Reminders

- Added geolocated driller wells
- Stage for Glendale Bridge - Wood River Ranch reach set to DEM elevation when it has water
- Water master records and Landsat photos to determine when Drybed and Wood River Ranch-Stanton Crossing reaches are dry
- Use stage at Hailey gage to switch between three different riverbed conductance parameters for Drybed
Reminders

- Riverbed Conductance lumped parameter
  - KLW/M

![Graph showing average monthly river stage with flood, high flow, and base conductance levels from January 1995 to January 2013.](image)
Reminders

- Added area to include significant irrigation wells
New

• After ESPA synoptic IDWR did QA check of IDWR water-level database
• Made some corrections
• Found some missing water level data
  – The August 2018 calibration run had 1022 water-levels in the Observation Well group
  – This calibration run has 1101 water-levels in the Observation Well group
  – About a 7% increase in the number of observations
Observation Wells

- Wells surveyed
- Measured multiple times
- Total head change from north to south is more than 1,100 ft
  - 30 ft mismatch ~ 2%
  - 95% C.I. = +/- 0.35
    - Between 0.16 & -0.53
    - Negative residual means modeled value is too high
Observation Wells

- Wells surveyed
- Every measured water level plotted
- If fit was perfect
  - Intercept = 0
  - Slope = 1
  - $R^2 = 1$

$y = 0.9861x + 70.4$

$R^2 = 0.9988$
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft
  - 30 ft mismatch = 2%
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft
  - 30 ft mismatch = 2%
Observation Wells

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Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft
  - 30 ft mismatch = 2%

Legend:
- Observed
- Warm-up
- Modeled
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft
  - 30 ft mismatch = 2%
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 100 ft
- 30 ft mismatch = 2%

Jan-95 Jan-96 Dec-96 Dec-97 Jan-99 Jan-00 Dec-00 Dec-01 Jan-03 Jan-04 Dec-04 Dec-05 Jan-07 Jan-08 Dec-08 Dec-09 Jan-11 Jan-12 Dec-12 Dec-13 Jan-15

ft abv mean sea level

[Graph showing observed, warm-up, and modeled data with annotations for wells surveyed and head change]
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft

• 30 ft mismatch = 2%

Jan-95 Jan-96 Dec-96 Jan-97 Jan-99 Jan-00 Dec-00 Jan-01 Jan-03 Jan-04 Dec-04 Dec-05 Jan-07 Jan-08 Dec-08 Dec-09 Jan-11 Jan-12 Dec-12 Dec-13 Jan-15

01S18E14AAB1

Observed Warm-up Modeled

ft abv mean sea level

Jan-95 Jan-96 Dec-96 Jan-97 Jan-99 Jan-00 Dec-00 Jan-01 Jan-03 Jan-04 Dec-04 Dec-05 Jan-07 Jan-08 Dec-08 Dec-09 Jan-11 Jan-12 Dec-12 Dec-13 Jan-15

4910.00
4915.00
4920.00
4925.00
4930.00
4935.00
4940.00
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft
- 30 ft mismatch = 2%
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft
- 30 ft mismatch = 2%

Jan-95 Jan-96 Dec-96 Dec-97 Jan-99 Jan-00 Dec-00 Dec-01 Jan-03 Dec-03 Jan-04 Dec-04 Dec-05 Jan-06 Jan-07 Jan-08 Dec-08 Dec-09 Jan-11 Jan-12 Dec-12 Dec-13 Jan-15

ft abv mean sea level 03N18E07DBB1

- Observed
- Warm-up
- Modeled
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1,100 ft
- 30 ft mismatch = 2%
Observation Wells

- Wells surveyed
- Total head change from north to south is more than 1100 ft
- 30 ft mismatch = 2%
Geo Located Driller Wells

- Water-levels collected by driller
- Wells located by driller using GPS or address
- Measured by driller
- 95% C.I. = +/-3.56
  - Between -1.22 & -8.54
  - Negative residual means modeled value is too high
**Driller Wells**

- Wells located by hand held GPS or address
- Measured by driller
- If fit was perfect
  - Intercept = 0
  - Slope = 1
  - $R^2 = 1$
Why the Geolocated Wells are Important

Water Level Frequency

- Observation Wells
- Driller Wells
River Gains and Losses

- Transient Gains
  - Nr Ketchum
  - Hailey
  - Willow Creek
  - Silver Cr Abv
  - Silver Cr Blw
- Observed
- Warm-up
- Modeled
River Gains and Losses

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

Sportsman Access

Gain (cfs)
Hailey - Stanton Crossing
Observed Warm-up Modeled
River Gains and Losses

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

Sportsman Access

Gain (cfs)
River Gains and Losses

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

Sportsman Access

Silver Abv Sportsman’s Access

Gain (cfs)

