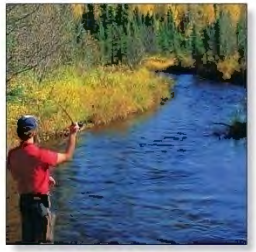
Preliminary Calibration Run

Presented by Allan Wylie, IDWR

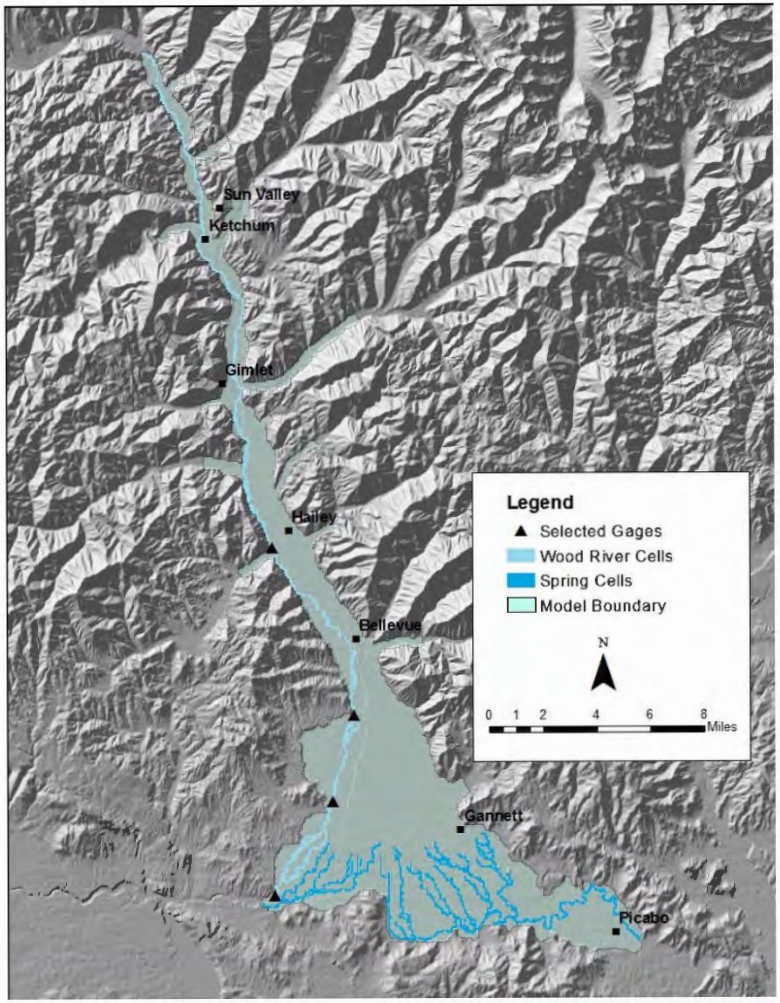
November 15, 2017

Reminders and Changes

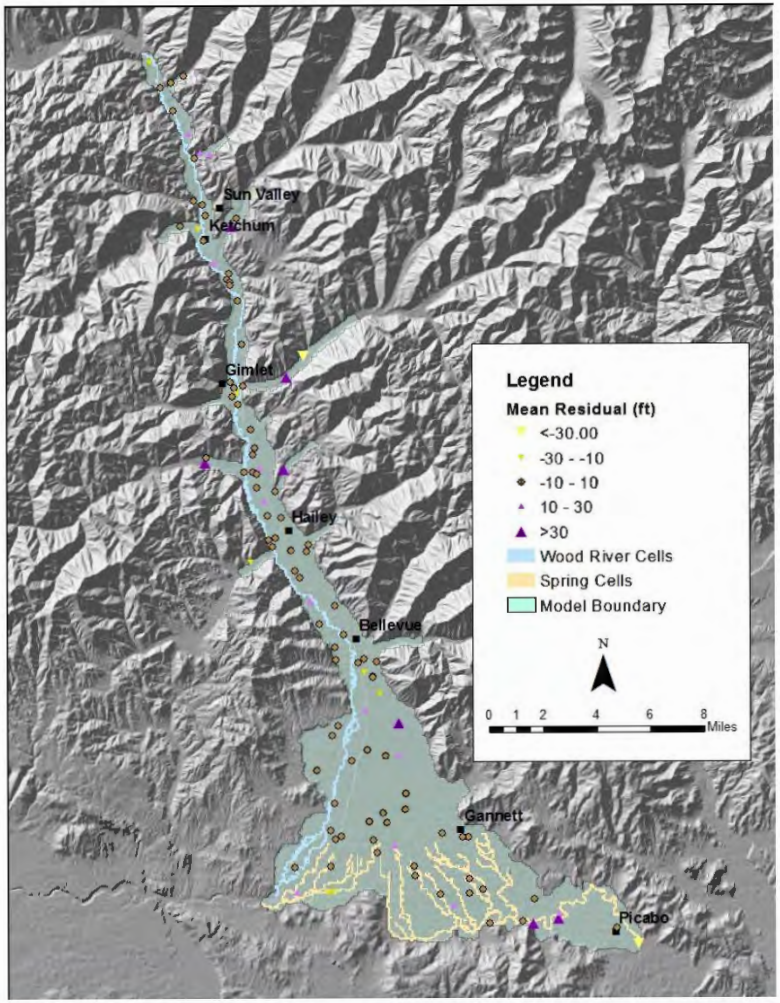
- Set maximum tributary underflow to 20% of average annual precipitation within the basin
- Set kriging limit for Sy to between 0.10 to 0.30
- Added geo located wells
  - We believe geo located well are more accurately placed
- Fix stage at Wood River Ranch and at Glendale Bridge at DEM elevation
- Added 2011-2014
  - Includes dates for seepage runs
  - Includes 2012 mass measurement
  - Includes transducer data in several wells
  - Includes USGS gages on tribs

Changes in River file



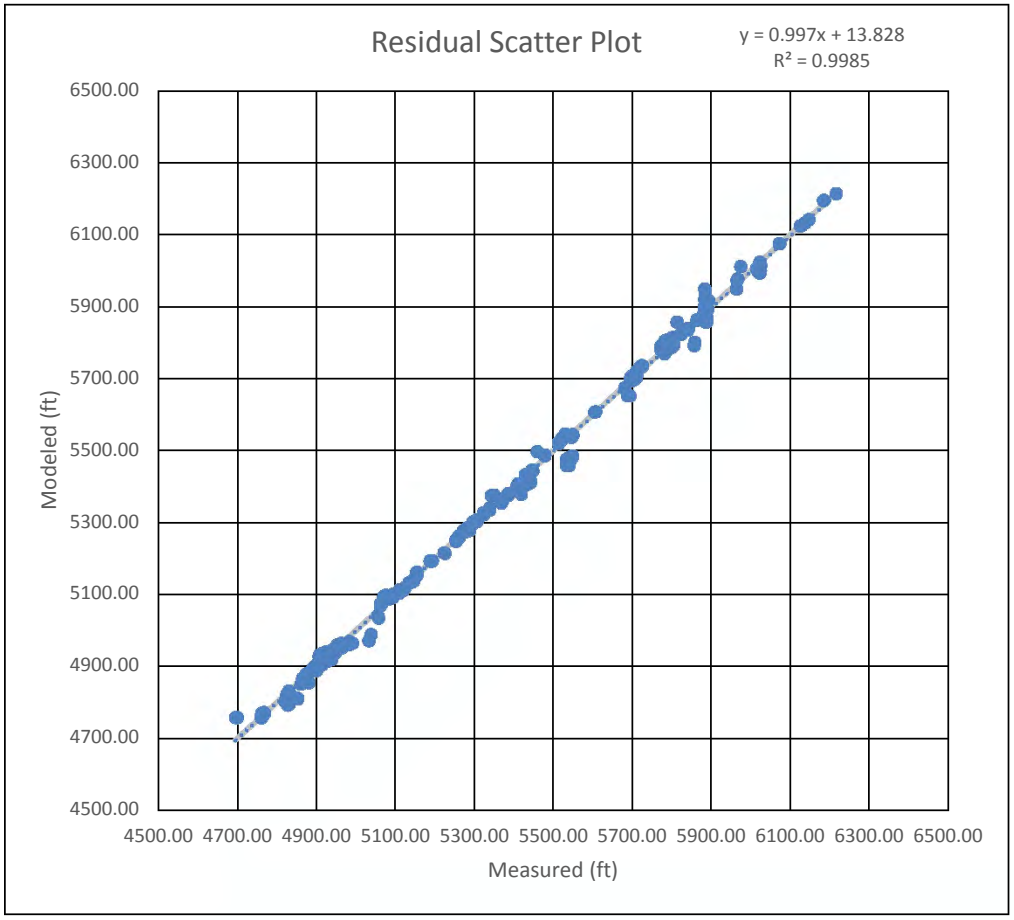
- Fix stage at Glendale Bridge at DEM elevation
  - Interpolate stage between Hailey and Glendale
- Fix stage at Wood River Ranch at DEM elevation
  - Interpolate stage between Wood River Ranch and Stanton Crossing
- Stage between Glendale and Wood River Ranch is at DEM elevation or dry depending on season

Observation Wells



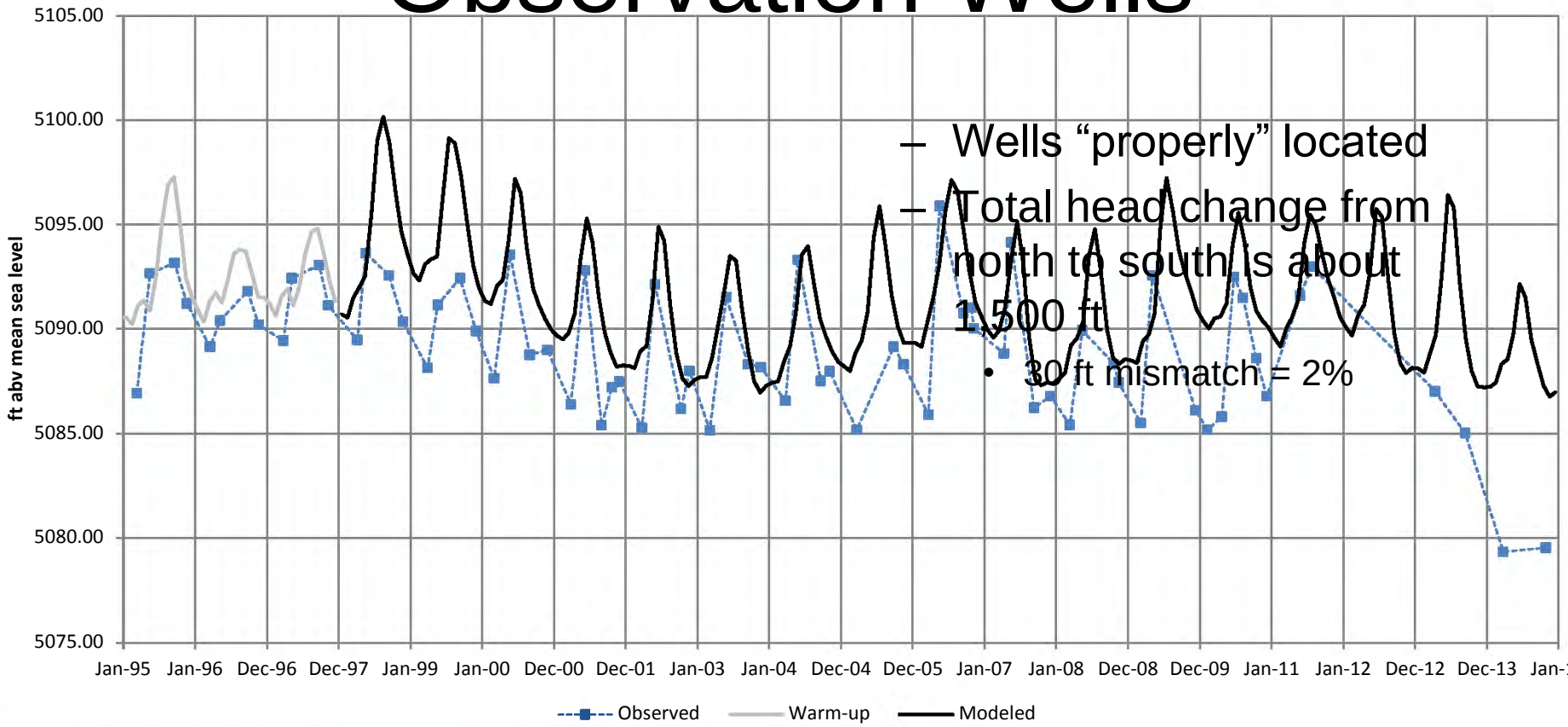
- Total head change from north to south is about 1,500 ft
  - 30 ft mismatch = 2%

Observation Wells



- If fit was perfect
  - Intercept = 0
  - Slope = 1
  - $R^2 = 1$
  - All points on the red line

Observation Wells



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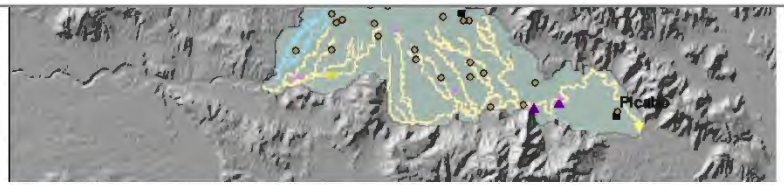

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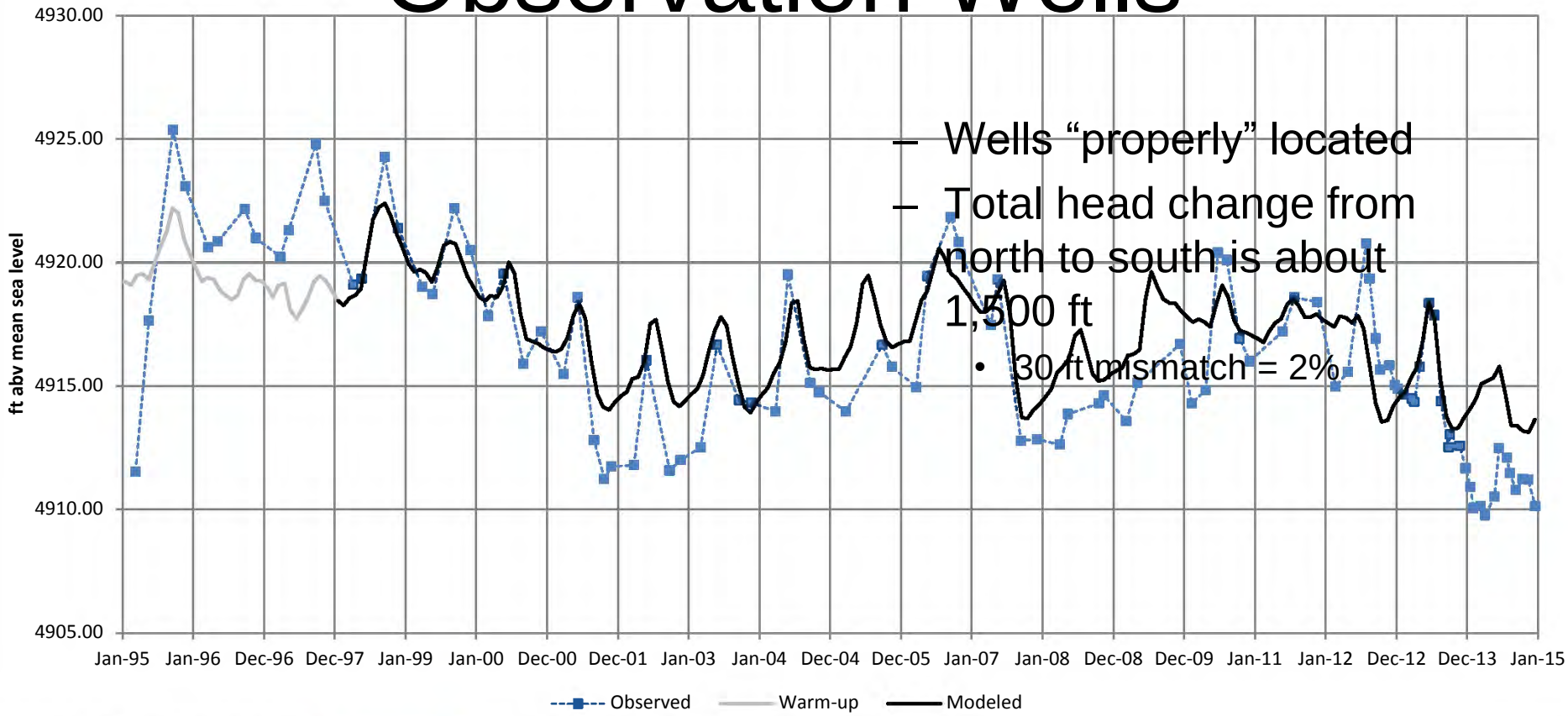

