

2004 ANNUAL OPERATING PLAN  
FOR  
COLORADO RIVER SYSTEM RESERVOIRS

## **INTRODUCTION**

### **Authority**

This 2004 annual operating plan (AOP) was developed in accordance with Section 602 of *The Colorado River Basin Project Act* (Public Law 90-537), and 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), promulgated by the Secretary of the Interior (Secretary) pursuant thereto. In accordance with *The Colorado River Basin Project Act* and 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, Treaty Between the United States of America and Mexico*, signed February 3, 1944 (1944 U.S.-Mexico Water Treaty), interstate compacts, court decrees, the Record of Decision, Colorado River Interim Surplus Guidelines Final Environmental Impact Statement (Interim Surplus Guidelines) (66 FR 7772), 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 Operating Criteria and Section 602 of *The Colorado River Basin Project Act* mandate consultation with representatives of the Governors of the seven Basin States and such other parties as the Secretary may deem appropriate in preparing the annual plan for operation of the Colorado River reservoirs. In addition, *The Grand Canyon Protection Act of 1992* (Title XVIII of Public Law 102-575) requires consultation to include the general public and others. Accordingly, the 2004 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).

### **Purpose**

The purposes of the AOP are to determine: (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 as of September 30, 2004, to be in storage in the Upper Basin reservoirs as required by Section 602(a) of *The Colorado River Basin Project Act*; (3) water available for delivery pursuant to the 1944 U.S.-Mexico Water Treaty and Minute No. 242 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 (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 1964 U.S. Supreme Court Decree in *Arizona v. California* (Decree), and the Interim Surplus Guidelines.

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. The minimum objective release criterion will control the annual release from Glen Canyon Dam during water year 2004 in accordance with Article II(2) of the Operating Criteria unless spill avoidance and/or the storage equalization criteria in Article II(3) is controlling.

Lower Basin Delivery. Under the most probable inflow scenario, downstream deliveries are expected to control the releases from Hoover Dam.

The suspension of surplus determinations under Section 2(B)(1) and 2(B)(2) of the Interim Surplus Guidelines remained in effect until October 10, 2003, at which time California completed all required actions pursuant to Section 5(B) of the Interim Surplus Guidelines. Consistent with Section 5(B) of the Interim Surplus Guidelines, the interim surplus determinations under Sections 2(B)(1) and 2(B)(2) were reinstated on October 10, 2003. The October 10, 2003, Colorado River Water Delivery Agreement provides for California to make the reductions in water use reflected in Section 5(C) of the Interim Surplus Guidelines.

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) Sections 2(B)(1) and 7 of the Interim Surplus Guidelines, the Partial Domestic Surplus condition is the criterion governing the operation of Lake Mead for calendar year 2004 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Decree, subject to Section 5(C) of the Interim Surplus Guidelines.

Reclamation does not anticipate any available unused apportionment for calendar year 2004 at this time. However, if any unused apportionment is available, the Secretary shall allocate any available unused apportionments for calendar year 2004 in accordance with Article II(B)(6) of the Decree and Section 1(B) of the Interim Surplus Guidelines.

In accordance with 43 CFR Part 414 (Offstream Storage of Colorado River Water; Development and Release of Intentionally Created Unused Apportionment in the Lower Division States: Final Rule), Intentionally Created Unused Apportionment (ICUA) may be made available by a Lower Division state for use in another Lower Division state via a Storage and Interstate Release Agreement (SIRA) with the Secretary. On December 18, 2002, the United States, acting through the

Secretary of the Interior, executed a SIRA with the Arizona Water Banking Authority, the Southern Nevada Water Authority, and the Colorado River Commission of Nevada. Assuming all requirements are met, the Secretary will make up to 20,000 acre-feet of ICUA available to the consuming entity (Southern Nevada Water Authority) from the storing entity (Arizona Water Banking Authority) in 2004.

1944 U.S.-Mexico Water Treaty Delivery. A volume of 1.5 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2004 in accordance with Article 15 of the 1944 U.S.-Mexico Water Treaty and Minute No. 242 of the International Boundary and Water Commission (IBWC).

The International Boundary and Water Commission concluded Minute No. 310 entitled “Emergency Delivery of Colorado River Water for Use in Tijuana, Baja California,” on July 28, 2003. The Minute allows for the delivery of approximately 1,200 acre-feet per month of Colorado River water through the California agencies’ distribution system facilities to Tijuana, Baja California. In conformance with the provisions of the Minute, the volume of water delivered and the system conveyance losses will be charged against the total volume of Colorado River water apportioned under the 1944 U.S.-Mexico Water Treaty. The Tijuana utility, the State Commission for Public Services of Tijuana (CESPT), pays all financial costs incurred in making such deliveries. This arrangement will be implemented via an agreement among the Otay Water District, the Metropolitan Water District of Southern California, the San Diego County Water Authority, the United States Section of the International Boundary and Water Commission, and the Bureau of Reclamation and will be applicable through calendar year 2008.

