



Greater Harney Valley – Groundwater Study Advisory Committee Meeting  
Tuesday, July 17, 2018  
10:00am – 4:00pm  
Harney Education Service District – 25 Fairview Heights Loop, Burns, OR



## July 17, 2018 - Meeting Summary

### Participants

#### Advisory Committee Members

Allison Aldous, The Nature Conservancy (Zach Freed participated on behalf of TNC)  
~~Angie Ketscher, Citizen/Landowner~~  
Brandon Haslick, Burns Paiute Tribe  
Brenda Smith, High Desert Partnership  
~~Charlotte Roderique, Numu Allottee Association~~  
~~Erin Maupin, Citizen/Landowner~~  
Fred Otley, Citizen/Landowner  
~~Herb Vloedman, Citizen/Landowner~~  
Gary Ball, US Fish and Wildlife Services  
~~JR Johnson, OWRD~~  
~~Karen Moon, Harney County Watershed Council~~  
Mark Owens, County Commission and Landowner  
Steve Rickman, Landowner/Business Owner  
Tony Hackett, Downright Drilling  
~~Wayne Evans, Citizen/Landowner~~

#### Groundwater Study Team

Darrick Boschmann, OWRD  
Jerry Grondin, OWRD  
Justin Iverson, OWRD  
Steve Gingerich, USGS  
Hank Johnson, USGS  
Amanda Garcia, USGS  
Nick Dosch, USGS

#### Others

Harmony Burrigh, OWRD (Facilitator)  
Jason Spriet, OWRD  
Doug Woodcock, OWRD  
Steve Parrett, OWRD

### Meeting Overview, Action Items, Recommendations, and Updates

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The purpose of this meeting was to learn about key components of the groundwater study, provide updates on activities since the last Advisory Committee meeting, and brief the Committee on upcoming activities. The focus of this meeting was on a very preliminary comparison of 1932, 1969, and more recent groundwater level data as well as an update on the development of a Harney Basin water budget, including a discussion of methods for estimating groundwater storage. During the work session there were four breakout tables: geologic mapping, water chemistry, the water budget, and groundwater levels. Members of the Groundwater Study team hosted small group discussions with Committee members and members of the public to answer questions about various aspects of the Study.



Looking at geologic maps and discussing water chemistry in breakout groups.

**Action Items**

<b>Who</b>	<b>What</b>	<b>When</b>
OWRD and USGS	Work on a brief handout describing methods to estimate ET	Outstanding
Harmony B, Karen M, Angie K, and Halley B	Work on a brief handout describing the groundwater study	Outstanding
Harmony B and Karen M	Update the Harney County Watershed Council website with Groundwater Study information	Outstanding
Harmony B, Karen M and Angie K	Develop a draft outreach strategy for the Advisory Committee to consider at a future meeting	Outstanding
Mark O	Convene additional meetings of the sub-committee to continue working on local monitoring efforts	Ongoing

**Decisions/Recommendations**

- Charlotte Roderique, the representative for the Numu Allottee Association, was jointly appointed to the Advisory Committee by the Oregon Water Resources Department and the Harney County Court.

**Proposed Future Discussions**

- Updates on activities to estimate recharge and preliminary estimates.

**Updates**

The next meeting is scheduled for Tuesday, October 16 from 10am - 4pm at the Harney County Community Center. The chair (Mark Owens) and facilitator (Harmony Burrigh) will develop and distribute an agenda for review prior to the next meeting. If you would like to propose discussion topics, email them to: [harmony.s.burright@oregon.gov](mailto:harmony.s.burright@oregon.gov).

