

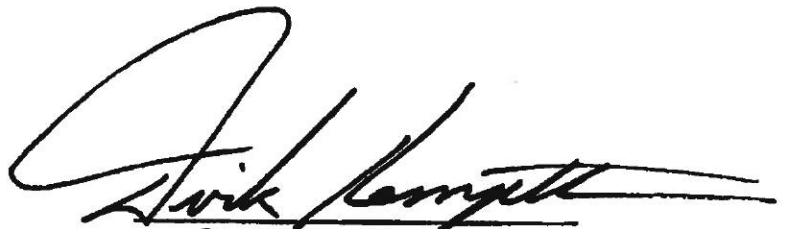
**HYDROLOGIC DETERMINATION  
2007**

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

**April 2007**

**MAY 29 2007**

**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. Implementation of the Navajo-Gallup Water Supply Project and the NIIP is subject to compliance with federal environmental laws including the National Environmental Policy Act and the Endangered Species Act.

## **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 NIIP.

On June 19, 2003, the Upper Colorado River Commission 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 this 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 defined 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.

Neither the Lower Division states nor the Upper Colorado River Commission agree with the modeling assumption for the objective minimum release used in this report. 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 these 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 reservoirs 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>	Minimum Lower Basin Delivery (maf)	Yield without Shortages (maf)	Yield with 6% Overall Shortages (maf)
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**

For use in this investigation, the New Mexico Interstate Stream Commission provided the Bureau of Reclamation with 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 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 based on the analysis performed by Reclamation in consultation with the Upper Colorado River Commission, 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 upon 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). Implementation of the Navajo-Gallup Water Supply Project and the NIIP is subject to compliance with federal environmental laws including the National Environmental Policy Act and the Endangered Species Act.

**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.

---

## **List of Appendices**

**APPENDIX A - Mass Balance Analysis**

**APPENDIX B - Reservoir Storage**

**APPENDIX C - CRSP Evaporation Analysis**

**APPENDIX D - New Mexico Depletion Schedule**

**APPENDIX E - Upper Colorado River Commission Resolution**



---

**APPENDIX A**

**Mass Balance Analysis**

Upper Basin Yield Mass Balance Analysis

Run 1 - Maintain CRSP Minimum Power Pools, 8.25 mcf Lower Basin Delivery, No Shortage

CY	CR Natural Flow at Lee Ferry (mcf)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Users (subtotals)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables	
												Storage	Shortage
1906	16,560,021	29,530,030	24,847,704	8,250,000	5,550,000	748,290	33,530,711	4,000,731	0	29,530,030	24,847,704	Storage	30,167,576 of
1907	21,261,694	29,530,030	24,847,704	8,250,000	5,550,000	748,290	26,182,434	6,632,404	0	29,530,030	24,847,704	Redistribution Rate (Active)	24,292 mcf
1908	12,218,817	29,530,030	24,847,704	8,250,000	5,550,000	725,218	27,223,639	0	0	27,223,639	22,907,009	Bank Storage	4%
1909	22,356,301	27,223,639	22,907,008	8,250,000	5,550,000	725,218	25,054,712	5,524,682	0	29,530,030	24,847,704	Adjusted Storage (2006)	29,530,030 of
1910	14,650,616	29,530,030	24,847,704	8,250,000	5,550,000	748,290	29,631,256	191,226	0	29,530,030	24,847,704	UB Demand Level	3,550,000 mcf
1911	15,499,729	29,530,030	24,847,704	8,250,000	5,550,000	748,290	30,489,488	960,439	0	29,530,030	24,847,704	LB Delivery	8,250,000 mcf
1912	18,823,410	29,530,030	24,847,704	8,250,000	5,550,000	748,290	33,604,150	4,074,120	0	29,530,030	24,847,704		
1913	14,536,378	29,530,030	24,847,704	8,250,000	5,550,000	748,290	29,917,247	0	0	29,530,030	24,847,704		
1914	21,354,814	29,517,747	24,836,947	8,250,000	5,550,000	749,157	28,322,908	6,792,873	0	29,530,030	24,847,704		
1915	13,873,277	29,530,030	24,847,704	8,250,000	5,550,000	726,725	28,613,582	0	0	28,613,582	24,678,568		
1916	20,142,862	28,613,582	24,078,586	8,250,000	5,550,000	726,725	34,216,748	4,665,710	0	28,630,030	24,847,704		
1917	18,282,804	29,530,030	24,847,704	8,250,000	5,550,000	748,290	29,823,644	8,323,514	0	29,530,030	24,847,704		
1918	15,865,930	29,530,030	24,847,704	8,250,000	5,550,000	748,290	30,844,670	1,316,649	0	29,530,030	24,847,704		
1919	12,681,289	29,530,030	24,847,704	8,250,000	5,550,000	729,886	27,651,713	0	0	27,651,713	23,287,218		
1920	22,287,632	27,651,713	23,287,218	8,250,000	5,550,000	729,886	25,406,695	5,879,829	0	29,530,030	24,847,704		
1921	22,526,781	29,530,030	24,847,704	8,250,000	5,550,000	748,290	27,507,521	7,977,491	0	29,530,030	24,847,704		
1922	16,447,198	29,530,030	24,847,704	8,250,000	5,550,000	749,290	33,437,835	3,867,598	0	29,530,030	24,847,704		
1923	18,024,048	29,530,030	24,847,704	8,250,000	5,550,000	748,290	34,004,798	4,474,756	0	29,530,030	24,847,704		
1924	13,877,798	29,530,030	24,847,704	8,250,000	5,550,000	748,290	29,343,337	0	0	29,530,030	24,847,704		
1925	14,438,701	28,365,474	24,288,951	8,250,000	5,550,000	748,290	28,085,474	0	0	28,365,474	24,288,951		
1926	18,213,131	28,711,813	24,201,131	8,250,000	5,550,000	740,284	29,438,268	0	0	28,711,813	24,201,131		
1927	18,958,212	29,438,268	24,787,982	8,250,000	5,550,000	748,290	34,426,187	4,886,164	0	29,530,030	24,847,704		
1928	18,954,334	29,530,030	24,847,704	8,250,000	5,550,000	748,290	31,933,074	2,405,044	0	29,530,030	24,847,704		
1929	21,829,589	28,530,030	24,847,704	8,250,000	5,550,000	748,290	36,810,332	7,280,298	0	29,530,030	24,847,704		
1930	14,821,041	29,530,030	24,847,704	8,250,000	5,550,000	748,290	28,801,781	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	688,538	23,517,626	0	0	23,517,626	19,768,636		
1932	17,422,187	29,530,030	24,847,704	8,250,000	5,550,000	684,754	26,485,035	0	0	26,485,035	22,288,545		
1933	12,183,520	26,485,035	22,288,545	8,250,000	5,550,000	681,949	24,208,607	0	0	24,208,607	20,368,371		
1934	6,178,182	24,208,607	20,368,371	8,250,000	5,550,000	592,849	18,031,950	0	0	18,031,950	13,488,900		
1935	12,630,348	18,031,950	13,488,900	8,250,000	5,550,000	450,818	14,411,851	0	0	14,411,851	10,226,543		
1936	14,848,873	14,411,851	12,126,343	8,250,000	5,550,000	637,998	14,822,358	0	0	14,822,358	12,472,271		
1937	14,308,056	14,822,358	12,472,271	8,250,000	5,550,000	542,943	14,885,871	0	0	14,885,871	12,325,375		
1938	18,148,319	14,885,871	12,528,376	8,250,000	5,550,000	483,935	18,750,855	0	0	18,750,855	15,777,018		
1939	11,184,059	18,750,855	15,777,018	8,250,000	5,550,000	481,825	15,822,480	0	0	15,822,480	13,148,264		
1940	8,891,857	15,822,480	13,148,264	8,250,000	5,550,000	414,294	11,239,882	0	0	11,239,882	9,341,787		
1941	20,116,578	11,239,882	9,341,787	8,250,000	5,550,000	413,015	17,225,825	0	0	17,225,825	14,484,220		
1942	17,225,136	17,225,825	14,484,220	8,250,000	5,550,000	622,737	20,727,825	0	0	20,127,825	16,906,410		
1943	13,731,401	20,127,825	16,906,410	8,250,000	5,550,000	548,608	19,512,717	0	0	19,512,717	16,418,781		
1944	15,366,422	19,512,717	16,418,781	8,250,000	5,550,000	560,819	20,331,321	0	0	20,331,321	17,278,843		
1945	14,140,328	20,331,321	17,278,843	8,250,000	5,550,000	566,168	20,512,681	0	0	20,512,681	17,081,871		
1946	11,995,453	20,512,681	17,081,871	8,250,000	5,550,000	823,198	17,084,398	0	0	17,084,398	14,378,823		
1947	16,438,488	17,084,398	14,378,823	8,250,000	5,550,000	511,717	19,121,786	0	0	19,121,786	16,484,309		
1948	15,126,294	18,212,705	16,168,294	8,250,000	5,550,000	577,243	22,566,096	0	0	22,566,096	18,987,982		
1949	16,933,834	20,026,765	18,026,765	8,250,000	5,550,000	542,944	20,026,765	0	0	20,026,765	18,838,979		
1950	13,140,118	22,566,096	18,987,982	8,250,000	5,550,000	580,573	21,315,839	0	0	21,315,839	17,925,799		
1951	12,508,864	21,315,839	17,925,799	8,250,000	5,550,000	568,488	18,483,047	0	0	18,483,047	16,378,957		
1952	20,808,422	18,483,047	16,378,957	8,250,000	5,550,000	608,842	20,808,422	0	0	20,808,422	17,781,725		
1953	11,146,418	20,808,422	17,781,725	8,250,000	5,550,000	638,572	22,588,374	0	0	22,588,374	18,007,568		
1954	8,496,102	22,588,374	18,007,568	8,250,000	5,550,000	543,381	16,742,084	0	0	16,742,084	14,087,442		
1955	8,413,808	16,742,084	14,087,442	8,250,000	5,550,000	432,065	11,823,937	0	0	11,823,937	10,033,298		
1956	11,428,874	11,823,937	10,033,298	8,250,000	5,550,000	383,322	9,197,489	0	0	9,197,489	7,730,121		
1957	21,500,863	9,197,489	7,730,121	8,250,000	5,550,000	481,055	16,487,287	0	0	16,487,287	13,881,544		
1958	15,882,511	16,487,287	13,881,544	8,250,000	5,550,000	483,820	18,056,288	0	0	18,056,288	15,291,570		
1959	9,696,188	18,056,288	15,291,570	8,250,000	5,550,000	481,325	13,402,132	0	0	13,402,132	11,277,911		
1960	11,374,160	13,402,132	11,277,911	8,250,000	5,550,000	384,885	10,742,407	0	0	10,742,407	9,036,073		
1961	10,010,259	10,742,407	9,036,073	8,250,000	5,550,000	314,281	8,638,386	0	0	8,638,386	7,385,793		
1962	17,377,600	8,638,386	7,385,793	8,250,000	5,550,000	305,587	9,910,398	0	0	9,910,398	8,338,960		
1963	8,840,900	9,910,398	8,338,960	8,250,000	5,550,000	285,014	4,666,284	0	0	4,666,284	3,826,391		
1964	10,863,586	4,666,284	3,826,391	8,250,000	5,550,000	197,571	1,530,298	0	0	1,530,298	1,289,335		
1965	18,875,027	1,530,298	1,289,335	8,250,000	5,550,000	225,909	7,381,417	0	0	7,381,417	6,211,038		
1966	10,679,844	7,381,417	6,211,038	8,250,000	5,550,000	291,764	4,906,487	0	0	4,906,487	4,373,745		
1967	11,670,830	4,906,487	4,373,745	8,250,000	5,550,000	182,241	1,887,986	0	0	1,887,986	1,620,326		
1968	13,739,932	1,887,986	1,620,326	8,250,000	5,550,000	189,918	2,577,407	0	0	2,577,407	2,200,168		
1969	13,272,159	1,620,326	1,420,326	8,250,000	5,550,000	204,417	4,987,125	0	0	4,987,125	4,447,470		
1970	15,344,138	2,577,407	2,200,168	8,250,000	5,550,000	233,838	8,557,146	0	0	8,557,146	7,804,534		
1971	15,493,659	4,987,125	4,447,470	8,250,000	5,550,000	239,870	4,703,612	0	0	4,703,612	4,057,9		

