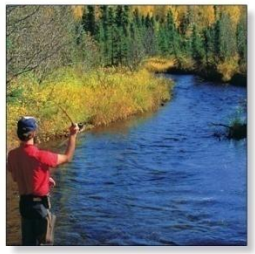
Preliminary Calibration Run

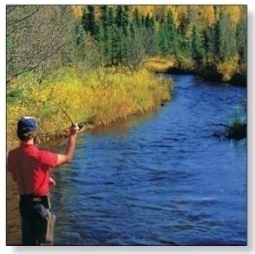
Presented by Allan Wylie, IDWR

Date October 2, 2014



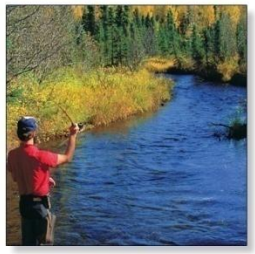
Outline

- **<u>Preliminary</u>** Steady State Calibration Run
- This is **<u>Preliminary</u>**
- <u>NO</u> we are <u>NOT</u> there yet!!!
  - We will probably conduct hundreds of preliminary calibration runs.



Outline

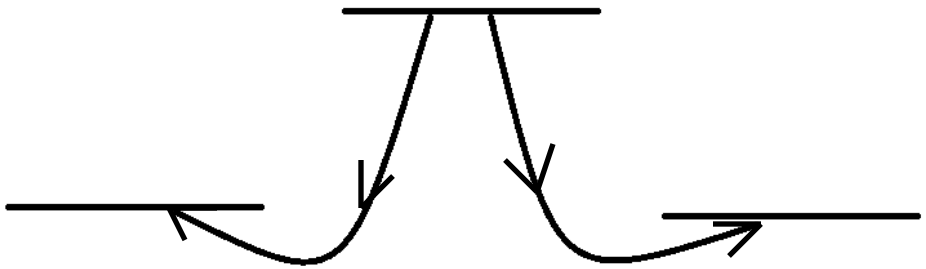
- Recharge program not ready yet
  - Multiply starting recharge array by array of scalars
- Tributary underflow adjusted by multiplying starting values by adjustment factor
- Physical properties adjusted by changing values in MODFLOW input files
  - Aquifer transmissivity
  - Riverbed conductance
  - Drain conductance



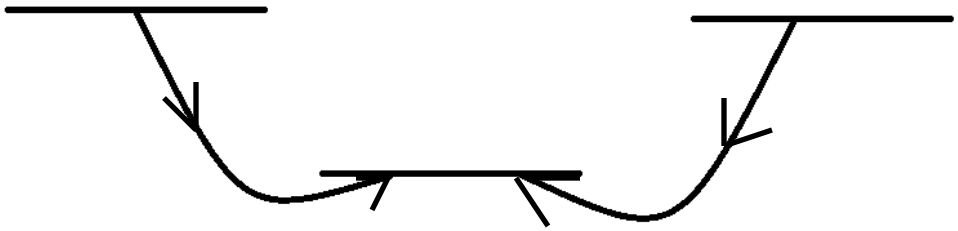
Changes since last meeting

- Scanned through the river file and adjusted anomalously high or low cells.
  - Set anomalously high or low cells equal to neighbors.
  - Asked Jason to run “bumping” routine on river cells.
    - Bumping routine not conducted for this calibration run.
- Changed regularization for layer 2 alluvium.
  - Bias used to be for horizontal homogeneity.
  - For this run bias is for vertical homogeneity.
    - Hydraulic conductivity at pilot point in layer 2 is asked to be as similar as possible to hydraulic conductivity of pilot point in layer 1.
- Changed reach gain targets to averages for the current steady state period - 2004

River file changes

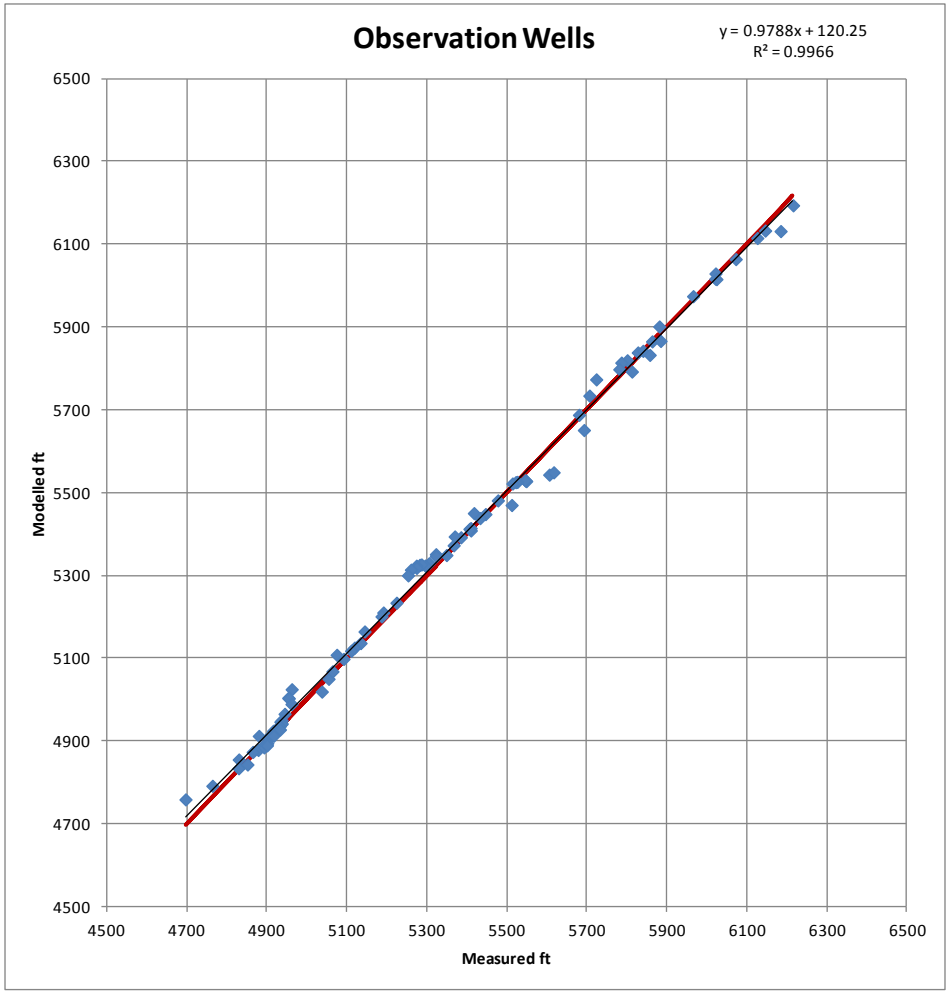


- If river cell is to high
  - River cell has infinite volume of water.
  - Large volumes of water can exit cell and show up as gains in adjacent cells.