## Detailed Meeting Notes

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### PRESENTATIONS – GROUNDWATER LEVEL MAPS AND ESTIMATING GROUNDWATER STORAGE IN THE WATER BUDGET

The meeting began with two presentations, which focused on the following:

- A very preliminary comparison of 1932, 1969, and more recent groundwater level data– OWRD led
- Methods for estimating groundwater storage in the basin water budget – USGS led

#### Groundwater Level Maps – Comparing Past to Present

**For the full presentation, click here**

Jerry Grondin from OWRD presented a very preliminary comparison of historic and recent groundwater level data. He compared maps of 1932 data by Piper and others, 1969 data by Leonard and other sources, and data from the current Harney Basin groundwater study. He noted the type, amount, and geographic distribution of the data available in 1932, 1969 and the current groundwater study and what the resultant groundwater elevation contours suggest about groundwater flow directions, areas of recharge and discharge, and changes in the groundwater storage. Jerry emphasized that there is additional data to collect and much more analysis to do, but he wanted the group to get a sense of what data is out there and the story that it is beginning to tell.

Preliminary observations:

- Groundwater levels in Harney Valley have declined primarily since 1969. Jerry used the 4100-foot groundwater elevation contour line as an example. The 4100-foot contour line location is similar for the 1932 and 1969 data and significantly different for the 2018 data where the contour line has shifted from the south side to the north side of Dog mountain, to the east of Crane Buchanan Road, and to the north of Highway 20. The shift of this water level contour line to the north and east indicates a recession in water levels and reduction in groundwater storage over time. The apparent groundwater level declines from 1969 to 2018 in particular areas are:
  - Hwy 20 (E of Burns): more than 20 feet
  - Crane: more than 30 feet
  - Princeton: about 10 feet
  - Weaver Springs: 25 to more than 80 feet
  - Riley: about 5 feet
- The Silvies River alluvial fan in Harney Valley is a groundwater recharge area where Silvies River water seeps to groundwater resulting in higher groundwater levels (a groundwater level mound) in the vicinity of the river. This recharge slows the retreat of groundwater levels in the vicinity of the river.
- The Donner und Blitzen River valley is a groundwater discharge area where groundwater contributes to river flow.

- Upland groundwater levels north of Burns and in the Steens Mountains often nearly coincide with local upland stream and/or spring elevations. This preliminary observation appears to support previous descriptions of upland groundwater discharging to upland streams that subsequently flow down to the major valleys where the streams can lose some water back to groundwater as they flow out over the basin floor toward Malheur Lake.

Next steps:

- Well elevation surveys to improve groundwater elevation accuracy for constructing and interpreting groundwater elevation contour maps.
- Comparing groundwater connection and flow interpreted from the groundwater level data with water chemistry data –does the water chemistry data support the groundwater connection and flow interpretations?

**Key Discussion Topics/Questions:**

- **Question:** Is there a difference in February and May groundwater levels? **Answer:** Groundwater levels generally peak in April and May. However, irrigation use of groundwater can potentially begin in March and start causing seasonal groundwater level drawdown (decline) before April – May. Consequently, OWRD measures groundwater levels just before the irrigation season begins.
- **Question:** What does the difference between 1930s and 2018 water levels represent? **Answer:** It represents a change in groundwater storage. In this case, use/pumping of stored groundwater over that time period.
- **Question:** What do you mean by groundwater mound (reference to Palomino Butte plateau)? **Answer:** The groundwater elevation below the Palomino Butte plateau is 10 to 20 feet higher than the surrounding groundwater elevations. The reason for the mound is currently uncertain, but could include possible minor local groundwater recharge from surface seepage on the plateau, significantly less groundwater pumping on the plateau relative to the surrounding areas, or some other reason to be determined.
- **Question:** In the Virginia Valley, do you see that water is leaving the basin? **Answer:** The current contour map shows a gradient to the southeast suggesting that water might be leaving the basin, but it's still an open question. Improving well elevation data and collecting more water chemistry samples will help us answer that question. The current well elevation uncertainties are as much as 5 to 10 feet. In very flat parts of the basin, there is less than a 5 foot groundwater elevation difference between wells (less than the potential elevation uncertainty), which complicates contouring the groundwater elevation data necessary for interpreting groundwater connections and flow directions. This was a big driver for surveying well elevations now in progress. The surveying will improve elevation values to within several inches in most cases
- **Question:** Where is the water from Virginia Valley potentially going? **Answer:** S. Fork Malheur River.
- **Question:** How many data points are there around Wright's Point? How many wells? How recent is the data? **Answer:** There were few wells measured near Wrights Point in 2016 and we

have made a concerted effort to pick up wells in the vicinity of Wright’s Point (north and south) to get a better control on the water level contour line.

