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The Honorable Dirk Kempthorne
September 6, 2006
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supply and yield within the Colorado River Basin, including a revision of the natural flow data base. While the Upper Division States and the Upper Colorado River Commission have had an opportunity to participate and provide input into the draft 2006 Hydrologic Determination, the Lower Division States were not provided a copy of the draft 2006 Hydrologic Determination until after it had been submitted to the Commissioner of Reclamation for approval.

The Lower Division States appreciate the need for the Upper Division States to determine with reasonable certainty the amount of water that is likely to be available to support Upper Division projects while at the same time giving respect to obligations under the 1922 Colorado River Compact. This requires a very careful analysis of potential risk and that risk analysis should be clearly reflected in all documents such as the draft 2006 Hydrologic Determination. We believe that it is important that this determination should be based on a neutral set of assumptions and modeling approaches that do not prejudice either the Upper Division or Lower Division States.

Upper Basin's Water Delivery Obligation to the Lower Basin

The draft 2006 Hydrologic Determination states that: "Nothing in this report is intended to interpret the provisions of the Colorado River Compact (45 Stat. 1057),"; however, this determination only utilizes Reclamation's and the Upper Division States' assumptions regarding the water delivery obligation to the Lower Basin during the critical period. As both the Upper Division States and the Department of the Interior are well aware, it is the position of the Lower Division States that the delivery obligation of the Upper Division States to the Lower Division States under Article III(c) of the Colorado River Compact requires that one-half of the 1944 Mexican Treaty obligation and associated conveyance losses be delivered each year in addition to the 75 million acre-feet every ten years required by Article III(d) of the Compact. The Lower Division States' believe that our position regarding the Upper Basin's delivery obligation should be reflected in the hydrologic determination to more fairly show the range of potential risk that is being accepted by the Upper Division States.

Inclusion of Additional Reservoir Storage

The draft 2006 Hydrologic Determination assumes that reservoirs other than those of the Colorado River Storage Project (CRSP) initial units will be used to meet the water demands of the Upper Division States during the critical period of below normal water supply and will be drawn down proportionally with CRSP reservoirs during the critical period. Previous Hydrologic Determinations did not rely on the use of these other reservoirs to determine the water available from Navajo Reservoir and the Upper Colorado River Basin for use in New Mexico. This assumption adds about 4.5 million acre-feet of water that contributes to the yield determination and is utilized during the critical period. Although this water will be available for use in the Upper Division States during the critical period, it will be utilized by specific water right holders and may not be drawn upon in the same fashion as CRSP reservoirs absent the negotiation and execution of operating agreements within the Upper Basin.

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We question Reclamation's inclusion of this additional storage in the draft 2006 Hydrologic Determination while excluding such storage in its annual determination of whether projected Upper Basin storage is sufficient to meet storage requirements under section 602(a) of the Colorado River Basin Project Act.

Reclamation Analysis and Conclusions

The draft 2006 Hydrologic Determination uses a "mass balance" analysis, rather than Reclamation's Colorado River Simulation System (CRSS), which is the analytical model used in all other decisional documents prepared by Reclamation regarding Colorado River management. The draft 2006 Hydrologic Determination also appears to be based solely on one hydrologic trace—as compared to the nearly 100 traces used to support the seven states' negotiations—and assumes that all reservoirs are full to begin the cycle. Moreover, the trace used in the draft 2006 Hydrologic Determination ends with the year 2000, just as the Colorado River Basin began one of its driest periods on record. These analytical inconsistencies call into question the report's conclusion.

The draft 2006 Hydrologic Determination assumes an overall shortage in the Upper Basin's consumptive use of six percent during the critical period in order to conclude that at least 5.76 million acre-feet of water is available for use by the Upper Basin, exclusive of reservoir evaporation at CRSP reservoirs. In its June 9, 2006, Resolution, the Upper Colorado River Commission opposes the use of this assumption; however absent that assumption, the conclusion reached in the hydrologic determination and supported by the Upper Colorado River Commission may not be valid under either Reclamation's or the Lower Division States' assumption regarding the Upper Basin's delivery obligation under Article III(c) of the Colorado River Compact. Also, several statements are made in the draft 2006 Hydrologic Determination regarding a Colorado River Compact call; however, no analysis, such as that contained in the 1988 Hydrologic Determination was conducted.

Conclusion

The Lower Division States support negotiated water rights settlements with all Tribal nations including the proposed Navajo settlement. We understand that the purpose of the draft 2006 Hydrologic Determination is to support additional Colorado River water use in New Mexico that may be necessary to resolve the water rights claims of the Navajo Nation. While we do support New Mexico's efforts to reach a Navajo settlement, the proposal to divert water in the Upper Basin for use in the Lower Basin raises legal and policy concerns that will need to be addressed in a collaborative setting involving all seven Basin States and included in any legislation authorizing the settlement.

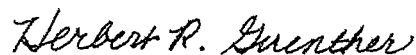
We appreciate this opportunity to express our views regarding Reclamation's May 2006 draft Hydrologic Determination regarding the Water Available from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico. Before granting your approval of the draft 2006 Hydrologic Determination, we urge you to direct Reclamation to reexamine its analysis in response to

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the concerns raised in this letter. We stand ready to work with you, Reclamation and the Upper Division States to address our concerns regarding the draft 2006 Hydrologic Determination and related issues, as well as other issues of mutual interest in the Colorado River Basin.

We would appreciate a response from Reclamation to the concerns raised in this letter. Thank you for your consideration.

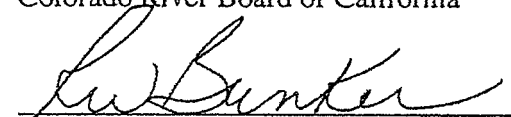
Sincerely,



Herbert R. Guenther
Director
Arizona Department of Water Resources



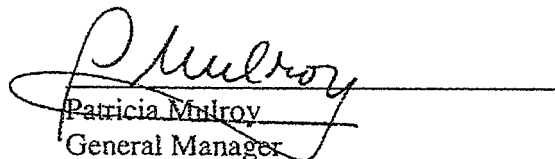
Dana B. Fisher, Jr.
Chairman
Colorado River Board of California



Richard Bunker
Chairman
Colorado River Commission of Nevada



Gerald R. Zimmerman
Executive Director
Colorado River Board of California



Patricia Mulroy
General Manager
Southern Nevada Water Authority

cc: Upper and Lower Colorado Regional Directors (USBR)
Upper Colorado River Division States
Upper Colorado River Commission

UC-6
2006 Hydrologic Deter
copy: UC-3
Compact Admin

RESOLUTION OF THE
UPPER COLORADO RIVER COMMISSION

Regarding the Availability of Water from Navajo Reservoir for Navajo Nation Uses
within the State of New Mexico

WHEREAS, the State of New Mexico has proposed the Navajo-Gallup Water Supply Project to provide a needed renewable water supply from the San Juan River for municipal and domestic uses for Indian and non-Indian communities located within New Mexico in both the Upper Basin and the Lower Basin; and

WHEREAS, the State of New Mexico and the Navajo Nation on April 19, 2005, executed the San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement Agreement (the "Settlement Agreement"), which is conditioned upon, among other things, the implementation of the Navajo Nation components of the Navajo-Gallup Water Supply Project within New Mexico; and

WHEREAS, the source of water supply for the proposed Navajo-Gallup Water Supply Project would be Navajo Reservoir and the San Juan River in New Mexico; and

WHEREAS, water from Navajo Reservoir and the San Juan River would be delivered to the proposed Navajo-Gallup Water Supply Project to meet the water demands of Navajo Nation communities in New Mexico through a proposed Settlement Contract between the United States, acting through the Secretary of the Interior, and the Navajo Nation (Appendix 4 to the Settlement Agreement); and

WHEREAS, Public Law 87-483 at section 11(a) requires that no new long-term contracts "... shall be entered into for the delivery of water stored in Navajo Reservoir or any other waters of the San Juan River and its tributaries, as aforesaid, until the Secretary has determined by hydrologic investigations that sufficient water to fulfill said contract is reasonably likely to be available for use in the State of New Mexico during the term thereof under the allocations made in articles III and XIV of the Upper Colorado River Basin compact, and has submitted such determination to the Congress of the United States and the Congress has approved such contracts"; and

WHEREAS, pursuant to Public Law 87-483, and in furtherance of the Jicarilla Apache Tribe Water Rights Settlement Act of 1992 and the Navajo Reservoir water supply contract approved by said Act, the Secretary of the Interior on February 2, 1989, approved the report on "Hydrologic Determination, 1988, Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico" (the "1988 Hydrologic Determination"); and

WHEREAS, the 1988 Hydrologic Determination evaluated the availability of water from the Navajo Reservoir supply for uses in New Mexico through the 2040 planning horizon; and

WHEREAS, an update and extension to the 1988 Hydrologic Determination is needed to evaluate the availability of water from the Navajo Reservoir supply through a 2060 planning horizon under the allocation of water made to the State of New Mexico by the Upper Colorado River Basin Compact for the purpose of furthering Congressional legislative approval of the Settlement Agreement, the authorization of the proposed Navajo-Gallup Water Supply Project, and the legislative approval of the proposed Settlement Contract for the Navajo Nation's project uses in New Mexico; and

WHEREAS, the proposed Settlement Contract between the United States and the Navajo Nation would provide water supplies for Navajo Nation uses in New Mexico under both the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project which was authorized by Public Law 87-483, and would supersede the existing Navajo Reservoir water supply contract for the Navajo Indian Irrigation Project; and

WHEREAS, the US Bureau of Reclamation has presented to the Upper Colorado River Commission for its consideration a draft hydrologic determination, dated May 2006, that evaluates the availability of water from the Navajo Reservoir supply through 2060 and shows: (1) at least 5.76 million acre-feet of water is reasonably available annually for use by the Upper Basin, exclusive of reservoir evaporation at Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit reservoirs of the Colorado River Storage Project; and (2) sufficient water is reasonably likely to be available from the Navajo Reservoir supply to fulfill the proposed Settlement Contract for the Navajo Nation's uses in New Mexico under the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project, in addition to existing Navajo Reservoir water supply contracts for other uses, under the allocations made to New Mexico in Articles III and XIV of the Upper Colorado River Basin Compact; and

WHEREAS, the Settlement Agreement would provide at subparagraph 9.3.1: "The Navajo Nation and the United States agree that the State of New Mexico may administer in priority water rights in the San Juan River Basin in New Mexico, including rights of the Navajo Nation, as may be necessary for New Mexico to comply with its obligations under interstate compacts and other applicable law"; and

WHEREAS, the Upper Colorado River Commission supports water resource development in the Upper Colorado River Basin to enable the Upper Division States to fully develop their compact apportionments of Colorado River water while meeting compact obligations relating to the flow of the Colorado River at Lee Ferry; and

WHEREAS, it is the position of the Upper Colorado River Commission and the Upper Division States that, with the delivery at Lee Ferry of 75 million acre-feet of water in each period of ten consecutive years, the water supply available in the Colorado River

System below Lee Ferry is sufficient to meet the apportionments to the Lower Basin provided for in Articles III (a) and III (b) of the Colorado River Compact; and

WHEREAS, it is the position of the Upper Colorado River Commission and the Upper Division States that the obligation of the Upper Basin under Article III(c) of the Colorado River Compact to deliver water toward the Mexican Treaty obligation does not require the delivery at Lee Ferry of 0.75 million acre-feet of water annually; and

WHEREAS, the Upper Colorado River Commission anticipates that the Upper Division States will take all actions necessary to ensure that all Upper Basin States have access to their respective apportionments as specified in the Upper Colorado River Basin Compact; and

WHEREAS, the Upper Colorado River Commission on June 19, 2003, resolved that: (1) "the States of Colorado, New Mexico, Utah and Wyoming, support and to the extent necessary consent to the diversion of water from the Upper Basin for use in the Lower Basin solely within New Mexico via the proposed Navajo-Gallup Water Supply Project; provided, that any water so diverted by said project to the Lower Basin portion of New Mexico, being a depletion of water at Lee Ferry, shall be a part of the consumptive use apportionment made to the State of New Mexico by Article III (a) of the Upper Colorado River Compact;" and (2) "the Upper Colorado River Commission supports such Congressional action as may be necessary to authorize the Navajo-Gallup Water Supply Project."

NOW, THEREFORE, BE IT RESOLVED by the Upper Colorado River Commission, that the Commission supports Congressional action to: (1) approve the Settlement Agreement; (2) authorize the proposed Navajo-Gallup Water Supply Project; and (3) approve the proposed Settlement Contract for the Navajo Nation's uses in New Mexico from the Navajo Reservoir supply under the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project.

BE IT FURTHER RESOLVED, that while the Upper Colorado River Commission does not endorse all of the study assumptions used by the Bureau of Reclamation in its May 2006 draft hydrologic determination, including an assumption of a 6 percent allowable overall shortage, and specifically disagrees with the modeling assumption of a minimum Upper Basin delivery of 8.25 million acre-feet annually at Lee Ferry, the Commission supports a determination by the Secretary of the Interior that at least 5.76 million acre-feet of water is available annually for use by the Upper Basin, exclusive of reservoir evaporation at Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit reservoirs of the Colorado River Storage Project.

BE IT FURTHER RESOLVED, that the Upper Colorado River Commission supports a determination by the Secretary of the Interior that sufficient water is reasonably likely to be available to fulfill the proposed Settlement Contract for the Navajo Nation's uses in New Mexico from the Navajo Reservoir supply under the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project, in addition

to existing Navajo Reservoir water supply contracts for other uses, under the allocations made to New Mexico in Articles III and XIV of the Upper Colorado River Basin Compact.


BE IT FURTHER RESOLVED, that nothing in this Resolution, or resulting from the adoption of this Resolution, shall limit the right or ability of any Upper Basin State to develop the full apportionment made to it under the Colorado River Compact and the Upper Colorado River Basin Compact.

BE IT FURTHER RESOLVED, that a copy of this resolution be transmitted to the Regional Director, Upper Colorado Region, Bureau of Reclamation, Salt Lake City, Utah.

CERTIFICATE

I, Don A. Ostler, Executive Director and Secretary of the Upper Colorado River Commission, do hereby certify that the Upper Colorado River Commission adopted the above Resolution at its regular meeting held in Jackson Hole, Wyoming, on June 5, 2006.

WITNESS my hand this 9th day of June 2006.



DON A. OSTLER
Executive Director and Secretary

UC-6
2006 Hydrologic
Determination

NEW MEXICO INTERSTATE STREAM COMMISSION

COMMISSION MEMBERS

JIM DUNLAP, Chairman, Farmington
J. PHELPS WHITE, III, Vice-Chairman, Roswell
JOHN R. D'ANTONIO, JR., P.E., Secretary, Santa Fe
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JULIA DAVIS STAFFORD, Cimarron
PATRICIO GARCIA, Rio Chama
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JAMES WILCOX, Carlsbad



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June 6, 2006

Mr. Scott Balcomb, Commissioner
Upper Colorado River Commission
PO Drawer 790
Glenwood Springs, Colorado 81602

Mr. Rod Kuharich, Director
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Re: New Mexico's Response to Colorado's May 24, 2006, Letter to John D'Antonio, Jr.

Gentlemen:

This letter is in response to your May 24, 2006, letter to me regarding the Upper Colorado River Basin hydrologic determination update, my telephone conversation with Rod Kuharich on May 25, 2006, and our subsequent telephone conferences and meetings on the subject. You have requested New Mexico's support for Colorado's proposed changes to the draft resolution of the Upper Colorado River Compact Commission on the May 2006 draft Hydrologic Determination and to the proposed determination, and you request certain assurances from New Mexico relating to specific issues identified in the letter. While New Mexico cannot agree to all of the State of Colorado's suggested changes to the May 2006 draft Hydrologic Determination or to the proposed resolution of the Upper Colorado River Commission relating to the determination, New Mexico and Colorado have agreed to revised versions of the documents which are attached to this letter.

The draft Hydrologic Determination has been prepared to indicate the availability of water within the State of New Mexico's Upper Basin allocation for the Navajo-Gallup Water Supply Project, which is a component of a Navajo Nation water rights settlement in the San Juan River Basin in New Mexico. The draft Hydrologic Determination uses many of the same assumptions used in the 1988 Hydrologic Determination, and indicates that sufficient water is likely to be available within New Mexico's Upper Basin allocation to supply the Navajo-Gallup Project. The May 2006 draft Hydrologic Determination shows the same total Upper Basin depletion during the 1953-1977 critical water supply period as was shown in the 1988 Hydrologic Determination, but refines the analysis by deducting the critical period evaporation, rather than the long-term average evaporation, from the critical period total depletion to determine the availability of water for use by the states during the period. The Upper Colorado Regional Office of the Bureau of Reclamation and the engineering staff representing the States of the Upper

Mr. Balcomb, Mr. Kuharich
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Division accepted this approach in the draft Hydrologic Determination as technically appropriate and sound.

The Hydrologic Determination would provide for the continuation of Upper Basin water development, provide a mechanism for resolving certain long-standing disputes within the Upper Basin as to the accounting procedures for consumptive uses in the basin, and assist in moving forward the Navajo Nation water rights settlement. In addition, under the settlement, the Navajo Nation would agree that its rights to the use of water in the San Juan Basin, and its exercise of these rights, are subject to both the Upper Colorado River Basin Compact and New Mexico state water law. Thus, the settlement provides great benefits to users of San Juan River Basin water in both Colorado and New Mexico.

Although the position of the Southwestern Water Conservation District, as conveyed by your letter, addresses more than the technical merits of the Hydrologic Determination and the corresponding Commission resolution, we address the District's and Colorado's requests as follows. As a participant in the San Juan River Basin Recovery Implementation Program, New Mexico continues to support and work towards the dual goals of the program: (1) to conserve populations of Colorado pikeminnow and razorback sucker in the San Juan River Basin consistent with the recovery goals established under the Endangered Species Act; and (2) to proceed with water development in the basin in compliance with federal and state laws, interstate compacts, Supreme Court decrees, and federal trust responsibilities to the Southern Ute Indian Tribe, the Ute Mountain Ute Tribe, the Jicarilla Apache Nation and the Navajo Nation. The State of Colorado and water development interests in both New Mexico and Colorado also participate in the Program. New Mexico continues, as does Colorado, to make available its required cost-share funds pursuant to Public Law 106-392, as amended, to assist in the implementation of capital recovery projects in the San Juan River, and supports extension of the term of the Recovery Implementation Program as necessary to accomplish the goals of the program.

Moreover, to proceed with the Animas-La Plata (ALP) Project and its role as a vehicle in the settlement of the Colorado Ute Tribes' reserved water rights claims, which benefit water users in both Colorado and New Mexico, the states of Colorado and New Mexico agreed to the re-operation of Navajo Reservoir to benefit the populations of endangered fish in the San Juan River. The re-operation of Navajo Reservoir to assist with meeting the flow recommendations of the Recovery Implementation Program, in combination with the other activities of the Recovery Implementation Program, provides a reasonable and prudent alternative for Endangered Species Act compliance for all existing and future San Juan River Basin federal water development and water management activities in Colorado as well as in New Mexico. The State of New Mexico continues to support the preferred alternative of the Bureau of Reclamation's Navajo Reservoir Operations Final Environmental Impact Statement to operate Navajo Reservoir to help meet the flow recommendations or a reasonable alternative.

Neither the states of New Mexico and Colorado nor the Fish and Wildlife Service considers the Recovery Implementation Program's flow recommendations to be inviolate. Therefore, New Mexico agrees with Colorado that the flow recommendations should not be used to impede additional water development in the San Juan River Basin in both states that is consistent with each states' allocation under the Upper Colorado River Basin Compact. New Mexico and Colorado have worked with the water development interests in both states and through the Recovery Implementation Program to ensure

Mr. Balcomb, Mr. Kuharich
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that the Program provides a reasonable and prudent alternative for Endangered Species Act compliance. Section 7 consultations rely on the Recovery Implementation Program for Endangered Species Act compliance by utilizing, among other things, the Program as the reasonable and prudent alternative. Water development projects in the San Juan River Basin in Colorado and New Mexico, while perhaps hindered by, have not been stopped, because of the Recovery Implementation Program's flow recommendations, or a project's inability to utilize the Recovery Implementation Program as a reasonable and prudent alternative for Endangered Species Act compliance. The Recovery Implementation Program, in total, is intended to provide the reasonable and prudent alternative to offset the depletion and other impacts of water development in the San Juan River Basin. New Mexico supports the continuation of the Recovery Implementation Program as a reasonable and prudent alternative to offset the impacts of water development in the basin in accordance with the program documents, including in particular the Principles for Conducting Endangered Species Act Section 7 Consultations on Water Development and Water Management Activities Affecting Endangered Fish Species in the San Juan River Basin adopted by the program on June 19, 2002. The Principles document also describes how the Recovery Implementation Program addresses and provides compliance for the "take" provisions of Section 9 of the Endangered Species Act. New Mexico further agrees that it will not use the Recovery Implementation Program, including the flow recommendations, to hinder or impair any future water development in the Colorado portion of the San Juan River Basin.