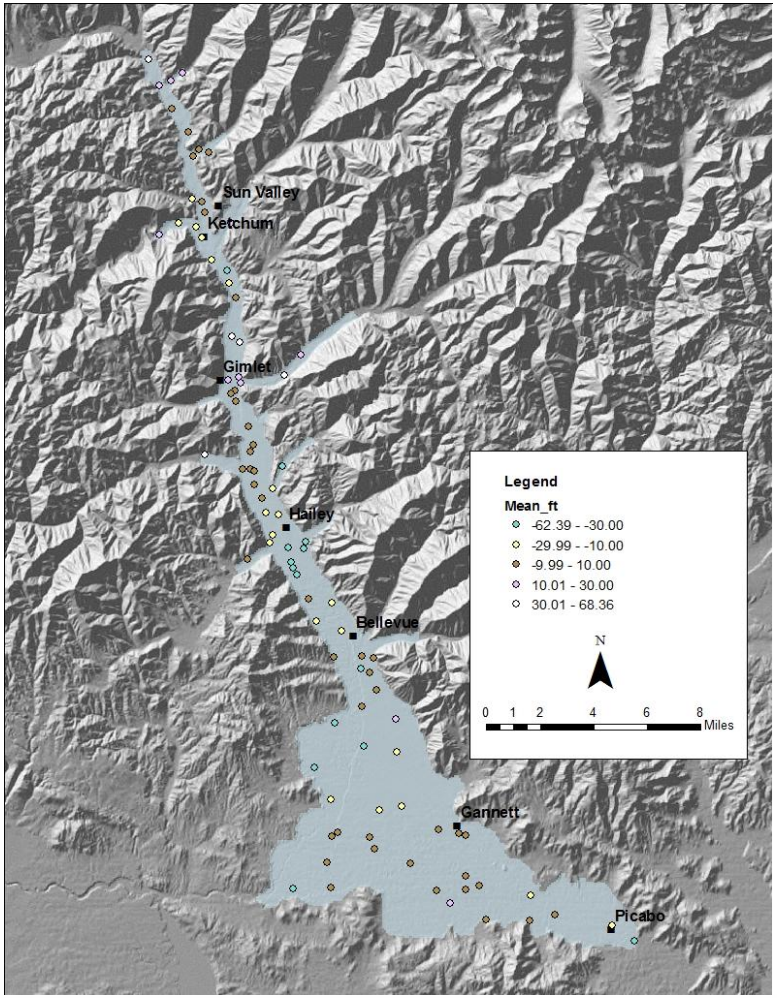
- If river cell is to low
  - River cell can adsorb and infinite volume of water.
  - Large volumes of water can exit adjacent river cells to be adsorbed by low river cell.

Observation Wells



- Wells with GPS or surveyed location
- Measured by a trained technician
- If fit was perfect
  - Intercept = 0
  - Slope = 1
  - $R^2 = 1$
  - All points on the red line

Observation Wells

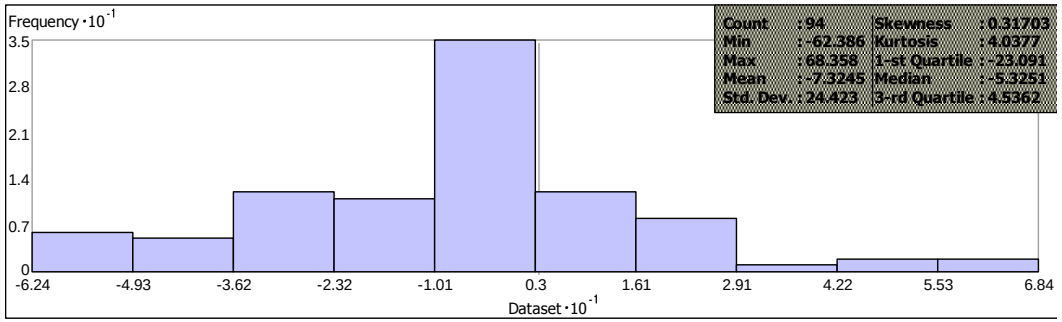


- Wells with GPS or surveyed location
- Measured by a trained technician

Observation Wells

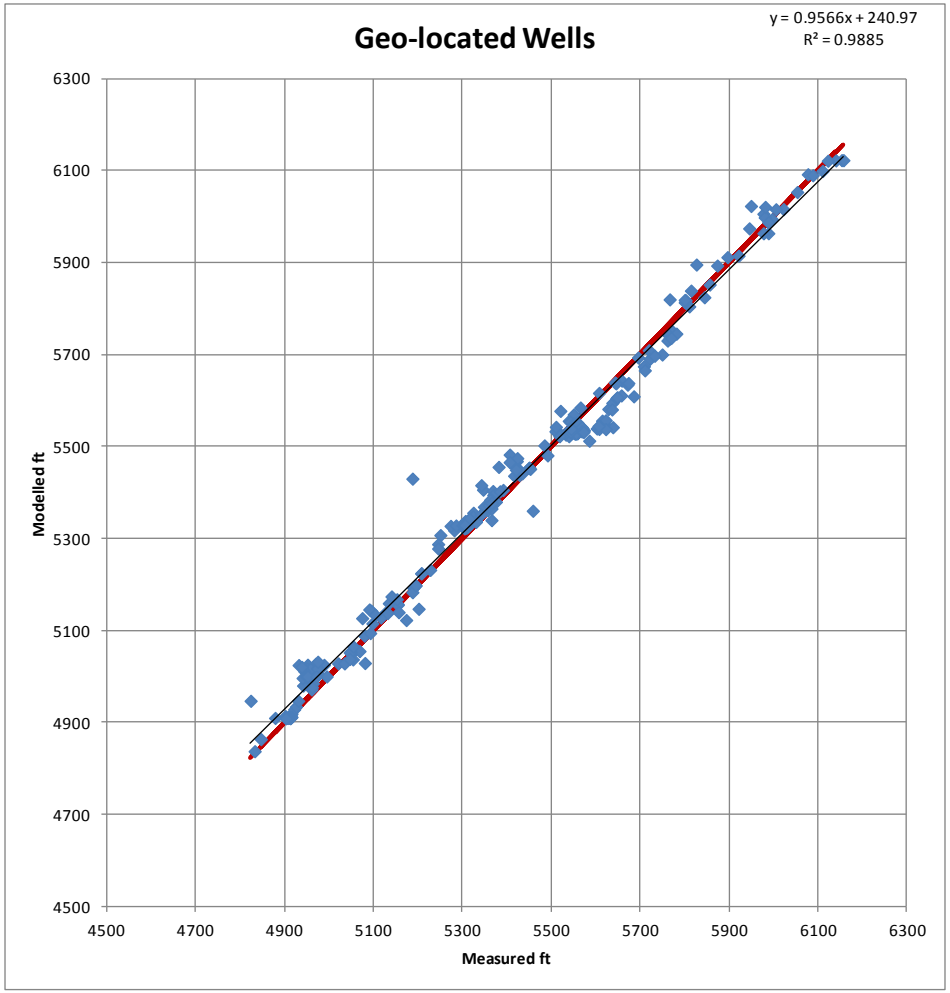
- Wells with GPS or surveyed location
- Measured by a trained technician

