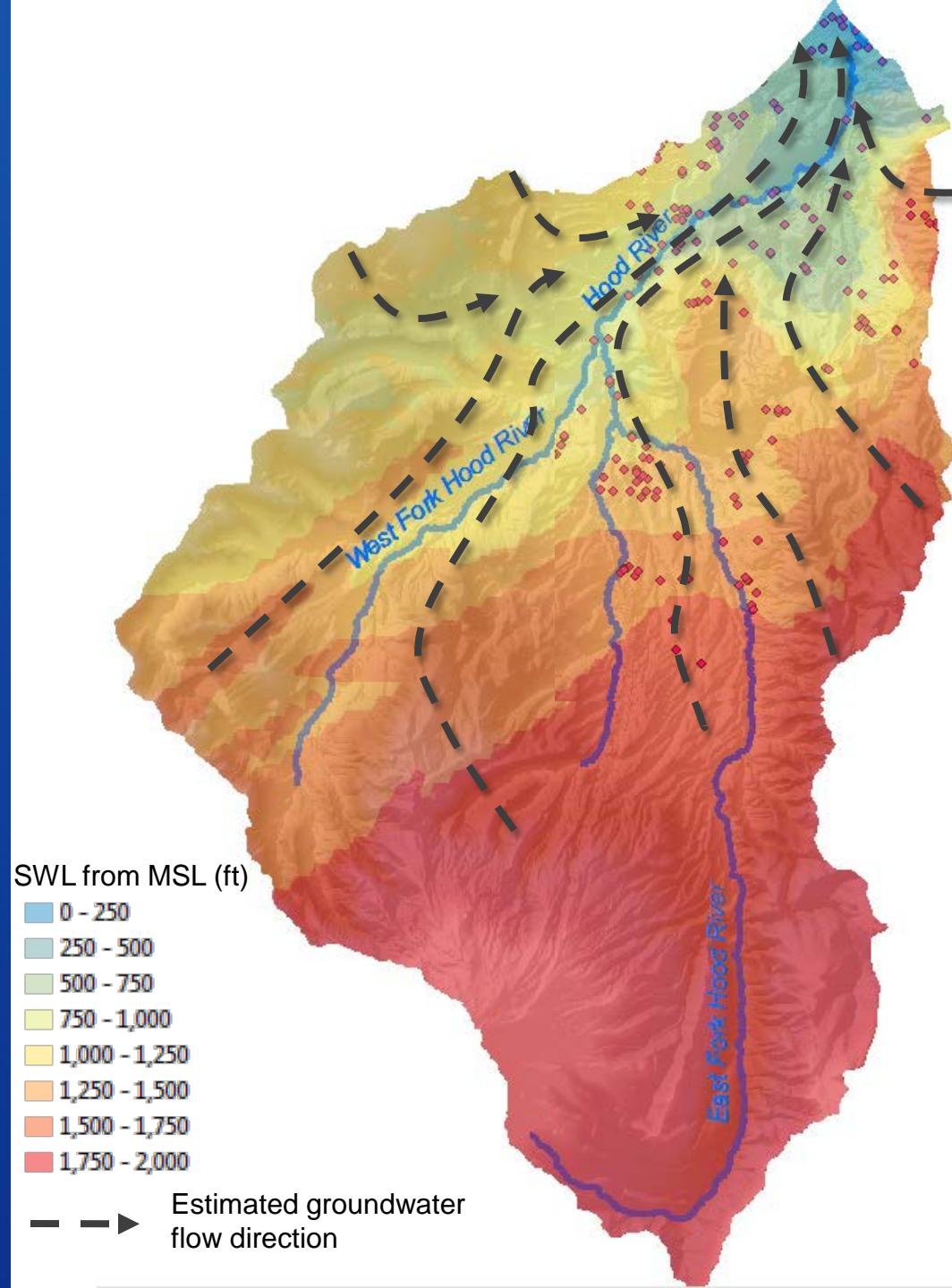


HOOD 50299 HOOD 50698 HOOD 50550 HOOD 50290 HOOD 50504 HOOD 50503 HOOD 372



