RECLAMATION

Managing Water in the West

DRAFT Annual Operating Plan for Colorado River Reservoirs 2009

U.S. Department of the Interior
Bureau of Reclamation

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INTRODUCTION

Authority

This 2009 Annual Operating Plan (AOP) was developed in accordance with Section 602 of the Colorado River Basin Project Act (Public Law 90-537); the Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968 (Operating Criteria), as amended, promulgated by the Secretary of the Interior (Secretary); and Section 1804(~~C~~ c)(3) of the Grand Canyon Protection Act (Public Law 102-575). Section 602(b) of the Colorado River Basin Project Act requires that the Secretary annually prepare "a report describing the actual operation under the adopted criteria [i.e., the Operating Criteria] for the preceding compact water year [i.e., from October 1 to September 30] and the projected operation ~~of~~ for the current year."

In accordance with the Operating Criteria, the AOP must be developed and administered consistent with applicable Federal laws; the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, the Treaty Between the United States of America and Mexico, signed February 3, 1944 (1944 United States-Mexico Water Treaty); interstate compacts; court decrees; the Colorado River Water Delivery Agreement (69 *Federal Register* 12202, March 15, 2004); the Record of Decision~~1~~ for Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead[1] (Interim Guidelines) (73 *Federal Register* 19873, April 11, 2008); and other documents relating to the use of the waters of the Colorado River, which are commonly and collectively known as the "Law of the River."

The 2009 AOP was prepared by the Bureau of Reclamation (Reclamation) in consultation with the seven Basin States Governors' representatives; the Upper Colorado River Commission; Native American tribes; appropriate Federal agencies; representatives of the academic and scientific communities, environmental organizations, and the recreation industry; water delivery contractors; contractors for the purchase of Federal power; others interested in Colorado River operations; and the general public, through the Colorado River Management Work Group (CRMWG).

Article I(2) of the Operating Criteria allows for revision of this 2009 AOP by June of 2009 to reflect the current hydrologic conditions. This process for revision is further described in Section 7.C of the Interim Guidelines. Any revision to the AOP may occur only through the AOP consultation process as required by applicable Federal law.

Purpose

The purposes of the AOP are to determine or address: (1) the projected operation of the Colorado River reservoirs to satisfy project purposes under varying hydrologic and climatic conditions; (2) the quantity of water considered necessary to be in storage in the Upper Basin reservoirs as of September 30, 2009, pursuant to Section 602(a) of the Colorado River Basin Project Act; (3) water available for delivery pursuant to the 1944 United States-

[1] A Record of Decision ~~(ROD)~~ adopting the Interim Guidelines was signed by the Secretary on December 13, 2007.

Mexico Water Treaty and Minutes No. 242 and 310 of the International Boundary and Water Commission, United States and Mexico (IBWC); (4) whether the reasonable consumptive use requirements of mainstream users in the Lower Division States will be met under a "Normal," "Surplus," or "Shortage" Condition as outlined in Article III of the Operating Criteria and as implemented by the Interim Guidelines; and (5) whether water apportioned to, but unused by one or more Lower Division States, exists and can be used to satisfy beneficial consumptive use requests of mainstream users in other Lower Division States as provided in the Consolidated Decree of the Supreme Court of the United States in *Arizona v. California*, 547 U.S. 150 (2006) (Consolidated Decree).

Consistent with the above determinations and in accordance with other applicable provisions of the "Law of the River," the AOP was developed with "appropriate consideration of the uses of the reservoirs for all purposes, including flood control, river regulation, beneficial consumptive uses, power production, water quality control, recreation, enhancement of fish and wildlife, and other environmental factors" (Operating Criteria, Article I(2)).

Since the hydrologic conditions of the Colorado River Basin can never be completely known in advance, the AOP addresses the operations resulting from three different hydrologic scenarios: the probable maximum, most probable, and probable minimum reservoir inflow conditions. River operations under the plan are modified during the year as runoff predictions are adjusted to reflect existing snowpack, basin storage, and flow conditions.

Summary

Upper Basin Delivery. Annual releases from Lake Powell during water year 2009 shall be made consistent with Section 6.B (Upper Elevation Balancing Tier) of the Interim Guidelines. Consistent with Section 6.B.1, the water year release from Lake Powell in 2009 shall be 8.23 million acre-feet (maf) (10,150 million cubic meters [mcm]) unless provisions in Section 6.B.3 occur. Consistent with Section 6.B.3 of the Interim Guidelines, if the April 2009 24-Month Study projects the September 30, 2009, Lake Powell elevation to be greater than elevation 3,639.0 feet (1,109.2 meters), Section 6.A (Equalization Tier) of the Interim Guidelines will govern the release of water from Lake Powell for the remainder of water year 2009 (through September 2009).

Lower Basin Delivery. Under the most probable inflow scenario, downstream deliveries are expected to control the releases from Hoover Dam. Taking into account (1) the existing water storage conditions in the basin, (2) the most probable near-term water supply conditions in the basin, and (3) Section 2.B.5 of the Interim Guidelines, the Intentionally Created Surplus (ICS) Surplus Condition is the criterion governing the operation of Lake Mead for calendar year 2009 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Consolidated Decree.

No unused apportionment for calendar year 2009 is anticipated. If any unused apportionment becomes available after adoption of this AOP, Reclamation, on behalf of the Secretary, shall allocate any such available unused apportionment for calendar year 2009 in accordance with Article II(B)(6) of the Consolidated Decree.

Water may be made available for diversion pursuant to 43 CFR Part 414[2] to contractors within the Lower Division States. The Secretary shall make Intentionally Created Unused Apportionment (ICUA) available to contractors in Arizona, California, or Nevada for the off-stream storage or consumptive use of water pursuant to individual Storage and Interstate Release Agreements (SIRA) and 43 CFR Part 414. In calendar year 2008, approximately 0.025 maf (30.84 mcm) of ICUA water stored in Arizona is anticipated to be recovered for use in California[3] by the Metropolitan Water District of Southern California (MWD). In calendar year 2008, approximately 0.015 maf (18.50 mcm) of ICUA water from Nevada is anticipated to be stored in California by MWD.[4] In calendar year 2009, ~~up to 0.035 maf (43.17 mcm) of~~ ICUA water stored in Arizona is anticipated to be recovered for use in California by MWD. The Southern Nevada Water Authority (SNWA) may propose to make additional unused Nevada basic apportionment available for storage by MWD in 2009.

The Inadvertent Overrun and Payback Policy (IOPP), which became effective January 1, 2004, will be in effect during calendar year 2009.[5]

The Colorado River Water Delivery Agreement[6] requires payback of California overruns occurring in 2001 and 2002 as noted in Exhibit C of that document. Each district with a payback obligation under Exhibit C may at its own discretion elect to accelerate paybacks.

In calendar years 2008 and 2009, paybacks occurring in California result from Exhibit C obligations and IOPP overruns. During calendar year 2008, the California paybacks are projected to total 0.044 maf (54.27 mcm). In calendar year 2009, California paybacks are projected to total 0.004 maf ~~t~~ (4.934 mcm).

During calendar year 2008, the Arizona paybacks are projected to total 0.0006 maf ~~t~~ (0.740 mcm). In calendar year 2009, Arizona paybacks are projected to total 0.0003 maf ~~t~~ (0.370 mcm).

Nevada incurred no payback obligation for 2008. In calendar year 2009, Nevada paybacks are projected to total 0.00013 maf (0.160 mcm).

The Interim Guidelines adopted the ICS mechanism that among other things encourages the efficient use and management of Colorado River water in the Lower Basin. ~~-~~ICS may be created and delivered in 2009 pursuant to the Interim Guidelines and appropriate delivery and forbearance agreements.

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[2] Off-stream Storage of Colorado River Water; Development and Release of Intentionally Created Unused Apportionment in the Lower Division States: Final Rule (43 CFR Part 414; 64 *Federal Register* 59006, November 1, 1999).

[3] Amendatory Agreement to Agreement between the Central Arizona Water Conservation District and the Metropolitan Water District of Southern California for a Demonstration Project on Underground Storage of Colorado River Water, December 1, 1994.

[4] Storage and Interstate Release Agreement among The United States of America, acting through the Secretary of the Interior; The Metropolitan Water District of Southern California; the Southern Nevada Water Authority; and the Colorado River Commission of Nevada, October 21, 2004.

[5] Record of Decision for Implementation Agreement, Inadvertent Overrun and Payback Policy, and Related Federal Actions, Final Environmental Impact Statement, October 10, 2003.

[6] Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement for Purposes of Section 5(B) of Interim Surplus Guidelines, October 10, 2003.

In 2006, Reclamation implemented an ICS Demonstration Program in the Lower Basin. The ICS Demonstration Program allowed entitlement holders to undertake extraordinary conservation activities in 2006 and 2007 to reduce their approved annual consumptive use of Colorado River water and account for that conserved water in Lake Mead. The ICS credits created and accounted for under the ICS Demonstration Program become~~s~~ available for delivery pursuant to the Interim Guidelines and appropriate delivery and forbearance agreements. In calendar year 2006, MWD created 0.050 maf (61.67 mcm) of ICS credits.[7] In calendar year 2008, MWD is anticipated to recover up to 0.046 maf (56.74 mcm) ~~the balance~~ of ICS credits created under the ICS Demonstration Program.~~7~~ If MWD has not recovered all of its Demonstration Program ICS credits during calendar year 2008, MWD may request delivery of those credits during 2009. In calendar year 2007, the Imperial Irrigation District (IID) planned to create 0.001 maf (1.234 mcm) of ICS credits under the program.[8] Pursuant to the IID ICS agreement, the conserved water was applied to reduce its 2007 IOPP overrun.

In 2006, Reclamation implemented the System Conservation of Colorado River Water Demonstration Program (SC Demonstration Program) in the Lower Division States ~~Basin~~ which allows entitlement holders to participate in voluntary conservation to conserve a portion of their approved annual consumptive use of Colorado River water in exchange for appropriate compensation provided by Reclamation. Reclamation extended the SC Demonstration P~~p~~rogram through December 31, 2010.[9] The ~~water~~ System Conservation Water (SC Water) ~~conserved (SC Water)~~ is retained in Lake Mead to assist in providing an interim, supplemental source of water to replace the drainage water from the Wellton-Mohawk Irrigation and Drainage District (WMIDD) that is bypassed to the Cienega de Santa Clara (Cienega) and the reject stream from operation of the Yuma Desalting Plant (YDP). In calendar year 2008, approximately 0.003~~4~~1 maf (3.82~~4~~4700 mcm) of SC Water is projected to be created by Yuma Mesa Irrigation and Drainage District (YMIDD) and retained in Lake Mead.[10] In calendar year 2009, approximately 0.0035 maf (4.317 mcm) of SC Water is projected to be created by YMIDD and retained in Lake Mead.[11]

In 2007, Reclamation signed a funding agreement for the construction of the Drop 2 Storage Reservoir. In exchange for project funding, SNWA ~~has~~ received 0.40~~4~~0 maf (493.4 mcm) and MWD and the Central Arizona Water Conservation District (CAWCD) ~~have~~ each received 0.100 maf (123.3 mcm) of System Efficiency ICS credits. In calendar year 2008, MWD is anticipated to take delivery of 0.034 maf (41.94 mcm) of its System Efficiency ICS credits~~,~~ and may request delivery of up to 0.034 maf (41.94 mcm) of these credits in 2009.

