

**Wind/Bighorn River Basin Advisory Group Meeting**  
**November 12, 2009 - 6:00 p.m.**  
**BLM Field Office, Worland**  
**Meeting Record**

I. Welcome

Jodie Pavlica, Wyoming Water Development Office, called the meeting to order at approximately 6:05 p.m. All attendees introduced themselves, followed by a review of the overall meeting agenda. A sign-in sheet was passed around to record attendance.

II. Groundwater Plan Update

Mike Sweat, with the USGS, provided a status report on the Groundwater Plan Update. The draft report is in very good shape. The Green River Groundwater Report gives an example of what the report may look like (but Green River has more information than Wind- Bighorn basin, so Green River report is bigger.)

The draft Wind-Bighorn Report will be submitted December 31, 2009. A consulting geologist, 3 people from USGS, 4 people from WSGS are on team. The framework of the report is complete. The team is currently filling in text and illustrations, and working on recharge estimates and saturated aquifer estimates. Mr. Sweat expects all deadlines for work to be met or exceeded.

III. Draft Results Presentation

a. Demand Projections

Ed Harvey with Harvey Economics was introduced. The goal with his work is to project future water demands. This can then be used to help develop opportunities and strategies within the basin. Mr. Harvey's presentation reviewed present water uses and projects future water uses to 2060. Mr. Harvey encouraged the BAG to contact him directly with questions or issues.

Water demand projections were developed for each water use sector. Driving variables (e.g. population projections and per capita use projections) were then used to developed projections into the future. Three water use projections were investigated: low, medium, and high.

Low – Most pessimistic economic and water use scenarios

Mid – Most likely economic and water use projects

High – Most optimistic economic and water use projections

Mr. Harvey reviewed existing water uses in the basin. The largest single water use within the basin is agriculture. Agriculture is also important to the economy within the basin. Livestock is 2/3 of annual cash receipts in basin. Public grazing land and growing hay supports the livestock industry. The Cattle markets are currently in a declining trend. Barley and sugar beet production are also

important in the basin's agricultural community. Anheuser-Busch purchases barley grown by basin farmers. The total amount of irrigated acres contracted during the 2002 drought. Since the drought, irrigation has returned closer to pre-drought levels. The BAG suggested that reduction in irrigated acreage is not evident on the ground.

Mr. Harvey reviewed factors that influence agricultural demand projections and assumptions for agricultural demand projections, including economic drivers, irrigation project development and climate related influence. Projections were also developed for irrigated acreages in each scenario and livestock production.

Mr. Harvey then reviewed non-agricultural water uses. Mining and other industries are included in the water use projections. Varying levels of increases and decreases within each industry are included in the projections. These industries include oil and gas production, bentonite, coal, uranium, power plants, sugar beet processing and ethanol plants. The BAG stated the importance of considering produced water. Increases in produced water are implicit in Mr. Harvey's projections and stressed that produced water originates from groundwater.

Tourism and recreation are important to the Wind-Bighorn Basin. Fishing, hunting and boating are 10%-20% of state total. Future prospects are generally well served with existing resources. Sleeping Giant ski area may be revitalized. Expanded lake and stream recreation opportunities are always welcome.

Population growth is not as important in Wind/Bighorn Basin as in other basins. Population is currently about 90,000 people. Projections are fairly muted. In next 30 years, projections are for a 0.2% (Federal projection) to 0.4% per year (State projections) increase. The high demand scenario assumed 0.8% per year. Municipal demands are and will continue to be a low water use when compared to other uses.

Environmental water uses vary within the basin. The main use highlighted in the presentation is in-stream flows. Federal Reserve Rights remain constant for all future water use projections. State instream flow rights range from existing rights (for low use scenario) to all expected applications being approved (high use scenario). Mr. Harvey separates out non-consumptive (or in-stream uses) from other consumptive uses.

Wind River Indian Reservation development potential was discussed. Maximum future agricultural potential would include a total of 108,000 acres with a diversion of 500,000 ac-ft per year. Futures water is available for use on the reservation and for agriculture or legally compliant subsumed uses. New water development potential is for 56,700 acres on 5 potential projects. Tribes have also drafted a Tribal Water Plan. It includes potential water uses, but not declared use, and includes several non-agricultural uses. The low scenario

assumes no futures lands are developed (“status quo”) – there would be O&M and improvement of existing facilities. The high scenario includes 56,712 acres of new irrigated lands, and 209,500 acre-feet of new diversions. The mid scenario includes 4,060 acres of newly irrigated acres (Riverton East), and 13,730 acre-feet of new diversions. Expansion of Washakie Reservoir was also considered.

A follow-up question was asked regarding produced water. Mr. Harvey indicated that the projections include produced groundwater from mining.

The BAG suggested that the dry-bean industry should be discussed. New processing facilities are in place. Mr. Harvey replied that beans and barely are included in estimates.

Mr. Harvey then presented overall future water use projects, and noted that several of the proposed diversions are “in-channel” uses such as instream flows. The BAG suggested that the term “diversion” on the last slide maybe easily misinterpreted as not all uses are diversions. Mr. Harvey will consider modifying the term.