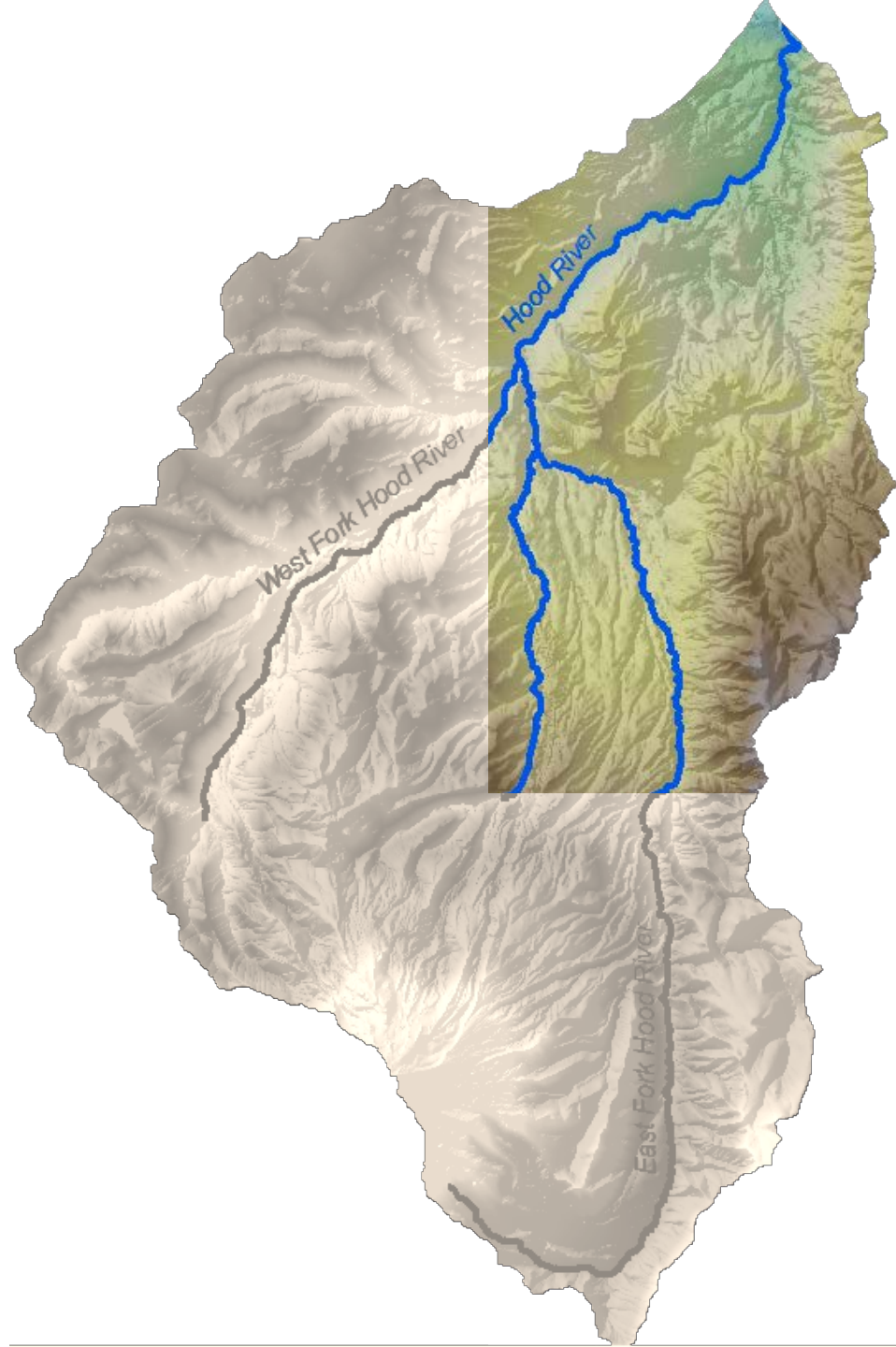
Data Analysis

- Water level data suggests connectivity between the upper and lower valleys