Histogram
Transformation: None



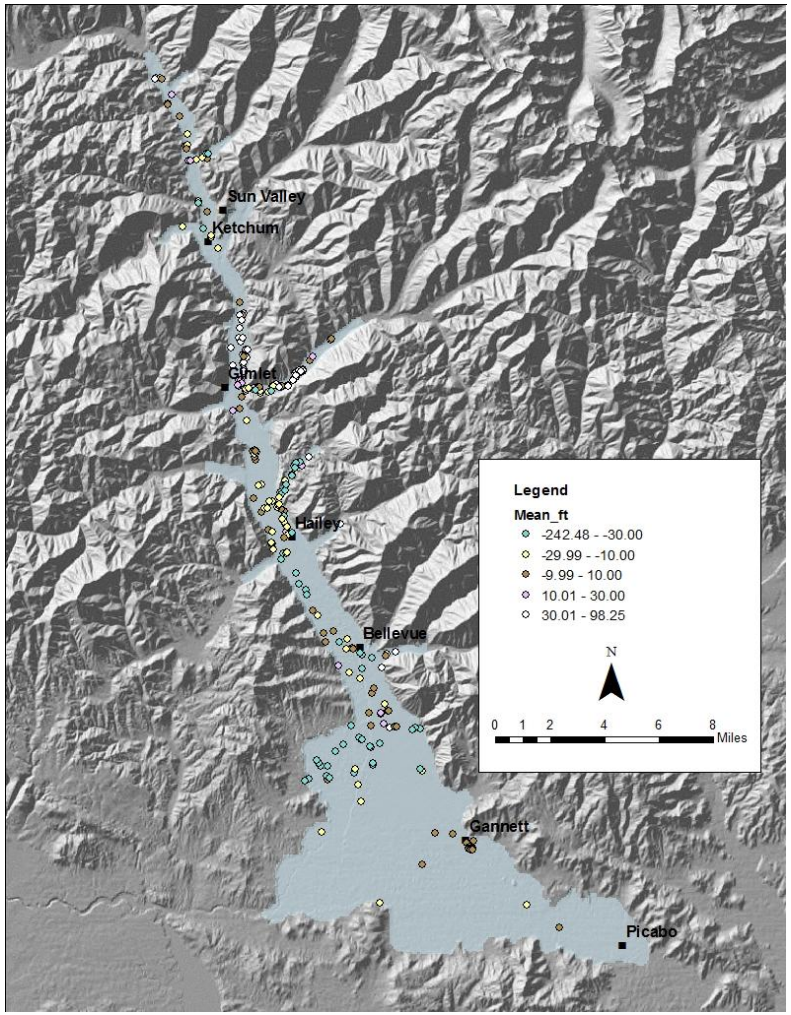
Dataset : ObsWell Attribute: Mean ft

Geo-located Wells



- Wells located by address
- Measured by driller
- If fit was perfect
  - Intercept = 0
  - Slope = 1
  - $R^2 = 1$
  - All points on the red line

Geo-located Wells

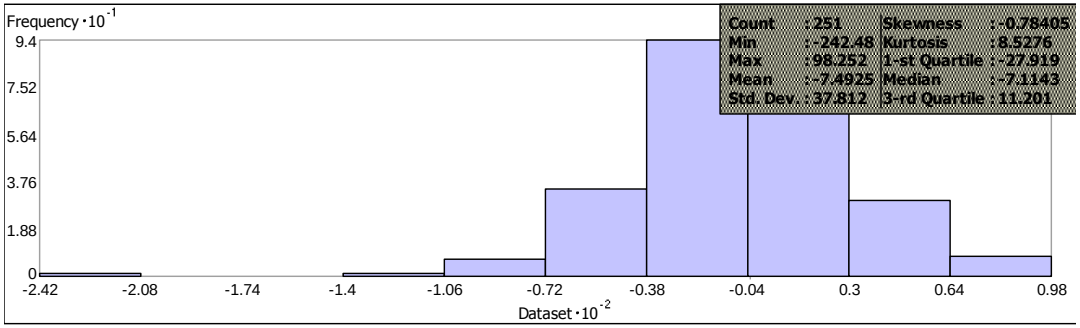


- Wells located by address
- Measured by driller

Geo-located Wells

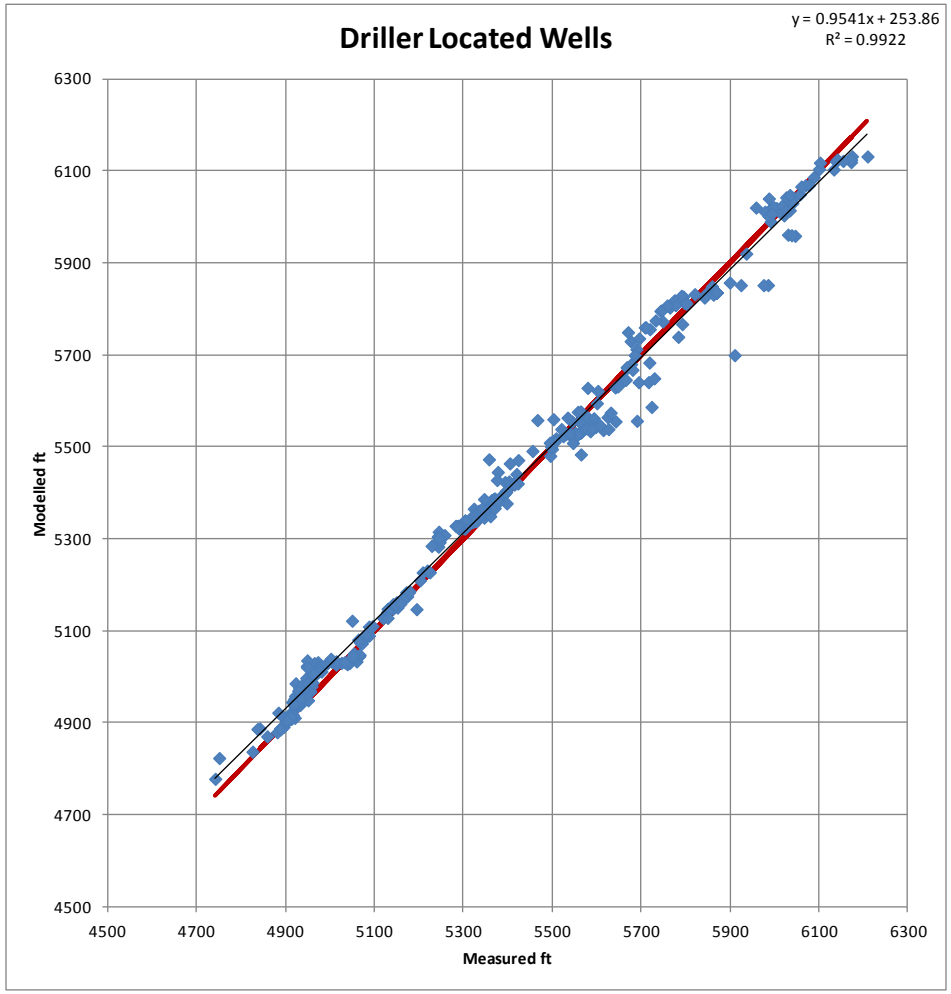
- Wells located by address
- Measured by driller

