

# HOOD RIVER BASIN WATER PLANNING STUDY

*Meeting Minutes: December 5<sup>th</sup>, 2012*

## **I. CALL TO ORDER**

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **December 5<sup>th</sup>, 2012**.

## **II. ATTENDEES**

The following were present:

<b>Name</b>	<b>Organization</b>
1. Dan Church	Bureau of Reclamation
2. Toni Turner	Bureau of Reclamation
3. Chris Brun	Confederated Tribes of Warm Springs
4. Hugh McMahan	At Large Member
5. John Buckley	East Fork Irrigation District
6. Jason Keller	Geo-Systems Analysis, Inc.
7. Niklas Christensen	Herrera Environmental Consultants
8. Les Perkins	Hood River County
9. Mike Benedict	Hood River County
10. Mattie Bossler	Hood River County/ East Fork Irrigation District
11. Steve Stampfli	Hood River Watershed Group
12. Craig DeHart	Middle Fork Irrigation District
13. Thomas Gast	Normandeau Associates
14. Bonnie Lamb	Oregon Department of Environmental Quality
15. Daina Bambe	U.S. Forest Service
16. Ed Salminen	Watershed Professionals Network

## **III. PLANNED BUSINESS**

Niklas began the meeting with introductions. The majority of the meeting was spent reviewing the status report by starting with the groundwater assessment portion of the study.

### **A. GROUNDWATER MODELING**

1. Mattie reviewed her plan to set up a groundwater monitoring network. She will use the Department of Geology and Mineral Industries' newly completed geologic map and all the wells in the County to select new monitoring sites. Her plan is to select sites that are vertically and spatially representative of the geologic conditions. She also mentioned her plans to go with Marc Norton (OWRD) and Bob Wood (Watermaster) for their quarterly water measurements on the following day to understand how they measure water levels and help develop a volunteer

monitoring network. Once the wells are identified, OWRD has stated they can incorporate up to 20 additional wells in their monitoring. There was also mention of incorporating isotope sampling at some point in the future.

2. Toni summarized the Groundwater Workshop (see 12.05.12 Status Report) and mentioned Jennifer Johnson (Bureau) would be preparing a design document by the end of December that would propose currently available data, data gaps, and groundwater model development. Dan also included the possibility of having continuing communication with people who attended the groundwater workshop through conference calls/webinars and Mattie would be coordinating that communication.

## **B. CLIMATE CHANGE ANALYSIS**

1. Toni summarized the Bureau's progress on Climate Change Analysis (see 12.05.12 Status Report).
2. Hugh wondered if the glacier thickness was hypothetical and not representative of Mt. Hood's glaciers. Niklas said Ed developed the DHVSM model for the Middle Fork and would be able to answer. Ed said the glacier thickness wasn't representative and was set at one meter. Mike wondered if the model would calculate when the glacier would be gone. Ed responded and said the model could not determine that because the glacier parameters (area, thickness) are difficult to quantify. Niklas believes that the new dynamic University of British Columbia glacier model does explicitly model over year glacial change, hence will be able to predict if/when a glacier would be gone.
3. Steve wondered if the Bureau was contracting Bebe for the dynamic glacier component she was developing for the model. Niklas responded and said that she isn't but would be able to publish a journal article focusing on the glacier component in return for her work. Steve said her work and Ed's Middle Fork Study should be documented as an in-kind contribution in the grant (Section V Action Items).

## **C. WATER STORAGE ASSESSMENT**

1. Toni summarized the Bureau's progress and plan for their Storage Assessment portion of the study (see 12.05.12 Status Report).
2. Niklas said the County would develop a tentative list of criteria and which would be given to stakeholders for review.
3. Les said we could immediately eliminate some sites and then use the matrix with a more select list of sites.
4. Chris wondered when several meetings had been conducted to select storage sites (referring to 12.05.12 Status Report) and said that whoever was involved in the meetings should be documented (see Section V Action Items). Niklas said that information would be documented, and also mentioned that he sent an email to everyone on the HRWPG email list on October 30 informing them of the process and soliciting input.
5. Bonnie wondered if there is still time for more input for selecting storage sites. Niklas said the Storage Assessment should be put into context of the whole study and less focus should be placed on selecting storage sites, but more input could be included from people not initially involved with selecting sites.

6. Daina said she did not receive the attachments to the storage report and Niklas said he would send them out to the group (see Section V Action Items). Mattie said she would also provide a smaller version of the map at the meeting showing the storage sites and IFIM reaches.
7. Steve wondered if storage sites were selected using a topographic model and Toni responded and said that they mainly solicited input from stakeholders based on their needs. She also mentioned several more steps are needed to evaluate the sites; a full geology investigation which would include collecting samples.
8. Les mentioned that part of this study is questioning whether or not we need storage sites and that should be determined before an extensive investigation of each proposed site. Mike wondered if a matrix would be needed if enough detail wasn't available at this stage in the study. Toni said it was important to continue with the process they were following.
9. Mike wondered how many sites could pragmatically be incorporated into the water resources model. Toni responded that ideally three and no more than five sites could be modeled. Les said he would prefer more storage sites incorporated and Toni responded by saying that it would be difficult to incorporate 15 sites into the model.
10. Les wondered if the exact location of each storage site was necessary in the model. Niklas responded by saying that model could be more volume based and each storage site just needed to be placed relative to upstream and downstream diversions. Les said that model should focus on different storage scenarios rather than specific sites and the model could be a decision tool to select what sites from the actual sites should be selected. Toni agreed and other factors should be incorporated, like conservation, to determine the extent of storage needs for the Basin. She also said that she could do a less detailed model that wouldn't take into account reservoir operational rules.
11. Ed mentioned that the model will route flows, so the model could be run without storage and reaches that are most impacted could drive the selection of storage sites. Similarly, Niklas said the model would run several scenarios: existing conditions, conservation, and climate change to determine the water availability of each reach.
12. Chris thought there was a lot of focus being placed on storage and conservation was the highest priority. Toni said the intent of the storage study was to provide a toolbox for future needs. Les agreed and said the storage assessment was about management options for the future and doing a cost/benefit analysis of future storage sites.
13. Daina said she would prefer not to select sites and would like to compare the sites through different criteria. Steve thought other storage studies should be reviewed to see how they initiated storage site selection and to get an idea of how much time is really needed to use the matrix evaluation and whether or not this is an appropriate time to select sites.
14. Chris said the number of storage sites has grown and effort shouldn't be placed on a lot of sites. Les responded by saying that we should incorporate as many sites as we can now because we don't have the knowledge to eliminate sites. Toni said the Bureau's process should be used to narrow in on specific sites and specific sites can't be determined immediately.
15. Toni also mentioned that once the storage needs are more defined through the water conservation and needs assessment, a storage workshop should be conducted to fully evaluate the storage sites.

**Considering everyone had a lot of input and opposing views for how to continue the storage assessment, Niklas, Les, and Mike met the following day to discuss the best path forward. They, along with consultation from the Bureau, thought that storage sites in the water resource model should be non-site specific. This would allow the study to focus on how much, if any, storage is necessary. Once we quantify the climate change impacts and finish the Water Conservation Assessment, the HRWPG will discuss target volumes to use in the water resource**

**model. With this modified approach, there is no need to go through the site selection matrix at this point. After meeting with Mike and Les, and consulting with the Bureau, Niklas called EFID, MFID, CTWS, and SWCD to discuss this approach. If anyone wants the HRWPG to go through the storage site selection matrix process, please contact Niklas.**

#### **D. IN-STREAM FLOW ASSESSMENT**

1. Thomas summarized Normandeau's progress on the IFIM study. They have almost completed field measurements and they just need to get high flow measurements on Green Point Creek. Their next step is to develop the Habitat Suitability Criteria and they plan on using the Middle Fork IFIM Study criteria. He asked Ed when the Middle Fork Study would be completed and Ed responded that the Study is currently in internal review, but he could provide the criteria (See Section IV Action Items).
2. Chris included that the fall Chinook sub-yearling criteria should be included as well because the Middle Fork Study does not have them. He said he would provide that criteria and Thomas said he might have the Chinook criteria in his current database.
3. Chris also mentioned that a meeting should be held to review the criteria. Mike wondered if a meeting was necessary and they could save money by not having a meeting. Chris said they could set up a conference call and asked Thomas when they could have the conference call. Thomas said that he should review the criteria as soon as possible.
4. Niklas wondered what Normandeau was using for hydrologic data and Thomas said the County is providing data. Niklas said that he and Thomas should discuss this further and thought the DHVSM model flows should be used. Niklas also thought there was duplication in effort when generating flows both from the water resources model and the PHABSIM model.

#### **E. WATER NEEDS ASSESSMENT**

1. Niklas said he was partnering with Ed to do the Watershed Needs Assessment and the assessment would be used to develop the Water Resources Model.
2. Ed reported his progress; he said the OWRD GIS water use data is incomplete so he generated a complete version of all the points of diversion (POD) and categorized them by use. Mike wondered if there was any spatial data. Ed said the POD was a shapefile and the other data is hyperlinked.

#### **F. WATER CONSERVATION ASSESSMENT**

Niklas said that conservation assessment will begin after the Water Needs Assessment.

#### **G. WATER RESOURCES MODELING**

1. Toni summarized the Bureau's progress in the water resources modeling portion of the study and reviewed different model options for them to use (see 12.05.12 Status Report)
2. Niklas also added that Riverware is a proprietary model with a \$6,000 initial license and \$3,000 for each additional year and the model requires training. Excel is free but the modeling can get complicated quickly. He also mentioned that Riverware can provide more detail but will

probably become a static document. Mike thought Excel seemed like the best model for the County.