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[7] Agreement between the Bureau of Reclamation and MWD to Implement a Demonstration Program to Create Intentionally Created Surplus Water, May 18, 2006.

[8] Agreement between IID and Reclamation to Implement a Demonstration Program to Create Intentionally Created Surplus Water, June 26, 2006.

[9] Extension of Policy Establishing a Demonstration Program for System Conservation of Colorado River Water, September 16, 2008.

[10] Agreement between the United States Bureau of Reclamation and the Yuma Mesa Irrigation and Drainage District to Implement a Demonstration Program for System Conservation of Colorado River Water, February 4, 2008.

[11] Agreement between the United States Bureau of Reclamation and the Yuma Mesa Irrigation and Drainage District to Implement a Demonstration Program for System Conservation of Colorado River Water, October 7, 2008.

Upon approval by the Secretary of an ICS creation plan, SNWA anticipates creating and taking delivery of Tributary Conservation ICS credits from projects on the Muddy and Virgin Rivers. SNWA anticipates creating and taking delivery of 0.016 maf (19.74 mcm) of Tributary Conservation ICS credits in 2008~~,~~ and 0.030 maf (37.00 mcm) in 2009.

1944 United States-Mexico Water Treaty Delivery. A volume of 1.500 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2009 in accordance with Article 15 of the 1944 United States-Mexico Water Treaty and Minutes No. 242 and 310 of the IBWC.

2008 HYDROLOGY SUMMARY AND RESERVOIR STATUS

Above average streamflows were observed in the Colorado River Basin during 2008. Unregulated[12] inflow to Lake Powell in water year 2008 was 12.356 maf (15,241 mcm), or 102 percent of the 30-year average[13] which is 12.06 maf (14,876 mcm). Unregulated inflow to Flaming Gorge, Blue Mesa, and Navajo Reservoirs was 59, 133, and 120 percent of average, respectively.

Basin-wide precipitation during water year 2008 initially trended drier with near average conditions occurring in October 2007 followed by well below average conditions in November. In December, however, precipitation rebounded and was well above average in the basin during December, January, and February. Snowpack conditions on March 1, 2008, were 124 percent of average. By mid-April, the snowpack was 122 percent of average.

Snowpack conditions trended drier in water year 2008 in the Upper Green River Basin in comparison to the Upper Colorado River, Gunnison River, and San Juan River basins. On April 1, 2008, the Upper Green River Basin snowpack measured 95 percent of average while the Upper Colorado, Gunnison, and San Juan Basins measured 119 ~~percent~~, 137 ~~percent~~, and 125 percent of average, respectively.

Inflows to Lake Powell during April and May were below forecasted levels due to below average temperatures. By late May, however, inflows increased to more than 75,000 cubic feet per second (cfs) (2,123.8 cubic meters per second [cms]) with Lake Powell elevations increasing by more than 1 foot per day. The observed unregulated inflow volume to Lake Powell during the April through July period was 8.906 maf (10,985 mcm), 112 percent of average.

Inflow to Lake Powell has been below average in seven out of the past nine years. While drought conditions eased in 2005 and 2008, and the inflow in 2006 and 2007 was not as low as what occurred in 2000 through 2004, drought conditions in the Colorado River Basin persist. Provisional calculations of natural flow for the Colorado River at Lees Ferry, Arizona, show that the average natural flow since calendar year 2000 (2000-2008, inclusive) is the lowest nine-year average in over 100 years of record keeping on the Colorado River.

Tributary inflows in the Lower Basin were below average for water year 2008 except for the Little Colorado River. Although drought conditions eased for central Arizona, drought conditions persisted for water year 2008 in other parts of ~~throughout~~ the Lower Basin and the southwestern United States.[~~14~~] Abnormally dry to moderate drought conditions persisted ~~throughout~~ in far western Arizona ~~and southern Arizona~~, southern California, and southern Nevada.[14] However, because of above average snowpack in ~~on~~ the Gila, Salt, and Verde River watersheds, the Gila River Basin experienced 110 percent of average precipitation for

[12] Unregulated inflow adjusts for the effects of operations at upstream reservoirs. It is computed by adding the change in storage and the evaporation losses from upstream reservoirs to the observed inflow. Unregulated inflow is used because it provides an inflow time series that is not biased by upstream reservoir operations.

[13] Inflow statistics throughout this document will be compared to the 30-year average, 1971-2000, unless otherwise noted.

[14] From the U.S. Drought Monitor website: http://drought.unl.edu/dm/monitor.html, ~~August 26~~September 30, 2008.

water year 2008. During water year 2008, no tributary inflow from the Gila River reached the mainstream of the Colorado River.[15]

Tributary inflow from the Little Colorado River for water year 2008 reflected above average conditions in northern Arizona. Tributary inflow from the Little Colorado for water year 2008 totaled 0.206 maf (254.1 mcm), or 114 percent of the long-term average.[16] By contrast, tributary inflow from the Bill Williams River into the mainstream totaled 0.029 maf (35.77 mcm) for water year 2008, or 28 percent of the long-term average. Tributary inflow from the Virgin River for water year 2008 experienced below average conditions, totaling 0.116 maf (143.1 mcm), or 67 percent of the long-term average.

Above average inflow to Colorado River reservoirs in water year 2008 resulted in a net gain in the Colorado River total system storage in the amount of 1.937 maf (2,389 mcm). Reservoir storage in Lake Powell experienced an increase during water year 2008, increasing by 2.580 maf (3,182 mcm). Reservoir storage in Lake Mead declined during water year 2008 by 0.492 maf (607 mcm). At the beginning of water year 2008, Colorado River total system storage was 54 percent of capacity. As of September 30, 2008, total system storage was 57 percent of capacity.

[15] Tributary inflow from the Gila River to the mainstream is very sporadic. These flows occur very seldom and when they do they are typically of high magnitude.

[16] The basis for the long-term average of tributary inflows in the Lower Basin is natural flow data from 1906 to 2005. Additional information regarding natural flows may be found at http://www.usbr.gov/lc/region/g4000/NaturalFlow/current.html.

Tables 1 and 2 list the October 1, 2008, reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in water elevation during water year 2008.

Table 1. Reservoir Conditions on October 1, 2008 (English Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(maf)	(maf)	(ft)	(%)	(maf)	(ft)
Fontenelle	0.091	0.254	6,493.8	74	0.068	10.4
Flaming Gorge	0.726	3.024	6,021.3	81	-0.039	-1.1
Blue Mesa	0.179	0.650	7,498.6	78	-0.037	-4.5
Navajo	0.376	1.319	6,057.7	78	-0.191	-14.4
Lake Powell	9.81	14.51	3,626.9	60	2.579	25.0
Lake Mead	13.87	12.01	1,105.8	46	-0.492	-5.3
Lake Mohave	0.225	1.585	638.8	88	0.041	1.5
Lake Havasu	0.036	0.584	448.2	94	0.008	0.4
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Totals	25.31	33.94		57.3	1.937	

* From October 1, 2007, to September 30, 2008.

Table 2. Reservoir Conditions on October 1, 2008 (Metric Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(mcm)	(mcm)	(m)	(%)	(mcm)	(m)
Fontenelle	112	313	1,979.3	74	83	3.2
Flaming Gorge	896	3,730	1,835.3	81	-49	-0.3
Blue Mesa	221	802	2,285.6	78	-45	-1.4
Navajo	463	1,627	1,846.4	78	-235	-4.4
Lake Powell	12,102	17,896	1,105.5	60	3,181	7.6
Lake Mead	17,105	14,818	337.0	46	-606	-1.6
Lake Mohave	277	1,955	194.7	88	50	0.5
Lake Havasu	45	720	136.6	94	10	0.1
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Totals	31,221	41,862		57.3	2,389	

* From October 1, 2007, to September 30, 2008.

2009 WATER SUPPLY ASSUMPTIONS

For 2009 operations, three reservoir unregulated inflow scenarios were developed and analyzed and are labeled as probable maximum, most probable, and probable minimum. The attached graphs show these inflow scenarios with associated release patterns and end-of-month contents for each reservoir.

There is considerable uncertainty associated with streamflow forecasts and reservoir operating plans made a year in advance. The National Weather Service's Colorado Basin River Forecast Center developed the inflow for the probable maximum (10 percent exceedance), most probable (50 percent exceedance), and probable minimum (90 percent exceedance) inflow scenarios in 2009 using the Ensemble Streamflow Prediction (ESP) model. The ESP model accounts for antecedent streamflows as well as current soil moisture levels with a continuous soil moisture accounting model known as the Sacramento Soil Moisture Accounting Model. The most probable unregulated inflow for Lake Powell in water year 2009 is 10.84 maf (13,371 mcm), or 90 percent of average. The probable minimum unregulated inflow to Lake Powell in water year 2009 is 4.00 maf (4,934 mcm), or 33 percent of average. The probable maximum unregulated inflow is 18.00 maf (22,203 mcm), or 149 percent of average. The three inflow scenarios for Lake Powell are shown in Tables 3 and 4.

Inflows to the mainstream from Lake Powell to Lake Mead, Lake Mead to Lake Mohave, and Lake Mohave to Lake Havasu are forecasted using historic data over the five-year period of January 2003 through December 2007, inclusive. The last five years of historic data are being used to best represent most recent hydrologic conditions for operational forecasts. Most probable forecasted side inflows into each reach are the arithmetic mean of the five--year record. The probable maximum and probable minimum forecasts for the reach between Lake Powell and Lake Mead are the 10 percent exceedance and 90 percent exceedance, respectively, of the five-year record. The most probable side inflow into Lake Mead during water year 2009 is 0.931 maf (1,148 mcm). The probable minimum side inflow into Lake Mead is 0.494 maf (609 mcm). The probable maximum side inflow is 1.598 maf (1,971 mcm).

The monthly volumes of inflow resulting from these assumptions were input into Reclamation's monthly reservoir simulation model and used to plan reservoir operations for 2009. Starting with October 1, 2008, reservoir storage conditions, the monthly releases for each reservoir were adjusted until release and storage levels best accomplished project purposes and applicable operational objectives.

Graphs of the projected 2009 inflows, releases, and storages for each hydrologic scenario are presented in Attachment I.

Table 3. Projected Unregulated Inflow into Lake Powell for Water Year 2009 (English Units: maf)[17]

Time Period	Probable Minimum	Most Probable	Probable Maximum
10/08–12/08	0.73	1.30	1.98
1/09 – 3/09	0.79	1.41	1.75
4/09– 7/09	2.15	7.19	12.61
8/09 – 9/09	0.33	0.94	1.66
10/09 – 12/09	1.55	1.45	1.55
WY 2009	4.00	10.84	18.00
CY 2009	4.82	10.99	17.57

Table 4. Projected Unregulated Inflow into Lake Powell for Water Year 2009 (Metric Units: mcm)

Time Period	Probable Minimum	Most Probable	Probable Maximum
10/08 –12/08	900	1,600	2,450
1/09–3/09	970	1,740	2,160
4/09 –7/09	2,650	8,870	15,550
8/09 –9/09	410	1,160	2,050
10/09 –12/09	1,910	1,790	1,910
WY 2009	4,930	13,370	22,200
CY 2009	5,940	13,560	21,670

[17] All values in Tables 3 and 4 are forecasted inflows with the exception of the values for 10/09—12/09. The values for this period are the average unregulated inflow from 1976-2005. The calendar year totals in Tables 3 and 4 also reflect the average values for the 10/09-12/09 time period.