Histogram
Transformation: None



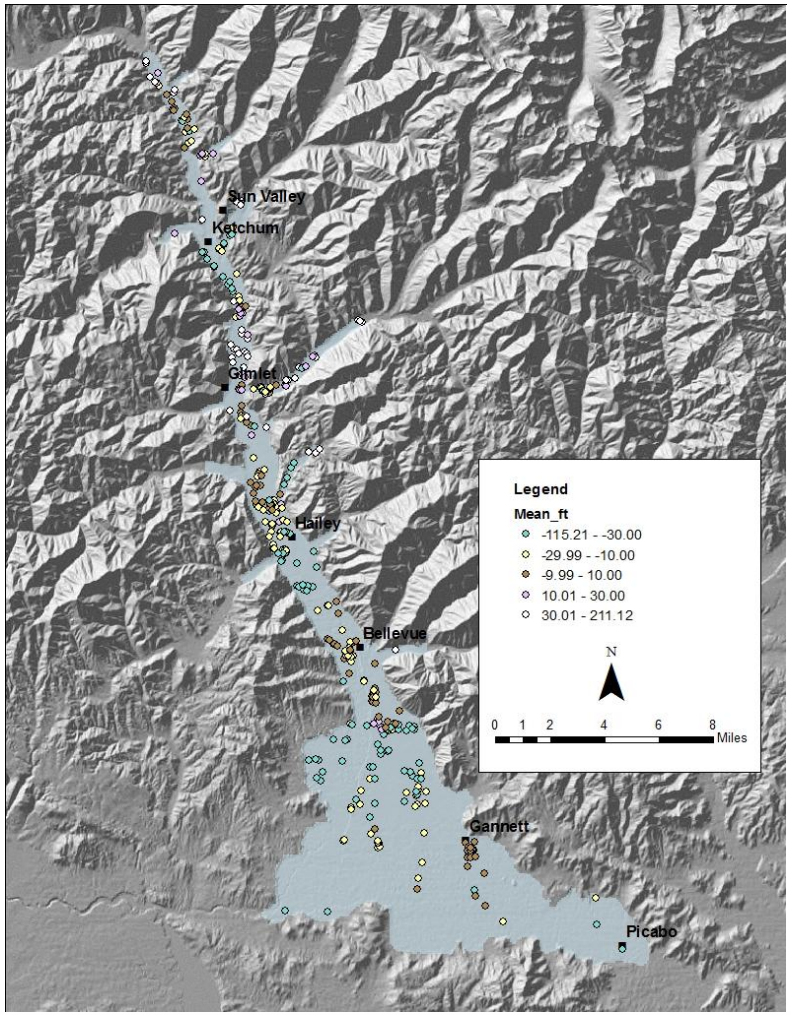
Dataset : GeoWell Attribute: Mean ft

Driller Wells



- Wells located by PLS
- Measured by driller
- If fit was perfect
  - Intercept = 0
  - Slope = 1
  - $R^2 = 1$
  - All points on the red line

Driller Wells

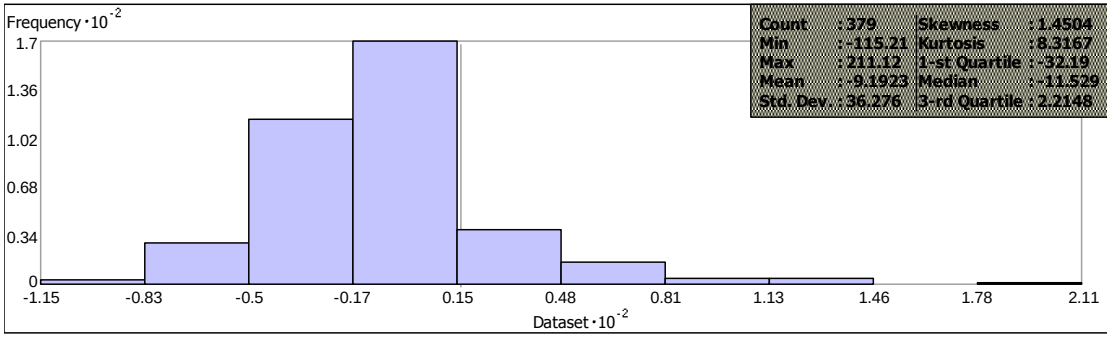


- Wells located by PLS
- Measured by driller

Driller Wells

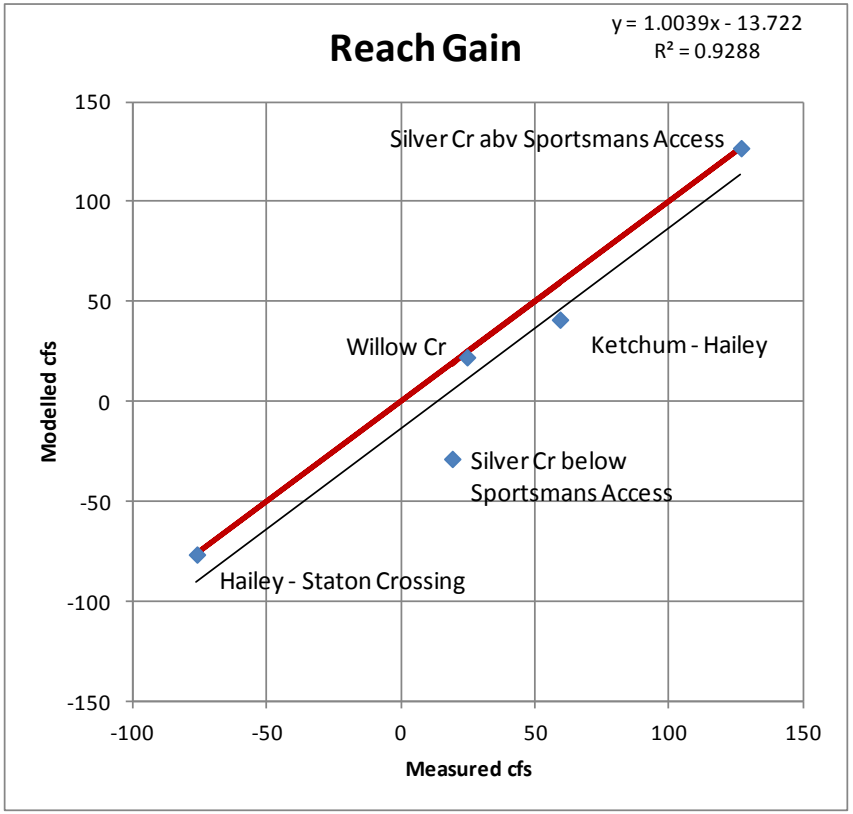
- Wells located by PLS
- Measured by driller