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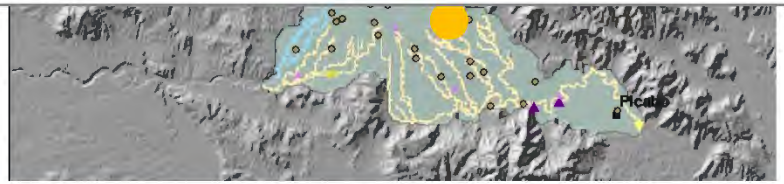

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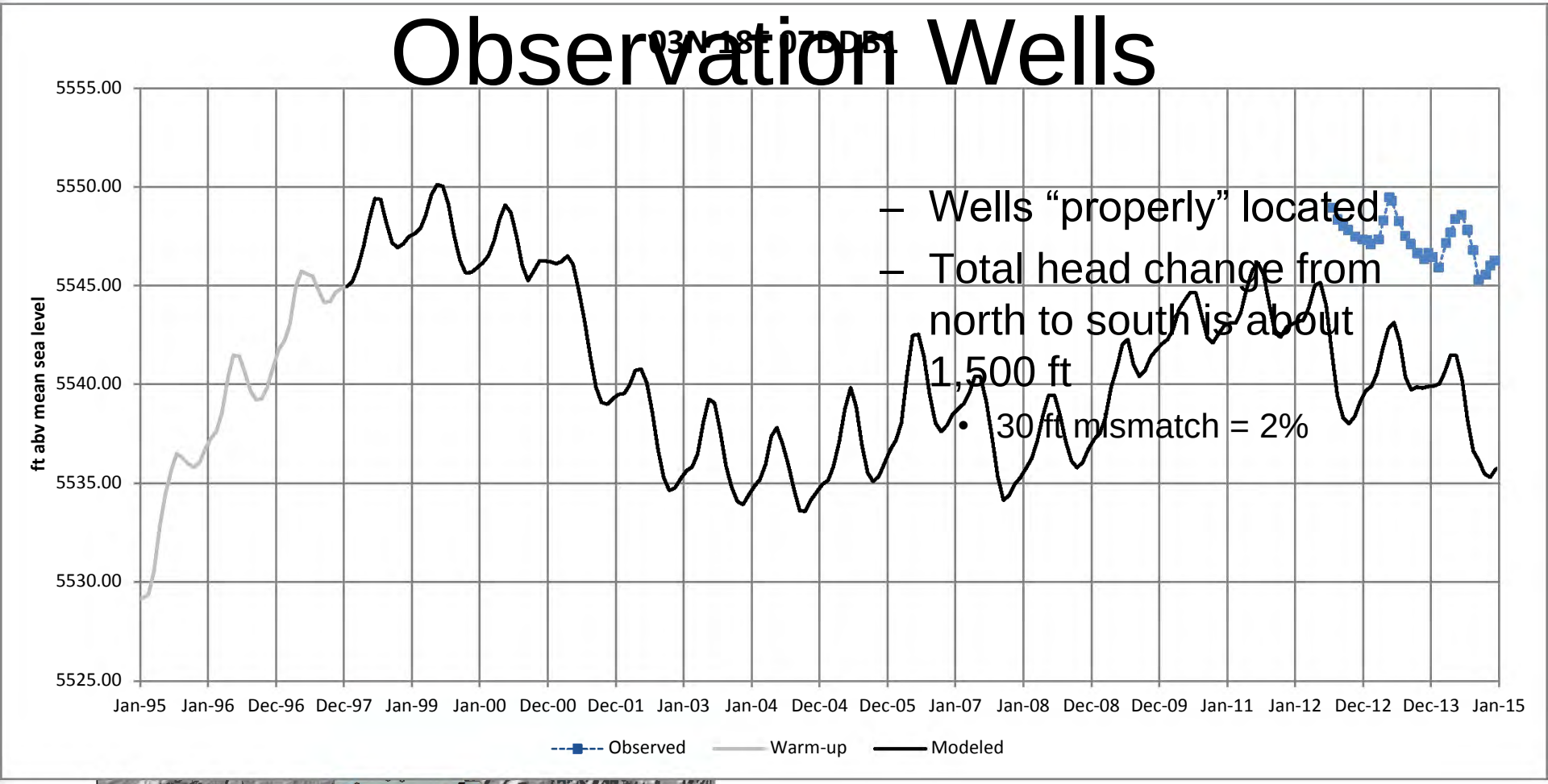

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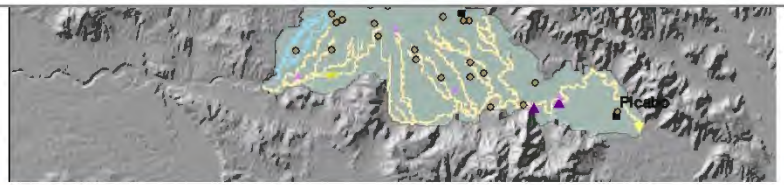

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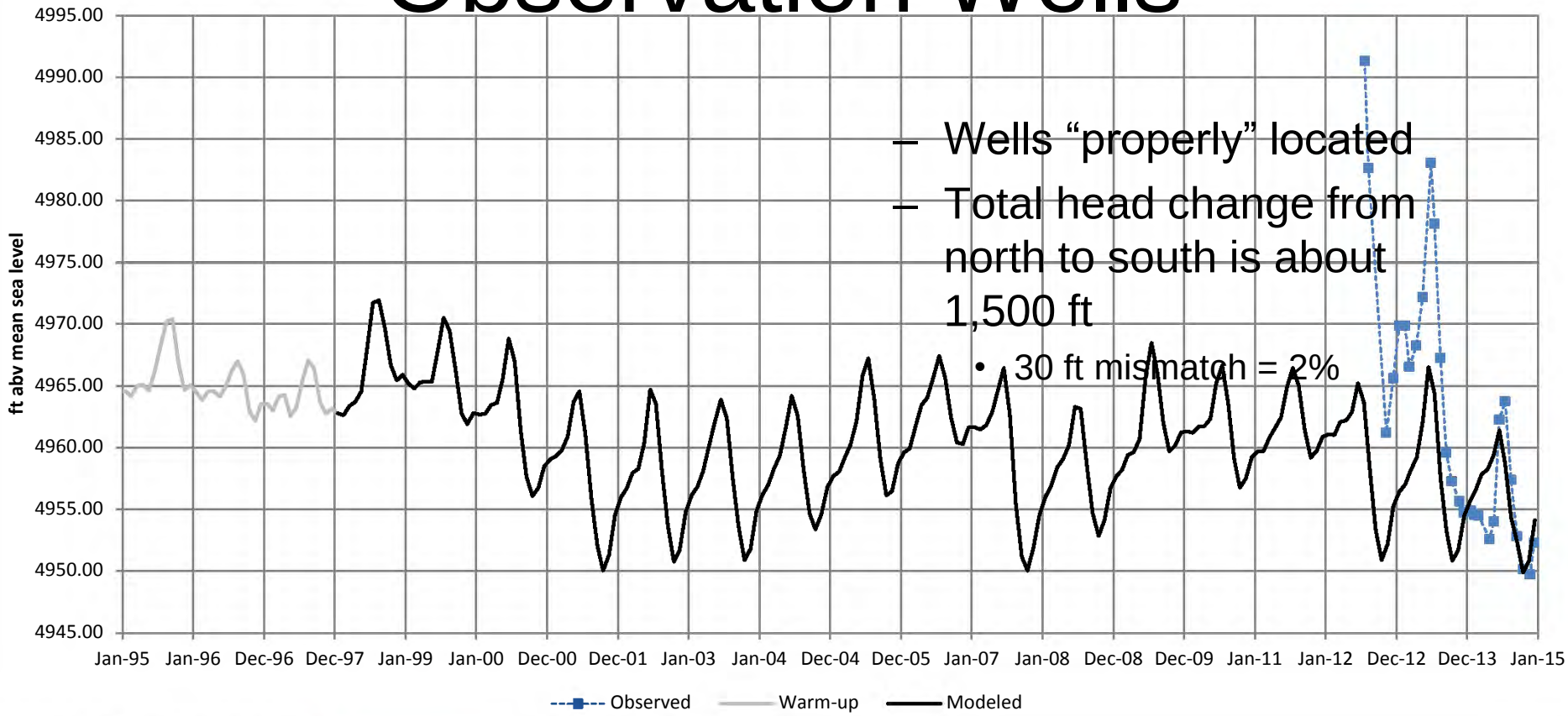

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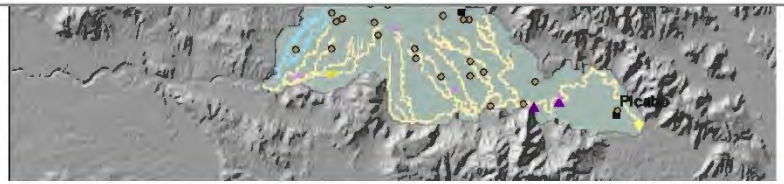

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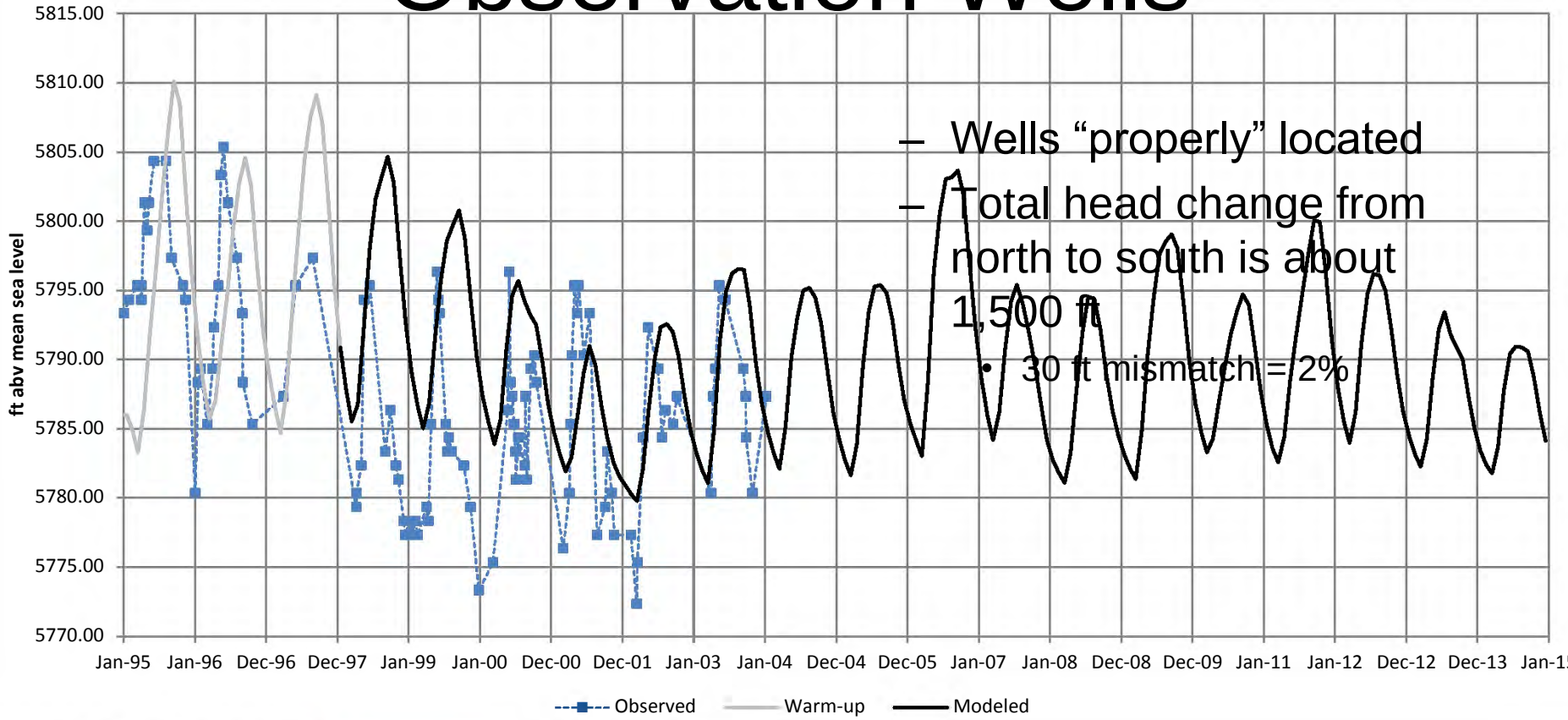

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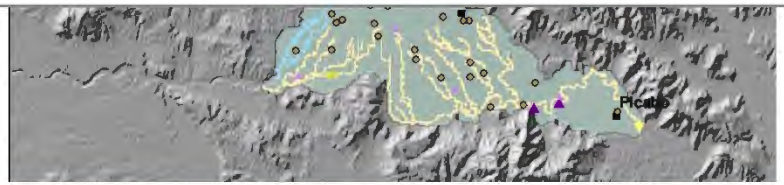