New Mexico also supports the right of each Upper Basin state to develop its Upper Colorado River Basin Compact allocation. The Navajo-Gallup Water Supply Project would provide about 29,500 acre-feet per year of depletions in New Mexico, of which about 20,800 acre-feet are for use by the Navajo Nation under a proposed Navajo Reservoir water supply contract and 8,700 acre-feet are for use by the Jicarilla Apache Nation and the City of Gallup under the Jicarilla Apache Nation's existing Navajo Reservoir water supply contract. Pursuant to the Colorado Ute Indian Water Rights Settlement Act Amendments of 2000, the ALP Project will provide about 43,500 acre-feet per year of depletions in Colorado and 13,600 acre-feet per year of depletions in New Mexico which were the subject of the Project's previous Section 7 consultation under the ESA. In addition, it is anticipated that the proposed Long Hollow Reservoir Project will deplete about 1,500 acre-feet of water per year, on average, in the La Plata River drainage in Colorado. I confirm New Mexico's support for the Long Hollow Reservoir Project as stated in my January 31, 2006, letter to Hal Simpson, Colorado State Engineer.

The State of New Mexico disagrees, however, with the State of Colorado's position regarding where the states may choose to use their La Plata River Compact apportionments. The La Plata River Compact is administered daily by the State Engineers of Colorado and New Mexico, and issues regarding the compact administration should be discussed and addressed by the State Engineers.

With respect to the San Juan-Chama Project, the flow bypass parameters for operation of the San Juan-Chama Project at its points of diversion in Colorado were mandated by section 8 of Public Law 87-483, which authorized the project in June 1962. The Bureau of Reclamation's hydrologic modeling prepared for water planning and federal environmental compliance activities in the San Juan River Basin uses the Public Law 87-483, section 8, bypass requirements. I am not adverse to discussing possible modifications to San Juan-Chama Project bypass requirements, in consultation with the Bureau of

Mr. Balcomb, Mr. Kuharich
May 6, 2006
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Reclamation and the project contractors, so long as the San Juan-Chama Project yield is not adversely affected.

Finally, New Mexico will continue to work through the Seven Basin States process to identify and help bring to fruition water augmentation opportunities throughout the Colorado River Basin, including weather modification. The San Juan Water Commission, a New Mexico entity and participant in the ALP Project, has in the past contributed funding to snowpack augmentation in the San Juan Mountains of Colorado. The State of New Mexico remains committed to all of the concepts contained in the draft Seven Basin States agreement transmitted to the Secretary of the Interior via letter dated February 3, 2006, so long as the states continue to honor and support each state's rights to develop its compact allocation.

Thank you for your support of New Mexico's right to develop its compact allocation, and for your support of the Hydrologic Determination update and the proposed resolution. Please call me to discuss this matter further if you have any questions or believe that further discussion would be helpful.

Sincerely,



John R. D'Antonio, Jr., PE
Secretary and State Engineer

Copy: Dennis Strong, Commissioner, Upper Colorado River Commission
Patrick Tyrrell, Commissioner, Upper Colorado River Commission
Don Ostler, Executive Director, Upper Colorado River Commission
Rick Gold, Upper Colorado Regional Director, Bureau of Reclamation
Hal Simpson, Colorado State Engineer
Nate Gentry, Office of Senator Pete Domenici
Mike Connor, Office of Senator Jeff Bingaman
Steve Farris, Office of the New Mexico Attorney General
Bill Hume, Office of Governor Bill Richardson

JUNE 2006 DRAFT

RESOLUTION OF THE
UPPER COLORADO RIVER COMMISSION

Regarding the Availability of Water from Navajo Reservoir for Navajo Nation Uses
within the State of New Mexico

WHEREAS, the State of New Mexico has proposed the Navajo-Gallup Water Supply Project to provide a needed renewable water supply from the San Juan River for municipal and domestic uses for Indian and non-Indian communities located within New Mexico in both the Upper Basin and the Lower Basin; and

WHEREAS, the State of New Mexico and the Navajo Nation on April 19, 2005, executed the San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement Agreement (the "Settlement Agreement"), which is conditioned upon, among other things, the implementation of the Navajo Nation components of the Navajo-Gallup Water Supply Project within New Mexico; and

WHEREAS, the source of water supply for the proposed Navajo-Gallup Water Supply Project would be Navajo Reservoir and the San Juan River in New Mexico; and

WHEREAS, water from Navajo Reservoir and the San Juan River would be delivered to the proposed Navajo-Gallup Water Supply Project to meet the water demands of Navajo Nation communities in New Mexico through a proposed Settlement Contract between the United States, acting through the Secretary of the Interior, and the Navajo Nation (Appendix 4 to the Settlement Agreement); and

WHEREAS, Public Law 87-483 at section 11(a) requires that no new long-term contracts "... shall be entered into for the delivery of water stored in Navajo Reservoir or any other waters of the San Juan River and its tributaries, as aforesaid, until the Secretary has determined by hydrologic investigations that sufficient water to fulfill said contract is reasonably likely to be available for use in the State of New Mexico during the term thereof under the allocations made in articles III and XIV of the Upper Colorado River Basin compact, and has submitted such determination to the Congress of the United States and the Congress has approved such contracts"; and

WHEREAS, pursuant to Public Law 87-483, and in furtherance of the Jicarilla Apache Tribe Water Rights Settlement Act of 1992 and the Navajo Reservoir water supply contract approved by said Act, the Secretary of the Interior on February 2, 1989, approved the report on "Hydrologic Determination, 1988, Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico" (the "1988 Hydrologic Determination"); and

WHEREAS, the 1988 Hydrologic Determination evaluated the availability of water from the Navajo Reservoir supply for uses in New Mexico through the 2040 planning horizon; and

WHEREAS, an update and extension to the 1988 Hydrologic Determination is needed to evaluate the availability of water from the Navajo Reservoir supply through a 2060 planning horizon under the allocation of water made to the State of New Mexico by the Upper Colorado River Basin Compact for the purpose of furthering Congressional legislative approval of the Settlement Agreement, the authorization of the proposed Navajo-Gallup Water Supply Project, and the legislative approval of the proposed Settlement Contract for the Navajo Nation's project uses in New Mexico; and

WHEREAS, the proposed Settlement Contract between the United States and the Navajo Nation would provide water supplies for Navajo Nation uses in New Mexico under both the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project which was authorized by Public Law 87-483, and would supersede the existing Navajo Reservoir water supply contract for the Navajo Indian Irrigation Project; and

WHEREAS, the US Bureau of Reclamation has presented to the Upper Colorado River Commission for its consideration a draft hydrologic determination, dated May 2006, that evaluates the availability of water from the Navajo Reservoir supply through 2060 and shows: (1) at least 5.76 million acre-feet of water is reasonably available annually for use by the Upper Basin, exclusive of reservoir evaporation at Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit reservoirs of the Colorado River Storage Project; and (2) sufficient water is reasonably likely to be available from the Navajo Reservoir supply to fulfill the proposed Settlement Contract for the Navajo Nation's uses in New Mexico under the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project, in addition to existing Navajo Reservoir water supply contracts for other uses, under the allocations made to New Mexico in Articles III and XIV of the Upper Colorado River Basin Compact; and

WHEREAS, the Settlement Agreement would provide at subparagraph 9.3.1: "The Navajo Nation and the United States agree that the State of New Mexico may administer in priority water rights in the San Juan River Basin in New Mexico, including rights of the Navajo Nation, as may be necessary for New Mexico to comply with its obligations under interstate compacts and other applicable law"; and

WHEREAS, the Upper Colorado River Commission supports water resource development in the Upper Colorado River Basin to enable the Upper Division States to fully develop their compact apportionments of Colorado River water while meeting compact obligations relating to the flow of the Colorado River at Lee Ferry; and

WHEREAS, it is the position of the Upper Colorado River Commission and the Upper Division States that, with the delivery at Lee Ferry of 75 million acre-feet of water in each period of ten consecutive years, the water supply available in the Colorado River

System below Lee Ferry is sufficient to meet the apportionments to the Lower Basin provided for in Articles III(a) and III(b) of the Colorado River Compact; and

WHEREAS, it is the position of the Upper Colorado River Commission and the Upper Division States that the obligation of the Upper Basin under Article III(c) of the Colorado River Compact to deliver water toward the Mexican Treaty obligation does not require the delivery at Lee Ferry of 0.75 million acre-feet of water annually; and

WHEREAS, the Upper Colorado River Commission anticipates that the Upper Division States will take all actions necessary to ensure that all Upper Basin States have access to their respective apportionments as specified in the Upper Colorado River Basin Compact; and

WHEREAS, the Upper Colorado River Commission on June 19, 2003, resolved that: (1) "the States of Colorado, New Mexico, Utah and Wyoming, support and to the extent necessary consent to the diversion of water from the Upper Basin for use in the Lower Basin solely within New Mexico via the proposed Navajo-Gallup Water Supply Project; provided, that any water so diverted by said project to the Lower Basin portion of New Mexico, being a depletion of water at Lee Ferry, shall be a part of the consumptive use apportionment made to the State of New Mexico by Article III (a) of the Upper Colorado River Compact;" and (2) "the Upper Colorado River Commission supports such Congressional action as may be necessary to authorize the Navajo-Gallup Water Supply Project."

NOW, THEREFORE, BE IT RESOLVED by the Upper Colorado River Commission, that the Commission supports Congressional action to: (1) approve the Settlement Agreement; (2) authorize the proposed Navajo-Gallup Water Supply Project; and (3) approve the proposed Settlement Contract for the Navajo Nation's uses in New Mexico from the Navajo Reservoir supply under the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project.

BE IT FURTHER RESOLVED, that while the Upper Colorado River Commission does not endorse all of the study assumptions used by the Bureau of Reclamation in its May 2006 draft hydrologic determination, including an assumption of a 6 percent allowable overall shortage, and specifically disagrees with the modeling assumption of a minimum Upper Basin delivery of 8.25 million acre-feet annually at Lee Ferry, the Commission supports a determination by the Secretary of the Interior that at least 5.76 million acre-feet of water is available annually for use by the Upper Basin, exclusive of reservoir evaporation at Lake Powell, Flaming Gorge Reservoir and the Aspinnall Unit reservoirs of the Colorado River Storage Project.

BE IT FURTHER RESOLVED, that the Upper Colorado River Commission supports a determination by the Secretary of the Interior that sufficient water is reasonably likely to be available to fulfill the proposed Settlement Contract for the Navajo Nation's uses in New Mexico from the Navajo Reservoir supply under the Navajo-Gallup Water Supply Project and the Navajo Indian Irrigation Project, in addition

to existing Navajo Reservoir water supply contracts for other uses, under the allocations made to New Mexico in Articles III and XIV of the Upper Colorado River Basin Compact.

BE IT FURTHER RESOLVED, that nothing in this Resolution, or resulting from the adoption of this Resolution, shall limit the right or ability of any Upper Basin State to develop the full apportionment made to it under the Colorado River Compact and the Upper Colorado River Basin Compact.

BE IT FURTHER RESOLVED, that a copy of this resolution be transmitted to the Regional Director, Upper Colorado Region, Bureau of Reclamation, Salt Lake City, Utah.

CERTIFICATE

I, Don A. Ostler, Executive Director and Secretary of the Upper Colorado River Commission, do hereby certify that the Upper Colorado River Commission adopted the above Resolution at its regular meeting held in Jackson Hole, Wyoming, on June 5, 2006.

WITNESS my hand this ____ day of _____ 2006.

DON A. OSTLER
Executive Director and Secretary

MAY 2006 DRAFT
HYDROLOGIC DETERMINATION
2006

Water Availability from Navajo Reservoir and
the Upper Colorado River Basin for Use in New Mexico

Date

Secretary of the Interior

I. Executive Summary

Determination as to the availability of water under long-term service contracts for uses from Navajo Reservoir involves a projection into the future of estimated water uses and water supplies. On the basis of this hydrologic investigation, water depletions by the Upper Basin states from the Upper Colorado River Basin can be reasonably allowed to rise to an annual average of 5.76 million acre-feet (maf) per year, exclusive of Colorado River Storage Project (CRSP) reservoir evaporation from Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit. This depletion level can be achieved under the same shortage criteria upon which the allowable Upper Basin yield was determined in the 1988 Hydrologic Determination.

This document determines the availability through at least 2060 of water from New Mexico's Upper Basin allocation and Navajo Reservoir to service a proposed contract for the Navajo Nation's consumptive uses in New Mexico under the Navajo-Gallup Water Supply Project in the annual amount of 20,780 acre-feet (af) and the Navajo Indian Irrigation Project (NIIP) in the amount of 270,000 af per year on average over any period of ten consecutive years. It also is likely that sufficient water will be available from Navajo Reservoir to service the proposed contract after the 2060 planning horizon, depending upon future storage, hydrologic conditions and other factors. This determination does not guarantee that the United States will be able to deliver water under the proposed contract without shortages in deliveries, and does not obligate the United States to maintain storage facilities beyond their useful lives. The proposed contract is part of a Navajo Nation water rights settlement in the Upper Basin in New Mexico, and the settlement provides that uses made pursuant to the contract will be subject to administration in accordance with the Upper Colorado River Basin Compact and New Mexico state law.

II. Introduction

The State of New Mexico has proposed the Navajo-Gallup Water Supply Project to provide a renewable water supply from the San Juan River for municipal and domestic uses for Indian and non-Indian communities located within New Mexico. Uses under the project by the Jicarilla Apache Nation and the City of Gallup would be supplied through the Jicarilla Apache Nation's Navajo Reservoir water supply contract approved by Congress in 1992. Uses in New Mexico under the project by the Navajo Nation would be supplied through a proposed new Navajo Reservoir water supply contract that is a component of the San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement Agreement (hereinafter referred to as the Settlement Agreement) that the State of New Mexico and the Navajo Nation executed on April 19, 2005. The new contract also would supersede the existing Navajo Reservoir water supply contract for the Navajo Indian Irrigation Project (NIIP).

The Upper Colorado River Commission on June 19, 2003, resolved that the States of the Upper Division consent to the Navajo-Gallup Water Supply Project provided that water

diverted by the project for use in New Mexico shall be a part of the consumptive use apportionment made to the State of New Mexico by Article III(a) of the Upper Colorado River Basin Compact. The maximum amount of consumptive use through the project by the Navajo Nation in New Mexico that would be permitted in any one year under the Settlement Agreement and the proposed contract is 20,780 acre-feet.

Public Law 87-483 at section 11(a) requires that no long-term contract, except contracts for the NIIP and the San Juan-Chama Project, shall be entered into for the delivery of water stored in Navajo Reservoir, or any other waters of the San Juan River and its tributaries to which the United States is entitled, until the Secretary of the Interior has determined by hydrologic investigation that sufficient water to fulfill such contract is reasonably likely to be available for use in the State of New Mexico under the allocations made in Articles III and XIV of the Upper Colorado River Basin Compact, has submitted such determination to Congress, and Congress has approved the contract. The last such hydrologic determination was approved by the Secretary on February 2, 1989 (Hydrologic Determination, 1988, Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico, hereinafter referred to as the 1988 Hydrologic Determination). The 1988 Hydrologic Determination evaluated the availability of water from the Navajo Reservoir water supply for the Jicarilla Apache Nation's Navajo Reservoir water supply contract. The State of New Mexico by letter dated May 3, 2005, requested that the 1988 Hydrologic Determination be updated to evaluate the availability of water to service the proposed Navajo-Gallup Water Supply Project.

This hydrologic investigation is made for the purpose of contracting for water from the Navajo Reservoir water supply for the Navajo Nation's uses in New Mexico under the Navajo-Gallup Water Supply Project. The Bureau of Reclamation prepared the hydrologic investigation in consultation with the Upper Colorado River Commission because of the critical nature of this determination of the Upper Basin water supply. The Upper Colorado River Basin Compact created and defines several areas of responsibility for the Commission that directly and indirectly relate to this investigation.

III. Upper Basin Yield

A. General Upper Basin Hydrology

Based on the Bureau of Reclamation's Colorado River Simulation System (CRSS) natural flows for the period 1906-2000, the natural runoff from the Upper Colorado River Basin averages about 15.3 maf per year at Lee Ferry. Of this amount, approximately 2 maf per year originates in the San Juan River Basin above Bluff, Utah. New Mexico can only develop its Upper Basin allocation from the San Juan River and its tributaries. The Bureau of Reclamation's Colorado River System Consumptive Uses and Losses Report for 1996-2000 indicates that current consumptive uses from the San Juan River Basin average about 382,400 af per year in New Mexico and about 192,500 af per year in

Colorado. Only minor amounts of depletions are made in the San Juan River Basin in Utah and Arizona.

B. Approach

This hydrologic investigation considers and uses many of the same basic assumptions as the 1988 Hydrologic Determination. Both investigations assume use of the CRSS natural flows at Lee Ferry, minimum releases from Lake Powell of between 7.48 maf and 8.23 maf annually, an allowable overall shortage of no more than 6 percent for a critical period, either maintenance or use of the minimum power pools at CRSP units, reduced storage capacity in Lake Powell due to sedimentation, and inclusion of bank storage. The CRSS natural flows at Lee Ferry for the period 1971-1980 were increased to reflect recalculation of historic irrigation depletions in the Upper Basin using the Soil Conservation Service (SCS) modified Blaney-Criddle method with SCS effective precipitation. The revised CRSS natural flows for 1971-1980 are consistent with the CRSS natural flows at Lee Ferry determined for the remainder of the 1906-2000 period of record. Also, sedimentation in Lake Powell was adjusted to reflect a 2060 planning horizon, and a 4-percent bank storage factor was used in this investigation consistent with Reclamation's current CRSS model.

The Upper Colorado River Commission does not agree with the modeling assumption of an objective minimum release of 8.23 maf and the assumed delivery of 0.75 maf each year toward the Mexican Treaty obligation included therein. At the request of the Commission, this hydrologic investigation considers for planning purposes both the objective minimum release of 8.23 maf and a minimum release from Lake Powell of 7.48 maf annually. However, this hydrologic determination does not quantify the Colorado River Compact Article III(c) requirement or make or rely on a critical compact interpretation regarding Article III(c). The 1988 Hydrologic Determination also showed the Upper Basin yields under both minimum release scenarios.

Mass balance analyses were used to analyze potential water use by the Upper Basin under 2060 conditions. The mass balance considers Upper Basin reservoir storage, natural flows at Lee Ferry, deliveries to the Lower Basin, consumptive use demands in the Upper Basin, and CRSP evaporation as a function of storage volume. All existing Upper Basin storage capacity was included in the analysis because all storage supports water use in the Upper Basin and impacts stream flows. The CRSP and non-CRSP reservoirs as groups were assumed to be the same percent full each year, and CRSP storage was assumed to be distributed between units in accordance with the average historic storage distribution. The CRSP reservoir evaporation that is used in the mass balance analyses includes evaporation from Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit that is shared among the Upper Division States, but excludes evaporation from Navajo Reservoir which is chargeable to the states based on use. Shared CRSP reservoir evaporation is modeled using a regression equation relating historic shared CRSP reservoir evaporation from Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit to the aggregate historic storage volume in these reservoir plus Navajo Reservoir. Evaporation equations were developed for both active and live storage, and were applied

to estimate annual shared CRSP evaporation based upon yearly reservoir storage volume (surface area). The 1988 Hydrologic Determination considered variations in shared CRSP reservoir evaporation with storage for conducting statistical trace analyses to evaluate possible frequencies and magnitudes of shortages; however, it deducted a long-term average shared CRSP reservoir evaporation of 0.52 maf per year from the critical-period Upper Basin yield of at least 6.0 maf/yr to determine the amount of water available for Upper Basin uses through the critical period.

C. Results

Mass balance analyses were performed for various combinations of storage, Lower Basin deliveries and overall shortages to evaluate the allocation of water to the Upper Basin (see mass balance analyses provided in Appendix A). The following is a summary of the results of the analyses:

<u>Storage Assumption</u>	<u>Minimum Lower Basin Delivery (maf)</u>	<u>Yield without Shortages (maf)</u>	<u>Yield with 6% Overall Shortages (maf)</u>
Maintain minimum power pools	8.25	5.55	5.79
	7.50	6.30	6.57
Use minimum power pools	8.25	5.72	5.98
	7.50	6.47	6.76

The yield for this analysis is defined as the amount of water available at Lee Ferry for use, on average, by the Upper Basin, exclusive of shared CRSP reservoir evaporation. Shortages in the above table are defined as 6 percent or less overall computed shortage for any period of 25 consecutive years consistent with the 1988 Hydrologic Determination. Results are shown for minimum Lower Basin deliveries of 8.25 maf and 7.50 maf as was done in the 1988 Hydrologic Determination. The analyses in this investigation should not be construed to prejudice the positions of either the Upper Colorado River Commission or the States of the Lower Division as to the interpretation or administration of Article III of the Colorado River Compact.