Histogram
Transformation: None



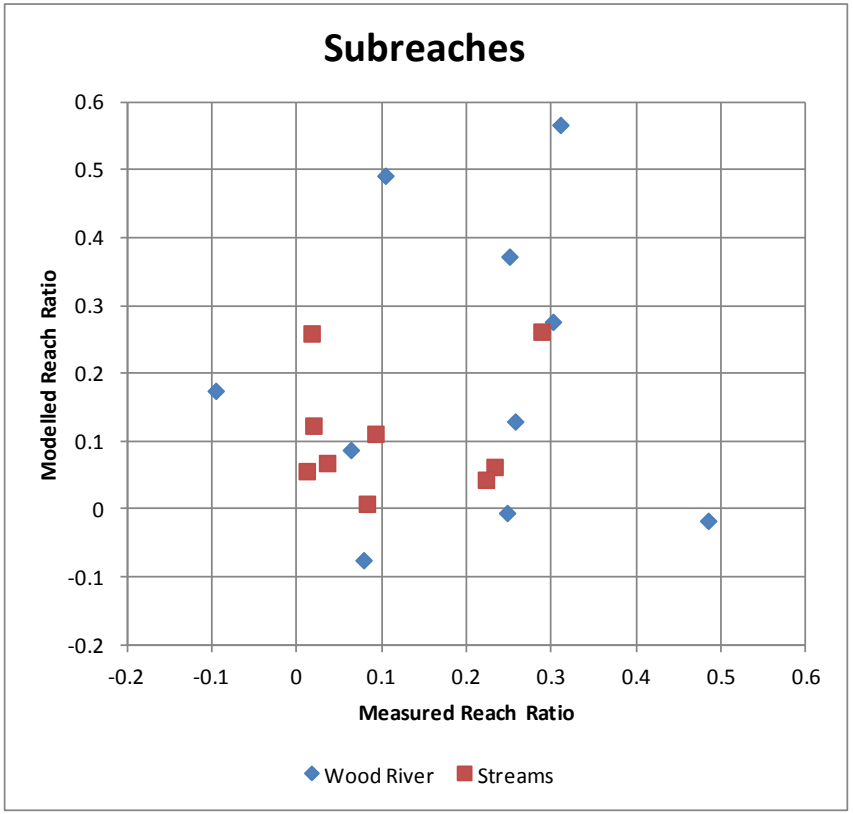
Dataset : DrlWell Attribute: Mean ft

River Gains and Losses



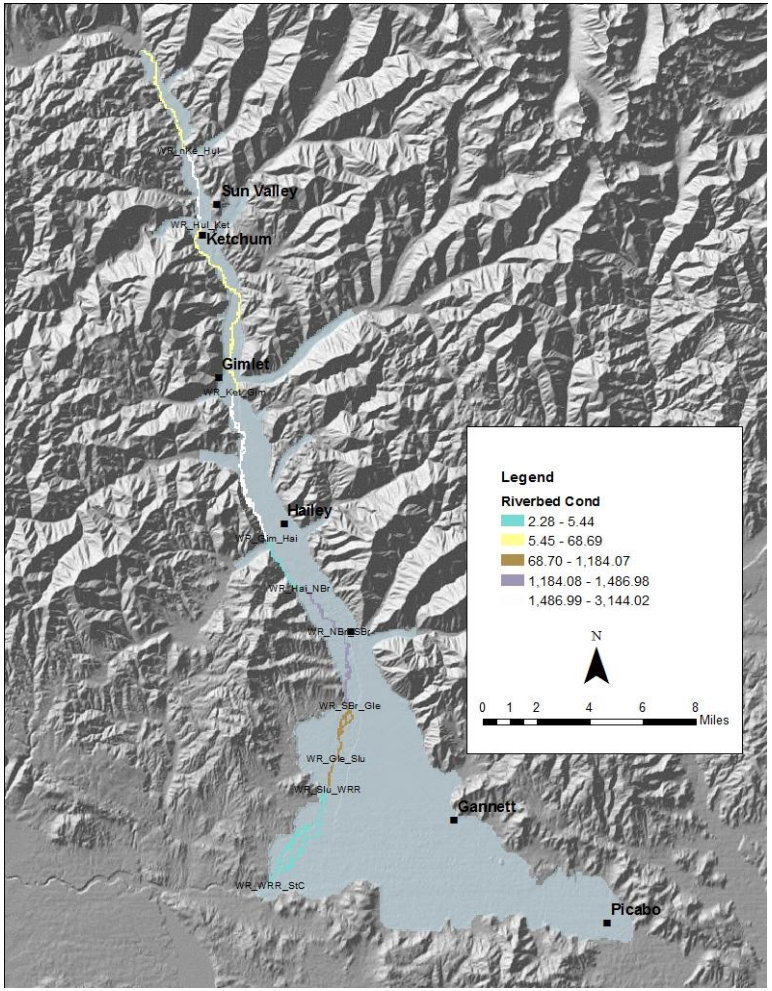
- Cross Plot
  - Plot of Modeled Vs Observed values
  - If model is perfict
    - Slope =1
    - Intercept = 0
    - $R^2 = 1$
    - All points on red line

Sub-reach Gains and Losses



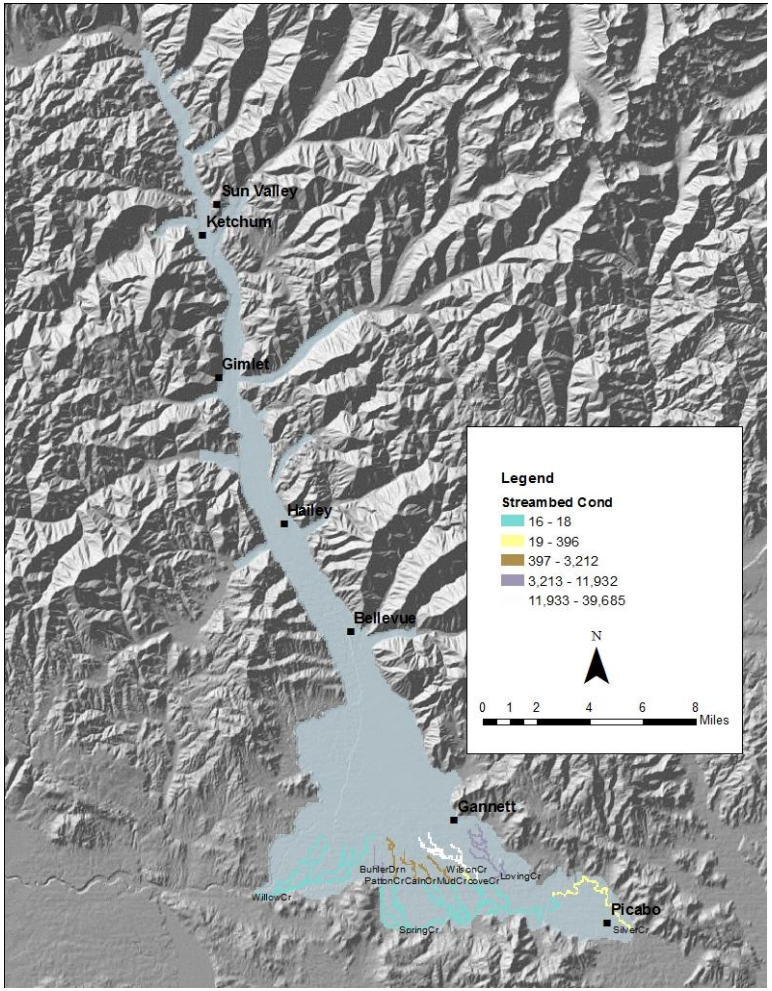
- Cross Plot
  - Plot of Modeled Vs Observed values
  - Blue = Wood River sub-reaches
  - Red = Silver Cr and Willow Cr sub-reaches
  - Ratios, not cfs gain
  - Seepage runs
    - Not annual average
    - May not be meaningful steady state target