3. Toni said the model will require a knowledge handoff and would include training the County to use the model. Craig wondered if a user manual could also be provided and Toni said that could be included (see Section V Action Items). Craig also mentioned that they had Excel spreadsheet modeling the MFID and he could provide that to the Bureau (see Section V Action Items).
4. Niklas reviewed items 4 and 5 under the Water Resources Modeling Section of the 12.05.12 Status Report.
5. Bonnie wondered if a water quality component was also being considered in the study. Niklas responded by saying that this was a weak aspect of the model and could be done somewhat qualitatively. If this study is brought to a feasibility level, more focus will be placed on water quality. Mike wondered if there are models that show correlation between volume and temperature and Bonnie responded by saying that DEQ had developed a model for the main stem Hood River, East Fork and Neal Creek a few years ago, but updating the model to current conditions would be challenging. Niklas said he had a conversation with Jason Dunham (OSU) who created a temperature model dependent on volume and air temperature that would be ready in about six months. Toni also added that one of the requirements of the basin study is to examine how changes in water supply affect water quality and ecological resiliency. The examination would most likely be qualitative, but could be quantitative with more stakeholder input.

## **H. ADMINISTRATIVE TASKS**

The next HRWPG meeting is scheduled for January 2<sup>nd</sup> which is likely not a good day to meet. Niklas suggested combining the January and February HRWPG meeting into a single meeting held on January 16<sup>th</sup>. Two people mentioned conflicts with January 16<sup>th</sup>, after which other dates were proposed each of which also had scheduling conflicts. A status report with project updates will be sent out to the HRWPG on January 4<sup>th</sup>, at which time we will reassess the need to meet depending on progress made.

Adjournment

Niklas ended the meeting at **4:30 pm**.

## **IV. ACTION ITEMS**

1. Document in-kind contributions from Bebe and the Middle Fork IFIM Study (Mattie).
2. Send out storage report attachments to WPG (Niklas, been completed already).
3. Send out map of storage site locations and IFIM reaches to WPG (Mattie).
4. Provide Habitat Suitability Criteria from the Middle Fork IFIM Study to Thomas (Ed).
5. Provide Chinook Criteria to Thomas (Chris).
6. Include user manual for water resources model (Toni).
7. Provide MFID Excel Model to Bureau (Craig).

# HOOD RIVER BASIN WATER PLANNING STUDY

*Meeting Minutes: January 16<sup>th</sup>, 2013*

## **I. CALL TO ORDER**

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **January 16<sup>th</sup>, 2013**.

## **II. ATTENDEES**

The following were present:

<b>Name</b>	<b>Organization</b>
1. Dan Church	Bureau of Reclamation
2. Chris Brun	Confederated Tribes of Warm Springs
3. Chuck Gehling	Confederated Tribes of Warm Springs
4. Hugh McMahan	At Large Member
5. John Buckley	East Fork Irrigation District
6. Niklas Christensen	Herrera Environmental Consultants
7. Les Perkins	Hood River County
8. Mike Benedict	Hood River County
9. Mattie Bossler	Hood River County/ East Fork Irrigation District
10. Steve Stampfli	Hood River Watershed Group
11. Rachel Reagan	U.S. Geologic Survey
12. Gary Asbridge	U.S. Forest Service
13. Ed Salminen	Watershed Professionals Network
14. Jason Seals	Oregon Department of Fish and Wildlife
15. Bob Wood	Oregon Department of Water Resources

## **III. PLANNED BUSINESS**

Niklas began the meeting with introductions. The majority of the meeting was spent reviewing the status report.

### **A. GROUNDWATER MODELING**

1. Dan summarized the Bureau's progress on Groundwater Modeling (see 1.16.13 Status Report).
2. Steve wondered if the groundwater model would be able to determine the impact on streamflows from increased groundwater use. Niklas said this would be difficult to quantify because an interface between the Groundwater Model, MODFLOW, and the Water Resources Model would be required.
3. Hugh said the Groundwater Model should be able to incorporate new data as more groundwater data is collected.

## **B. CLIMATE CHANGE ANALYSIS**

1. Dan summarized the Bureau's progress on Climate Change Analysis (see 1.16.13 Status Report).
2. Niklas also mentioned his concern with the Bureau's use of a ten-year time series for the DHVSM Model and thought a 20-year time series was more appropriate.

## **C. WATER STORAGE ASSESSMENT**

1. Dan summarized the Bureau's progress on the Water Storage Assessment (see 1.16.13 Status Report).

## **D. WATER RESOURCES MODELING**

1. Dan summarized the Bureau's progress in the water resources modeling portion of the study and reviewed different model options for them to use (see 1.16.13 Status Report).
2. Niklas thought MODSIM was a good alternative to both Riverware and Excel. The software is free unlike Riverware and would not be cumbersome or complicated to use like Excel.
3. Niklas said in the next WPG meeting he could address how different components, such as MODFLOW and DHVSM, feed into the Water Resources Model (See Action Items). Dan said a webinar could be set up as well which could focus on how MODSIM interacts with MODFLOW (See Action Items).
4. Niklas went over a Hood River Basin schematic (see 1.16.13 Status Report) he created, which symbolizes the rivers, pipelines, canals, and diversions in all of the Irrigation Districts in the County. He also mentioned how he plans to aggregate certain diversions in each Irrigation District (shown in the Basin Schematic) to meet the data formatting requirements of the Water Resources Model.

## **E. IN-STREAM FLOW ASSESSMENT**

1. Niklas summarized Normandeau's progress on the IFIM Study (see 1.16.13 Status Report).
2. Niklas also mentioned flows from the DHVSM model will be used in the study and Normandeau would like to use a 20-year time series, so as mentioned previously, Niklas is working with the Bureau to shift from the 10-year time series they plan to use.

## **F. WATER NEEDS ASSESSMENT**

1. Niklas summarized his progress on the Water Needs Assessment (see 1.16.13 Status Report). He has reviewed a lot of data and passed around spreadsheets containing examples of what he has collected. He plans on manipulating the raw data he collected and putting it in a more organized and condensed form.
2. He mentioned he had difficulty collecting water use information from smaller water users like Dee Irrigation District and Mt. Hood Irrigation District. He was also unable to get in contact with Parkdale Water Company and Oak Grove. He is not too concerned with contacting these smaller users and said they can be lumped together in the Water Resources Model.
3. Niklas asked the group to examine Table 1 in the 1.16.13 Status Report and indicate the major industrial users in the Basin. (Unable to record responses, please email me if you remember what the responses were)
4. Chris wondered if hydropower use is not included in the water needs assessment because they are not considered consumptive. Niklas said there is some hydropower use that is consumptive and

because all of the hydropower use in the Basin is within MFID and FID and he will include each irrigation district's hydropower use as a portion of their total water use.

## **G. WATER CONSERVATION ASSESSMENT**

Niklas said that conservation assessment will begin after the Water Needs Assessment.

## **H. HRC UPDATE**

1. Mattie reviewed her progress with developing a groundwater monitoring network for the Basin (see 1.16.2012 Status Update).
2. Mattie mentioned her efforts in developing a list wells to consider for monitoring and was concerned that she would waste time developing a list of prospective wells but wouldn't be able to monitor them because well owners could decline permission. Les suggested she should double the list of prospective wells by having two sets of wells with similar characteristics, so the second list of wells could provide an alternative for instances when landowners would not give permission to monitor their wells (See Action Items).
3. When Mattie mentioned planning on writing a letter to request permission to access well owners' land, Les suggested she should write letter that introduces the project and solicits interest rather than directly asking for permission to access property (See Action Items).
4. Hugh mentioned he would be able to write an article for Hood River News introducing the groundwater monitoring program (See Action Items).
5. Steve said he could also include the monitoring program in a press release he was preparing for Jason Keller's presentation for the HRWG. He also thought she could introduce the program at the HRWG's upcoming meeting and implore any well owners attending the meeting if they would like to participate.
6. Mattie also reviewed her progress and future plans with collecting irrigation system and crop type data with all the irrigation districts (see 1.16.12 Status Update).

## **I. NEXT STEPS**

1. Niklas opened a discussion for how the group should proceed after the BOR and OWRD studies are completed and reviewed other short term and long term projects around the Basin (see 1.16.2012 Status Update).
2. Mike said there would be a lack of project management because he was retiring and Mattie and Niklas's contracts would end before the completion of the BOR project and wondered if there were future BOR programs the group could pursue.
3. Dan responded and said the thought BOR may be in the planning stages of developing a Basin Feasibility Study program. He also mentioned the WaterSMART System Optimization Review as a potential opportunity the HRWPG could pursue after completion of the current project. He said he would look into this program and send information to the group (See Action Items).
4. Mike thought the group should decide what role it would play in the future: a group providing data and support to new projects or a group playing an active role in pursuing new projects.
5. Les mentioned the main intent of the HRWG was to pursue new projects for the Basin, so the HRWPG should play a supplementary role by providing data from the current BOR and OWRD projects to future projects.

6. Steve mentioned usually there wasn't an issue with finding and acquiring new projects, but giving enough time to do them accurately was a problem.
7. Chris thought the group should potentially consider hiring a grant writer to pursue projects related to water planning.

The meeting was adjourned at **4:00 pm**.

#### **IV. ACTION ITEMS**

1. Address how the water resources model interfaces with DHVSM and MODFLOW in March meeting (Niklas).
2. Mention groundwater monitoring program in HRWG press release (Steve, already completed).
3. Write letter of inquiry presenting groundwater study to County residents owning wells and sent out to group for review (Mattie).
4. Develop list of prospective wells for the groundwater monitoring program (Mattie).
5. Coordinate webinar to introduce MODSIM for group (Dan).
6. Send information about System Optimization WaterSMART grant (Dan).
7. Draft article for Hood River News mentioning groundwater monitoring program (Hugh).

# HOOD RIVER BASIN WATER PLANNING STUDY

## *Meeting Minutes: March 6th, 2013*

### **I. CALL TO ORDER**

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **March 6<sup>th</sup>, 2013**.