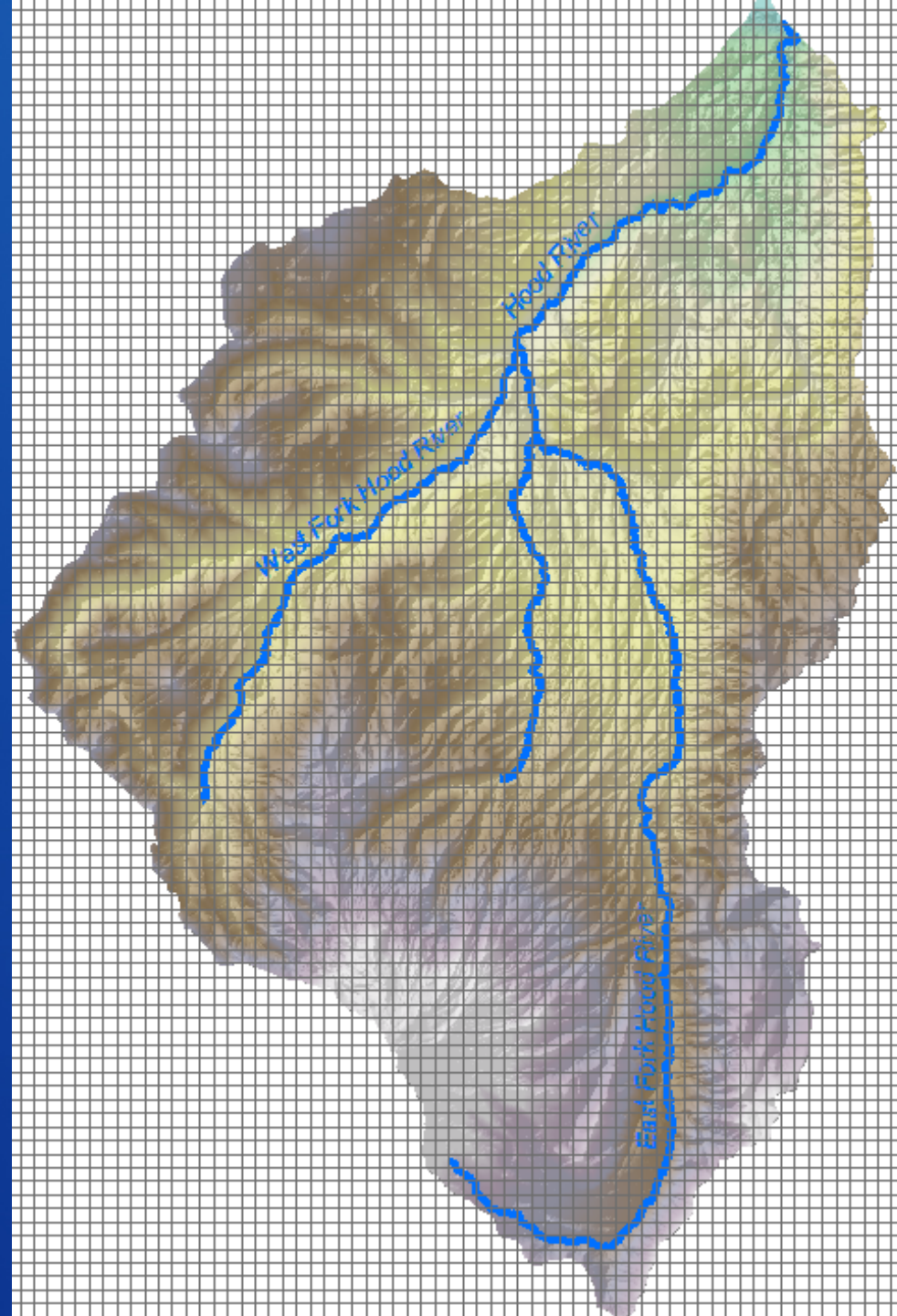
Proposed Model Area

- Use entire basin
 - Higher uncertainty where there are no well data