Riverbed Conductance



- Riverbed conductance in M^2/d
- Wood River

Streambed Conductance

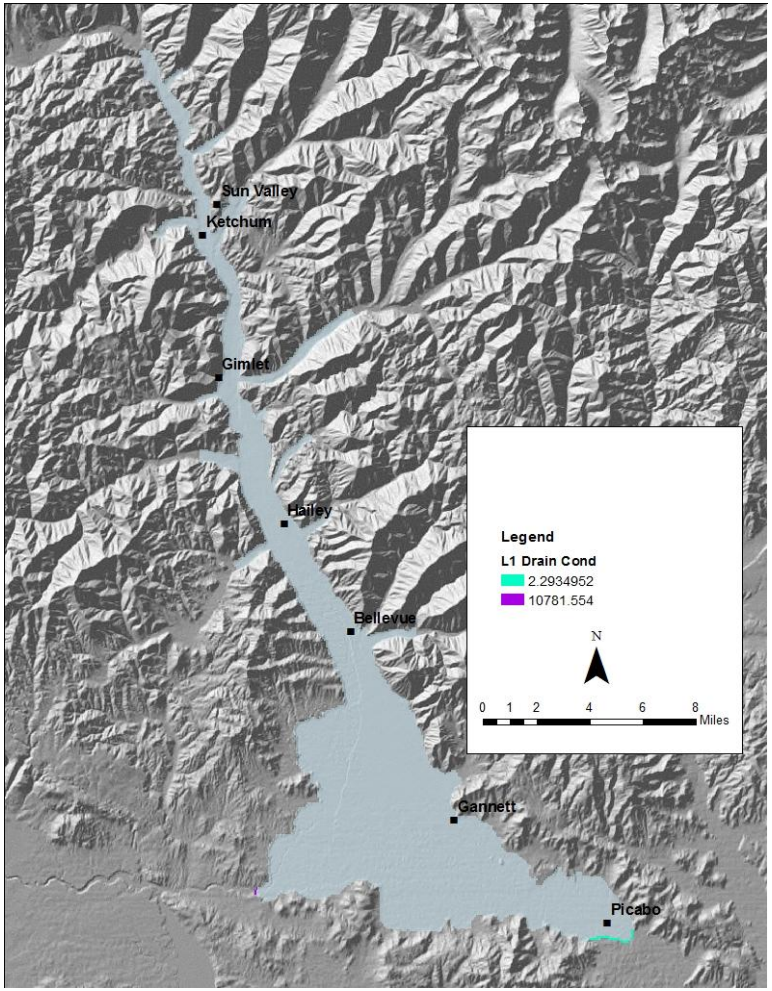


- Riverbed conductance in M^2/d
- Willow Cr, and Silver Cr

Subsurface Discharge From Model

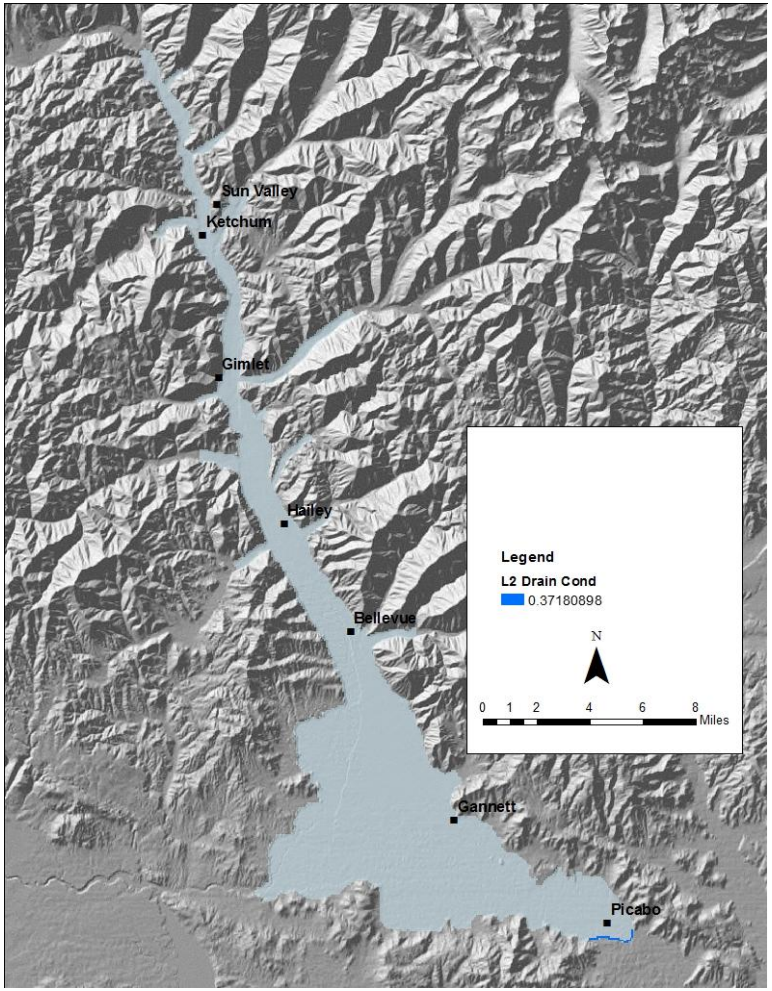
- Stanton Crossing
  - Estimated ~ Negligible – 300 ac-f/yr
    - 0 - 0.41 cfs
    - Modeled = 4.5 cfs
- Silver Cr underflow
  - Estimated ~ 4,000 – 53,000 ac-f/yr
    - 5.5 – 73 cfs
    - Modeled = 40 cfs

Drain Conductance



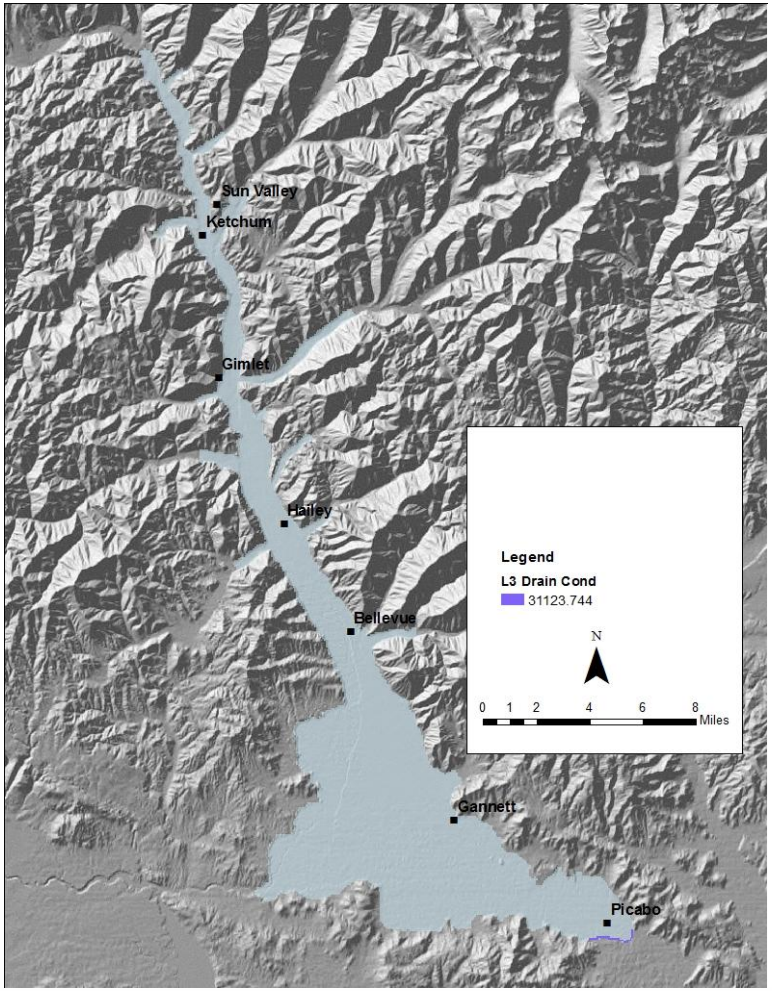
- Drain conductance in M^2/d
- Layer 1
  - Stanton Crossing
  - Silver Creek