### **II. ATTENDEES**

The following were present:

<b>Name</b>	<b>Organization</b>
1. Hugh McMahan	At Large Member
2. Jason Keller	At Large Member
3. Chris Brun	Confederated Tribes of Warm Springs
4. John Buckley	East Fork Irrigation District
5. Jer Camarata	Farmers Irrigation District
6. Les Perkins	Hood River County
7. Mike Benedict	Hood River County
8. Mattie Bossler	Hood River County/ East Fork Irrigation District
9. Steve Stampfli	Hood River Watershed Group
10. Bonnie Lamb	Oregon Department of Environmental Quality
11. Rick Craiger	Oregon Watershed Enhancement Board
12. Gary Asbridge	U.S. Forest Service
13. Niklas Christensen	Watershed Professionals Network

### **III. PLANNED BUSINESS**

Niklas began the meeting with introductions. The majority of the meeting was spent reviewing the status report.

#### **A. INTRODUCTION**

1. Mike announced that Niklas had ended his employment with Herrera Environmental Consultants and now is employed with Watershed Professionals Network (WPN). The County ended their contract with Herrera and signed a new contract with WPN which amounted to the unused funds and incomplete tasks from the contract with Herrera.
2. Niklas presented and reviewed the schedule for Consultants, the Bureau of Reclamation, and Hood River County working on the Water Planning Study on page 3 of the 3.1.13 Status Report to clarify any confusion with previous versions of the schedule. He announced the majority of the tasks for each party were on schedule with exception to Climate/Hydrologic Modeling being

performed by the Bureau of Reclamation. The Bureau is at the calibration stage with the DHVSM model.

3. Niklas also reviewed two overall considerations (see pg. 4, 3.1.13 Status Update): the need for extending the historical record for the flow data used in the DHVSM model, and the need to better calibrate the model to produce results more representative of observed data. Niklas said he planned on meeting with the Climate Impact Group at the University of Washington and the Bureau on 3.7.13 to discuss how to remedy these issues.

## **B. GROUNDWATER MODELING**

1. Niklas summarized the Bureau's progress on Groundwater Modeling (see 3.1.13 Status Report).
2. Niklas presented some overall considerations from the Bureau's Groundwater Design Document; They found in their preliminary level of analysis that the Basin has a lot of clays and fine grain soils with low permeability which will limit recharge and ultimately groundwater availability.
3. Niklas also mentioned the need to potentially reevaluate the level of USGS involvement after the groundwater webinar being held on 3.13.13. It's possible the USGS may not need all the money remaining in their contract, and if so, some of that money could be shifted towards working on the DHSVM calibration. Mike responded and said he didn't see any problem and could prepare a contract amendment to decrease the amount of the USGS contract.

## **C. CLIMATE CHANGE ANALYSIS**

1. Niklas summarized the Bureau's progress on Climate Change Analysis (see 3.1.13 Status Report).
2. Niklas presented the Bureau's progress in developing the DHVSM model by going over the DHVSM plots in Figures 1-4 of the Status Report. Figures 2 and 3 show modeled flows from DHVSM and observed streamflows from Hood River at Tucker Bridge and the West Fork Hood River, respectively. Modeled streamflow is under simulated in August and September for both sites. The under simulation is actually greater than what it appears in the figures, as the modeled flows need to be compared to naturalized streamflow (removes affects of diversions and regulation). Naturalizing the Tucker Bridge gauged streamflow adds roughly 330 cfs to summer flow and 70 cfs to winter flow. Niklas has analyzed this in the Water Needs Assessment and passed on the naturalizing data to Reclamation. Figure 4 presented the model's underestimation of Snow Water Equivalent (SWE) when compared to observed SWE as well. Niklas thought these results identified the need for more funds to improve the DHVSM model as mentioned in Item 3 of Groundwater Modeling section above.
3. Chris wondered if these flows could be modeled at the mouth of the Hood River. Niklas responded by saying that the model could route flows to any point in the Basin (e.g. IFIM locations) but that they were focusing on locations with stream gauges at this point for calibration.

## **D. WATER STORAGE ASSESSMENT**

1. Niklas summarized the Bureau's progress on the Water Storage Assessment (see 3.1.13 Status Report).

#### **E. WATER RESOURCES MODELING**

1. Niklas summarized the Bureau's progress in the water resources modeling portion of the study (see 3.1.13 Status Report). He was impressed with the level of spatial detail in the model. Some items in the model do not accurately represent the Basin yet (Lawrence Lake, potable water districts, and groundwater recharge/discharge are excluded), but these items will be worked through in the coming weeks.

#### **F. IN-STREAM FLOW ASSESSMENT**

1. Niklas summarized Normandeau's progress on the IFIM Study (see 3.1.13 Status Report).

#### **G. WATER NEEDS ASSESSMENT**

1. Niklas summarized his progress on the Water Needs Assessment (see 1.16.13 Status Report). He passed around a draft Water Needs Report.
2. Niklas still is having issues collecting enough data from potable water districts. He has not received any information from Parkdale and Oak Grove Water Company and some potable water districts do not have water use reports. He has also received limited information from Mt. Hood Meadows.
3. Mike wondered how the group would sign off on Niklas' Water Needs Report. Les responded and said each of the water users would need to review sections of the document with their information and he said he could also review the report. Niklas also mentioned Bob Wood should review the document as well.

#### **H. WATER CONSERVATION ASSESSMENT**

Niklas said that Conservation Assessment will begin after the Water Needs Assessment.

#### **I. INTERACTIVE MAP OF HOOD RIVER BASIN (GOOGLE EARTH OR ARC EXPLORER?)**

1. Niklas presented two options the County could use to store the spatial data from the Study: Google Earth or ArcExplorer and asked the group for feedback on what software would be more appropriate.
2. Bonnie mentioned that the Crooked River Watershed Council has utilized Google fusion tables with their water quality data and said the map incorporated attribute data easily with spatial information
3. Jer wondered if the spatial and attribute data from this study could be incorporated into the County's web-based interactive map. Niklas thought that was a possibility.
4. Ultimately the group decided Niklas should correspond with Mike Schrankel and ask him what software he would prefer.

### **IV. HRC UPDATE**

1. Mattie summarized the work she has completed with establishing the Groundwater Monitoring Network and assisting Niklas with the Conservation Assessment (see 3.1.13 Status Report).

2. Bonnie wondered if what water quality parameters well owners were interested in testing. Mattie responded and said well owners were mostly interested in testing for bacteria and nitrates.
3. Mike wondered if quarterly groundwater level measurements were sufficient to provide enough data. Jason responded and said a quarter was a standard timestep used in groundwater models.
4. Chris mentioned that another article could be written in Ruralite magazine and he has used the publication as a contact platform for past projects and received a lot of response. Hugh said he knew the contact for the Ruralite and he would be happy to write another article about the program.
5. Niklas also mentioned that with a volunteer monitoring program some administration would be required and asked if the Watershed Group or SWCD would be able to store equipment and make it available. Steve responded and said that the HRWG could likely house equipment, and perhaps participate in other aspects of the program. He also stated that availability of program funding would not necessarily result in the HRWG deciding to adopt the program, given office and staffing limitations.

## **V. BUDGET FOR OWRD HOLDBACK FUNDS (10% OF OVERALL OWRD BUDGET)**

1. Niklas stated the possibility for allocating the remaining \$25,000 of the OWRD grant funds to be spent after 6.1.13 (see page 18, 3.1.13 Status Report).
2. Mike mentioned that the County plans on only spending \$223,500 of the \$225,000 and the remaining funds could be added to the holdback funds available after June 30<sup>th</sup>.
3. Niklas reemphasized the need to spend more funds on improving the DHVSM model by potentially reallocating funds from the USGS contract. Jason wondered if it would be useful to use the remaining funds from the USGS on conducting seepage funds. Niklas responded and said the cost to conduct seepage runs is more expensive than amount of remaining funds available.
4. Niklas asked Rick Craiger what grant opportunities the County could pursue with OWEB in regards to groundwater monitoring. Rick said that the regular grant program could be used for monitoring and the small grant program could not be used for monitoring. He also said in past years their funds used to be split for two purposes: one for monitoring, watershed studies, and education and the remaining funds were used for technical assistance on projects. He also mentioned these rules could change because the funds are now combined and OWEB is looking into the possibility of allowing monitoring as an option for the small grant program.
5. Rick also mentioned that the OWRD grant program is modeled after OWEB and said that a grant extension is required if funds are used after the grant availability date. He recommended making an amendment to the grant agreement to secure the funds and allow funds to be spent after the grant availability date.
6. Mike mentioned his concerns with securing funds from the OWRD 10 percent holdback because the allocation of the funds would be contingent on a complete final report. OWRD would likely require results from the Bureau's final report to be included the County's final report. The exact date the Bureau's final report is complete might not be concrete and potentially completed after the grant availability date set in a grant amendment with OWRD. Les responded and said based on his understanding, the Final OWRD report did not have to include results from every part of

the Study so the Bureau's results could be potentially excluded. Mattie mentioned she would look into the exact requirements of the OWRD final report.

7. Niklas also wanted a decision from the group as to whether or not funds could be reallocated from the USGS contract or the 10 percent holdback to improve the DHVSM model. Les gave his support to reallocate the funds from either option. Mike said he preferred to allocate funds from USGS. Jason wondered if the USGS would be able to review the OWRD groundwater model with a smaller contract. Niklas responded and asked Jason how long it would take to review the model. Jason thought about eight hours would be sufficient to review the model and Niklas said the USGS contract costs \$680 per day of work. Niklas said he would discuss the remaining level of effort required with the USGS after the groundwater webinar on 3.13.13.

The group decided to skip the April meeting and meet again in May. The meeting was adjourned at **4:10 pm.**

## **VI. ACTION ITEMS**

1. Provide flow measurements taken from two points along the Dee Irrigation Ditch (Les).
2. Provide Draft Groundwater Design Document to Bonnie and Hugh (Mattie, already completed).
3. Correspond with Terrence Conlon about potentially changing the County's contract with USGS (Niklas).
4. Correspond with Mike Shrankel on whether or not he would be able to maintain the spatial and attribute data from the project using an interactive web-based map (Niklas).
5. Consult Bob Wood and Marc Norton if a certification is required to measure groundwater levels (Mattie).