Upper Basin Yield Mass Balance Analysis

Run 2 - Maintain CRSP Minimum Power Pools, 0.26 mcf Lower Basin Delivery, 6% Overall Shortage

CY	CR Natural Flow of Lee Ferry (Mcf)	Total Carry-Over Storage (Mcf)	CRSP Carry-Over Storage (Mcf)	Lower Basin Delivery (Mcf)	Upper Basin Use (Mcf)	Shared CRSP Evap (Mcf)	Net Available to Store (subtotal)	Spill to LC (Mcf)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables
1904	14,550,021	29,530,030	24,847,704	8,250,000	3,790,000	748,290	33,293,781	3,760,731	0	29,530,030	24,847,704	Storage
1907	21,291,804	29,530,030	24,847,704	8,250,000	3,790,000	748,290	35,841,434	4,142,404	0	29,530,030	24,847,704	Sedimentation Rate (Active)
1908	22,236,301	29,530,030	24,847,704	8,250,000	3,790,000	722,736	35,886,180	0	0	29,530,030	24,847,704	Bank Storage
1910	14,650,616	29,530,030	24,847,704	8,250,000	3,790,000	747,858	29,382,789	0	0	29,530,030	24,847,704	Adjusted Storage (2005)
1911	15,496,729	29,530,030	24,847,704	8,250,000	3,790,000	747,858	36,104,660	574,629	0	29,530,030	24,847,704	US Demand Limit
1912	16,822,410	29,530,030	24,847,704	8,250,000	3,790,000	748,290	33,284,150	3,834,120	0	29,530,030	24,847,704	LS Delivery
1913	14,536,373	29,530,030	24,847,704	8,250,000	3,790,000	748,678	29,278,726	0	0	29,530,030	24,847,704	
1914	21,254,814	29,530,030	24,847,704	8,250,000	3,790,000	748,678	35,847,862	5,317,832	0	29,530,030	24,847,704	
1915	13,923,277	29,530,030	24,847,704	8,250,000	3,790,000	737,246	26,376,061	0	0	29,530,030	24,847,704	
1916	20,142,892	29,530,030	24,847,704	8,250,000	3,790,000	737,246	33,741,707	4,211,677	0	29,530,030	24,847,704	Needs
1917	22,942,804	29,530,030	24,847,704	8,250,000	3,790,000	748,290	37,683,344	6,153,514	0	29,530,030	24,847,704	Average CRSP Evap
1918	15,888,938	29,530,030	24,847,704	8,250,000	3,790,000	748,290	30,689,879	1,078,649	0	29,530,030	24,847,704	Total Yield of CRSP evap
1919	12,451,289	29,530,030	24,847,704	8,250,000	3,790,000	727,207	27,414,399	0	0	29,530,030	24,847,704	
1920	22,287,832	27,414,182	23,067,256	8,250,000	3,790,000	727,207	34,924,817	5,404,587	0	29,530,030	24,847,704	Storage Years
1921	22,538,781	29,530,030	24,847,704	8,250,000	3,790,000	748,290	37,267,921	7,737,481	0	29,530,030	24,847,704	Shortage
1922	18,447,198	29,530,030	24,847,704	8,250,000	3,790,000	749,280	33,187,338	3,657,908	0	29,530,030	24,847,704	1923
1923	18,024,048	29,530,030	24,847,704	8,250,000	3,790,000	749,280	33,764,788	4,234,756	0	29,530,030	24,847,704	1924
1924	13,777,768	29,530,030	24,847,704	8,250,000	3,790,000	738,875	28,627,953	0	0	29,530,030	24,847,704	1925
1925	14,436,701	28,827,963	24,088,682	8,250,000	3,790,000	738,875	29,201,704	0	0	28,201,704	23,806,729	1926
1926	16,213,731	28,201,704	23,806,729	8,250,000	3,790,000	728,002	28,737,342	0	0	28,737,342	24,180,706	1927
1927	16,530,212	28,737,342	24,180,706	8,250,000	3,790,000	741,017	33,085,437	3,943,507	0	29,530,030	24,847,704	MM allocation (two evap)
1928	16,954,234	29,530,030	24,847,704	8,250,000	3,790,000	748,290	31,895,674	2,183,044	0	29,530,030	24,847,704	
1929	21,829,585	29,530,030	24,847,704	8,250,000	3,790,000	748,290	36,370,325	7,040,295	0	29,530,030	24,847,704	Note: MM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against NM's allocation. Utah CRSP evaporation is already removed from UC scenarios.
1930	14,821,041	29,530,030	24,847,704	8,250,000	3,790,000	747,552	28,363,319	0	0	29,530,030	24,847,704	
1931	8,474,124	29,530,030	24,847,704	8,250,000	3,790,000	690,819	23,117,034	0	0	29,530,030	24,847,704	
1932	17,422,189	29,530,030	24,847,704	8,250,000	3,790,000	748,290	35,856,211	0	0	29,530,030	24,847,704	
1933	12,162,500	28,855,218	21,736,575	8,250,000	3,790,000	646,458	21,352,290	0	0	23,352,290	19,449,490	
1934	8,178,192	23,352,290	19,449,490	8,250,000	3,790,000	532,730	14,857,731	0	0	14,857,731	12,568,811	
1935	12,830,348	14,857,731	12,568,811	8,250,000	3,790,000	425,948	13,122,133	0	0	13,122,133	11,041,468	Total Upper Basin depletion, inc. CRSP evap:
1936	14,848,873	13,122,133	11,041,468	8,250,000	3,790,000	406,877	13,222,130	0	0	13,222,130	11,041,468	1933-1977
1937	14,208,054	13,222,130	11,041,468	8,250,000	3,790,000	406,877	13,178,718	0	0	13,178,718	11,041,468	1931-1977
1938	18,148,319	13,178,718	11,041,468	8,250,000	3,790,000	446,102	16,840,844	0	0	16,840,844	14,170,333	1908-2000
1939	11,184,059	16,840,844	14,170,333	8,250,000	3,790,000	448,704	13,515,159	0	0	13,515,159	11,372,209	
1940	8,031,857	13,515,159	11,372,209	8,250,000	3,790,000	388,272	9,808,585	0	0	9,808,585	7,605,413	
1941	20,116,078	9,808,585	7,605,413	8,250,000	3,790,000	390,285	14,734,268	0	0	14,734,268	12,397,890	
1942	17,225,126	14,734,268	12,397,890	8,250,000	3,790,000	489,782	17,460,512	0	0	17,460,512	14,851,818	
1943	12,711,451	17,460,512	14,851,818	8,250,000	3,790,000	489,820	14,853,183	0	0	14,853,183	14,012,837	
1944	15,380,422	14,853,183	14,012,837	8,250,000	3,790,000	485,266	17,493,349	0	0	17,493,349	14,719,877	
1945	14,740,528	17,493,349	14,719,877	8,250,000	3,790,000	493,929	17,098,944	0	0	17,098,944	14,388,554	
1946	11,095,453	17,098,944	14,388,554	8,250,000	3,790,000	454,348	13,701,053	0	0	13,701,053	11,528,593	
1947	16,438,484	13,701,053	11,528,593	8,250,000	3,790,000	438,332	15,881,207	0	0	15,881,207	13,177,542	
1948	15,138,284	15,881,207	13,177,542	8,250,000	3,790,000	468,398	18,794,106	0	0	18,794,106	13,710,487	
1949	18,923,584	18,794,106	13,710,487	8,250,000	3,790,000	498,004	16,688,684	0	0	16,688,684	15,726,220	
1950	12,140,418	16,688,684	15,726,220	8,250,000	3,790,000	508,313	17,281,788	0	0	17,281,788	14,541,381	
1951	22,505,894	17,281,788	14,541,381	8,250,000	3,790,000	472,674	16,278,098	0	0	16,278,098	12,653,979	
1952	20,805,822	16,278,098	12,653,979	8,250,000	3,790,000	518,045	21,523,464	0	0	21,523,464	18,110,889	
1953	11,165,410	21,523,464	18,110,889	8,250,000	3,790,000	444,453	18,102,448	0	0	18,102,448	15,228,098	
1954	8,406,182	18,102,448	15,228,098	8,250,000	3,790,000	448,209	12,110,342	0	0	12,110,342	10,190,108	
1955	8,413,806	12,110,342	10,190,108	8,250,000	3,790,000	333,901	7,150,349	0	0	7,150,349	6,016,879	
1956	11,426,874	7,150,349	6,016,879	8,250,000	3,790,000	232,228	4,284,996	0	0	4,284,996	3,605,890	
1957	21,500,863	4,284,996	3,605,890	8,250,000	3,790,000	297,061	11,448,867	0	0	11,448,867	9,833,517	
1958	18,882,811	11,448,867	9,833,517	8,250,000	3,790,000	306,845	12,884,333	0	0	12,884,333	10,841,542	
1959	9,898,180	12,884,333	10,841,542	8,250,000	3,790,000	351,798	8,000,803	0	0	8,000,803	6,807,998	
1960	11,524,180	8,000,803	6,807,998	8,250,000	3,790,000	272,683	5,302,401	0	0	5,302,401	4,481,844	
1961	10,010,250	5,302,401	4,481,844	8,250,000	3,790,000	199,419	1,073,241	0	0	1,073,241	903,066	
1962	17,777,609	1,073,241	903,066	8,250,000	3,790,000	188,150	4,222,699	0	0	4,222,699	3,553,143	
1963	8,840,800	4,222,699	3,553,143	8,250,000	3,790,000	178,949	-1,153,249	0	1,153,249	0	0	
1964	10,883,586	0	0	8,250,000	3,790,000	130,379	-3,269,269	0	3,269,269	0	0	
1965	18,875,697	0	0	8,250,000	3,790,000	191,775	5,643,282	0	0	5,643,282	4,748,448	
1966	10,879,864	5,643,282	4,748,448	8,250,000	3,790,000	213,577	2,086,719	0	0	2,086,719	1,741,541	
1967	11,870,850	2,086,719	1,741,541	8,250,000	3,790,000	184,478	-433,829	0	433,829	0	0	
1968	13,728,932	0	0	8,250,000	3,790,000	132,876	-432,844	0	432,844	0	0	
1969	15,272,159	0	0	8,250,000	3,790,000	144,231	1,087,828	0	0	1,087,828	915,425	
1970	15,344,136	1,087,828	915,425	8,250,000	3,790,000	187,449	2,224,815	0	0	2,224,815	1,871,877	
1971	15,400,850	2,224,815	1,871,877	8,250,000	3,790,000	182,476	3,485,798	0	0	3,485,798	2,933,084	
1972	13,188,637	3,485,798	2,933,084	8,250,000	3,790,000	184,700	2,437,734	0	0	2,437,734	2,051,269	
1973	18,650,183	2,437,734	2,051,269	8,250,000	3,790,000	229,483	8,818,443	0	0	8,818,443	5,737,201	
1974	12,288,426	8,818,443	5,737,201	8,250,000	3,790,000	264,569	5,796,201	0	0	5,796,201	4,879,755	
1975	17,972,661	5,796,201	4,879,755	8,250,000	3,790,000	252,534						



Upper Basin Yield Mass Balance Analysis

Run 4 - Maintain CRSP Minimum Power Pools, 7.50 maf Lower Basin Delivery, 6% Overall Shortage