For those analyses that use an allowable or tolerable overall shortage of 6 percent or less of the use over any period of 25 consecutive years, the results indicate that there would be 5 years of shortage to meet all demands on the Upper Basin out of 95 years of record used in this investigation. However, the annual amounts of computed shortages for those five years would not fully materialize because Upper Basin consumptive uses will be below average under critical-period hydrology due to physical water supply shortages at the sites of use in the Upper Basin. For example, the natural flow at Lee Ferry for 1977 was only 5.55 maf, and severe water supply shortages occurred throughout the Upper Basin in that year. The computations of shortage in this analysis give conservatively large estimates of annual shortages at Lee Ferry and do not fully reflect all factors,

including physical shortages in the Upper Basin, that might contribute or relate to a shortage condition at any given time. The computed shortages in this investigation do not equate to administrative calls to curtail Upper Basin uses.

D. Comparison to 1988 Hydrologic Determination

The 1988 Hydrologic Determination concluded that the total Upper Basin yield, including CRSP reservoir evaporation, is at least 6.0 maf per year for the 1953-1977 critical period hydrology with a 6 percent allowable overall shortage for the period. Under the conditions assumed in the current investigation, the shared CRSP evaporation varies with CRSP storage assumptions and storage levels. Assuming an average annual Upper Basin use of 5.79 maf, an annual Lower Basin delivery of 8.25 maf and maintenance of the power pools, the shared CRSP evaporation would range from an average of about 0.25 maf per year over the worst 25-year period of reservoir storage draw down (1953-1977) to an average of about 0.49 maf per year over the period of record used in the analysis (1906-2000). Thus, the total Upper Basin depletion, including both Upper Basin uses and CRSP reservoir evaporation, would average about 6.04 maf per year or more over any period of 25 consecutive years. The total Upper Basin depletion amount for this scenario for the 1953-1977 period is comparable to the total Upper Basin depletion of 6.0 maf per year determined to be available for the period by the 1988 Hydrologic Determination. The difference is due to the revisions made to the CRSS natural flows for 1971-1980. If the minimum power pools are used, the shared CRSP reservoir evaporation is reduced due to increased reservoir storage draw downs.

IV. Water Use Projections

A. Upper Basin

The Upper Colorado River Commission last approved depletions schedules for the Upper Division States for planning purposes in 1999. The depletions schedules, dated January 2000, project that the total Upper Basin use exclusive of shared CRSP reservoir evaporation will average about 5.37 maf per year under 2060 development conditions. Unless additional Upper Basin water development occurs by 2060 as compared to the January 2000 depletions schedules, the Upper Basin use may average less than about 5.40 maf per year from now through 2060. The time required to develop the Upper Basin allocation reduces risk of shortage within the 2060 planning horizon.

B. State of New Mexico

The New Mexico Interstate Stream Commission for use in this investigation provided to the Bureau of Reclamation a preliminary revised schedule of anticipated depletions through 2060 from the Upper Basin in New Mexico dated May 2006 (see Appendix B). The revised depletions schedule includes irrigation depletions calculated using the SCS modified Blaney-Criddle method with SCS effective precipitation so that demands and supply for this hydrologic investigation are evaluated using consistent methodologies.

The irrigation depletions for the Navajo Nation's irrigation projects are water right depletion amounts provided by the Settlement Agreement. Both this hydrologic investigation and the 1988 Hydrologic Determination assume use of the full depletion amount for the NIIP. This is a conservative assumption because the total NIIP depletion right is not expected to be fully utilized under normal farm management practices. The revised depletions schedule does not include New Mexico's allocation of shared CRSP reservoir evaporation. The revised New Mexico depletions schedule shows a total anticipated depletion of 642,000 af per year, on average, for uses in New Mexico under 2060 development conditions. This represents an increase in New Mexico's total Upper Basin depletion, excluding shared CRSP reservoir evaporation, of 23,000 af per year, or about 0.02 maf per year, as compared to the January 2000 depletions schedules.

V. Probabilities of Calls to Curtail Upper Basin Uses

The 1988 Hydrologic Determination included a probabilistic risk analysis of administrative calls to curtail Upper Basin uses that indicated that: (1) such calls would occur rarely at an Upper Basin demand level of 6.1 maf per year, though their effects could have significant impact to the Upper Basin; and (2) the frequency and magnitude of such calls would diminish rapidly below this demand level. The risk analysis was made using the CRSS model. It is not necessary for this investigation to duplicate such a risk analysis.

The computations of shortage in this current investigation give conservatively large estimates of annual shortages at Lee Ferry and do not fully reflect all factors, including physical shortages in the Upper Basin, that might contribute or relate to a shortage condition at any given time. While this investigation uses a 2060 reservoir storage sedimentation condition for Lake Powell, a risk analysis should vary the storage development and sedimentation conditions over time. In addition, it will take decades to develop the Upper Basin allocation. Therefore, risk of shortage is reduced within a 2060 planning horizon. Even using the CRSS model, computed shortages would not necessarily equate to administrative calls to curtail Upper Basin uses.

VI. Physical Availability of Water from Navajo Reservoir

The Bureau of Reclamation using a detailed hydrologic model for the San Juan River Basin has evaluated the physical availability of water from Navajo Reservoir and the San Juan River for the Navajo-Gallup Water Supply Project, taking into account, among other things, the habitat needs of San Juan River populations of fish species listed as endangered under the Endangered Species Act. The physical water supply analysis contained in the Biological Assessment, Navajo-Gallup Water Supply Project, dated August 16, 2005, indicates that sufficient water is likely to be available from the Navajo Reservoir water supply for the Navajo Nation's uses under the project. Although the depletions for individual uses in New Mexico that were used in the Biological Assessment differ slightly from those in New Mexico's May 2006 revised depletions

schedule, the physical water supply analysis in the Biological Assessment assumes possible full use of the depletion rights for both the NIIP and the Navajo-Gallup Water Supply Project, and assumes up to about 640,500 af per year of depletion, on average, in New Mexico from the San Juan River. This amount of total average depletion in New Mexico is not significantly different than the amount of total average depletion in New Mexico shown in the May 2006 revised New Mexico depletions schedule under 2060 development conditions.

VII. Conclusions

It is concluded that the Upper Basin yield and New Mexico water allocation needed to support New Mexico's revised Upper Basin depletions schedule are reasonably likely to be available. The mass balance analyses results are sufficient to conclude that: (1) the Upper Basin yield is at least 5.76 maf per year, on average, excluding shared CRSP reservoir evaporation; (2) New Mexico's Upper Basin allocation is at least 642,400 af per year, excluding shared CRSP reservoir evaporation; and (3) the total anticipated average annual consumptive use in New Mexico from the Upper Basin, including Navajo Reservoir evaporation, of 642,000 af per year as shown in the revised New Mexico depletions schedule is not likely to exceed New Mexico's Upper Basin allocation. This conclusion is reached assuming full use of the Navajo Nation's proposed depletion rights under the Settlement Agreement for both the Navajo-Gallup Water Supply Project and the NIIP.

Based on this hydrologic investigation for a planning horizon through 2060, the May 2006 revised New Mexico depletions schedule, and the Biological Assessment for the Navajo-Gallup Water Supply Project, sufficient water is reasonably likely to be available from the Navajo Reservoir water supply through at least 2060 to fulfill the contract that is proposed by the Settlement Agreement to provide water for the Navajo Nation's uses in New Mexico under the Navajo-Gallup Water Supply Project and the NIIP. If the term of the contract extends beyond 2060, or is perpetual as proposed by the Settlement Agreement, the risk of shortages in deliveries under the contract may increase after 2060 depending upon future storage, hydrologic conditions and other factors. Section 11(a) of Public Law 87-483 allows for contracting of water from Navajo Reservoir up to a total amount that, in the event of shortage, still results in a reasonable amount of water being available for the diversion requirements of the NIIP and the San Juan-Chama Project.

VIII. Disclaimers

A. Interstate Compacts and Federal Laws

Nothing in this report is intended to interpret the provisions of the Colorado River Compact (45 Stat. 1057), the Upper Colorado River Basin Compact (63 Stat. 31), the Water Treaty of 1944 between the United States of America and the United Mexican States (59 Stat. 1219), the decree entered by the Supreme Court of the United States in

Arizona v. California, et al. (376 U.S. 340), the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Storage Project Act (70 Stat. 105), or the Colorado River Basin Project Act (82 Stat. 885).

B. Proposed Navajo Reservoir Water Contract

This determination is not to be construed as acceptance by the Department of the Interior of the terms of the Settlement Agreement, including the terms of the proposed contract. This determination also does not guarantee that the United States would be able to deliver water under the proposed contract without shortages in deliveries on account of drought or other causes outside the control of the Secretary. Nothing in this determination shall be construed to impose on the United States any obligation to maintain CRSP storage facilities, including Navajo Dam and Reservoir, or NIIP or Navajo-Gallup Water Supply Project facilities beyond their useful lives or to take extraordinary measures to keep these facilities operating.

APPENDIX A

Mass Balance Analyses

Upper Basin Yield Mass Balance Analysis

Maintain CRSP Minimum Power Pools, 8.25 maf Lower Basin Delivery, No Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin-Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables	
1906	18,550,021	29,530,030	24,847,704	8,250,000	5,550,000	749,290	33,530,761	4,000,731	0	29,530,030	24,847,704	Storage	30,167,576 af
1907	21,201,694	29,530,030	24,847,704	8,250,000	5,550,000	749,290	36,182,434	6,552,404	0	29,530,030	24,847,704	Sedimentation Rate (Active)	24,282,420 af
1908	12,218,817	29,530,030	24,847,704	8,250,000	5,550,000	725,218	27,223,629	0	0	27,223,629	22,907,009	Bank Storage	4%
1909	22,356,301	27,223,629	22,907,009	8,250,000	5,550,000	725,218	35,054,712	5,524,882	0	29,530,030	24,847,704	Adjusted Storage (2060)	29,530,030 af
1910	14,650,616	29,530,030	24,847,704	8,250,000	5,550,000	749,290	28,831,358	101,326	0	29,530,030	24,847,704	UB Demand Level	5,550,000 af/yr
1911	15,489,729	29,530,030	24,847,704	8,250,000	5,550,000	749,290	30,480,469	950,439	0	29,530,030	24,847,704	LB Delivery	8,250,000 af/yr
1912	16,623,410	29,530,030	24,847,704	8,250,000	5,550,000	749,290	33,604,150	4,074,120	0	29,530,030	24,847,704		
1913	14,536,373	29,530,030	24,847,704	8,250,000	5,550,000	749,157	29,517,247	0	0	29,530,030	24,847,704		
1914	21,354,814	29,517,247	24,836,947	8,250,000	5,550,000	749,157	36,322,904	6,792,873	0	29,530,030	24,847,704		
1915	13,823,277	29,530,030	24,847,704	8,250,000	5,550,000	739,725	26,613,582	0	0	28,619,582	24,076,569		
1916	20,142,882	28,613,582	24,076,569	8,250,000	5,550,000	739,725	34,216,749	4,686,719	0	29,530,030	24,847,704		
1917	22,942,804	29,530,030	24,847,704	8,250,000	5,550,000	749,290	37,923,544	8,393,514	0	29,530,030	24,847,704		
1918	16,865,939	29,530,030	24,847,704	8,250,000	5,550,000	749,290	30,846,679	1,316,649	0	29,530,030	24,847,704		
1919	12,651,369	29,530,030	24,847,704	8,250,000	5,550,000	729,688	27,651,713	0	0	27,651,713	23,267,216		
1920	22,287,632	27,651,713	23,267,216	8,250,000	5,550,000	729,688	35,409,659	5,679,629	0	29,530,030	24,847,704		
1921	22,526,781	29,530,030	24,847,704	8,250,000	5,550,000	749,290	37,507,521	7,977,491	0	29,530,030	24,847,704		
1922	18,447,198	29,530,030	24,847,704	8,250,000	5,550,000	749,290	33,427,938	3,897,908	0	29,530,030	24,847,704		
1923	19,024,406	29,530,030	24,847,704	8,250,000	5,550,000	749,290	34,004,786	4,474,756	0	29,530,030	24,847,704		
1924	13,877,788	29,530,030	24,847,704	8,250,000	5,550,000	742,354	28,865,474	0	0	28,865,474	24,288,521		
1925	14,430,701	28,865,474	24,288,521	8,250,000	5,550,000	734,337	28,761,839	0	0	28,761,839	24,201,318		
1926	15,213,731	28,761,839	24,201,318	8,250,000	5,550,000	740,284	29,435,288	0	0	29,435,288	24,767,982		
1927	19,539,212	29,435,288	24,767,982	8,250,000	5,550,000	748,301	34,426,187	4,896,166	0	29,530,030	24,847,704		
1928	16,954,334	29,530,030	24,847,704	8,250,000	5,550,000	749,290	31,935,074	2,405,044	0	29,530,030	24,847,704		
1929	21,829,585	29,530,030	24,847,704	8,250,000	5,550,000	749,290	36,810,325	7,280,285	0	29,530,030	24,847,704		
1930	14,821,041	29,530,030	24,847,704	8,250,000	5,550,000	749,290	29,601,781	71,751	0	29,530,030	24,847,704		
1931	8,474,134	29,530,030	24,847,704	8,250,000	5,550,000	686,538	23,517,626	0	0	23,517,626	19,788,636		
1932	17,422,187	23,517,626	19,788,636	8,250,000	5,550,000	654,758	26,485,055	0	0	26,485,055	22,285,545		
1933	12,183,500	26,485,055	22,285,545	8,250,000	5,550,000	661,949	24,206,607	0	0	24,206,607	20,368,371		
1934	5,178,192	24,206,607	20,368,371	8,250,000	5,550,000	552,349	16,031,950	0	0	16,031,950	13,489,900		
1935	12,630,349	16,031,950	13,489,900	8,250,000	5,550,000	450,618	14,411,681	0	0	14,411,681	12,126,543		
1936	14,648,873	14,411,681	12,126,543	8,250,000	5,550,000	437,996	14,822,558	0	0	14,822,558	12,472,271		
1937	14,306,056	14,822,558	12,472,271	8,250,000	5,550,000	442,943	18,865,871	0	0	18,865,871	15,256,376		
1938	19,148,319	14,865,671	12,525,376	8,250,000	5,550,000	463,935	16,760,550	0	0	16,760,550	15,777,018		
1939	11,164,059	18,750,055	15,777,018	8,250,000	5,550,000	491,625	15,622,489	0	0	15,622,489	13,145,384		
1940	9,931,657	15,622,489	13,145,384	8,250,000	5,550,000	414,284	11,339,882	0	0	11,339,882	9,541,787		
1941	20,116,878	11,339,882	9,541,787	8,250,000	5,550,000	431,015	17,225,525	0	0	17,225,525	14,484,220		
1942	17,225,136	17,225,525	14,484,220	8,250,000	5,550,000	522,737	20,127,925	0	0	20,127,925	16,936,410		
1943	13,731,401	20,127,925	16,936,410	8,250,000	5,550,000	546,808	19,512,717	0	0	19,512,717	16,418,751		
1944	15,369,422	19,512,717	16,418,751	8,250,000	5,550,000	550,819	20,531,321	0	0	20,531,321	17,275,843		
1945	14,140,528	20,531,321	17,275,843	8,250,000	5,550,000	559,189	20,312,681	0	0	20,312,681	17,091,871		
1946	11,095,453	20,312,681	17,091,871	8,250,000	5,550,000	623,188	17,084,938	0	0	17,084,938	14,375,923		
1947	16,439,486	17,084,938	14,375,923	8,250,000	5,550,000	511,717	19,212,705	0	0	19,212,705	16,168,309		
1948	15,139,284	19,212,705	16,168,309	8,250,000	5,550,000	542,244	20,008,765	0	0	20,008,765	16,838,978		
1949	16,933,584	20,008,765	16,838,978	8,250,000	5,550,000	577,243	22,566,086	0	0	22,566,086	18,987,982		
1950	13,140,416	22,566,086	18,987,982	8,250,000	5,550,000	590,873	21,315,639	0	0	21,315,639	17,935,799		
1951	12,505,884	21,315,639	17,935,799	8,250,000	5,550,000	558,186	19,463,047	0	0	19,463,047	16,376,957		
1952	20,805,422	19,463,047	16,376,957	8,250,000	5,550,000	605,942	25,862,527	0	0	25,862,527	21,761,725		
1953	11,185,419	25,862,527	21,761,725	8,250,000	5,550,000	638,672	22,589,374	0	0	22,589,374	19,007,568		
1954	8,496,102	22,589,374	19,007,568	8,250,000	5,550,000	543,381	16,742,094	0	0	16,742,094	14,087,442		
1955	8,413,908	16,742,094	14,087,442	8,250,000	5,550,000	492,085	11,923,937	0	0	11,923,937	10,033,259		
1956	11,426,874	11,923,937	10,033,259	8,250,000	5,550,000	353,322	9,197,489	0	0	9,197,489	7,739,121		
1957	21,500,963	9,197,489	7,739,121	8,250,000	5,550,000	401,055	16,497,397	0	0	16,497,397	13,881,544		
1958	15,852,511	16,497,397	13,881,544	8,250,000	5,550,000	493,620	18,068,288	0	0	18,068,288	15,201,670		
1959	9,598,169	18,068,288	15,201,670	8,250,000	5,550,000	461,325	13,403,132	0	0	13,403,132	11,277,911		
1960	14,524,160	13,403,132	11,277,911	8,250,000	5,550,000	384,885	10,742,407	0	0	10,742,407	9,039,075		
1961	10,010,259	10,742,407	9,039,075	8,250,000	5,550,000	314,281	6,638,386	0	0	6,638,386	5,585,793		
1962	17,277,609	6,638,386	5,585,793	8,250,000	5,550,000	305,697	9,910,398	0	0	9,910,398	8,338,990		
1963	8,840,900	9,910,398	8,338,990	8,250,000	5,550,000	285,014	4,666,284	0	0	4,666,284	3,928,381		
1964	10,863,586	4,666,284	3,928,381	8,250,000	5,550,000	197,571	1,532,290	0	0	1,532,290	1,289,335		
1965	10,875,027	1,532,290	1,289,335	8,250,000	5,550,000	225,909	7,381,417	0	0	7,381,417	6,211,006		
1966	10,878,844	7,381,417	6,211,006	8,250,000	5,550,000	251,764	4,009,487	0	0	4,009,487	3,373,745		
1967	11,670,830	4,009,487	3,373,745	8,250,000	5,550,000	182,341	1,687,986	0	0	1,687,986	1,420,336		
1968	13,739,932	1,687,986	1,420,336	8,250,000	5,550,000	165,754	1,462,164	0	0	1,462,164	1,230,321		
1969	15,272,159	1,462,164	1,230,321	8,250,000	5,550,000	176,916	2,757,407	0	0	2,757,407	2,320,188		
1970	15,344,136	2,757,407	2,320,188	8,250,000	5,550,000	204,417	4,097,125	0	0	4,097,125	3,447,479		
1971	15,493,659	4,097,125	3,447,479	8,250,000	5,550,000	233,038	5,557,146	0	0	5,557,146	4,675,996		
1972	13,186,637	5,557,146	4,675,996	8,250,000	5,550,000	239,970	4,703,812	0	0	4,703,812	3,957,968		
1973	16,650,183	4,703,812	3,957,968	8,250,000	5,550,000	278,776	9,275,229	0	0	9,275,229	7,504,534		
1974	13,285,426	9,275,229	7,504,534	8,250,000	5,550,000	317,801	8,442,854	0	0	8,442,854	7,104,142		
1975	17,072,661	8,442,854	7,104,142	8,250,000	5,550,000	339,725	11,375,790	0	0	11,375,790	9,572,028		
1976	11,313,561	11,375,790	9,572,028	8,250,000	5,550,000	340,828	8,548,524	0	0	8,548,524	7,193,057		
1977	5,851,188	8,548,524	7,193,057	8,250,000	5,550,000	222,899	76,813	0	0	76,813	64,633		
1978	15,335,809	76,813	64,633	8,250,000	5,550,000	148,955	1,463,766	0	0	1,463,766	1,231,689		

