>>> <emiwegner@aol.com> 04/27/07 04:03PM >>>
Dear BOR - please find attached a copy of comments on the Draft EIS on the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinate Operations for Lake Powell and Lake Mead. Can you please send me a return e-mail that indicates that you have received these comments? Thank you.

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Comments on Bureau of Reclamation Draft EIS Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead

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I. General Comments

The Draft EIS is the latest addition of water management related documents produced by the Bureau of Reclamation to address issues related the distribution of water from the Colorado River. This document and resulting management direction will add to the existing tomes on managing surplus water, the Long-Term Operating Criteria and the coordinated management of water between the upper and lower Colorado River Basin States. No one expects exciting reading or innovative thought, but the lack of addressing current state of climate and hydrology is troubling.

The Bureau is grossly missing the opportunity and responsibility to address potential future conditions for water management based on scientific advice from experts in water management and climate. Recent reports that point towards a much different hydrologic condition in the Colorado River Basin include:

> National Research Council – February 2007 – reporting that future droughts will likely be more extreme and for longer periods of time.
> Intergovernmental Panel on Climate Change – Climate Change 2007 – stating that droughts in the Southwest will be more extreme and calls on governments to begin planning now for reduced water.
> Recent Science article reporting the result of running 19 climate computer models and their indication of a worsening drying trend for the Southwest.
> Tree-ring analysis clearly shows that climate and hydrology in the Colorado River basin are linked and that historically there have been long and extreme drought events.

To not admit that the system is changing quickly nor addressing appropriate water management contingencies is akin to the Corp of Engineers telling the people of New Orleans to not worry, the dikes are in great shape. Reclamation is better than that but unfortunately this document does not provide much hope, direction or acknowledgement of the fact that SW hydrology is changing.

Recent climate documentation is consistent in concluding that the future for the Colorado River Basin is for far less water. The analytical approach used in the DRAFT EIS has a fatal flaw in that it assumes, based on a very short historic data set, that change will balance out and therefore it is business as usual for the Bureau of Reclamation.

Climate change impacts will occur far sooner than the 2026 timeline outlined in the Draft EIS. The Colorado River Basin is entering a drought, one that continues the trend since water year 2000 (except for 2005) of below average water conditions. In the April 2007 announcement from the Upper Colorado River Basin Bureau of Reclamation lead hydrologist, *Water year 2007 is shaping up to be yet another year with below average inflow. The current projection for spring runoff into Lake Powell is only 50 percent of average. … Reservoir storage in Lake Powell and Lake Mead is currently 48 and 54 percent of capacity.* This sobering monthly report from the Bureau of Reclamation clearly identifies that conditions in the Colorado River Basin are changing quickly. It would stand to reason then that the Bureau of Reclamation should look at a much different hydrologic future than the one that they are using as the baseline for projecting future conditions.

Weather conditions for the Colorado River Basin and the Southwest are changing at a rate far faster than the historic record that the Bureau of Reclamation is using indicates. The Southwest has had significantly below-average rainfall since 1999. The prospect of a drier Southwest is clear and should not be ignored and to do so violates a basic trust that the citizens of this country have regarding government management of a precious resource.

II. Comments Related to Assumptions Utilized

The assumptions utilized in the DRAFT EIS are constrained by their lack of addressing some basic information. The entire premise of the DEIS is driven by the set of inflow conditions. The Bureau uses a very limited (1906-2004) historical data set of actual flows to define the input supply parameters for the model and analysis. Peer reviewed literature and a stable of climate scientists have pointed out that the historical parameters and data are not a scientifically credible way to address the future.

Historic Hydrology Utilized – Based on measured flows from 1906 – 2004. This range of flows does not cover the potential future lower flow conditions that will be found in the Colorado River Basin.

CRSS Model – limited application to addressing extreme conditions. Was developed and applied under a narrow set of operating constraints and inputs.

Glen Canyon Dam Elevation Ranges – does not address the concerns over water movement once the elevation of Lake Powell drops below minimum power pool. At that point control of releases will occur only through the river outlet tubes.

Upper Basin Depletions – uses a figure of 5.4 MAF when in fact the Upper Basin is proclaiming to want to deplete 6.0 MAF. This difference amounts to 3 MAF by the year 2030.

Input Volumes – the Bureau of Reclamation uses historic hydrology data (1906 to 2004) and assumes that 15 MAF will be available. Scientifically peer reviewed analysis performed and reported by the National Academy of Sciences indicate that at BEST CASE, no more 14.5 MAF should be used, and more likely the actual volume should be closer to 13.5 MAF. If everything else remains the same,

the Bureau of Reclamation's assumption that the flow will be 500,000 acre feet higher than the long-term mean amounts to 5 MAF in ten years and 12.5 MAF in 25 years.