CY	CR Natural Flow at Low 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	18,520,021	29,530,030	24,847,704	7,500,000	6,570,000	749,290	32,268,711	3,730,751	0	29,530,030	24,847,704	Storage
1907	21,201,894	29,530,030	24,847,704	7,500,000	6,570,000	748,290	35,812,434	6,382,404	0	29,530,030	24,847,704	Sedimentation Rate (Active)
1908	22,218,171	29,530,030	24,847,704	7,500,000	6,570,000	722,429	26,954,418	0	0	29,530,030	24,847,704	Bank Storage
1909	22,356,304	28,896,418	22,682,188	7,500,000	6,570,000	722,429	24,538,290	4,960,290	0	29,530,030	24,847,704	Adjusted Storage (2080)
1910	14,650,616	29,530,030	24,847,704	7,500,000	6,570,000	747,548	29,263,968	0	0	29,530,030	24,847,704	UB Demand Level
1911	15,496,729	29,530,030	24,847,704	7,500,000	6,570,000	747,548	30,043,260	515,249	0	29,530,030	24,847,704	LB Delivery
1912	16,822,410	29,530,030	24,847,704	7,500,000	6,570,000	748,290	30,334,150	3,004,120	0	29,530,030	24,847,704	
1913	14,538,373	29,530,030	24,847,704	7,500,000	6,570,000	746,268	29,280,836	0	0	29,530,030	24,847,704	
1914	21,354,814	29,530,030	24,847,704	7,500,000	6,570,000	746,268	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	738,936	28,346,371	0	0	29,530,030	24,847,704	
1916	20,142,892	21,344,371	22,851,729	7,500,000	6,570,000	736,936	33,882,227	4,132,296	0	29,530,030	24,847,704	Results
1917	22,842,804	29,530,030	24,847,704	7,500,000	6,570,000	749,290	37,863,344	6,123,514	0	29,530,030	24,847,704	Average CRSP Evap
1918	15,888,929	29,530,030	24,847,704	7,500,000	6,570,000	749,290	30,576,979	1,048,649	0	29,530,030	24,847,704	Total Yield of CRSP evap
1919	12,451,369	29,530,030	24,847,704	7,500,000	6,570,000	726,897	27,384,592	0	0	29,530,030	24,847,704	
1920	22,287,632	27,384,592	23,042,374	7,500,000	6,570,000	726,897	24,875,237	5,345,207	0	29,530,030	24,847,704	Shortage Years
1921	22,826,781	29,530,030	24,847,704	7,500,000	6,570,000	749,290	27,237,821	7,707,491	0	29,530,030	24,847,704	1983
1922	18,447,168	29,530,030	24,847,704	7,500,000	6,570,000	749,290	31,137,538	3,027,908	0	29,530,030	24,847,704	1984
1923	18,024,046	29,530,030	24,847,704	7,500,000	6,570,000	749,290	33,734,768	4,264,756	0	29,530,030	24,847,704	1985
1924	13,877,798	24,830,030	24,847,704	7,500,000	6,570,000	739,565	28,888,263	0	0	29,530,030	24,847,704	1986
1925	14,430,701	28,588,263	24,863,679	7,500,000	6,570,000	726,027	24,232,027	0	0	29,530,030	24,847,704	1987
1926	15,713,731	28,232,027	23,736,279	7,500,000	6,570,000	726,568	24,650,969	0	0	29,530,030	24,847,704	1988
1927	19,538,212	29,530,030	24,847,704	7,500,000	6,570,000	749,290	33,379,206	3,845,175	0	29,530,030	24,847,704	1989
1928	16,954,334	29,530,030	24,847,704	7,500,000	6,570,000	749,290	31,885,674	2,135,044	0	29,530,030	24,847,704	1990
1929	21,829,283	29,530,030	24,847,704	7,500,000	6,570,000	749,290	36,340,259	7,010,295	0	29,530,030	24,847,704	Note: NM allocation is exclusive of its portion of CRSP evaporation. Monthly evaporation would be primarily charged against NM's allocation. Shared CRSP evaporation is already removed from UC demands.
1930	8,474,924	29,530,030	24,847,704	7,500,000	6,570,000	747,242	35,323,829	0	0	29,530,030	24,847,704	
1931	17,422,187	22,058,267	19,402,113	7,500,000	6,570,000	678,086	23,068,267	0	0	29,530,030	24,847,704	
1932	12,983,500	25,767,875	21,682,188	7,500,000	6,570,000	644,479	25,767,875	0	0	29,530,030	24,847,704	
1933	6,176,182	23,237,129	19,552,614	7,500,000	6,570,000	644,479	25,767,875	0	0	29,530,030	24,847,704	
1934	12,630,349	14,815,280	12,468,154	7,500,000	6,570,000	630,032	14,815,280	0	0	29,530,030	24,847,704	
1935	14,648,877	12,468,154	10,869,109	7,500,000	6,570,000	630,032	14,815,280	0	0	29,530,030	24,847,704	
1936	14,208,056	13,126,744	11,048,248	7,500,000	6,570,000	405,072	13,126,744	0	0	29,530,030	24,847,704	
1937	18,146,319	12,967,879	10,903,080	7,500,000	6,570,000	405,072	12,967,879	0	0	29,530,030	24,847,704	
1938	11,184,059	16,594,882	13,963,404	7,500,000	6,570,000	441,316	16,594,882	0	0	29,530,030	24,847,704	
1939	8,631,857	13,244,432	11,144,373	7,500,000	6,570,000	444,309	13,244,432	0	0	29,530,030	24,847,704	
1940	20,116,076	8,743,721	7,337,303	7,500,000	6,570,000	382,268	8,743,721	0	0	29,530,030	24,847,704	
1941	17,225,136	14,415,905	12,130,013	7,500,000	6,570,000	374,594	14,415,905	0	0	29,530,030	24,847,704	
1942	13,731,401	17,199,038	14,396,263	7,500,000	6,570,000	481,003	17,199,038	0	0	29,530,030	24,847,704	
1943	16,399,422	16,288,046	13,706,179	7,500,000	6,570,000	481,454	16,288,046	0	0	29,530,030	24,847,704	
1944	14,140,528	17,105,876	14,394,468	7,500,000	6,570,000	485,637	16,891,867	0	0	29,530,030	24,847,704	
1945	11,005,453	14,691,867	12,468,154	7,500,000	6,570,000	445,608	13,271,712	0	0	29,530,030	24,847,704	
1946	16,438,468	13,271,712	11,167,229	7,500,000	6,570,000	430,163	13,271,712	0	0	29,530,030	24,847,704	
1947	15,138,264	15,211,043	12,799,156	7,500,000	6,570,000	456,786	15,211,043	0	0	29,530,030	24,847,704	
1948	16,623,564	18,823,643	13,214,544	7,500,000	6,570,000	487,574	18,190,163	0	0	29,530,030	24,847,704	
1949	12,140,116	14,196,183	12,313,478	7,500,000	6,570,000	487,574	14,196,183	0	0	29,530,030	24,847,704	
1950	12,505,884	18,771,700	14,112,362	7,500,000	6,570,000	481,626	14,745,777	0	0	29,530,030	24,847,704	
1951	20,805,422	14,745,777	12,467,864	7,500,000	6,570,000	508,702	20,805,422	0	0	29,530,030	24,847,704	
1952	11,185,418	20,973,487	17,481,591	7,500,000	6,570,000	534,324	17,481,591	0	0	29,530,030	24,847,704	
1953	8,496,182	17,336,092	14,756,848	7,500,000	6,570,000	436,180	11,526,096	0	0	29,530,030	24,847,704	
1954	6,112,808	11,825,095	9,684,418	7,500,000	6,570,000	321,820	9,684,418	0	0	29,530,030	24,847,704	
1955	11,426,874	6,548,263	5,510,022	7,500,000	6,570,000	236,482	3,666,776	0	0	29,530,030	24,847,704	
1956	21,500,963	3,065,775	3,064,528	7,500,000	6,570,000	283,989	10,912,749	0	0	29,530,030	24,847,704	
1957	15,882,511	10,812,749	9,068,283	7,500,000	6,570,000	373,364	12,231,864	0	0	29,530,030	24,847,704	
1958	6,596,169	10,262,363	7,800,000	7,500,000	6,570,000	338,005	7,422,000	0	0	29,530,030	24,847,704	
1959	11,524,160	7,422,000	6,245,181	7,500,000	6,570,000	258,535	4,617,856	0	0	29,530,030	24,847,704	
1960	10,610,250	4,617,856	3,885,472	7,500,000	6,570,000	184,963	372,860	0	0	29,530,030	24,847,704	
1961	17,377,690	372,860	313,815	7,500,000	6,570,000	173,373	3,507,186	0	0	29,530,030	24,847,704	
1962	8,640,800	3,507,186	2,981,081	7,500,000	6,570,000	169,481	-1,891,286	0	1,891,286	29,530,030	24,847,704	
1963	10,823,588	0	0	7,500,000	6,570,000	130,876	-3,308,290	0	3,308,290	29,530,030	24,847,704	
1964	16,875,027	0	0	7,500,000	6,570,000	181,485	5,815,862	0	0	29,530,030	24,847,704	
1965	10,679,844	5,815,862	4,725,487	7,500,000	6,570,000	312,454	2,010,963	0	0	29,530,030	24,847,704	
1966	11,870,830	2,010,963	1,682,093	7,500,000	6,570,000	153,864	-4,420,863	0	4,420,863	29,530,030	24,847,704	
1967	12,799,832	0	0	7,500,000	6,570,000	132,876	-482,844	0	482,844	29,530,030	24,847,704	
1968	16,272,150	0	0	7,500,000	6,570,000	143,821	1,058,238	0	0	29,530,030	24,847,704	
1969	15,344,136	1,058,238	890,442	7,500,000	6,570,000	166,526	2,185,648	0	0	29,530,030	24,847,704	
1970	14,193,650	2,185,648	1,822,428	7,500,000	6,570,000	190,952	3,308,556	0	0	29,530,030	24,847,704	
1971	13,186,837	3,308,556	2,859,875	7,500,000	6,570,000	192,588	2,322,800	0	0	29,530,030	24,847,704	
1972	18,650,183	2,322,800	1,964,327	7,500,000	6,570,000	228,795	6,678,001	0	0	29,530,030	24,847,704	
1973	13,285,426	6,678,001	5,617,444	7,500,000	6,570,000	261,318	5,830,111	0	0	29,530,030	24,847,704	
1974	17,072,681	5,617,444	4,737,282	7,500,000	6,570,000	378,629	6,253,844	0	0	29,530,030	24,847,704	
1975	11,133,561	4,737,282	3,920,330	7,500,000	6,570,000	278,812	3,221,894	0	0	29,530,030	24,847,704	
1976	8,351,188	3,221,894	4,478,048	7,500,000	6,570,000	188,421	-3,280,240	0	3,280,240	29,530,030	24,847,704	
1977	16,238,439	0	0	7,500,000	6,570,000	144,379	1,121,328	0	0	29,530,030	24,847,704	
1978	17,927,078	1,121,328	943,530	7,500,000	6,570,000	193,450	4,683,298	0	0	29,530,030	24,847,704	
1979	8,915,200	4,683,298	3,940,708	7,500,000	6,570,000	268,064	8,272,290	0	0	29,530,030	24,847,704	
1980	17,489,400	3,940,708	3,248,797	7,500,000	6,570,000	228,123	6,158,572	0	0	2		