Drain Conductance



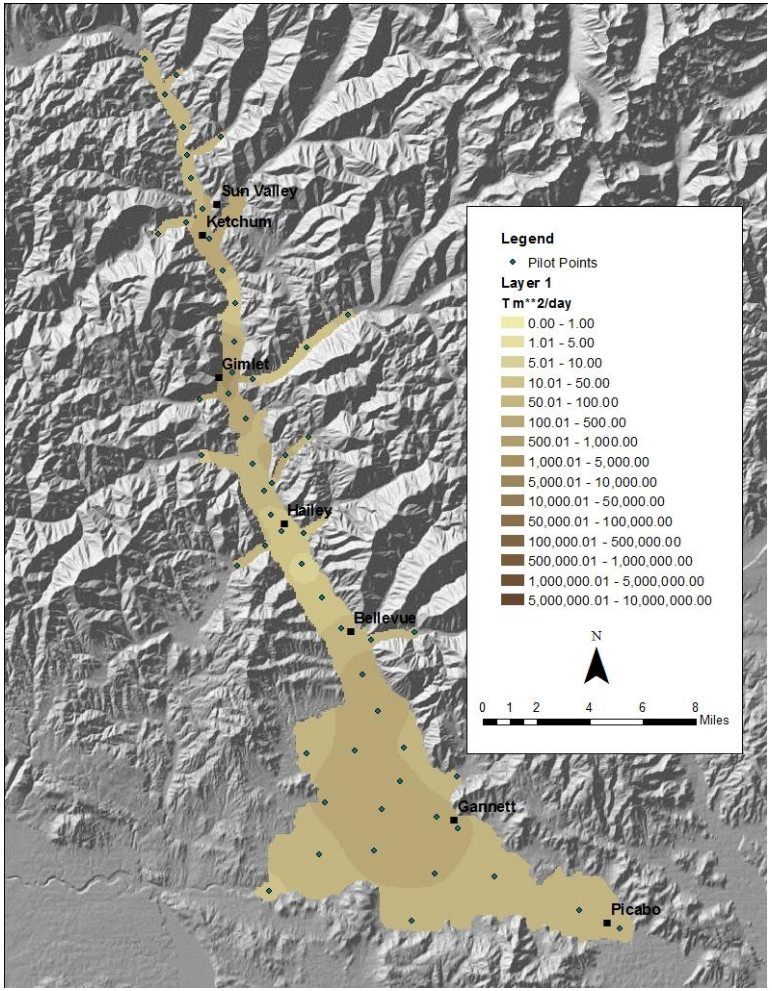
- Drain conductance in M^2/d
- Layer 2
  - Silver Creek

Drain Conductance



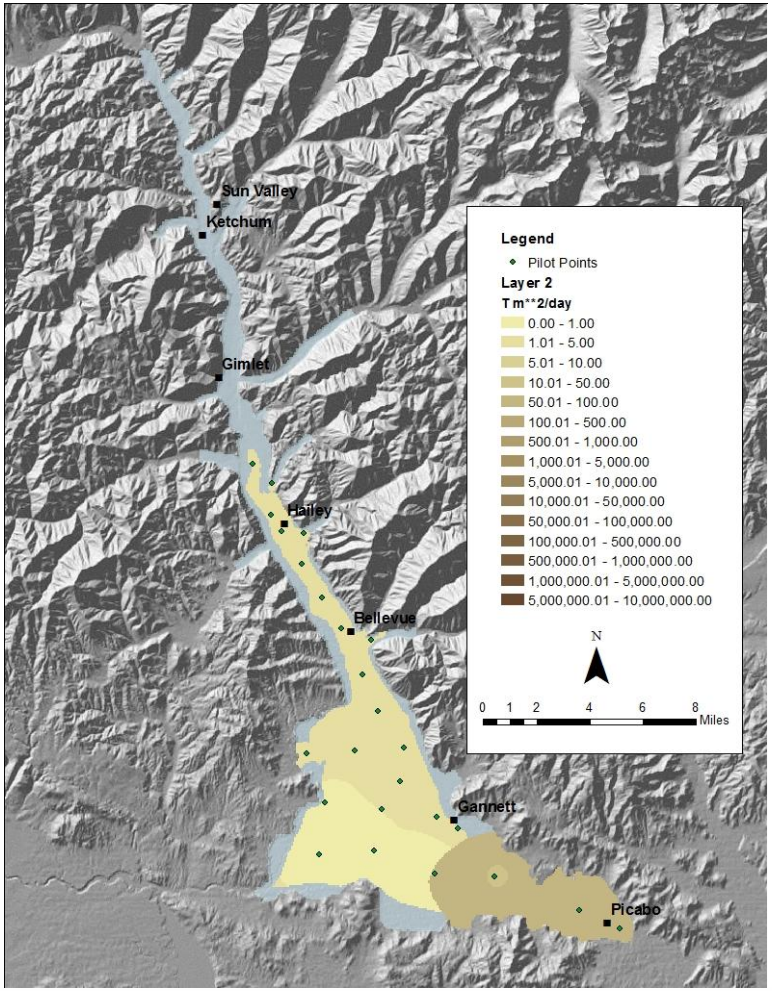
- Drain conductance in M^2/d
- Layer 3
  - Silver Creek

Layer 1 Transmissivity



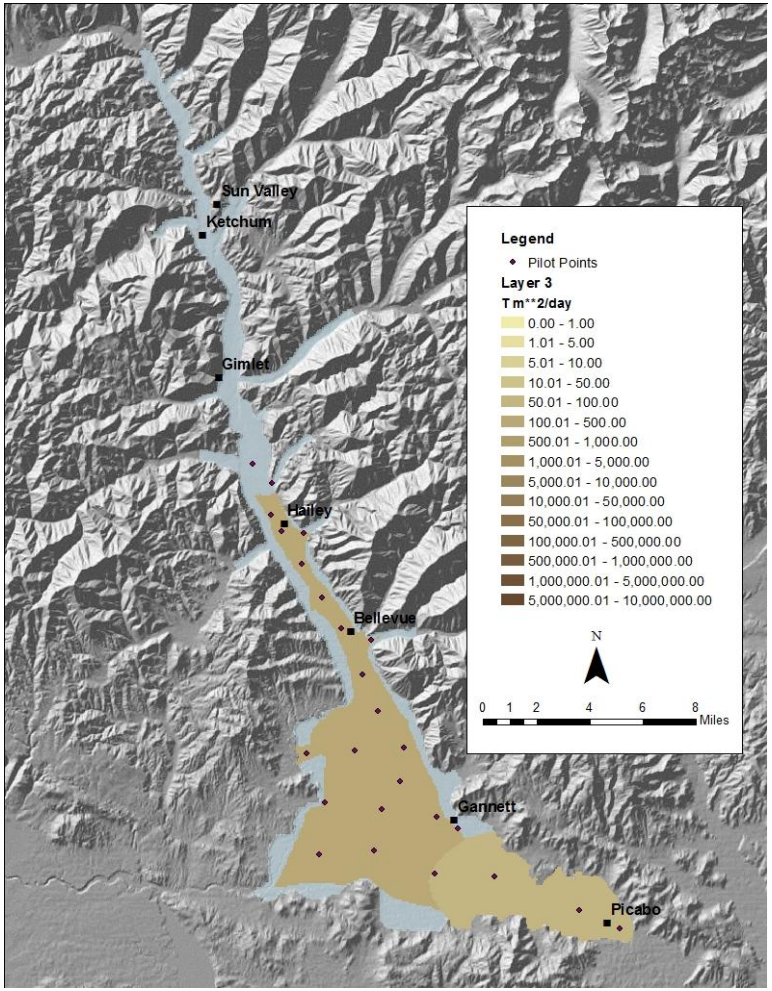
- Layer 1 temporarily modeled as non-time varying transmissivity
- Pilot points can be moved
- Number of pilot points not fixed