Overall future projected water use is as follows:

Existing: 3,356,000 acre-feet

Low: 3,071,000 acre-feet (change -285,000 acre-feet)

Medium: 3,780,000 acre-feet (change +423,900 acre-feet)

High: 4,618,000 acre-feet (change +1,262,000 acre-feet)

#### b. Shortages and Available Water Determination

Mr. Jerry Gibbens, with MWH, was introduced as the project manager for the consulting team performing the surface water portion of the basin plan update. Mr. Gibbens’ presentation contained the following main parts: progress report for all tasks, review of surface water modeling and water availability determination, and future water use issues and topics (discussed in agenda item III.c). Mr. Gibbens reported the following progress since the previous BAG meeting:

- Task 3 – Surface Water Use Profile: All but one of the technical memoranda were submitted to WWDC for review. The remaining tech memo, Agricultural Water Use, is in internal review.
- Task 4 – Available Surface Water Determination: Task to be completed in November.
- Task 5 – Demand Projections: Harvey Economics is completing draft technical memoranda.
- Task 6 – Future Water Use Issues and Opportunities: Five of the 6 technical memoranda are in internal review and likely to be submitted by the end of the week or early next week. The remaining technical memorandum, Future Water Use Project Opportunities and Program

Strategies, will be completed following the BAG meeting and Task 4 completion.

- Task 7 – Strategies: A draft technical memorandum describing the process for developing opportunities and strategies was completed and submitted to WWDC for review.

Mr. Gibbens then described the surface water modeling and draft results. The surface water models are Microsoft Excel spreadsheet models developed as part of the previous basin planning effort. The models simulate basin operations on a monthly time-step for dry, average and wet year hydrology. There are limitations to the spreadsheet models that must be considered when interpreting results: The models do not fully simulate storage operations (storage releases are fixed to historical releases), account for carryover storage affects, or simulate water rights.

The models were updated as part of the current process, including extension of the previous 1973-2001 hydrology to 1973-2008, development and linkage of the models to a new hydrologic database, development of a new automated calibration routine, and a routine to “batch run” several models at once. Available flow estimations consider limitations due to conflicts and state permitted (or permits in process<sup>1</sup>) instream flows that are downstream or in the reaches of consideration.

Following description of the model, Mr. Gibbens proceeded to present a general overview of draft model results. Simulated agricultural shortages and available surface water determinations were presented for each of the basins and sub-basins. Mr. Gibbens stated that all model results are draft at this time.

Models were developed for the Madison, Gallatin, Yellowstone and Clarks Fork. Only the Clarks Fork has substantial uses within Wyoming. The following was noted for the Clarks Fork:

- Clarks Fork - Minor shortages are simulated in tributaries. Water is available on the mainstem and tributaries during all hydrologic conditions.

The Wind River models include the option of simulating Tribal Futures projects. Tribal futures projects would primarily affect the Upper Wind basin. The following summaries were discussed for Wind River sub-basins:

- Upper Wind - Early season shortages occur during all hydrologic conditions. Shortages occur in all months of the growing season during dry hydrologic conditions. Mainstem water is available in average and wet hydrologic conditions.
- Upper Wind with All Futures Projects: Early and late season shortages for all hydrologic conditions. Shortages are substantial for all months during dry hydrologic conditions. Mainstem and tributary water is available during

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<sup>1</sup> Note: Based on comments received from WWDC following the meeting, final available flow determinations will only include approved instream flow permits.

average and wet hydrologic conditions during runoff. Even with storage, mainstem water shortages would likely occur in dry and potentially average hydrologic conditions.

- Little Wind - Late season shortages are simulated during all hydrologic conditions. Mainstem and tributary water is available during average and wet hydrologic conditions during spring runoff
- Popo Agie - Minor late season shortages occur. There is available flow during runoff in all hydrologic conditions.
- Lower Wind – Shortages occur in tributaries during all hydrologic conditions. Water is available on the mainstem and tributaries during all hydrologic conditions.

Due to the limitations of the models, effects of Tribal Futures projects cannot be simulated downstream of Boysen Reservoir. However, a graph showing end-of-month reservoir contents for Boysen Reservoir during average year conditions was presented. Mr. Gibbens stated that the graphs show that during average years, Boysen may not refill, which could affect its operations. More detailed models are necessary to fully understand the effects of Tribal Futures Projects downstream of Boysen Reservoir.

The following summaries were presented for sub-basins in the Bighorn Basin.

- Upper Bighorn - Minor shortages were simulated in the tributaries. Flow is available on the mainstem and some tributaries during all hydrologic conditions.
- Owl Creek - Substantial shortages were simulated in this basin during all hydrologic conditions. Additionally, there is inadequate flow available to fully meet all demands even with additional storage in place. Other opportunities may need to be investigated in this basin, including more efficient delivery and on-farm systems.
- Nowood - Late season shortages were simulated, primarily on tributaries but also on the mainstem. Water is available during all hydrologic conditions on the mainstem and in some tributaries.
- Lower Bighorn - Minor shortages are shown in tributaries. Water is available on the mainstem and some tributaries during all hydrologic conditions.
- Greybull – The results presented for the Greybull do not include the affects of Greybull Valley Reservoir (Roach Gulch). Greybull Valley Reservoir operations are currently being incorporated into the model. The analysis does show mainstem shortages, however, the reservoir should be able to meet shortages during average and wet hydrologic conditions. Some shortages may occur during dry years. The model also shows tributary shortages. Without Greybull Valley storage operational, water is available on the mainstem. With the reservoir operational, some of this water will be used for the reservoir.