SUMMARY OF RESERVOIR OPERATIONS IN 2008 AND PROJECTED 2009 RESERVOIR OPERATIONS

The operation ~~regulation~~ of the Colorado River reservoirs has had effects on some aquatic and riparian resources. Controlled releases from dams have modified temperature, sediment load, and flow patterns, resulting in increased productivity of some riparian and non-native ~~introduced~~ aquatic resources and the development of economically significant sport fisheries. However, these same releases have detrimental effects on endangered and other native species. Operating strategies designed to protect and enhance aquatic and riparian resources have been established after appropriate ~~through the~~ National Environmental Policy Act (NEPA) compliance at several locations in the Colorado River Basin.

In the Upper Basin, public stakeholder work groups have been established at Fontenelle Dam, Flaming Gorge Dam, the Aspinall Unit, and Navajo Dam. These work groups provide a public forum for dissemination of information regarding ongoing and projected reservoir operations throughout the year and allow stakeholders the opportunity to provide information and feedback with respect to ongoing reservoir operations. The Glen Canyon Dam Adaptive Management Work Group (AMWG), a Federal Advisory Committee Act committee, was established in 1997.[18] ~~Since its inception, the AMWG has met regularly to analyze and make recommendations to the Secretary regarding research and monitoring programs in the Grand Canyon as well as experimental modifications to dam operations.~~[18]

Modifications to planned operations may be made based on changes in forecasted conditions or other relevant factors. Consistent with the Upper Colorado River Endangered Fish Recovery Program (Upper Colorado Recovery Program),[19] the San Juan River Basin Recovery Implementation Program (San Juan Recovery Program),[20] Section 7 consultations under the Endangered Species Act (ESA), and other downstream concerns, modifications to monthly operation plans may be based on other factors in addition to changes in-stream flow forecasts. Decisions on spring peak releases and downstream habitat target flows may be made midway through the runoff season. Reclamation will conduct meetings with the U.S. Fish and Wildlife Service (Service), other Federal agencies, representatives of the Basin States, and with public stakeholder work groups to facilitate the discussions necessary to finalize site-specific operations plans.

In 1995, Reclamation and the Service formed a partnership with other Federal, state, and local public agencies and private organizations to develop the Lower Colorado River Multi-Species Conservation Program (LCR MSCP). This program permits both non-Federal and Federal parties to participate in and address ESA compliance requirements under Sections 7 and 10 of the ESA. In April 2005, the Secretary signed the Record of Decision (ROD) to begin implementation of the LCR MSCP.[21] Reclamation, in consultation and partnership with a Steering Committee made up of representatives from 56 participating entities, is the

[18] Additional information on the AMWG can be found at www.usbr.gov/uc/rm/amp.
[19] Additional information on the Upper Colorado Recovery Program can be found at http://coloradoriverrecovery.fws.gov.
[20] Additional information on the San Juan Recovery Program can be found at www.fws.gov/southwest/sjrip.
[21] Additional information on the LCR MSCP can be found at http://www.lcrmscp.gov.

primary implementing agency. The LCR MSCP is currently meeting the goals outlined in the habitat conservation plan.

The following paragraphs discuss the 2008 and most probable projected 2009 operation of each of the reservoirs with respect to applicable provisions of compacts, the Consolidated Decree, statutes, regulations, contracts, and instream flow needs for maintaining or improving aquatic and riparian resources where appropriate.

Fontenelle Reservoir

Hydrologic conditions in water year 2008 in the Upper Green River Basin were slightly below average when compared to the historic record for the reservoir. The April through July inflow to Fontenelle Reservoir during water year 2008 was 0.582 maf (718 mcm), which was 68 percent of average. Though conditions were well above average in the rest of the Upper Colorado River Basin, the Upper Green River Basin was below average and was classified as continuing to be in drought. Inflow to Fontenelle Reservoir has been below average for nine consecutive years.

Fontenelle Reservoir filled in 2008 and bypass releases were necessary in order to safely route the spring runoff. Inflow peaked at 6,225 cfs (176 ~~cubic meters per second [~~cms~~]~~) on June 27, 2008. Releases from Fontenelle Reservoir increased from a baseflow of 700 cfs (19.8 cms) to powerplant capacity (approximately 1,700 cfs~~,~~ [48 cms]) during the spring runoff period. Bypass releases up to 2,500 cfs (70.8 cms) were sustained for a total of 11 days in July, including ramping days. The resulting peak releases of 4,195 cfs (119 cms) occurred on July 10, 2008. The peak elevation of Fontenelle Reservoir during water year 2008 was 6,505.7 feet (1,982.9 meters) ~~above sea level~~ which occurred on July 8, 2008. This elevation is 0.3 feet (0.1 meters) below the spillway crest elevation.

The most probable April through July inflow to Fontenelle Reservoir during water year 2009 is 0.766 maf (945 mcm), or 89 percent of average. This volume far exceeds the 0.345 maf (426 mcm) storage capacity of Fontenelle Reservoir. For this reason, the most probable and probable maximum inflow scenarios require releases during the spring that exceed the capacity of the powerplant to avoid uncontrolled spills from the reservoir. It is very likely that Fontenelle Reservoir will fill during water year 2009. In order to minimize high spring releases and to maximize downstream water resources and power production, the reservoir will most likely be drawn down to about elevation 6,468 feet (1,971 meters) by early April 2009, which is five feet (1.5 meters) above minimum power pool, and corresponds to a volume of 0.111 maf (137 mcm) of live storage.

Flaming Gorge Reservoir

Inflow to Flaming Gorge Reservoir during water year 2008 was below average. Unregulated inflow in water year 2008 was 1.023 maf (1,262 mcm), which is 59 percent of average. Flaming Gorge Reservoir did not fill during water year 2008. On October 1, 2007, the beginning of water year 2008, the reservoir elevation was 6,022.3 feet (1,835.6 meters). The reservoir elevation showed an overall decrease during water year 2008 with an ending water year (September 30, 2008) reservoir elevation of 6,021.25 feet (1,835.28 meters). The water year ending reservoir elevation was 18.75 feet (5.72 meters) below the full pool elevation of

6,040.0 feet (1,841.0 meters) which corresponds to an available storage space of 0.726 maf (896 mcm).

Reclamation operated Flaming Gorge Dam in compliance with the Flaming Gorge Record of Decision (Flaming Gorge ROD) in 2008. The hydrologic conditions during the spring of 2008 were designated as average. Reclamation convened the Flaming Gorge Technical Working Group (FGTWG) comprised of the Service, Western Area Power Administration (Western), and Reclamation personnel. The FGTWG proposed to Reclamation that the Green River measured at the Jensen, Utah, stream ~~gauge~~ gage be managed to maintain flows at or above 15,000 cfs (425 cms) for a minimum of five consecutive days during the peak flows of the Yampa River. The Yampa River Basin received significant amounts of moisture and the FGTWG agreed that if flows at Jensen, Utah, were at or above 18,600 cfs (526.4 cms) for at least 10 days, Reclamation should consider managing river flows to achieve the 18,600 cfs (526.4 cms) target at Jensen, Utah, for 14 days if reasonably possible.

Releases from Flaming Gorge Reservoir were increased to powerplant capacity of 4,300 cfs (121.8 cms) on May 17, 2008, in anticipation of peak flows on the Yampa River. On June 6, 2008, as a result of releases from Flaming Gorge Dam and flows on the Yampa River, the flows in the Green River at Jensen reached 23,875 cfs (676 cms). Releases were maintained at powerplant capacity until June 15, 2008, when the flows in the Green River at Jensen dropped below 14,000 cfs (396 cms). Flows in the Green River at Jensen remained above 15,000 cfs (425 cms) from May 21, 2008, to June 14, 2008 (24 days), with 14 days of flows greater than 18,600 cfs (526.4 cms). The use of the bypass tubes was not required to meet these flow objectives. Releases from Flaming Gorge Reservoir were reduced by 500 cfs (14 cms) per day beginning on June 15, 2008.

In June 2008, hydrologic conditions deteriorated from average to ~~a~~ moderately dry. Reclamation convened the FGTWG to develop a flow proposal for the Green River during the base flow period (August through February of the following year). The FGTWG proposed to Reclamation that flows in the Green River, during the base flow period, should fall within the average range, as described in the Flaming G~~g~~orge Final Impact Statement for the Action Alternative. The purpose of this proposal was to better match the flow conditions that occurred during the spring peak when average targets were achieved. Additionally, the Upper Colorado ~~River Endangered Species~~ Recovery Program requested research flows of 1,500 cfs (42.48 cms) in the Green River below Flaming Gorge Dam during the base flow period through September 30, 2008. Releases reached 1,500 cfs (42.48 cms) on June 25, 2008, and were maintained at that ~~the~~ level through September 30, 2008.

During water year 2009, Flaming Gorge Dam will continue to be operated in accordance with the Flaming Gorge ROD. High spring releases are scheduled to occur in 2009, timed with the Yampa River's spring runoff peak flow, followed by lower summer and autumn base flows. Under the most probable scenario, releases of 1,100 cfs (31.1 cms) ~~will~~ ~~begin~~began on October ~~1~~3, 2008, and will likely continue through February 28, 2009. Beginning March 1, 2009, releases would~~will~~ decrease to 800 cfs (22.6~~5~~ cms) and ~~will~~would likely remain at that level until the beginning of the 2009 high spring peak release. Western is working with the Utah Department of Wildlife Resources to study effects downstream of a double-peak fluctuating flow pattern. Reclamation will be considering an operation

regime that includes double peaks during the winter months of water year 2009 depending on water availability.

The Upper Colorado~~River Endangered Species~~ Recovery Program, in coordination with Reclamation, the Service, and Western, is conducting studies associated with floodplain inundation. Such studies include: (1) improving connectivity of floodplain habitats, (2) identifying ways to improve entrainment of larval razorback suckers into floodplain habitats, (3) maintaining the river channel, (4) restoring natural variability of the river system, and (5) analyzing possibilities for meeting ~~the goals of the Flow~~ flow and ~~Temperature~~ temperature ~~R~~recommendations ~~for Endangered Fishes in the Green River downstream of Flaming Gorge Dam~~ at lower peak flow levels where feasible.[22]

Blue Mesa, Morrow Point, and Crystal Reservoirs (Aspinall Unit)

Above average snowpack conditions prevailed in the Gunnison Basin during water year 2008. Snow measurement sites in the basin reported above average moisture throughout the winter and into the spring of 2008. The April through July unregulated runoff into Blue Mesa Reservoir in 2008 was 1.006 maf (1,241 mcm), which was 140 percent of average. Water year 2008 unregulated inflow into Blue Mesa Reservoir was 1.324 maf (1,633 mcm), which was 133 percent of average. Blue Mesa Reservoir came close to filling in 2008 reaching a peak elevation of 7,511.87 feet (2,289.6 meters) on July 31, 2008, 7.5 feet (2.3 meters) from full pool. Storage in Blue Mesa Reservoir decreased~~increased~~ during water year 2008 by 0.037 maf (45.64 mcm). Storage in Blue Mesa Reservoir on September 30, 2008, was 0.650 maf (802 mcm), or 78 percent of capacity.