Upper Basin Yield Mass Balance Analysis

Maintain CRSP Minimum Power Pools, 8.25 maf Lower Basin Delivery, 6% Overall Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin		Variables	
										Year-end Storage (equals)	CRSP Year-end Storage		
1906	18,550,021	29,530,030	24,847,704	8,250,000	5,790,000	749,290	33,290,761	3,760,731	0	29,530,030	24,847,704	Storage	30,167,576 af
1907	21,201,694	29,530,030	24,847,704	8,250,000	5,790,000	749,290	35,842,434	6,412,404	0	29,530,030	24,847,704	Sedimentation Rate (Active)	24,292 af/yr
1908	12,218,817	29,530,030	24,847,704	8,250,000	5,790,000	722,739	26,586,108	0	0	26,586,108	22,707,150	Bank Storage	4%
1909	22,356,301	26,886,108	22,707,150	8,250,000	5,790,000	722,739	34,579,670	5,049,640	0	29,530,030	24,847,704	Adjusted Storage (2060)	29,530,030 af
1910	14,650,816	29,530,030	24,847,704	8,250,000	5,790,000	747,858	29,392,789	0	0	29,392,789	24,732,223	UB Demand Level	5,790,000 af/yr
1911	16,489,729	29,392,789	24,732,223	8,250,000	5,790,000	747,858	30,104,660	574,629	0	29,530,030	24,847,704	LB Delivery	8,250,000 af/yr
1912	18,623,410	29,530,030	24,847,704	8,250,000	5,790,000	749,290	33,364,150	3,834,120	0	29,530,030	24,847,704		
1913	14,536,373	29,530,030	24,847,704	8,250,000	5,790,000	746,678	29,279,726	0	0	29,279,726	24,637,088		
1914	21,354,814	29,279,726	24,637,088	8,250,000	5,790,000	746,678	35,847,862	6,317,832	0	29,530,030	24,847,704		
1915	13,623,277	29,530,030	24,847,704	8,250,000	5,790,000	737,246	28,376,061	0	0	28,376,061	23,876,710	Results	
1916	20,142,892	28,376,061	23,876,710	8,250,000	5,790,000	737,246	33,741,707	4,211,877	0	29,530,030	24,847,704	Average CRSP Evap	491,413 af/yr
1917	22,942,804	29,530,030	24,847,704	8,250,000	5,790,000	749,290	37,683,544	8,153,514	0	29,530,030	24,847,704	Total Yield w/ CRSP evap	6,281,413 af/yr
1918	15,865,939	29,530,030	24,847,704	8,250,000	5,790,000	749,290	30,606,679	1,076,649	0	29,530,030	24,847,704		
1919	12,651,369	29,530,030	24,847,704	8,250,000	5,790,000	727,207	27,414,192	0	0	27,414,192	23,067,356	Shortage Years	Shortage
1920	22,287,632	27,414,192	23,067,356	8,250,000	5,790,000	727,207	34,934,817	5,404,587	0	29,530,030	24,847,704		
1921	22,526,781	29,530,030	24,847,704	8,250,000	5,790,000	749,290	37,267,521	7,737,491	0	29,530,030	24,847,704	1983	1,153,349 af
1922	18,447,198	29,530,030	24,847,704	8,250,000	5,790,000	749,290	33,187,938	3,657,908	0	29,530,030	24,847,704	1964	3,309,290 af
1923	19,024,046	29,530,030	24,847,704	8,250,000	5,790,000	749,290	33,764,785	4,234,756	0	29,530,030	24,847,704	1967	453,929 af
1924	13,877,798	29,530,030	24,847,704	8,250,000	5,790,000	739,875	28,627,953	0	0	28,627,953	24,088,662	1968	432,944 af
1925	14,430,791	28,627,953	24,088,662	8,250,000	5,790,000	726,951	28,291,704	0	0	28,291,704	23,805,728	1977	3,136,608 af
1926	15,213,731	29,291,704	23,805,728	8,250,000	5,790,000	728,092	28,737,342	0	0	28,737,342	24,180,706		
1927	19,539,292	28,737,342	24,180,706	8,250,000	5,790,000	741,017	33,495,637	3,965,507	0	29,530,030	24,847,704	NM allocation(w/o evap)	845,750 af/yr
1928	16,954,394	29,530,030	24,847,704	8,250,000	5,790,000	749,290	31,695,074	2,165,044	0	29,530,030	24,847,704		
1929	21,829,585	29,530,030	24,847,704	8,250,000	5,790,000	749,290	36,570,285	7,040,285	0	29,530,030	24,847,704		
1930	14,621,041	29,530,030	24,847,704	8,250,000	5,790,000	747,332	29,363,519	0	0	29,530,030	24,847,704	CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.	
1931	8,474,134	29,363,519	24,707,595	8,250,000	5,790,000	690,619	23,117,034	0	0	29,363,519	24,707,595		
1932	17,422,187	23,117,034	19,451,562	8,250,000	5,790,000	644,003	25,855,218	0	0	23,117,034	19,451,562		
1933	12,183,500	25,855,218	21,755,575	8,250,000	5,790,000	646,458	23,352,280	0	0	25,855,218	21,755,575		
1934	6,178,182	23,352,280	19,649,490	8,250,000	5,790,000	532,720	14,957,731	0	0	23,352,280	19,649,490		
1935	12,630,349	14,957,731	12,586,011	8,250,000	5,790,000	425,948	13,122,133	0	0	14,957,731	11,041,468	Total Upper Basin depletion; inc. CRSP evap:	
1936	14,648,873	13,122,133	11,041,468	8,250,000	5,790,000	408,877	13,322,129	0	0	13,122,133	11,041,468	1953-1977	6,039,013 af/yr
1937	14,306,056	13,322,129	11,089,080	8,250,000	5,790,000	409,467	13,178,718	0	0	13,322,129	11,089,080	1981-1977	6,149,902 af/yr
1938	18,148,319	13,178,718	11,089,080	8,250,000	5,790,000	446,192	16,840,844	0	0	13,178,718	11,089,080	1906-2000	6,281,413 af/yr
1939	11,164,059	16,840,844	14,170,535	8,250,000	5,790,000	449,704	13,515,199	0	0	16,840,844	14,170,535		
1940	9,931,657	13,515,199	11,372,209	8,250,000	5,790,000	368,272	9,038,585	0	0	13,515,199	11,372,209		
1941	20,116,678	9,038,585	7,605,413	8,250,000	5,790,000	380,995	14,734,268	0	0	9,038,585	7,605,413	Flow Adjustments:	
1942	17,225,136	14,734,268	12,387,980	8,250,000	5,790,000	468,782	17,450,912	0	0	14,734,268	12,387,980	1971	203,226 af
1943	13,731,401	17,450,912	14,683,616	8,250,000	5,790,000	488,820	16,853,193	0	0	17,450,912	14,683,616	1972	226,985 af
1944	15,360,422	16,853,193	14,012,637	8,250,000	5,790,000	489,286	17,493,349	0	0	16,853,193	14,012,637	1973	252,377 af
1945	14,140,528	17,493,349	14,719,577	8,250,000	5,790,000	493,929	17,099,948	0	0	17,493,349	14,719,577	1974	196,384 af
1946	11,095,453	17,099,948	14,388,554	8,250,000	5,790,000	454,348	13,701,053	0	0	17,099,948	14,388,554	1975	246,665 af
1947	16,439,486	13,701,053	11,528,593	8,250,000	5,790,000	439,332	15,681,207	0	0	13,701,053	11,528,593	1976	173,250 af
1948	15,139,294	15,681,207	13,177,842	8,250,000	5,790,000	466,396	16,284,105	0	0	15,681,207	13,177,842	1977	112,291 af
1949	16,933,584	16,284,105	13,710,487	8,250,000	5,790,000	498,004	18,689,684	0	0	16,284,105	13,710,487	1978	152,187 af
1950	13,140,416	18,689,684	15,726,220	8,250,000	5,790,000	508,313	17,281,788	0	0	18,689,684	15,726,220	1979	153,559 af
1951	12,505,894	17,281,788	14,541,561	8,250,000	5,790,000	472,674	15,275,008	0	0	17,281,788	14,541,561	1980	161,893 af
1952	20,805,422	15,275,008	12,852,979	8,250,000	5,790,000	516,845	21,523,486	0	0	15,275,008	12,852,979		
1953	11,165,419	21,523,486	18,110,689	8,250,000	5,790,000	546,455	18,102,449	0	0	21,523,486	18,110,689		
1954	8,496,102	18,102,449	15,232,998	8,250,000	5,790,000	448,209	12,110,342	0	0	18,102,449	15,232,998		
1955	9,413,908	12,110,342	10,190,108	8,250,000	5,790,000	393,901	7,150,349	0	0	12,110,342	10,190,108		
1956	11,428,874	7,150,349	6,018,579	8,250,000	5,790,000	252,228	4,284,996	0	0	7,150,349	6,018,579		
1957	21,500,993	4,284,996	3,605,560	8,250,000	5,790,000	297,091	11,448,867	0	0	4,284,996	3,605,560		
1958	15,862,511	11,448,867	9,633,517	8,250,000	5,790,000	385,845	12,884,533	0	0	11,448,867	9,633,517		
1959	9,998,169	12,884,533	10,841,542	8,250,000	5,790,000	351,798	8,080,803	0	0	12,884,533	10,841,542		
1960	11,524,160	8,080,903	6,807,998	8,250,000	5,790,000	272,683	5,302,401	0	0	8,080,903	6,807,998		
1961	10,010,269	5,302,401	4,461,644	8,250,000	5,790,000	199,419	1,073,241	0	0	5,302,401	4,461,644		
1962	17,377,609	903,066	825,000	8,250,000	5,790,000	188,150	4,222,699	0	0	1,073,241	903,066		
1963	8,840,900	4,222,699	3,553,142	8,250,000	5,790,000	176,849	-1,153,349	0	0	4,222,699	3,553,142		
1964	10,883,585	0	0	8,250,000	5,790,000	132,676	-3,209,290	0	0	0	0		
1965	19,875,027	0	0	8,250,000	5,790,000	191,776	5,643,252	0	0	0	0		
1966	10,679,844	5,643,252	4,748,449	8,250,000	5,790,000	213,377	2,069,719	0	0	5,643,252	4,748,449		
1967	11,670,830	2,069,719	1,741,541	8,250,000	5,790,000	154,478	-453,929	0	0	2,069,719	1,741,541		
1968	13,739,932	0	0	8,250,000	5,790,000	132,676	-432,944	0	0	453,929	0		
1969	15,272,159	0	0	8,250,000	5,790,000	144,231	1,087,628	0	0	0	0		
1970	15,344,136	1,087,628	915,425	8,250,000	5,790,000	167,449	2,224,615	0	0	1,087,628	915,425		
1971	15,493,659	2,224,615	1,871,877	8,250,000	5,790,000	192,476	3,485,798	0	0	2,224,615	1,871,877		
1972	13,186,637	3,485,798	2,933,084	8,250,000	5,790,000	194,700	2,437,734	0	0	3,485,798	2,933,084		
1973	18,850,193	2,437,734	2,051,203	8,250,000	5,790,000	229,483	6,818,443	0	0	2,437,734	2,051,203		
1974	13,285,426	6,818,443	5,737,301	8,250,000	5,790,000	264,588	5,799,301	0	0	6,818,443	5,737,301		
1975	17,072,661	5,799,301	4,879,755	8,250,000	5,790,000	282,634	8,549,329	0	0	5,799,301	4,879,755		
1976	11,313,561	8,549,329	7,193,734	8,250,000	5,790,000	279,858	5,542,932	0	0	8,549,329	7,193,734		
1977	5,551,188</												

Upper Basin Yield Mass Balance Analysis

Maintain CRSP Minimum Power Pools, 7.50 maf Lower Basin Delivery, No Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables	
1906	18,550,021	29,530,030	24,847,704	7,500,000	6,300,000	749,290	33,530,761	4,000,731	0	29,530,030	24,847,704	Storage	30,167,576 af
1907	21,201,684	29,530,030	24,847,704	7,500,000	6,300,000	749,290	36,182,434	6,552,404	0	29,530,030	24,847,704	Sedimentation Rate (Active)	24,292 af/yr
1908	12,218,817	29,530,030	24,847,704	7,500,000	6,300,000	725,218	27,223,629	0	0	27,223,629	22,907,009	Bank Storage	4%
1909	22,956,301	27,223,629	22,907,009	7,500,000	6,300,000	725,218	35,054,712	5,524,682	0	29,530,030	24,847,704	Adjusted Storage (2060)	29,530,030 af
1910	14,650,618	29,530,030	24,847,704	7,500,000	6,300,000	749,290	29,631,356	101,326	0	29,530,030	24,847,704	UB Demand Level	6,300,000 af/yr
1911	15,499,729	29,530,030	24,847,704	7,500,000	6,300,000	749,290	30,480,469	950,439	0	29,530,030	24,847,704	LB Delivery	7,500,000 af/yr
1912	18,623,410	29,530,030	24,847,704	7,500,000	6,300,000	749,290	33,604,150	4,074,120	0	29,530,030	24,847,704		
1913	14,536,373	29,530,030	24,847,704	7,500,000	6,300,000	749,157	29,517,247	0	0	29,530,030	24,847,704		
1914	21,354,814	29,517,247	24,836,947	7,500,000	6,300,000	749,157	36,322,904	6,792,873	0	29,530,030	24,847,704		
1915	13,623,277	29,530,030	24,847,704	7,500,000	6,300,000	739,725	28,619,682	0	0	29,530,030	24,847,704	Results	
1916	20,142,892	28,619,569	24,078,569	7,500,000	6,300,000	739,725	34,216,749	4,586,719	0	29,530,030	24,847,704	Average CRSP Evap	527,920 af/yr
1917	22,842,804	29,530,030	24,847,704	7,500,000	6,300,000	749,290	37,923,544	8,389,514	0	29,530,030	24,847,704	Total Yield w/ CRSP evap	6,827,920 af/yr
1918	15,865,939	29,530,030	24,847,704	7,500,000	6,300,000	749,290	30,846,679	1,316,849	0	29,530,030	24,847,704		
1919	12,651,369	29,530,030	24,847,704	7,500,000	6,300,000	729,686	27,651,713	0	0	27,651,713	23,267,218	Shortage Years	Shortage
1920	22,267,632	27,651,713	23,267,218	7,500,000	6,300,000	729,686	35,409,659	5,878,629	0	29,530,030	24,847,704		
1921	22,526,781	29,530,030	24,847,704	7,500,000	6,300,000	749,290	37,507,521	7,877,491	0	29,530,030	24,847,704	1983	0 af
1922	18,447,198	29,530,030	24,847,704	7,500,000	6,300,000	749,290	33,427,938	3,697,908	0	29,530,030	24,847,704	1984	0 af
1923	19,024,046	29,530,030	24,847,704	7,500,000	6,300,000	749,290	34,004,786	4,474,756	0	29,530,030	24,847,704	1985	0 af
1924	13,877,788	29,530,030	24,847,704	7,500,000	6,300,000	742,354	28,865,474	0	0	28,865,474	24,288,521	1986	0 af
1925	14,430,701	28,865,474	24,288,521	7,500,000	6,300,000	734,337	28,761,839	0	0	28,761,839	24,201,318	1987	0 af
1926	15,213,731	28,761,839	24,201,318	7,500,000	6,300,000	740,264	29,435,286	0	0	29,435,286	24,767,982		
1927	19,539,212	29,435,286	24,767,982	7,500,000	6,300,000	748,301	34,426,197	4,896,166	0	29,530,030	24,847,704	NM allocation(w/o evap)	703,125 af/yr
1928	16,854,334	29,530,030	24,847,704	7,500,000	6,300,000	749,290	31,935,074	2,405,044	0	29,530,030	24,847,704		
1929	21,829,585	29,530,030	24,847,704	7,500,000	6,300,000	749,290	36,810,325	7,280,295	0	29,530,030	24,847,704	Note: NM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.	
1930	14,621,041	29,530,030	24,847,704	7,500,000	6,300,000	686,538	23,517,626	0	0	23,517,626	19,788,636		
1931	8,474,134	29,530,030	24,847,704	7,500,000	6,300,000	654,758	26,485,055	0	0	26,485,055	22,285,545		
1932	17,422,187	29,517,247	19,788,636	7,500,000	6,300,000	661,949	24,206,807	0	0	24,206,807	20,368,371		
1933	12,183,500	26,485,055	22,285,545	7,500,000	6,300,000	652,849	15,031,950	0	0	16,031,950	13,489,900		
1934	6,178,192	24,206,807	20,368,371	7,500,000	6,300,000	450,618	14,411,881	0	0	14,411,881	12,126,543	Total Upper Basin depletion, inc. CRSP evap:	
1935	12,630,349	16,031,950	13,489,900	7,500,000	6,300,000	437,896	14,822,558	0	0	14,822,558	12,472,271	1953-1977	6,520,057 af/yr
1936	14,648,873	14,411,881	12,126,543	7,500,000	6,300,000	442,843	14,885,871	0	0	14,885,871	12,525,376	1931-1977	6,721,255 af/yr
1937	14,306,058	14,822,558	12,472,271	7,500,000	6,300,000	483,835	18,750,055	0	0	18,750,055	15,777,018	1906-2000	6,827,920 af/yr
1938	18,148,319	14,885,871	12,525,376	7,500,000	6,300,000	481,825	15,622,489	0	0	15,622,489	13,145,384		
1939	11,164,059	18,750,055	15,777,018	7,500,000	6,300,000	414,284	11,339,882	0	0	11,339,882	9,541,787		
1940	9,931,657	15,622,489	13,145,384	7,500,000	6,300,000	431,016	17,225,525	0	0	17,225,525	14,494,220	Flow Adjustments	
1941	20,116,678	11,339,882	8,541,797	7,500,000	6,300,000	522,737	20,127,925	0	0	20,127,925	18,936,410	1971	203,226 af
1942	17,225,136	17,225,525	14,494,220	7,500,000	6,300,000	546,608	19,512,717	0	0	19,512,717	16,418,751	1972	226,985 af
1943	13,731,401	20,127,925	16,936,410	7,500,000	6,300,000	559,189	19,512,717	0	0	20,312,881	17,275,843	1973	252,377 af
1944	15,369,422	19,512,717	16,418,751	7,500,000	6,300,000	550,819	20,531,321	0	0	17,084,838	14,375,923	1974	196,384 af
1945	14,140,528	20,531,321	17,275,843	7,500,000	6,300,000	559,189	20,312,881	0	0	20,312,881	16,166,309	1975	246,665 af
1946	11,095,453	20,312,881	17,091,871	7,500,000	6,300,000	523,198	17,084,838	0	0	20,009,755	16,858,978	1976	173,250 af
1947	16,439,486	17,084,838	14,375,923	7,500,000	6,300,000	511,717	18,212,705	0	0	19,212,705	16,166,309	1977	112,291 af
1948	15,139,284	18,212,705	16,166,309	7,500,000	6,300,000	542,244	20,009,755	0	0	22,566,096	18,987,982	1978	152,167 af
1949	16,833,584	20,009,755	16,836,878	7,500,000	6,300,000	577,243	22,566,096	0	0	21,315,639	17,935,799	1979	153,559 af
1950	13,140,416	22,566,096	18,987,982	7,500,000	6,300,000	590,873	21,315,639	0	0	18,463,047	16,376,957	1980	161,893 af
1951	12,505,894	21,315,639	17,935,799	7,500,000	6,300,000	568,498	19,463,047	0	0	25,862,527	21,781,725		
1952	20,805,422	19,463,047	16,376,957	7,500,000	6,300,000	605,942	25,862,527	0	0	22,589,374	19,007,668		
1953	11,165,419	25,862,527	21,761,725	7,500,000	6,300,000	638,572	22,589,374	0	0	16,742,094	14,087,442		
1954	8,496,102	22,589,374	19,007,668	7,500,000	6,300,000	543,381	16,742,094	0	0	11,923,937	10,033,259		
1955	9,413,906	16,742,094	14,087,442	7,500,000	6,300,000	432,065	11,923,937	0	0	9,197,489	7,739,121		
1956	11,426,874	11,923,937	10,033,259	7,500,000	6,300,000	353,322	9,197,489	0	0	16,497,397	13,881,544		
1957	21,500,963	9,197,489	7,739,121	7,500,000	6,300,000	401,055	16,497,397	0	0	18,066,288	15,201,670		
1958	15,862,511	16,497,397	13,881,544	7,500,000	6,300,000	493,620	18,066,288	0	0	13,403,132	11,277,911		
1959	9,598,169	18,066,288	15,201,670	7,500,000	6,300,000	461,325	13,403,132	0	0	10,742,407	9,039,076		
1960	11,524,160	13,403,132	11,277,911	7,500,000	6,300,000	384,885	10,742,407	0	0	6,830,386	5,585,793		
1961	10,010,259	10,742,407	9,039,076	7,500,000	6,300,000	314,281	6,830,386	0	0	9,910,398	8,338,990		
1962	17,377,609	6,830,386	5,585,793	7,500,000	6,300,000	305,597	9,910,398	0	0	4,666,284	3,826,391		
1963	8,840,900	9,910,398	8,338,990	7,500,000	6,300,000	285,014	4,666,284	0	0	1,532,299	1,289,333		
1964	10,863,586	4,666,284	3,826,391	7,500,000	6,300,000	187,671	1,532,299	0	0	7,381,417	6,211,008		
1965	19,875,027	1,532,299	1,289,333	7,500,000	6,300,000	225,909	7,381,417	0	0	4,008,487	3,373,745		
1966	10,678,844	7,381,417	6,211,008	7,500,000	6,300,000	251,764	4,008,487	0	0	1,687,986	1,420,336		
1967	11,670,830	4,008,487	3,373,745	7,500,000	6,300,000	192,341	1,687,986	0	0	1,462,164	1,230,321		
1968	13,739,932	1,687,986	1,420,336	7,500,000	6,300,000	165,754	1,462,164	0	0	2,757,407	2,320,188		
1969	15,272,159	1,462,164	1,230,321	7,500,000	6,300,000	176,916	2,757,407	0	0	4,097,125	3,447,479		
1970	15,344,136	2,757,407	2,320,188	7,500,000	6,300,000	204,417	4,097,125	0	0	5,557,146	4,675,996		
1971	15,493,659	4,097,125	3,447,479	7,500,000	6,300,000	233,638	5,557,146	0	0	4,703,812	3,957,968		
1972	13,186,637	5,557,146	4,675,996	7,500,000	6,300,000	239,970	4,703,812	0	0	9,275,229	7,804,534		
1973	18,650,193	4,703,812	3,957,968	7,500,000	6,300,000	278,776	9,275,229	0	0	8,442,854	7,104,142		
1974	13,285,426	9,275,229	7,804,634	7,500,000	6,300,000	317,801	8,442,854	0	0	11,376,790	9,572,028		
1975	17,072,861	8,442,854	7,104,142	7,500,000	6,300,000	339,725	11,376,790	0	0	8,548,524	7,193,057		
1976	11,313,581	11,376,790	9,572,028	7,500,000	6,300,000	340,828	8,548,524</						