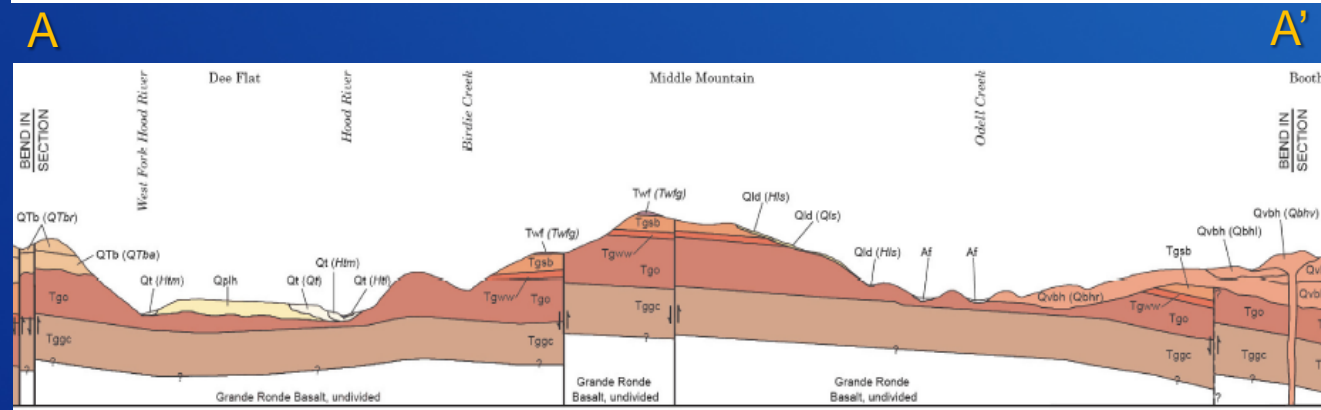
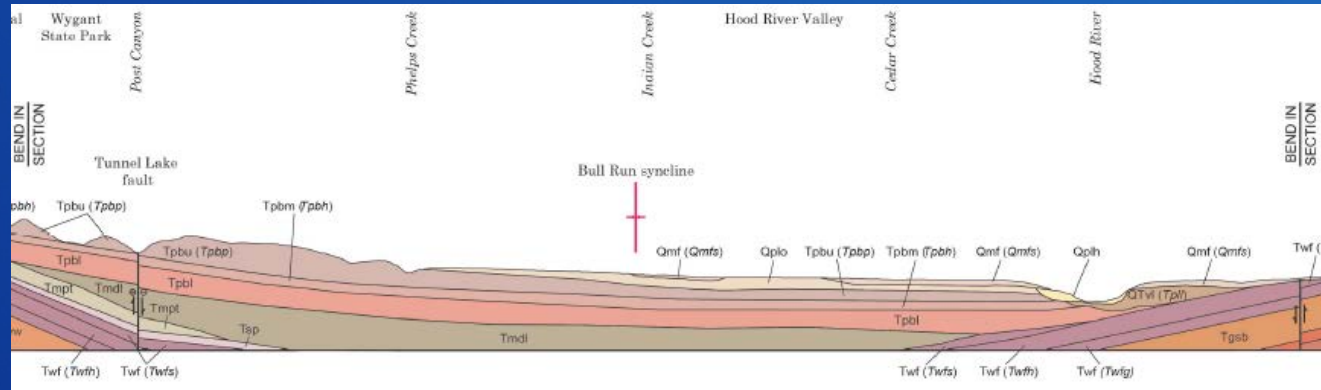
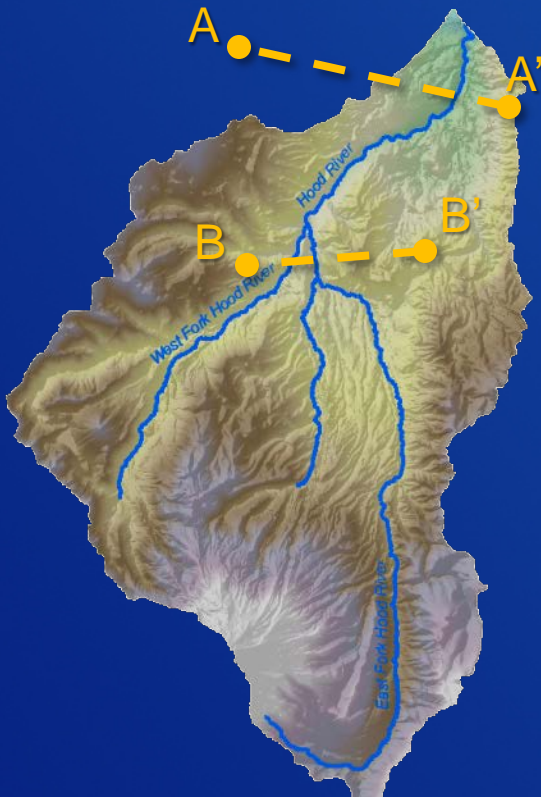
Proposed Model Set-up