Releases from Aspinall Unit reservoirs in 2008 were much above normal levels. Releases from the Aspinall Unit provided for a flow of 650 to 1,100 cfs (18.4 to 31.1 cms) from October 1, 2007, to January 9, 2008, in the Gunnison River through the Black Canyon (below the Gunnison Tunnel). On January 19, 2008, releases were increased to 1,800 cfs (51.0 cms) in response to above average forecasted inflow. Beginning the first week of March, Crystal Dam releases were decreased to accomplish planned maintenance activities for inspection of the stilling basin at Crystal Dam ~~stilling basin~~ and later in the month for rock removal from the stilling basin at Blue Mesa Dam~~Reservoir's stilling basin~~. During the month of March, flows ranged from a low of no flow (very short duration) up to 1,900 cfs (53.8 cms). Starting the first of April, after all maintenance activities were accomplished, Crystal Dam releases were increased to maximum powerplant capacity of 2,100 cfs (59.5 cms). Later in April, the releases were again increased and the river bypass valves were opened. Maximum bypass at Crystal Dam was realized on April 29, 2008, at 4,200 cfs (118.9 cms). Crystal Dam started to spill on May 21, 2008, and achieved a maximum release of 7,921 cfs (224 cms) on May 31, 2008. Water year 2008 powerplant bypasses were approximately 0.391 maf (482 mcm) at Crystal Dam. These bypass releases occurred due to the large spring runoff and to a lesser ~~extant~~ extent due to maintenance activities during March.

[22] Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam, September 2000.

On August 16, 1995, Memorandum of Agreement (MOA) No. 95-07-40-R1760 was signed by Reclamation, the Service, and the Colorado Water Conservation Board. The purpose of the MOA was to provide water to the Redlands Fish Ladder, assure at least 300 cfs (8.5 cms) of flow in the 2-mile reach of the Gunnison River between the Redlands Fish Ladder and the confluence of the Gunnison and Colorado Rivers (2-mile reach), and to benefit Colorado River Basin endangered fish. This MOA was extended for an additional five years on June 30, 2000. A key provision of the MOA requires that the parties adopt a plan to share water shortages in dry years, when total storage at Blue Mesa Reservoir is projected to drop below 0.40 maf (493 mcm) by the end of calendar year 2008. However, the MOA was not renewed in 2005. To the extent possible, Reclamation will continue to meet the intent of the MOA to the degree that ~~as~~ it falls within the scope of normal operations and will also continue to coordinate with the Aspinall Working Group as part of the operational planning process.

For water year 2009, the Aspinall Unit will be operated to conserve storage while meeting downstream delivery requirements, consistent with authorized project purposes. Under normal conditions, the minimum release objectives of the Aspinall Unit are to honor the delivery requirements of the Uncompahgre Valley Project, and other senior water rights downstream, to the extent possible to maintain a year round minimum flow of at least 300 cfs (8.5 cms) in the Gunnison River through the Black Canyon, and to the extent possible maintain a minimum flow of 300 cfs (8.5 cms) in the 2-mile reach below the Redlands Diversion Dam during the months of July through October. In dry years, the 300 cfs (8.5 cms) flow through the canyon and the 2-mile reach may be reduced. In 2009, under the most probable inflow conditions, flows through the Black Canyon of the Gunnison National Park will be above the 300 cfs (8.5 cms) minimum release objective during the summer months. Consideration shall be given to the trout fishery in the Black Canyon and Gunnison Gorge and recreational interests consistent with ~~P~~project purposes. Releases during 2009 will be planned to minimize fluctuations in the daily and monthly flows in the Gunnison River below the Gunnison Tunnel diversion.

Under the probable minimum inflow scenario, Blue Mesa Reservoir would not fill in 2009. Under the most probable and probable maximum inflow scenarios, Blue Mesa Reservoir is expected to fill in 2009.

Navajo Reservoir

Inflow to Navajo Reservoir in 2008 was above the 30-year average. Water year 2008 unregulated inflow was 1.337 maf (1,649 mcm), or 120 percent of average. The April through July unregulated inflow into Navajo Reservoir in water year 2008 was 0.959 maf (1,183 mcm), or 122 percent of average. Unregulated inflow to Navajo Reservoir has been below average for all water years from 2000 through 2007, except for 2005 which was 136 percent of average.

Navajo Reservoir reached a peak water surface elevation of 6,066.8 feet (1,849.2 meters) on May 25, 2008, 18.2 feet (5.5 meters) from full pool. The water surface elevation at Navajo Reservoir on September 30, 2008, was 6,057.7 feet (1,846.4 meters), with reservoir storage at 78 percent of capacity.

~~The~~ A final report ~~titled, "Flow Recommendations for the San Juan River" (San Juan Flow Recommendations),~~ which outlines flow recommendations for the San Juan River (San Juan Flow Recommendations) below Navajo Dam, was completed by the San Juan Recovery Program in May 1999 after a seven-year research period.[23] The purpose of the report was to provide flow recommendations for the San Juan River that promote the recovery of the endangered Colorado River pikeminnow and razorback sucker, maintain important habitat for these two species as well as the other native species, and provide information for the evaluation of continued water development in the basin.

In 2006, Reclamation completed a NEPA process on the implementation of operations at Navajo Dam that meet the San Juan Flow Recommendations, or a reasonable alternative to them. ~~–~~The ROD for the Navajo Reservoir Operations Final EIS was signed by the Regional Director of Reclamation's Upper Colorado Region on July 31, 2006.

The San Juan Flow Recommendations called for a 21-day spring peak release of 5,000 cfs (142 cms) from Navajo Reservoir in 2008. Due to a high inflow forecast received in February, a release of 3,000 cfs (85~~4.9~~ cms) began on February 12, 2008. The decision was made to begin releases a couple weeks earlier than the March 1st minimum release date identified in the San Juan Flow Recommendations to avoid a potential spill and to avoid triggering mandatory inspections of the outlet works that are required at higher releases. Another increase in the inflow forecast for March led to the decision to release 4,000 cfs (113~~4~~ cms) beginning March 10, 2008. This release continued until April 7, 2008, when the release was reduced in order to perform a required inspection on the 72-inch main outlet pipe. The April inflow forecast led to the decision to continue releases at 2,200 cfs (62.~~5~~3 cms). A further decrease in releases to 1,000 cfs (28.~~4~~3 cms) occurred on May 12, 2008, due to a further decrease in the May inflow forecast. The spring peak release began on May 19, 2008, with a release of 2,000 cfs (56.~~8~~6 cms) ramping up to a release rate of 5,000 cfs (142 cms) reached on May 28, 2008, and maintained through June 18, 2008. The rampdown began on June 19, 2008 and the base summer release rate of 500 cfs (14.~~1~~2 cms) was implemented on July 2, 2008.

In 2007, a two-year agreement~~, "Recommendations for Administration and Operation of the San Juan River,"~~ was developed among~~st~~ major users to limit their water use to the rates/volumes indicated in the agreement.[24] ~~for the years 2007-2008.~~ The 2007-2008 agreement was similar to the agreements that were developed in 2003, 2004, 2005, and 2006. Ten major water users (the Jicarilla Apache and Navajo Nations, Hammond Conservancy District, Public Service Company of New Mexico, City of Farmington, Arizona Public Service Company, BHP-Billiton, Bloomfield Irrigation District, Farmers Mutual Ditch, and Jewett Valley Ditch) endorsed the recommendations. The recommendations included limitations on diversions for 2007-2008, criteria for determining a shortage, and shortage-sharing requirements in the event of a water supply shortfall, including sharing of shortages between the water users and the flow demands for endangered fish habitat. In addition to the ten major water users, the New Mexico Interstate Stream Commission, the Bureau of Indian Affairs, the Service, and the San Juan Recovery

[23] Flow Recommendations for the San Juan River, May 1999.
[24] Recommendations for San Juan River Operations and Administration for 2007 and 2008, December 15, 2006.

Program all provided input to the recommendations. The recommendations were acknowledged by Reclamation and the New Mexico State Engineer for reservoir operation and river administration purposes. A new two-year agreement, similar to past years, is expected to be developed for 2009 and 2010.

During water year 2009, Navajo Reservoir will be operated in accordance with the Navajo Reservoir Operations ROD. Navajo Reservoir storage levels are expected to be near average in 2009 under the most probable inflow scenario. Releases from the reservoir will likely remain at a 500 cfs (14 cms) base release through the winter. Under the most probable inflow condition in 2009, a 21-day spring peak release of 5,000 cfs (142 cms), as described in the San Juan Flow Recommendations, is likely to occur.

Lake Powell

Reservoir storage in Lake Powell increased significantly in water year 2008. On October 1, 2007, the beginning of water year 2008, reservoir storage in Lake Powell was 49 percent of capacity or 11.93 maf (14,720 mcm). As a result of inflows to Lake Powell during water year 2008 that were above normal (102 percent of average), Lake Powell storage increased ~~during water year 2008~~ by 2.58 maf (3,180 mcm) and ended the water year ~~2008~~ (September 30, 2008) at 60 percent of capacity, or 14.51 maf (17,920 mcm).

Due to low reservoir storage at Lake Powell on January 1, 2008, and storage in Lake Powell being less than Lake Mead, and in concurrence with Section 6.B (Upper Elevation Balancing Tier) of the Interim Guidelines, the annual release volume from Glen Canyon Dam in 2008 was initially scheduled to be 8.23 maf (10,~~0~~150 mcm). ~~In April, consistent with Section 6.B.3 of the Interim Guidelines,~~ However, the April 24-month study ~~forecasted inflows to Lake Powell~~ projected the September 30, 2008, Lake Powell elevation to be above 3,636 feet (1,108.2 meters) (the equalization level for water year 2008), based on the April 1st final inflow forecast. Consistent with Section 6.B.3 of the Interim Guidelines, this ~~which~~ triggered Section 6.A (Equalization Tier) of the Interim Guidelines to govern the operation of Glen Canyon Dam for the remainder of water year 2008. ~~Under the Equalization Tier,~~ T~~t~~he annual release volume during water year 2008 from Glen Canyon Dam was 8.978 maf (11,070 mcm).

April through July unregulated inflow to Lake Powell in water year 2008 was 8.906 maf (10,990 mcm) or 112 percent of average. Lake Powell reached a seasonal peak elevation of 3,633.7 feet (1,107.6 meters), 66.3 feet (20.2 meters) from full pool, on July 16, 2008. On September 30, 2008, the water surface elevation of Lake Powell was 3,626.9 feet (1,105.5 meters), 73.1 feet (22.3 meters) from full pool.

In December 2007, Reclamation proposed a Spring 2008 high flow test as part of experimental releases from Glen Canyon Dam. This proposal was the result of information gathered through scientific monitoring and research activities and discussions within the Glen Canyon Dam Adaptive Management Program. The proposal also included steady flows in September and October to be implemented each year during the next five years (2008-2012) and ROD flows in the other months (November through August). ESA and NEPA compliance for the proposed high flow test and five-year period of steady flows was completed. A Final Biological Opinion on the Operation of Glen Canyon Dam was issued

on February 27, 2008, and a final Environmental Assessment (EA) and Finding of No Significant Impact were issued on February 29, 2008.