January 1995 to January 2015

- Observed
- Warm-up
- Modeled
River Gains and Losses

- Seepage Runs
  - Model input is average monthly diversions and returns
  - Seepage run responding to what is happening at that moment
River Gains and Losses

- August 2012
  Seepage Run
River Gains and Losses

- October 2012 Seepage Run
River Gains and Losses

- March 2013 Seepage Run
River Gains and Losses

- Heart Rock Ranch to Stanton Crossing
River Gains and Losses

- Heart Rock to Stanton Crossing

Legend
- Heart Rock Ranch POD
- Big_Wood_gages
- Model Boundary

Gains (cfs)
Heart Rock Ranch to Stanton Crossing Gains
Observed Modeled
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
- Statistics
  - Minimum = 0.04 ft/day
  - Maximum = 1,800 ft/day
  - Mean = 41.2 ft/day
Layer 2 Hydraulic Conductivity

- Layer 2 modeled as confined
- No zones, allows PEST to select values
- Alluvium
  - Minimum = 0.000269 ft/day
  - Maximum = 74,900 ft/day
  - Mean = 443 ft/day
- Confining layer
  - Minimum = 0.000003 ft/day
  - Maximum = 0.645 ft/day
  - Mean = 0.00245 ft/day
- Basalt
  - Minimum = 0.000023 ft/day
  - Maximum = 930,000 ft/day
  - Mean = 6,850 ft/day
Layer 3 Hydraulic Conductivity

- Layer 3 modeled as confined
- Alluvial aquifer
  - Minimum = 4.99 ft/day
  - Maximum = 321 ft/day
  - Mean = 20.7 ft/day
- Basalt
  - Minimum = 2.37 ft/day
  - Maximum = 11.6 ft/day
  - Mean = 4.87 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
Riverbed Conductance

- Riverbed Conductance
  - lumped parameter
  - KLW/M
Riverbed Conductance

- High Flow Riverbed Conductance
  - Stage at Hailey between 3 and 4.5 ft
  - lumped parameter
  - KLW/M
Riverbed Conductance

- Riverbed Conductance
  - Stage at Hailey greater than 4.5 ft
  - lumped parameter
  - KLW/M
Riverbed Conductance

- Willow Creek
- Silver Creek
## Tributary Underflow

<table>
<thead>
<tr>
<th>Tributary</th>
<th>Avg Precip (AF)</th>
<th>Underflow (AF)</th>
<th>Underflow/Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams Gulch</td>
<td>17,600</td>
<td>8.51</td>
<td>0.0005</td>
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<tr>
<td>Chocolate Gulch</td>
<td>864</td>
<td>172.80</td>
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<td>Cold Springs Gulch</td>
<td>3,341</td>
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<td>Clear Creek</td>
<td>2,288</td>
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<td>Cove Canyon</td>
<td>11,200</td>
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<td>Croy Creek</td>
<td>23,595</td>
<td>1,668.43</td>
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<td>Deer Creek</td>
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<td>Eagle Creek</td>
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<td>Elkhorn Gulch</td>
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<td>East Fork</td>
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<td>Greenhorn Gulch</td>
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<td>Indian Creek</td>
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<td>Lake Creek</td>
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<td>Lees Gulch</td>
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<td>Ohio Gulch</td>
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<td>Oregon Gulch</td>
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<td>Quigley Creek</td>
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<td>Seamans Creek</td>
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<td>Slaughterhouse Gulch</td>
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<td>Trail Creek</td>
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<td>Townsend Gulch</td>
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<td>Upper Big Wood River</td>
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<td>Warm Springs Creek</td>
<td>180,735</td>
<td>2,308.57</td>
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</table>
Drains

- Layer 1 drains
Drains

- Layer 2 drains
DRAINS

- Layer 3 drains
Aquifer Discharge

Stanton Out

Modeled=307 AF
Target=0-300 AF

Silver Cr Out

Modeled=23,200 AF
Target=4,000-53,000 AF
Irrigation Efficiency

- Percent of diversion applied to crop consumptive use
- Some entities have explicitly modeled canals
  - Hiawatha
  - District 45
  - Baseline
- Seepage in modeled canals not included in Efficiency calculations
- Layer 1 Head January 1998
• Layer 2 Head January 1998
• Layer 3 Head January 1998
End
Changes in River file

- During irrigation season Glendale Rd to Wood River Ranch dry when water master records indicate it is dry.
  - Remains dry until Landsat photos show it has water
- Wood River Ranch to Stanton Crossing dry when Landsat photos show it is dry
Riverbed Conductance

Flood Conductance

High Conductance

Base

Riverbed Conductance limped parameter

KWL/M