Upper Basin Yield Mass Balance Analysis

Run 5 - Use CRSP Minimum Power Pools, 0.25 mcf 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	
1908	18,500,021	33,833,580	29,151,263	8,250,000	5,720,000	725,380	37,686,221	3,854,631	0	33,833,580	29,151,263	Storage	35,233,298 of
1909	21,201,694	33,833,580	29,151,263	8,250,000	5,720,000	725,380	40,338,634	5,506,304	0	33,833,580	29,151,263	Sedimentation Rate (Active)	37,000 alyr
1910	12,218,817	33,833,580	29,151,263	8,250,000	5,720,000	699,302	31,385,105	0	0	31,385,105	27,038,807	Bank Storage	4%
1911	22,358,301	31,385,105	27,038,807	8,250,000	5,720,000	899,302	36,070,104	5,238,514	0	33,833,580	29,151,263	Adjusted Storage (2000)	33,833,580 of
1912	14,650,816	33,833,580	29,151,263	8,250,000	5,720,000	724,918	32,796,288	0	0	32,796,288	29,151,263	US Demand Level	5,720,000 alyr
1913	15,499,729	33,833,580	29,151,263	8,250,000	5,720,000	724,918	34,964,099	760,500	0	33,833,580	29,151,263	LB Delivery	0.250,000 alyr
1914	18,623,430	33,833,580	29,151,263	8,250,000	5,720,000	725,380	37,761,610	3,924,020	0	33,833,580	29,151,263		
1915	14,538,373	33,833,580	29,151,263	8,250,000	5,720,000	722,715	35,878,248	0	0	33,833,580	29,151,263		
1916	21,354,814	33,833,580	29,151,263	8,250,000	5,720,000	722,715	40,387,348	6,503,758	0	33,833,580	29,151,263		
1917	12,623,277	33,833,580	29,151,263	8,250,000	5,720,000	714,998	32,772,771	0	0	32,772,771	29,151,263		
1918	20,142,892	33,833,580	29,151,263	8,250,000	5,720,000	714,998	38,231,568	4,307,778	0	33,833,580	29,151,263	Results	
1919	22,042,804	33,833,580	29,151,263	8,250,000	5,720,000	725,380	43,681,004	8,247,414	0	33,833,580	29,151,263	Average CRSP Evap	463,436 alyr
1920	15,865,938	33,833,580	29,151,263	8,250,000	5,720,000	725,380	35,004,139	1,170,540	0	33,833,580	29,151,263	Total Yd of CRSP evap	6,183,436 alyr
1921	12,611,289	33,833,580	29,151,263	8,250,000	5,720,000	700,858	31,811,100	0	0	31,811,100	27,408,872	Shortage Years	
1922	22,267,832	31,811,100	27,408,872	8,250,000	5,720,000	700,858	38,424,874	5,591,284	0	33,833,580	29,151,263	Shortage	
1923	22,826,781	33,833,580	29,151,263	8,250,000	5,720,000	725,380	41,664,261	7,751,808	0	33,833,580	29,151,263	1963	0 of
1924	12,447,198	33,833,580	29,151,263	8,250,000	5,720,000	725,380	37,565,398	2,713,808	0	33,833,580	29,151,263	1964	0 of
1925	10,024,646	33,833,580	29,151,263	8,250,000	5,720,000	725,380	36,182,246	4,328,856	0	33,833,580	29,151,263	1965	0 of
1926	13,877,799	33,833,580	29,151,263	8,250,000	5,720,000	716,777	33,024,611	0	0	33,024,611	28,454,241	1966	0 of
1927	14,548,701	33,833,580	29,151,263	8,250,000	5,720,000	705,958	32,779,783	0	0	32,779,783	28,243,270	1967	0 of
1928	15,137,731	32,779,783	28,243,270	8,250,000	5,720,000	708,848	33,314,836	0	0	33,314,836	28,704,301	1968	0 of
1929	18,538,373	33,833,580	29,151,263	8,250,000	5,720,000	718,847	38,184,181	4,306,591	0	33,833,580	29,151,263	Nil allocation (two evap)	637,675 alyr
1930	18,854,324	33,833,580	29,151,263	8,250,000	5,720,000	725,380	38,259,280	2,258,844	0	33,833,580	29,151,263		
1931	21,829,885	33,833,580	29,151,263	8,250,000	5,720,000	725,380	40,967,783	7,134,195	0	33,833,580	29,151,263		
1932	14,821,841	33,833,580	29,151,263	8,250,000	5,720,000	714,608	33,740,026	0	0	33,740,026	29,067,379		
1933	8,474,134	33,740,026	29,067,379	8,250,000	5,720,000	648,207	27,802,832	0	0	27,802,832	23,783,399		
1934	17,422,187	27,802,832	23,783,399	8,250,000	5,720,000	622,911	30,435,198	0	0	30,435,198	26,223,124		
1935	12,183,500	30,435,198	26,223,124	8,250,000	5,720,000	627,333	29,021,294	0	0	29,021,294	24,143,247		
1936	6,178,192	28,021,294	24,143,247	8,250,000	5,720,000	513,222	19,718,234	0	0	19,718,234	16,987,674		
1937	12,620,248	19,718,234	16,987,674	8,250,000	5,720,000	406,222	17,070,391	0	0	17,070,391	15,443,417		
1938	14,848,873	17,070,391	15,443,417	8,250,000	5,720,000	390,704	16,258,860	0	0	16,258,860	15,731,708	Total Upper Basin depletion, net CRSP evap:	
1939	14,306,066	18,258,860	15,731,708	8,250,000	5,720,000	393,184	18,201,482	0	0	18,201,482	15,822,501	1933-1977	5,934,611 alyr
1940	18,148,219	18,201,482	15,822,501	8,250,000	5,720,000	430,434	21,847,237	0	0	21,847,237	18,398,263	1934-1977	6,050,021 alyr
1941	11,184,059	21,847,237	18,908,063	8,250,000	5,720,000	437,780	18,703,817	0	0	18,703,817	16,115,178	1969-2000	6,183,436 alyr
1942	9,831,887	18,703,817	16,115,178	8,250,000	5,720,000	356,461	14,308,812	0	0	14,308,812	12,329,575		
1943	20,114,676	14,308,812	12,329,575	8,250,000	5,720,000	371,180	20,084,330	0	0	20,084,330	17,304,832	Flow Adjustments:	
1944	17,225,136	20,084,330	17,304,832	8,250,000	5,720,000	482,377	22,877,060	0	0	22,877,060	19,711,064	1971	203,226 of
1945	13,731,401	22,877,060	19,711,064	8,250,000	5,720,000	484,411	22,154,080	0	0	22,154,080	19,088,114	1972	226,985 of
1946	15,268,422	22,154,080	19,088,114	8,250,000	5,720,000	486,433	23,067,088	0	0	23,067,088	19,874,731	1973	232,377 of
1947	14,140,328	23,067,088	19,874,731	8,250,000	5,720,000	482,723	22,744,874	0	0	22,744,874	19,567,146	1974	166,284 of
1948	11,085,453	22,744,874	19,567,146	8,250,000	5,720,000	453,850	18,148,680	0	0	18,148,680	16,728,248	1975	248,865 of
1949	16,438,486	18,148,680	16,728,248	8,250,000	5,720,000	440,631	21,445,923	0	0	21,445,923	18,477,981	1976	173,250 of
1950	15,139,284	21,445,923	18,477,981	8,250,000	5,720,000	480,680	22,148,127	0	0	22,148,127	19,081,292	1977	132,291 of
1951	16,933,884	22,148,127	19,081,292	8,250,000	5,720,000	502,742	24,806,989	0	0	24,806,989	21,201,241	1978	152,187 of
1952	13,140,818	24,806,989	21,201,241	8,250,000	5,720,000	514,620	23,282,756	0	0	23,282,756	20,241,267	1979	153,358 of
1953	12,805,884	23,282,756	20,241,267	8,250,000	5,720,000	479,627	21,318,023	0	0	21,318,023	18,368,623		
1954	20,805,422	21,318,023	18,368,623	8,250,000	5,720,000	558,102	27,621,343	0	0	27,621,343	23,804,778		
1955	11,165,418	27,621,343	23,804,778	8,250,000	5,720,000	557,478	24,264,285	0	0	24,264,285	20,908,004		
1956	8,498,102	24,264,285	20,908,004	8,250,000	5,720,000	458,520	18,333,856	0	0	18,333,856	15,796,502		
1957	9,413,938	18,333,856	15,796,502	8,250,000	5,720,000	343,218	13,434,547	0	0	13,434,547	11,575,301		
1958	11,426,874	13,434,547	11,575,301	8,250,000	5,720,000	261,206	10,830,214	0	0	10,830,214	9,159,980		
1959	21,500,963	10,830,214	9,159,980	8,250,000	5,720,000	308,243	17,852,934	0	0	17,852,934	16,382,216		
1960	15,802,511	17,852,934	16,382,216	8,250,000	5,720,000	401,813	19,244,432	0	0	19,244,432	16,667,301		
1961	9,598,189	19,244,432	16,667,301	8,250,000	5,720,000	388,448	14,606,162	0	0	14,606,162	12,864,768		
1962	11,324,180	14,606,162	12,864,768	8,250,000	5,720,000	388,914	11,875,398	0	0	11,875,398	10,239,205		
1963	10,010,259	11,875,398	10,239,205	8,250,000	5,720,000	213,250	7,708,263	0	0	7,708,263	6,834,601		
1964	17,277,639	7,708,263	6,834,601	8,250,000	5,720,000	203,683	10,904,789	0	0	10,904,789	9,356,444		
1965	8,840,920	10,904,789	9,356,444	8,250,000	5,720,000	180,871	5,598,018	0	0	5,598,018	4,820,707		
1966	10,863,586	5,598,018	4,820,707	8,250,000	5,720,000	90,114	2,294,489	0	0	2,294,489	2,068,556		
1967	18,875,027	2,294,489	2,068,556	8,250,000	5,720,000	117,896	8,185,821	0	0	8,185,821	7,052,982		
1968	10,676,844	8,185,821	7,052,982	8,250,000	5,720,000	142,760	4,732,904	0	0	4,732,904	4,095,136		
1969	11,876,830	4,732,904	4,095,136	8,250,000	5,720,000	80,877	2,372,656	0	0	2,372,656	2,044,471		
1970	13,736,832	2,372,656	2,044,471	8,250,000	5,720,000	32,501	2,080,259	0	0	2,080,259	1,800,982		
1971	15,172,159	2,080,259	1,800,982	8,250,000	5,720,000	82,717	3,329,701	0	0	3,329,701	2,848,894		
1972	15,344,136	3,329,701	2,848,894	8,250,000	5,720,000	89,287	4,514,280	0	0	4,514,280	3,975,871		
1973	16,493,689	4,514,280	3,975,871	8,250,000	5,720,000	119,224	6,011,885	0	0	6,011,885	5,185,564		
1974	18,658,193	6,011,885	5,185,564	8,250,000	5,720,000	123,831	9,115,190	0	0	9,115,190	7,825,317		
1975	13,285,426	8,331,006	7,335,427	8,250,000	5,720,000	200,863	8,745,780	0	0	8,745,780	7,535,427		
1976	17,072,851	8,745,780	7,535,427	8,250,000	5,720,000	221,897	11,826,544	0	0	11,826,544	10,017,313		
1977	11,213,561	11,826,544	10,017,313	8,250,000	5,720,000	221,823	8,748,183	0	0	8,748,183	7,537,487		
1978	6,551,188	8,748,183	7,537,487	8,250,000	5,720,000	100,584	228,786	0	0	228,786	187,124		