The high flow test was initiated on March 5, 2008, and completed on March 9, 2008. During the high flow experiment, Reclamation released water through Glen Canyon Dam's powerplant and bypass tubes to a maximum amount of 41,500 cfs (1,180 cms) for 60 hours. As a result of the high flow test, the elevation of Lake Powell dropped by approximately 2.3 feet (0.70 meters). However, the annual volume of water released from Lake Powell for water year 2008 was not modified as a result of the high flow experiment.

A test of steady flows (steady daily releases), as described in the EA, was conducted during September and October in 2008. The steady flow test will be repeated through 2012.

Annual releases from Lake Powell during water year 2009 will be made consistent with Section 6.B (Upper Elevation Balancing Tier) of the Interim Guidelines. Consistent with Section 6.B.1 of the Interim Guidelines, the water year release from Lake Powell in 2009 will be 8.23 maf (10,150 mcm) unless provisions in Section 6.B.3 occur. Consistent with Section 6.B.3 of the Interim Guidelines, if the April 2009 24-Month Study projects the September 30, 2009, Lake Powell elevation to be greater than elevation 3,639.0 feet (1,109 meters), Section 6.A (Equalization Tier) of the Interim Guidelines will govern the release of water from Lake Powell for the remainder of water year 2009 (through September 2009). The distribution of release volumes throughout water year 2009 will be consistent with the 1996 ROD and subsequent environmental compliance documents.

Under the minimum probable inflow scenario, the Upper Elevation Balancing Tier would govern throughout water year 2009 and the annual release volume from Lake Powell would be 8.23 maf (10,150 mcm). The projected September 30, 2009, elevation and reservoir storage would be 3,594.5 feet (1,095.6 meters) and 11.23 maf (13,850 mcm), respectively. Under the most probable and maximum probable inflow scenarios, the Upper Elevation Balancing Tier would govern through April 2009. In April 2009, however, the projected September 30, 2009, elevation of Lake Powell under the most probable and maximum probable inflow scenarios would ~~likely~~ trigger the Equalization Tier to govern the annual release volume for the remainder of water year 2009. Under the most probable inflow scenario the projected annual release volume would be 9.197 maf (11,350 mcm). The projected September 30, 2009, elevation and reservoir storage would be 3,632.0 feet (1,107.0 meters) and 15.07 maf (18,590 mcm), respectively. Under the maximum probable inflow scenario the projected annual release volume would be 13.91 maf (17,160 mcm). The projected September 30, 2009, elevation and reservoir storage would be 3,651.7 feet (1,113.0 meters) and 17.42 maf (21,490 mcm), respectively.

In 2009, scheduled maintenance activities at Glen Canyon Dam powerplant will require that one or more of the eight generating units periodically be offline. Coordination between Reclamation offices in Salt Lake City, Utah, and Page, Arizona, will take place in the scheduling of maintenance activities to minimize impacts to operations throughout the water year including potential experimental releases.

Because of less than full storage conditions in Lake Powell resulting from drought in the Colorado River Basin, releases for dam safety purposes are highly unlikely in 2009. If

implemented, releases greater than powerplant capacity would be made consistent with the 1956 Colorado River Storage Project Act, the Colorado River Basin Project Act, and to the extent practicable, the recommendations made pursuant to the 1992 Grand Canyon Protection Act. Reservoir releases in excess of powerplant capacity required for dam safety purposes during high reservoir conditions may be used to accomplish the objectives of the beach/habitat-building flow according to the terms contained in the Glen Canyon Dam ROD and as published in the Glen Canyon Dam Operating Criteria (62 *Federal Register* 9447, March 3, 1997).

Daily and hourly releases in 2009 will be made according to the parameters of the 1996 ROD for the Glen Canyon Dam Final Environmental Impact Statement (GCDFEIS) and the Glen Canyon Dam Operating Criteria, as shown in Table 5. Exceptions to these parameters may be made during power system emergencies, during experimental releases, or for purposes of humanitarian search and rescue.

Table 5. Glen Canyon Dam Release Restrictions (Glen Canyon Dam Operating Criteria)

Parameter	(cfs)	(cms)	Conditions
Maximum Flow[25]	25,000	708~~.0~~	
Minimum Flow	5,000	14~~21.6~~	7:00 p.m. to 7:00 a.m.
	8,000	22~~76.6~~	7:00 a.m. to 7:00 p.m.
Ramp Rates			
Ascending	4,000	113~~.3~~	per hour
Descending	1,500	4~~32.5~~	per hour
Daily Fluctuations[26]	5,000 / 8,000	14~~21.6~~ / 22~~76.6~~	

Releases from Lake Powell in water year 2009 will continue to reflect consideration of the uses and purposes identified in the authorizing legislation for Glen Canyon Dam. Powerplant releases will reflect criteria based on the findings, conclusions, and recommendations made in the 1996 ROD for the GCDFEIS pursuant to the Grand Canyon Protection Act of 1992 and appropriate NEPA documentation regarding experimental flows.

Consistent with the GCDFEIS and the 1996 ROD, projected monthly releases under the most probable, minimum probable, and maximum probable inflow scenario, for water year 2009, are displayed in Table 6 and Table 7.

[25] May be exceeded during beach/habitat-building flows, habitat maintenance flows, or when necessary to manage above average hydrologic conditions.

[26] Daily fluctuations limit is 5,000 cfs (142 cms) for months with release volumes less than 0.600 maf (740 mcm); 6,000 cfs (170 cms) for monthly release volumes of 0.600 to 0.800 maf (740 to 990 mcm); and 8,000 cfs (227 cms) for monthly release volumes over 0.800 maf (990 mcm).

Table 6. Projected Monthly Releases from Lake Powell in Water Year 2009 Under Most Probable Inflow Conditions (English Units)[27]

Month	Most Probable Inflow Scenario Projected Monthly Release Volume (maf)	Minimum Probable Inflow Scenario Projected Monthly Release Volume (maf)	Maximum Probable Inflow Scenario Projected Monthly Release Volume (maf)
October 2008	0.743	0.717	0.717
November 2008	0.600	0.600	0.600
December 2008	0.800	0.800	0.800
January 2009	0.800	0.800	0.800
February 2009	0.700	0.600	1.000
March 2009	0.700	0.600	1.537
April 2009	0.700	0.600	1.487
May 2009	0.800	0.600	1.537
June 2009	0.814	0.650	1.487
July 2009	0.970	0.832	1.537
August 2009	0.970	0.831	1.537
September 2009	0.600	0.600	0.875
Water Year 2009 Total	9.197	8.230	13.914

Table 7. Projected Monthly Releases from Lake Powell in Water Year 2009 Under Most Probable Inflow Conditions (Metric Units)

Month	Most Probable Inflow Scenario Projected Monthly Release Volume (mcm)	Minimum Probable Inflow Scenario Projected Monthly Release Volume (mcm)	Maximum Probable Inflow Scenario Projected Monthly Release Volume (mcm)
October 2008	916	884	884
November 2008	740	740	740
December 2008	987	987	987
January 2009	987	987	987
February 2009	863	740	1,233
March 2009	863	740	1,896
April 2009	863	740	1,834
May 2009	987	740	1,896
June 2009	1,004	802	1,834
July 2009	1,196	1,026	1,896
August 2009	1,196	1,025	1,896
September 2009	741	740	1,079
Water Year 2009 Total	11,342	10,151	17,162

The ten-year total flow of the Colorado River at Lee Ferry[28] for water years 1999 through 2008 is 88.7 maf (109,400 mcm). This total is computed as the sum of the flow of the

[27] Modifications to projected monthly releases from Lake Powell would be made based on changes in forecasted conditions or other relevant factors.

Colorado River at Lees Ferry, Arizona, and the Paria River at Lees Ferry, Arizona, surface-water discharge stations which are operated and maintained by the United States Geological Survey.

Lake Mead

For calendar year 2008, the ICS Surplus Condition was the criterion governing the operation of Lake Mead in accordance with Article III(3)(b) of the Operating Criteria, Article II(B)(2) of the Consolidated Decree, and Section 2.B.5 of the Interim Guidelines. A volume of 1.500 maf (1,850 mcm) of water was scheduled for delivery to Mexico in accordance with Article 15 of the 1944 United States-Mexico Treaty and Minutes No. 242 and 310 of the IBWC.

Lake Mead began water year 2008 on October 1, 2007, at elevation 1,111.06 feet (338.7 meters), with 12.50 maf (15,419 mcm) in storage, which is 48 percent of the conservation capacity of 25.88 maf (31,923 mcm). Lake Mead's elevation increased to an elevation of 1,116.93 feet (340.4 meters) by the end of February 2008. After February 2008, Lake Mead steadily declined. The September 30, 2008, end of water year elevation at Lake Mead was 1,105.76 feet (337.0 meters), with 12.01 maf (14,814 mcm) in storage (46 percent of capacity).

The total release from Lake Mead through Hoover Dam during water year 2008 was 9.531 maf (11,756 mcm). The total release from Lake Mead through Hoover Dam during calendar year 2008 is projected to be 9.501 maf (11,719 mcm). Consumptive use from Lake Mead during calendar year 2008 resulting from diversions for Nevada above Hoover Dam is projected to be 0.282 maf (347.8 mcm).

The total inflow into Lake Mead is a combination of water released from Glen Canyon Dam plus inflows in the reach between Glen Canyon and Hoover Dams. In water year 2008, inflow into Lake Mead was 9.894 maf (12,204 mcm). For water year 2009, under the most probable assumptions, total inflow into Lake Mead is anticipated to be 10.13 maf (12,495 mcm).

Under the most probable inflow conditions during water year 2009, Lake Mead will be at its maximum elevation of 1,114.20 feet (339.6 meters), with 12.80 maf (15,789 mcm) in storage, at the end of February 2009. Lake Mead will likely decline during water year 2009 to reach its minimum elevation of approximately 1,104.71 feet (336.7 meters), with approximately 11.92 maf (14,703 mcm) in storage, at the end of ~~July~~ June 2009.

Based on the August 2008 24-Month Study, Lake Mead's elevation on January 1, 2009, is projected to be 1,110.41 feet (338.5 meters). In accordance with Section 2.B.5 of the Interim Guidelines, the ICS Surplus Condition will govern the releases from Lake Mead in calendar year 2009. Releases from Lake Mead through Hoover Dam for water year and calendar year 2009 are anticipated to be approximately the same as 2008 releases.

Lakes Mohave and Havasu

[28] A point in the mainstream of the Colorado River one mile below the mouth of the Paria River.

At the beginning of water year 2008, Lake Mohave was at an elevation of 637.26 feet (194.2 meters), with an active storage of 1.545 maf (1,906 mcm). The water level of Lake Mohave was regulated between elevation 634.2 feet (193.3 meters) and 644.0 feet (196.3 meters) throughout the water year, ending at an elevation of 638.8 feet (194.7 meters) with 1.585 maf (1,955 mcm) in storage. The total release from Lake Mohave through Davis Dam for water year 2008 was 9.206 maf (11,355 mcm) for downstream water use requirements. The calendar year 2008 total release is projected to be 9.216 maf (11,368 mcm).

For water year and calendar year 2009, Davis Dam is projected to release approximately the same amount of water as in 2008. The water level in Lake Mohave will be regulated between an elevation of approximately 633 feet (193 meters) and 645 feet (197 meters).

