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January 28, 2011

WER 12193
U.S. Department of the Interior
Bureau of Reclamation Great Plains Region
Reclamation Managing Water in the West
Draft Bighorn Lake Operating Criteria Evaluation Study and
Report September 14, 2010

Leonard Duberstein
Bureau of Reclamation
Great Plains Region
Montana Area Office
PO Box 30137
Billings, MT 59107-0137

Dear Mr. Deberstein:

The staff of the Wyoming Game and Fish Department has reviewed the Draft Bighorn Lake Operating Criteria Evaluation Study and Report September 14, 2010. We offer the following comments for your consideration

Terrestrial Considerations:

The Wyoming Game & Fish Department generally supports increasing the level of Big Horn Lake as prescribed in the draft operating evaluation. On Page 14, we suggest moving the old target elevation of 3635 ft from October 15th to October 1st. This should ensure that lake levels are appropriate for migrating waterfowl during crucial times. We support the addition of an October 31 elevation range of 3638 to 3640 ft. Although there will be some lost wetland and terrestrial habitat at higher lake levels there will be a net gain of open and shallow-water habitat. We urge Bureau of Reclamation personnel to actively participate (funding and personnel) with the Department and the National Park Service to establish vegetation (e.g., bulrush, cattail, and other submergent vegetation species) in these newly formed shallow waters to provide habitats for waterfowl, shorebirds and other wildlife species. We list potential positive and negative issues to terrestrial wildlife related to this new operating criteria:

Positive impacts

- Higher lake levels in the winter will increase the probability of ice jams and flooding on the Shoshone River. While late spring/early summer flood events are more beneficial to the floodplain in terms of cottonwood regeneration and other riparian ecological

processes, winter flooding does increase soil moisture and recharge ground water that sustains riparian vegetation.

- Higher and more static water levels would decrease the amount of lakebed that has an opportunity to support growth of salt cedar and Russian olive. Even though these plants are generally killed at some point when lake levels remain high, their persistence during low levels provides a source of seed.
- The old target reservoir level for October 15 (elev. 3635) results in an area of inundation of 10,986 acres. The old target for November 30 (elev. 3630) results in 9,131 acres. The new October 31 target (elev. average 3639) results in 12,273 acres of inundation. This represents a net increase of 1,287 to 3,142 acres in open water habitats that would be available for waterfowl in the fall. Most of this increase would occur in Wyoming, as the Montana side of the reservoir is largely confined by vertical canyon walls. An elevation of 3640 will provide 130 more acres of shallow water (less than one foot) habitat that benefits dabbling waterfowl than the old target elevation of 3630.
- Ideally for waterfowl, lake levels would be drawn down shortly after spring flows in order to allow vegetation to grow on the exposed lakebed during the growing season (for at least a month), then slowly raised to the maximum fall level to inundate vegetation. This would provide the best scenario to create shallow water habitat with high food value.

Negative Impacts

- Wetlands constructed and maintained by the Department will be inundated in the southern portion of the lake.
- If the operating criteria changes and lake levels are managed for lower levels, wetlands constructed by the Department will need to be reconstructed when funds are available.
- Some terrestrial (pheasant, small mammal, etc.) habitat will be inundated and lost.
- Increased winter flooding would make it more difficult to conduct Russian olive and salt cedar mechanical removal treatments on the Shoshone floodplain as these must be done during the winter.

Aquatic Considerations:

We applaud the Bureau of Reclamation (BOR) for reviewing their historic operating criteria for Big Horn Lake and attempting to find workable modifications that provide higher lake elevations while still providing for the needs of other water users.

Regarding the Draft Bighorn Lake Operating Criteria Evaluation Study and Report, we offer the following comments and suggestions:

The format of the document created some confusion for us and others. The document as we read it is a report on what BOR has done to modify operations in recent years with little indication as to what this means for future operating plans. The document is not written as a "plan" and maybe this is BOR's intent. However, in communication with BOR and other groups regarding this document, indications have been that this "report" will be a guiding document for the future. If this is true, and BOR intends to use this report to guide future operations, the document needs to more clearly state this as an objective and provide a summary to be used as a clear road map for how BOR plans to use the information in the report to operate the dam in the immediate future. If BOR doesn't intend to use this as a "operating plan" or guiding document it would be in the BOR's best interest to better communicate this to user groups.

Page 2, second paragraph-In the Executive Summary under specific modifications studied, the reservoir targets that were revised should be mentioned briefly, i.e., October 31 (Waterfowl Hunting), March 31(lowest spring draft of reservoir) as well the new procedure for establishing a Fall/Winter river release should also be explained briefly.

All figures/tables in this document should be numbered, fall into order as they are mentioned in the text and have good titles/labels that explain the content. This will greatly improve the readability of the report.

Page 2; paragraph 4; "The proposed modification allows the reservoir to operate 3 to 8 feet higher on average than historic operations mostly during late winter and early spring"... A better explanation is needed here as to how this was determined i.e., modeling of historic operations from 1988 to 2008 using proposed criteria modifications.