## **2003 OPERATIONS SUMMARY AND RESERVOIR STATUS**

Drier than average hydrologic conditions were observed in the Colorado River basin in water year 2003, marking the fourth consecutive year of drought in the basin. Basinwide precipitation was 89 percent of average during water year 2003 with snowpack accumulations also being below normal levels. As the spring snowmelt season began on April 1, 2003, snowpack levels throughout the Colorado River Basin averaged about 80 percent of average. The volume of runoff in the basin was reduced, however, due to very dry antecedent soil moisture conditions resulting from three previous years of drought. Unregulated<sup>(1)</sup> inflow into Lake Powell during the April through July runoff period in 2003 was 3.92 maf (4,840 mcm) or 49 percent of the 30 year average<sup>(2)</sup>. Total unregulated inflow into Lake Powell for water year 2003 was 6.36 maf (7,845 mcm) or 53 percent of average.

Water year 2003 marked the fourth consecutive year with below average inflow into Colorado River reservoirs. Unregulated inflow to Lake Powell was 62, 59, and 25 percent of average in water years 2000, 2001, and 2002, respectively. Reservoir storage at Lake Powell and Lake Mead declined for the fourth straight year. By the end of water year 2003, Lake Mead storage decreased by 1.48 maf (1,830 mcm). Storage in Lake Powell decreased by 2.36 maf (2,910 mcm). Storage in reservoirs upstream of Lake Powell increased by approximately 0.055 maf (68 mcm) in 2003. At the beginning of water year 2003, Colorado River total system storage was 64 percent of capacity. Total Colorado River system storage decreased by approximately 3.8 maf (4,690 mcm) during water year 2003. As of September 30, 2003, total system storage was 57 percent of capacity.

Even though Colorado River reservoir storage has been reduced during 2003, deliveries of water to meet obligations pursuant to applicable provisions of "The Law of the River" were maintained.

Preliminary Colorado River water delivery accounting data for calendar year (CY) 2002, compiled pursuant to Article V of the Decree, indicated that requests for water deliveries by agricultural users in California during CY 2002 had the potential to exceed the maximum amount of water available under the determinations made in the 2002 AOP approved and transmitted on January 14, 2002. In light of the potential for such overuse within the Lower Basin, and after consultation with members of the CRMWG, a supplement to the 2002 AOP was approved on November 22, 2002. The supplement to the 2002 AOP addressed this potential CY 2002 overuse and established appropriate

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<sup>(1)</sup> 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.

<sup>(2)</sup> Inflow statistics throughout this document will be as compared to 30-year averages.

January 7, 2004

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conditions for repayment if Reclamation determines that any overuse occurred in CY 2002 pursuant to final Article V Decree accounting data.

Tables 1(a) and 1(b) list the October 1, 2003, reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in water elevation during water year 2003.

Table 1(a). Reservoir Conditions on October 1, 2003 (English Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(maf)	(maf)	(feet)	(percent)	(maf)	(feet)
Fontenelle	0.087	0.258	6,494.3	75	0.011	1.6
Flaming Gorge	1.114	2.635	6,009.8	70	-0.040	-1.2
Blue Mesa	0.442	0.387	7,462.4	47	0.112	19.4
Navajo	0.961	0.734	5,999.4	43	-0.138	-16.2
Lake Powell	12.212	12.110	3,603.7	50	-2.358	-22.8
Lake Mead	10.259	15.618	1,142.1	60	-1.475	-13.3
Lake Mohave	0.167	1.643	641.0	91	0.066	2.5
Lake Havasu	0.057	0.562	447.1	91	-0.003	-0.1
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Totals	25.299	33.947		57	-3.825	

\* From October 1, 2002 to September 30, 2003.

Table 1(b). Reservoir Conditions on October 1, 2003 (Metric Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(mcm)	(mcm)	(meters)	(percent)	(mcm)	(meters)
Fontenelle	107	318	1,979	75	14	0.5
Flaming Gorge	1,374	3,205	1,832	70	-49	-0.4
Blue Mesa	545	477	2,275	47	138	5.9
Navajo	1,185	905	1,829	43	-170	-4.9
Lake Powell	15,064	14,938	1,098	50	-2,909	-6.9
Lake Mead	12,654	19,265	348	60	-1,819	-4.1
Lake Mohave	206	2,027	195	91	81	0.8
Lake Havasu	71	693	136	91	-4	0.0
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Totals	31,207	41,874		57	-4,718	

\* From October 1, 2002 to September 30, 2003.

## **2004 WATER SUPPLY ASSUMPTIONS**

For 2004 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 and associated release patterns and end of month contents for each reservoir.