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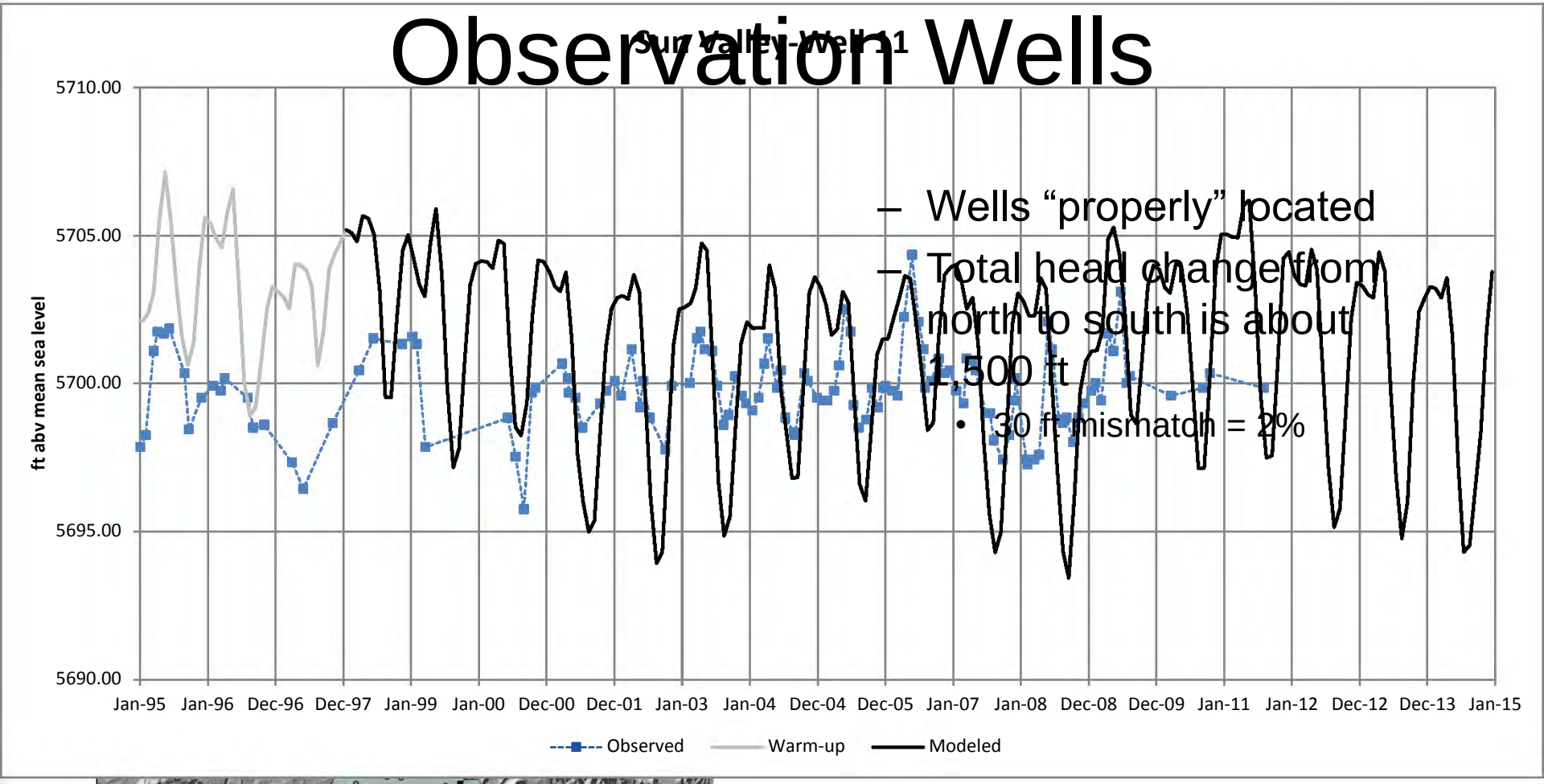

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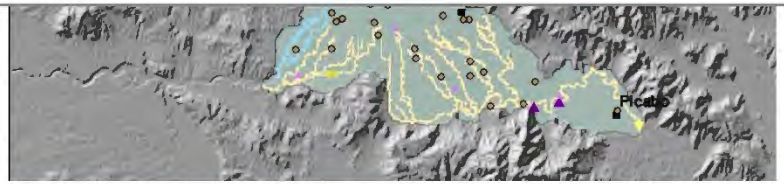

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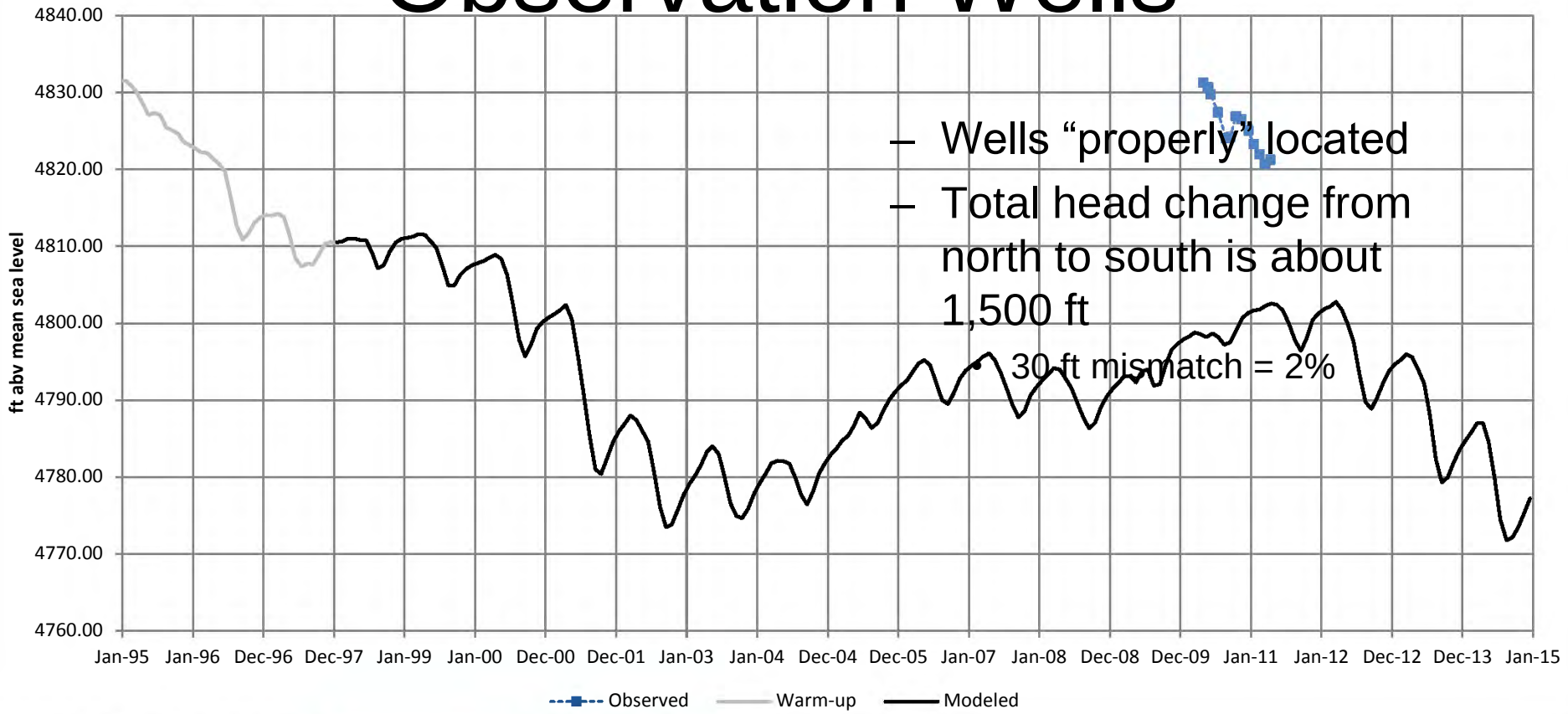

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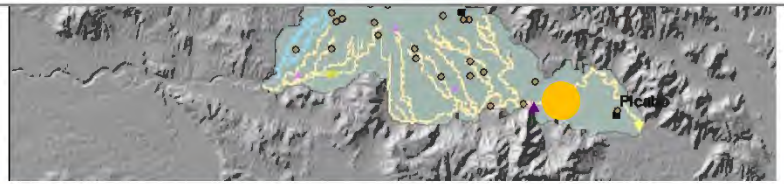

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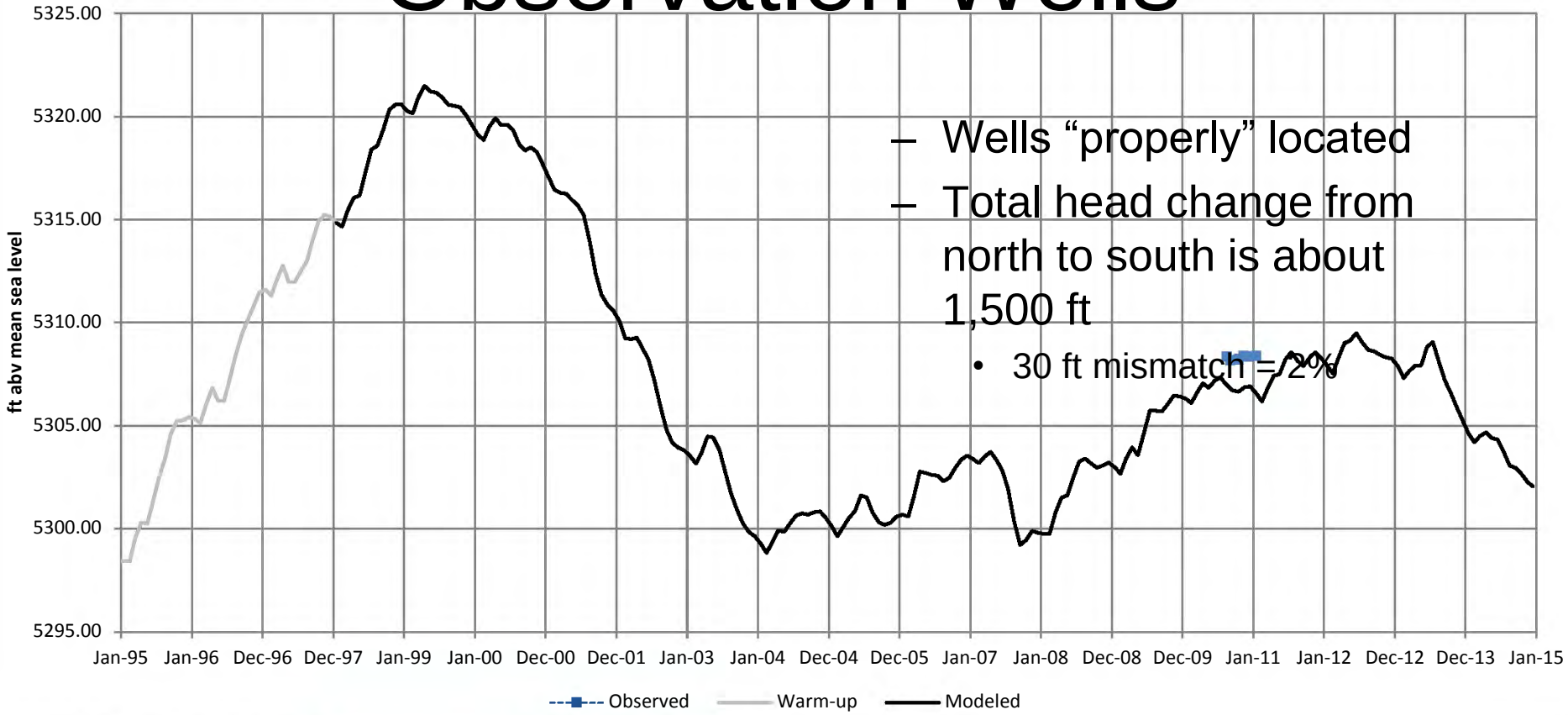

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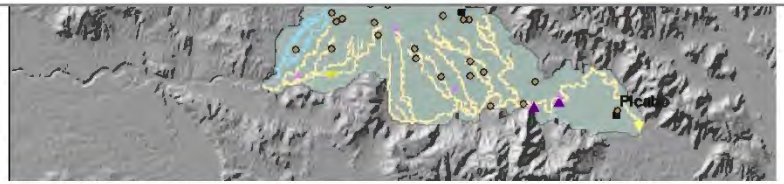
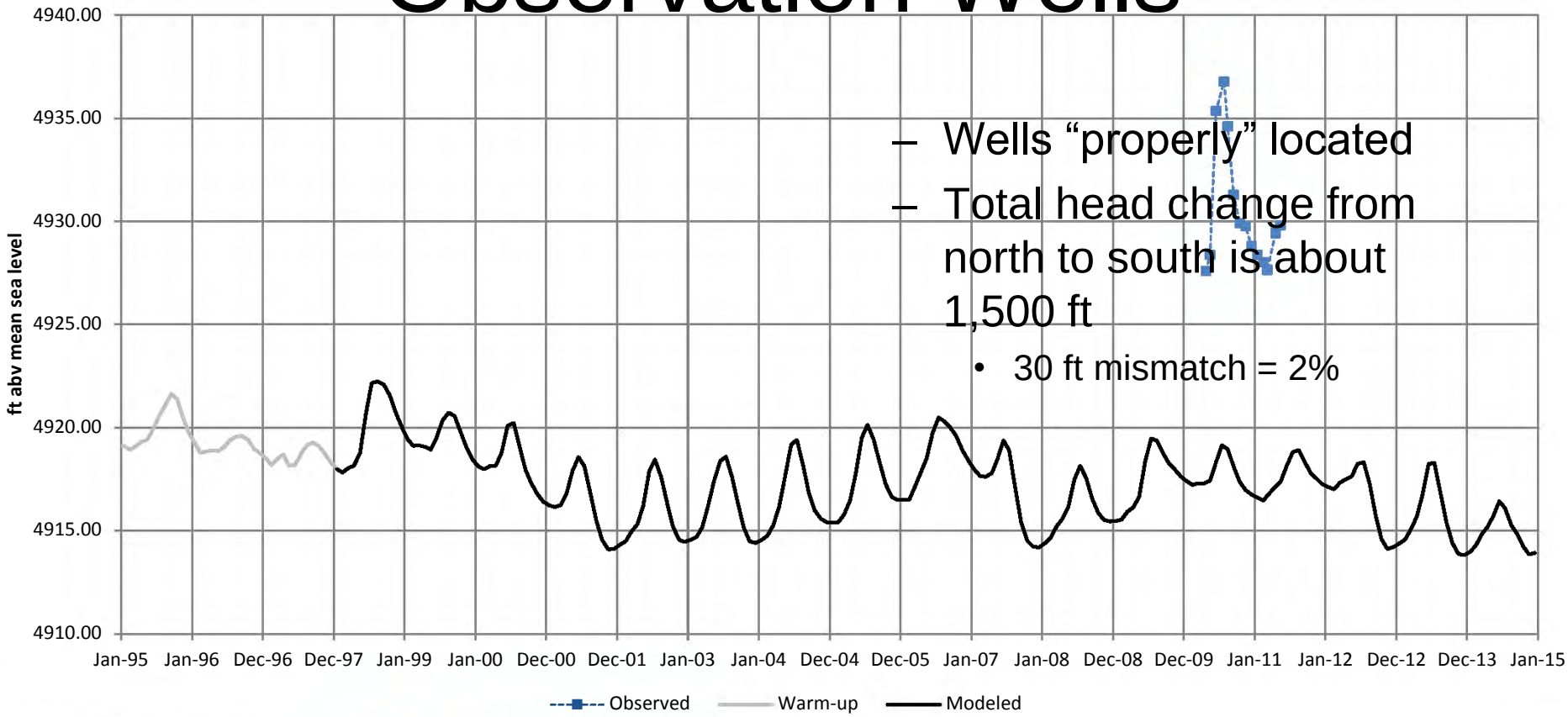