- Steady state model
 - Transient model with a seasonal time-step if time and budget allows.
- 0.5 km grid cells



Proposed Model Set-up

- Model layering



B

B'

Source: Oregon Department of Geology and Mineral Industries Open-File Report O-12-03

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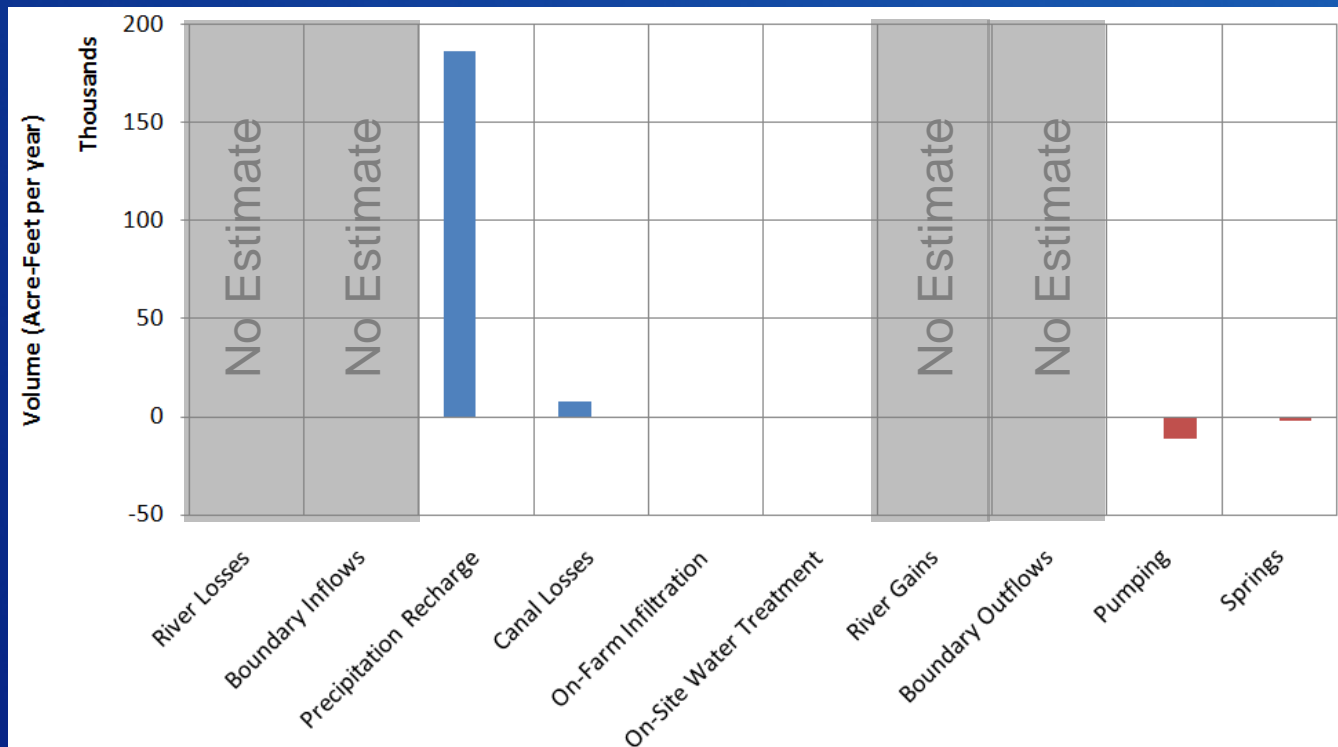
Proposed Model Set-up

