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Ray Alvarado, CRWAS Study Manager
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Ray:

Thank you for the opportunity to submit comments on the draft of the CWCB's Colorado River Water Availability Study (CRWAS) Phase I Report.

The Rocky Mountain Climate Organization (RMCO) also is joining in a group letter reflecting common comments of some members of the Steering Committee of the Water Adaptation Initiative of RMCO's Colorado Climate Project. We submit these additional comments only on our own behalf, and they should not be taken to also reflect the views of any of our partner organizations nor those of either any organizations represented on or individual members of our Water Adaptation Steering Committee.

In 2006, before the last gubernatorial election, RMCO convened a blue-ribbon Climate Action Panel to address Colorado's contributions and vulnerabilities to climate change. Of the panel's 70 recommendations, 15 address actions to meet Colorado's water needs in a changed climate. One of those recommendations, adopted unanimously, is:

> To ensure that the new Colorado River water supply study is complete, relevant, widely accepted, and useful for future decision making, the state government should ensure that the potential effects of climate change are considered in the study.

Especially because of this recommendation, RMCO has followed with interest the development of the CRWAS. We applaud the CWCB and its contractors for devoting a significant portion of Phase I of CRWAS to considering the potential effects of climate change on the Colorado River. The information that has been gathered and presented in the report is good, useful information that goes beyond previous efforts and will be of significant value in helping people understand how much Colorado River water may be available to our state in the future and what decisions should be made with respect to future water supply and use. The following specific comments about the draft report are intended to suggest changes that may make the final Phase I Report – and the Phase II Report to follow – more "complete, relevant, widely accepted, and useful for decision making," to use the language from the recommendation of RMCO's Climate Action Panel. Our comments should be taken as our thoughts on how to improve a good effort, not a criticism of the overall effort.

2070 Projections

For the report, projections were made of hydrological conditions for both 2040 and 2070, based in part on climate projections from five different climate models for each of those years. But only the 2040 hydrological projections are discussed in the body of the draft report, and the 2070 projections were included in the appendices only. For the key question to be addressed by the report – how much Colorado River water will be available to the state in the future – an answer was suggested for 2040 on page 3-45: a range of from no additional water to one million acre-feet of additional water. But no comparable answer was even suggested for 2070, although apparently all the underlying projections and calculations made for 2040 were also made for 2070.

The grounds stated in the draft report for discounting the analysis done for 2070 are twofold. First, of the five climate models selected for analysis in 2070, four produced results on the drier half of the scale of a larger range of 112 preliminary projections done for a separate effort underway by the U.S. Bureau of Reclamation. Second, the projections done for 2040 are "representative of 2070 conditions except for the driest projections," in support of which comparisons are presented of projections of river flows near Glenwood Springs, for 2040 and 2070, and from the analyses done for this report and the preliminary analyses done for the Bureau.

We are not persuaded that these arguments warrant discounting the 2070 projections done for this report, according to a methodology widely agreed to ahead of time – and also paid for by Colorado taxpayers.

With respect to the first argument made in the draft report, we do not believe that the preliminary results of other projections being done but not yet even published should be a basis for discounting the work done for this report. Even when finalized and published, this other, fuller range of projections will not be a lasting, definitive standard, as models and modeling will continue to improve. Most importantly, though, the stated argument really applies only to the use of one way of presenting the 2070 results – a combined average of the five projections done for this report. The argument is that this combined average might be skewed toward the drier end of possible projections because four projections are on the dry half of a scale and only one is on the wet half. An easy way to address this is present the 2070 projections by showing the low projection, the high projection, and a simple average of those two projections. Of the five individual 2070 projections, the lowest or driest falls at the 29th percentile of all 112 projections for river flows near Glenwood Springs, and the highest or wettest falls at the 82nd percentile. Those two projections therefore present two representative points out of a full range of possible conditions. Further, the mid-point between those two projections would fall at the 55.5th percentile of the larger range of projections for river flows near Glenwood Springs – perhaps skewed slightly toward wet conditions, but not alarmingly so. Presenting the 2070 results in these ways (with or without also presenting a combined average of the five 2070 projections) seems to avoid entirely the identified concerns about the 2070 projections, without discounting them unnecessarily.

With respect to the second argument, we believe that the information in the appendices of the draft report demonstrates that the 2040 projections are actually **not** representative of 2070 conditions. The argument that 2040 projections sufficiently represent 2070 conditions is supported by information on river flows near Glenwood Springs – but the river flows at that point are not the most important. For the purposes of determining future water availability, flows at Lee Ferry would be most important, but detailed projections for that point are not presented in the draft report. In the absence of information on Lee Ferry flows, the projected flows of the main stem of the Colorado at near the state line are the most important of those for which information is presented. Tables E-1 and E-6 in the appendices show that a simple average of the low and high projections for river flows there in 2070 is 653,600 acre-feet lower than a simple average of the low and high projections for 2040. (Projections of river flows there for 2040 range from a low of 3,052,100 to a high of 4,986,500 acre-feet. For 2070, they range from a low of 2,823,100 to a high of 3,908,300.)

This difference of 653,600 acre-feet between 2040 and 2070 in projected flows as the main stem of the Colorado River leaves our state is very significant. This is not the only factor that would need to be considered to produce an overall estimate of how much water is available to the state in 2070. Also needed to be considered would be changes in the flows of other tributaries and other climate-related changes, such as increased reservoir evaporation from higher temperatures in 2070. But this 653,600 acre-feet of difference clearly means that the projections of 2040 hydrology do not represent likely 2070 conditions. A fuller consideration in the final report of these 2070 projections and their ramifications certainly seems warranted.

Integration of Phase I and Phase II

As was stated in the letter we co-signed with others on our Water Adaptation Steering Committee, we recognize that the CWCB faces choices on how much time and effort should be spent resolving issues in the Phase I report before it is finalized, compared to dealing with those issues in the Phase II report. As said in that other letter, once all comments are submitted to the CWCB on the draft Phase I report, we urge the CWCB to continue to reach out to affected and interested parties around the state to help it decide what to resolve in the Phase I final report and what to leave to Phase II.

Again, we complement the CWCB and its contractors for the good work done in Phase I of this study, and for the opportunity to submit these comments.

Sincerely,

Stephen Saunders
President