Lake Havasu started water year 2008 at an elevation of 447.8 feet (136.5 meters) with 0.576 maf (710.5 mcm) in storage. The water level of Lake Havasu was regulated between elevation 446.4 feet (136.1 meters) and 448.8 feet (136.8 meters), throughout the water year, ending at an elevation of 448.2 feet (136.6 meters), with 0.584 maf (720 mcm) in storage. During water year 2008, 6.692 maf (8,254 mcm) were released from Parker Dam. The calendar year 2008 total release is projected to be 6.806 maf (8,395 mcm). Diversions from Lake Havasu during calendar year 2008 by the Central Arizona Project (CAP) and MWD are projected to be 1.505 maf (1,856 mcm) and 0.842 maf (1,039 mcm), respectively.

For water year 2009, Parker Dam is expected to release approximately the same amount of water as in water year 2008. Diversions from Lake Havasu in calendar year 2009 by CAP and MWD are projected to be 1.514 maf (1,867 mcm) and 0.833 maf (1,028 mcm), respectively.

Lakes Mohave and Havasu are scheduled to be drawn down in the late summer and fall months to provide storage space for local storm runoff and will be filled in the winter to meet higher summer water needs. This drawdown will also correspond with normal maintenance at both Davis and Parker powerplants which is scheduled for September through February.

At Davis Dam, a major overhaul of Unit No. 2 began on October 1, 2007, and the unit was returned to service on March 17, 2008. This overhaul included removal and maintenance of the fixed wheel gate and hydraulic cylinder, as well as testing the generator windings. Rehabilitation of the fixed wheel gate of Unit 1 ~~is tentatively scheduled for water year 2009~~began on October 6, 2008, with an anticipated return to service of March 19, 2009.

At Parker Dam, a major turbine overhaul of Unit 1 began on September 7, 2007, and ~~it~~ the unit was returned to service on August 15, 2008. A major turbine overhaul of Unit 2 ~~is scheduled~~ began on ~~for~~ September 2, 2008, ~~through~~ with an anticipated return to service of February 28, 2009.

Bill Williams River

Runoff and precipitation events during December 2007, and January and February 2008, contributed to tributary inflows that increased Lake Alamo's storage by 0.050 maf (61.67 mcm) by mid March 2008. Tributary monthly inflows into Lake Alamo were below average

except for January during water year 2008. Abnormally dry to moderate drought conditions persisted for water year 2008 ~~throughout~~ in far western ~~and southern~~ Arizona, including the Bill Williams River watershed. Tributary inflow from the Bill Williams River into the mainstream of the Colorado River totaled 0.029 maf (35.77 mcm) for water year 2008, approximately 28 percent of the long-term average.

Releases in water year 2008 from the United States Army Corp of Engineers' (USACE's) Alamo Dam were coordinated with the Service and the Bill Williams River Corridor Steering Committee (BWRCSC) to maintain riparian habitat established in water year 2005 and 2006. Alamo Lake elevation was approximately 1,112.01 feet (338.94 meters) after October 1, 2007, and increased to elevation 1,126.15 feet (343.25 meters) by mid March 2008. A storage volume of 0.002 maf (2.47 mcm), equivalent to the storage between approximately elevations 1,125.8 feet (343.1 meters) and 1,125.4 feet (343.0 meters), was released on March 31, 2008. The purpose of the release was to maintain downstream riparian habitat. The March 31, 2008, release from Alamo Dam increased from approximately 40 cfs (1 cms) to approximately 2,000 cfs (56.6 cms) for a 14-hour period, tapering to approximately 40 cfs (1 cms) on the same day. Data collection associated with Alamo Dam releases supports ongoing studies conducted by the ~~Bill Williams Steering Committee~~ BWRCSC. The BWRCSC ~~Bill Williams Steering Committee~~ is chaired by the Service and is comprised of other stakeholders, including, but not limited to, Reclamation, the USACE, the Bureau of Land Management, and other governmental and non-governmental organizations.

Senator Wash and Laguna Reservoirs

Operations at Senator Wash Reservoir allow regulation of water deliveries to United States water users upstream and downstream of Imperial Dam and Mexican water users downstream of Imperial Dam. The reservoir is utilized as an off-stream storage facility to meet downstream water demands and to conserve water for future uses in the United States and the scheduled uses of Mexico in accordance with the 1944 United States-Mexico Water Treaty obligations. Senator Wash Reservoir is the only major storage facility below Parker Dam (approximately 142 river miles downstream) and has a storage capacity of 0.014 maf (17.27 mcm) at full pool elevation of 251.0 feet (76.5 meters). Operational objectives are to store excess flows from the river caused by water user cutbacks and side wash inflows due to rain. Stored waters are utilized to meet the ~~United States' and Mexico's~~ water ~~demands~~demands of the United States and the delivery obligation to Mexico.

Since 1992, elevation restrictions have been placed on Senator Wash Reservoir due to potential piping and liquefaction of foundation and embankment materials at West Squaw Lake Dike and Senator Wash Dam. Currently, Senator Wash Reservoir is restricted to an elevation of 240.0 feet (73.2 meters) with 0.009 maf (11.10 mcm) of storage, a loss of about 0.005 maf (6.167 mcm) of storage from its original capacity. Senator Wash Reservoir elevation must not exceed an elevation of 238.0 feet (72.5 meters) for more than 10 consecutive days. This reservoir restriction is expected to continue in 2009.

Laguna Reservoir is a regulating storage facility located approximately five river miles downstream of Imperial Dam. Operational objectives are similar to those for Senator Wash Reservoir and the reservoir is primarily used to capture sluicing flows from Imperial Dam.

The storage capability of Laguna Reservoir has diminished from about 1,500 acre-feet (1.850 mcm) to approximately 400 acre-feet (0.493 mcm) due to sediment accumulation and vegetation growth. Sediment accumulation in the reservoir has occurred primarily due to flood releases that occurred in 1983 and 1984, and flood control or space building releases that occurred between 1985 and 1988 and from 1997 through 1999.

Imperial Dam

Imperial Dam is the last diversion dam on the Colorado River for United States water users. From the head works at Imperial Dam, the diversions of flows for the United States' and Mexico's water users occur into the All-American Canal on the California side, and into the Gila Gravity Main Canal on the Arizona side of the dam. These diversions supply all the irrigation districts in the Yuma area, in Wellton-Mohawk, in the Imperial and Coachella Valleys, and through Siphon Drop and Pilot Knob to the Northerly International Boundary (NIB) for diversion at Morelos Dam to the Mexicali Valley in Mexico. The diversions also supply much of the domestic water needs in the Yuma area. Flows arriving at Imperial Dam for calendar year 2008 are projected to be 5.669 maf (6,993 mcm). The flows arriving at Imperial Dam for calendar year 2009 are projected to be approximately the same as calendar year 2008.

Gila River Flows

Although drought conditions eased for central Arizona, drought conditions persisted for water year 2008 ~~throughout~~ in other parts of the Lower Basin and the southwestern United States. Abnormally dry to moderate drought conditions persisted ~~throughout~~ in far western ~~and southern~~ Arizona, southern California, and southern Nevada. However, because of above average snowpack ~~on~~in the Gila, Salt, and Verde River watersheds, the Gila River Basin experienced 110 percent of average precipitation for water year 2008. During water year 2008 no tributary inflow from the Gila River reached the mainstream of the Colorado River.

Additional Regulatory Storage (Drop 2 Storage Reservoir)

In 2005, Reclamation completed a study[29] that evaluated the needs and developed options for additional water storage facilities on the mainstream of the Colorado River below Parker Dam. The study, developed in cooperation with ~~Imperial Irrigation District (~~IID~~)~~, Coachella Valley Water District (CVWD), San Diego County Water Authority (SDCWA), and MWD, recommended the construction of a small reservoir near the All-American Canal in Imperial County, California, as the best option.

The purpose of the planned 0.008 maf (9.868 mcm) Drop 2 Storage Reservoir is to capture extra water in the system, especially during storm events. The reservoir will make up for the loss of water storage at Senator Wash due to the operational restrictions and provide additional regulatory storage, allowing for more efficient management of water below Parker Dam.

[29] Preliminary Study of Lower Colorado River Water Storage Alternatives, February 21, 2005.

Final design of the Drop 2 Storage Reservoir was completed in the spring of 2008. The construction contract ~~is scheduled to be~~was awarded to Ames-Coffman Joint Venture on~~in~~ August 30, 2008 and construction of the first phase of the project ~~is scheduled to start~~ began in September 2008. Construction is scheduled to be completed in the fall of 2010.

Yuma Desalting Plant

In 1974, the Colorado River Basin Salinity Control Act (Public Law 93-320) authorized the federal government to construct the YDP to desalt the drainage flows from the Wellton-Mohawk Division of the Gila Project.~~The Yuma Desalting Plant (YDP) was authorized and constructed to reduce the salinity of drain water from the Wellton-Mohawk Division of the Gila Project,~~ This would allow~~ing~~ the treated water to be delivered to Mexico as part of its 1.5 maf (1,850 mcm) 1944 United States-Mexico Water Treaty allotment. ~~The YDP operated at one-third capacity from May 1992 through January 1993. Gila River flood flows occurring during 1993 damaged the concrete lining of sections of the Main Outlet Drain Extension (MODE), which carries feed water to the YDP. In January 1993, Reclamation placed the YDP into ready reserve status, and the YDP has continued to be maintained in that status.~~ To date, the United States has met salinity requirements, established in IBWC Minute 242 ~~of the 1944 United States-Mexico Water Treaty,~~ through use of a ~~the Main Outlet Drain (MOD)~~bypass canal to bypass Wellton-Mohawk drain water to the Cienega ~~de Santa Clara~~, a wetland of approximately 40,000 acres (16,200 hectares) of open water and vegetation that is within a Biosphere Reserve in Mexico. In calendar year 2008, the amount of water discharged through the ~~(MOD)~~bypass canal is ~~projected~~ anticipated to be 0.110 maf (135.7 mcm), measured at the Southerly International Boundary (SIB), at an approximate concentration of total dissolved solids of 2,430 parts per million (ppm).

Due to the ongoing drought in the Southwest, there is concern about continuing to discharge water through the bypass canal, as such water is not credited toward the United States' obligation to deliver water to Mexico pursuant to the 1944 United States-Mexico Water Treaty~~MOD~~. Reclamation initiated the Bypass Flow Consultation Process ~~a public process~~ in 2005 to identify, analyze, and evaluate methods to replace or recover the water discharged through the bypass canal ~~MOD~~. ~~A report is being prepared and is anticipated to be completed by the end of 2008.~~

As part of the public process, Reclamation completed a demonstration run of the YDP in 2007, operating the plant at 10 percent capacity for three months. By the conclusion of the three-month run, 0.004~~,349~~ maf~~acre-feet~~ (5.364 mcm) had been delivered to the Colorado River and included in water deliveries to Mexico, preserving an equivalent volume in Colorado River system storage. The plant produced 0.002~~,632~~ maf~~acre-feet~~ (3.247 mcm) of product water which was blended with 0.001~~,717~~ maf~~acre-feet~~ (2.118 mcm) of untreated bypass flow water prior to discharge into the Colorado River.