Observation Wells 7706



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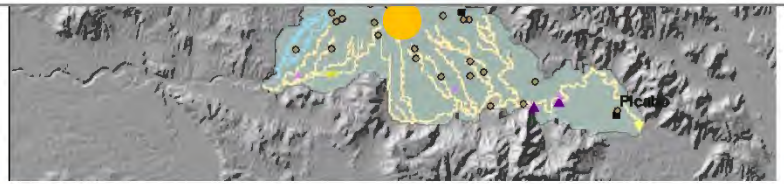
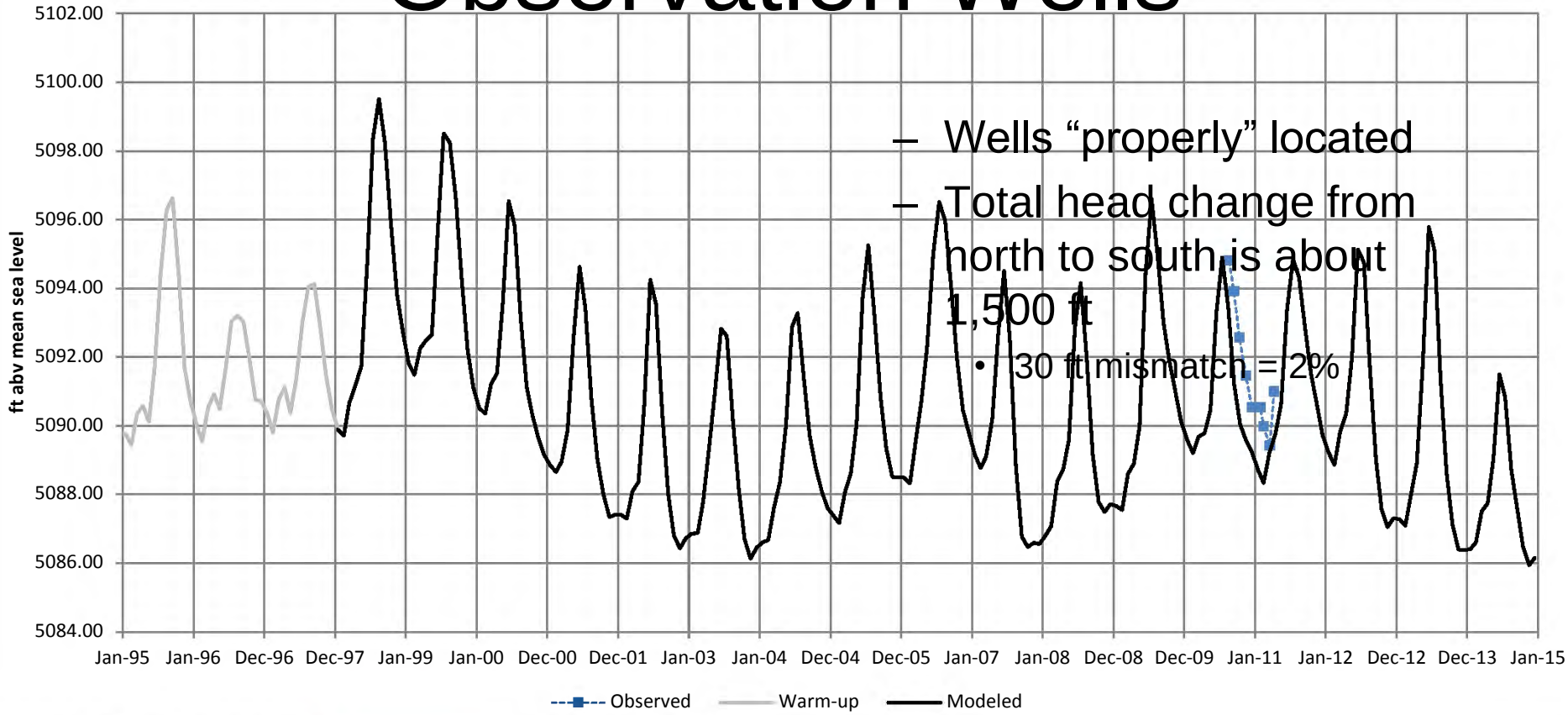


Observation Wells 7108



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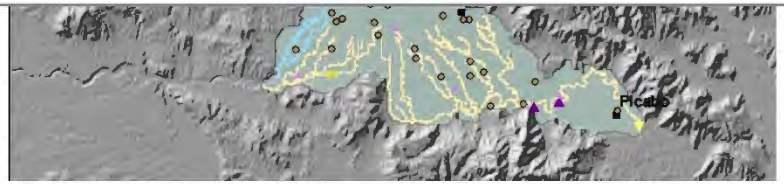
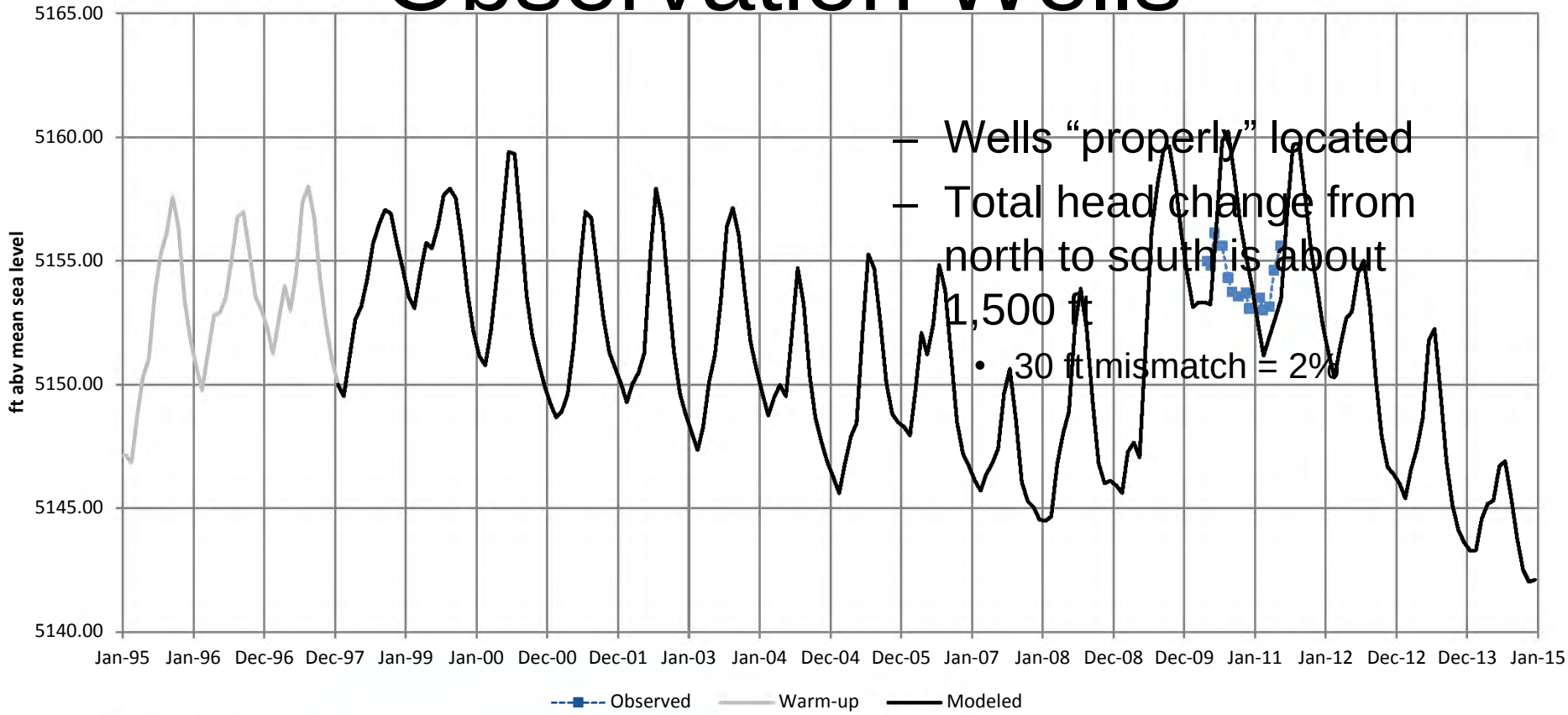


Observation Wells 7/10



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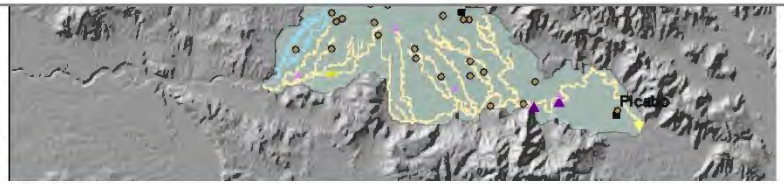
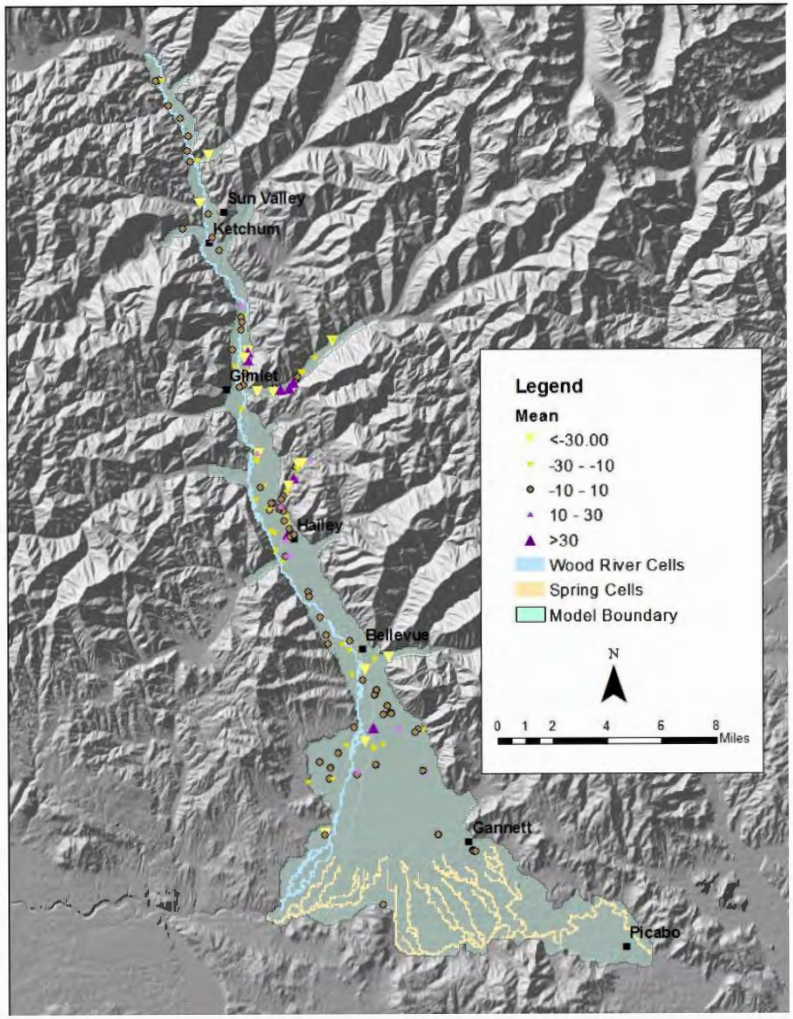
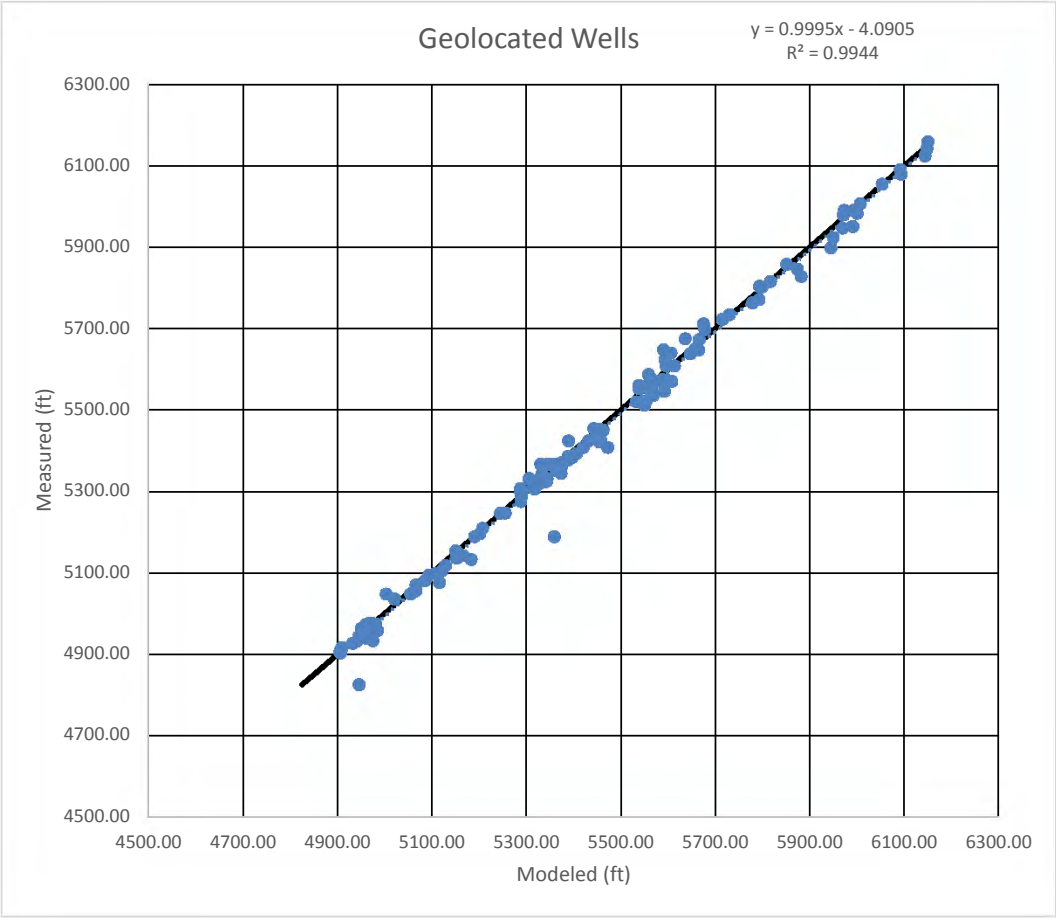