- **Question:** How much more retreat can the basin withstand? **Answer:** The Groundwater Study Team is here to do the science, to provide information about the impacts of past and current water use. In terms of determining what is acceptable, that’s not the purview of the Groundwater Study. Ultimately, the Study will not tell us what is an acceptable impact, but can help us understand the impacts of different groundwater management scenarios.
- **Question:** How does drought affect the groundwater contour map? How do you account for drought years when you are trying to establish an equilibrium? Not every year will be the same. **Answer:** The groundwater model to be developed by the USGS will hopefully represent the groundwater system well enough that we can represent how the system did respond to groundwater development to present, assess how the system will likely respond to different water use management scenarios into the future, and assess what management scenario modifications may achieve stable water levels under different climate scenarios.
- **Question:** If we already knew that we are mining the resource and depleting storage in 2015, why are we waiting to do something about it? **Answer:** In 2015, OWRD and others became increasingly concerned that the Harney Basin couldn’t support the level of groundwater development already approved within the Greater Harney Valley area given documented declines in the Weaver Springs area, the Crane-Buchanan area, and north of highway 20. Limited data suggested possible groundwater level declines in other areas also. The preliminary data pointed to a problem, but additional data was needed to assess the geographic extent and the severity of the situation. That led to a moratorium on issuing new groundwater permits when OWRD adopted Basin Rule changes. The basin rule changes also included an agreement to conduct the current groundwater study to collect and analyze new data across the basin, which will be communicated in a report due in 2020. The Rules Advisory Committee will be reconvened within a year of completing the study to consider the study results and discuss potential groundwater management changes.

**Decisions Points/Recommendations:** None

**Action Items:** None

**Proposed Future Discussion Topics:** None

### **The Water Budget Continued – Estimating Groundwater Storage Change**

**For the full presentation, click here**

Amanda Garcia from the USGS continued her presentation from past meetings on how to develop a water budget. This presentation focused primarily on groundwater storage.

- Amanda described pre-development conditions where the system was in equilibrium and natural recharge from precipitation equaled natural discharge from native vegetation. Under development conditions groundwater is used and cones of depression can form around

pumping wells. Since groundwater moves from higher elevations to lower elevations, a change in the water level can cause a change in the groundwater-flow direction. Locally, groundwater will flow towards the depression in the water table. In areas where groundwater flows toward and discharges into streams, large water-level declines could alter the flow direction so that groundwater flows toward the groundwater depression rather than the stream. In an extreme case, the stream could start to lose water to the groundwater system whereas under natural conditions the stream gained water from groundwater discharge.

- When groundwater is used it is either coming from storage or it is capturing the natural groundwater discharge to streams or springs or through ET by native vegetation.
- The storage coefficient of different hydrologic units represents the fillable pore space in the aquifer material – this coefficient is estimated from literature / aquifer tests.
- Groundwater level maps described by Jerry help us understand the potential change in storage over time and points out cones of depression in the basin.
- In some areas of the basin, data suggests that it could take over 100 years for that groundwater to travel from its initial recharge zone to a discharge zone.
- Water-level records from wells show the potential loss of storage. There is not sufficient data from one single well to show the extent of the declines, but there are wells that track together and in some areas they show declines of more than 70 feet. The rates of groundwater-level decline correspond with the rate of development.