# HOOD RIVER BASIN WATER PLANNING STUDY

## *Meeting Minutes: May 1st, 2013*

### **I. CALL TO ORDER**

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **May 1st, 2013**.

### **II. ATTENDEES**

The following were present:

<b>Name</b>	<b>Organization</b>
1. Hugh McMahan	At Large Member
2. Jason Keller	At Large Member
3. Jonathan Rocha (via Webex)	Bureau of Reclamation
4. Jennifer Johnson (via Webex)	Bureau of Reclamation
5. Jonathan Rocha (via Webex)	Bureau of Reclamation
6. Chris Brun	Confederated Tribes of Warm Springs
7. John Buckley	East Fork Irrigation District
8. Jer Camarata	Farmers Irrigation District
9. Les Perkins	Hood River County
10. Mike Benedict	Hood River County
11. Mattie Bossler	Hood River County/ East Fork Irrigation District
12. Cindy Thieman	Hood River Watershed Group
13. Craig Dehart	Middle Fork Irrigation District
14. Bob Wood	Oregon Water Resources Department
15. Ed Salimen	Watershed Professionals Network
16. Niklas Christensen	Watershed Professionals Network
17. Bob Wood	Oregon Water Resources Dept

### **III. PLANNED BUSINESS**

The meeting was initiated with a presentation given by Jennifer and Jonathan, Groundwater Specialists with the Bureau of Reclamation (BOR). The remainder of planned business followed the agenda listed in the 5.1.13 Status Report.

#### **A. GROUNDWATER MODELING**

Jennifer and Jonathan provided an update of their groundwater assessment, an explanation of the steady-state groundwater model they are building, and the model's results. This section provides a detailed account of the Bureau's presentation and questions from the WPG, so please skim as needed. The numbered items also are presented in the order of the powerpoint presentation, so the powerpoint can be

used to clarify and questions about the items (the slide number referenced corresponds to the powerpoint in presentation mode).

1. The Bureau first provided the overall purpose and objectives of their groundwater assessment (see Slide 3, HRB GW 1May2013 Shared power point presentation).
2. Jonathan described the inflows and outflows into the Basin's groundwater system and mentioned the difficulty in representing the basin, due to lack of data for outflows and inflows (Slide 5, HRB GW 1May2013 Shared.pptx)
3. Jonathan focused on the available data and presented water level data collected by OWRD from 14 wells. The figure depicted little to no change in the 14 wells' water levels over a five year period. Jonathan also mentioned the stable groundwater levels are indicative of the inflows equaling the outflows for a long period of time (Slide 7, HRB GW 1May2013 Shared.pptx).
4. Jonathan then presented their estimates for aquifer inflows and outflows in the basin (Slide 8, HRB GW 1May2013 Shared.pptx).
  - a. Canal losses were estimated from Irrigation District Conservation Plans.
  - b. Spring outflows were estimated from reported potable water use from the water districts and were considered underestimated due to other springs not allocated for use.
  - c. Pumping outflows were estimated from reported water rights and corresponding irrigated acres and were considered overestimated because users were likely to not use their entire water right,
  - d. Estimates for river losses and gains were taken from Niklas' estimate for naturalized flow at Tucker Gage in October and expanded to account for an entire year.
5. Jonathan then described the methodology the used to calculate recharge. Precipitation recharge was the largest water budget item (slides 9-10, HRB GW 1May2013 Shared.pptx ).
  - a. Using guidance from a USGS Study of the Columbia Plateau Regional Aquifer System, the Bureau calibrated their recharge estimates for the Hood Basin using a regression equation correlating modeled recharge to estimated recharge for the NW Deschutes Basin (borders Hood River Basin). The correlation coefficient was 0.93 for the regression equation, indicating the modeled recharge adequately represents the estimated recharge for NW Deschutes Basin and confirmed the ability to use the equation for the Hood River Basin.
  - b. Slide 9 presented the Bureau's estimates for the spatial distribution of annual recharge in the Hood River Basin using the USGS regression equation as well as the seasonal distribution for the recharge.
6. Jonathan felt more confident in their estimates for Precipitation Recharge, Canal Losses, and Pumping losses, and less confident in their estimates for River Losses and Gains, Boundary Inflows and Outflows, and Spring Outflows (slide 11, HRB GW 1May2013 Shared.pptx).
  - a. The underestimation for the river losses and gains is due to only being able to use flows at Tucker Bridge in October. Niklas wondered what the Bureau's methodology was to distribute the base flows from annual scale to a seasonal scale. Jennifer responded and said they would use outputs from their model to estimate annual river losses and use a general seasonal pattern of increased outflows during the winter and spring months and lower outflows in the summer and fall months. Niklas said he had time series for spring

discharge, showing the seasonal fluctuation which he thought could be applied to the river losses and gains.

- b. Les asked Niklas if the base flow estimate from the naturalized flow at Tucker Gage removed contributions from glacier melt. Niklas said glacial melt is not removed; however very little glacier melt contributes to baseflow in October due to evening frost. Ed thought baseflow could be estimated from the USGS gauge at the West Fork Hood River because there is little glacial melt and scaled based on watershed area for the mainstem Hood River at Tucker Gage.
  - c. Jennifer said the the overall outputs from the model would provide a relative relationships between groundwater and surface water rather than hard numbers so more focus on fine tuning baseflow was unnecessary for completing the overall objective of the assessment.
7. Jonathan expected they would finalize their steady state model by mid-May and then begin building the transient model. They also will begin formulating alternatives and scenarios to evaluate in the model (Slide 12, HRB GW 1May203 Shared powerpoint).
- a. Niklas asked what scenarios the Bureau planned to model. Jonathan responded and said they would use the questions presented in Slide 2 and utilize feedback from the USGS and WPG to form the scenarios. Jennifer also added they would include scenarios incorporating climate change impacts.

## **B. PROJECT TIMELINE**

Niklas summarized progress for the Consultants, Bureau of Reclamation and Hood River County (Page 3, 5.1.13 Status Report). Climate and Hydrologic Modeling is delayed due to issues with calibrating DHSVM and they expect to finish calibrating the model and generating stream flow by the end of May. The delay in climate/hydrologic modeling changed the timeline for finishing the Instream Flow Assessment from the end of May to the end June because generated stream flows will be used in PHABSIM.

## **C. CLIMATE CHANGE ANALYSIS**

1. Niklas summarized the Bureau's progress on Climate Change Analysis (Page 4, 5.1.13 Status Report).
2. Due to Bureau's lack of time and resources, University of Washington will be contracted by the Bureau to assist the Bureau in calibrating DHSVM.

## **D. WATER STORAGE ASSESSMENT**

1. Niklas summarized the Bureau's progress on the Water Storage Assessment (see 3.1.13 Status Report).
2. Niklas also mentioned water storage will be revisited once water resources modeling has been complete and any possible deficits have been identified.

## **E. WATER RESOURCES MODELING**

1. Niklas summarized the Bureau's progress in the water resources modeling portion of the study (Page 4, 3.1.13 Status Report). Similarly to the Instream Flow Assessment, the Bureau will not be able to begin actual modeling until they receive results from DHSVM. The Bureau will conduct

a similar presentation to the groundwater assessment once they are further along with building the model.

#### **F. IN-STREAM FLOW ASSESSMENT**

1. Niklas summarized Normandeu's progress on the IFIM Study (Page 5, 5.1.1 Status Report). As mentioned previously, Normandeu is waiting for results from DHSVM.
2. Thomas Gast will plan on presenting their results at the next WPG meeting in June.

#### **G. WATER NEEDS ASSESSMENT**

1. Niklas summarized his progress on the Water Needs Assessment (Page 5, 5.1.13 Status Report). He passed around a draft Water Needs Report.
2. Niklas found errors in the OWRD water rights database for the City of Hood River which could indicate water rights for other users are wrong as well. Niklas plans on reviewing the actual water right certificates (original scope based on OWRD Water Rights Information System database) to confirm water rights of other users in the County.
  - a. When reviewing certificates for users with multiple sources, Niklas is experiencing difficulties in determining how the maximum use rate is distributed over multiple sources to derive the actual water use of the user.
  - b. Bob described one method the State uses when there are multiple sources but the certificate doesn't specify a specific rate for each source. If the certificate specifies a rate for each source, that is the number that will appear under the heading "rate". This corresponds to "use rate" on Niklas's tables. Max rate is actually the maximum rate allowed for each use on the certificate. Bob also said that there are errors in the data he has discovered over the years. That is why Bob also suggested to Niklas that he check the actual certificates for the flow values to verify they are correct.

#### **H. INTERACTIVE MAP OF HOOD RIVER BASIN**

1. Niklas summarized his progress on completing the interactive map for the Hood River Basin (Page 5, 5.1.13 Status Report).
2. Mike Schrankel agreed to incorporate the spatial data on the County's interactive map on their website.
3. Niklas said the map will allow the user to click on a particular element and a table will pop-up presenting links to the water rights and use reports on the OWRD website.

#### **I. WATER CONSERVATION ASSESSMENT**

1. Niklas summarized his progress on completing the water conservation assessment (Page 6, 5.1.13 Status Report).
2. Niklas began reviewing his calculations with estimating conservation opportunities with sprinklers and soil moisture sensors for the Irrigation Districts.
  - a. Niklas and Mattie first collected all the available information on existing application systems in each of the Irrigation Districts.
    - i. MFID conducted a field survey and follow up questionnaire.
    - ii. EFID conducted a mail survey was done followed by a phone survey.