Upper Basin Yield Mass Balance Analysis

Maintain CRSP Minimum Power Pools, 7.50 maf Lower Basin Delivery, 6% Overall Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry- Over Storage (plus)	CRSP Carry- Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year- end Storage	Variables	
1906	18,550,021	29,530,030	24,847,704	7,500,000	6,570,000	749,290	33,260,761	3,730,731	0	29,530,030	24,847,704	Storage	30,167,576 af
1907	21,201,894	29,530,030	24,847,704	7,500,000	6,570,000	749,290	35,912,434	6,382,404	0	29,530,030	24,847,704	Sedimentation Rate (Active)	24,282 af/yr
1908	12,218,817	29,530,030	24,847,704	7,500,000	6,570,000	722,428	26,956,418	0	0	26,956,418	22,682,168	Bank Storage	4%
1909	22,356,301	26,956,418	22,682,168	7,500,000	6,570,000	722,428	34,620,290	4,990,280	0	29,530,030	24,847,704	Adjusted Storage (2060)	29,530,030 af
1910	14,650,816	29,530,030	24,847,704	7,500,000	6,570,000	747,548	29,263,098	0	0	29,383,088	24,707,241	UB Demand Level	6,570,000 af/yr
1911	15,499,729	29,363,098	24,707,241	7,500,000	6,570,000	747,548	30,045,280	515,249	0	29,530,030	24,847,704	LB Delivery	7,500,000 af/yr
1912	18,623,410	29,530,030	24,847,704	7,500,000	6,570,000	749,290	33,334,150	3,804,120	0	29,530,030	24,847,704		
1913	14,536,373	29,530,030	24,847,704	7,500,000	6,570,000	746,368	29,250,036	0	0	29,250,036	24,812,106		
1914	21,354,814	29,250,036	24,812,106	7,500,000	6,570,000	746,368	35,788,482	6,258,451	0	29,530,030	24,847,704		
1915	13,623,277	29,530,030	24,847,704	7,500,000	6,570,000	736,936	28,346,371	0	0	28,346,371	23,851,728	Results	
1916	20,142,804	29,530,030	24,847,704	7,500,000	6,570,000	736,936	33,682,327	4,162,286	0	29,530,030	24,847,704	Average CRSP Evap	487,445 af/yr
1917	22,942,898	29,530,030	24,847,704	7,500,000	6,570,000	749,290	37,653,544	8,123,514	0	29,530,030	24,847,704	Total Yield w CRSP evap	7,057,445 af/yr
1918	15,855,938	29,530,030	24,847,704	7,500,000	6,570,000	749,290	30,576,679	1,046,649	0	29,530,030	24,847,704		
1919	12,651,389	29,530,030	24,847,704	7,500,000	6,570,000	726,897	27,384,502	0	0	27,384,502	23,042,374	Shortage Years	Shortage
1920	22,287,832	27,384,502	23,042,374	7,500,000	6,570,000	726,897	34,875,237	5,345,207	0	29,530,030	24,847,704		
1921	22,526,781	29,530,030	24,847,704	7,500,000	6,570,000	749,290	37,237,521	7,707,491	0	29,530,030	24,847,704	1963	1,891,395 af
1922	18,447,198	29,530,030	24,847,704	7,500,000	6,570,000	749,290	33,157,938	3,627,908	0	29,530,030	24,847,704	1964	3,339,290 af
1923	19,024,046	29,530,030	24,847,704	7,500,000	6,570,000	749,290	33,734,786	4,204,756	0	29,530,030	24,847,704	1967	542,082 af
1924	13,877,798	29,530,030	24,847,704	7,500,000	6,570,000	739,565	28,598,263	0	0	28,598,263	24,063,678	1968	462,944 af
1925	14,430,701	28,598,263	24,063,678	7,500,000	6,570,000	726,027	28,232,937	0	0	28,232,937	23,756,279	1977	3,385,340 af
1926	15,213,731	28,232,937	23,756,279	7,500,000	6,570,000	726,588	28,650,099	0	0	28,650,099	24,107,296		
1927	19,539,212	28,650,099	24,107,296	7,500,000	6,570,000	740,106	33,378,205	3,849,175	0	29,530,030	24,847,704	NM allocation(w/o evap)	733,500 af/yr
1928	16,954,334	29,530,030	24,847,704	7,500,000	6,570,000	749,290	31,665,074	2,135,044	0	29,530,030	24,847,704		
1929	21,829,585	29,530,030	24,847,704	7,500,000	6,570,000	749,290	36,540,325	7,010,295	0	29,530,030	24,847,704		
1930	14,621,041	29,530,030	24,847,704	7,500,000	6,570,000	747,242	29,333,829	0	0	29,333,829	24,682,613	Note: NM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.	
1931	8,474,134	29,333,829	24,682,613	7,500,000	6,570,000	679,896	23,058,267	0	0	23,058,267	19,402,113		
1932	17,422,187	23,058,267	19,402,113	7,500,000	6,570,000	642,479	25,757,975	0	0	25,757,975	21,682,166		
1933	12,183,500	25,757,975	21,682,166	7,500,000	6,570,000	644,346	23,237,129	0	0	23,237,129	19,552,614		
1934	5,178,192	23,237,129	19,552,614	7,500,000	6,570,000	530,032	14,815,289	0	0	14,815,289	12,466,164		
1935	12,630,349	14,815,289	12,466,164	7,500,000	6,570,000	422,895	12,932,293	0	0	12,932,293	10,899,105	Total Upper Basin depletion, inc. CRSP evap:	
1936	14,648,873	12,932,293	10,899,105	7,500,000	6,570,000	405,072	13,126,744	0	0	13,126,744	11,045,348	1953-1977	6,812,460 af/yr
1937	14,306,056	13,126,744	11,045,348	7,500,000	6,570,000	405,121	12,957,879	0	0	12,957,879	10,903,090	1931-1977	6,923,418 af/yr
1938	18,148,319	12,957,879	10,903,090	7,500,000	6,570,000	441,316	16,594,682	0	0	16,594,682	13,963,404	1906-2000	7,057,446 af/yr
1939	11,164,059	16,594,682	13,963,404	7,500,000	6,570,000	444,309	13,244,432	0	0	13,244,432	11,144,375		
1940	9,931,657	13,244,432	11,144,375	7,500,000	6,570,000	362,388	8,743,721	0	0	8,743,721	7,357,303		
1941	20,116,678	8,743,721	7,357,303	7,500,000	6,570,000	374,594	14,415,805	0	0	14,415,805	12,150,013	Flow Adjustments:	
1942	17,225,136	14,415,805	12,150,013	7,500,000	6,570,000	461,903	17,109,038	0	0	17,109,038	14,396,203	1971	203,228 af
1943	13,731,401	17,109,038	14,396,203	7,500,000	6,570,000	481,454	16,288,986	0	0	16,288,986	13,706,179	1972	226,985 af
1944	15,369,422	16,288,986	13,706,179	7,500,000	6,570,000	481,432	17,106,976	0	0	17,106,976	14,394,468	1973	252,377 af
1945	14,140,628	17,106,976	14,394,468	7,500,000	6,570,000	465,637	16,891,867	0	0	16,891,867	14,045,179	1974	198,384 af
1946	11,095,453	16,891,867	14,045,179	7,500,000	6,570,000	445,808	13,271,712	0	0	13,271,712	11,167,329	1975	246,665 af
1947	16,439,488	13,271,712	11,167,329	7,500,000	6,570,000	430,153	15,211,045	0	0	15,211,045	12,799,159	1976	173,250 af
1948	15,139,294	15,211,045	12,799,159	7,500,000	6,570,000	456,786	15,823,553	0	0	15,823,553	13,314,546	1977	112,281 af
1949	16,933,584	15,823,553	13,314,546	7,500,000	6,570,000	467,974	18,199,163	0	0	18,199,163	15,313,476	1978	152,187 af
1950	13,140,416	18,199,163	15,313,476	7,500,000	6,570,000	497,870	16,771,709	0	0	16,771,709	14,112,362	1979	153,559 af
1951	12,505,894	16,771,709	14,112,362	7,500,000	6,570,000	461,626	14,745,777	0	0	14,745,777	12,407,664	1980	161,693 af
1952	20,805,422	14,745,777	12,407,664	7,500,000	6,570,000	505,702	20,975,497	0	0	20,975,497	17,649,591		
1953	11,165,419	20,975,497	17,649,591	7,500,000	6,570,000	534,824	17,536,092	0	0	17,536,092	14,755,543		
1954	8,496,102	17,536,092	14,755,543	7,500,000	6,570,000	436,199	11,525,995	0	0	11,525,995	9,688,416		
1955	9,413,908	11,525,995	9,688,416	7,500,000	6,570,000	321,520	6,548,383	0	0	6,548,383	5,510,062		
1956	11,428,874	6,548,383	5,510,062	7,500,000	6,570,000	239,482	3,665,775	0	0	3,665,775	3,084,925		
1957	21,500,863	3,665,775	3,084,925	7,500,000	6,570,000	283,889	10,812,749	0	0	10,812,749	9,088,263		
1958	15,862,511	10,812,749	9,088,263	7,500,000	6,570,000	373,394	12,231,866	0	0	12,231,866	10,292,363		
1959	9,599,169	10,292,363	9,088,263	7,500,000	6,570,000	338,005	7,422,030	0	0	7,422,030	6,245,181		
1960	11,524,160	7,422,030	6,245,181	7,500,000	6,570,000	258,535	4,617,655	0	0	4,617,655	3,885,472		
1961	10,010,259	4,617,655	3,885,472	7,500,000	6,570,000	184,968	372,950	0	0	372,950	313,815		
1962	17,377,609	372,950	313,815	7,500,000	6,570,000	173,373	3,507,186	0	0	3,507,186	2,851,081		
1963	8,840,900	3,507,186	2,851,081	7,500,000	6,570,000	169,481	-1,891,395	0	1,891,395	0	0		
1964	10,863,686	0	0	7,500,000	6,570,000	132,876	-3,339,290	0	3,339,290	0	0		
1965	19,875,027	0	0	7,500,000	6,570,000	191,465	5,813,562	0	0	5,813,562	4,723,467		
1966	10,679,844	5,813,562	4,723,467	7,500,000	6,570,000	212,454	2,010,952	0	0	2,010,952	1,682,093		
1967	11,870,830	2,010,952	1,682,093	7,500,000	6,570,000	153,884	-542,082	0	542,082	0	0		
1968	13,739,932	0	0	7,500,000	6,570,000	132,876	-462,944	0	462,944	0	0		
1969	15,272,159	0	0	7,500,000	6,570,000	143,921	1,058,238	0	0	1,058,238	890,442		
1970	15,344,136	1,058,238	890,442	7,500,000	6,570,000	166,528	2,165,848	0	0	2,165,848	1,822,428		
1971	16,493,659	2,165,848	1,822,428	7,500,000	6,570,000	190,952	3,398,555	0	0	3,398,555	2,859,675		
1972	13,186,637	3,398,555	2,859,675	7,500,000	6,570,000	192,588	2,322,603	0	0	2,322,603	1,954,327		
1973	18,650,183	2,322,603	1,954,327	7,500,000	6,570,000	226,785	6,676,001	0	0	6,676,001	5,617,444		
1974	13,858,426	6,676,001	5,617,444	7,500,000	6,570,000	261,316	5,630,111	0	0	5,630,111	4,737,392		
1975	17,072,661	5,630,111	4,737,392	7,500,000	6,570,000	278,828	8,353,944	0	0	8,353,944	7,029,330		
1976	11,313,561	5,353,944	4,478,046	7,500,000	6,570,000	275,612	5,321,894	0	0	5,321,894	4,478,046		

Upper Basin Yield Mass Balance Analysis

Use CRSP Minimum Power Pools, 8.25 maf Lower Basin Delivery, No Shortage

CR Natural CY	Flow at Lee Ferry (plus)	Total Carry- Over Storage (plus)	CRSP Carry- Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC (plus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year- end Storage	Variables	
1906	16,550,021	33,833,590	29,151,263	8,250,000	5,720,000	725,390	37,688,221	3,854,831	0	33,833,590	29,151,263	Storage	35,233,298 af
1907	21,201,594	33,833,590	29,151,263	8,250,000	5,720,000	725,390	40,339,894	6,506,304	0	33,833,590	29,151,263	Sedimentation Rate (Active)	37,000 af/yr
1908	12,218,817	33,833,590	29,151,263	8,250,000	5,720,000	699,302	31,383,105	0	0	31,383,105	27,039,907	Bank Storage	4%
1909	22,356,301	33,833,590	27,039,907	8,250,000	5,720,000	699,302	39,070,104	5,236,514	0	33,833,590	29,151,263	Adjusted Storage (2060)	33,833,590 af
1910	14,650,816	33,833,590	28,151,263	8,250,000	5,720,000	724,918	33,789,288	0	0	33,789,288	29,113,092	UB Demand Level	5,720,000 af/yr
1911	15,469,729	33,833,590	28,113,092	8,250,000	5,720,000	724,918	34,594,099	760,509	0	33,833,590	29,151,263	LB Delivery	8,250,000 af/yr
1912	18,623,410	33,833,590	29,151,263	8,250,000	5,720,000	725,390	37,761,610	3,928,020	0	33,833,590	29,151,263		
1913	14,536,373	33,833,590	29,151,263	8,250,000	5,720,000	723,715	33,678,248	0	0	33,678,248	29,015,896		
1914	21,354,814	33,833,590	28,015,696	8,250,000	5,720,000	723,715	40,337,348	6,503,758	0	33,833,590	29,151,263		
1915	13,623,277	33,833,590	28,151,263	8,250,000	5,720,000	714,096	32,772,771	0	0	32,772,771	28,237,254	Results	
1916	20,142,892	33,833,590	28,237,254	8,250,000	5,720,000	714,096	36,231,556	4,387,976	0	33,833,590	29,151,263	Average CRSP Evap	483,436 af/yr
1917	22,942,804	33,833,590	29,151,263	8,250,000	5,720,000	725,390	42,081,004	8,247,414	0	33,833,590	29,151,263	Total Yield w/ CRSP evap	6,183,436 af/yr
1918	15,865,839	33,833,590	29,151,263	8,250,000	5,720,000	725,390	35,004,139	1,170,549	0	33,833,590	29,151,263		
1919	12,651,359	33,833,590	29,151,263	8,250,000	5,720,000	703,858	31,811,100	0	0	31,811,100	27,408,572	Shortage Years	Shortage
1920	22,877,632	33,833,590	27,408,572	8,250,000	5,720,000	703,858	39,424,874	5,581,284	0	33,833,590	29,151,263	1963	0 af
1921	22,526,781	33,833,590	29,151,263	8,250,000	5,720,000	725,390	41,664,881	7,831,391	0	33,833,590	29,151,263	1964	0 af
1922	18,447,198	33,833,590	29,151,263	8,250,000	5,720,000	725,390	37,585,398	3,751,808	0	33,833,590	29,151,263	1967	0 af
1923	19,024,046	33,833,590	28,151,263	8,250,000	5,720,000	725,390	38,162,246	4,328,856	0	33,833,590	29,151,263	1968	0 af
1924	13,877,798	33,833,590	29,151,263	8,250,000	5,720,000	716,777	33,024,811	0	0	33,024,811	28,454,241	1977	0 af
1925	14,300,701	33,024,811	28,454,241	8,250,000	5,720,000	705,558	32,779,753	0	0	32,779,753	28,243,270		
1926	15,213,731	32,779,753	28,243,270	8,250,000	5,720,000	708,648	33,314,838	0	0	33,314,838	28,704,301	NM allocation (w/o evap)	637,875 af/yr
1927	19,539,212	33,314,838	28,704,301	8,250,000	5,720,000	719,687	38,164,181	4,330,691	0	33,833,590	29,151,263		
1928	16,954,334	33,833,590	29,151,263	8,250,000	5,720,000	725,390	36,092,534	2,258,944	0	33,833,590	29,151,263	Note: NM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.	
1929	21,829,585	33,833,590	29,151,263	8,250,000	5,720,000	725,390	40,967,785	7,134,195	0	33,833,590	29,151,263		
1930	14,821,041	33,833,590	28,151,263	8,250,000	5,720,000	724,606	33,760,025	0	0	33,760,025	29,087,879		
1931	8,474,134	33,760,025	28,087,879	8,250,000	5,720,000	659,307	27,605,852	0	0	27,605,852	23,785,399		
1932	17,422,187	27,605,852	23,785,399	8,250,000	5,720,000	622,911	30,435,128	0	0	30,435,128	26,223,124		
1933	12,183,500	30,435,128	26,223,124	8,250,000	5,720,000	627,333	28,021,294	0	0	28,021,294	24,143,347		
1934	6,178,102	28,021,294	24,143,347	8,250,000	5,720,000	513,222	19,716,264	0	0	19,716,264	16,987,674	Total Upper Basin depletion, inc. CRSP evap:	
1935	12,630,349	19,716,264	16,987,674	8,250,000	5,720,000	406,222	17,970,391	0	0	17,970,391	15,483,417	1953-1977	5,834,611 af/yr
1936	14,648,873	17,970,391	15,483,417	8,250,000	5,720,000	390,704	18,258,580	0	0	18,258,580	15,731,706	1931-1977	6,956,021 af/yr
1937	14,306,056	16,258,580	15,731,706	8,250,000	5,720,000	393,164	18,201,452	0	0	18,201,452	15,998,983	1906-2000	6,183,436 af/yr
1938	18,148,319	18,201,452	16,682,501	8,250,000	5,720,000	432,434	21,847,337	0	0	21,847,337	18,703,617		
1939	11,164,058	21,847,337	18,909,983	8,250,000	5,720,000	437,780	18,703,617	0	0	18,703,617	16,115,170		
1940	9,931,657	18,703,617	16,115,170	8,250,000	5,720,000	356,461	14,308,812	0	0	14,308,812	12,328,575		
1941	20,116,678	14,308,812	12,328,575	8,250,000	5,720,000	371,160	20,084,330	0	0	20,084,330	17,304,802	Flow Adjustments:	
1942	17,225,136	20,084,330	17,304,802	8,250,000	5,720,000	462,877	22,877,090	0	0	22,877,090	19,711,094	1971	203,228 af
1943	13,731,401	22,877,090	19,711,094	8,250,000	5,720,000	484,411	22,154,080	0	0	22,154,080	19,088,114	1972	226,985 af
1944	15,369,422	22,154,080	19,088,114	8,250,000	5,720,000	488,433	23,067,069	0	0	23,067,069	19,874,751	1973	252,377 af
1945	14,140,528	23,067,069	19,874,751	8,250,000	5,720,000	492,723	22,744,874	0	0	22,744,874	19,597,146	1974	196,384 af
1946	11,985,453	22,744,874	19,597,146	8,250,000	5,720,000	453,859	19,416,468	0	0	19,416,468	16,729,368	1975	246,865 af
1947	16,439,486	19,416,468	17,477,861	8,250,000	5,720,000	440,031	21,445,923	0	0	21,445,923	18,477,861	1976	173,250 af
1948	15,139,294	21,445,923	18,477,861	8,250,000	5,720,000	469,090	22,146,127	0	0	22,146,127	19,081,262	1977	112,291 af
1949	16,933,584	22,146,127	19,081,262	8,250,000	5,720,000	502,742	24,608,969	0	0	24,608,969	21,201,541	1978	152,187 af
1950	13,140,416	24,608,969	21,201,541	8,250,000	5,720,000	514,629	23,262,756	0	0	23,262,756	20,043,357	1979	153,659 af
1951	12,605,894	23,262,756	20,043,357	8,250,000	5,720,000	479,627	21,318,023	0	0	21,318,023	18,368,623	1980	181,893 af
1952	20,805,422	21,318,023	18,368,623	8,250,000	5,720,000	526,102	27,628,343	0	0	27,628,343	23,804,778		
1953	11,165,419	27,628,343	23,804,778	8,250,000	5,720,000	557,478	24,266,285	0	0	24,266,285	20,908,004		
1954	8,496,102	24,266,285	20,908,004	8,250,000	5,720,000	458,530	18,333,856	0	0	18,333,856	15,796,582		
1955	9,413,908	18,333,856	15,796,582	8,250,000	5,720,000	343,218	13,434,547	0	0	13,434,547	11,576,301		
1956	11,426,874	13,434,547	11,576,301	8,250,000	5,720,000	261,206	10,630,214	0	0	10,630,214	9,159,069		
1957	21,500,963	10,630,214	9,159,069	8,250,000	5,720,000	308,243	17,852,934	0	0	17,852,934	15,382,216		
1958	15,862,511	17,852,934	15,382,216	8,250,000	5,720,000	401,013	19,344,432	0	0	19,344,432	16,687,301		
1959	9,598,169	19,344,432	16,687,301	8,250,000	5,720,000	366,449	14,606,152	0	0	14,606,152	12,584,765		
1960	11,524,160	14,606,152	12,584,765	8,250,000	5,720,000	286,914	11,873,398	0	0	11,873,398	10,230,205		
1961	10,010,259	11,873,398	10,230,205	8,250,000	5,720,000	213,395	7,700,263	0	0	7,700,263	6,534,601		
1962	17,377,609	7,700,263	6,534,601	8,250,000	5,720,000	203,083	10,904,679	0	0	10,904,679	9,395,644		
1963	8,840,900	10,904,679	9,395,644	8,250,000	5,720,000	180,671	5,585,018	0	0	5,585,018	4,820,707		
1964	10,863,586	5,585,018	4,820,707	8,250,000	5,720,000	90,114	2,398,489	0	0	2,398,489	2,066,556		
1965	19,875,027	2,398,489	2,066,556	8,250,000	5,720,000	117,696	8,165,821	0	0	8,165,821	7,052,962		
1966	10,678,844	6,165,821	5,052,962	8,250,000	5,720,000	142,760	4,752,904	0	0	4,752,904	4,095,136		
1967	11,670,830	4,752,904	4,095,136	8,250,000	5,720,000	80,877	2,372,858	0	0	2,372,858	2,044,471		
1968	13,739,932	2,372,858	2,044,471	8,250,000	5,720,000	52,531	2,090,259	0	0	2,090,259	1,800,882		
1969	15,272,159	2,090,259	1,800,882	8,250,000	5,720,000	82,717	3,326,701	0	0	3,326,701	2,868,894		
1970	15,344,136	3,326,701	2,868,894	8,250,000	5,720,000	89,587	4,614,250	0	0	4,614,250	3,975,671		
1971	15,493,659	4,614,250	3,975,671	8,250,000	5,720,000	118,224	6,018,685	0	0	6,018,685	5,186,604		
1972	13,166,637	6,018,685	5,186,604	8,250,000	5,720,000	123,531	5,112,790	0	0	5,112,790	4,405,217		
1973	18,650,183	5,112,790	4,405,217	8,250,000	5,720,000	161,077	9,631,006	0	0	9,631,006	8,298,144		
1974	13,285,426	9,631,006	8,298,144	8,250,000	5,720,000	200,653	8,745,780	0	0	8,745,780	7,535,427		
1975	17,072,861	8,745,780	7,535,427	8,250,000	5,720,000	221,897	11,626,544	0	0	11,626,544	10,017,513		
1976	11,313,561	11,626,544	1										