Next Steps:

- Incorporate new well measurement points into water-level elevations
- Contour basin-wide water-levels
- Create water-level change maps
- Compile aquifer-test data
- Refine groundwater-use estimates

**Key Discussion Topics/Questions:**

- **Question:** What about systems where the surface water isn't connected to the groundwater? Aren't we talking about two different areas with two different water tables? **Answer:** In an unconfined aquifer the water table delineates the top of the aquifer. A confined aquifer is overlain by a clay layer or another confining unit that limits water movement.
- **Comment:** If you are pumping from a deep aquifer that is sealed off in a lower unit, it may not be affecting the shallower system. Need to think about these different hydrogeologic units and how they're connected or separated. **Response:** There can be a cone of depression in both aquifers, but a cone of depression in a deep well may not affect the water table and may not have a localized impact on vegetation and streams. It depends on the aerial extent of the confined aquifer. At some point that confined unit is getting recharged and discharged somewhere in the system. Depends on the porosity, width, and continuity of the confining layer though even a thick clay layer is permeable (there is moisture) and water is working its way

through the system. Some materials have a dampening effect on signals from nearby groundwater use.

- **Question:** Is there sufficient data to make the statement that travel time for groundwater is greater than 100 years? **Answer:** We are still collecting and analyzing the data, but it does look like the wells that we've sampled so far in those discharge areas towards the center of the basin have very old water. Wells in the upland areas tend to be younger. This is consistent with what Amanda is saying – it suggests long travel times between the two areas.
- **Comment:** USGS is very professional and scientific in the way they collect water chemistry samples. I was very impressed by their protocols. It was very beneficial for me to go out with them. I look forward to seeing more of the water chemistry data and really grappling with that data as a group. There is the potential for that data to really start highlighting some of the differences we expect are there. The group may decide that additional testing would be beneficial. **Response:** We appreciate the feedback. USGS is hoping that the full analysis of wells tested in the spring will be ready this fall. They expect to share preliminary results in January. DEQ also collected samples for carbon 14, tritium, and stable isotopes in 70 wells scattered across the basin.
- **Question:** So when you talk about lost storage, you mean that some of the rock or soil has been dried up? How long does that take to fill back up? **Answer:** Our estimates will be improved once we develop a numerical flow model. This model can be used to evaluate how much water is being removed from storage or restored under different management scenarios.
- **Question:** Since we don't necessarily have a single well with a record showing 100 foot decline, how do you know that it's declined that much? **Answer:** I can present on this at a future meeting. No single well captures the entire record, but wells that track together show this amount of decline over time.

**Decisions Points/Recommendations:** None

**Action Items:** None

**Proposed Future Discussion Topics:** None

## MEMBERSHIP UPDATE

OWRD and Harney County jointly appointed Charlotte Roderique, a representative of the Numu Allottee Association, as a as a member of the Groundwater Study Advisory Committee.

It was noted that Allison Aldous and Erin Maupin are no longer able to serve on the Committee, leaving two vacancies on the Committee. Members were asked to consider suitable replacements and have those interested send letters to OWRD and the County Court for consideration.

## TECHNICAL UPDATES FROM OWRD, USGS, AND PARTNERS

OWRD, USGS, and partners shared the following updates:

- **OWRD Updates Memo** – Jerry Grondin provided a handout summarizing OWRD technical updates, which is accessible here.
- **Observation Wells** – OWRD will begin drilling observation wells along 205 – Downright Drilling has been contracted to drill the holes. There is an open invitation to visit the site – please contact Darrick if you're interested in seeing an observation well being drilled: [Darrick.E.Boschmann@oregon.gov](mailto:Darrick.E.Boschmann@oregon.gov). Three wells in total will be drilled in late summer/fall.
  - **Comment:** The Advisory Committee is interested in seeing more funding dedicated to the Harney Basin for observation wells.
- **Water Chemistry** – USGS is continuing to collect water chemistry samples and is slowly getting results from the lab. USGS was very appreciative of the ability to take water chemistry samples at Fred's place in the spring. The samples collected by DEQ can also be useful to the study – those are currently at the lab. USGS anticipates being able to deliver a presentation with updated information in October or January.
- **Water Budget** – USGS continues to assess water use and vegetation distribution using various tools. The evapotranspiration (ET) station measuring ET of native vegetation was moved to a new location – it was moved to the USFWS Refuge discharge area on the South side of the lake. USGS has identified the control points for the unmanned aerial system drone and plan to run those transects in early August. They are appreciative of participating landowners – Numu Allottee parcels, USFWS property near the ET station, and Laurie and Sally's property.
- **Well Elevation Surveys** – OWRD is working with DOGAMI to improve well elevations and will continue this work through the summer.
- **Hydrologic/Aquifer Properties** – OWRD will be using existing data as well as additional pump tests to determine a storage coefficient. OWRD may seek volunteers who are interested/willing to do a pump test on their well.
- **Groundwater Levels** – OWRD is taking quarterly groundwater level measurements and entering data from the spring synoptic. They are also using available groundwater level data from the synoptic to update groundwater level maps (contour maps).
- **Local Groundwater Monitoring** – The Watershed Council is taking quarterly measurements.
- **Groundwater Supported Ecology** – The Nature Conservancy is going to be doing work around springs, water chemistry parameters, and habitat supported by groundwater.
- **Geologic Maps** – OWRD is anticipating upcoming publications from DOGAMI in the Harney Basin.
- **Community Based Planning** – There is a meeting of the full Collaborative tomorrow night (July 18) as well as a barbeque. Everyone is welcome. Justin will be giving the same presentation that he delivered to the Commission in June.
  - **Comment:** It's important for community members to know what is being said about these things to statewide audiences and to have access to the same information.



**Decisions Points/Recommendations:** None

**Action Items:** None

**Proposed Future Discussion Topics:** None

## OWRD PROJECT MANAGEMENT UPDATES

Justin Iverson provided several updates to the group:

- **Project Schedule** – OWRD and USGS reviewed the Gantt chart provided as a part of the Plan of Study. OWRD has prepared a brief and extended memo that describes the status of the study in greater detail. Members of the Advisory Committee are encouraged to review the memo and reach out to Justin with any questions. Generally speaking, the Study Team is on track to finish the study on schedule. Some of the individual tasks may take longer to complete than originally anticipated, but this should not affect the overall schedule.
  - **Question:** Is there the budget to do it all? Will the money be there to see it through to the end? **Answer:** Yes, we expect that the budget is secure and funding will be sufficient to finish the study.
- **Water Use Measurement Cost-Share Program** – OWRD is now able to offer cost-share to install water measurement devices for groundwater users (it was previously only available to surface water users). Justin provided packets of information to those that were interested and left a stack of packets with JR (the District 10 Watermaster). Reporting of water use is voluntary and encouraged. Understanding how much water is pumped will help OWRD and USGS better understand how much applied water is lost through evapotranspiration and how much applied water may percolate back into the groundwater system. Self-reported water use data is variable and may not be reliable, but it is the best we have right now.
- **Update to the Water Resources Commission** – OWRD provided an update on the Groundwater Study to the Water Resources Commission at their June meeting. Angie presented to the Commission on the local groundwater monitoring efforts and Mark and Brenda presented on the community based water planning effort. Justin will deliver the same presentation that was delivered to the Commission at the meeting of the full water planning collaborative tomorrow.