Geolocated Driller Wells



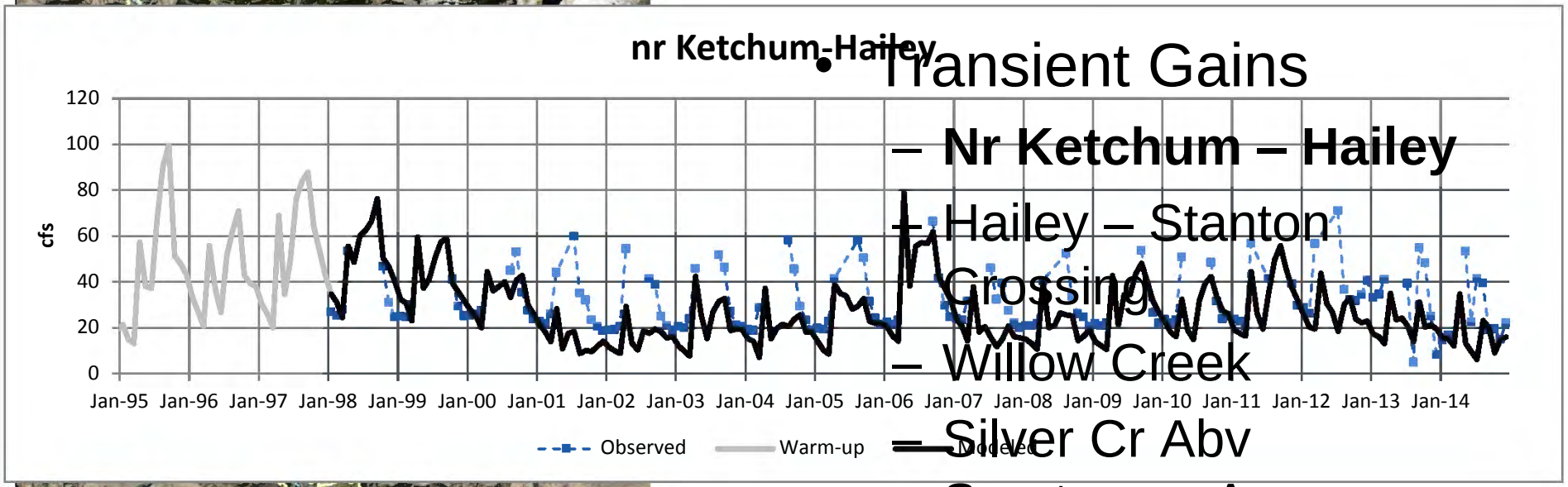
– Measured by driller

Geolocated Driller Wells



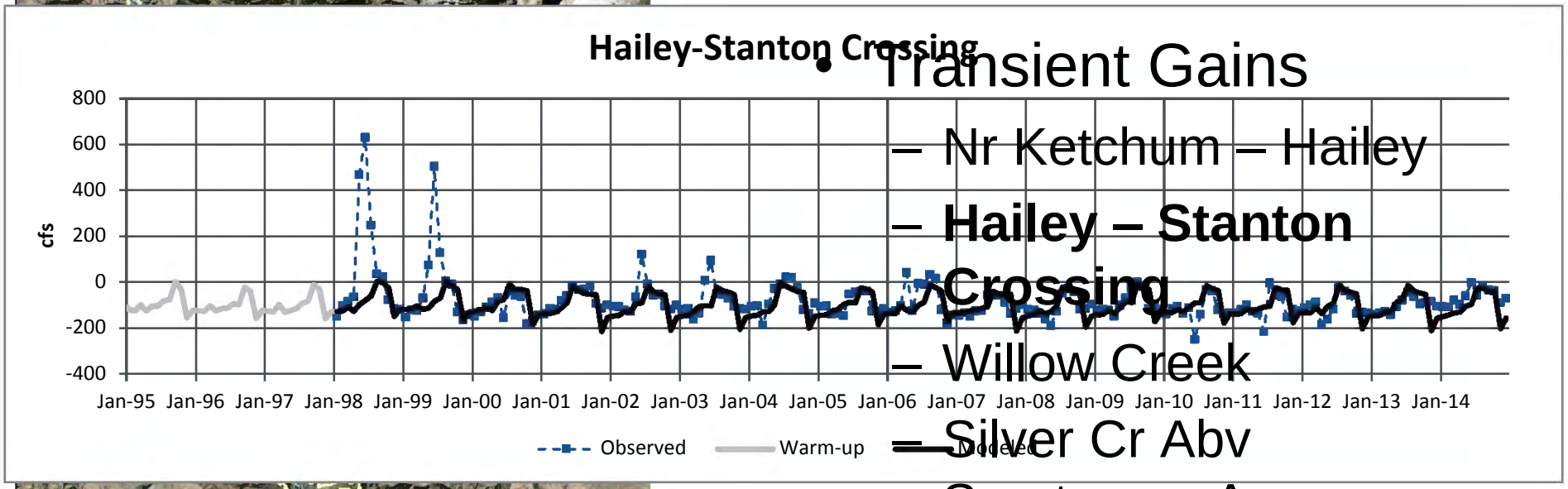
- Wells located by address
- Measured by driller
- If fit was perfect
  - Intercept = 0
  - Slope = 1
  - $R^2 = 1$
  - All points on the red line

River Gains and Losses



- Transient Gains
  - **Nr Ketchum – Hailey**
  - Hailey – Stanton Crossing
  - Willow Creek
  - Silver Cr Abv Sportsman Access
  - Silver Cr Blw Sportsman Access

River Gains and Losses



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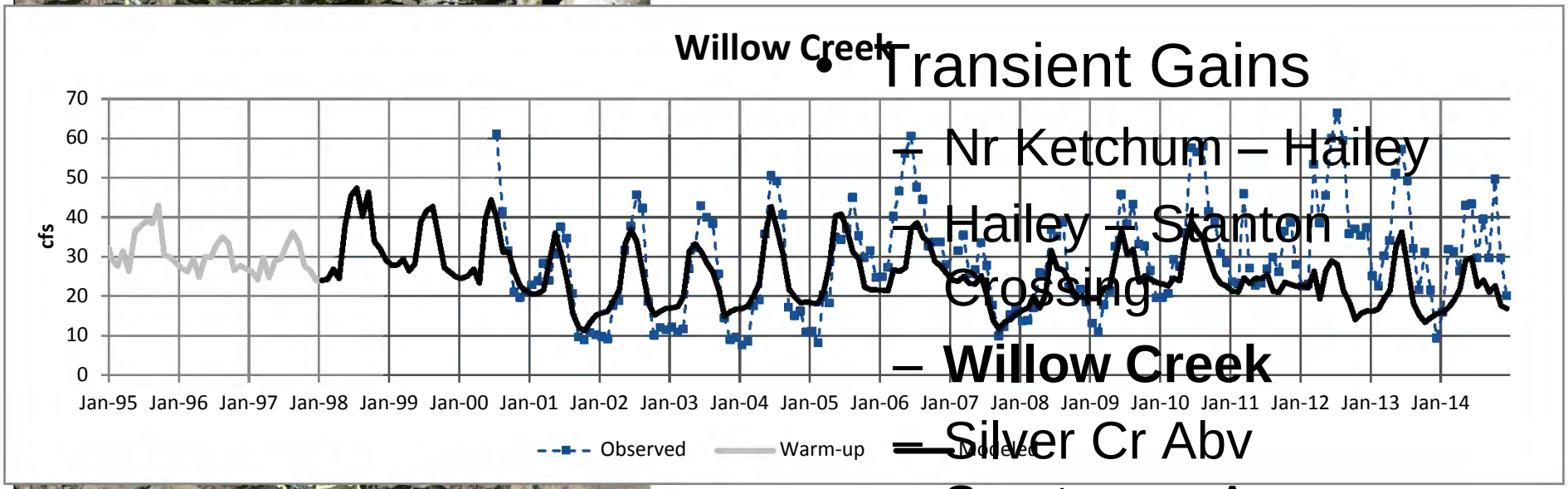
River Gains and Losses



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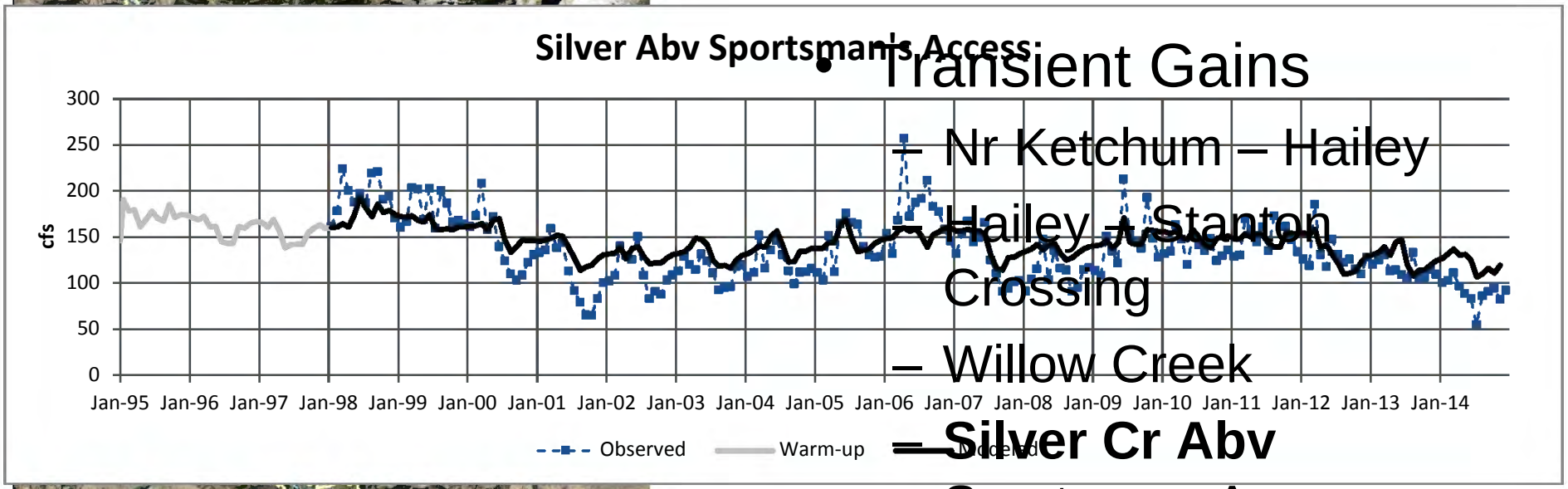
River Gains and Losses



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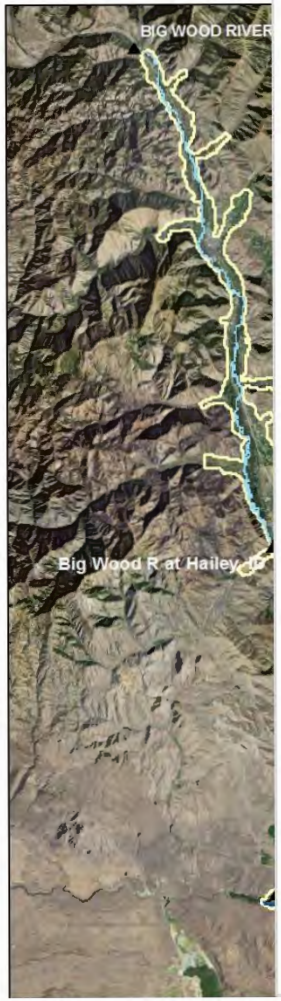
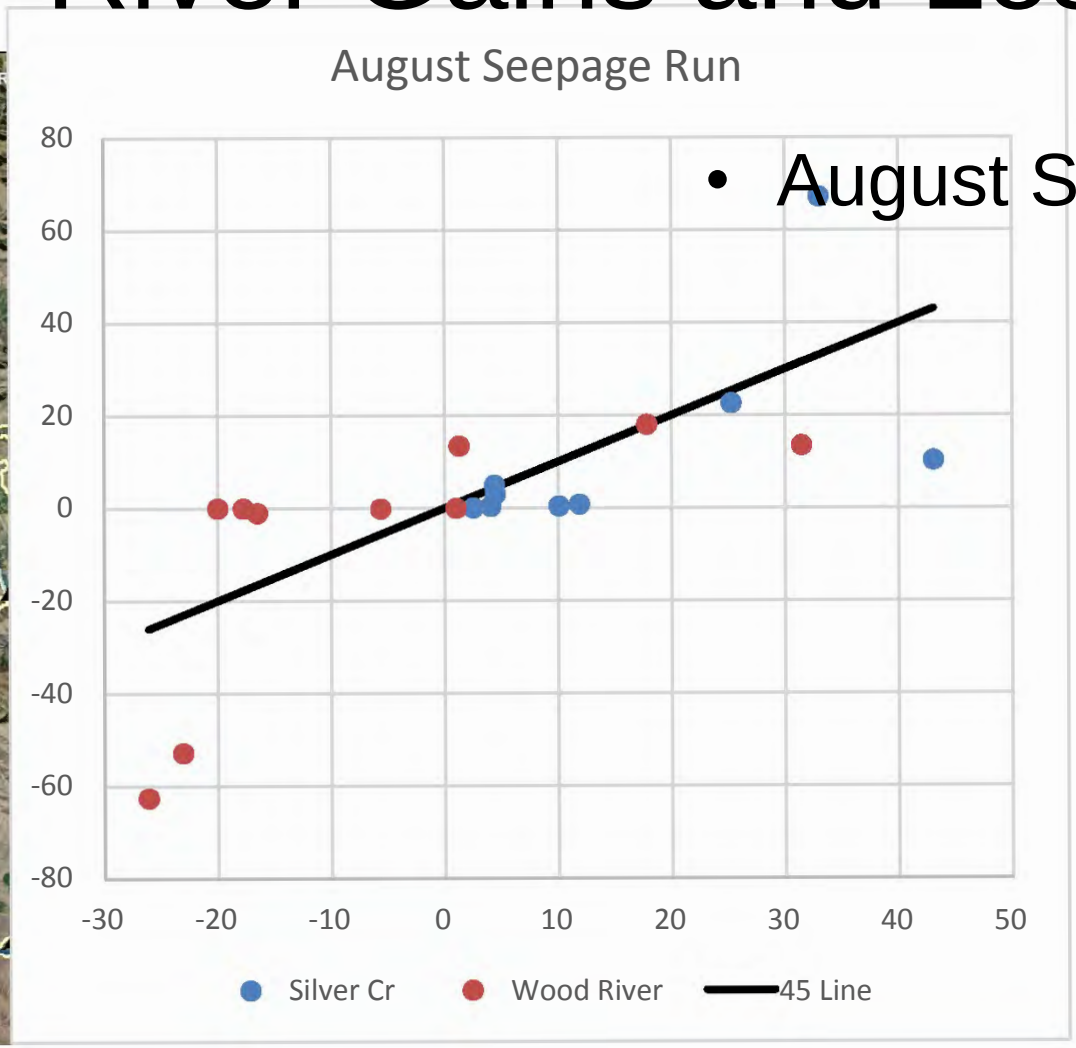
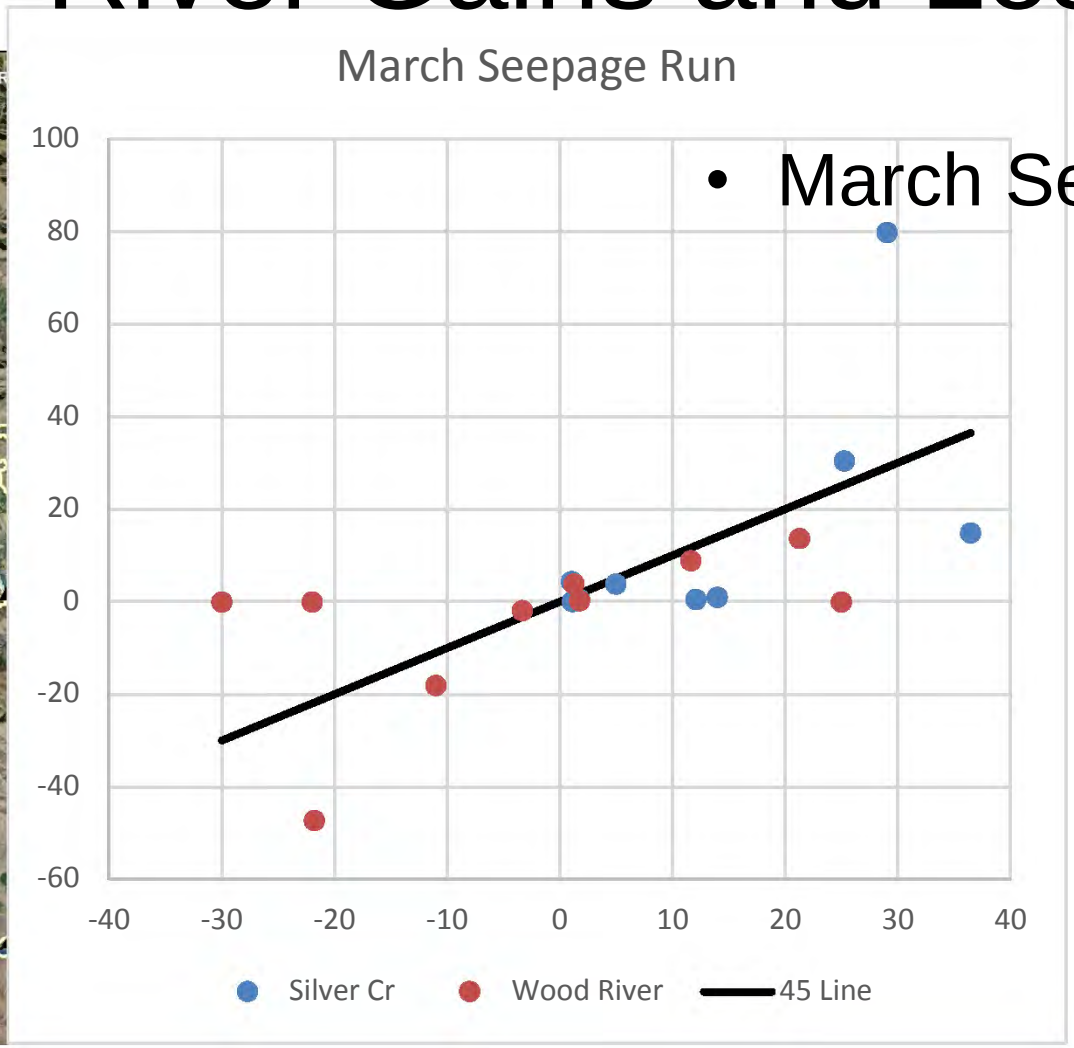
River Gains and Losses