- Shoshone - Minor shortages were simulated in the tributaries. Available flow is simulated on the mainstem and tributaries during all hydrologic conditions.

Mr. Gibbens then provided a brief comparison of available flow and shortages in the basin plan update with those in the previous basin plan. In general, due to methods used for hydrologic classification, slightly more shortages are shown to occur in average and wet years and less shortage in dry years. Conversely, more water is shown as available in dry years, and less water available in wet years. Mr. Gibbens reiterated the limitations of the model, and also that all model results are draft at this time.

### c. Future Water Use Issues and Topics

Mr. Gibbens stated that future water use issues and topics consists of two main discussions: the issues affecting future opportunities and the potential opportunities themselves.

Technical memorandums are being prepared on several topics affecting future water use opportunities, including: permitting and regulations, water quality, climate, municipal and agricultural conservation and the WWDC watershed planning program. Additional slides were presented on the climate technical memorandum, including a presentation of climate variability, historical measured temperature and precipitation data, paleohydrology, and the bark beetle infestation. Mr. Gibbens was asked to verify and support the numbers presented for crop yields under the EPA/IPCC report.

A summary of the opportunities and strategy identification process was then presented. Program strategies were defined as general, broad-ranging ideas that are not specific to location, while project opportunities are more specific “on-the-ground” projects. Mr. Gibbens then described the process for developing project opportunities, and introduced the opportunities list and maps of available surface water and shortages.

### Break

Following Mr. Gibbens' presentation, the BAG took a 20 minute break, during which the information was reviewed and an informal discussion ensued regarding opportunities.

#### IV. Strategies and Opportunities Discussion

Following the break, Ms. Diane Hoppe of MWH facilitated a discussion of Project Opportunities. A list of Preliminary Project Opportunities was handed out the BAG and reviewed line-by-line. The following was noted or suggested as a change to the list:

- The following two reservoirs in the Upper Wind basin should be added to the list as they have been studied extensively: Blue Holes and Wiggins Fork.
- Remove “(Bighorn)” from the reservoir descriptions – this term not needed in this list because it only includes sites in the Wind-Bighorn basin.
- Change the two Boysen Reservoir release items to “Establish Winter Operations Schedule for Boysen Reservoir”
- Add “Develop” to the beginning of the Flooded Uranium Mine Pits. Or, add the term “Put to Beneficial Use”
- Add the reference “Upper Wind Storage Study” to the Wind River storage sites source.
- The BAG explained that the Riverton Valley/LeClair Irrigation District consolidation is to move the Riverton Valley headgate off of the Reservation to avoid needing to negotiate access. No change needed on the list.
- Most of the Bighorn Regional Joint Powers Board and Hyattville projects are completed. These should be removed from the list.
- The Tensleep improvements are completed in town. Some connections to sub-divisions outside of town are desired, but have not been completed.
- Manderson has a new wastewater treatment plant. There is no wastewater treatment plant in Hyattville.
- Kirby and Lucerne are involved in the BRJPB.
- A Level II study of Wales Reservoir is about done. Test pits have been completed.
- The “Clarks Fork to Shoshone Pipeline” should be deleted. This pipeline is not needed.
- Transbasin diversions from Sunshine Reservoir should be clarified to say that a larger pipeline would be needed from Wood River to more fully capture peak runoff.
- Owl Creek gaging stations and flow management is complete. Delete from list.
- Kirby Creek gaging station is not high on SEO priority list.
- The Hyattville Transmission Project is complete – delete from list.
- The Burlington Water Tank is complete – delete from list. Check with Burlington on remainder of Burlington items.
- Delete “Town of Greybull” entry in table.
- Dust abatement at Buffalo Bill Reservoir is complete – delete from list.

- Work on Hot Springs State Park cooling ponds is complete. Check with HSSP on remainder of items.
- The Hyattville, Thermopolis and Southern Bighorn wells have been drilled. There is some water available for development – leave on list.
- Change the Willwood Irrigation District opportunities to “Install Measuring Devices”
- Delete both proposed Transbasin Diversion Projects (to North Platte and to Colorado River) – these are not supported by BAG.
- Delete “Unused Water Rights”
- Specify group of opportunities that are for municipal water use.
- Check list for repeats.
- Recategorize list where appropriate.

#### V. Public Comment

No additional public comment was received.

#### VI. Next Meeting

The next meeting will be scheduled prior to submittal of final report. This is anticipated in February. A draft report will be released to the public and notice provided to BAG mailing list in late January.

There was a request to have meetings from 3:00 to 6:00 pm rather than 6:00 pm to 9:00 pm. Thermopolis was supported as a location for the next BAG meeting.

The meeting adjourned at approximately 9:20 pm.