Upper Basin Yield Mass Balance Analysis

Run 5 - Use CRSP Minimum Power Pools, 8.25 mcf Lower Basin Delivery, 6% Overall Shortage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage (plus)	Lower Basin Delivery (minus)	Upper Basin Use (minus)	Shared CRSP Evap (minus)	Net Available to Storm (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables	
1906	18,560,021	33,833,560	29,151,263	8,250,000	5,980,000	725,390	37,429,221	3,664,631	0	33,833,560	29,151,263	Storage	
1907	21,201,484	33,833,560	29,151,263	8,250,000	5,980,000	725,390	40,078,894	8,248,304	0	33,833,560	29,151,263	Sedimentation Rate (Active)	
1908	12,218,817	33,833,560	29,151,263	8,250,000	5,980,000	725,390	696,563	31,122,844	0	31,122,844	26,818,249	Bank Storage	
1909	22,356,201	31,122,844	26,818,249	8,250,000	5,980,000	725,390	688,563	38,263,581	4,721,991	0	33,833,560	29,151,263	Adjusted Storage (2009)
1910	14,850,816	33,833,560	29,151,263	8,250,000	5,980,000	722,179	33,833,027	0	0	33,833,027	28,891,434	UB Demand Level	
1911	15,499,729	33,833,560	29,151,263	8,250,000	5,980,000	722,179	34,078,577	345,967	0	33,833,560	29,151,263	LB Delivery	
1912	16,823,410	33,833,560	29,151,263	8,250,000	5,980,000	725,290	37,501,810	3,688,020	0	33,833,560	29,151,263		
1913	14,536,373	33,833,560	29,151,263	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	36,822,825	5,989,235	0	33,833,560	29,151,263		
1918	12,623,277	33,833,560	29,151,263	8,250,000	5,980,000	711,258	32,515,509	0	0	32,515,509	28,615,566		
1916	20,142,992	32,515,509	28,615,566	8,250,000	5,980,000	711,258	37,717,844	2,883,454	0	33,833,560	29,151,263	Results	
1917	22,942,804	33,833,560	29,151,263	8,250,000	5,980,000	725,390	41,821,904	7,947,414	0	33,833,560	29,151,263	Average CRSP Evap	
1919	15,885,938	33,833,560	29,151,263	8,250,000	5,980,000	725,390	34,744,138	910,549	0	33,833,560	29,151,263	Total Yield w/ CRSP evap	
1920	12,851,269	33,833,560	29,151,263	8,250,000	5,980,000	701,120	38,919,351	0	0	31,353,639	27,187,813	Shortage Years	
1922	22,287,632	31,453,329	27,187,813	8,250,000	5,980,000	725,390	41,404,481	5,078,732	0	33,833,560	29,151,263	Shortage	
1921	22,529,781	33,833,560	29,151,263	8,250,000	5,980,000	725,390	41,404,481	0	0	33,833,560	29,151,263	1963	
1922	18,447,198	33,833,560	29,151,263	8,250,000	5,980,000	725,390	37,325,338	3,491,808	0	33,833,560	29,151,263	1964	
1923	19,024,046	33,833,560	29,151,263	8,250,000	5,980,000	725,390	37,842,248	4,068,056	0	33,833,560	29,151,263	1967	
1924	13,877,706	33,833,560	29,151,263	8,250,000	5,980,000	714,039	32,787,249	0	0	32,787,249	29,232,583	1968	
1925	14,430,701	32,787,249	28,232,583	8,250,000	5,980,000	807,400	32,270,851	0	0	32,270,851	27,804,623	1977	
1926	15,213,731	32,270,851	27,804,623	8,250,000	5,980,000	695,184	32,566,188	0	0	32,566,188	28,023,238		
1927	19,538,212	32,566,188	28,023,238	8,250,000	5,980,000	711,823	37,156,287	3,222,967	0	33,833,560	29,151,263	HM allocation (info evap)	
1928	16,954,204	33,833,560	29,151,263	8,250,000	5,980,000	725,390	38,823,824	1,998,944	0	33,833,560	29,151,263		
1929	21,829,885	33,833,560	29,151,263	8,250,000	5,980,000	725,390	40,787,785	8,874,195	0	33,833,560	29,151,263	Note: HM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against HM's allocation. UC CRSP evaporation is already removed from LB demand.	
1930	14,827,061	33,833,560	29,151,263	8,250,000	5,980,000	721,888	33,582,783	0	0	33,582,783	29,866,229		
1931	8,474,134	33,582,783	29,866,229	8,250,000	5,980,000	690,148	27,288,748	0	0	27,288,748	23,348,753		
1932	17,423,187	27,288,748	23,348,753	8,250,000	5,980,000	609,447	29,879,490	0	0	29,879,490	23,572,069		
1933	12,183,500	27,288,748	23,348,753	8,250,000	5,980,000	609,447	27,051,214	0	0	27,051,214	23,284,542		
1934	8,178,182	27,051,214	23,284,542	8,250,000	5,980,000	489,480	18,483,028	0	0	18,483,028	15,925,107		
1935	12,830,349	18,483,028	15,925,107	8,250,000	5,980,000	377,502	16,505,472	0	0	18,505,872	14,221,878	Total Upper Basin depletion, inc. CRSP evap:	
1936	14,844,873	18,505,872	14,221,878	8,250,000	5,980,000	357,112	16,547,834	0	0	18,567,834	14,274,792	1953-1977	
1937	14,208,054	18,567,834	14,274,792	8,250,000	5,980,000	354,802	16,268,848	0	0	18,288,888	14,034,823	1,108,607 mcf	
1938	18,148,319	18,288,888	14,034,823	8,250,000	5,980,000	389,402	19,817,805	0	0	18,817,805	17,075,182	6,268,233 mcf	
1939	11,184,056	19,817,805	17,075,182	8,250,000	5,980,000	390,177	16,361,847	0	0	18,281,887	14,097,246	4,400,850 mcf	
1940	8,031,857	16,361,847	14,097,246	8,250,000	5,980,000	304,384	11,758,969	0	0	11,758,969	10,131,803		
1941	20,116,878	11,758,969	10,131,803	8,250,000	5,980,000	314,703	17,330,926	0	0	17,330,926	14,932,457	Flow Adjustments:	
1942	17,225,136	17,330,926	14,932,457	8,250,000	5,980,000	401,831	19,924,440	0	0	19,924,440	17,187,040	1971	
1943	13,731,401	19,924,440	17,187,040	8,250,000	5,980,000	419,487	19,008,373	0	0	19,008,373	16,378,027	1972	
1944	15,368,422	19,008,373	16,378,027	8,250,000	5,980,000	417,381	19,728,415	0	0	19,728,415	16,998,143	1973	
1945	16,345,528	19,728,415	16,998,143	8,250,000	5,980,000	418,847	19,218,295	0	0	19,218,295	16,598,483	1974	
1946	11,096,453	19,218,295	16,598,483	8,250,000	5,980,000	378,848	15,707,903	0	0	18,707,903	13,634,041	1975	
1947	15,439,486	18,707,903	13,634,041	8,250,000	5,980,000	389,182	17,584,227	0	0	17,584,227	15,128,294	1976	
1948	15,139,294	17,584,227	15,128,294	8,250,000	5,980,000	384,448	18,063,073	0	0	18,063,073	15,580,505	1977	
1949	16,933,584	18,063,073	15,580,505	8,250,000	5,980,000	414,405	20,372,251	0	0	20,372,251	17,582,877	1978	
1950	13,140,616	20,372,251	17,582,877	8,250,000	5,980,000	422,876	18,558,981	0	0	18,558,981	16,249,903	1979	
1951	12,505,884	18,558,981	16,249,903	8,250,000	5,980,000	344,133	16,781,753	0	0	18,781,753	14,433,429	1980	
1952	20,805,422	16,781,753	14,433,429	8,250,000	5,980,000	427,143	22,909,031	0	0	22,909,031	19,730,831		
1953	11,188,418	22,909,031	19,730,831	8,250,000	5,980,000	456,126	18,386,324	0	0	19,386,324	16,898,228		
1954	8,498,478	18,386,324	16,898,228	8,250,000	5,980,000	328,837	13,295,866	0	0	13,295,866	11,438,824		
1955	9,413,008	13,295,866	11,438,824	8,250,000	5,980,000	290,203	8,243,183	0	0	8,243,183	7,192,598		
1956	11,870,830	8,243,183	7,192,598	8,250,000	5,980,000	149,098	5,298,958	0	0	5,298,958	4,848,728		
1957	21,600,063	5,298,958	4,848,728	8,250,000	5,980,000	193,021	12,368,901	0	0	12,368,901	10,657,133		
1958	15,882,511	12,368,901	10,657,133	8,250,000	5,980,000	282,741	13,718,671	0	0	13,718,671	11,820,185		
1959	8,898,168	13,718,671	11,820,185	8,250,000	5,980,000	245,190	8,841,860	0	0	8,841,860	7,616,029		
1960	11,524,180	8,841,860	7,616,029	8,250,000	5,980,000	182,732	5,973,878	0	0	5,973,878	5,146,447		
1961	10,810,259	5,973,878	5,146,447	8,250,000	5,980,000	84,282	1,666,985	0	0	1,666,985	1,436,286		
1962	17,377,000	1,666,985	1,436,286	8,250,000	5,980,000	73,228	4,741,255	0	0	4,741,255	4,085,188		
1963	8,840,600	4,741,255	4,085,188	8,250,000	5,980,000	55,493	-793,237	0	793,237	0	0		
1964	10,853,588	0	0	8,250,000	5,980,000	5,017	-3,371,431	0	3,371,431	0	0		
1965	19,875,027	0	0	8,250,000	5,980,000	54,427	5,588,000	0	0	5,588,000	4,808,185		
1966	10,879,847	5,588,000	4,808,185	8,250,000	5,980,000	85,139	1,843,207	0	0	1,843,207	1,678,001		
1967	11,870,830	1,843,207	1,678,001	8,250,000	5,980,000	26,728	439,588	0	639,588	0	0		
1968	13,738,832	0	0	8,250,000	5,980,000	5,017	-485,085	0	485,085	0	0		
1969	15,272,150	0	0	8,250,000	5,980,000	15,842	1,026,217	0	0	1,026,217	884,196		
1970	16,244,136	1,026,217	884,196	8,250,000	5,980,000	38,320	2,102,633	0	0	2,102,633	1,811,127		
1971	15,493,669	2,102,633	1,811,127	8,250,000	5,980,000	62,558	3,303,132	0	0	3,303,132	2,848,003		
1972	13,186,637	3,303,132	2,848,003	8,250,000	5,980,000	63,582	2,196,207	0	0	2,196,207	1,892,268		
1973	18,650,163	2,196,207	1,892,268	8,250,000	5,980,000	97,793	8,514,607	0	0	8,514,607	8,616,478		
1974	13,2												