In the graph titled "Bighorn Lake Rule Curves" what does UQ and UD stand for? A legend label would help.

Page 3, second paragraph-"The trout fishery will benefit by an increased percent of time the fishery flow targets are met..." It would help if you could specify when you are talking about the tail-water or river fishery and when you are talking about the reservoir fishery. Referring to the river as the "fishery" or "trout fishery" isn't only confusing but it gives the appearance of discounting the reservoir "fishery".

Page 6, second paragraph-"Based on input provided from all of the various interests attending the issue group meetings, the Bighorn Lake operating criteria was reviewed and studies were prepared to determine if modifications could be made to these criteria which would improve the overall operations and enhance the benefits derived from the Yellowtail Unit." Even though the BOR briefly explains the 2000 Bighorn Lake Operating Criteria on pages 8 through 11, the specific document that contains the Bighorn Lake operating criteria needs to be referenced here

as well so the reader can go to that document that details how the reservoir has been operated in the past.

Page 10, second paragraph-"The desired river releases for the river fishery were based on studies prepared initially by the U. S. Fish and Wildlife Service in the 1970s and then additional studies prepared by the Montana Fish, Wildlife and Parks (MTFWP) in the 1980s." Is there a reference available for these documents?

Page 10, third paragraph-General reader may not know what SOP stands for. Need to spell out this abbreviation the first time used in the document.

Page 12, second paragraph-"WYGF believes that below elevation 3620 the reservoir fails to provide fishing opportunities in Wyoming and greatly reduces the preferred habitat of many fish." Add words "and survival" after the word habitat.

Page 13, third paragraph-"Both the MTFWP and the WYGF now agree that a spring draft after the end of March is not a real concern for the existing reservoir fishery." The two agencies agree that such a draft is no longer a concern for walleye spawning. However substantial drafting of the reservoir during the late spring period will result in "real concern" and real biological consequences for the reservoir fishery. We understand that substantial late spring drafting will at times be necessary when space is needed for large forecasted inflows but we urge BOR to avoid such drafting whenever possible.

Page 14, in the second and third paragraph-reference is made to normal snowpack and high mountain snowpack. What is considered normal snowpack—100% of average snow water equivalents and high snowpack greater than 120%? An explanation is need here.

Page 15, second paragraph- it is stated "The least complicated and consistent method to account for the gain is to calculate it as the inflow to Bighorn Lake less the total releases from Boysen and Buffalo Bill Dams." The WGFD supports the least complicated and most consistent method for accounting for gains and feel it is imperative that this method be fine tuned so the best November to March gain forecast will lead to a March 31 water storage level that ranges from elevation 3617 ft to 3621 ft. An explanation of how inflows to Big Horn Lake are actually calculated here would help the reader better understand this important component of setting a winter period flow discharge.

Page 18, first paragraph-indicates that the gains forecast method did an acceptable job in estimating the November through March gains over the last 19 years of record. What is considered acceptable; a $\pm$ 5% of actual gains? Acceptable is a very subjective measure of perfection.

Page 18, second paragraph Within the "Determining the November through March release rate:" section- we would suggest that the operating criteria stress the importance of setting the winter release flow rate as closely to the October 31st target date as possible when the most current information regarding reservoir storage level, forecasted gains and anticipated winter releases for Buffalo Bill and Boysen are available to determine a winter release rate that will most probably achieve a March 31st reservoir storage elevation of 3618 ft.

Page 18, third paragraph-in this discussion of Balancing Risk, the WGFD suggests that the BOR should be able to more accurately manage water levels than using 500 cfs increments. The methods described appear to diminish the value of the forecasts and computations by overly large buffering of the discharge. We are not suggesting an absolute adherence to the formula but a 100 cfs buffer seems more appropriate. In the statement; "A couple of other limits are also included in this procedure. These are: (1) If the river release is calculated to be less than 1,500 cfs then the river release is set at 1,500 cfs;" WGFD disagree with operating the reservoir with any absolute minimum or maximum reservoir elevations or discharges that aren't legally mandated or physical/safety constraints. We don't believe it is equitable to other user groups to establish minimum discharges when there are not (nor should there be) minimum storage levels.

Page 20, second paragraph-what is high flood flows-please provide a range or standard i.e., flows equal to or exceeding 25 year flood flows.

Page 21, first paragraph-"In wetter years this percentage is much higher and in dry years, much lower." It would be more informative to give the recorded range and average rather than telling us wet years are wetter and dry years are drier.

Page 21, first paragraph-"Until our ability to predict the weather improves significantly, there will remain a large amount of uncertainty in the spring runoff forecasts." We understand and appreciate BOR efforts to predict spring runoff and feel that using the best modeling techniques presently available is of paramount importance.

Page 22, second paragraph-"In most of these years the reservoir will fill to a level less than the normal full level of at elevation 3640." Delete the word "at" in this sentence.