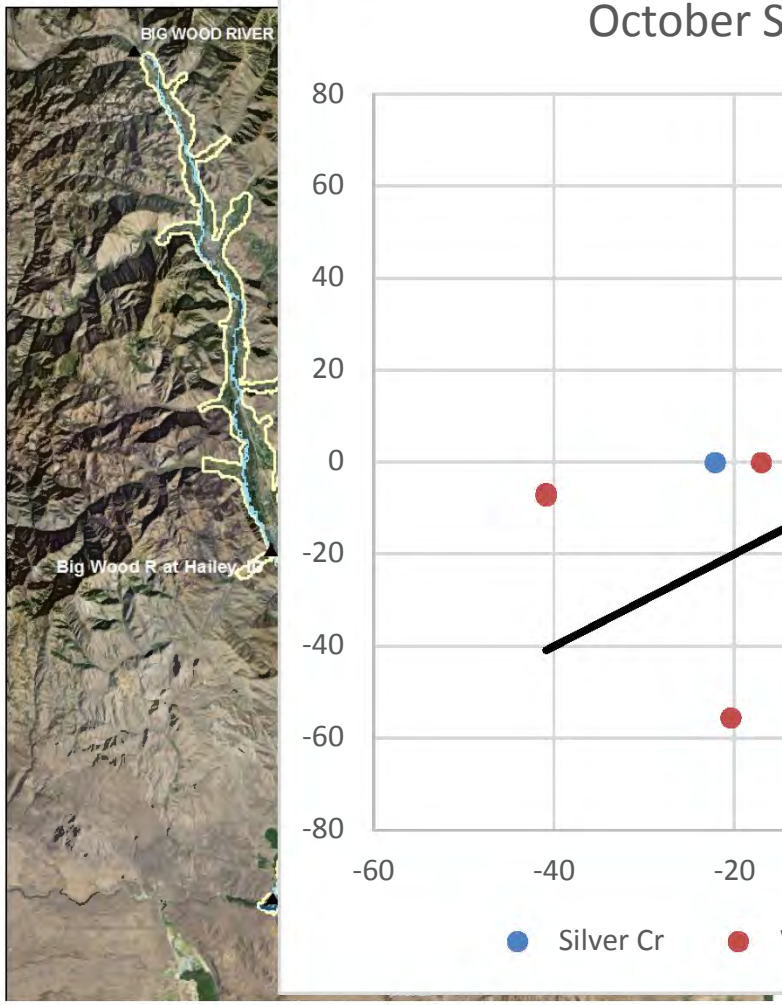
- August Seepage Run

River Gains and Losses



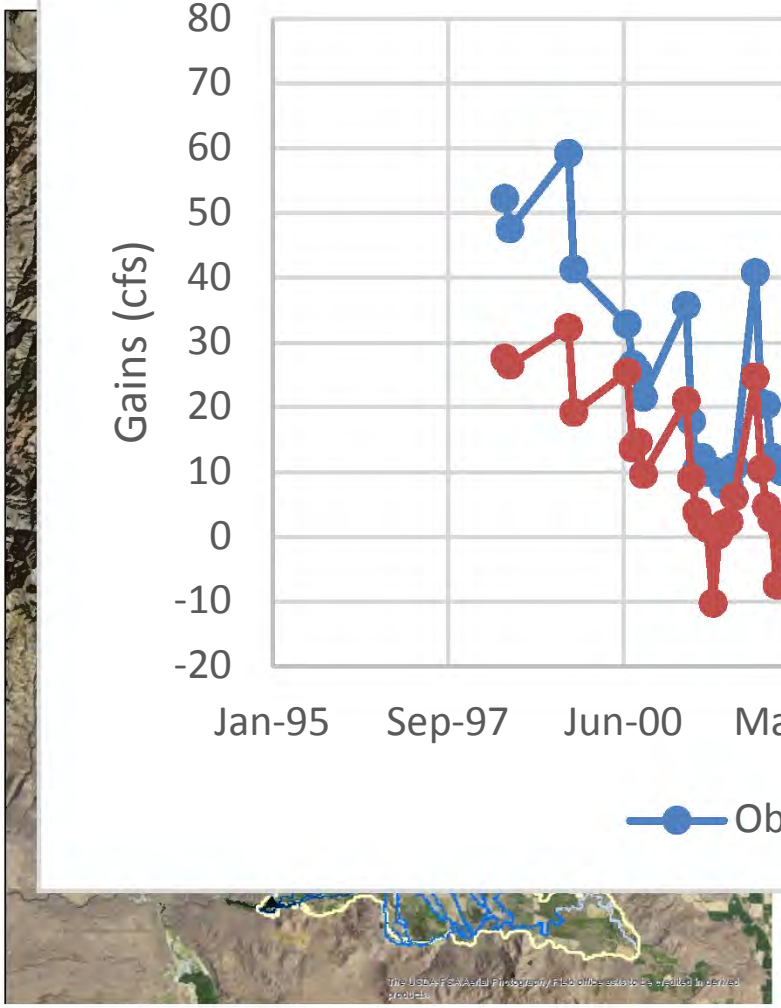
- March Seepage Run

River Gains and Losses



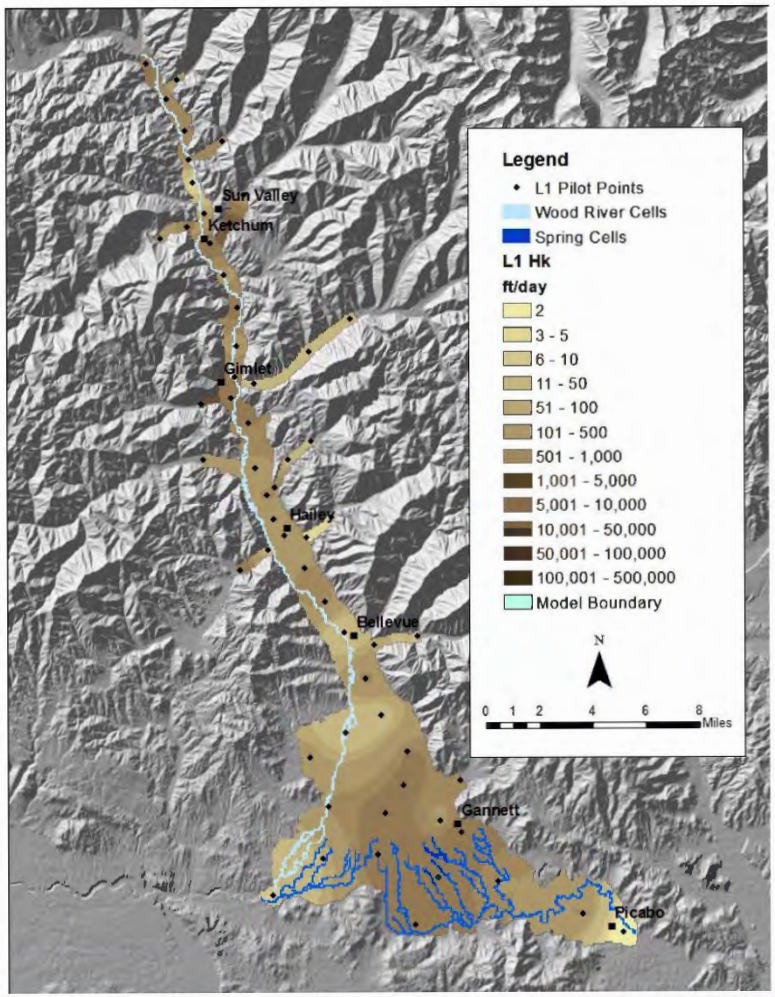
- October Seepage Run

River Gains and Losses



- Heart Rock to Stanton Crossing

Layer 1 Hydraulic Conductivity



- Layer 1 modeled as non-time varying transmissivity
- Pilot points can be moved
- Number of pilot points not fixed
- Tributary valleys are in their own zones
- In valley and triangle
  - Min = 0.3 ft/day
  - Max = 61,553 ft/day
  - Mean = 968 ft/day

Layer 1 Hydraulic Conductivity

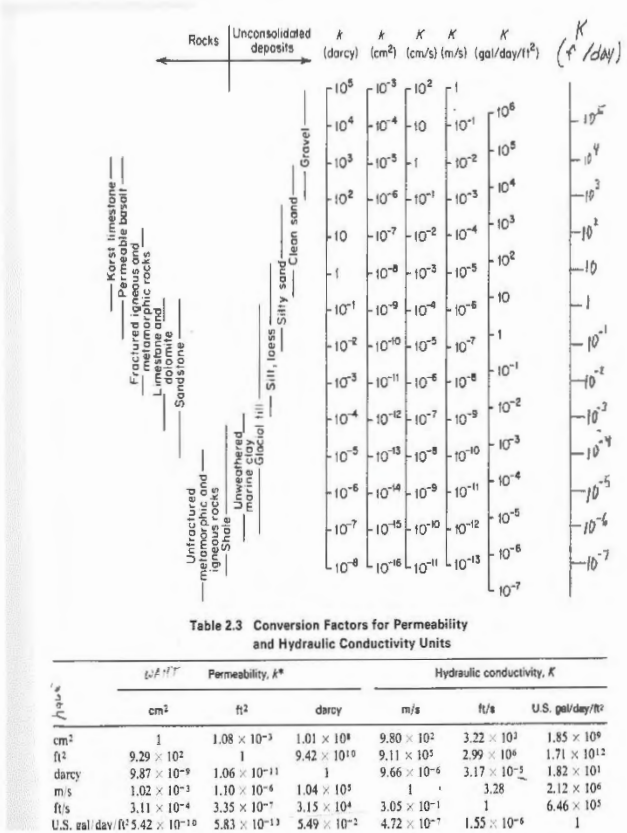


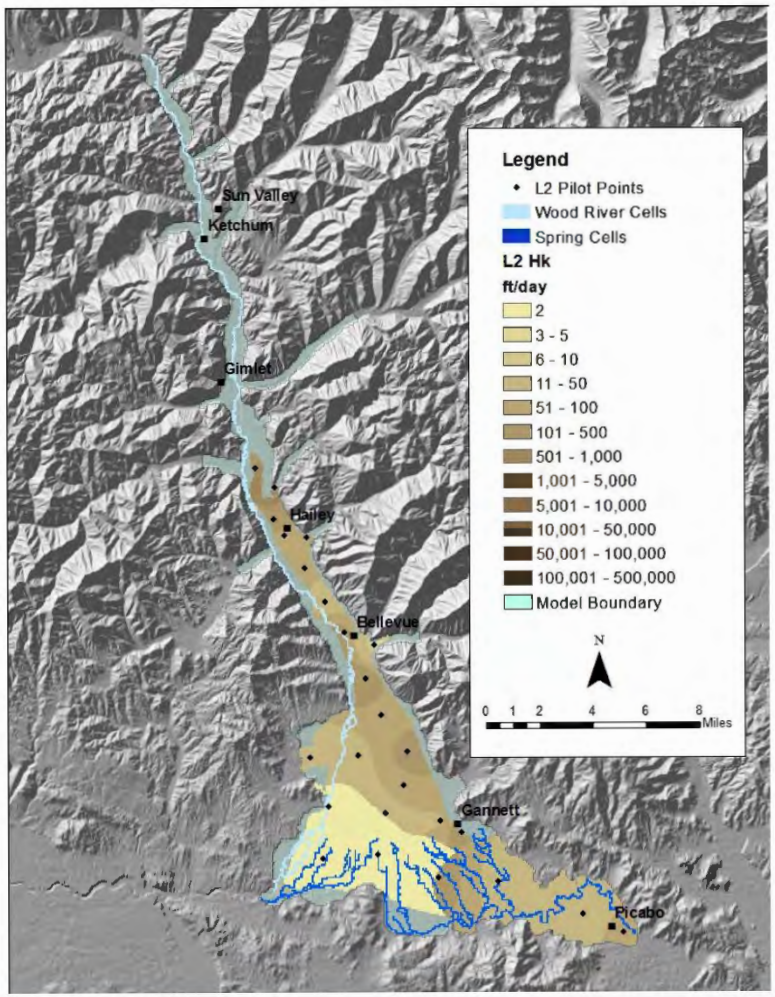
Table 2.3 Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, k*			Hydraulic conductivity, K		
	cm^2	ft^2	darcy	m/s	ft/s	U.S. gal/day/ft^2
cm^2	1	1.08×10^{-3}	1.01×10^{8}	9.80×10^{2}	3.22×10^{1}	1.85×10^{9}
ft^2	9.29×10^{2}	1	9.42×10^{10}	9.11×10^{5}	2.99×10^{4}	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-5}	1.82×10^{1}
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^{5}	1	3.28	2.12×10^{6}
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^{4}	3.05×10^{-1}	1	6.46×10^{5}
U.S. gal/day/ft^2	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.55×10^{-6}	1

Groundwater, Freeze & Cherry, 1979

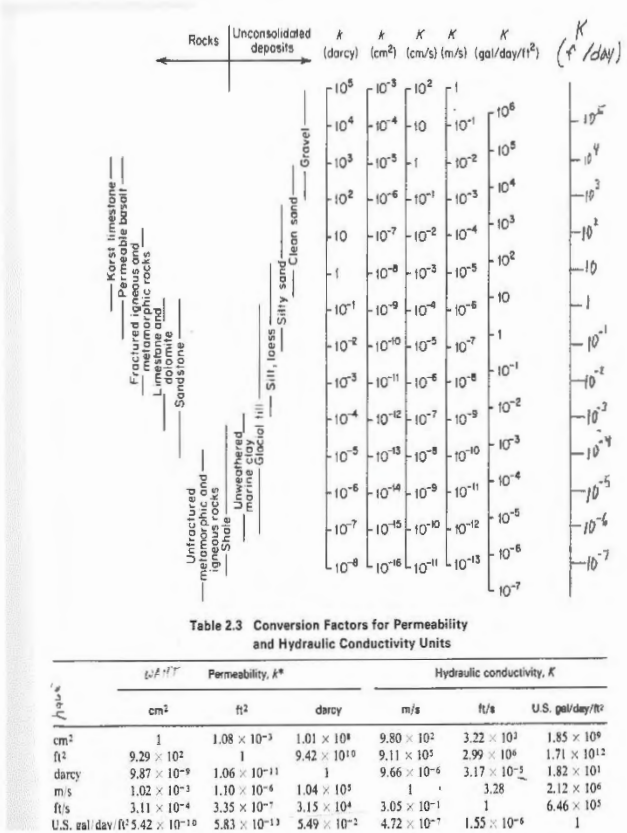
- Tributary valleys are in their own zones
  - Contain maximum and minimum values
- In valley and triangle
  - Min = 0.3 ft/day
  - Max = 61,553 ft/day
  - Mean = 968 ft/day
- 437 wells in Wood River alluvial sediments.