Upper Basin Yield Mass Balance Analysis

Run 7 - Use CRSP Minimum Power Pools, 7.50 maf Lower Basin Delivery, No Storage

CY	CR Natural Flow at Lee Ferry (plus)	Total Carry-Over Storage (plus)	CRSP Carry-Over Storage	Lower Basin Delivery (minus)	Upper Basin Use	Shared CRSP Rsvp (minus)	Net Available to Store (subtotal)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables
1904	18,596,021	33,833,590	29,151,263	7,500,000	6,470,000	725,390	37,889,221	3,854,831	0	33,833,590	29,151,263	Storage
1907	21,291,894	33,833,590	29,151,263	7,500,000	6,470,000	725,390	40,339,894	6,506,304	0	33,833,590	29,151,263	Bank Storage
1908	12,218,417	33,833,590	29,151,263	7,500,000	6,470,000	699,202	31,383,105	0	0	31,383,105	27,609,907	Reduction Rate (Ave)
1909	22,358,301	33,833,590	29,151,263	7,500,000	6,470,000	699,202	36,670,104	5,236,514	0	33,833,590	29,151,263	Adjusted Storage (2000)
1910	14,650,810	33,833,590	29,151,263	7,500,000	6,470,000	724,918	33,782,288	0	0	33,782,288	29,151,263	UB Demand Level
1911	15,498,729	33,833,590	29,151,263	7,500,000	6,470,000	724,918	34,594,099	760,509	0	33,833,590	29,151,263	LB Delivery
1912	16,823,410	33,833,590	29,151,263	7,500,000	6,470,000	725,390	37,761,610	3,928,020	0	33,833,590	29,151,263	
1913	14,536,273	33,833,590	29,151,263	7,500,000	6,470,000	725,390	33,678,248	0	0	33,678,248	29,015,896	
1914	21,354,814	33,833,590	29,151,263	7,500,000	6,470,000	723,715	40,337,341	6,503,758	0	33,833,590	29,151,263	
1916	13,823,277	33,833,590	29,151,263	7,500,000	6,470,000	714,098	32,771,771	0	0	32,771,771	28,237,254	
1917	20,142,882	32,771,771	28,237,254	7,500,000	6,470,000	714,098	38,239,856	4,397,975	0	33,833,590	29,151,263	Average CRSP Evap
1918	22,942,834	33,833,590	29,151,263	7,500,000	6,470,000	725,390	42,091,934	8,247,414	0	33,833,590	29,151,263	Total Yield w/ CRSP evap
1919	15,846,939	33,833,590	29,151,263	7,500,000	6,470,000	725,390	35,094,139	1,176,549	0	33,833,590	29,151,263	
1918	12,651,249	33,833,590	29,151,263	7,500,000	6,470,000	703,858	31,811,100	0	0	31,811,100	27,408,472	
1920	22,267,832	31,811,100	27,408,472	7,500,000	6,470,000	703,858	38,424,874	3,561,284	0	33,833,590	29,151,263	
1921	22,826,781	33,833,590	29,151,263	7,500,000	6,470,000	725,390	41,684,681	7,831,291	0	33,833,590	29,151,263	1943
1922	16,447,195	33,833,590	29,151,263	7,500,000	6,470,000	725,390	37,586,398	3,791,808	0	33,833,590	29,151,263	1964
1923	18,024,848	33,833,590	29,151,263	7,500,000	6,470,000	725,390	38,182,248	4,278,656	0	33,833,590	29,151,263	1967
1924	13,877,798	33,833,590	29,151,263	7,500,000	6,470,000	716,777	33,024,811	0	0	33,024,811	28,454,241	1968
1925	14,430,701	30,091,511	28,454,241	7,500,000	6,470,000	706,858	32,779,733	0	0	32,779,733	28,243,270	1977
1926	15,213,731	32,779,733	28,243,270	7,500,000	6,470,000	708,844	33,214,836	0	0	33,214,836	28,704,301	
1927	19,539,232	33,214,836	28,704,301	7,500,000	6,470,000	719,867	38,164,181	4,330,991	0	33,833,590	29,151,263	MM allocation (w/o evap)
1928	16,954,334	33,833,590	29,151,263	7,500,000	6,470,000	725,390	36,082,534	2,258,944	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	40,987,785	7,134,190	0	33,833,590	29,151,263	Note: MM allocation is exclusive of its portion of CRSP evaporation. Navajo evaporation would be primarily charged against H&H's allocation. Shared CRSP evaporation is already removed from UC demands.
1930	14,321,941	33,833,590	29,151,263	7,500,000	6,470,000	724,918	33,780,825	0	0	33,780,825	29,027,879	
1931	8,471,835	33,780,825	29,027,879	7,500,000	6,470,000	656,207	27,605,852	0	0	27,605,852	23,785,823	
1932	17,422,187	27,605,852	23,785,823	7,500,000	6,470,000	622,911	30,435,128	0	0	30,435,128	28,223,124	
1933	12,163,500	30,435,128	28,223,124	7,500,000	6,470,000	627,333	28,021,294	0	0	28,021,294	24,143,347	
1934	6,178,192	28,021,294	24,143,347	7,500,000	6,470,000	613,222	18,718,254	0	0	18,718,254	18,987,874	
1936	12,630,349	18,718,254	18,987,874	7,500,000	6,470,000	408,222	17,970,261	0	0	17,970,261	15,480,417	Total Upper Basin depletion, inc. CRSP evap:
1934	6,644,877	17,970,261	15,480,417	7,500,000	6,470,000	390,704	10,258,590	0	0	10,258,590	15,731,706	1953-1977
1937	14,308,056	18,258,560	15,731,706	7,500,000	6,470,000	393,184	18,261,452	0	0	18,261,452	15,882,301	1931-1977
1938	16,448,518	18,261,452	15,882,301	7,500,000	6,470,000	432,434	21,847,307	0	0	21,847,307	18,909,983	1906-2000
1939	11,184,059	21,847,307	18,909,983	7,500,000	6,470,000	437,790	18,703,817	0	0	18,703,817	16,113,170	
1940	9,931,897	18,703,817	16,113,170	7,500,000	6,470,000	355,481	14,309,812	0	0	14,309,812	12,329,875	
1941	20,114,878	14,309,812	12,329,875	7,500,000	6,470,000	371,960	20,084,309	0	0	20,084,309	17,954,778	Flow Adjustments:
1942	17,225,136	20,084,309	17,954,778	7,500,000	6,470,000	482,377	22,877,990	0	0	22,877,990	19,711,064	1971
1943	13,731,421	22,877,990	19,711,064	7,500,000	6,470,000	484,411	22,154,080	0	0	22,154,080	19,088,114	1972
1944	15,369,492	22,154,080	19,088,114	7,500,000	6,470,000	485,433	23,067,088	0	0	23,067,088	19,874,751	1973
1945	14,540,528	23,067,088	19,874,751	7,500,000	6,470,000	482,729	22,744,874	0	0	22,744,874	19,587,146	1974
1946	11,065,453	22,744,874	19,587,146	7,500,000	6,470,000	453,859	18,116,468	0	0	18,116,468	16,728,288	1975
1947	16,438,486	18,116,468	16,728,288	7,500,000	6,470,000	440,031	21,445,823	0	0	21,445,823	18,477,981	1976
1948	15,339,284	21,445,823	18,477,981	7,500,000	6,470,000	468,090	22,146,127	0	0	22,146,127	19,081,282	1977
1948	16,823,584	22,146,127	19,081,282	7,500,000	6,470,000	502,742	24,808,989	0	0	24,808,989	21,201,541	1978
1950	13,540,416	24,808,989	21,201,541	7,500,000	6,470,000	514,829	23,882,738	0	0	23,882,738	20,043,357	1978
1951	12,806,884	23,882,738	20,043,357	7,500,000	6,470,000	479,827	21,319,023	0	0	21,319,023	18,369,827	1980
1952	20,809,422	21,319,023	18,369,827	7,500,000	6,470,000	528,102	27,422,543	0	0	27,422,543	23,905,004	
1953	11,183,419	27,422,543	23,905,004	7,500,000	6,470,000	557,478	24,246,226	0	0	24,246,226	20,906,004	
1954	8,408,192	24,246,226	20,906,004	7,500,000	6,470,000	458,830	18,333,856	0	0	18,333,856	15,796,582	
1956	8,413,000	18,333,856	15,796,582	7,500,000	6,470,000	343,218	13,434,847	0	0	13,434,847	11,575,301	
1956	11,428,874	13,434,847	11,575,301	7,500,000	6,470,000	261,206	10,630,214	0	0	10,630,214	8,159,069	
1957	21,500,983	10,630,214	8,159,069	7,500,000	6,470,000	308,243	17,852,834	0	0	17,852,834	15,382,216	
1958	15,862,511	17,852,834	15,382,216	7,500,000	6,470,000	401,013	19,344,432	0	0	19,344,432	16,887,301	
1959	9,598,199	19,344,432	16,887,301	7,500,000	6,470,000	366,448	14,806,182	0	0	14,806,182	12,544,765	
1960	11,324,180	14,806,182	12,544,765	7,500,000	6,470,000	388,914	11,873,284	0	0	11,873,284	10,230,205	
1961	10,010,258	11,873,284	10,230,205	7,500,000	6,470,000	313,395	7,700,283	0	0	7,700,283	6,534,801	
1962	17,377,509	7,700,283	6,534,801	7,500,000	6,470,000	300,063	10,904,789	0	0	10,904,789	9,265,544	
1963	8,840,800	10,904,789	9,265,544	7,500,000	6,470,000	181,892	8,831,056	0	0	8,831,056	7,890,707	
1964	10,983,588	8,831,056	7,890,707	7,500,000	6,470,000	98,114	2,386,489	0	0	2,386,489	2,064,566	
1966	19,875,027	2,386,489	2,064,566	7,500,000	6,470,000	117,898	8,185,821	0	0	8,185,821	7,052,982	
1964	10,679,844	8,185,821	7,052,982	7,500,000	6,470,000	142,760	4,782,904	0	0	4,782,904	4,085,138	
1967	11,670,830	4,782,904	4,085,138	7,500,000	6,470,000	80,877	2,372,856	0	0	2,372,856	2,044,471	
1968	13,738,932	2,372,856	2,044,471	7,500,000	6,470,000	52,531	2,080,256	0	0	2,080,256	1,800,982	
1969	16,272,150	2,080,256	1,800,982	7,500,000	6,470,000	62,717	3,328,761	0	0	3,328,761	2,868,894	
1970	15,344,136	3,328,761	2,868,894	7,500,000	6,470,000	89,587	4,614,298	0	0	4,614,298	3,975,671	
1971	18,493,658	4,614,298	3,975,671	7,500,000	6,470,000	118,224	6,019,885	0	0	6,019,885	5,188,604	
1972	13,188,837	6,019,885	5,188,604	7,500,000	6,470,000	123,531	5,112,790	0	0	5,112,790	4,405,217	
1973	18,896,193	5,112,790	4,405,217	7,500,000	6,470,000	161,977	8,831,056	0	0	8,831,056	8,298,144	
1974	13,286,428	8,831,056	8,298,144	7,500,000	6,470,000	200,853	9,745,790	0	0	9,745,790	7,935,427	
1975	17,072,081	9,745,790	7,935,427	7,500,000	6,470,000	221,887	11,828,544	0	0	11,828,544	10,017,313	
1976	11,213,561	11,828,544	10,017,313	7,500,000	6,470,000	221,882	9,748,183	0	0	9,748,183	7,307,497	
1977	9,551,188	9,748,183	7,307,497	7,500,000	6,470,000	100,584	228,786	0	0	228,786	197,124	
1978	15,338,900	228,786	197,124	7,500,000	6,470,000	24,172	1,570,522	0	0	1,570,522	1,353,173	
1979	17,825,429	1,570,522	1,353,173	7,500,000	6,470,000	78,863	5,347,288	0	0	5,347,288	4,607,282	
1980	17											

Upper Basin Yield Mass Balance Analysis

Run 8 - Use CRSP Minimum Power Pools, 7.50 mcf Lower Basin Delivery, 6% Overall Shortage

