

Bighorn River System Issues Group
Lovell, WY.
January 15, 2009

Welcome/Introduction

Facilitator, Barb Beck, welcomed participants and reviewed the outcomes for the meeting.

Reservoir Operation Curves (Brian Marotz, DNRC, Gordon Aycock, USBR)

Brian explained that developing the rule curves is an iterative process. First curves are developed. Then they are tested, then discussed, and finally corrected. It's important to understand what the system is capable of doing, develop and agree to rules, and then stick by the rules. Brian worked with a couple of assumptions; the reservoir would be refilled every year and there would be no use of the flood pool. He set up and ran some preliminary rule curves based on water supply for the past several years. Power demand and irrigation were not factored in, but a flushing flow was. The outcome was that the reservoir did not refill every year and the results would be improved if some portion of the exclusive flood control pool could be used.

Gordon also developed and tested rule curves for higher spring/summer lake levels, better assurance for refill, reduced chance of large spring releases, more transparency in spring operations, maximizing power generation and maintaining peaking capability, and providing flood control. Gordon looked back to find years for various quartiles and deciles of reservoir inflows (upper 10%, upper 25%, median, and down to 28% probability.) Based on these years that roughly represent high, median, and low inflows, he developed rule curves. Then he developed a simulated operation for the reservoir starting at 3618 feet elevation at the end of March and ran it using the rule curve. He also compared the rule curves with actual operations for those years. He assumed that up to approximately 3 feet of elevation into the flood pool could be used. The results varied by year with respect to whether and when the reservoir refilled (it refilled 5 of the 6 years) and how much and when the releases were to the river. Specific results by year can be found in the presentation posted on the website.

During discussion after the presentation the following points were made. One tool can't solve all of the problems. There would still need to be flexibility in applying the rule curves to decisions because of situations that arise such as flooding elsewhere in the system or late runoff, etc. Gordon needs to look at more than six past years to compare the rule curve to actual. There might be a need for separate rule curves for very dry years or cumulative dry years because it may not be possible to completely refill the reservoir. Releases from Buffalo Bill and Boysen are critical factors. It would be helpful if at some point in the future, rule curves were also developed for these two dams.

For the coming operational season, Gordon will run more years through the simulation with the rule curves and then use the rule curves for additional input to the decisions. At the same time, he will be able to compare actual decisions with the rule curve.

Bighorn Lake Sedimentation Management Study Update (Dan Pridal, Corp of Engineers, Omaha)

This study is being done under an interagency agreement between the Corp and Reclamation to look at alternatives for addressing sedimentation in the lake. The study has been completely funded. Modeling has been completed and the report is 90% done. An independent technical review will be scheduled. A possible reviewer will be Reclamation's Technical Service Center. Date of the final report is uncertain.

Six alternatives were identified and five of these were modeled.

- A) Higher pool level during the recreation season
- B) Trap sediments upstream of the causeway
- C) Flush through Horseshoe Bend (HSB)
- D) Construct a dike to manage sediments within HSB
- E) Manage sediment in the watershed (this was not modeled)
- F) Dredge

The methodology was to collect data, construct the model (SRH), modify the model, and run and calibrate the model (for the years 1966-2007.) The model was used to simulate the future situation for the five alternatives. Average bed elevation change was used for comparison between the alternatives. The alternatives have a big impact on where the delta forms. Many factors affect sediment loads and delivery. Each of the five alternatives that were modeled showed an impact for the 40-year simulation period. Differences between the alternatives included such things as costs, difficulty to implement and maintain, effectiveness during drought, recreationists' safety, ability to catch fine sediment, and location of sediment deposition.

Flood Pool Reallocation Study Update (Travis Yonts, Corp of Engineers, Omaha)

The purpose of this study is to evaluate the change in flood reduction benefits due to reallocation of flood control storage in the lake if the joint use pool is raised from 3640 to 3645 feet. Reclamation is working with the Corp on this study. The Corp has calibrated the HEC-ResSim Model--simulating reservoir operations. Three simulations and one actual flood event have been run through the model. Travis has produced some preliminary results, but is not able to say yet whether raising the flood pool five feet will be acceptable when flood reduction benefits are considered. He will be completing the calibration then performing baseline and reallocated simulations. Then analytical relationships

will be developed for the baseline and proposed simulations. The final report will be ready by summer.