Layer 2 Hydraulic Conductivity



- Layer 2 modeled as confined
- Includes basalt in east
- Includes confining layer
- Sand and gravel aquifer in valley and triangle
  - Min = 1.0 ft/day
  - Max = 286 ft/day
  - Mean = 53 ft/day

Layer 2 Hydraulic Conductivity



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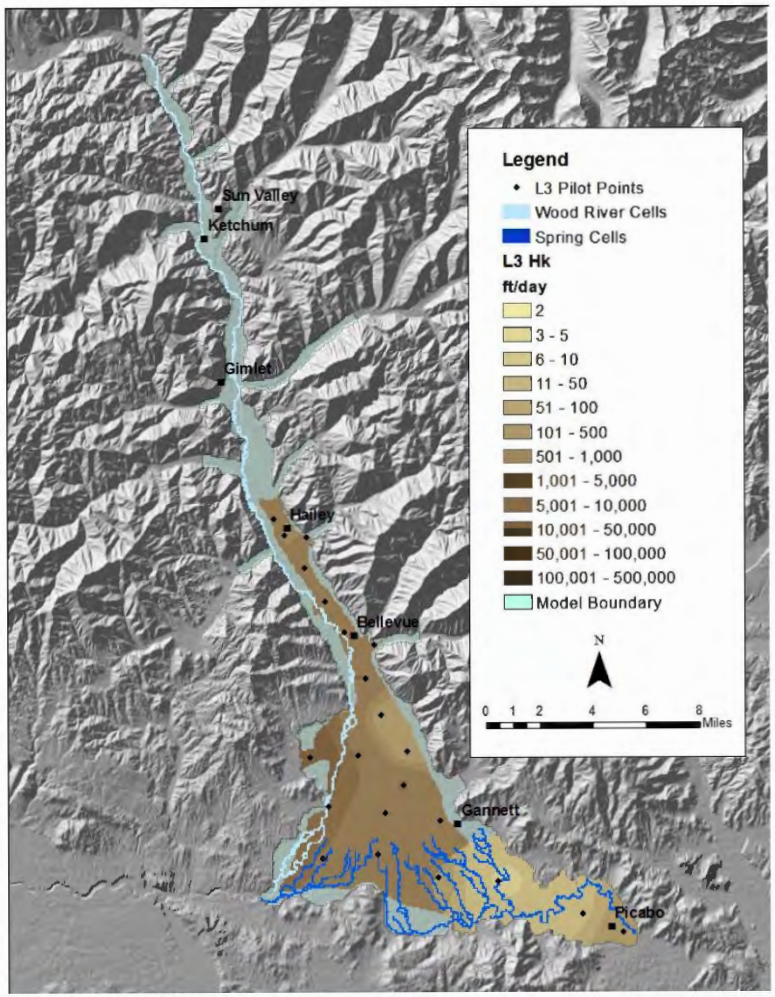
Groundwater, Freeze & Cherry, 1979

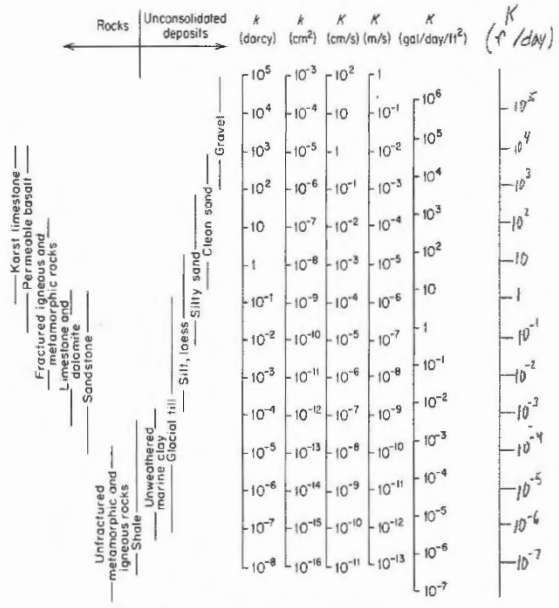
- Low hydraulic conductivity in confining layer
  - Min = 0.000052 ft/day
  - Max = 0.000298 ft/day
- Basalt
  - Min = 5.9 ft/day
  - Max = 67.7 ft/day
- Sand and gravel In valley and triangle
  - Min = 1.0 ft/day
  - Max = 286 ft/day
  - Mean = 53 ft/day
- 14 wells in Wood River alluvial sediments.

Layer 3 Hydraulic Conductivity



- Layer 3 modeled as confined
- Basalt
  - Min = 1.9 ft/day
  - Max = 131 ft/day
- Sand and gravel aquifer in valley and triangle
  - Min = 53.2 ft/day
  - Max = 12,179 ft/day
  - Mean = 1,542 ft/day

Layer 3 Hydraulic Conductivity



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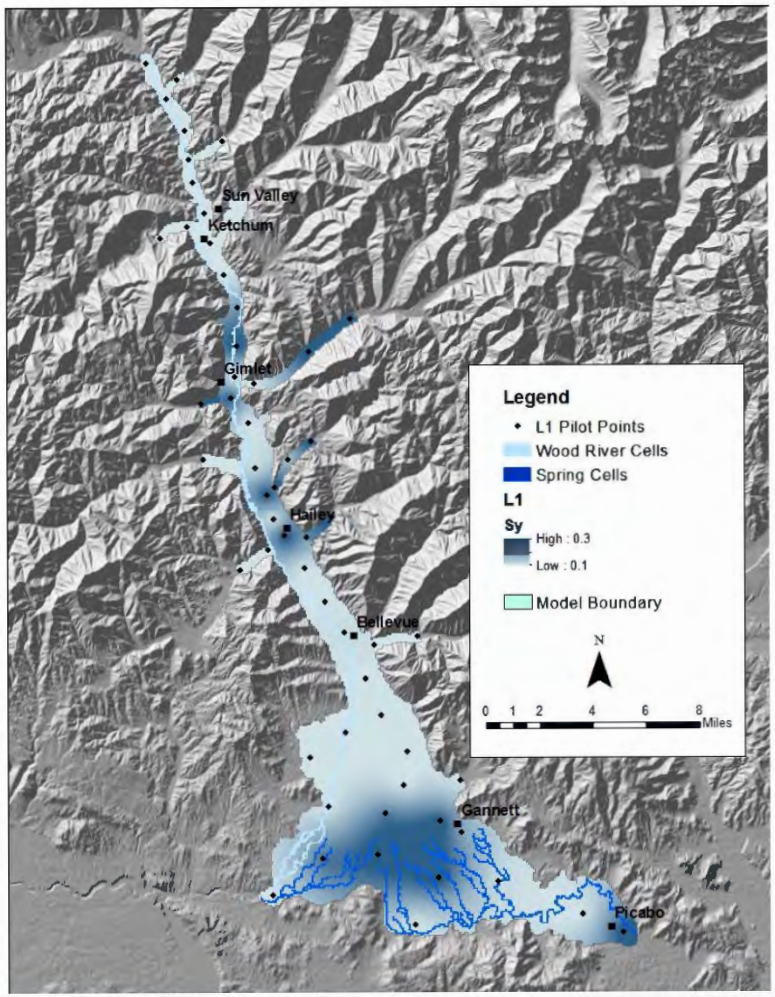
cm²	1	1.08×10^{-3}	1.01×10^{3}	9.80×10^{2}	3.22×10^{1}	1.85×10^{9}
ft²	9.29×10^{2}	1	9.42×10^{10}	9.11×10^{5}	2.99×10^{6}	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-5}	1.82×10^{1}
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^{5}	1	3.28	2.12×10^{6}
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^{4}	3.05×10^{-1}	1	6.46×10^{5}
U.S. gal/day/ft²	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.55×10^{-6}	1

Groundwater, Freeze & Cherry, 1979

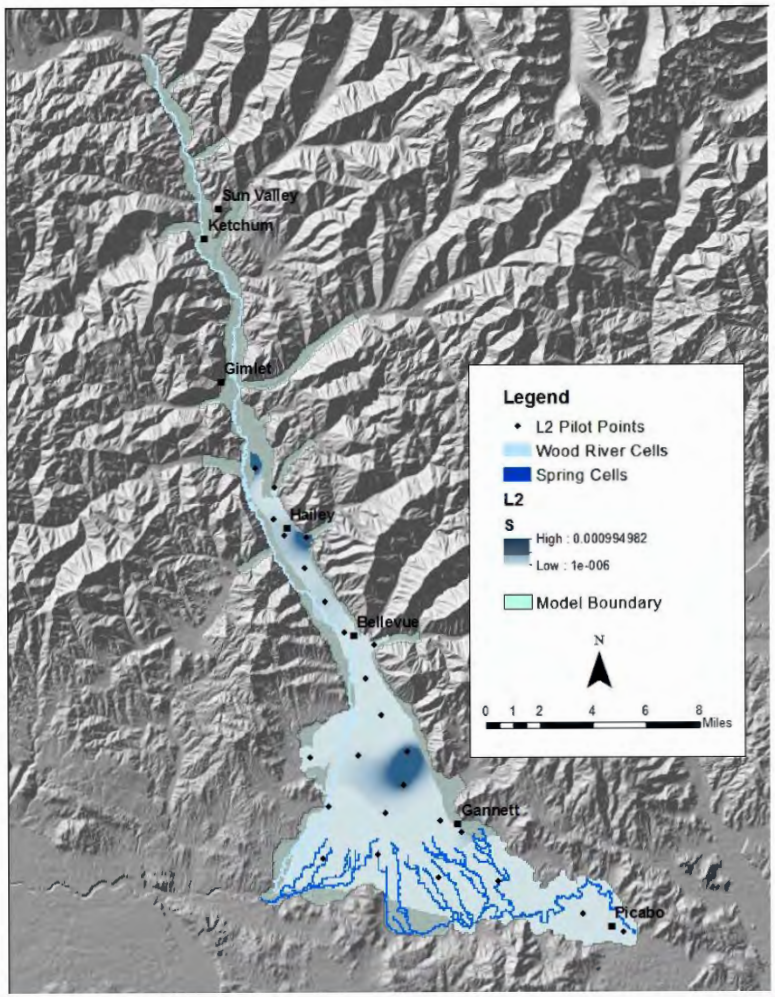
- Basalt
  - Min = 1.9 ft/day
  - Max = 131 ft/day
- Sand and gravel aquifer in valley and triangle
  - Min = 53.2 ft/day
  - Max = 12,179 ft/day
  - Mean = 1,542 ft/day

Layer 1 Storage



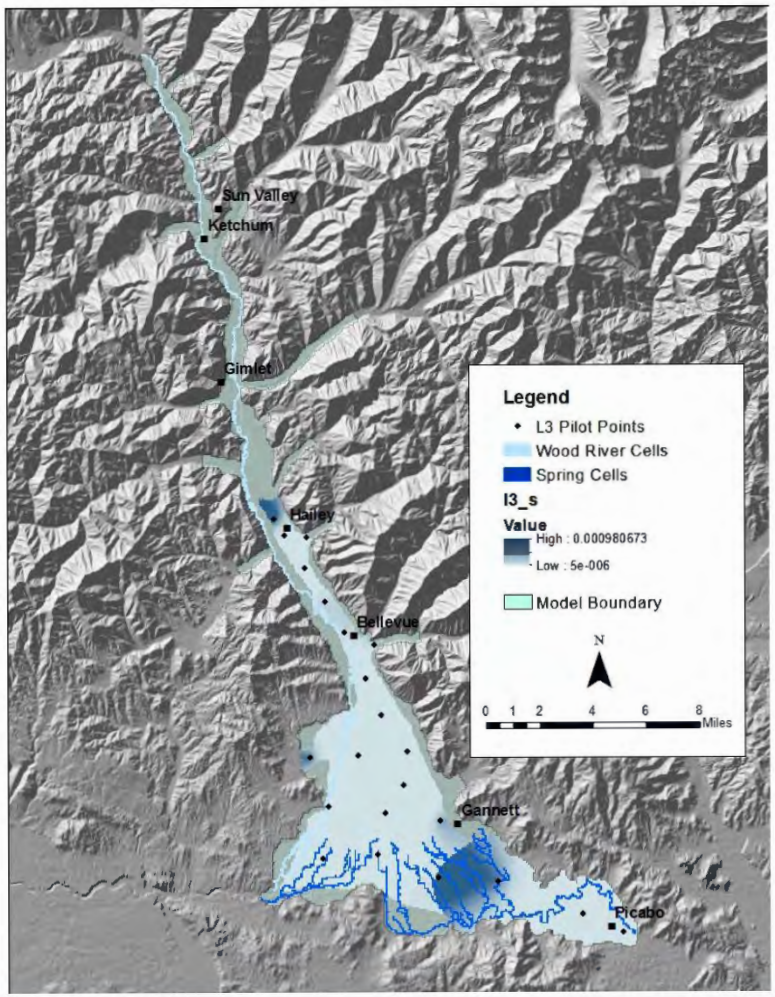
- Layer 1 modeled as non-time varying thickness
- Pilot points can be moved
- Number of pilot points not fixed