CT	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 (plus)	Spill to LC (minus)	Shortage (plus)	UC Basin Year-end Storage (equals)	CRSP Year-end Storage	Variables
1907	18,540,021	33,833,590	29,151,263	7,500,000	8,760,000	725,390	37,399,221	3,564,631	0	33,833,590	29,151,263	Storage
1908	21,201,884	33,833,590	29,151,263	7,500,000	8,760,000	725,390	40,048,804	8,218,204	0	33,833,590	29,151,263	Sedimentation Rate (Active)
1909	12,218,817	33,833,590	29,151,263	7,500,000	8,760,000	696,247	31,096,160	0	0	31,096,160	26,782,673	Bank Storage
1908	22,354,301	33,833,590	29,151,263	7,500,000	8,760,000	696,247	36,496,213	4,642,622	0	33,833,590	29,151,263	Adjusted Storage (2040)
1918	14,450,616	33,833,590	29,151,263	7,500,000	8,760,000	721,863	33,502,343	0	0	33,502,343	28,865,858	UB Demand Level
1911	13,491,729	33,833,590	29,151,263	7,500,000	8,760,000	721,863	34,020,299	186,619	0	33,833,590	29,151,263	LB Delivery
1912	16,822,410	33,833,590	29,151,263	7,500,000	8,760,000	725,390	37,471,610	3,634,020	0	33,833,590	29,151,263	
1913	14,538,373	33,833,590	29,151,263	7,500,000	8,760,000	720,660	33,289,303	0	0	33,289,303	28,764,462	
1914	21,354,814	33,833,590	29,151,263	7,500,000	8,760,000	720,660	36,763,437	5,029,867	0	33,833,590	29,151,263	
1916	13,653,377	33,833,590	29,151,263	7,500,000	8,760,000	711,641	32,485,825	0	0	32,485,825	27,980,019	Residual
1916	20,142,892	32,485,825	27,980,019	7,500,000	8,760,000	725,390	31,524,185	0	0	31,524,185	29,151,263	Average CRSP Evap
1917	22,943,804	33,833,590	29,151,263	7,500,000	8,760,000	725,390	37,957,614	3,824,098	0	33,833,590	29,151,263	Total Yield w/ CRSP evap
1917	15,865,939	33,833,590	29,151,263	7,500,000	8,760,000	725,390	34,714,139	900,349	0	33,833,590	29,151,263	
1918	12,451,358	33,833,590	29,151,263	7,500,000	8,760,000	700,804	30,517,294	0	0	30,517,294	27,181,439	Shortage Years
1920	22,287,432	33,833,590	29,151,263	7,500,000	8,760,000	700,804	36,850,983	5,017,294	0	33,833,590	29,151,263	Shortage
1921	22,826,781	33,833,590	29,151,263	7,500,000	8,760,000	725,390	41,374,981	7,541,291	0	33,833,590	29,151,263	1963
1922	18,447,188	33,833,590	29,151,263	7,500,000	8,760,000	725,390	37,295,358	3,481,808	0	33,833,590	29,151,263	1964
1923	19,024,046	33,833,590	29,151,263	7,500,000	8,760,000	725,390	37,872,246	4,038,656	0	33,833,590	29,151,263	1967
1924	13,877,796	33,833,590	29,151,263	7,500,000	8,760,000	713,723	32,737,565	0	0	32,737,565	28,207,007	1968
1925	14,430,701	32,737,565	28,207,007	7,500,000	8,760,000	694,456	32,211,908	0	0	32,211,908	27,754,010	1977
1926	18,123,731	32,211,908	27,754,010	7,500,000	8,760,000	693,430	32,472,000	0	0	32,472,000	27,978,115	
1927	19,530,212	32,472,000	27,978,115	7,500,000	8,760,000	710,894	37,040,323	3,206,736	0	33,833,590	29,151,263	NW allocation (no evap)
1928	16,854,234	33,833,590	29,151,263	7,500,000	8,760,000	725,390	35,802,531	1,964,944	0	33,833,590	29,151,263	
1929	21,826,855	33,833,590	29,151,263	7,500,000	8,760,000	725,390	40,877,778	6,844,165	0	33,833,590	29,151,263	Note: NW 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	14,881,841	33,833,590	29,151,263	7,500,000	8,760,000	649,207	37,638,006	0	0	33,833,590	29,151,263	
1931	8,474,134	33,833,590	29,151,263	7,500,000	8,760,000	649,207	29,862,200	0	0	29,862,200	25,496,307	Total Upper Basin depletion, inc. CRSP evap:
1932	17,422,187	27,838,008	23,296,139	7,500,000	8,760,000	607,983	28,582,300	0	0	27,838,008	23,296,139	1953-1977
1933	12,183,500	29,562,300	25,496,307	7,500,000	8,760,000	604,523	26,909,276	0	0	26,909,276	22,185,222	1951-1977
1934	8,176,102	28,908,278	23,185,222	7,500,000	8,760,000	488,740	18,340,726	0	0	18,340,726	15,922,503	1906-2000
1935	12,630,340	18,340,726	15,922,503	7,500,000	8,760,000	374,180	16,336,880	0	0	16,336,880	14,878,561	
1936	14,844,873	18,336,880	14,675,941	7,500,000	8,760,000	353,236	18,372,527	0	0	18,372,527	14,106,886	
1937	14,308,056	18,372,527	14,106,886	7,500,000	8,760,000	350,375	18,068,208	0	0	18,068,208	13,844,482	
1938	15,148,310	18,068,208	13,844,482	7,500,000	8,760,000	364,437	19,572,000	0	0	19,572,000	16,863,482	
1939	11,164,289	19,572,000	16,863,482	7,500,000	8,760,000	364,685	16,091,484	0	0	16,091,484	13,864,320	
1940	9,831,837	16,091,484	13,864,320	7,500,000	8,760,000	294,753	11,464,748	0	0	11,464,748	9,878,107	
1941	20,116,878	11,464,748	9,878,107	7,500,000	8,760,000	308,168	17,013,233	0	0	17,013,233	14,654,725	Flow Adjustments:
1942	17,225,136	17,013,233	14,654,725	7,500,000	8,760,000	304,822	19,563,749	0	0	19,563,749	16,873,498	1971
1943	13,731,401	19,563,749	16,873,498	7,500,000	8,760,000	411,974	16,443,176	0	0	16,443,176	16,053,094	1972
1944	15,269,422	16,443,176	16,053,094	7,500,000	8,760,000	409,613	16,343,185	0	0	16,343,185	16,546,227	1973
1945	14,140,528	16,343,185	16,053,094	7,500,000	8,760,000	411,218	16,812,488	0	0	16,812,488	16,208,943	1974
1946	11,095,453	16,812,488	16,208,943	7,500,000	8,760,000	387,559	15,279,910	0	0	15,279,910	13,164,350	1975
1947	16,436,486	15,279,910	13,164,350	7,500,000	8,760,000	348,031	17,109,648	0	0	17,109,648	14,741,793	1976
1948	15,136,294	17,109,648	14,741,793	7,500,000	8,760,000	374,681	17,814,250	0	0	17,814,250	16,178,571	1977
1949	16,833,564	17,814,250	15,170,571	7,500,000	8,760,000	404,213	19,883,630	0	0	19,883,630	17,131,878	1978
1950	12,140,418	19,883,630	17,131,878	7,500,000	8,760,000	412,066	18,251,980	0	0	18,251,980	16,812,197	1979
1951	12,303,894	18,251,980	16,812,197	7,500,000	8,760,000	373,115	16,224,756	0	0	16,224,756	13,979,368	1980
1952	20,805,427	16,224,756	13,979,368	7,500,000	8,760,000	416,724	22,354,457	0	0	22,354,457	19,260,760	
1953	11,165,419	22,354,457	19,260,760	7,500,000	8,760,000	443,219	18,816,559	0	0	18,816,559	16,212,482	
1954	8,496,102	18,816,559	16,212,482	7,500,000	8,760,000	340,654	12,711,907	0	0	12,711,907	10,925,748	
1955	6,412,803	12,711,907	10,925,748	7,500,000	8,760,000	221,725	8,593,916	0	0	8,593,916	6,584,300	
1956	11,426,874	7,644,180	6,584,300	7,500,000	8,760,000	156,184	4,674,890	0	0	4,674,890	4,037,519	
1957	21,500,983	4,674,890	4,037,519	7,500,000	8,760,000	178,726	11,738,128	0	0	11,738,128	10,111,921	
1958	15,863,811	11,738,128	10,111,921	7,500,000	8,760,000	269,094	13,040,848	0	0	13,040,848	11,260,813	
1959	9,986,160	13,040,848	11,260,813	7,500,000	8,760,000	231,199	8,176,515	0	0	8,176,515	7,044,944	
1960	11,324,160	8,176,515	7,044,944	7,500,000	8,760,000	148,403	5,292,272	0	0	5,292,272	4,569,859	
1961	10,010,250	5,292,272	4,569,859	7,500,000	8,760,000	71,683	970,830	0	0	970,830	836,481	
1962	17,377,606	970,830	836,481	7,500,000	8,760,000	58,267	4,030,190	0	0	4,030,190	3,472,440	
1963	18,400,900	4,030,190	3,472,440	7,500,000	8,760,000	47,822	-1,438,822	0	1,438,822	0	0	
1964	19,863,296	0	0	7,500,000	8,760,000	5,017	-3,461,431	0	3,461,431	0	0	
1965	19,878,027	0	0	7,500,000	8,760,000	84,111	0	0	0	5,561,916	4,782,708	
1966	19,879,844	5,561,916	4,782,708	7,500,000	8,760,000	84,195	1,696,565	0	0	1,696,565	1,824,478	
1967	11,870,830	1,696,565	1,824,478	7,500,000	8,760,000	25,191	-727,708	0	727,708	0	0	
1968	13,728,832	0	0	7,500,000	8,760,000	5,017	-625,085	0	625,085	0	0	
1969	16,272,150	0	0	7,500,000	8,760,000	15,628	966,333	0	0	966,333	854,620	
1970	18,344,134	966,333	854,620	7,500,000	8,760,000	37,375	2,043,291	0	0	2,043,291	1,760,514	
1971	18,480,850	2,043,291	1,760,514	7,500,000	8,760,000	61,006	3,215,943	0	0	3,215,943	2,770,880	
1972	13,186,637	3,215,943	2,770,880	7,500,000	8,760,000	61,408	2,081,171	0	0	2,081,171	1,763,132	
1973	18,650,183	2,081,171	1,763,132	7,500,000	8,760,000	85,054	8,374,310	0	0	8,374,310	5,483,874	
1974	13,286,426	8,374,310	5,483,874	7,500,000	8,7							

---

**APPENDIX B**

**Reservoir Storage**

Upper Colorado River Basin Reservoir Storage

Upper Colorado River Basin Reservoirs	Complete	Live Capacity	CRSP Live	CRSP Active	CRSP Active + Other	State	Major Basin	Hydropanel	Source
1 Big Sandy	X	38,300	30,731,061	746,500	31,300	WY	GR	BGRW	Hydropanel
2 Blue Mesa	X	629,660	620,000	746,500	746,500	CO	CR	BMDC	Hydropanel
3 Boulder Lake	X	22,250			22,250	WY	CR		Jada Henderson Superintendent for Region IV
4 Baldy Hater	X	11,778			11,778	UT	CR	BHRU	Liik Knight from GJ office
5 Crawford	X	13,976	17,508	13,000	13,976	CO	CR	CFRC	Hydropanel
6 Crystal	X	17,236		13,000	17,236	CO	CR	CRRC	Hydropanel
7 Current Creek	X	16,200			16,440	UT	CR	CURU	Hydropanel
8 Ditch	X	252,036			252,078	UT	CR		NRCS Website <a href="http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html">http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html</a> NRCS Website
9 Edon	X	13,164			13,164	WY	GR	EDRU	
10 Electric Lake - Utah Power & Light	X	31,600			31,600	UT	GR		Comedy Baldwin at Pacific Corp. ComedyBaldwin@pacifiCorp.com or 801-220-4638
11 Elkhead	X	10,400			10,400	CO	GR		Bill Emley with the City of Craig Public Works Dept. 870-626-2614
12 Fleming Gorge	X	3,619,000	3,748,000	3,615,700	3,615,700	UT	GR	FGRU	Hydropanel
13 Fontenelle	X	344,000			344,000	WY	GR	FTRW	Hydropanel
14 Fremont Lake	X	30,800			30,800	WY	GR		Jada Henderson Superintendent for Region IV
15 Gould	X	10,300			10,300	CO	CR		Georgia West with Colorado Division of Water Resources georgiewest@colorado.gov
16 Footprints	X	4,400			4,400	CO	CR	FGRC	Hydropanel
17 Gandy	X	640,033			640,033	CO	CR		NRCS Website <a href="http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html">http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html</a>
18 Green Mountain	X	153,676			153,676	CO	CR	GAURC	NRCS Website <a href="http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html">http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html</a>
19 Grandditch	X	27,500			27,500	CO	CR		NRCS Website <a href="http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html">http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html</a>
20 Grady	X	12,035			12,035	CO	CR		Georgia West with Colorado Division of Water Resources georgiewest@colorado.gov
21 Homestead	X	42,882			42,882	CO	CR		NRCS Website <a href="http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html">http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html</a>
22 Jackson Gulch	X	8,951			8,951	CO	CR	JGRC	Hydropanel
23 John's Valley	X	81,900			81,900	UT	CR	JVRU	Hydropanel
24 Johnson	X	15,300			15,300	CO	CR		Hydropanel
25 Merry Reservoir (Taylor Dam)	X	8,400			8,400	CO	CR		Edin Lujan@info.usda... Division 8 Water Resources, Inc. State of Colorado
26 Lake Powell	X	24,322,000	24,322,000	20,209,819	20,209,818	AZ	CR	GLDA	Comedy Baldwin at Pacific Corp. ComedyBaldwin@pacifiCorp.com or 801-220-4638
27 Lake Vista Naughton	X	69,645			69,645	WY	CR		Hydropanel
28 Lennon	X	28,782			28,782	UT	CR	LUAC	Hydropanel
29 Long Park	X	14,600			14,600	UT	CR		Hydropanel
30 MtPine	X	247,400			247,400	WY	CR	MCRC	Hydropanel
31 Minks Cabin	X	20,000			20,000	UT	CR	MLRW	Hydropanel
32 Mullen	X	20,000			20,000	UT	CR		Georgia West with Colorado Division of Water Resources georgiewest@colorado.gov
33 Minnanta	X	11,600			11,600	CO	CR		Hydropanel
34 Moon Lake	X	48,500			48,500	UT	CR	MLLU	Hydropanel
35 Morgan Lake Dam	X	42,800			42,800	CO	CR	MPRC	Hydropanel
36 Morrow Point	X	117,025	117,025	42,120	42,120	CO	CR		NRCS Website <a href="http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html">http://www.wcc.ars.usda.gov/water/reservoirs/wr_ypt.html</a>
37 Morrow Point	X	22,700			22,700	CO	CR	MPRN	Hydropanel
38 Nampahapp	X	1,098,000	1,098,000	1,036,100	1,036,100	WY	GR	PAUC	Jada Henderson Superintendent for Region IV
39 New Fort Lake	X	20,340			20,340	WY	GR		Hydropanel
40 Pecos	X	16,703			16,703	UT	CR		Hydropanel
41 Pelican Lake	X	18,650			18,650	UT	CR		Edin Lujan@info.usda... Division 8 Water Resources, Inc. State of Colorado
42 Pleasant Valley Lake Coffer	X	7,275			7,275	UT	CR		Hydropanel
43 Reclamation Creek	X	16,000			16,000	UT	CR		Hydropanel
44 Redtail	X	25,700			25,700	UT	CR		Hydropanel
45 Ridgway	X	62,980			62,980	CO	CR		Hydropanel
46 Rifle Gap	X	12,708			12,708	CO	CR		Great Plains Region Website
47 Rust	X	102,330			102,330	UT	CR		Hydropanel
48 Scabed	X	85,800			85,800	UT	CR		Great Plains Region Website
49 Shoshone Mountain	X	18,368			18,368	CO	CR	SLRC	Hydropanel
50 Silver Jack	X	13,000			13,000	CO	CR	SCRU	Hydropanel
51 Snider Creek	X	1,105,810			1,105,810	UT	GR		Edin Lujan@info.usda... Division 8 Water Resources, Inc. State of Colorado
52 Stagecoach	X	33,275			33,275	UT	GR		Hydropanel
53 Staveland	X	665,320			665,320	WY	GR	SLRW	Hydropanel
54 Staveland	X	13,800			13,800	WY	GR		Hydropanel
55 Steamboat Lake	X	25,400			25,400	CO	GR		Edin Lujan@info.usda... Division 8 Water Resources, Inc. State of Colorado
56 Steamboat Lake	X	34,495			34,495	UT	GR	STRU	Hydropanel
57 Taylor Park	X	906,210			906,210	CO	CR	TPRC	Hydropanel
58 Upper Shinarump	X	31,382			31,382	UT	GR	USRU	Hydropanel
59 Vallecito	X	126,400			126,400	CO	GR	VCRC	Hydropanel
60 Vega	X	33,311			33,311	CO	CR		Edin Knight from GJ office
61 Williams Creek	X	10,064			10,064	CO	CR		Georgia West with Colorado Division of Water Resources georgiewest@colorado.gov
62 Williams Fork	X	86,824			86,824	CO	CR	WPRC	Great Plains Region Website
63 Willow Lake	X	18,818			18,818	WY	GR		Jada Henderson Superintendent for Region IV
64 Willow Creek	X	10,550			10,550	WY	GR		Great Plains Region Website
65 Wolfport Mountain	X	84,000			84,000	CO	CR	WCRC	Georgia West with Colorado Division of Water Resources georgiewest@colorado.gov
66 Yencido	X	8,000			8,000	CO	CR		Edin Lujan@info.usda... Division 8 Water Resources, Inc. State of Colorado
<b>Total Capacity</b>		<b>35,233,290</b>	<b>30,731,061</b>	<b>25,663,338</b>	<b>30,167,678</b>				