Upper Basin Yield Mass Balance Analysis

Use CRSP Minimum Power Pools, 8.25 maf Lower Basin Delivery, 6% Overall Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables	
1906	18,550,021	33,833,580	28,151,263	8,250,000	5,980,000	725,390	37,428,221	3,594,631	0	33,833,580	28,151,263	Storage	35,233,298 af
1907	21,201,694	33,833,580	28,151,263	8,250,000	5,980,000	725,390	40,079,894	6,246,304	0	33,833,580	28,151,263	Sedimentation Rate (Active)	37,000 af/yr
1908	12,218,917	33,833,580	28,151,263	8,250,000	5,980,000	696,563	31,125,844	0	0	31,125,844	26,818,249	Bank Storage	4%
1909	22,356,301	31,125,844	26,818,249	8,250,000	5,980,000	696,563	36,555,681	4,721,991	0	33,833,580	28,151,263	Adjusted Storage (2060)	33,833,580 af
1910	14,650,616	33,833,580	28,151,263	8,250,000	5,980,000	722,179	33,532,027	0	0	33,532,027	28,891,434	UB Demand Level	5,980,000 af/yr
1911	15,498,729	33,532,027	28,891,434	8,250,000	5,980,000	722,179	34,079,577	245,987	0	33,833,580	28,151,263	LB Delivery	8,250,000 af/yr
1912	18,623,410	33,833,580	28,151,263	8,250,000	5,980,000	725,390	37,501,610	3,668,020	0	33,833,580	28,151,263		
1913	14,536,373	33,833,580	28,151,263	8,250,000	5,980,000	720,976	33,418,987	0	0	33,418,987	28,794,038		
1914	21,354,814	33,418,987	28,794,038	8,250,000	5,980,000	720,976	38,822,825	5,989,235	0	33,833,580	28,151,263		
1915	13,623,277	33,833,580	28,151,263	8,250,000	5,980,000	711,358	32,616,500	0	0	32,616,500	28,015,595	Results	
1916	20,142,802	32,515,509	28,015,595	8,250,000	5,980,000	711,358	37,717,044	3,833,454	0	33,833,580	28,151,263	Average CRSP Evap	420,659 af/yr
1917	22,942,904	33,833,580	28,151,263	8,250,000	5,980,000	725,390	41,821,004	7,867,414	0	33,833,580	28,151,263	Total Yield w/ CRSP evap	6,400,859 af/yr
1918	15,865,939	33,833,580	28,151,263	8,250,000	5,980,000	701,120	31,553,839	0	0	31,553,839	27,187,013	Shortage Years	Shortage
1919	12,651,969	33,833,580	28,151,263	8,250,000	5,980,000	701,120	38,910,351	5,076,762	0	33,833,580	28,151,263	1963	703,237 af
1920	22,287,632	31,553,839	27,187,013	8,250,000	5,980,000	725,390	41,404,881	7,571,391	0	33,833,580	28,151,263	1964	3,371,431 af
1921	22,526,781	33,833,580	28,151,263	8,250,000	5,980,000	725,390	37,325,398	3,491,908	0	33,833,580	28,151,263	1967	639,589 af
1922	18,447,198	33,833,580	28,151,263	8,250,000	5,980,000	725,390	37,002,246	4,068,656	0	33,833,580	28,151,263	1968	495,085 af
1923	12,402,046	33,833,580	28,151,263	8,250,000	5,980,000	714,039	32,767,349	0	0	32,767,349	28,232,583	1977	3,665,093 af
1924	13,877,798	33,833,580	28,151,263	8,250,000	5,980,000	697,400	32,270,851	0	0	32,270,851	27,804,623		
1925	14,430,701	32,767,349	28,232,583	8,250,000	5,980,000	695,184	32,559,188	0	0	32,559,188	28,053,238		
1926	15,213,731	32,270,851	27,804,623	8,250,000	5,980,000	695,184	32,559,188	3,322,997	0	33,833,580	28,151,263	NM allocation (w/o evap)	667,125 af/yr
1927	18,539,212	32,559,188	28,053,238	8,250,000	5,980,000	725,390	35,832,314	1,998,944	0	33,833,580	28,151,263		
1928	16,854,334	33,833,580	28,151,263	8,250,000	5,980,000	725,390	40,707,785	6,874,195	0	33,833,580	28,151,263	Note: NM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.	
1929	14,621,041	33,833,580	28,151,263	8,250,000	5,980,000	721,668	33,502,763	0	0	33,502,763	28,868,220		
1930	14,474,134	33,833,580	28,151,263	8,250,000	5,980,000	650,146	27,096,749	0	0	27,096,749	23,346,753		
1931	8,474,141	33,833,580	28,151,263	8,250,000	5,980,000	609,447	28,679,489	0	0	28,679,489	25,572,060		
1932	17,122,187	27,096,749	23,346,753	8,250,000	5,980,000	608,675	27,024,314	0	0	27,024,314	23,284,342		
1933	12,483,500	28,679,489	25,572,060	8,250,000	5,980,000	489,480	18,483,026	0	0	18,483,026	15,925,107		
1934	6,178,192	27,024,314	23,284,342	8,250,000	5,980,000	377,502	16,505,872	0	0	16,505,872	14,221,578	Total Upper Basin depletion, inc. CRSP evap:	
1935	12,630,349	18,483,026	15,925,107	8,250,000	5,980,000	357,112	16,567,634	0	0	16,567,634	14,274,792	1953-1977	6,109,607 af/yr
1936	14,648,873	16,505,872	14,221,578	8,250,000	5,980,000	354,802	16,288,888	0	0	16,288,888	14,034,623	1931-1977	103,167 af/yr
1937	14,306,056	16,567,634	14,034,623	8,250,000	5,980,000	390,402	19,817,805	0	0	19,817,805	17,075,162	1906-2000	6,400,859 af/yr
1938	18,148,319	16,288,888	14,034,623	8,250,000	5,980,000	390,402	19,817,805	0	0	19,817,805	17,075,162		
1939	11,164,059	16,317,805	14,034,623	8,250,000	5,980,000	390,402	19,817,805	0	0	19,817,805	17,075,162		
1940	9,931,857	16,317,805	14,034,623	8,250,000	5,980,000	390,402	19,817,805	0	0	19,817,805	17,075,162		
1941	20,116,878	17,558,959	15,925,107	8,250,000	5,980,000	390,402	19,817,805	0	0	19,817,805	17,075,162		
1942	17,225,136	17,330,935	14,932,457	8,250,000	5,980,000	419,467	19,006,373	0	0	19,006,373	16,376,027	Flow Adjustments:	
1943	13,731,401	19,824,440	17,167,040	8,250,000	5,980,000	419,467	19,218,295	0	0	19,218,295	16,559,482	1971	203,226 af
1944	15,369,422	18,006,373	16,376,027	8,250,000	5,980,000	419,467	19,218,295	0	0	19,218,295	16,559,482	1972	226,865 af
1945	14,140,528	19,728,415	16,998,143	8,250,000	5,980,000	375,048	15,707,903	0	0	15,707,903	13,534,041	1973	252,377 af
1946	11,095,453	19,218,295	16,559,482	8,250,000	5,980,000	375,048	15,707,903	0	0	15,707,903	13,534,041	1974	106,384 af
1947	16,439,486	15,707,903	13,534,041	8,250,000	5,980,000	384,448	18,083,073	0	0	18,083,073	16,580,505	1975	246,665 af
1948	15,139,294	17,558,227	15,128,294	8,250,000	5,980,000	384,448	18,083,073	0	0	18,083,073	16,580,505	1976	173,260 af
1949	16,933,584	18,083,073	15,580,505	8,250,000	5,980,000	414,405	20,372,251	0	0	20,372,251	17,552,877	1977	112,291 af
1950	13,140,416	20,372,251	17,552,877	8,250,000	5,980,000	427,143	22,900,031	0	0	22,900,031	19,730,831	1978	152,187 af
1951	12,505,894	16,859,891	16,249,903	8,250,000	5,980,000	384,133	16,751,782	0	0	16,751,782	14,433,429	1979	153,559 af
1952	20,805,422	16,751,782	14,433,429	8,250,000	5,980,000	427,143	22,900,031	0	0	22,900,031	19,730,831	1980	161,893 af
1953	11,165,419	22,900,031	19,730,831	8,250,000	5,980,000	352,057	13,293,569	0	0	13,293,569	11,453,834		
1954	8,496,102	19,380,324	16,698,226	8,250,000	5,980,000	234,293	8,243,183	0	0	8,243,183	7,102,386		
1955	9,413,908	13,293,569	11,453,834	8,250,000	5,980,000	149,099	5,290,858	0	0	5,290,858	4,558,728		
1956	11,426,874	8,243,183	7,102,386	8,250,000	5,980,000	193,021	12,368,901	0	0	12,368,901	10,657,133		
1957	21,500,963	5,290,858	4,558,728	8,250,000	5,980,000	282,741	13,718,671	0	0	13,718,671	11,820,105		
1958	15,862,511	12,368,901	10,657,133	8,250,000	5,980,000	162,732	5,973,078	0	0	5,973,078	5,146,447		
1959	8,598,169	13,718,671	11,820,105	8,250,000	5,980,000	88,352	1,866,985	0	0	1,866,985	1,436,286		
1960	11,524,160	8,841,650	7,618,029	8,250,000	5,980,000	73,239	4,741,355	0	0	4,741,355	4,085,188		
1961	10,010,259	5,973,078	5,146,447	8,250,000	5,980,000	55,493	-703,237	0	703,237	0	0		
1962	17,377,609	1,666,985	1,436,286	8,250,000	5,980,000	5,017	-3,371,431	0	3,371,431	0	0		
1963	8,840,900	4,741,355	4,085,188	8,250,000	5,980,000	64,427	5,580,600	0	0	5,580,600	4,806,265		
1964	10,883,586	0	0	8,250,000	5,980,000	85,138	1,945,307	0	0	1,945,307	1,676,091		
1965	19,875,027	0	0	8,250,000	5,980,000	25,726	-638,689	0	639,589	0	0		
1966	10,679,844	5,580,600	4,808,285	8,250,000	5,980,000	5,017	-485,085	0	495,085	0	0		
1967	11,670,830	1,945,307	1,676,091	8,250,000	5,980,000	15,942	1,026,217	0	0	1,026,217	884,196		
1968	13,739,932	0	0	8,250,000	5,980,000	38,320	2,102,033	0	0	2,102,033	1,811,127		
1969	15,272,159	0	0	8,250,000	5,980,000	62,559	3,303,132	0	0	3,303,132	2,846,003		
1970	15,344,136	1,026,217	884,196	8,250,000	5,980,000	63,582	2,196,207	0	0	2,196,207	1,892,268		
1971	15,493,659	2,102,033	1,811,127	8,250,000	5,980,000	99,081	5,998,061	0	0	5,998,061	5,167,872		
1972	13,186,637	3,303,132	2,846,003	8,250,000	5,980,000	238,055	15,891,995	0	0	15,891,995	13,692,657		
1973	18,650,183	2,196,207	1,892,268	8,250,000	5,980,000	457,000	26,564,372	0	0	26,564,372	22,888,053		
1974	13,285,426	6,518,607	5,616,478	8,250,000	5,980,000	638,511	32,941,970	0	0	32,941,970	28,383,037		
1975	17,072,661	5,441,689	4,688,598	8,250,000	5,980,000	715,898	41,009,518	0	0	41,009,518	33,833,580		
1976	11,313,561	8,134,800	7,009,002	8,250,000	5,980,000	725,390	34,518,679	0	0	34,518,679	29,151,263		
1977	5,551,188	5,072,739	4,370,70										