Impact due to climate change. On a best case approach we may see as little as 5% reduction in flow volumes, this would amount to an error in the Bureau's input volume of 7.5 MAF in ten years and 18 MAF in 25 years. If the worse case of 40% reduction in flow occurs this would lead to even larger error in the amount of input volume to the system.

Ongoing Research – no mention is made of the impact of the proposed operational impacts as related to the ongoing Grand Canyon Monitoring Program and its proposed use of periodic flow releases to protect the resources of the Grand Canyon. A slight mention is made of the Lower Colorado River Multispecies Conservation Program but only in reference to its ongoing presence. No discussion occurs as to how changing the operational patterns will be factored into these important and ESA driven efforts.

Glen Canyon dam and Hoover dam operational constraints. Limited discussion occurs as to the general management philosophy regarding the day to day operational management of the two dams. Specific discussion as to critical reservoir elevation limits (power pool, cavitation of generators from air entrainment, use and limits of river outlet tubes, and operational constraints) is not provided in a single section in the document.

Impacts to Basin Fund from reduced Lake Powell levels – a thorough discussion needs to exist to what will happen to the revenue flow to the Basin Fund as the elevation of Lake Powell drops and power generation is diminished. What will this do to Westerns existing power contract rates (expect increases?), capacity and energy amounts, and the Basin Fund which supports a multitude of other water user and Bureau of Reclamation projects (i.e. subsidizes).

Impacts to Hydroelectric production. Discussion is limited on the impacts that will likely occur to the financial balance of Western Area Power Administration if hydropower is seriously constrained due to low reservoir elevation levels at Lake Powell. While the report writers may not want to address the issues, it is important that the potential worse case scenario of limited water available for hydropower generation. What happens to the existing balance of payments for the CRSP? What impacts occur to basin rate payers?

Identification of Priorities. It would seem logical that a clear process flow chart should be identified in a SHORTAGE document that identifies what the process would be in regards to meeting the priorities of water delivery. It would seem pertinent that this process should be articulated and laid out so that there is a clear identification of process and procedure.

III. Comments on Five Alternatives

The Bureau of Reclamation identifies five alternatives that they have assessed in the DEIS. These five evolved through a series of scoping and coordination meetings that the Bureau had with individuals, groups, and the seven Colorado River Basin States. The five alternatives include:

No action – business as usual

Basin States
Conservation Before Shortage
Water Supply
Reservoir Storage

All five alternatives are addressed assuming the same management philosophy that has existed since the Long-Range Operating Criteria were agreed to. This philosophy assumes that Lake Powell and Lake Mead are operated as one unit, balancing releases based on the Law of the River constraints and a limited input supply data set.

Of the five alternatives, based on the historic set of assumptions, the most logical alternative is *Conservation Before Storage* as it utilizes set elevation targets in Lake Mead to direct specific water management actions.

However, based on the assumptions identified in Section I and the change that will occur in available water supply in the Colorado River Basin, we believe that an additional alternative should be evaluated that includes the following:

Shifting Storage from Lake Powell to Lake Mead. Under a lower flow volume scenario both Powell and Mead cannot and will not ever fill again under the historic hydrological rules articulated by Reclamation.

Storing water in Lake Mead will provide benefits to users of the Colorado River Basin by:

- Reducing evaporation. Maintaining one large reservoir instead of two will reduce the amount of water that evaporates off of the reservoir surface. Estimated water savings of 500,000 acre feet per year.
- Reduced loss of water migrating into the sandstone of Lake Powell basin. The granitic rock of Lake Mead basin does not draw as much water into the substrata. Result = increase in water.
- Maintain reservoir elevations of Lake Mead to continue electrical generation.
- Provide more normal flow regime in the Grand Canyon

Credit Upper Basin states with the amount of water flowing past the gaging station at Lees Ferry. We support the development of intentionally created surplus (Conservation Before Shortage Alternative) as a viable way to aggressively address water conservation with incentives.

Implement aggressive water conservation campaign throughout the Colorado River Basin.

IV. Comments on Methodology Used to Estimate a Range of Daily Glen Canyon Dam Releases

Only six annual Lake Powell release volumes were considered (7.00, 7.48, 8.23, 9.00, 9.50 mafy). If climate scientists are correct, release volumes may approach 5 million acre feet per year. It would seem prudent to at least run scenarios that reflect the worse case conditions

Approach does not take into consideration the historical drought regimes that have historically occurred within the Colorado River Basin.

The CRSS methodology assumptions and input factors are limited resulting in a narrow set of comparison options.

V. Comments on Coordinated Operations on Lake Powell and Lake Mead

Lake Powell is the input for the majority of water to be distributed in the Lower Colorado River Basin.