In early 2008, ~~the Lower Division States formed~~ a work group was formed to examine reactivation of the YDP. A proposed pilot project for operation of the YDP (YDP Pilot Project) is being considered to begin in 2009 to gather additional cost and operational data as well as data to assist in defining future modifications to further the public process. ~~as a means to recover a portion of the bypass flows. Work group members include: the Arizona Department of Water Resources (ADWR), the Central Arizona Water Conservation~~

~~District~~CAWCD, MWD, and SNWA have expressed interest in providing additional funding for the YDP Pilot Project. The funding entities would receive System Efficiency ICS credits in exchange for that funding. If the proposed YDP Pilot Project is implemented, it is anticipated that approximately 0.0296 maf (36.51 mcm) of water would be released to the Colorado River for delivery to Mexico, conserving an equivalent amount of water in Lake Mead. Reclamation anticipates the Bypass Flow Public Consultation Process will conclude after the YDP Pilot Project and appropriate reports are completed. ~~the City of Yuma, Environmental Defense Fund, MWD, SNWA, the Colorado River Board of California, Reclamation, and the Yuma County Water Users Association. Reclamation supports this work group with information and analysis.~~

Intentionally Created Surplus

The Interim Guidelines included the adoption of the ICS mechanism that among other things encourages the efficient use and management of Colorado River water in the Lower Basin. ICS may be created through several types of activities that include improvements in system efficiency, extraordinary conservation, tributary conservation, and the importation of non-Colorado River System water into the Colorado River mainstream. Several implementing agreements[30] were executed concurrent with the issuance of the ROD for the Interim Guidelines. ICS credits may be created and delivered in 2009 pursuant to the Interim Guidelines and the implementing agreements.

Demonstration Program. In 2006, Reclamation implemented an ICS Demonstration Program in the Lower Basin. This program allowed Colorado River water entitlement holders to undertake extraordinary conservation activities in 2006 and 2007 to reduce their approved annual consumptive use of Colorado River water and account for that conserved water in Lake Mead.

Reclamation entered into an agreement with MWD for the creation of ICS credits in calendar year 2006 and 2007.~~[31]~~[7] In calendar year 2006, MWD created 0.050 maf (61.67 mcm) of ICS credits. In calendar year 2008, MWD is anticipated to recover up to 0.046 maf (56.74 mcm) ~~the balance~~ of ~~its~~ ICS credits created under the ICS Demonstration Program. If MWD has not recovered all of its Demonstration Program ICS credits during calendar year 2008, MWD may request delivery of those credits during 2009.

In calendar year 2007, IID planned to create 0.001 maf (1.234 mcm) of ICS credits under the program.[8] Pursuant to the IID ICS agreement, the conserved water was applied to reduce its 2007 IOPP overrun.

[30] Delivery Agreement between the United States and IID; Delivery Agreement between the United States and MWD; Delivery Agreement between the United States, SNWA and the CRCN; Lower Colorado River Basin Intentionally Created Surplus Forbearance Agreement among the Arizona Department of Water Resources, SNWA, CRCN, the Palo Verde Irrigation District (PVID), IID, CVWD, MWD, and the City of Needles; and the California Agreement for the Creation and Delivery of Extraordinary Conservation Intentionally Created Surplus among the PVID, IID, CVWD, MWD, and the City of Needles.

~~[31] Agreement between Reclamation and MWD to Implement a Demonstration Program to Create Intentionally Created Surplus Water, May 18, 2006.~~

System Efficiency ICS. Reclamation, the Colorado River Commission of Nevada (CRCN), and SNWA signed a funding agreement for the construction of the Drop 2 Storage Reservoir on December 13, 2007. In exchange for project funding of $172 million, the agreement provides for SNWA to receive 0.600 maf (740.1 mcm) of ICS credits at an annual maximum delivery rate of 0.040 maf (49.34 mcm) from 2011 until the year 2036. MWD and CAWCD became parties to the Funding Agreement in May~~,~~ 2008. In exchange for a contribution of 1/6th of the project funding amount, MWD and CAWCD each received 0.100 maf (123.3 mcm) of SNWA's ICS credits with a corresponding reduction in SNWA's ICS credits to 0.400 maf (493.4 mcm). In the event that project costs exceed $172 million but are less than $206 million, SNWA would receive an additional ICS credit of 1 acre-foot for each $600 of additional funding provided.

In calendar year 2008, MWD is anticipated to take delivery of 0.034 maf (41.94 mcm) of System Efficiency ICS credits created from the Drop 2 Storage Reservoir project. In calendar year 2009, MWD may request delivery of up to 0.034 maf (41.94 mcm) of System Efficiency ICS credits created from the Drop 2 Storage Reservoir project.

~~**Extraordinary Conservation ICS.** MWD may create Extraordinary Conservation ICS in 2009.~~

Tributary Conservation ICS. Upon approval by the Secretary of an ICS creation plan, SNWA anticipates creating and taking delivery of Tributary Conservation ICS credits from projects on the Muddy and Virgin Rivers. SNWA anticipates creating and taking delivery of 0.016 maf (19.74 mcm) of Tributary Conservation ICS credits in 2008~~,~~ and 0.030 maf (37.00 mcm) in 2009. ~~Any Tributary Conservation ICS credits created in a year but not delivered in that year would be converted to Extraordinary Conservation ICS at the beginning of the following year.~~

System Conservation of Colorado River Water Demonstration Program

In 2006, Reclamation implemented the ~~System Conservation of Colorado River Water Demonstration Program (~~SC Demonstration Program~~)~~ in the Lower ~~Basin~~ Division States which allows entitlement holders to participate in voluntary conservation to conserve a portion of their approved annual consumptive use of Colorado River water in exchange for appropriate compensation provided by Reclamation. Reclamation extended the SC Demonstration Program through December 31, 2010.[9] The ~~water conserved (~~SC Water~~)~~ is retained in Lake Mead to assist in providing an interim, supplemental source of water to replace the drainage water from the WMIDD~~Wellton-Mohawk Irrigation and Drainage District~~ that is bypassed to the Cienega ~~de Santa Clara~~ and the reject stream from operation of the YDP~~Yuma Desalting Plant~~. In calendar year 2008, approximately 0.0031 maf (3.824~~700~~ mcm) of SC Water is anticipated to be created by YMIDD~~Yuma Mesa Irrigation and Drainage District (YMIDD)~~ and retained in Lake Mead.[10] In calendar year 2009, approximately 0.0035 maf (4.317 mcm) of SC Water is projected to be created by YMIDD and retained in Lake Mead.[11]

Delivery of Water to Mexico

~~Total delivery to Mexico for calendar year 2008 is projected to be approximately 1.536 maf (1,895 mcm), resulting in excess flows of approximately 0.036 maf (44.41 mcm). The excess flows in 2008 resulted from a combination of rejected water from water users after rain storms, inflows into the Colorado River below Parker Dam, and spills from irrigation facilities below Imperial Dam to the river.~~

Delivery to Mexico pursuant to the 1944 United States-Mexico Water Treaty is anticipated to be 1.500 maf (1,850 mcm) in calendar year 2008. Excess flows arriving at the NIB are anticipated to be 0.053 maf (65.37 mcm) in calendar year 2008. Excess flows result from a combination of factors, including water ordered but not delivered to United States users downstream of Parker Dam, inflows into the Colorado River below Parker Dam, and spills from irrigation facilities below Imperial Dam.

Of the ~~total~~delivery to Mexico in calendar year 2008, approximately 1.370 maf (1,690 mcm) is projected to be delivered at ~~the~~ NIB and approximately 0.125 maf (154.2 mcm) is projected to be delivered at ~~the Southerly International Boundary (~~SIB~~)~~. ~~, and~~ A~~a~~pproximately 0.005 maf (6.167 mcm) will be diverted from Lake Havasu and delivered through MWD, SDCWA, and the Otay Water District's respective distribution system facilities to Tijuana, Baja California at the request of the Mexican section of the IBWC.~~.~~

Of the delivery to ~~the~~ SIB in calendar year 2008, approximately 0.070 maf (86.34 mcm) is projected to be delivered from the Yuma Project Main Drain and approximately 0.055 maf (67.8 mcm) is expected to be delivered by the Protective and Regulatory Pumping Unit (Minute 242 wells).

~~In calendar year 2009, it is anticipated that a volume of 1.500 maf will be delivered to Mexico,~~Pursuant to the 1944 United States-Mexico Water Treaty, a volume of 1.500 maf (1,850 mcm) will be available to be scheduled for delivery to Mexico in calendar year 2009, of which 0.140 maf (172.7 mcm) is projected to be delivered at ~~the~~ SIB. ~~In accordance with Minute No. 310 and the~~ Following execution and approval of a new IBWC minute and amendment of the Emergency Delivery Agreement[32], up to 0.005 maf (6.167 mcm) may be delivered for Tijuana through MWD, SDCWA, and the Otay Water District's respective distribution system facilities in California. The remainder of the 1.500 maf (1,850 mcm) ~~Mexico's available water~~ will be delivered at NIB.

Drainage flows to the Colorado River from the Yuma Mesa Conduit (YMC) and South Gila Conduit are projected to be 0.042 maf (51.8 mcm) and 0.065 maf (80.18 mcm), respectively, for calendar year 2008. This water is available for delivery at ~~the~~ NIB in satisfaction of the 1944 United States-Mexico Water Treaty. Of the total flow in the YMC, groundwater pumped by Reclamation under permit from ADWR to replace water bypassed to the Cienega through the bypass canal ~~(MOD)~~, is projected to be between 0.018 to 0.022 maf

[32] ~~"~~The Agreement for Temporary Emergency Delivery of a Portion of the Mexican Treaty Waters of the Colorado River to the International Boundary in the Vicinity of Tijuana, Baja California, Mexico, and for Operation of the Facilities in the United States,~~"~~ applicable through November 9, 2008. It is anticipated that this agreement will be amended by the end of calendar year 2008.

(22.20 to 27.14 mcm) during calendar year 2008. In 2009, up to 0.025 maf (30.84 mcm) of groundwater is projected to be pumped under this permit.[33]

As stated in Minute 242, the maximum allowable salinity differential is 145 ppm by the United States' measurement or count and 151 ppm by the Mexican count. The salinity differential for calendar year 2008 is projected to be 143 ppm by the United States' count.

Mexico has identified four critical months, October through January, regarding improving the quality of water delivered at ~~the~~ SIB. As a matter of comity, the United States has agreed to reduce the salinity of water delivered at SIB during this period. To accomplish the reduction in salinity, the United States constructed a diversion channel to bypass up to 0.008 maf (9.868 mcm) of Yuma Valley drainage water during the four critical months identified by Mexico. This water will be replaced by better quality water from the Minute 242 well field to reduce the salinity at SIB. Reclamation anticipates bypassing approximately 0.001 maf (1.233 mcm) in calendar year 2008 to the diversion channel for salinity control and up to 0.008 maf (9.868 mcm) in calendar year 2009.

2009 DETERMINATIONS

The AOP provides guidance regarding reservoir storage and release conditions during the upcoming year, based upon Congressionally mandated and authorized storage, release, and delivery criteria and determinations. After meeting these criteria and determinations, specific reservoir releases may be modified within these requirements as forecasted inflows change in response to climatic variability and to provide additional benefits coincident to the projects' multiple purposes.