Upper Basin Flow Mass Balance Analysis

Use CRSP Minimum Power Pools, 7.50 maf Lower Basin Delivery, No Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables
1906	18,550,021	33,833,590	29,151,263	7,500,000	6,470,000	725,390	37,689,221	3,854,831	0	33,833,590	29,151,263	Storage
1907	21,201,894	33,833,590	29,151,263	7,500,000	6,470,000	725,390	40,339,894	6,506,204	0	33,833,590	29,151,263	Sedimentation Rate (Active)
1908	12,218,817	33,833,590	29,151,263	7,500,000	6,470,000	699,302	31,383,105	0	0	31,383,105	27,039,907	Bank Storage
1909	22,356,301	31,383,105	27,039,907	7,500,000	6,470,000	699,302	39,070,104	5,236,514	0	33,833,590	29,151,263	Adjusted Storage (2060)
1910	14,650,616	33,833,590	29,151,263	7,500,000	6,470,000	724,918	33,789,288	0	0	33,789,288	29,113,092	UB Demand Level
1911	15,489,729	33,833,590	29,113,092	7,500,000	6,470,000	724,918	34,584,098	760,509	0	33,833,590	29,151,263	LB Delivery
1912	18,623,410	33,833,590	29,151,263	7,500,000	6,470,000	725,390	37,761,610	3,828,020	0	33,833,590	29,151,263	
1913	14,536,373	33,833,590	29,151,263	7,500,000	6,470,000	723,715	33,676,248	0	0	33,676,248	29,015,696	
1914	21,354,814	33,833,590	29,015,696	7,500,000	6,470,000	723,715	40,337,348	6,503,758	0	33,833,590	29,151,263	
1915	13,623,277	33,833,590	29,151,263	7,500,000	6,470,000	714,096	32,772,771	0	0	32,772,771	28,237,254	
1916	20,142,892	33,833,590	28,237,254	7,500,000	6,470,000	714,096	38,231,566	4,397,976	0	33,833,590	29,151,263	Results
1917	22,542,804	33,833,590	28,151,263	7,500,000	6,470,000	725,390	42,081,004	8,247,414	0	33,833,590	29,151,263	Average CRSP Evap
1918	15,865,938	33,833,590	28,151,263	7,500,000	6,470,000	725,390	35,004,139	1,170,549	0	33,833,590	29,151,263	Total Yield w/ CRSP evap
1919	12,651,369	33,833,590	28,151,263	7,500,000	6,470,000	703,858	31,811,100	0	0	31,811,100	27,408,872	Shortage Years
1920	22,287,632	31,811,100	27,408,872	7,500,000	6,470,000	703,858	39,424,874	5,591,284	0	33,833,590	29,151,263	Shortage
1921	22,526,781	33,833,590	29,151,263	7,500,000	6,470,000	725,390	41,664,981	7,831,391	0	33,833,590	29,151,263	1963
1922	18,447,198	33,833,590	29,151,263	7,500,000	6,470,000	725,390	37,585,399	3,751,908	0	33,833,590	29,151,263	1964
1923	19,024,046	33,833,590	29,151,263	7,500,000	6,470,000	725,390	38,162,246	4,328,858	0	33,833,590	29,151,263	1967
1924	13,877,788	33,833,590	29,151,263	7,500,000	6,470,000	718,777	33,024,811	0	0	33,024,811	28,454,241	1968
1925	14,430,701	33,024,811	28,454,241	7,500,000	6,470,000	705,558	32,779,753	0	0	32,779,753	28,243,270	1977
1926	15,213,731	32,779,753	28,243,270	7,500,000	6,470,000	708,648	33,314,838	0	0	33,314,838	28,704,301	
1927	19,539,212	33,314,838	28,704,301	7,500,000	6,470,000	719,867	38,164,181	4,330,591	0	33,833,590	29,151,263	NM allocation (w/o evap)
1928	16,954,334	33,833,590	29,151,263	7,500,000	6,470,000	725,390	36,092,534	2,258,844	0	33,833,590	29,151,263	
1929	21,829,585	33,833,590	29,151,263	7,500,000	6,470,000	725,390	40,967,785	7,134,195	0	33,833,590	29,151,263	
1930	14,621,041	33,833,590	29,151,263	7,500,000	6,470,000	724,606	37,605,025	0	0	33,760,025	29,087,879	Note: NM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.
1931	8,474,134	33,760,025	29,087,879	7,500,000	6,470,000	658,307	27,605,852	0	0	27,605,852	23,785,399	
1932	17,422,187	27,605,852	23,785,399	7,500,000	6,470,000	622,911	30,435,128	0	0	30,435,128	26,223,124	
1933	12,183,500	30,435,128	26,223,124	7,500,000	6,470,000	627,333	28,021,294	0	0	28,021,294	24,143,347	
1934	6,178,102	28,021,294	24,143,347	7,500,000	6,470,000	513,222	19,716,264	0	0	19,716,264	16,987,674	
1935	12,630,348	19,716,264	16,987,674	7,500,000	6,470,000	406,222	17,970,391	0	0	17,970,391	16,493,417	Total Upper Basin depletion, inc. CRSP evap:
1936	14,648,873	17,970,391	15,483,117	7,500,000	6,470,000	390,704	18,258,580	0	0	18,258,580	15,731,706	1953-1977
1937	14,306,056	18,258,580	15,731,706	7,500,000	6,470,000	393,184	18,201,452	0	0	18,201,452	15,682,501	1931-1977
1938	18,148,319	18,201,452	15,682,501	7,500,000	6,470,000	432,434	21,847,337	0	0	21,847,337	19,909,983	1906-2000
1939	11,164,059	21,847,337	18,909,983	7,500,000	6,470,000	437,780	18,703,617	0	0	18,703,617	16,115,170	
1940	9,831,857	18,703,617	16,115,170	7,500,000	6,470,000	356,461	14,308,812	0	0	14,308,812	12,328,575	
1941	20,116,078	14,308,812	12,328,575	7,500,000	6,470,000	371,160	20,084,330	0	0	20,084,330	17,304,802	Flow Adjustments:
1942	17,225,138	20,084,330	17,304,802	7,500,000	6,470,000	484,411	22,154,080	0	0	22,154,080	19,088,114	1971
1943	13,731,401	22,154,080	19,088,114	7,500,000	6,470,000	486,433	23,067,069	0	0	23,067,069	19,874,751	1972
1944	15,369,422	22,154,080	19,088,114	7,500,000	6,470,000	492,723	22,744,874	0	0	22,744,874	19,597,148	1973
1945	14,140,228	23,067,069	19,874,751	7,500,000	6,470,000	453,589	19,416,468	0	0	19,416,468	16,729,368	1974
1946	11,095,453	22,744,874	19,597,148	7,500,000	6,470,000	440,031	21,445,923	0	0	21,445,923	18,477,961	1975
1947	16,439,486	19,416,468	16,729,368	7,500,000	6,470,000	489,090	22,148,127	0	0	22,148,127	19,081,262	1976
1948	15,139,294	21,445,923	18,477,961	7,500,000	6,470,000	502,742	24,606,969	0	0	24,606,969	21,201,541	1977
1949	16,833,584	22,148,127	19,081,262	7,500,000	6,470,000	514,829	23,262,756	0	0	23,262,756	20,043,357	1978
1950	13,140,416	24,606,969	21,201,541	7,500,000	6,470,000	479,627	21,219,023	0	0	21,219,023	18,368,623	1980
1951	12,505,894	23,262,756	20,043,357	7,500,000	6,470,000	526,102	27,628,343	0	0	27,628,343	23,804,778	
1952	20,805,422	21,219,023	18,368,623	7,500,000	6,470,000	567,478	24,266,285	0	0	24,266,285	20,908,004	
1953	11,165,419	27,628,343	23,804,778	7,500,000	6,470,000	458,530	18,333,856	0	0	18,333,856	16,796,582	
1954	8,496,102	24,266,285	20,908,004	7,500,000	6,470,000	343,218	13,434,547	0	0	13,434,547	11,575,301	
1955	9,413,908	18,333,856	15,796,582	7,500,000	6,470,000	281,206	10,630,214	0	0	10,630,214	9,159,069	
1956	11,426,874	13,434,547	11,575,301	7,500,000	6,470,000	308,243	17,852,934	0	0	17,852,934	15,382,218	
1957	21,500,963	10,630,214	9,159,069	7,500,000	6,470,000	401,013	19,344,432	0	0	19,344,432	16,667,301	
1958	15,862,511	17,852,934	15,382,218	7,500,000	6,470,000	366,449	14,606,152	0	0	14,606,152	12,584,765	
1959	9,598,169	19,344,432	16,667,301	7,500,000	6,470,000	286,914	11,873,398	0	0	11,873,398	10,230,205	
1960	11,524,180	14,606,152	12,584,765	7,500,000	6,470,000	213,395	7,700,263	0	0	7,700,263	6,834,801	
1961	10,010,259	11,873,398	10,230,205	7,500,000	6,470,000	203,083	10,904,789	0	0	10,904,789	9,395,644	
1962	17,377,809	7,700,263	6,834,801	7,500,000	6,470,000	180,871	5,595,018	0	0	5,595,018	4,820,707	
1963	8,840,900	10,904,789	9,395,644	7,500,000	6,470,000	90,114	2,388,489	0	0	2,388,489	2,066,556	
1964	10,663,588	5,595,018	4,820,707	7,500,000	6,470,000	117,866	-1,885,821	0	0	1,885,821	7,052,982	
1965	19,875,027	2,388,489	2,066,556	7,500,000	6,470,000	142,760	4,752,904	0	0	4,752,904	4,095,136	
1966	10,676,844	8,185,821	7,052,982	7,500,000	6,470,000	80,877	2,372,858	0	0	2,372,858	2,044,471	
1967	11,870,830	4,752,904	4,095,136	7,500,000	6,470,000	52,531	2,090,259	0	0	2,090,259	1,800,982	
1968	13,739,932	2,372,858	2,066,556	7,500,000	6,470,000	82,717	3,329,701	0	0	3,329,701	2,888,894	
1969	15,272,159	2,090,259	1,800,982	7,500,000	6,470,000	89,587	4,814,250	0	0	4,814,250	3,875,671	
1970	15,344,136	3,329,701	2,888,894	7,500,000	6,470,000	118,224	6,019,685	0	0	6,019,685	5,186,604	
1971	15,493,659	4,814,250	3,875,671	7,500,000	6,470,000	123,531	5,112,790	0	0	5,112,790	4,405,217	
1972	13,186,637	6,019,685	5,186,604	7,500,000	6,470,000	161,977	9,831,006	0	0	9,831,006	8,286,144	
1973	18,650,193	5,112,790	4,405,217	7,500,000	6,470,000	200						

Upper Basin Yield Mass Balance Analysis

Use CRSP Minimum Power Pools, 7.50 maf Lower Basin Delivery, 6% Overall Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Store (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin Storage (equals)	CRSP Year-end Storage	Variables	
1906	18,550,021	33,833,590	29,151,263	7,500,000	6,760,000	725,390	37,398,221	3,564,631	0	33,833,590	29,151,263	Storage	35,233,298 af
1907	21,201,694	33,833,590	29,151,263	7,500,000	6,760,000	725,390	40,049,894	6,216,304	0	33,833,590	29,151,263	Sedimentation Rate (Active)	37,000 af/yr
1908	22,356,301	33,833,590	29,151,263	7,500,000	6,760,000	725,390	41,096,160	0	0	33,833,590	29,151,263	Bank Storage	4%
1909	22,356,301	31,096,160	26,792,673	7,500,000	6,760,000	686,247	38,406,213	4,662,623	0	33,833,590	29,151,263	Adjusted Storage (2060)	33,833,590 af
1910	14,650,616	33,833,590	29,151,263	7,500,000	6,760,000	721,863	33,502,343	0	0	33,833,590	29,151,263	UB Demand Level	6,760,000 af/yr
1911	15,499,728	33,502,343	28,865,858	7,500,000	6,760,000	721,863	34,020,209	185,619	0	33,833,590	29,151,263	LB Delivery	7,500,000 af/yr
1912	18,623,410	33,833,590	29,151,263	7,500,000	6,760,000	725,390	37,471,610	3,638,020	0	33,833,590	29,151,263		
1913	14,536,373	33,833,590	29,151,263	7,500,000	6,760,000	720,560	33,389,303	0	0	33,833,590	29,151,263		
1914	21,354,814	33,389,303	28,768,462	7,500,000	6,760,000	720,560	39,763,457	5,928,887	0	33,389,303	28,768,462		
1915	13,623,277	33,833,590	29,151,263	7,500,000	6,760,000	711,041	32,465,825	0	0	33,833,590	29,151,263	Results	
1916	20,142,892	32,465,825	27,990,019	7,500,000	6,760,000	711,041	37,657,676	3,824,086	0	33,833,590	29,151,263	Average CRSP Evap	416,577 af/yr
1917	22,942,804	33,833,590	29,151,263	7,500,000	6,760,000	725,390	41,791,004	7,957,414	0	33,833,590	29,151,263	Total Yield w/ CRSP evap	7,176,577 af/yr
1918	15,865,939	33,833,590	29,151,263	7,500,000	6,760,000	725,390	34,714,139	890,549	0	33,833,590	29,151,263		
1919	12,651,369	33,833,590	29,151,263	7,500,000	6,760,000	700,804	31,624,155	0	0	33,833,590	29,151,263	Shortage Years	Shortage
1920	22,287,632	31,524,155	27,161,438	7,500,000	6,760,000	700,804	38,850,983	5,017,394	0	33,833,590	29,151,263	1963	1,436,832 af
1921	22,526,781	33,833,590	29,151,263	7,500,000	6,760,000	725,390	41,374,981	7,541,391	0	33,833,590	29,151,263	1964	3,401,431 af
1922	18,447,198	33,833,590	29,151,263	7,500,000	6,760,000	725,390	37,285,398	3,461,808	0	33,833,590	29,151,263	1967	727,706 af
1923	19,024,046	33,833,590	29,151,263	7,500,000	6,760,000	725,390	37,872,248	4,038,856	0	33,833,590	29,151,263	1968	525,085 af
1924	13,877,768	33,833,590	29,151,263	7,500,000	6,760,000	713,723	32,737,665	0	0	32,737,665	28,207,007	1969	3,913,425 af
1925	14,300,701	32,737,665	28,207,007	7,500,000	6,760,000	686,458	32,211,908	0	0	32,211,908	27,764,010		
1926	15,213,731	32,211,908	27,764,010	7,500,000	6,760,000	693,630	32,472,009	0	0	32,472,009	27,978,115		
1927	19,539,212	32,472,009	27,978,115	7,500,000	6,760,000	710,884	37,040,326	3,206,736	0	33,833,590	29,151,263	NM allocation (w/o evap)	754,875 af/yr
1928	16,954,334	33,833,590	29,151,263	7,500,000	6,760,000	725,390	35,802,734	1,968,944	0	33,833,590	29,151,263		
1929	21,829,585	33,833,590	29,151,263	7,500,000	6,760,000	725,390	40,677,585	6,844,195	0	33,833,590	29,151,263		
1930	14,621,041	33,833,590	29,151,263	7,500,000	6,760,000	721,552	33,473,079	0	0	33,473,079	28,840,644		
1931	8,474,134	33,473,079	28,840,644	7,500,000	6,760,000	648,207	27,038,006	0	0	27,038,006	23,296,139	Note: NM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.	
1932	17,422,187	27,038,006	23,296,139	7,500,000	6,760,000	605,523	26,909,278	0	0	26,909,278	23,185,228		
1933	12,183,500	29,592,300	25,406,837	7,500,000	6,760,000	605,523	26,909,278	0	0	26,909,278	23,185,228		
1934	6,178,192	26,909,278	23,185,228	7,500,000	6,760,000	485,740	18,340,729	0	0	18,340,729	15,802,503		
1935	12,830,349	18,340,729	15,802,503	7,500,000	6,760,000	374,189	16,336,890	0	0	16,336,890	14,076,981	Total Upper Basin depletion, inc. CRSP evap:	
1936	14,648,873	16,336,890	14,076,981	7,500,000	6,760,000	353,235	16,372,627	0	0	16,372,627	14,106,686	1953-1977	6,882,986 af/yr
1937	14,306,056	16,372,627	14,106,686	7,500,000	6,760,000	350,375	16,068,208	0	0	16,068,208	13,844,483	1931-1977	7,019,845 af/yr
1938	18,148,318	16,068,208	13,844,483	7,500,000	6,760,000	384,437	19,572,090	0	0	19,572,090	16,863,452	1906-2000	7,176,577 af/yr
1939	11,164,058	19,572,090	16,863,452	7,500,000	6,760,000	384,585	16,091,464	0	0	16,091,464	13,854,520		
1940	9,831,637	16,091,464	13,854,520	7,500,000	6,760,000	298,375	11,464,746	0	0	11,464,746	9,878,107		
1941	20,116,678	11,464,746	9,878,107	7,500,000	6,760,000	308,188	17,013,295	0	0	17,013,295	14,658,725	Flow Adjustments:	
1942	17,225,136	17,013,295	14,658,725	7,500,000	6,760,000	394,622	19,583,749	0	0	19,583,749	16,873,498	1971	203,228 af
1943	13,731,401	19,583,749	16,873,498	7,500,000	6,760,000	411,974	18,843,176	0	0	18,843,176	16,063,094	1972	226,985 af
1944	15,358,422	16,873,498	14,658,725	7,500,000	6,760,000	409,413	19,343,185	0	0	19,343,185	16,656,227	1973	252,377 af
1945	14,140,528	19,343,185	16,656,227	7,500,000	6,760,000	412,116	18,812,498	0	0	18,812,498	16,208,983	1974	196,384 af
1946	11,095,453	18,812,498	16,208,983	7,500,000	6,760,000	367,859	15,278,991	0	0	15,278,991	13,165,350	1975	246,665 af
1947	16,439,486	15,278,991	13,165,350	7,500,000	6,760,000	349,831	17,109,646	0	0	17,109,646	14,741,793	1976	173,250 af
1948	15,138,294	17,109,646	14,741,793	7,500,000	6,760,000	374,681	17,614,259	0	0	17,614,259	15,176,571	1977	112,291 af
1949	16,933,584	17,614,259	15,176,571	7,500,000	6,760,000	404,213	19,893,639	0	0	19,893,639	17,191,678	1978	152,187 af
1950	13,140,416	19,893,639	17,191,678	7,500,000	6,760,000	412,066	18,351,980	0	0	18,351,980	15,612,187	1979	153,559 af
1951	12,505,894	18,351,980	15,612,187	7,500,000	6,760,000	373,115	16,224,759	0	0	16,224,759	13,978,958	1980	161,893 af
1952	20,805,422	16,224,759	13,978,958	7,500,000	6,760,000	415,724	22,354,457	0	0	22,354,457	19,260,760		
1953	11,165,419	22,354,457	19,260,760	7,500,000	6,760,000	443,316	18,816,559	0	0	18,816,559	16,212,482		
1954	8,496,102	18,816,559	16,212,482	7,500,000	6,760,000	340,664	12,711,897	0	0	12,711,897	10,952,748		
1955	9,413,998	12,711,897	10,952,748	7,500,000	6,760,000	221,725	7,644,180	0	0	7,644,180	6,589,280		
1956	11,426,874	7,644,180	6,589,280	7,500,000	6,760,000	136,164	4,674,890	0	0	4,674,890	4,027,919		
1957	21,500,963	4,674,890	4,027,919	7,500,000	6,760,000	179,728	11,736,128	0	0	11,736,128	10,111,931		
1958	15,862,511	11,736,128	10,111,931	7,500,000	6,760,000	269,094	13,069,545	0	0	13,069,545	11,260,813		
1959	9,589,169	13,069,545	11,260,813	7,500,000	6,760,000	231,199	8,176,515	0	0	8,176,515	7,044,944		
1960	11,624,180	7,044,944	6,176,515	7,500,000	6,760,000	146,403	5,292,272	0	0	5,292,272	4,559,859		
1961	10,010,259	5,292,272	4,559,859	7,500,000	6,760,000	71,593	970,838	0	0	970,838	836,481		
1962	17,377,609	836,481	715,973	7,500,000	6,760,000	58,257	4,030,190	0	0	4,030,190	3,472,440		
1963	8,840,900	4,030,190	3,472,440	7,500,000	6,760,000	47,822	-1,436,832	0	1,436,832	0	0		
1964	10,083,586	0	0	7,500,000	6,760,000	5,017	-3,401,431	0	3,401,431	0	0		
1965	19,876,027	0	0	7,500,000	6,760,000	64,111	5,550,916	0	0	5,550,916	4,782,709		
1966	10,679,844	5,550,916	4,782,709	7,500,000	6,760,000	84,185	1,886,585	0	0	1,886,585	1,625,478		
1967	11,670,830	1,886,585	1,625,478	7,500,000	6,760,000	26,101	-727,706	0	727,706	0	0		
1968	13,739,932	0	0	7,500,000	6,760,000	5,017	-525,085	0	525,085	0	0		
1969	15,272,159	0	0	7,500,000	6,760,000	15,828	896,533	0	0	996,533	858,620		
1970	15,344,136	996,533	858,620	7,500,000	6,760,000	37,378	2,043,291	0	0	2,043,291	1,760,514		
1971	15,493,659	2,043,291	1,760,514	7,500,000	6,760,000	61,006	3,215,943	0	0	3,215,943	2,770,890		
1972	13,186,637	3,215,943	2,770,890	7,500,000	6,760,000	61,409	2,081,171	0	0	2,081,171	1,793,162		
1973	18,650,193	2,081,171	1,793,162	7,500,000	6,760,000	95,054	6,376,310	0	0	6,376,310	5,493,874		
1974	13,285,426	6,376,310	5,493,874	7,500,000	6,760,000	129,030	5,272,706	0	0	5,272,706	4,543,031		
1975	17,072,681	5,272,706	4,543,031	7,500,000	6,760,000	145,674	7,939,693	0	0	7,939,693	6,840,897		
1976	11,313,561	7,939,693	6,840,897	7,500,000	6,760,000	141,196	4,852,059	0	0	4,852,059	4,180,569		
1977	5,551,188	4,852,059	4,180,569	7,500,000									