Page 22, Figure 7 needs a title that better explains what it depicts and what LD, LQ, UQ and UD mean.

Page 23, Figure 8 same comments as for Figure 7.

Page 23, second paragraph-"Normally, adjustments to the reservoir releases should be based on looking at least a week ahead to allow time for the reservoir level to come back on track with the rule curve." Does this statement suggest that we can expect a weekly evaluation/adjustment? This is just a little foggy to interpret.

Page 23, third paragraph-"The rule curves show that for low snowpack years the reservoir should be allowed to begin filling in early April, and for high snowpack years the reservoir should be drafted to an elevation as low as 3605 by near the end of May." WGFD submits two comments here. Earlier in document it was indicated that the rule curves don't work well in low snowpack year. Is this true or false? Operating the rules curves as suggested here is not much different than in the past with the problem for Wyoming concerns happening when the reservoir is drafted to a low elevation of 3605 ft but inflows aren't forecasted close enough and the reservoir does not fill. The new operating criteria should provide examples/scenarios with step wise procedures that will be followed when low or high snow packs are forecasted and should include impact analyses to lake recreation and lake fisheries for a range of these scenarios if enacted.

Page 24, first paragraph-"The goal, in these low runoff years, should initially be that of holding a river release of no less than 2,000 cfs through the end of the following March if this will allow the reservoir to end up near elevation 3618 by the end of March." WGFD believe the goal should be to conserve storage to balance all user needs. Maybe this is what BOR was trying to say but it appears that the focus is on maintaining 2,000 cfs.

Page 24, first paragraph-"Reducing the river release below 1,500 cfs would be considered when needed to prevent full depletion of the active conservation pool." Depletion to anywhere close to the bottom of the Active Conservation Pool (El. 3547 ft) would be unacceptable to WGFD and destructive to the reservoir fishery.

Page 24, first paragraph-" Decisions to reduce releases below 2,000 cfs and especially 1,500 cfs are not decisions that can or should be spelled out in this report." In WGFD opinion BOR should at least attempt in this report to identify the primary factors to be considered in making these determinations. The focus on river release in describing these criteria suggests that preservation of the river fishery is a very big factor in the determination but other user interests are left "not spelled out".

Page 24, second paragraph-"Because the drought years are the most difficult to manage for the competing interests, it was desirable to include these years in the study period." While WGFD agree that drought years are very difficult on competing interests, from the perspective of the reservoir fishery, large drafts of the reservoir that would result from predicted and possibly delayed melt of large snow packs could be the most biologically devastating on reservoir fish. In other words, the reservoir fishery is more likely to be damaged in years when big fluctuations of the reservoir elevation occur over a several month period. During drought years we would expect the BOR would manage the reservoir somewhat lower than average but with small fluctuation resulting in a less severe impact on the fishery.

Page 25, reference to Figures 8 and 9 on this page is incorrect and should be Figures 9 and 10.

Page 26, first paragraph-" Each of the months of operations were examined to determine the percent of time the river flow met or exceeded the fishery flow targets of 1500 cfs, 2000 cfs, 2500 cfs and 3500 cfs." WGFD respectfully disagree with entertaining 3,500 cfs as a tailwater fishery flow in the operating criteria. We don't disagree that it might create a great tailwater fishery, but clearly it is beyond the normal natural capacity of the system. This analysis confirms this belief, and WGFD believes even including the analysis suggests consideration of an unrealistic discharge. WGFD would suggest that this would be a more balanced approach if a similar analysis, as conducted for river fishery discharge targets, were completed for targets of lake recreation, waterfowl and the reservoir fishery. WGFD suspects that had a similar analysis been completed on targeted reservoir elevations, the inverse would be seen, for example, for the number of times lake elevations of 3618 were met on March 31st.

Page 26, third paragraph-Figure 14 should be renumbered to Figure 12 to keep a chronological order to the figures as they appear in the document.

Page 29, fourth paragraph-"This indicated that the spring operation should not be based on filling the reservoir following a rule curve but rather on managing the limited water supply to conserve stored water in a manner that would allow maintaining a release near 2,000 cfs through the coming year." Here again, this language suggests favoring the river fishery over other water use considerations.

Page 34, first paragraph- Conclusions: "Modification of the Bighorn Lake operating criteria and operating tools to include revised reservoir level targets, a revised method for calculating the gains, a new procedure for establishing a November through March river release rate and the incorporation of operational rule curves for the April through July period will provide significant benefits for the lake recreation and fishery, while still providing river fishery flows equal to or better than provided in the past." WGFD agree with this conclusion and applaud BOR for making the effort to re-evaluate their normal operating plan.

Thank you for the opportunity to comment. If you have any questions or concerns, please contact Steve Yekel, Cody Region Fisheries Supervisor, at 307-527-7125 Ext. *816.

Sincerely,

For John Emmerich
Deputy Director

JE/mf/gb

cc: USFWS
Steve Yekel, Cody Region
Tim Woolley, Cody Region
Tom Easterly, Cody Region