Layer 2 Storage



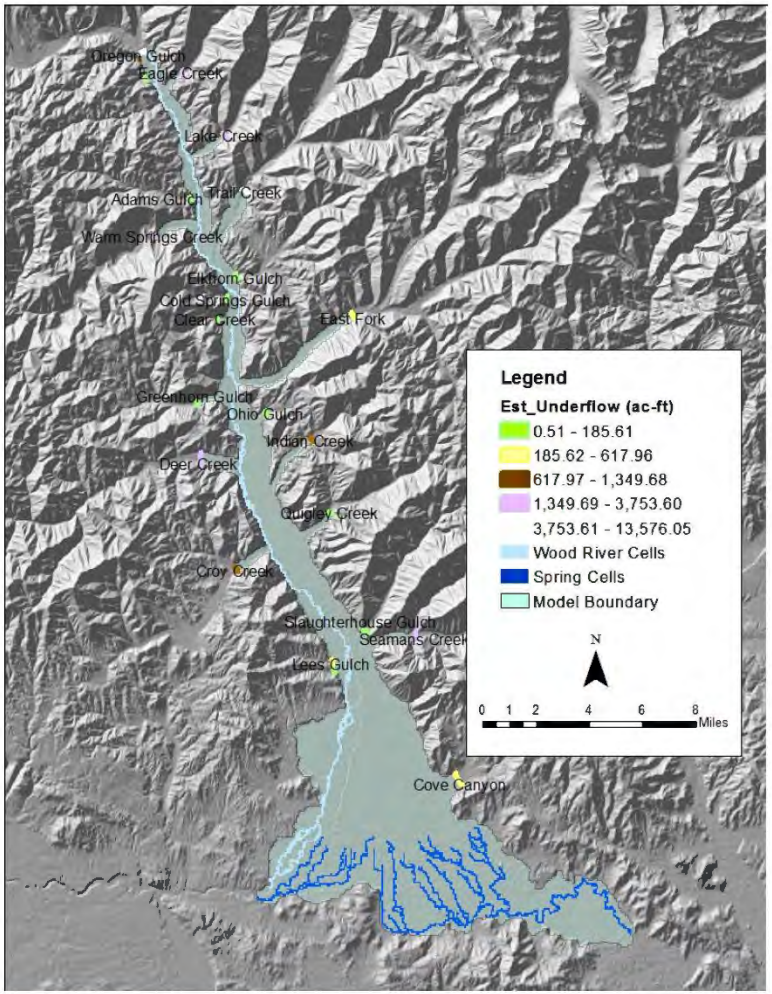
- Layer 2 modeled as storage
- Includes basalt in east
- Includes confining layer
- Pilot points can be moved
- Number of pilot points can be changed

Layer 3 Storage

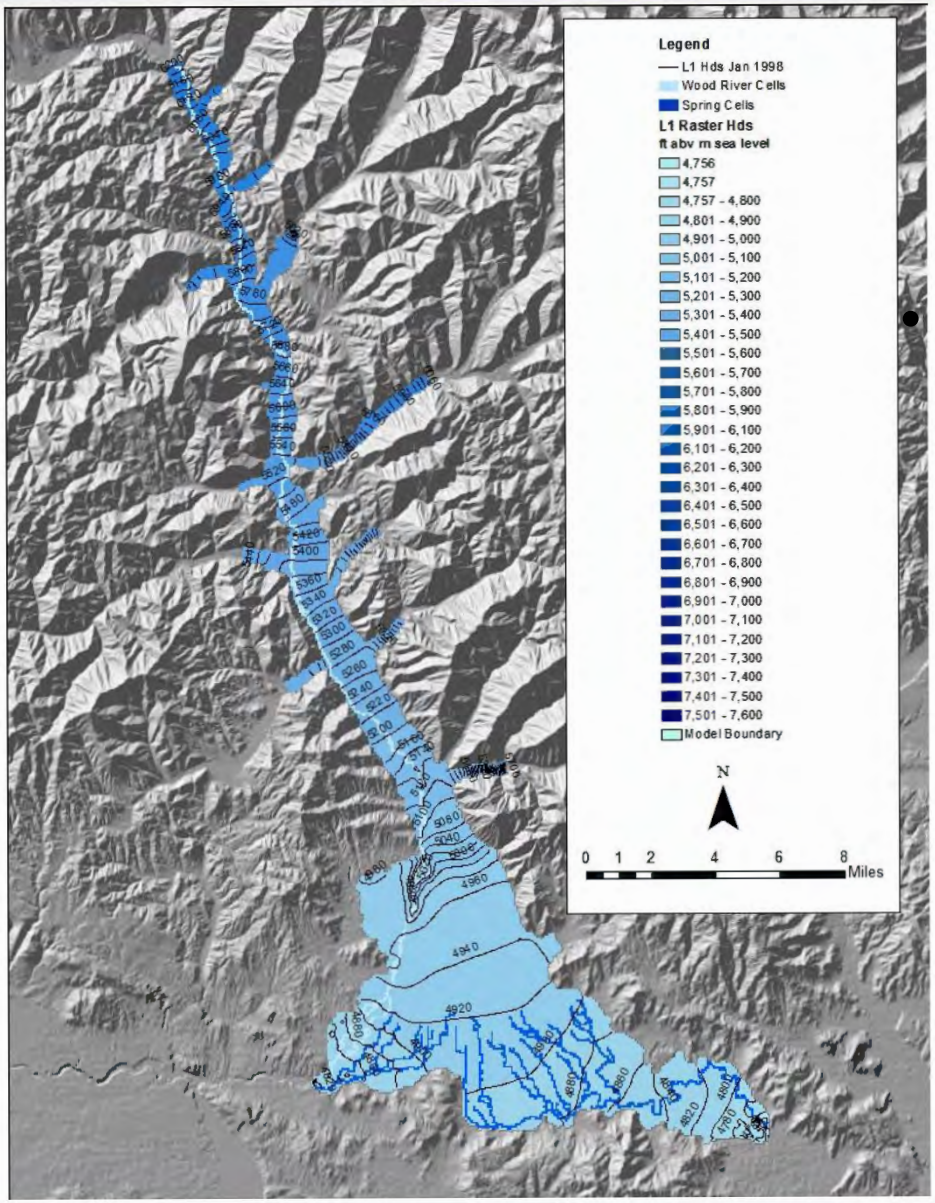


- Layer 3 modeled as storage
- Includes basalt in east
- Pilot points can be moved
- Number of pilot points can be changed

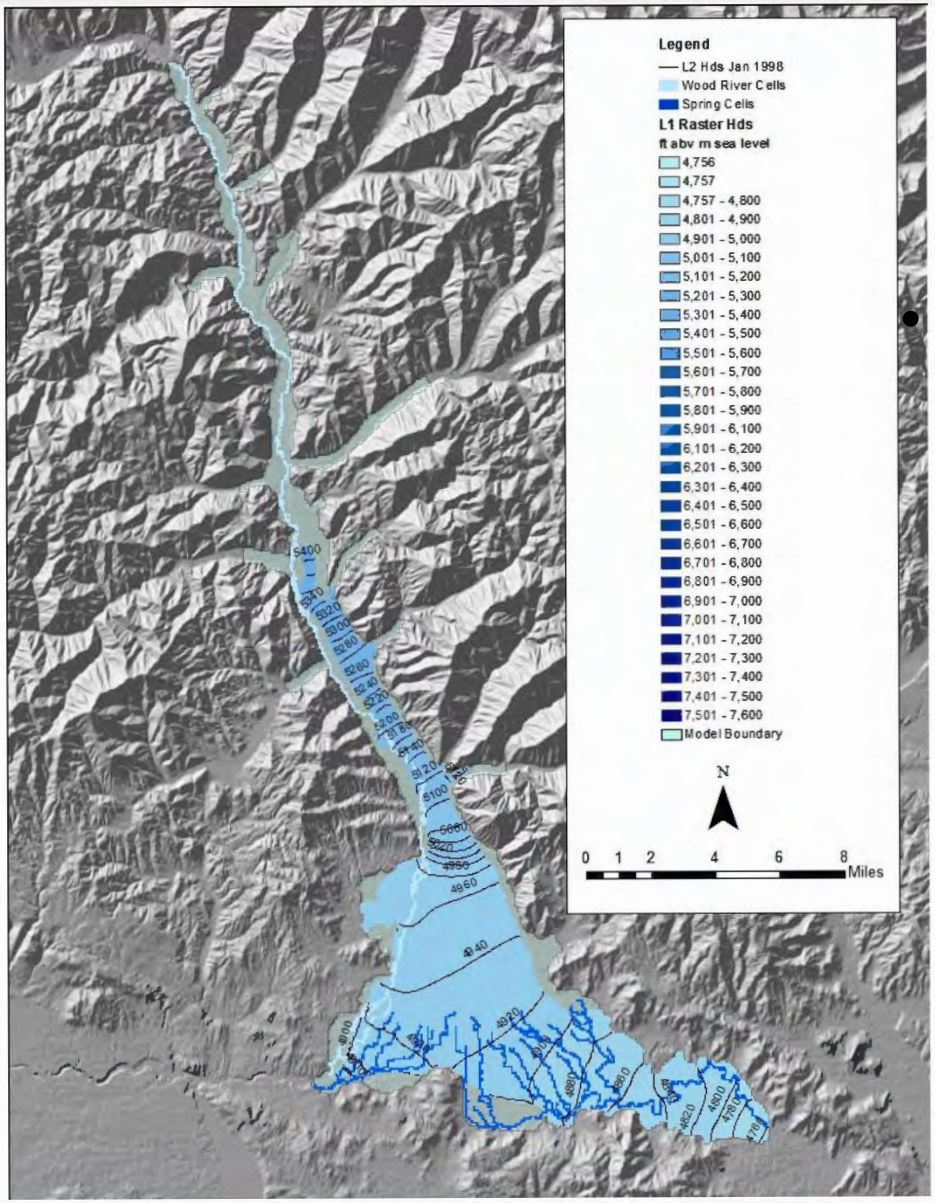
Tributary Underflow



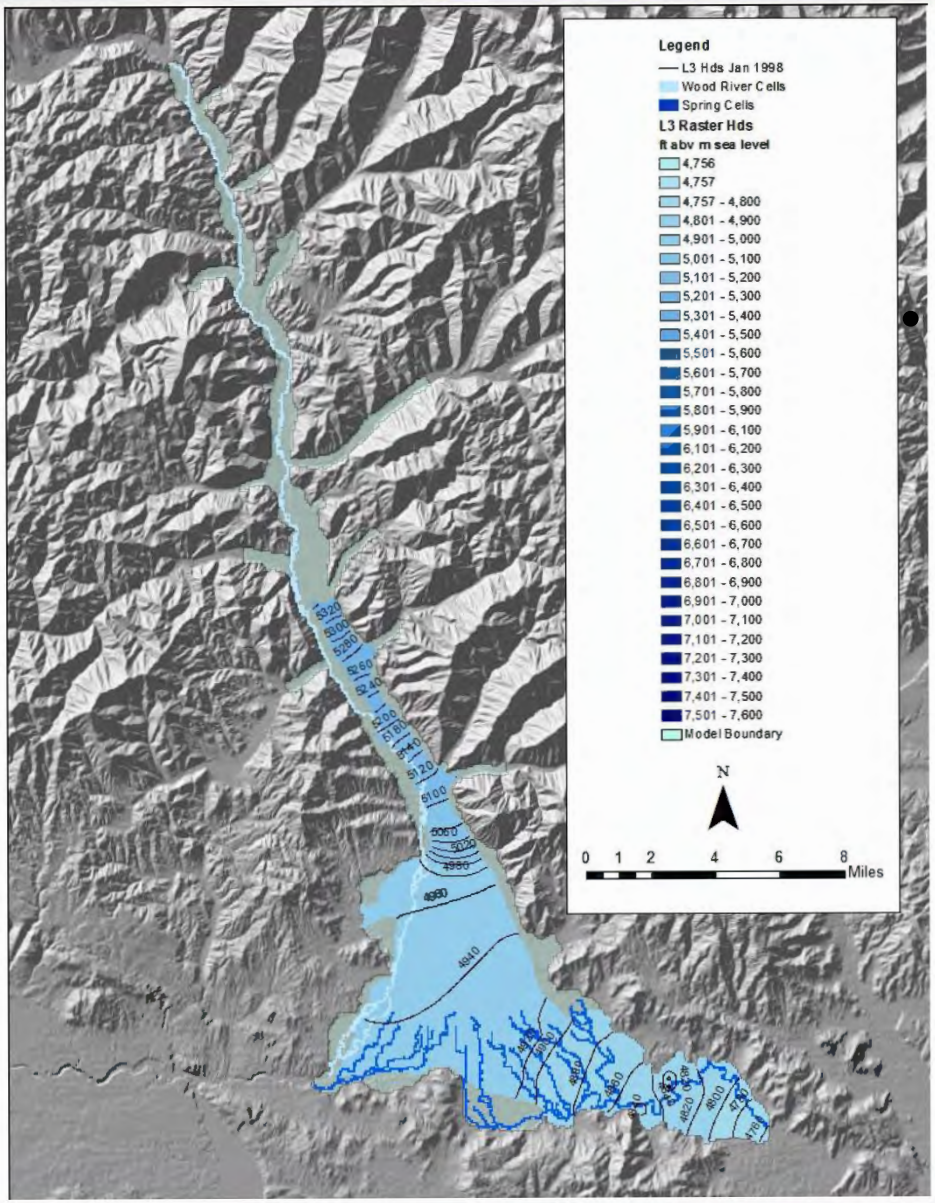
Tributary	DarcyFlux_AcFt	AvgPptVol_AcFt	Est_Underflow	EstUnd/AvgPpt
Adams Gulch	851	17600	12.96	0.0007
Chocolate Gulch	1,703	864	32.25	0.0373
Cold Springs Gulch	705	3,341	185.61	0.0556
Clear Creek	971	2,288	10.56	0.0046
Cove Canyon	145	11,200	387.32	0.0346
Croy Creek	704	23,595	774.24	0.0328
Deer Creek	1,462	74,213	2879.41	0.0388
Eagle Creek	1,015	17,248	3449.60	0.2000
Elkhorn Gulch	51	12,757	0.51	0.0000
East Fork	471	120,629	617.96	0.0051
Greenhorn Gulch	682	30,464	6.89	0.0002
Indian Creek	2,407	10,149	953.42	0.0939
Lake Creek	2,406	17,280	3456.00	0.2000
Lees Gulch	1,484	2,240	309.45	0.1381
Ohio Gulch	3,940	4,270	39.40	0.0092
Oregon Gulch	346	6,919	1349.68	0.1951
Quigley Creek	560	15,504	101.70	0.0066
Seamans Creek	1,949	18,768	3753.60	0.2000
Slaughterhouse Gulch	506	11,509	5.06	0.0004
Trail Creek	2,898	111,274	11378.89	0.1023
Townsend Gulch	1,218	960	40.16	0.0418
Upper Big Wood River	611	313,278	13576.05	0.0433
Warm Springs Creek	487	180,735	2309.63	0.0128



- Layer 1 Head January 1998



- Layer 2 Head January 1998



- Layer 3 Head January 1998

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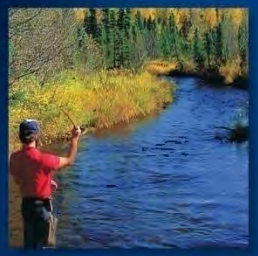

End