After this study has been completed and if there is a decision to move forward with reallocation there will be a risk assessment and NEPA process to go through. It is possible that some amount less than five feet would be acceptable if reallocation of five feet is too much. If a reallocation proceeds, Reclamation and the Corp would need to agree and then water control manuals, emergency response plans, etc. would have to be rewritten. Filling the additional joint use space would ultimately be dependent on adequate inflows.

Bighorn River Side Channel Study (Clayton Jordan, USBR)

This study is looking at the geomorphology of the Bighorn River. The total cost of this four-phase study is estimated to be \$400,000 with the majority of funding still needed. Tasks have been driven by available funding. Reclamation has spent \$40K to collect and rectify aerial photographs. Reclamation has made another \$65K available to finish the geomorphic analysis. Tasks for the next year include; repeating on-the-ground photography, depth mapping, cross-section surveys, bank material and sediment source surveys, and performing a quantitative analysis of channel changes. Some tasks may be changed if funding can not be found. An MOU has been signed by many parties.

Clayton also reported that staff gauges have been installed in the river to look at moss effects. Three more gauges will be installed. Results of this work will be reported at a future issues group meeting.

Putting it all Together (Lenny Duberstein, USBR)

Lenny reviewed what this group has done in the two years since it was formed. He believes that everyone has come a long way in terms of cooperation. Participation has not dropped off and those who attend the meetings are dedicated and knowledgeable.

Lenny presented the condensed outline for the assessment report. The report will contain the following sections; an introduction, Yellowtail as planned and built, Yellowtail Unit operation, comparison of past and present operations, problems and needs, and alternatives. The alternatives will address such things as operations, flood storage reallocation, lake sediment management, river flow management, river channel controls, and continuing improvement in forecasting tools. When ready, a draft will be made available for comments.

Reservoir operations have been looked at and refined with a variety of tools made available to the public. Reclamation has proposed interim reservoir operating objectives and targets, developed a fall/winter operations worksheet, developed spring/summer rule curve worksheets, and continues to share

information on regular conference calls. The interim operation objectives for Yellowtail include statutory and contractual commitments, flood control, power generation, reservoir levels, and flows in the Bighorn River. Lenny reviewed the targets Reclamation has compiled based on resource agency input. He will provide that information to the agencies for validation and then depending on actual conditions this year, Reclamation will implement them on an interim basis. At some point in the future they may become permanent targets.

Looking ahead, a decision will be made about implementing the interim targets. The sediment management and flood pool reallocation studies, and the assessment report should be completed by early summer. Work will continue on the river channel controls and flow management. Forecasting tools will be worked on in the future.

Opportunities (Tom Sawatzke, USBR)

Tom explained that Reclamation wants to ensure that their work is providing value to the participants and interested parties. He opened the discussion for any type of feedback that participants wanted to offer on “How is Reclamation doing?” He specifically asked about whether the information Reclamation is making available is adequate, whether access to the agency is adequate, and thoughts about the future of the issues group. The following comments from participants were captured:

- We have made progress, have a better understanding of the river system
- Good studies have been identified, launched, and are underway
- Preference is to meet twice a year, spring and fall—talk about both operations and special topics
- We’ve come a long way in understanding reservoir operations
- Need to keep momentum, suggest meeting spring, summer and fall (3 times/year)
- Don’t want to lose what has been gained so far, need to have the contact
- Suggest meeting 4 times/year
- Concur on 4 times/year, people are more respectful of each other and this needs to be maintained, eating together is important
- Need to meet 3-4 times/year because want to continue to monitor progress on the work that is underway
- NPS is comfortable with USBR continuing lead role
- Pleased with progress, good presentations, very educational
- Getting to the point where much time is spent on repeat information
- Support maximum transparency and access to tools
- We are in a refinement stage, don’t want to go backwards
- Potential future topics could be; sediment and irrigation management on BLM lands upstream from lake, coordination between MT and WY USBR offices

The group concurred that Reclamation should host the spring operations + special topics meeting in Billings. The meeting needs to occur early enough so that the fisheries folks will know if a flushing flow is planned (mid to late-March.) The locations of meetings should be rotated between Montana and Wyoming.

Wrap-up

Tom thanked the participants for their attendance and dedication.

Next meeting will be scheduled mid to late-March. USBR will host in Billings.