- iii. DID and MHID estimates were based on conversations with the District Managers.
    - iv. FID estimates are still a work in progress.
  - b. Niklas described his methodology for calculating the efficiency for each application system type. He used two studies conducted by Jac Laroux and the SWCD monitoring the water use of different irrigation systems Orchardists used in the Hood River Basin.
  - c. Niklas described his implementation of a conservation scenario for each district where he assumed a certain percentage of acres would be converted to more efficient application systems over a 10 year period.
  - d. For each district, Niklas compared the water use determined through the application efficiency and the use estimated from the water use reports. He found the water use based on application efficiency was relatively similar to the reported use for all of the irrigation districts except EFID, where the reported use exceeded the estimated use by around 14,000 acre-feet per year. Niklas said the discrepancy is likely due to overflows and seepage throughout EFID's distribution system.
- 3. Niklas said he would use the City of Hood River's Water Management Conservation Plan and EPA WaterSense documents to estimate conservation opportunities for the potable water districts. He found the water use for all the potable irrigation districts remained pretty steady on an annual basis, except for the City of Hood River and The Dalles where water use increased in summer due to not being served by a separate irrigation source.
- 4. Niklas reviewed hydroelectric options for each of the irrigation districts and found the most opportunity with EFID.
  - a. Niklas found two different options for EFID: 1) A low head hydropower system made by Natel Energy with three different installation configurations and a pretty high capital cost and 2) a in pipe configuration made by Lucid Energy with a reasonable capital cost. John Buckley wondered if these systems would be cost-effective with operation only during irrigation season and Niklas said he was unsure and still needed to determine if either option was feasible.
  - b. Craig mentioned that Niklas' option for MFID to direct Coe flows to their sediment pond would not improve the District's hydroelectric production. Niklas said he wanted to discuss this further with Craig in the coming weeks.

## **J. HRC UPDATE**

Mattie summarized the work she has completed with establishing the Groundwater Monitoring Network, assisting Niklas with the Conservation Assessment, and updates in OWRD Grant Administration (Page 7, 5.1.13 Status Report).

Niklas thought the group should meet again towards the end of June during the week of the 17<sup>th</sup> since it is closer to the end of the OWRD grant period. Niklas said he would confirm whether or not this week would work for the group in the coming weeks. The meeting was adjourned at **4:10 pm**.

# HOOD RIVER BASIN WATER PLANNING STUDY

## *Meeting Minutes: July 10th, 2013*

### **I. CALL TO ORDER**

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **July 10th, 2013**.

### **II. ATTENDEES**

The following were present:

<b>Name</b>	<b>Organization</b>
1. Hugh McMahan	At Large Member
2. Jason Keller	At Large Member
3. Chris Brun (via teleconference)	Confederated Tribes of Warm Springs
4. John Buckley	East Fork Irrigation District
5. Sean Welch	Hood River Citizen
6. Les Perkins	Hood River County
7. Mike Benedict	Hood River County
8. Mattie Bossler	Hood River County/ East Fork Irrigation District
9. Cindy Thieman	Hood River Watershed Group
10. Chuck Gehling	Hood River Watershed Group
11. Rick Craiger	Oregon Watershed Enhancement Board
12. Terrence Conlon (via teleconference)	United States Geological Survey
13. Niklas Christensen	Watershed Professionals Network

### **III. PLANNED BUSINESS**

The majority of the meeting was spent reviewing the July Status Update and considering budget alternatives to continue and complete the OWRD and Bureau studies. Niklas presented the status update and budget alternatives with a PowerPoint® presentation which can be used as a reference while reviewing the minutes presented below. Some of the slides contain animations, so view the presentation in presentation mode.

#### **A. OVERALL CONSIDERATIONS**

Niklas began the meeting with some overall considerations that would be addressed in the meeting (Slides 4-8, 7.10.2013\_WPG.pptx).

1. Niklas presented an overview of the Bureau and OWRD Studies showing the different components of the two studies and how they relate to each other (slide 5, 7.10.2013\_WPG.pptx).

2. Niklas presented Reclamation's current water resources model in MODSIM and said that the current model is still a work in progress. He said he was working with Toni Turner to ensure the model would accurately reflect the Basin (slide 6, 7.10.2013\_WPG.pptx).
3. Niklas presented an imaginary scenario that would be run through MODSIM and how MODSIM's results would be used in the Instream Flow Assessment (slide 7 & 8, 7.10.2013\_WPG.pptx).
4. Mike wondered if the Instream Flow Assessment would be identifying minimum flows required for each species. Niklas said the analysis would not produce concrete numbers and minimum flows could not easily be identified. Sean Welch wondered if any carrying capacity studies have been done for the Hood Basin because the flow found from those studies could be used as minimum requirement. Chuck responded saying several carrying capacity studies have been done and Chris would be able to provide more information on the details of those studies.

## **B. GROUNDWATER MODELING**

Niklas summarized Reclamation's progress with the Groundwater Assessment (slides 12-15, 7.10.2013\_WPG.pptx).

1. Niklas said Reclamation is currently developing different modeling scenarios that would incorporate combinations of current and projected climate conditions and increased pumping and aquifer injection scenarios.
2. Due to the coarse level of detail Reclamation will have available to model an aquifer injection scenario, Cindy wondered if it was worthwhile for Reclamation to conduct this analysis. Terrence responded and said that he thought Reclamation could conduct this level of analysis at a low level of effort, but he would mention her concern at his next meeting with Reclamation.
3. Niklas discussed Reclamation's other modeling scenario where they would increase pumping. Reclamation had estimated current annual pumping in the Basin at ~11,000 acre-feet and Niklas was concerned this amount was an overestimate because their estimation was based on water rights which represents the maximum amount available for use and not actual use. Les thought they should re-estimate actual use and include maximum use based on water rights as another scenario to model.
4. Hugh asked if Reclamation had incorporated well measurements taken from the newly added wells into MODFLOW. Mattie responded and said she had given Reclamation measurements from March and is unsure whether or not they have incorporated the data into their model.
5. Terrence said he would relay the group's questions to Reclamation and he would plan on Reclamation having another meeting with the Groundwater Subgroup in the coming weeks to confirm the groundwater modeling scenarios.

## **C. CLIMATE CHANGE ANALYSIS**

Niklas summarized the Reclamation's progress on Climate Change Analysis (Slide 17, 7.10.2013\_WPG.pptx).

## **D. WATER STORAGE ASSESSMENT**

Niklas summarized Reclamation's progress on the Water Storage Assessment (Slide 18, 7.10.2013\_WPG.pptx).

## **E. WATER RESOURCES MODELING**

Niklas summarized Reclamation's progress in the water resources modeling portion of the study (Slide 19, 7.10.2013\_WPG.pptx).

## **F. WATER NEEDS ASSESSMENT**

Niklas summarized his progress on the Water Needs Assessment (Slide 20, 7.10.2013\_WPG.pptx).

## **G. INTERACTIVE MAP OF HOOD RIVER BASIN**

Niklas summarized progress on completing the interactive map for the Hood River Basin (Slide 21, 7.10.2013\_WPG.pptx).

## **H. WATER CONSERVATION ASSESSMENT**

Niklas summarized his progress on completing the Water Conservation Assessment (Slide 22, 7.10.2013\_WPG.pptx).

1. Niklas reviewed his analysis on potable conservation measures for the Hood Basin. For conservation measures related to toilet and shower retrofits, Niklas found that there would be little summer decrease in use from the City of the Dalles because their Dog River water right is supplemented by groundwater and only groundwater use would decrease.
2. Niklas reviewed his analysis on irrigation conservation measures for the Hood Basin. Hugh wondered if residential irrigation use could be quantified because most of the irrigation districts use an honor system. Les responded saying FID was the only district that used flow restrictors to limit residential use. Chuck wondered if investigating costs associated with measuring individual use and the associated conservation measures was included in Niklas's analysis. Niklas responded saying he found little literature providing costs and related conservation gains from metering residential irrigation use.
3. Niklas reviewed his analysis on hydropower improvements for the Basin.
4. Niklas reviewed his analysis on opportunities for sediment control. He found little data on common particle size distribution of the Hood Basin limiting his analysis to only using studies outside of the Basin. In Niklas's analysis, settling was the only cost effective treatment method to reduce sediment in the irrigation systems.

## **I. IN-STREAM FLOW ASSESSMENT**

Niklas summarized Normandeu's progress on the IFIM Study (Slide 23, 7.10.2013\_WPG.pptx). Niklas reviewed three different budget alternatives Normandeu proposed to complete the Instream Flow Assessment. Niklas thought Option 3 was the best option for the WPG Group to pursue.

## **J. HRC UPDATE**

Mattie summarized the work she has completed with establishing the Groundwater Monitoring Network (Slide 24, 7.10.2013\_WPG.pptx).

## **K. BUDGET OPTIONS TO COMPLETE THE WATER PLANNING STUDY**

Niklas presented different alternatives to continue the Water Planning Study (Slides 25-27, 7.10.2013\_WPG.pptx).

1. The group agreed that the irrigation districts and other stakeholders like the tribes needed to be solicited to contribute to the shortfall in funding. Les Perkins said he could talk to Craig Dehart and Jer Camarata to see if they would have any available funds. John Buckley said EFID currently had little funds and probably would be unable to contribute.
2. Cindy said the shortfall in funding would not be helped by HRWG WaterSMART grant currently being reviewed by Reclamation. In the application, she included completing the Basin Study as a portion of work that would be completed with the grant funds. Unfortunately, she was recently told by Reclamation that funds from this grant could not support completion of the Basin Study.

## **IV. ACTION ITEMS**

1. Provide input to Reclamation for the scenarios they would implement in their groundwater model, MODFLOW, within the next two weeks (WPG Members).
2. Hold a Groundwater Subcommittee meeting to finalize the scenarios in MODFLOW (Mattie Bossler, Reclamation).
3. Prepare contract with WPN and Normandeau with the County's available funds (Mike Benedict, Mattie Bossler).
4. Solicit irrigation districts and other stakeholders for funds to fulfill the funding shortfall to complete the Water Planning Study (Les Perkins).

The group agreed to schedule the next meeting on **September 4<sup>th</sup>**.

# HOOD RIVER BASIN WATER PLANNING GROUP

*Meeting Minutes: November 6th, 2013*

## **I. CALL TO ORDER**

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **November 6th, 2013**.