Upper Basin Reservoirs

Releases from Lake Powell during water year 2009 shall be made consistent with Section 6.B (Upper Elevation Balancing Tier) of the Interim Guidelines. Consistent with Section 6.B.1 of the Interim Guidelines, the water year release from Lake Powell in 2009 shall be 8.23 maf (10,150 mcm) unless provisions in Section 6.B.3 occur. Consistent with Section 6.B.3 of the Interim Guidelines, if the April 2009 24-Month Study projects the September 30, 2009, Lake Powell elevation to be greater than elevation 3,639.0 feet (1,109.2 meters), Section 6.A (Equalization Tier) of the Interim Guidelines will govern the release of water from Lake Powell for the remainder of water year 2009 (through September 2009).

Section 602(a) of the Colorado River Basin Project Act provides for the storage of Colorado River water in Upper Basin reservoirs and the release of water from Lake Powell that the Secretary finds reasonably necessary to assure deliveries to comply with Articles III(c), III(d), and III(e) of the 1922 Colorado River Compact without impairment to the annual consumptive use in the Upper Basin. The Operating Criteria provide that the annual plan of operation shall include a determination of the quantity of water considered necessary to be in Upper Basin storage at the end of the water year after taking into consideration all relevant factors including historic stream flows, the most critical period of record, the

[33] ADWR Transport Permit Number ~~3~~10-001 entitled ~~"~~Permit to Transport Groundwater Withdrawn from the Yuma Groundwater Basin,~~"~~ March 1, 2007.

probabilities of water supply, and estimated future depletions. Water not required to be so stored will be released from Lake Powell:

- to the extent it can be reasonably applied in the States of the Lower Division to the uses specified in Article III(e) of the 1922 Colorado River Compact, but these releases will not be made when the active storage in Lake Powell is less than the active storage in Lake Mead;

- to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell; and

- to avoid anticipated spills from Lake Powell.

Taking into consideration all relevant factors required by Section 602(a)(3) of the Colorado River Basin Project Act and the Operating Criteria, it is determined that the active storage in Upper Basin reservoirs forecasted for September 30, 2009, under the most probable inflow scenario would exceed the storage required under Section 602(a) of the Colorado River Basin Project Act. Consistent with Section 6.B.3 of the Interim Guidelines, if the April 2009 24-Month Study projects the September 30, 2009, Lake Powell elevation to be greater than elevation 3,639.0 feet (1,109.2 meters), the Equalization Tier, Section 6.A of the Interim Guidelines, will govern the release of water from Lake Powell for the remainder of water year 2009 (through September 2009).

Lower Basin Reservoirs

Pursuant to Article III of the Operating Criteria and consistent with the Consolidated Decree, water shall be released or pumped from Lake Mead to meet the following requirements:

(a) 1944 United States-Mexico Water Treaty obligations;
(b) Reasonable beneficial consumptive use requirements of mainstream users in the Lower Division States;
(c) Net river losses;
(d) Net reservoir losses;
(e) Regulatory wastes; and
(f) Flood control.

The Operating Criteria provide that after the commencement of delivery of mainstream water by means of the CAP, the Secretary will determine the extent to which the reasonable beneficial consumptive use requirements of mainstream users are met in the Lower Division States. Reasonable beneficial consumptive use requirements are met depending on whether a Normal, Surplus, or Shortage Condition has been determined. The Normal Condition is defined as annual pumping and release from Lake Mead sufficient to satisfy 7.500 maf (9,251 mcm) of consumptive use in accordance with Article III(3)(a) of the Operating Criteria and Article II(B)(1) of the Consolidated Decree. The Surplus Condition is defined as annual pumping and release from Lake Mead sufficient to satisfy in excess of 7.500 maf (9,251 mcm) of consumptive use in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Consolidated Decree. An ICS Surplus Condition is

defined as a year in which Lake Mead's elevation is projected to be above elevation 1,075 feet (327.7 meters) on January 1, a Flood Control Surplus has not been determined, and delivery of ICS has been requested. The Secretary may determine an ICS Surplus Condition in lieu of a Normal Condition or in addition to other operating conditions that are based solely on the elevation of Lake Mead. The Shortage Condition is defined as annual pumping and release from Lake Mead insufficient to satisfy 7.500 maf (9,251 mcm) of consumptive use in accordance with Article III(3)(c) of the Operating Criteria and Article II(B)(3) of the Consolidated Decree.

The Interim Guidelines are being utilized in calendar year 2009 and serve to implement the narrative provisions of Article III(3)(a), Article III(3)(b), and Article III(3)(c) of the Operating Criteria and Article II(B)(1), Article II(B)(2), and Article II(B)(3) of the Consolidated Decree for the period through 2026. The Interim Guidelines will be used annually by the Secretary to determine the quantity of water available for use within the Lower Division States.

Consistent with the Interim Guidelines, the August 2008 24-Month Study was used to forecast the system storage as of January 1, 2009. Based on this projected elevation of Lake Mead and consistent with Section 2.B.5 of the Interim Guidelines, the ICS Surplus Condition will govern releases for use in the states of Arizona, Nevada, and California during calendar year 2009 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Consolidated Decree.

Article II(B)(6) of the Consolidated Decree allows the Secretary to allocate water that is apportioned to one Lower Division State but is for any reason unused in that state to another Lower Division State. This determination is made for one year only, and no rights to recurrent use of the water accrue to the state that receives the allocated water. No unused apportionment for calendar year 2009 is anticipated. If any unused apportionment becomes available after adoption of this AOP, Reclamation, on behalf of the Secretary, shall allocate any such available unused apportionment for calendar year 2009 in accordance with Article II(B)(6) of the Consolidated Decree.

Water may be made available for diversion pursuant to 43 CFR Part 414[2] to contractors within the Lower Division States. The Secretary shall make ~~Intentionally Created Unused Apportionment (~~ICUA~~)~~ available to contractors in Arizona, California, or Nevada for the off-stream storage or consumptive use of water pursuant to individual ~~Storage and Interstate Release Agreements (~~SIRA~~s)~~ and 43 CFR Part 414. ~~In calendar year 2008, 0.025 maf (30.84 mcm) of ICUA water stored in Arizona is anticipated to be recovered for use in California[3] by MWD. In calendar year 2008, 0.015 maf (18.50 mcm) of ICUA water from Nevada is anticipated to be stored in California by MWD.[4]~~ In calendar year 2009, ~~up to 0.035 maf (43.17 mcm) of~~ ICUA water stored in Arizona is anticipated to be recovered for use in California by MWD. SNWA may propose to make additional unused Nevada basic apportionment available for storage by MWD in 2009.

The ~~Inadvertent Overrun and Payback Policy (~~IOPP~~)~~, which became effective January 1, 2004, will be in effect during calendar year 2009.~~3435~~

~~34 Record of Decision for Implementation Agreement, Inadvertent Overrun and Payback Policy, and Related~~

The Colorado River Water Delivery Agreement[~~35~~36] requires payback of California overruns occurring in 2001 and 2002 as noted in Exhibit C of that document. Each district with a payback obligation under Exhibit C may at its own discretion elect to accelerate paybacks.

In calendar year~~s 2008 and~~ 2009, paybacks occurring in California result from Exhibit C obligations~~-~~ and IOPP overruns. ~~During calendar year 2008, the California paybacks are projected to total 0.044 maf (54.27 mcm).~~ In calendar year 2009, California paybacks are projected to total 0.004 maf ~~acre-feet~~ (4.933 mcm)~~. . During calendar year 2008, the Arizona paybacks are projected to total 0.0006 maf acre-feet (0.740 mcm).~~ In calendar year 2009, Arizona paybacks are projected to total 0.0003 maf ~~acre-feet~~ (0.370 mcm) and~~.Nevada incurred no payback obligation for 2008. In calendar year 2009,~~ Nevada paybacks are projected to total 0.00013 maf ~~acre-feet~~ (0.160 mcm).

The Interim Guidelines included the adoption of the ICS mechanism that among other things encourages the efficient use and management of Colorado River water in the Lower Basin. If MWD has not recovered all of its Demonstration Program ICS credits during 2008, MWD may request delivery of those credits during 2009. In calendar year 2009, MWD may request delivery of up to 0.034 maf (41.94 mcm) of System Efficiency ICS credits from the Drop 2 Storage Reservoir project. In calendar year 2009, SNWA anticipates creating and taking delivery of 0.030 maf (37.00 mcm) of Tributary Conservation ICS.

Given the limitation of available supply and the low inflow amounts within the Colorado River Basin due to the nine-year drought, the Secretary, through Reclamation, will continue to review Lower Basin operations to assure that all deliveries and diversions of mainstream water are in strict accordance with the Consolidated Decree, applicable statutes, contracts, rules, and agreements.

As provided in Section 7.C of the Interim Guidelines, the Secretary may undertake a mid-year review to consider revisions of the current AOP. For Lake Mead, the Secretary shall revise the determination in any mid-year review for the current year only to allow for additional deliveries from Lake Mead pursuant to Section 7.C of the Interim Guidelines.

1944 United States-Mexico Water Treaty

Under the most probable, probable minimum, and probable maximum inflow scenarios, water in excess of that required to supply uses in the United States will not be available. Vacant storage space in mainstream reservoirs is substantially greater than that required by flood control regulations. Therefore, a volume of 1.500 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2009 in accordance with Article 15 of the 1944 United States-Mexico Water Treaty and Minutes 242 and 310 of the IBWC.

~~Federal Actions, Final Environmental Impact Statement, October 10, 2003.~~

~~35~~ ~~Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement for Purposes of Section 5(B) of Interim Surplus Guidelines, October 10, 2003.~~

Calendar year schedules of the monthly deliveries of Colorado River water are formulated by the Mexican Section of the IBWC and presented to the United States Section before the beginning of each calendar year. Pursuant to the 1944 United States-Mexico Water Treaty, the monthly quantity prescribed by those schedules may be increased or decreased by not more than 20 percent of the monthly quantity, upon 30 days notice in advance to the United States Section. Any change in a monthly quantity is offset in another month so that the total delivery for the calendar year is unchanged.

DISCLAIMER

Nothing in this AOP is intended to interpret the provisions of the Colorado River Compact (45 Stat. 1057); the Upper Colorado River Basin Compact (63 Stat. 31); the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Treaty Between the United States of America and Mexico (Treaty Series 994, 59 Stat. 1219); the United States/Mexico agreement in Minute No. 242 of August 30, 1973, (Treaty Series 7708; 24 UST 1968); the Consolidated Decree entered by the Supreme Court of the United States in *Arizona v. California* (547 U.S 150 (2006)); the Boulder Canyon Project Act (45 Stat. 1057); the Boulder Canyon Project Adjustment Act (54 Stat. 774; 43 U.S.C. 618a); the Colorado River Storage Project Act (70 Stat. 105; 43 U.S.C. 620); the Colorado River Basin Project Act (82 Stat. 885; 43 U.S.C. 1501); the Colorado River Basin Salinity Control Act (88 Stat. 266; 43 U.S.C. 1951); the Hoover Power Plant Act of 1984 (98 Stat. 1333); the Colorado River Floodway Protection Act (100 Stat. 1129; 43 U.S.C. 1600); or the Grand Canyon Protection Act of 1992 (Title XVIII of Public Law 102-575, 106 Stat. 4669).

ATTACHMENT I

Monthly inflow, monthly release, and end-of-month contents for Colorado River reservoirs (October 2008 through December 2009) under the probable maximum, most probable, and probable minimum inflow scenarios, and historic end-of-month contents.