**Decisions Points/Recommendations:** None

**Action Items:** None

**Proposed Future Discussion Topics:** None

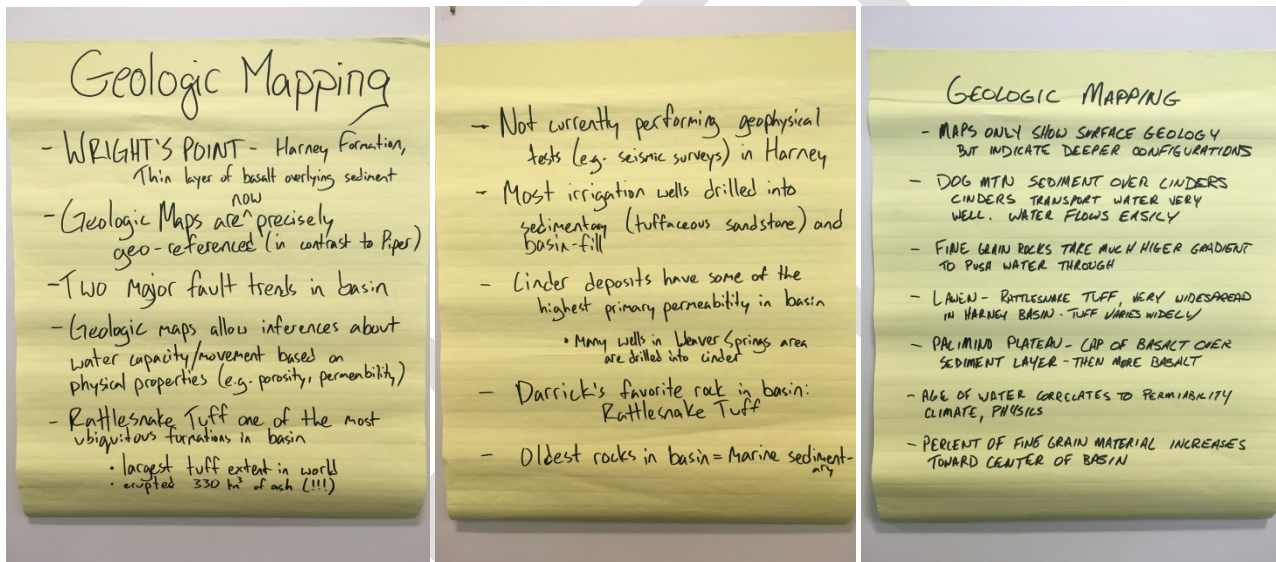
## BREAK OUT SESSIONS – NOTES, OBSERVATIONS, AND REFLECTIONS

The Advisory Committee and members of the public were invited to break into four groups to discuss topics of interest with Study Team members. Study Team members hosted small group discussions about geologic mapping, groundwater level mapping, water chemistry, and the water budget.

### Geologic Mapping

Topics discussed include:

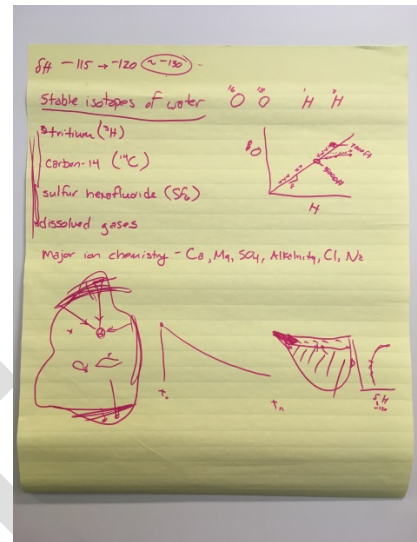
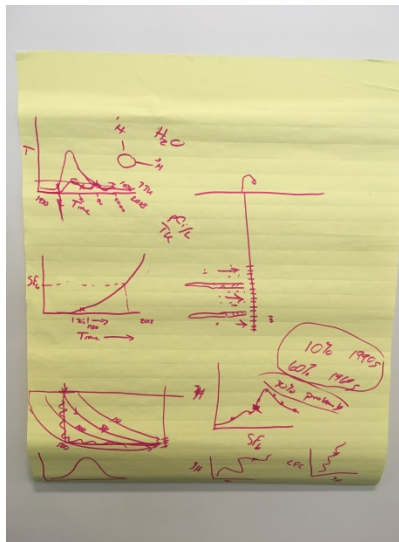
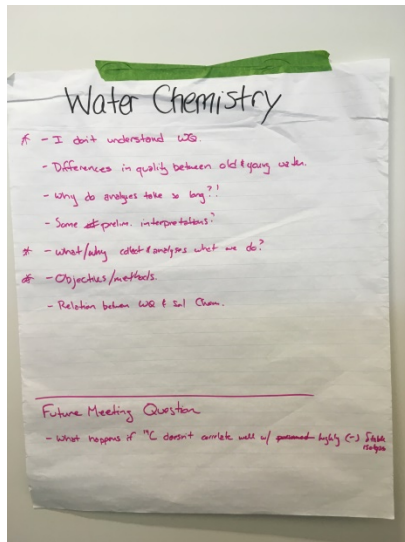
- How to make a map
- What you do with a geologic map – what you use it for
- How different rock types transmit water
- Differences between basin fill and other geologic layers