## **II. ATTENDEES**

The following were present:

<b>Name</b>	<b>Organization</b>
1. Bonnie Lamb (via teleconference)	Department of Environmental Quality
2. Chris Brun	Confederated Tribes of Warm Springs
3. Ed Salimen	Watershed Professionals Network
4. Hugh McMahan	At Large Member
5. Jennifer Johnson (via teleconference)	United States Bureau of Reclamation
6. John Buckley	East Fork Irrigation District
7. Jon Rocha (via teleconference)	United States Bureau of Reclamation
8. Mattie Bossler	Hood River County/ East Fork Irrigation District
9. Mike Benedict	Hood River County
10. Niklas Christensen	Watershed Professionals Network
11. Taylor Dixon (via teleconference)	United States Bureau of Reclamation
12. Toni Turner (via teleconference)	United States Bureau of Reclamation

## **III. PLANNED BUSINESS**

Taylor Dixon and Niklas Christensen presented during the majority of the meeting. Taylor presented the results from DHSVM and MODSIM for both current and future climates. Niklas discussed possible avenues to proceed with the Instream Flow Assessment in light of CTWS and ODFW's concerns with the current results. Taylor and Niklas presented with PowerPoint® presentations which can be used as a reference while reviewing the minutes presented below. Unlike previous meetings the discussion did not follow the November update and instead followed the meeting agenda.

### **A. PROJECT SCHEDULE**

Niklas presented the project timeline for Consultants, Reclamation, and Hood River County. Niklas presented the timelines for Reclamation to complete reports for the Groundwater Assessment, Climate Change Modeling, DHSVM AND MODSIM modeling, and the final report which will integrate all the reports into one (Slides 2-3, WPG\_Meeting\_11\_06\_13\_NC.pptx).

## **B. WATER USE AND WATER CONSERVATION REPORTS**

Niklas presented the status the reports he has completed as well as the progress Mike Shrankel has made in developing the Water Resources web map (Slide 4, WPG\_Meeting\_11\_06\_13\_NC.pptx).

## **C. IFIM UPDATE**

Niklas presented concerns raised by CTWS and ODFW regarding results from Normandeau and the agencies' recommendation for completing the Instream Flow Assessment.

1. Niklas said that the CTWS and ODFW expressed concerns that the optimal flows estimated in PHABSIM for the East Fork Hood River were lower than they would expect given prior studies done to estimate optimal flows for fish habitat (Slide 5, WPG\_Meeting\_11\_06\_13\_NC.pptx).
2. Niklas presented a graph comparing the monthly optimal flows estimated by Normandeau to the optimal flows estimated in the Basin Investigation Report (BIR) which was completed in 1973. The BIR recommended flows ranging from 150 to 250 cfs where Normandeau recommended flows ranging from 100 to 150 cfs (Slide 6, WPG\_Meeting\_11\_06\_13\_NC.pptx)..
3. Niklas said that Rod French and Chris Brun thought the Instream Assessment should proceed as scheduled but results from the study should be updated as new data becomes available.

## **D. WATER RESOURCE ALTERNATIVES**

Niklas presented the water resources alternatives that will be modeled in MODSIM, the Water Resources Model.

1. Niklas presented five alternatives to model: 1) current climate, water demands, water conservation, and water storage, 2) future climate and remaining current conditions, 3) future climate and future water demands and remaining current conditions, 4) future climate, water demands and conservation and current storage conditions, and 5) future climate, water demands and conservation and new storage, (Slide 7, WPG\_Meeting\_11\_06\_13\_NC.pptx).
2. Niklas said Reclamation is in the process of completing a report to more accurately estimate future water conservation related to irrigation which can be applied to the alternatives that incorporate future water conservation.
3. Ed Salimen wondered if only one climate scenario was going to be used in MODSIM and Niklas said that three future climate scenarios would be used, so a total of 12 alternative and scenario combinations would be evaluated in MODSIM.

## **E. GROUNDWATER**

Mattie Bossler presented her progress in establishing the groundwater monitoring network as well as the next steps she plans to complete (Slide 9, WPG\_Meeting\_11\_06\_13\_NC.pptx)..

## **F. PRELIMINARY DHSVM RESULTS**

Taylor Dixon presented Reclamation's progress in surface water modeling using DHSVM (Slides 1-10, WPG\_Meeting\_11\_6\_13\_BR\_Taylor.pdf).

1. Taylor provided a background on both DHSVM and MODSIM describing the inputs and outputs used for each model (Slides 1-4, WPG\_Meeting\_11 6 13\_BR\_Taylor.pdf).
2. Taylor described the steps Reclamation used to calibrate DHSVM. In collaboration with the University of Washington, Reclamation used gauged stream flow data and historical observations of Mt. Hood glacier volumes and extent to ensure simulated stream flows were representative of observed data (Slides 5, WPG\_Meeting\_11 6 13\_BR\_Taylor.pdf).
3. Taylor presented the baseline streamflow data generated in DHSVM and his analysis of the data. To assess the quality of the generated flows, he compared DHSVM flows with observed flows within the basin and in nearby watersheds as well as statistical estimates of flows in ungauged watersheds within and near the basin. Overall he felt the results were physically representative of observed and statistically estimated data within and near the basin. (Slides 7-10, WPG\_Meeting\_11 6 13\_BR\_Taylor.pdf).

#### **G. WATER RESOURCES MODELING**

Taylor presented the flows generated in MODSIM using the DHSVM flows described in the previous section (Slides 11-16, WPG\_Meeting\_11 6 13\_BR\_Taylor.pdf).

1. Taylor presented the MODSIM flows at several points with the watershed and compared them to corresponding observed flows. Although the modeled flows did not exactly align with observed flows at these locations when compared day by day, the modeled flows presented negligible bias from observed flows for flow points in the upper watershed when Taylor statistically compared the two flows. The modeled flows at Tucker Bridge did present bias for low and median flows when compared to observed flows (Slides 13-14, WPG\_Meeting\_11 6 13\_BR\_Taylor.pdf).
2. Overall he felt the MODSIM flows were consistent with the observed flows for the East, Middle and West Forks and modeled flows presented reasonable bias for the flows along the mainstem Hood River, given the accumulated uncertainty upstream diversions and tributaries contribute.

#### **IV. UNPLANNED BUSINESS**

Taylor was able to also present some preliminary results from Reclamation's climate change modeling (Slides 17-23, WPG\_Meeting\_11 6 13\_BR\_Taylor.pdf).

##### **A. PRELIMINARY CLIMATE CHANGE SCENARIO RESULTS**

1. Taylor presented the three climate scenarios Reclamation selected to use: a More Warming Dry (MW/D) scenario, a Median (MI) scenario, and a Less Warming Wet ( LW/W) scenario.
2. Taylor presented the simulated glacier volumes from 2009 to 2039 under each of the three climate scenarios compared to historical baseline volumes from 1979 to 2009. The figure showed the LW/W, MI, MW/D scenarios would result in glacier volumes decreasing by six, nine, and 13 percent, respectively, by 2039 (Slides 18, WPG\_Meeting\_11 6 13\_BR\_Taylor.pdf)..
3. Taylor also presented the future change in annual water volumes when compared to historical annual water volumes for the Middle Fork Headwaters, West Fork, East Fork, and mainstem Hood River. For all three scenarios the water volume for these locations would increase.

4. Taylor also examined the volume for these locations specifically during the summer months from July through September and found water volumes would decrease by as much as 110 cfs on the mainstem Hood River.
5. Taylor compared the monthly average flows under the three future scenarios at Tucker Bridge to the historical flows. The figure shows the future flows peak in February where historical flows peak in April.
6. Taylor summarized the climate change results. The data indicates more water will be in the watershed on annual basis but less water will occur during the summer months. Given the uncertainty of the climate data, Taylor said the relative changes were more important and should be used rather than the absolute (modeled) data to develop plans for future water resources management in the Hood Basin.

## **V. ACTION ITEMS**

The next WPG group meeting was scheduled for December 4<sup>th</sup>.

# HOOD RIVER BASIN WATER PLANNING GROUP

*Meeting Minutes: December 4th, 2013*

## I. CALL TO ORDER

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **December 4th, 2013**.

## II. ATTENDEES

The following were present:

Name	Organization
1. Chris Brun	Confederated Tribes of Warm Springs
2. Cindy Thieman	Hood River Watershed Group
3. Hugh McMahan	At Large Member
4. Jason Keller	At Large Member
5. Jennifer Johnson (via teleconference)	United States Bureau of Reclamation
6. Jer Camarata	Farmers Irrigation District
7. Jon Rocha (via teleconference)	United States Bureau of Reclamation
8. Les Perkins	Hood River County
9. Mattie Bossler	Hood River County/ East Fork Irrigation District
10. Niklas Christensen	Watershed Professionals Network
11. Taylor Dixon (via teleconference)	United States Bureau of Reclamation

## III. PLANNED BUSINESS

Taylor Dixon and Jonathan Rocha presented during the majority of the meeting. Jonathan presented results from the transient groundwater model, MODFLOW. Taylor presented the results from DHSVM and MODSIM for both current and future climate conditions. Mattie Bossler also provided a brief update of establishing the Groundwater Monitoring Network. Taylor and Jonathan presented with PowerPoint® presentations which can be used as a reference while reviewing the minutes presented below. Some of the slides contain animations, so view the presentation in presentation mode.

### A. GROUNDWATER MONITORING NETWORK

Mattie provided a brief update on her progress in recruiting more wells into the monitoring network. Since the November meeting, Mattie added an additional 16 wells to the 34 wells included in the network since 2013.

1. Les asked if she had used participating well owners to recruit other well owners into the network and Mattie said she had.

2. Cindy wondered if she planned on calling well owners who did not respond the letter she sent out in November. Mattie said she possibly would, but because phone numbers were not readily available she would prioritize other avenues to recruit more well owners.

## **B. FINAL GROUNDWATER MODELING RESULTS**

Jonathan Rocha presented results from their transient groundwater model, MODFLOW, as well scenarios they evaluated in the model (WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).