Although there is considerable uncertainty associated with streamflow forecasts and reservoir operating plans made a year in advance, these projections are valuable in analyzing probable impacts on project uses and purposes. The magnitude of inflows in each of these three inflow scenarios for 2004 are below the historical upper decile, mean, and lower decile (10 percent exceedance, 50 percent exceedance, and 90 percent exceedance, respectively). The volume of inflow is reduced in each of the three scenarios, due to dry antecedent conditions in the Colorado River basin resulting from four consecutive years of below average precipitation. The National Weather Service's Ensemble Streamflow Prediction (ESP) model was used to develop inflows for the three scenarios for 2004. ESP modeling showed that even with average temperatures and precipitation in 2004, runoff in the Colorado River Basin is likely to remain below average due to dry antecedent conditions. Most probable inflow for Lake Powell for water year 2004 is 9.29 maf (11,500 mcm) or 77 percent of average. Most probable inflow was reduced by 2.78 maf (3,430 mcm) from the 30 year average of 12.06 maf (14,870 mcm). Minimum probable inflow was reduced by 2.41 maf (2,970 mcm) from 51 percent of average (the statistical 90 percent exceedance level) to 31 percent of average. Maximum probable inflow was reduced by 2.98 maf (3,680 mcm) from 151 percent of average (the statistical 10 percent exceedance level) to 126 percent of average. The three inflow scenarios for Lake Powell are shown in Tables 2(a) and 2(b).

The volume of inflow resulting from these assumptions was used as input into Reclamation's monthly reservoir simulation model. This model is used to plan reservoir operations for the upcoming 24-month period. Projected water year 2004 inflow and October 1, 2003, reservoir storage conditions were used as input to this model and monthly releases were adjusted until release and storage levels accomplished project purposes.



Table 2(a). Projected Unregulated Inflow  
 Into Lake Powell for Water Year 2004  
 (English Units: maf)

Time Period	Probable Maximum	Most Probable	Probable Minimum
10/03 - 12/03	1.35	1.10	0.95
1/04 - 3/04	1.45	1.16	0.90
4/04 - 7/04	10.94	6.18	1.59
8/04 - 9/04	1.44	0.85	0.26
10/04 - 12/04	1.39	1.39	1.39
WY 2004	15.18	9.29	3.70
CY 2004	15.22	9.58	4.14

Table 2(b). Projected Unregulated Inflow  
 Into Lake Powell for Water Year 2004  
 (Metric Units: mcm)

Time Period	Probable Maximum	Most Probable	Probable Minimum
10/03 - 12/03	1,667	1,357	1,171
1/04 - 3/04	1,792	1,433	1,108
4/04 - 7/04	13,490	7,625	1,964
8/04 - 9/04	1,779	1,047	321
10/04 - 12/04	1,716	1,716	1,716
WY 2004	18,728	11,460	4,564
CY 2004	18,778	11,821	5,109

## **2004 RESERVOIR OPERATIONS**

The regulation of the Colorado River has had effects on downstream aquatic and riparian resources. Controlled releases from dams have modified temperature, sediment load, and flow patterns, resulting in increased productivity of some 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 downstream aquatic and riparian resources have been established at several locations in the Colorado River basin.

Modifications to planned operations may be made based on changes in forecast conditions. However, due to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Upper Colorado Recovery Program), Section 7 consultations, and other downstream concerns, modification to the monthly operation plans may be based on other factors in addition to changes in streamflow forecasts. Decisions on spring peak releases and downstream habitat target flows may be made midway through the runoff season. Reclamation and the Fish and Wildlife Service will initiate meetings with interested parties, including representatives of the Basin States, to facilitate the decisions necessary to finalize site-specific operations plans.

Reclamation completed Section 7 consultation with the Fish and Wildlife Service in April 2002 on current and projected discretionary routine lower Colorado River operations and maintenance activities for a period of up to 3 years. On an annual basis, Reclamation's compliance with environmental commitments related to the April 1997 and 2002 Biological Opinions are reported to the Fish and Wildlife Service. The most recent report documenting Reclamation's compliance with these commitments is dated April 2002. Reclamation's compliance with additional environmental commitments, related to adoption of the Interim Surplus Guidelines, will continue to be addressed in future annual reports, as appropriate. Reclamation and the Fish and Wildlife Service have also formed a partnership with other Federal, State, and private agencies to develop the Lower Colorado River Multi-Species Conservation Program. This program permits both non-Federal and Federal parties to participate and address Endangered Species Act (ESA) compliance requirements under Sections 7 and 10 of the ESA.

The following paragraphs discuss the operation of each of the reservoirs with respect to compact, decree, statutory water delivery obligations, and instream flow needs for maintaining or improving aquatic resources, where appropriate.