- 1 layer model



Water Budget

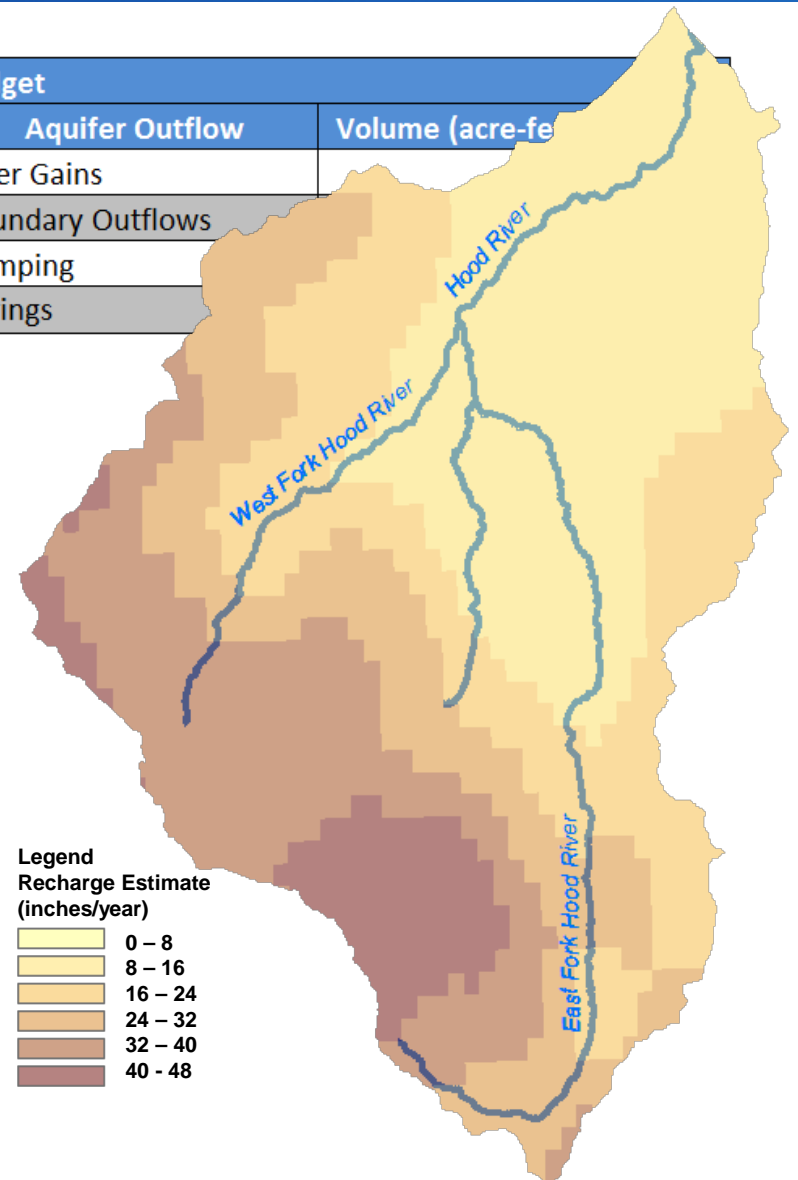
Water Budget			
Aquifer Inflow	Volume (acre-feet per year)	Aquifer Outflow	Volume (acre-feet per year)
River Losses	?	River Gains	?
Boundary Inflows	?	Boundary Outflows	?
Precipitation Recharge	186,303	Pumping	11,453
Canal Losses	7,907	Springs	2,278
On-Farm Infiltration	-	Sum	13,731
On-Site Water Treatment	-		
Sum	194,210		



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- Assumes similar average precipitation-recharge rates from the neighboring Mosier basin



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- Estimated based on ID conservation reports

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- River losses and gains will be generated by the DHSVM model
- An initial estimate of 480,446 AF/year for river gains
 - Estimated based on the baseflow separation program WHAT₁
 - Assumes a 41% glacier contribution to summer flows₂

[1] Lim, Kyoung Jae, Bernard A. Engel, Zhenxu Tang, Joongdae Choi, Ki-Sung Kim, Suresh Muthukrishnan, and Dibyajyoti Tripathy, 2005. Automated Web GIS Based Hydrograph Analysis Tool, WHAT. Journal of the American Water Resources Association 41(6):1407-1416

[2] Nolin, A. W., J. Phillippe, A. Jefferson, and S. L. Lewis, (2010), "Present-day and future contributions of glacier runoff to summertime flows in a Pacific Northwest watershed: Implications for water resources", Water Resour. Res., 46, W12509, doi:10.1029/2009WR008968

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- Estimated based on mapped water rights and water right rates

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- Based on reported water use originating from springs

Model Limitations

- This modeling effort is a *first step* towards a more comprehensive model
- High uncertainties

Schedule

Task	Mar-13	Apr-13	May-13
Model Development	■		
Model Calibration & Validation		■	
Scenario Modeling			■

Feedback

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