### **TRANSIENT GROUNDWATER MODEL RESULTS**

1. Jonathan first provided an overview of the questions they addressed when using MODFLOW (Slide 4, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
2. Jonathan presented the calibration results from the steady state groundwater model where he compared measured annual average water level elevations to modeled elevations. The graph indicated the model's ability to model measured data and Jon said MODFLOW modeled the measured data well (Slide 5, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
3. Jonathan presented a similar graph of the calibration results from the transient groundwater model where measured annual average water level elevations were compared to modeled elevations. Jon said the graph indicated that the transient model modeled the data well also (Slide 7, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
4. Jonathan presented several graphs comparing the quarterly measured water level elevations to quarterly modeled elevations at individual wells over a two-year time period. The model's elevations did not closely align with measured elevations at several wells. He said this was due to the graph showing average quarterly water elevations where the measured data were not summarized and represented water levels on a particular day (Slide 8-10, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
5. Jonathan said the model would be best as a tool to quantify relative changes in groundwater levels as opposed to be used for directly quantifying the water level of a particular well.

### **GROUNDWATER MODEL SCENARIOS UNDER CURRENT CONDITIONS**

6. Jonathan described the scenarios they modeled in the transient groundwater model. Jonathan said they modeled two different scenarios: an increased pumping scenario and an aquifer injection scenario. These scenarios were coupled with current conditions and climate conditions making a total of four scenario-condition combinations that were evaluated in the model (Slide 13, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
7. Jonathan first described the methodology and results of increased pumping scenario under current conditions. Reclamation identified locations that are currently not irrigated, but considered prime farmland. Reclamation placed 16 wells at these locations and assumed a demand of 1 cfs of each well over a 5 year period. (Slide 14-17, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
  - a. Niklas wondered if one or two wells could be evaluated and documented in their final report as opposed to the 16 wells evaluated in this scenario and Jon said they would be able to include that simulation as well.
  - b. Cindy wondered if Reclamation could estimate how much water could be sustainably with-drawn without any decrease in water elevations. Jennifer responded and said they

would not be able to estimate sustainable groundwater use with the current project, but the model could be developed in the future to answer this question.

- c. Jason wondered if the baseflows estimated by the model would be presented at the meeting and Jonathan said they would not but would be documented in the final report.
8. Jonathan described the methodology and results of the aquifer injection scenario under current conditions. Jonathan said they wanted to determine the best locations in the basin to place an injection well which would contribute streamflows during low flow periods. To do this, Jonathan placed an injection well in each grid cell of the model. Each injection well was evaluated with two criteria: 1) examining any increase in flows at Tucker Gage for use of an injection well for instream contributions and 2) evaluating the remaining volume of water remaining in the cell for use of an injection well for water storage. Using these criteria they found that none of the cells were viable to contribute flows during low flow periods or use for irrigation storage (Slide 18-20, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
- a. Hugh wondered what period of time were flows injected into each cell for this scenario. Jennifer responded and said flows were injected constantly during the period that was evaluated.
  - b. Jer wondered if the flow was increased in the injection well would instream contributions proportionally increase. Jennifer and Jon said if the flow into the injection well increased, the instream contribution would not necessarily increase proportionally. Jer also asked if certain stream reaches could be targeted for instream contribution by injection wells. Jonathan said that could be done, but they only focused on the Hood River at Tucker Gage because there was a detailed record of flow measurements.

#### **GROUNDWATER MODEL SCENARIOS UNDER FUTURE CONDITIONS**

9. Jonathan presented the methodology and results of the two scenarios under climate change conditions. For the two scenarios they evaluated the three climate conditions described in past meetings: a more warming/ dry scenario (MW/D), median condition (MI), and a less warming/ wet condition (LW/W) (Slide 21-22, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
10. Jonathan presented the change in recharge under each condition and all the conditions presented similar seasonal patterns in the change in the basin-averaged recharge. The three climate change conditions increased the recharge in the fall and winter quarters from current conditions and decreased recharge in the spring and summer quarters (Slide 23-25, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).
11. Jonathan described the methodology used for the increased pumping scenario under climate change conditions. Reclamation increased the pumping demand due to potential increases in evapotranspiration due to warming conditions and decreases in modeled streamflows under climate change conditions (Slide 26, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx)..
12. Jonathan presented the change in water elevations in three observation wells after 30 years of pumping from nearby wells under climate change conditions. Two of the wells, located in the Lower Valley, experienced a decrease in water levels under the three conditions. The remaining well, located in the Upper Valley, experienced little change in the water levels under the three conditions (Slide 28, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).

13. Jonathan presented the results for the aquifer injection scenario under climate change conditions and they presented little difference from the results under current conditions (Slide 29-30, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).

#### **CONCLUSION**

14. Jonathan reviewed the questions they addressed in the model and summarized the corresponding answers given the results of the model (Slide 31, WPG\_Meeting\_12 4 13\_Bureau\_Jon.pptx).

### **C. FINAL CLIMATE AND HYDROLOGY MODELING RESULTS**

Taylor presented results from the climate change and hydrology modeling efforts in the Basin Study.

1. Taylor described the metrics he used to evaluate the relative change of the results from DSHVM under climate change conditions compared to baseline conditions (Slide 2-3, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
2. Taylor provided a summary of the methodology used to calibrate model to historical observation of the volume and extent of glaciers on Mt. Hood (Slide 5, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
3. Taylor also summarized the methodology used to select climate conditions to model in DHSVM (Slide 7, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
4. Taylor presented a graph comparing relative volume and extent of the Mt. Hood Glaciers from a historical period of 1920 to 1980 to a simulated period from 1980 to 2010 (Slide 8, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
5. Taylor presented a graph of simulated glacier volumes under each of the climate change conditions where the LW/W, MI, and LW/W conditions produce a gradual decrease, an median decrease, and steep decline, respectively, in glacier volumes over a thirty year period (Slide 9, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
6. Taylor presented a graph comparing the average monthly glacial melt contributions to the Hood River at Tucker Gauge under the baseline and three climate change conditions. Niklas asked if the glacial melt contributions would be expected to lower than the results presented once the glacier receded to certain size. Taylor said he would expect to see those trends. Taylor also presented the monthly average of snowpack extent under historical, baseline, and climate change conditions. (Slide 11-12, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
7. Taylor presented a graph of the average natural flows at Tucker Gauge under baseline and the three climate change conditions. The climate conditions shift the hydrograph peak to February from March contribute to faster drop in flows in the summer months when compared to the baseline conditions (Slide 15, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
8. Taylor presented a graph comparing the mean volume change for natural flows at Tucker Gauge East Fork, Middle Fork, and West Fork on a quarterly and annual basis for each climate condition. On an annual basis for all locations, volume will increase, but in the summer and fall quarters volume will decrease (Slide 15, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).

## **D. PRELIMINARY WATER RESOURCE MODELING RESULTS**

Taylor presented results from the water resources modeling in MODSIM.

1. Taylor presented the schematic used in MODSIM to represent the different water resource components in the Basin (Slide 19, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
2. Taylor described the methodology he used to calibrate the flows generated in MODSIM utilizing information provided irrigation districts and Niklas's Water Use Report (Slide 20, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
3. Taylor presented a graph comparing the range of simulated versus observed flows for each month. Overall he thought the simulated flows represented the observed flows well. He compared the simulated and observed flows in a flow duration curve to highlight any bias from the observed flows and the simulated flows presented negligible bias from the observed flows (Slide 21, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
4. Taylor presented a graph comparing the total diversion shortages on a quarterly and annual basis for irrigation and potable water districts under baseline and climate change conditions. The graph presented more shortages during the late summer (Slide 22, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
5. Taylor presented a similar graph highlighting the average shortage from July to September for each irrigation district and potable water districts. The graph indicated that MFID would expect the most shortages under each climate change condition compared to other districts during this period (Slide 23, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
6. Taylor presented a graph displaying the volume of Laurance Lake on a monthly basis under the baseline and each climate change condition. During September, the graph indicates Laurence Lake stores more water than current reservoir operations. Taylor said this possibly due to an anomaly in the model and he plans to investigate this in the next few weeks (Slide 24, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
7. Taylor also presented a graph displaying the proportion of time that flows do not meet the minimum flow requirements for the Tucker Gauge, Clear Branch below Laurance Lake, the East Fork, and West Fork (Slide 25-26, WPG\_Meeting\_12 4 13\_BR\_Taylor.pdf).
8. Niklas asked if Taylor would be able to provide graphs of stream flows for various points in the Basin and Taylor confirmed he would be able to include those in the report. In addition to streamflow plots for the Tucker Gauge, Middle Fork, East Fork, and West Fork, Niklas asked Chris what other locations would be useful to include for streamflow plots. Chris said Neal Creek and Green Point Creek should be included as well.
9. Taylor asked if there were any other metrics besides those presented on Slide 2 and 3 that the WPG would like to include. Chris said he would like more time to review the results and Niklas said he would provide the presentations and wait unlike the following week.

#### **IV. ACTION ITEMS**

1. Include Green Point Creek and Neal Creek in the streamflow plots presented in the final report(Taylor Dixon).
2. Review metrics Taylor will analyze in MODSIM in DHSVM and provide any additional metrics to include to the current metrics (WPG members).

The next WPG group meeting was scheduled for January 14<sup>th</sup>, 2014. The attendees agreed to have meeting to provide a finalized summary of Reclamation's work during mid-February

# HOOD RIVER BASIN WATER PLANNING GROUP

*Meeting Minutes: February 12<sup>th</sup>, 2014*

## I. CALL TO ORDER

Niklas called to order the Hood River Water Planning Group Meeting at **2:00 pm** on **February 12th, 2014**.