Upper Colorado River Basin Reservoirs	Complete	Live Capacity	CRSP Live	CRSP Active	CRSP Active +Other	State	Major Basin	Hydromet	Source
1 Big Sandy	X	38,300	828,500	748,500	36,300	WY	GR	BGRW	Hydromet
2 Blue Mesa	X	829,500	828,500	748,500	748,500	CO	CR	BMDC	Hydromet
3 Boulder Lake	X	22,280			22,280	WY	GR	BHRU	Jada Henderson Superintendent for Region IV
4 Bottle Hollow	X	11,778			11,778	UT	GR	CFRC	Erik Knight from GJ office
5 Crawford	X	13,970			13,970	CO	CR	CRRC	Hydromet
6 Crystal	X	17,536	17,536	13,000	13,000	CO	CR	CURU	Hydromet
7 Current Creek	X	15,460			15,460	UT	CR	CR	NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
8 Dillon	X	252,678			252,678	CO	CR	EDRU	NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
9 Eden	X	13,164			13,164	WY	GR		Connelly Baldwin at Pacific Corp. Connelly.Baldwin@pacifiCorp.com or 801-220-4638
10 Electric Lake - Utah Power & Light	X	31,500			31,500	UT	GR		Bill Enay with the City of Craig Public Works Dept. 970-828-2014
11 Eskinead	X	10,400			10,400	CO	GR	FGRU	Hydromet
12 Fleming Gorge	X	3,749,000	3,749,000	3,515,700	3,515,700	UT	GR	FTRW	Jada Henderson Superintendent for Region IV
13 Fontenelle	X	344,800			344,800	WY	GR	FGRC	Hydromet
14 Fremont Lake	X	30,898			30,898	WY	GR	GMRC	NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
15 Gould	X	10,380			10,380	CO	CR		NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
16 Fullgrovers	X	4,460			4,460	CO	CR	FGRC	George Wear with Colorado Division of Water Resources george.wear@owr.state.co.us
17 Granby	X	540,033			540,033	CO	CR	GMRC	NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
18 Green Mountain	X	153,678			153,678	CO	CR		NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
19 Groundhog	X	27,500			27,500	CO	CR		George Wear with Colorado Division of Water Resources george.wear@owr.state.co.us
20 Gurley	X	12,035			12,035	CO	CR		NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
21 Hameslake	X	42,882			42,882	CO	CR	JGRC	Hydromet
22 Jackson Gulch	X	9,951			9,951	CO	CR	JVRU	Hydromet
23 Joe's Valley	X	61,590			61,590	UT	GR	GR777	Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
24 Johnson	X	15,300			15,300	CO	CR	GLDA	Connelly Baldwin at Pacific Corp. Connelly.Baldwin@pacifiCorp.com or 801-220-4638
25 Kenny Reservoir (Taylor Div)	X	8,400			8,400	CO	CR	LMRC	Hydromet
26 Lake Powell	X	24,322,000	24,322,000	20,309,919	20,309,919	AZ	GR		Connelly Baldwin at Pacific Corp. Connelly.Baldwin@pacifiCorp.com or 801-220-4638
27 Lake Vista Naughton	X	69,645			69,645	WY	GR		Hydromet
28 Lemon	X	39,792			39,792	CO	SJR		Hydromet
29 Long Park	X	14,600			14,600	UT	GR	MCRC	Hydromet
30 McPhee	X	247,400			247,400	CO	CR	MERW	Hydromet
31 Meeks Cabin	X	29,870			29,870	WY	GR		George Wear with Colorado Division of Water Resources george.wear@owr.state.co.us
32 Millie	X	20,000			20,000	UT	GR	MLLU	Hydromet
33 Miramonte	X	11,620			11,620	CO	CR		Hydromet
34 Moon Lake	X	49,500			49,500	UT	GR		Hydromet
35 Morgan Lake Dam	X	42,600			42,600	NM	SJR	MPRC	Hydromet
36 Morrow Point	X	117,025	117,025	42,120	42,120	CO	CR		NRCS Website http://www.wcc.nrcs.usda.gov/water/reservoir/resv_pt.html
37 Naraguinep	X	22,700			22,700	CO	SJR	NVRN	Hydromet
38 Navajo	X	1,696,000	1,696,000	1,036,100	1,036,100	NM	SJR		Jada Henderson Superintendent for Region IV
39 New Fork Lake	X	20,340			20,340	WY	GR	PARC	Hydromet
40 Poudre	X	18,703			18,703	CO	CR		Hydromet
41 Pelican Lake	X	19,650			19,650	UT	GR777		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
42 Pleasant Valley Lake Caten	X	7,275			7,275	CO	CR	GR777	Hydromet
43 Recapture Creek	X	16,000			16,000	UT	GR	RFRU	Hydromet
44 Redfict	X	25,700			25,700	UT	GR	RGRC	Hydromet
45 Ridgway	X	82,980			82,980	CO	CR	RURC	Great Plains Region Website
46 Rifle Gap	X	12,708			12,708	CO	CR	SFURC	Great Plains Region Website
47 Ruedi	X	102,330			102,330	CO	CR	SMRC	Great Plains Region Website
48 Scofield	X	65,600			65,600	UT	CR	SJRC	Hydromet
49 Shadow Mountain	X	18,368			18,368	CO	CR	SCRU	Hydromet
50 Silver Jack	X	13,000			13,000	CO	CR		Hydromet
51 Soldier Creek	X	1,105,910			1,105,910	UT	GR	SVRU	Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
52 Stagecoach	X	33,275			33,275	CO	GR	SLRU	Hydromet
53 Starvation	X	165,320			165,320	WY	GR	STRU	Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
54 Stetline	X	13,880			13,880	UT	GR	TPRC	Hydromet
55 Steamboat Lake	X	25,000			25,000	CO	GR	USRU	Hydromet
56 Stehaker	X	34,455			34,455	UT	GR	VGRU	Erik Knight from GJ office
57 Taylor Park	X	109,210			109,210	CO	CR	WFRU	George Wear with Colorado Division of Water Resources george.wear@owr.state.co.us
58 Upper Siltwater	X	31,382			31,382	UT	GR	WCRC	Jada Henderson Superintendent for Region IV
59 Vallecito	X	125,400			125,400	CO	SJR		Great Plains Region Website
60 Vega	X	33,311			33,311	CO	CR		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
61 Williams Creek	X	10,084			10,084	CO	CR		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
62 Williams Fork	X	96,824			96,824	CO	CR		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
63 Willow Lake	X	18,816			18,816	WY	GR		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
64 Willow Creek	X	10,550			10,550	CO	CR		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
65 Wolford Mountain	X	68,000			68,000	CO	CR		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado
66 Yampa	X	8,000			8,000	CO	GR		Edin.Lohf@state.co.us Division 6 Water Resources for State of Colorado

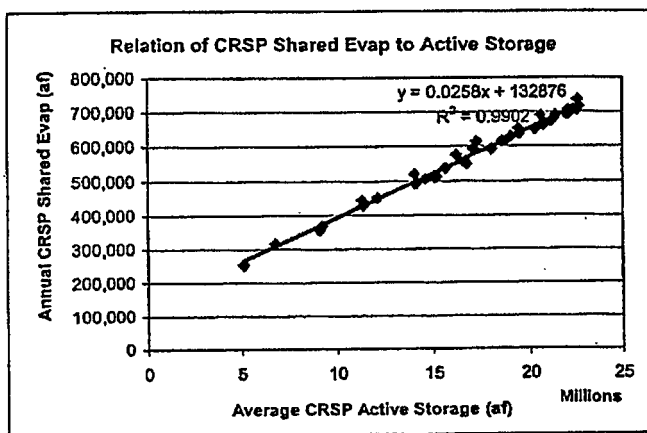
Total Capacity 35,233,298 30,731,061 25,665,339 30,167,676

Relationships of CRSP Shared Reservoir Evaporation to Total CRSP Storage

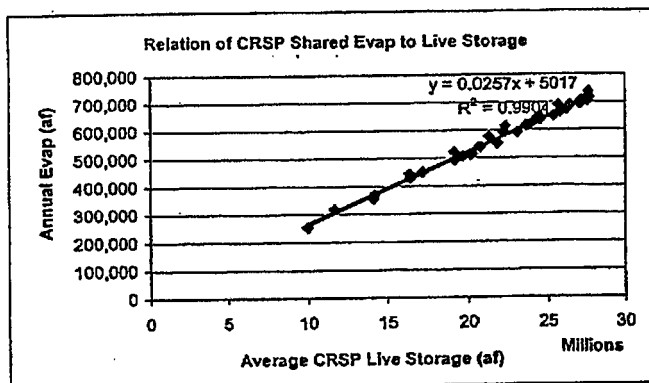
Year	Average CRSP Live Storage (af)	Average CRSP Active Storage (af)	CRSP Shared Evap (af)
1968	10,006,534	5,123,250	251,646
1969	11,701,142	6,764,000	315,083
1970	14,222,401	9,231,741	367,164
1971	16,417,858	11,354,088	442,260
1972	17,229,715	12,165,945	449,544
1973	19,703,066	14,639,296	504,409
1974	22,158,563	17,094,793	590,940
1975	23,634,096	18,570,326	613,612
1976	24,105,743	19,041,973	626,694
1977	20,730,592	15,672,536	537,406
1978	19,158,480	14,106,380	519,065
1979	22,336,514	17,284,414	612,639
1980	25,709,770	20,657,670	688,502
1981	25,392,305	20,340,205	648,525
1982	25,835,729	20,783,629	666,691
1983	27,692,454	22,640,354	734,416
1984	27,759,568	22,707,468	714,727
1985	27,619,938	22,567,838	702,973
1986	27,414,909	22,362,809	706,131
1987	27,153,464	22,101,364	705,172
1988	26,465,639	21,413,539	689,455
1989	24,540,351	19,488,251	634,821
1990	21,806,134	16,754,034	549,702
1991	20,141,572	15,089,472	510,689
1992	19,208,740	14,156,640	491,352
1993	21,297,564	16,245,464	573,884
1994	23,080,796	18,028,696	589,440
1995	24,500,724	19,448,624	649,206
1996	26,252,053	21,199,953	671,123
1997	26,416,641	21,364,541	681,115
1998	27,174,302	22,122,202	693,294
1999	27,050,819	21,998,719	694,007
2000	25,830,330	20,778,230	660,675
2001	23,802,258	18,750,158	614,593
2002	20,256,954	15,204,854	512,030
2003	16,472,537	11,420,437	427,526
2004	14,160,551	9,108,451	355,545

Regression Analyses

Active Storage:



Live Storage:



Notes:

- (1) Historic calendar year data from Bureau of Reclamation. Average storage values are based on the average of the end-of-year storage amounts for the year indicated and for the previous year. Storage amounts include storage in all CRSP units, including Lake Powell, Flaming Gorge Reservoir, Navajo Reservoir and the Aspinall Unit (Blue Mesa, Morrow Point and Crystal reservoirs).
- (2) CRSP shared evaporation includes lake evaporation for Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit reservoirs, and is shared between the Upper Division States in proportions to their Upper Colorado River Basin Compact Article III(a) apportionments. CRSP shared evaporation is approximately 10,000 af at zero live CRSP storage (5,000 af based on the regression analyses) and approximately 130,000 af if storage in all CRSP reservoirs were at the top of the inactive pools (133,000 af based on the regression analysis). Lake evaporation for Navajo Reservoir is not included in CRSP shared evaporation.
- (3) Data for the period 1968-2004 were used in the regression analyses. Data prior to 1968 do not reflect a normal distribution of storage between CRSP unit reservoirs under future operational conditions (for example, Navajo Reservoir storage remained below the top of the inactive pool required for operation of the Navajo Indian Irrigation Project diversion from 1962 when it began storing water until 1968, and Morrow Point Reservoir began operation in 1968). For the period 1968-1977, the historic average end-of-year CRSP storage and annual CRSP evaporation amount were increased to reflect the average storage of 15,670 af and average evaporation amount of 340 af occurring at Crystal Reservoir after its initial filling in 1978.

APPENDIX B

New Mexico Depletions Schedule

STATE OF NEW MEXICO SCHEDULE OF ANTICIPATED UPPER BASIN DEPLETIONS
(Units: 1000 acre-feet per year)

Year	2000	2010	2020	2030	2040	2050	2060
IRRIGATION USES (1)							
Navajo Nation Irrigation:							
Navajo Indian Irrigation Project	150.0	215.0	250.0	270.0	270.0	270.0	270.0
Fruitland-Cambridge Irrigation Project	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Hogback-Cudei Irrigation Project	15.5	15.5	21.3	21.3	21.3	21.3	21.3
Chaco River drainage irrigation	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Crystal area irrigation	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Navajo Nation Irrigation Subtotal	176.9	241.9	282.7	302.7	302.7	302.7	302.7
Non-Navajo Irrigation:							
Above Navajo Dam (including Jicarilla)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Upper San Juan (excluding Hammond)	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Hammond Irrigation Project	12.1	12.1	12.1	12.1	12.1	12.1	12.1
Animas River ditches	40.7	40.7	40.7	40.7	40.7	40.7	40.7
La Plata River ditches	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Farmers Mutual Ditch	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Jewett Valley Ditch	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Chaco River drainage irrigation	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Non-Navajo Irrigation Subtotal	86.5	86.5	86.5	86.5	86.5	86.5	86.5
Irrigation Total	263.4	328.4	369.2	389.2	389.2	389.2	389.2
STOCKPOND EVAPORATION AND STOCK USE	4.0	4.0	4.0	4.0	4.0	4.0	4.0
MUNICIPAL AND DOMESTIC USES (1)							
Current Municipal and Industrial Uses	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Animas-La Plata Project:							
San Juan Water Commission	1.0	5.0	10.4	10.4	10.4	10.4	10.4
Navajo Nation	0.0	1.0	2.0	2.3	2.3	2.3	2.3
La Plata Conservancy District	0.0	0.0	0.8	0.8	0.8	0.8	0.8
Ridges Basin Reservoir Evaporation - NM share	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Animas-La Plata Project Subtotal	1.0	6.0	13.3	13.6	13.6	13.6	13.6
Navajo-Gallup Water Supply Project: (2)							
Navajo Nation	0.0	0.0	7.9	10.2	12.5	12.5	12.5
Jicarilla Apache Nation	0.0	0.0	0.8	1.0	1.2	1.2	1.2
Navajo-Gallup Project Subtotal (within Basin)	0.0	0.0	8.7	11.2	13.7	13.7	13.7
Navajo Nation Municipal Use, Future (exc. NGWSP)	0.0	0.0	1.0	1.0	2.0	2.0	2.0
Jicarilla Apache Nation Municipal Use (exc. NGWSP)	0.0	0.0	0.0	0.4	0.6	0.6	0.6
Scattered Rural Domestic (including Jicarilla)	1.0	1.0	1.0	1.1	1.1	1.2	1.2
Municipal and Domestic Total	11.7	16.7	33.7	37.0	40.7	40.8	40.8
POWER AND INDUSTRIAL USES							
PNM - Navajo Reservoir contract (3)	16.2	16.2	16.2	16.2	16.2	16.2	16.2
BHP Billiton	37.0	37.0	38.0	39.0	39.0	39.0	39.0
Bloomfield Industrial	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Navajo Nation - Shiprock	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Navajo-Gallup Water Supply Project - NAPI (2)	0.0	0.0	0.7	0.7	0.7	0.7	0.7
Small Navajo Reservoir Contracts	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Power and Industrial Total	56.1	56.1	57.8	58.8	58.8	58.8	58.8
EXPORTS							
San Juan-Chama Project	105.2	105.2	105.2	105.2	105.2	105.2	105.2
Navajo-Gallup Water Supply Project: (2)							
Navajo Nation in New Mexico	0.0	0.0	4.0	5.8	7.6	7.6	7.6
City of Gallup	0.0	0.0	4.7	6.1	7.5	7.5	7.5
Navajo-Gallup Project Subtotal (Export)	0.0	0.0	8.7	11.9	15.1	15.1	15.1
Export Total	105.2	105.2	113.9	117.1	120.3	120.3	120.3
RESERVOIR EVAPORATION							
Navajo Reservoir Evaporation	28.3	28.0	27.7	27.7	27.7	27.7	27.7
Small Reservoir Evaporation	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Reservoir Evaporation Total	29.5	29.2	28.9	28.9	28.9	28.9	28.9
TOTAL DEPLETIONS (4)							
State Share of Upper Basin Yield (5)	642.4	642.4	642.4	642.4	642.4	642.4	642.4
Remaining Available (5,6)	172.5	102.8	34.9	7.4	0.5	0.4	0.4
Percent of State Share Remaining	26.9%	16.0%	5.4%	1.2%	0.1%	0.1%	0.1%

NOTES:

- (1) Does not reflect post-1965 transfers from irrigation to municipal and industrial uses.
- (2) Proposed Navajo-Gallup Water Supply Project depletions in New Mexico total 29,500 acre-feet per year. Exports to Gallup are anticipated to be supplied through a subcontract with the Jicarilla Apache Nation. Exports for Navajo Nation uses in Arizona are not included.
- (3) Supplied through a subcontract with the Jicarilla Apache Nation.
- (4) This is a schedule of anticipated depletions for planning purposes only. It is not a tabulation or determination of water rights or actual uses. Total depletions exclude New Mexico's share of reservoir evaporation from the major reservoirs constructed under the Colorado River Storage Project (CRSP) Act that are used principally to regulate compact deliveries at Lee Ferry and generate CRSP hydroelectric power. These include Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit.
- (5) This depletion schedule does not attempt to interpret the Colorado River Compact, the Upper Colorado River Basin Compact, or any other element of the "Law of the River." This schedule should not be construed as an acceptance of any assumption that limits the Upper Colorado River Basin's depletion or New Mexico's depletion. Of the water available to the Upper Basin at Lee Ferry, the allocation for use by New Mexico is listed in this schedule, for planning purposes, as 642,400 acre-feet. This amount does not include New Mexico's share of CRSP reservoir evaporation other than Navajo Reservoir evaporation.
- (6) Reserved.

PRESENTATION TO THE
UPPER COLORADO RIVER COMMISSION ON THE
DRAFT HYDROLOGIC DETERMINATION

Estevan Lopez, State of New Mexico
June 5, 2006

The State of New Mexico has proposed the Navajo-Gallup Water Supply Project to provide a needed renewable water supply from the San Juan River for municipal and domestic uses for Indian and non-Indian communities located within New Mexico. Uses under the project by the Jicarilla Apache Nation and the City of Gallup would be supplied through the Jicarilla Apache Nation's Navajo Reservoir water supply contract approved by Congress in 1992. Uses in New Mexico under the project by the Navajo Nation would be supplied through a proposed new Navajo Reservoir water supply contract that is a component of the San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement Agreement (hereinafter referred to as the Settlement Agreement) that the State of New Mexico and the Navajo Nation executed on April 19, 2005. The new contract also would supersede the existing Navajo Reservoir water supply contract for the Navajo Indian Irrigation Project (NIIP).

The Upper Colorado River Commission on June 19, 2003, resolved that the States of the Upper Division consent to the Navajo-Gallup Water Supply Project provided that water diverted by the project for use in New Mexico shall be a part of the consumptive use apportionment made to the State of New Mexico by Article III(a) of the Upper Colorado River Basin Compact. The maximum amount of consumptive use through the project by the Navajo Nation in New Mexico that would be permitted in any one year under the Settlement Agreement and the proposed contract is 20,780 acre-feet.

Public Law 87-483 requires that no long-term contract, except contracts for the NIIP and the San Juan-Chama Project, shall be entered into for the delivery of water stored in Navajo Reservoir, or any other waters of the San Juan River and its tributaries to which the United States is entitled, until the Secretary of the Interior has determined by hydrologic investigation that sufficient water to fulfill such contract is reasonably likely to be available for use in the State of New Mexico under the allocations made in Articles III and XIV of the Upper Colorado River Basin Compact, has submitted such determination to Congress, and Congress has approved the contract. The last such determination approved by the Secretary was the 1988 Hydrologic Determination.

The Bureau of Reclamation has prepared a draft hydrologic determination for the purpose of contracting for water from the Navajo Reservoir water supply for the Navajo Nation's uses in New Mexico under the Navajo-Gallup Water Supply Project. The Bureau of Reclamation prepared the hydrologic investigation in consultation with the Upper Colorado River Commission because of the critical nature of this determination of the Upper Basin water supply. The Upper Colorado River Basin Compact created and defines several areas of responsibility for the Commission that directly and indirectly relate to this investigation. The Engineering Committee has reviewed the contents both of the draft hydrologic determination report and of a proposed resolution drafted for the Commission's consideration that would support the findings of the draft determination, and their comments have been addressed. The Bureau of Reclamation agreed that it would append the resolution, if adopted, to the report. New Mexico for use in this investigation provided to the Bureau of Reclamation a preliminary revised schedule of anticipated depletions through 2060 from the Upper Basin in New Mexico that includes irrigation depletions calculated using the modified Blaney-Criddle method so that demands and supply for the hydrologic investigation are evaluated using consistent methodologies.

The draft hydrologic determination considers and uses many of the same basic assumptions as the 1988 Hydrologic Determination, without relying on a critical compact interpretation regarding obligations of the Upper Basin under Article III(c) of the Colorado River Compact. The draft determination concludes that depletions by the Upper Basin states from the Upper Colorado River Basin can be reasonably allowed to rise to an annual average of 5.76 million acre-feet (maf) per year, exclusive of Colorado River Storage Project (CRSP) reservoir evaporation from Lake Powell, Flaming Gorge Reservoir and the Aspinall Unit, and that sufficient water is reasonably likely to be available from the Navajo Reservoir water supply through at least 2060 to fulfill the contract that is proposed by the Settlement Agreement to provide water for the Navajo Nation's uses in New Mexico under both the Navajo-Gallup Water Supply Project and the NIIP. These conclusions are reached under the same shortage criteria upon which the allowable Upper Basin yield was determined in the 1988 Hydrologic Determination, though the computations of shortage in this analysis give conservatively large estimates of annual shortages at Lee Ferry and do not fully reflect all factors, including physical shortages in the Upper Basin, that might contribute or relate to a shortage condition at any given time. The computed shortages in the draft hydrologic determination do not equate to administrative calls to curtail Upper Basin uses.

Under the conditions assumed in the draft hydrologic determination, the shared CRSP evaporation averages about 0.25 maf per year for the 1953-1977 period to about 0.5 maf per year over the 1906-2000 period of record used in the analysis. Thus, with Upper Basin uses by the states averaging 5.76 maf per year, the total Upper Basin depletion, including both Upper Basin uses and CRSP reservoir evaporation, would average about 6.0 maf per year during the most critical reservoir draw down period 1953-1977. This result is consistent with the total Upper Basin depletion of 6.0 maf per year determined to be available for the same period by the 1988 Hydrologic Determination. The result of the current draft hydrologic determination essentially is to refine the 1988 Hydrologic Determination by deducting the critical period evaporation, rather than the long-term average evaporation, from the critical period total depletion to determine the availability of water for use by the states during the period. This refinement makes more of the critical period yield available for use by the states.

The draft hydrologic determination would provide for the continuation of Upper Basin water development, provide a mechanism for resolving certain long-standing disputes within the Upper Basin as to procedures for accounting consumptive uses in the basin, and assist in moving forward the Navajo Nation water rights settlement. In addition, under the settlement, the Navajo Nation would agree that its rights to the use of water in the San Juan River Basin in New Mexico, and its exercise of these rights, are subject to both the Upper Colorado River Basin Compact and New Mexico state water law.

New Mexico would appreciate your continued support of its right to develop its compact allocation, and more specifically, your support of the hydrologic determination update, through approval of the proposed Upper Colorado River Commission resolution on this subject.