Glen Canyon Dam operations are driven by a hierarchy of priorities, beginning with meeting the Colorado River Compact and ending with supporting recreation on the reservoir. Critical to upper basin water management is keeping the generators at Glen Canyon Dam spinning so that they generate electricity and revenue for the Upper Basin Fund and the support of other Bureau of Reclamation projects. The analysis provided by the Bureau of Reclamation indicated that they do not assume that Powell has a very high likelihood of ever dropping below the minimum power pool elevation in Lake Powell. This is a gross underestimation of the likely impacts to be felt as result of lower inflow volumes to Powell due to climate change.

Colorado River Basin – System Management. Glen Canyon and Hoover dams are the largest facilities in the river basin, however management of a reduced supply of water and increasing environmental concerns demand that a system wide EIS be developed to address and integrate the large range of issues and constraints that exist in the developed Colorado River system.

VI. Water Quality and Environmental Impacts

Affected Environment – <u>Water Quality</u>

- Temperature of Releases from Glen Canyon Dam do not take into account the full spectrum of thermal conditions that may exist as the reservoir level drops and seasonal limnology conditions change. It is highly likely that seasonal spikes in temperature will occur as warmer water in the reservoir is intercepted by the intakes (elevation 3470). No mention is made of the potential Temperature Control Device for Glen Canyon Dam that the Upper Colorado Region is currently reviewing.
- Dissolved Oxygen – In September 2006 and March of 2007 hypoxia events (release of low dissolved oxygen water) occurred at Glen Canyon Dam. These types of events will continue to occur at Glen Canyon Dam as the reservoir levels diminish and limnological conditions change. The DEIS indicates that this is an abnormal event and not likely to continue to occur. This is wrong – the probability will continue with potentially large impacts on the downstream environment.

Affected Environment – <u>Sediment</u>

- Lower reservoir levels in both Powell and Mead will expose significant sediment deposits in the delta areas. Remobilization of these sediments and the chemical residues trapped within them may pose a considerable risk to the aquatic environment in the reservoirs. Additional modeling under more

realistic reservoir conditions is required to predict future impacts and movement of sediment.

- Loss of storage capacity – no discussion occurs as to the reduction in reservoir storage capacity resulting from the input of sediment into the basins. No reference is made to the ongoing reservoir sedimentation studies at neither Powell nor the historic work completed by the Denver Technical Service Center on sedimentation rates. The Denver Technical Service Center also recently completed an assessment of bypassing sediment around Glen Canyon Dam. How will this work be integrated into the operational mix?

Affected Environment – Special Status Species

- Humpback Chub – no discussion on the impacts of variable flow and water quality conditions and their affects on the listed *gila cypha* (Humpback chub) in the Grand Canyon. The Upper Colorado River Basin is currently engaged in a lawsuit over the impacts of flow releases on the Grand Canyon environment and the listed species.

Affected Environment – Non-Native Species

- Zebra and quagga mussle population expansion – no mention is made of the potential population impacts of zebra and quagga mussels in the Colorado River. The lack of any discussion of these species and their potential impact on the water delivery system of the Colorado River is curious. At least referencing work completed by the USGS would seem worthy.
- Striped Bass from Lake Mead - will there be an expansion of striped bass further into the Grand Canyon if the water temperatures warm due to modified Glen Canyon Dam operations and Lake Powell limnological conditions?

Affected Environment – Colorado River Delta and Mexico. While it is an interesting line of logic of why it is not within the context of the Bureau to acknowledge that a Colorado River delta exists, it would seem prudent that at least a short discussion on what the five alternatives might mean to the water flows would be appropriate. Also no discussion is included about the potential for the Yuma Desalinization Plant coming on-line. This will affect the water quality and delivery of water to Mexico. It should be mentioned.

Affected Environment – Recreation. Lower reservoir levels are exposing historic rapids and creating new rapids in the inflow areas of Powell and Mead. How will these river hazards be managed under the new lower elevation reservoir regime?

VII. Recommendations

Redo the hydrologic projects based on realistic future hydrologic conditions

Include an alternative that looks at managing the Colorado River reservoirs to focus on filling Lake Mead first and reducing evaporation and loss due to infiltration.

Recognize the range of actual hydrologic supply that is likely in the Colorado River Basin.

Include impacts to the Colorado River Delta and the Grand Canyon

Use the DEIS and NEPA process to look at a range of basin wide conservation measures

Recommend the development of a basin wide Colorado River EIS to address the integrated management of the entire plumbing system of the Colorado River.
Implement a clear and graphical identification of the process that will be followed should shortage occur and water deliveries are constrained. What process will be followed? How will priorities be defined? What will get shorted first – environment, junior holders, and tribes?
Include a complete list of water holders and their priorities. Put in a table and chart so that we can understand who will get water when shortages begin to occur.