## II. ATTENDEES

The following were present:

Name	Organization
1. Hugh McMahan	At Large Member
2. Jason Keller (via teleconference)	At Large Member
3. Chris Brun	Confederated Tribes of Warm Springs
4. John Buckley	East Fork Irrigation District
5. Jer Camarata	Farmers Irrigation District
6. Mike Benedict	Hood River County
7. Mattie Bossler	Hood River County/ East Fork Irrigation District
8. Cindy Thieman	Hood River Watershed Group
9. Bonnie Lamb (via teleconference)	Oregon Department of Environmental Quality
10. Jon LaMarche (via teleconference)	Oregon Water Resources Department
11. Robert Wood	Oregon Water Resources Department
12. Jon Rocha (via teleconference)	United States Bureau of Reclamation
13. Taylor Dixon (via teleconference)	United States Bureau of Reclamation
14. Toni Turner	United States Bureau of Reclamation
15. Terrence Conlon (via teleconference)	United States Geological Survey
16. Niklas Christensen	Watershed Professionals Network

## III. PLANNED BUSINESS

Niklas Christensen began the meeting with a summary of the project schedule. Toni Turner provided a summary of the reports Reclamation will be preparing to document their work and corresponding schedule associated with completing their reports. Taylor Dixon presented during the majority of the meeting. Taylor presented via webinar the finalized results for the water resource alternatives that were analyzed in MODSIM for both current and future climate conditions. Mattie Bossler provided an update of her work administering the Groundwater Monitoring Network and completing some remaining tasks for the OWRD grant. PowerPoint® presentations were used during the meeting and are available on the County website which can be used as a reference while reviewing the minutes presented below.

## **A. OVERALL PROJECT SCHEDULE**

Niklas summarized the project schedule and listed the dates for the remaining meetings for the Water Planning Group. Niklas also mentioned the Watershed Group's new WaterSMART grant in conjunction with the future of the Water Planning Group and mentioned that the WPG would have to decide what its future and future role would be and one of the ideas was to transfer some, or all, of its functions to the grant (Slides 1-4, WPG\_Meeting\_2.12.14\_Niklas&Mattie.pptx).

## **B. RECLAMATION REPORT SCHEDULE**

Toni Turner summarized Reclamation's reporting process for the technical reports and final report they plan to prepare. She also provided a schedule of when these reports will be available for the stakeholders to review (WPG\_Meeting\_2.12.14\_Bureau\_Toni.pptx).

1. Chris asked Toni if an executive summary would be included in any of the reports and Toni said the technical reports would most likely not include executive summaries but the Final report would.
2. Cindy Thieman was concerned that a two week time period was not sufficient for her to review each technical report and the final report. Toni said she was most likely unable to increase the review period due to time constraints imposed by the study contract.

## **C. FINAL WATER RESOURCE MODELING RESULTS**

Taylor presented the final results from modeling the five water resource alternatives under the three different climate scenarios in MODSIM (WPG\_Meeting\_2.12.14\_Bureau\_Taylor.pptx). Taylor summarized significant findings from the model results on slide 32 of his presentation.

1. Jonathan LaMarche asked why the flow duration curves generated from the model at the East Fork above the Main Canal and Middle Fork for alternative four and five exceeded the baseline conditions at the 15<sup>th</sup> and 20<sup>th</sup> percentiles (figures in Slide 15, WPG\_Meeting\_2.12.14\_Bureau\_Taylor.pptx). Taylor said alternative four and five's higher low flows were due to the conservation measures implemented in them. The conservation measures reduced demand when compared to baseline conditions and ultimately resulted in more water in the East Fork at these two locations during periods of low flow.
2. Cindy Thieman asked if the agricultural water conservation measures implemented in alternative four and five were generalized over the basin or estimated specifically for each irrigation district. Niklas responded and said the conservation measures for those alternatives were estimated differently for each irrigation district.
3. Hugh McMahan asked how the model accounted for changes in evapotranspiration (ET) demands for the various agriculture crops with respect to the increase in temperature from the climate models. Niklas said the way ET demands were accounted for in the model depended on the efficiency of the irrigation system used: for crops with inefficient systems that provided more than ET demand, no changes were made and for crops with efficient sprinklers meeting the ET demand, water demand was increased as temperature increased.
4. Jonathan asked how the forest ET was accounted for in the model. Taylor responded and said that DHSVM accounts for the changes in forest ET demand due to temperature change.

5. Terrence asked how the change in precipitation was accounted for in the climate models Reclamation used. Taylor said the process was complex and would be difficult to explain in the remaining portion of the meeting but could provide Terrence with a presentation of the methodology used to develop climate data as well as technical memo which will be written in the coming months. Mattie said the presentation was available at the County website.
6. Chris asked if Reclamation will identify any data gaps in their technical memos and reports. Taylor said he would include recommendations of where additional data is needed. Toni also added that documentation of the need to address data gaps can assist in acquiring grant funding.

#### **D. GROUNDWATER MONITORING NETWORK & OWRD GRANT ANALYSIS & REPORT**

Mattie provided an update of work she has completed for the Groundwater Monitoring Network as well as completing the remaining OWRD grant tasks associated with the feasibility of the surface water storage alternatives (Slides 6-19, WPG\_Meeting\_2.12.14\_Niklas&Mattie.pptx).

1. Hugh asked what the accuracy of the GPS devices that were used to locate the monitoring wells. Mattie said the accuracy ranged from 10 to 40 feet.
2. Mike asked if the addition of new data will give insight to the extent of the aquifers in the Basin. Bob Wood responded and said in other projects OWRD and USGS have completed, they were able to identify aquifers with water level measurement data.
3. Cindy asked what the land ownership was for the Neal Creek Storage Site. Mattie said she was unsure but thought it was possibly on County Forest and USFS property.

#### **IV. ACTION ITEMS**

As shown on Slide 3 of Niklas and Mattie's presentation (WPG\_Meeting\_2.12.14\_Niklas&Mattie.pptx), the next WPG meeting was scheduled for April 2<sup>nd</sup>.

### GATHERING AROUND THE WATER TABLE

# Well owners sought for important groundwater monitoring study

**By HUGH B. MCMAHAN**  
Mount Hood's iconic beauty and recreational opportunities bless the Hood River Valley. Her glaciers and snow packs supply precious water for irrigation and her springs provide almost all of the domestic drinking water.

But the climate is warming and weather events are becoming more severe. The glaciers are melting. Most of the major recorded weather events such as the damaging debris flows and floods up on the mountain have occurred in the last 15 years. The Columbia River used to freeze regularly, but has not done so since 1987; droughts are becoming more frequent and winter precipitation is increasingly falling more as rain than snow.

Snowfall records at the Experiment Station on the Heights are available back to 1927 and there have been only two winters when no snowfall occurred: 2002-03 and 2004-05. Basin stream flows are forecast to decline 25 percent over the next 50 years.

A number of areas in Oregon, including the Willamette Valley, Wasco County and Umatilla County, have been facing water shortages for some time due to significantly falling groundwater tables.

Given the reality of decreasing water supplies and demand from increasing population, the more we know about our local water supplies the better. Some action to obtain that knowledge beforehand may stave off or prevent a crisis in the future and would clearly put the county in a good position to weather the storms (no pun intended).

That action came after some very fortuitous conversations between Commissioner Les Perkins and County Planning Director Mike Benedict, resulting in the Hood River County Board of Commissioners

beneficial uses in Hood River County. To that end, the project plans to inventory county water resources and determine current and future water use and needs, to assess potential climatic changes on the water supply and seasonal availability, to assess technological advances that will increase efficiency and thus conservation, to investigate water quality and the needs of fish and wildlife in the watershed.

This effort "...provides the basis for prudent planning and is essential to the protection of our water resources and our community that depends upon it."

The Group, with Perkins as chair, began meeting in

Water Resources Department, the Oregon Department of Fish and Wildlife, the Hood River Watershed Group and at-large members. Over the last four years

the hiring of a number of professional water consultants to address specific areas and gaps in the data. They are doing "modeling" using computer programs to

sess fish needs, a water needs assessment and, very importantly, a water conservation assessment. From this work has come the realization that we know too little about our groundwater and thus the need to establish a groundwater monitoring program.

There is much data regarding precipitation — the county has some 35 weather observation stations. From the stream gauges and flow meters, there is much data on surface water since it traditionally has been the primary source of orchard irrigation water. Groundwater is tied intimately to, and interacts with, surface water and the two are best considered a single resource. Until we obtain more data on the groundwater there will be a huge hole in our understanding of how our basin groundwater and surface water work together.

This data gap comprises our ability to plan. Do we have enough groundwater available to supplement surface water for irrigation if necessary? We need to build the best baseline model, constantly improving it. This improved data will, in turn, be fed into the overall basin water budget model.

Your participation is very important and will be greatly appreciated. ■  
Hugh McMahan is an at-large member of the Water Planning Group.



Photo by Hug McMahan  
**WATERMASTER** Bob Wood (left) and OWRD hydro geologist Marc Norton measure a well in this photo from January 2009.

The consultants are doing groundwater modeling with what limited data exists to feed into an overall water budget model for the entire basin. They are also doing a water storage assessment, an in-stream flow analysis to as-

analyze the data and estimate water availability under various scenarios including climate change. The consultants are doing groundwater modeling with what limited data exists to feed into an overall water budget model for the entire basin. They are also doing a water storage assessment, an in-stream flow analysis to as-

In 2010, after review of the data we had compiled, it became clear to the Group that outside resources and expertise were needed. To that

standing of how our basin groundwater and surface water work together.

This data gap comprises our ability to plan. Do we have enough groundwater available to supplement surface water for irrigation if necessary? We need to build the best baseline model, constantly improving it. This improved data will, in turn, be fed into the overall basin water budget model.

Your participation is very important and will be greatly appreciated. ■  
Hugh McMahan is an at-large member of the Water Planning Group.

*Groundwater is tied intimately to, and interacts with, surface water and the two are best considered a single resource.*

What does a groundwater monitoring system consist of? Most importantly a "well net" of water wells for measuring the water (level) table, usually four times a year. Currently, the only data available is from 14 wells

be fed, as accumulated, into the groundwater computer model, constantly improving it. This improved data will, in turn, be fed into the overall basin water budget model. Your participation is very important and will be greatly appreciated. ■

**PARTICIPATING IN THE SURVEY HELPS LANDOWNERS AND THE COMMUNITY**