

March 3, 2013

Ms. Pam Adams
Bureau of Reclamation
Colorado River Basin Study

Dear Ms. Adams,

As a property owner in the Phoenix, AZ area, I have a strong interest in future water demand and supply alternatives, as identified in the Bureau of Reclamation's December 2012 Colorado River Basin Water Supply and Demand Study. First, I'd like to complement the Bureau for preparing this comprehensive planning study in collaboration with a wide range of stakeholders throughout the Colorado River Basin. The study explored a wide range of potential options to help resolve the long-term water supply and demand imbalance expected in the Colorado Basin. Without a significant change in water resources management in the basin in coming decades, future water demand on the Colorado River will exceed supply by an average of 25 percent – or by about 3.2 million acre-feet (Maf).

It is noteworthy the Bureau included estimated future impacts of climate change into the study results. By using an ensemble of over 100 future downscaled GCM projections for climate change, the study shows that future climate in the Southwest will continue to warm and mean natural flow at Lees Ferry over the next 50 years is projected to decrease by up to 9 percent. In addition, the climate change studies project an increase in both drought frequency and duration, which will further exacerbate the supply and demand imbalance in the Colorado Basin.

Section 1.0 of the Executive Summary states “The amount of water available and changes in the demand for water throughout the Basin over the next 50 years are highly uncertain and depend on a number of factors.” This statement points out there is broad uncertainty in both the future supply and demand projections. Was a sensitivity analysis conducted of the parameters used in calibrating the Bureau's model? A sensitivity analysis of the modeling parameters would provide a statistical measure of the uncertainty in the report's projections, and should be done to inform decision makers. Output from the GCM projections likely represents most of the uncertainty in the planning study, next would be the output from the hydrologic modeling. Population growth and future water demands in the Southwest will also exert a strong impact on future water vulnerability, potentially as much as climate change.

There are about 160 different solutions considered in the study to close the expected gap between water supply and demand, and it is positive that relatively few options involved typical, “business as usual” proposals for major new infrastructure projects such as new dams, large diversions, and importing water into the Basin. It's important to note not all options presented in this study are feasible, reliable, cost-effective, or socially and politically acceptable. Moreover,

not all options will provide the necessary water supply where it is needed or when it's needed. For example, one option listed under "increasing supply" includes large-scale desalinization, which itself is energy intensive (also requiring large amounts of water), fairly expensive per acre-foot, and has environmental impacts due to disposal of brine waste.

Importation of water from outside the Colorado River Basin is another highly speculative and expensive option fraught with legal, environmental, political and social acceptance concerns. Another speculative and unproven option is weather modification, which is the major option identified in the study under watershed management.

I recommend decision makers in the Basin select for further evaluation a variety of the most feasible options which have the most promise to help fill the 3.2 Maf supply shortfall by 2060. The most feasible alternatives include a range of supply and demand options identified in the study to help fill the predicted future supply deficit. These non-structural options include increasing basin water supplies by increasing M&I water reuse; implementing various water management options (except for weather modification); reducing water demand in the Basin through M&I, agricultural and energy industry water conservation and efficiency measures; and finally, modifying current water management operations and water laws to allow for and encourage greater use of water transfers and exchanges through water markets and/or water banks.

The basic message from the Bureau's Colorado River Basin Study is sobering – without changing how our limited water supplies are managed, both regionally and locally, the future water supply in the Basin does not look promising, especially with expected population growth and increased water demand. The Basin Study found the typical large structural alternatives were not cost-effective compared to the great potential for water savings from agricultural, industrial, and municipal and urban water conservation, increased reuse, possible small-scale, local desalinization, and other non-structural strategies to manage water resources more efficiently and flexibly. What is also needed is more cooperation and collaboration in water resources management. This includes engaging all stakeholders in the Colorado Basin to fully evaluate the feasibility and potential of various non-structural alternatives identified above and a new water management approach that serves the needs of the Basin's people and ecosystems.

Thank you for the opportunity to comment on the Colorado River Basin Water Supply and Demand Study.

James D. Ruff, P.H.