### Water Chemistry

Topics discussed include:

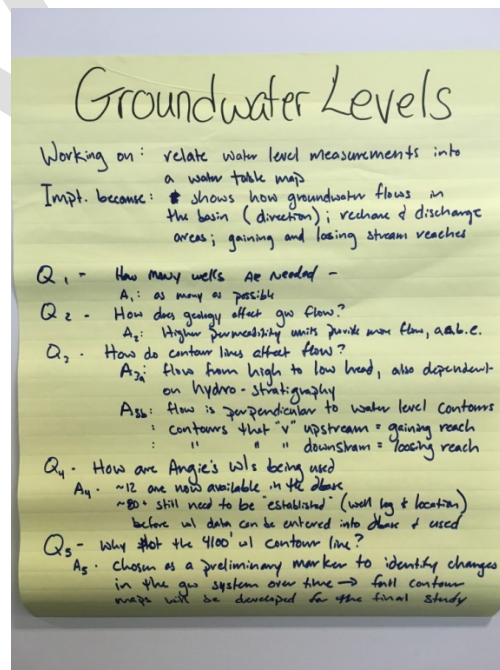
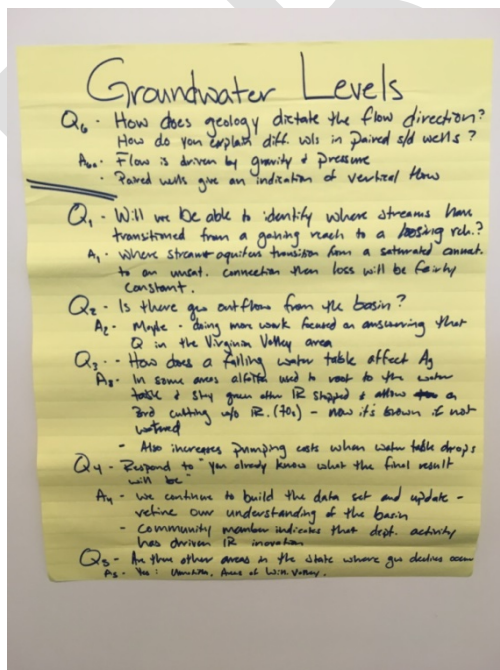
- More information about techniques and methodologies – why are these techniques/methodologies used and what they can tell us.
- How water chemistry complements physical hydrology – two lines of evidence that serve as a check and balance
- The usefulness of chemistry as a tool to understand groundwater systems
- Old vs. new water – there is a lot of interest in paleowater
- Usefulness of data for future modeling efforts



## Groundwater Levels

Topics discussed include:

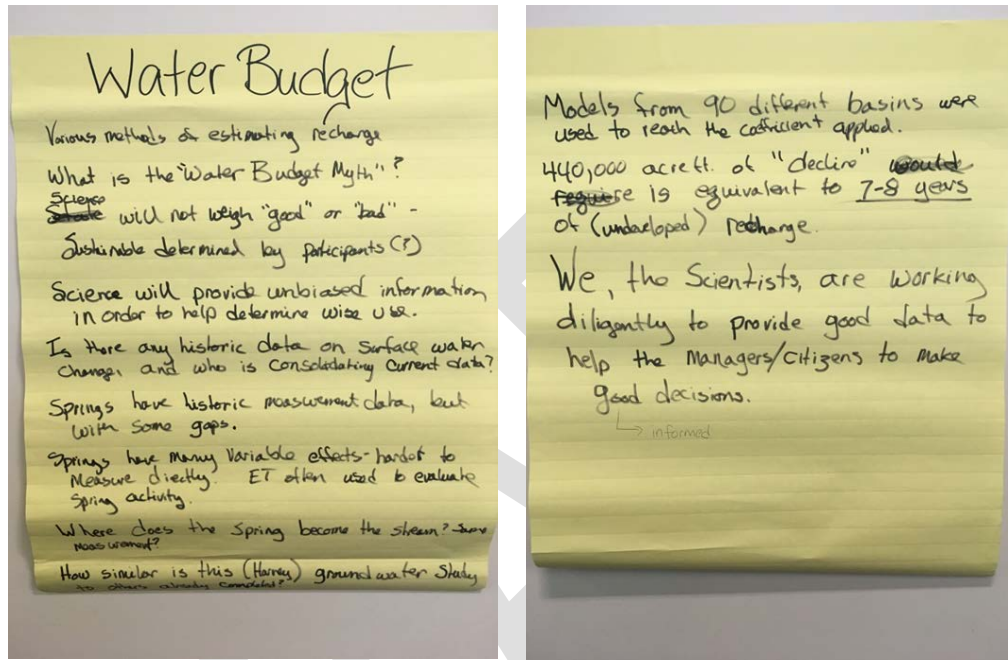
- Time series data and how that can help us understand responses to stress
- The difference between shallow and deep groundwater levels
- The significance of the 4100' contour and how it has changed over time
- Concern about following the data versus confirming preconceived ideas
- Groundwater recharge versus discharge areas
- Rate of recharge



## Water Budget

Topics discussed include:

- How baseflows are measured and why that's important
- Change in historic baseflows over time and how that might be connected to pumping
- Storage depletion - what it might mean to achieve a new equilibrium/sustainable management
- The many different sources of information that are used to build a water budget



Each person at the meeting was invited to share observations, feedback, or an outstanding question they had after the breakout sessions:

### Science Questions/Observations

- Can we map out the heavy clay sedimentation, basin fill characterization depth?
- It is surprising how big of a role vegetation plays.
- Scientists are using all available resources to evaluate the groundwater resources.
- Small group presentations were awesome! I'd like more info on any quality differences between "old" and "new" water.
- I have a better understanding of water flows and the data used to understand flows.
- H<sub>2</sub>O chemistry question – What can be shown in the difference between lacustrine sediments and glacial/periglacial sediments as to their contribution to water movement and residence times?
- Aha moment! Silvies River and Donner & Blitzen behave differently hydraulically. Silvies is discharging [to groundwater] and Donner & Blitzen is recharging [from groundwater].
- Where are the wells with the oldest water located? Chemically speaking.

- Interesting to learn from Darrick that Weaver Springs area is very permeable in relation to surrounding geology.
- How does the intersection of volcanic areas and sedimentary basin fill function and how much subsurface information exists to explain and map those formations as it relates to groundwater flows.

#### **Kudos**

- Breakout groups good!! More in-depth understanding. ☺
- Great job by the scientists!
- Small groups were a success.
- Darrick – good rocks and maps. Thanks.
- ☺
- Great questions and interest from participants! I enjoyed this session.
- Jerry's groundwater information ☺.
- ☺

#### **Process Suggestions**

- The data collection and study development is impressive and will be very helpful but it would have been great to have it before so many groundwater permits were issued.
- Science team needs to reassure everyone that they are being guided by data rather than preconceived conclusions.
- We should talk in small groups more frequently – it allows for focus, detail, and direct conversations.
- Continue updates info.
- Meeting face-to-face yields best solutions and brings out humor despite challenges.
- Good meeting. Reports from technical people are slow getting back to us.
- It appears there is a very uncomfortable mismatch between the need for info for the community planning and the groundwater modeling schedule.

#### **Other Observations**

- Who will regulate the water?
- My fears are increasingly based on science. We have me the enemy and they are us (Pogo). And, where was the chocolate?
- The difference between what people mean to say and what people hear is large.
- Good conversation about the response to regulation/study by the community members. Good frank discussion about community pulling together to increase irrigation efficiency.
- Even preliminary results show water reductions in 3 areas where water mining is likely occurring.