Layer 2 Transmissivity



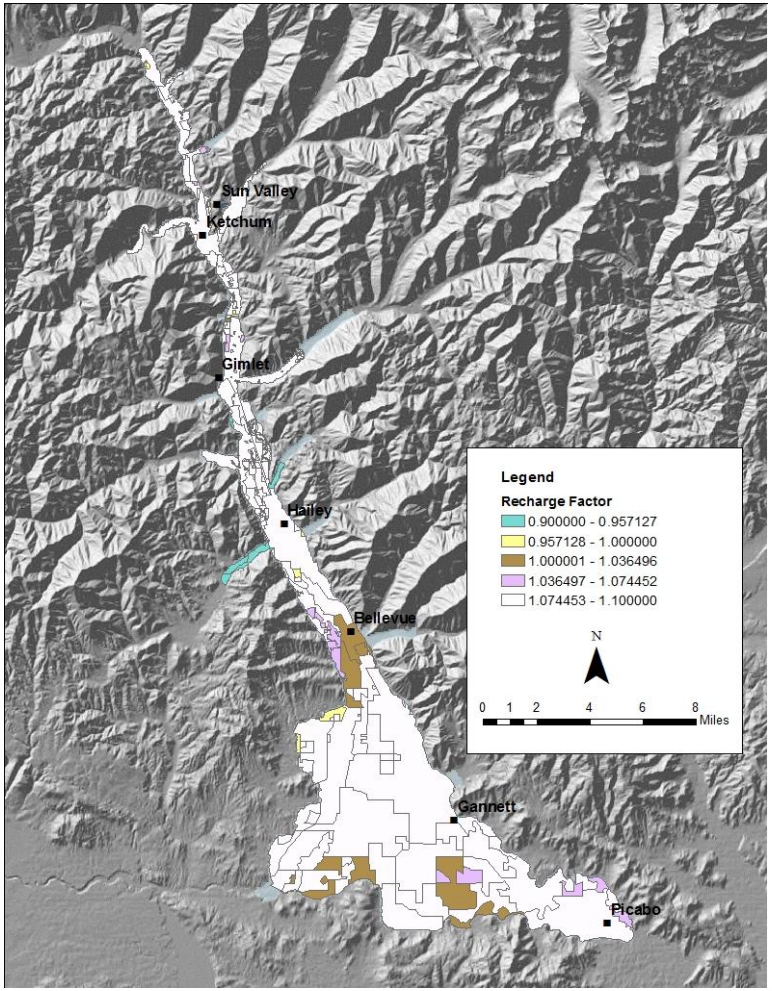
- Layer 2 modeled as transmissivity
- Includes basalt in east
- Includes confining layer
- Pilot points can be moved
- Number of pilot points can be changed

Layer 3 Transmissivity



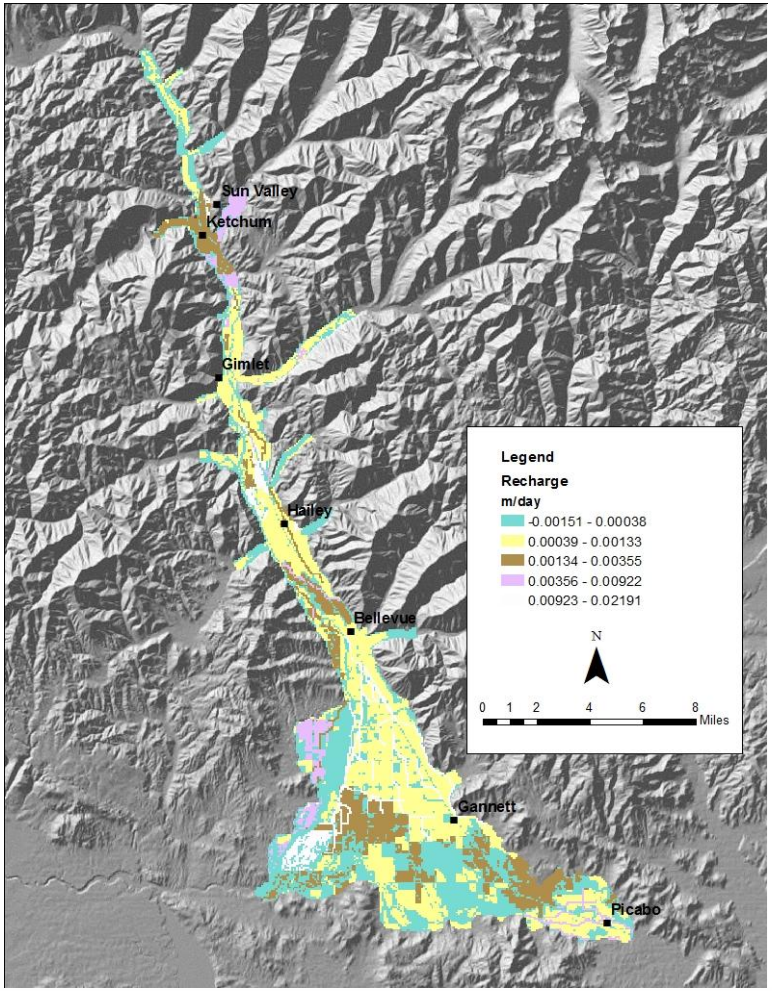
- Layer 3 modeled as transmissivity
- Includes basalt in east
- Pilot points can be moved
- Number of pilot points can be changed

Recharge Factors



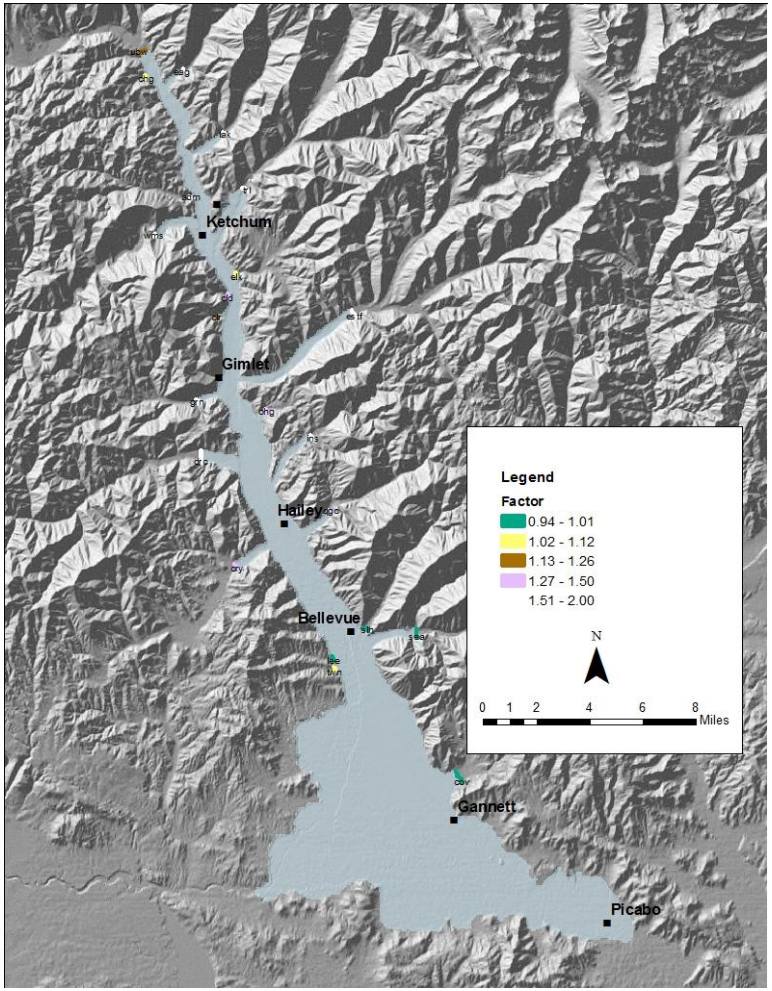
- Recharge array adjusted by multiplying starting array by an array of scalars

Recharge Array



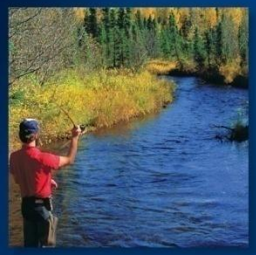
- Recharge array adjusted by multiplying starting array by an array of scalars

Tributary Underflow



- Trib underflow adjusted using adjustment factors

IDAHO Department of Water Resources



End