---

**APPENDIX C**

**CRSP Evaporation Analysis**

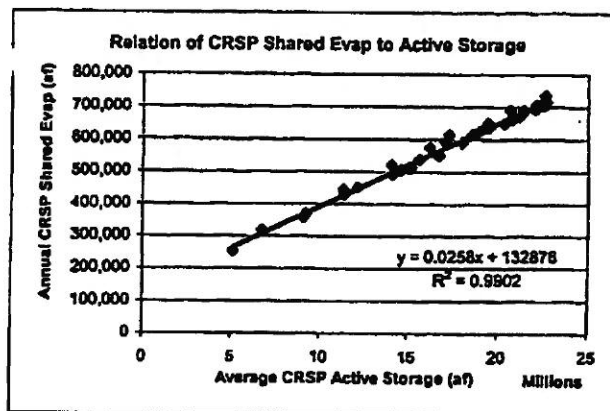


### Relationships of CRSP Shared Reservoir Evaporation to Total CRSP Storage

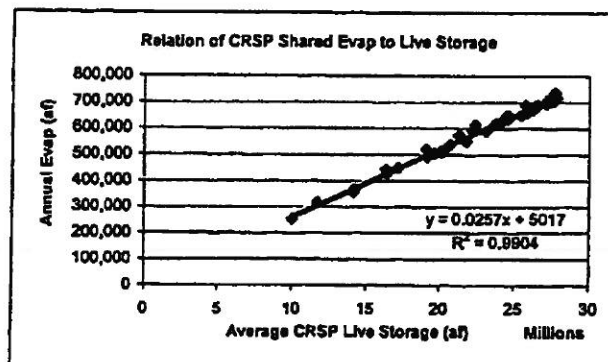
Year	Average CRSP Live Storage (af)	Average CRSP Active Storage (af)	CRSP Shared Evap (af)
1968	10,006,534	5,123,250	251,846
1969	11,701,142	6,764,000	315,083
1970	14,222,401	9,231,741	367,164
1971	16,417,858	11,354,088	442,260
1972	17,229,715	12,165,945	449,544
1973	19,703,066	14,639,296	504,409
1974	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	22,840,354	734,416
1984	27,759,568	22,707,468	714,727
1985	27,619,938	22,567,638	702,973
1986	27,414,909	22,362,809	706,131
1987	27,153,464	22,101,384	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	510,889
1992	19,208,740	14,156,640	491,352
1993	21,297,584	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.

Historic Storage and Evaporation at Colorado River Storage Project Reservoirs

Year	Laba Point		Elmton Gorge Reservoir		Merrill Reservoir		Blue Mesa Reservoir		Morrow Point Reservoir		Crystal Reservoir		TOTAL CRSP Reservoirs	
	EOY Live Storage (M)	Annual Evap Amount (M)	EOY Live Storage (M)	Annual Evap Amount (M)	EOY Live Storage (M)	Annual Evap Amount (M)	EOY Live Storage (M)	Annual Evap Amount (M)	EOY Live Storage (M)	Annual Evap Amount (M)	EOY Live Storage (M)	Annual Evap Amount (M)	EOY Live Storage (M)	Annual Evap Amount (M)
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	13,000	863,500	20,000	31,000	0	0	0	0	0	0	70,000	660,000
1964	4,200,000	76,171	1,097,000	47,370	331,000	10,631	0	0	0	0	0	0	2,165,334	1,989,000
1965	6,582,000	144,000	2,396,500	47,402	404,111	10,630	0	0	0	0	0	0	8,707,097	1,989,000
1966	8,237,300	181,001	2,243,200	66,899	400,388	10,720	0	0	0	0	0	0	10,555,348	5,026,100
1967	8,237,300	181,001	2,243,200	66,899	400,388	10,720	0	0	0	0	0	0	10,555,348	5,026,100
1968	8,237,300	181,001	2,243,200	66,899	400,388	10,720	0	0	0	0	0	0	10,555,348	5,026,100
1969	8,237,300	181,001	2,243,200	66,899	400,388	10,720	0	0	0	0	0	0	10,555,348	5,026,100
1970	12,071,540	305,679	2,161,250	84,074	1,043,002	22,226	862,343	8,004	118,528	600	0	0	12,824,480	7,622,000
1971	12,071,540	305,679	2,161,250	84,074	1,043,002	22,226	862,343	8,004	118,528	600	0	0	12,824,480	7,622,000
1972	12,071,540	305,679	2,161,250	84,074	1,043,002	22,226	862,343	8,004	118,528	600	0	0	12,824,480	7,622,000
1973	17,286,302	417,269	2,938,136	77,691	862,888	19,891	988,984	8,028	115,200	845	0	0	17,218,697	12,184,687
1974	17,286,302	417,269	2,938,136	77,691	862,888	19,891	988,984	8,028	115,200	845	0	0	17,218,697	12,184,687
1975	19,848,968	521,418	3,430,787	83,844	1,170,445	21,648	418,431	7,588	116,000	832	7,714	100	19,819,894	14,018,894
1976	19,848,968	521,418	3,430,787	83,844	1,170,445	21,648	418,431	7,588	116,000	832	7,714	100	19,819,894	14,018,894
1977	15,093,067	487,654	3,330,869	82,883	1,265,381	26,432	533,875	7,300	115,000	831	0	0	15,111,101	10,065,061
1978	15,093,067	487,654	3,330,869	82,883	1,265,381	26,432	533,875	7,300	115,000	831	0	0	15,111,101	10,065,061
1979	20,262,402	443,336	2,073,304	68,718	1,198,078	27,928	256,328	5,779	115,000	838	16,703	348	22,123,090	17,078,960
1980	20,262,402	443,336	2,073,304	68,718	1,198,078	27,928	256,328	5,779	115,000	838	16,703	348	22,123,090	17,078,960
1981	16,016,004	608,064	3,013,072	72,311	1,362,000	34,327	816,786	8,040	115,300	832	10,000	300	16,016,004	10,016,894
1982	22,062,430	579,638	3,207,236	84,057	1,445,720	30,981	864,201	8,250	116,478	849	10,000	300	22,062,430	16,068,373
1983	22,062,430	579,638	3,207,236	84,057	1,445,720	30,981	864,201	8,250	116,478	849	10,000	300	22,062,430	16,068,373
1984	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1985	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1986	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1987	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1988	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1989	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1990	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1991	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1992	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1993	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1994	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1995	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1996	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1997	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1998	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
1999	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
2000	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
2001	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
2002	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
2003	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894
2004	21,001,004	621,218	3,378,536	89,569	1,595,107	31,184	964,201	8,373	116,370	844	10,000	300	21,001,004	16,016,894

Note: (1) Lake Powell statistics: Dead storage 1,050,000 at elevation 3772; Live storage capacity 24,322,000 at between elevations 3370 and 3700; Active storage capacity 20,325,000 at between elevations 3400 and 3700. Storage began March 1963. (2) Flaming Gorge Reservoir statistics: Dead storage 30,700 at elevation 8748; Live storage capacity 3,749,500 at between elevations 8740 and 8940; Active storage capacity 3,519,000 at between elevations 8771 and 8940. Storage began November 1962. (3) Navajo Reservoir statistics: Dead storage 12,000 at elevation 8774; Live storage capacity 1,701,300 at between elevations 8775 and 8905; Active storage capacity 1,000,000 at between elevations 8800 and 8905. Storage began June 1962. (4) Apogee Unit statistics: Blue Mesa Reservoir - Dead storage 6,000 at elevation 8870; Live storage capacity 17,000 at between elevations 8870 and 8875; Active storage capacity 13,000 at between elevations 8700 and 8785. Storage began March 1977. Morrow Point Reservoir - Dead storage 111,200 at elevation 7266; Live storage capacity 626,000 at between elevations 7258 and 7512; Active storage capacity 748,800 at between elevations 7360 and 7512. Storage began October 1965. End-of-year 1983 total storage for Blue Mesa Reservoir was 85,240 at (0 live storage). Crystal Reservoir - Dead storage 163 at elevation 6808; Live storage capacity 117,000 at between elevations 6808 and 7100; Active storage capacity 42,000 at between elevations 7100 and 7100. Storage began January 1968. (5) Upper Division Statistics: Flaming Gorge Reservoir and the Apogee Unit Reservoir, and is shared between the Upper Division States in proportion to their Upper Reservoir. (6) Evaporation amounts were computed using the method and coefficients described in Historical Statistics, Colorado River Storage Project, Bureau of Reclamation (Tom Ryan), October 1993. (7) The 1962 evaporation amounts are estimated from calculated evaporation for six years and relative total storage amounts; Lake Powell for 1963, Flaming Gorge Reservoir for 1963-65, Navajo Reservoir for 1963-65, Morrow Point Reservoir for 1965-68, and Crystal Reservoir for 1971-73. These evaporation amounts for Flaming Gorge, Navajo and Blue Mesa Reservoirs were not reported for when storage began. Crystal Reservoir evaporation for 1974-2004 was estimated based on the evaporation amounts at Morrow Point Reservoir and the ratio of the surface area of Crystal Reservoir to the surface area of Morrow Point Reservoir at full capacity. (8) CRSP shared evaporation includes lake evaporation for Lake Powell, Flaming Gorge Reservoir and the Apogee Unit Reservoir, and is shared between the Upper Division States in proportion to their Upper Reservoir. Colorado River Basin Compact Article III(a) apportionments. Lake evaporation for Navajo Reservoir is accounted separately.

**APPENDIX D**

**New Mexico Depletion Schedule**

Preliminary

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

May 2006

	2000	2010	2020	2030	2040	2050	2060
<b>IRRIGATION USES (1)</b>							
Navajo Nation Irrigation:							
Navajo Indian Irrigation Project	150.0	215.0	250.0	270.0	270.0	270.0	270.0
Fruiland-Cambridge Irrigation Project	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Hogback-Cuddeh 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
<b>STOCKPOND EVAPORATION AND STOCK USE</b>							
	4.0	4.0	4.0	4.0	4.0	4.0	4.0
<b>MUNICIPAL AND DOMESTIC USES (1)</b>							
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							
Navajo Nation	1.0	5.0	10.4	10.4	10.4	10.4	10.4
La Plata Conservancy District	0.0	1.0	2.0	2.3	2.3	2.3	2.3
Ridges Basin Reservoir Evaporation - NM share	0.0	0.0	0.8	0.8	0.8	0.8	0.8
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	0.5	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
<b>POWER AND INDUSTRIAL USES</b>							
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	38.0	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
<b>EXPORTS</b>							
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
<b>RESERVOIR EVAPORATION</b>							
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
<b>TOTAL DEPLETIONS (4)</b>							
State Share of Upper Basin Yield (5)	489.9	538.6	607.5	635.0	641.9	642.0	642.0
Remaining Available (5,6)	642.4	642.4	642.4	642.4	642.4	642.4	642.4
Percent of State Share Remaining	132.8%	119.3%	105.8%	101.2%	100.1%	100.0%	100.0%

**NOTES:**

- (1) Does not reflect post-1995 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.

**APPENDIX E**

**Upper Colorado River Commission  
Resolution**

**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