### **Fontenelle Reservoir**

Precipitation and ensuing runoff in the Upper Green River Basin during water year 2003 were below normal for the fourth year in a row. The April through July runoff into Fontenelle during water year 2003 was 0.390 maf (481 mcm), or 45 percent of normal. Inflow peaked at 7,500 cfs (212 cms) on June 3, 2003. Releases in excess of powerplant capacity were not required from Fontenelle Reservoir in 2003. Maximum releases in 2003 were at powerplant capacity (approximately 1,500 cfs [40 cms]) from March 21, 2003, to June 3, 2003. Fontenelle Reservoir reached a peak elevation

of 6,498.5 feet (1,980.7 meters), on August 4, 2003, which was 7.5 feet (2.3 meters) below the crest of the spillway.

The most probable April through July inflow of 0.695 maf (857mcm) for water year 2004 far exceeds Fontenelle's storage capacity of 0.345 maf (426 mcm). Therefore, the most probable and maximum probable inflow scenarios require releases during the spring that exceed the capacity of the power plant to avoid uncontrolled spills from the reservoir. It is likely that Fontenelle reservoir will fill during water year 2004. In order to minimize high spring releases, and to maximize downstream resources and power production, the reservoir will most likely be drawn down to the minimum pool elevation of 6,463 feet above sea level (1,970 meters) by early April 2004, which corresponds to a volume of 0.093 maf (115 mcm) of live storage.

### **Flaming Gorge Reservoir**

For the fourth year in a row, inflows into Flaming Gorge were below normal during water year 2003. The annual unregulated inflow volume for water year 2003 was 0.764 maf (942 mcm), or 44 percent of normal. The annual unregulated inflow was only 56 percent of normal in water year 2000, only 43 percent of normal in water year 2001, and only 31 percent of normal in water year 2002. Flaming Gorge Reservoir did not fill in water year 2003, but the reservoir elevation did recover from 6010.50 feet above sea level at the beginning of water year 2003 to 6,009.8 feet (1,832 meters) above sea level by the end of water year 2003. The water year ending reservoir elevation was still 30 feet (9.2 meters) below the full pool elevation of 6,040 feet (1,841 meters).

A spring peak release of 4,600 cfs (130 cms) was made for a period of 8 days between May 20, 2003, and May 27, 2003, as called for in the 1992 Final Biological Opinion on the Operation of Flaming Gorge Dam (BOFG). These releases were made through the power plant and were successfully timed to meet peak flows on the Yampa River. The Yampa River peaked at approximately 16,000 cfs (450 cms) on June 3, 2003. Flows on the Green River near Jensen, an important segment of the Green River for endangered fish, peaked at about 19,000 cfs (538 cms) on June 3, 2003.

In September 2000, a final report titled "Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam" (Flaming Gorge Flow Recommendations) was published by the Upper Colorado River Recovery Program. The report compiled and summarized research conducted on endangered fish in the Green River under the Upper Colorado River Recovery Program and presents flow recommendations for three segments of the Green River. Reclamation is in the process of conducting a National Environmental Policy Act (NEPA) process to determine the best operational alternative for Flaming Gorge Dam to meet these flow recommendations. A Draft Environmental Impact Statement (DEIS) is scheduled to be published in the spring of 2004. Completion of the final EIS and Record of Decision (ROD) will likely occur in the latter half of 2004.

In water year 2004, until the ROD is finalized, Flaming Gorge Dam will continue to be operated in accordance with the BOFG. The BOFG calls for high spring releases to occur each year, timed with the peak of the Yampa River, so as to more closely mimic historic Green River flows. Releases

from Flaming Gorge Dam, under the most probable scenario, in the winter and early spring months of 2004 will be relatively low (approximately 800 cfs) in order to conserve reservoir storage.

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

Drought conditions prevailed again in the Gunnison River Basin during water year 2003. The April through July unregulated runoff into Blue Mesa Reservoir in 2003 was only 0.429 maf (529 mcm), or 60 percent of average. Water year 2003 unregulated inflow was 0.632 maf (780 mcm), or 63 percent of average. Even though this marks the fourth consecutive year of drought, water year 2003 had considerably more runoff volume than the record low water year set in 2002. The net effect of the 2003 runoff and the water conservation practices in the basin during the year resulted in Blue Mesa Reservoir increasing in storage during the water year 2003 by 0.112 maf (138 mcm). Storage in Blue Mesa Reservoir on September 30, 2003, was 0.387 maf (477 mcm), or 47 percent of capacity.

Releases from Aspinall Unit reservoirs in 2003 were at lower than normal levels, in part, to conserve reservoir storage. Releases from the Aspinall Unit were reduced on October 15, 2002, to provide for a flow of 250 cfs (7.1 cms) in the Gunnison River through the Black Canyon. This flow was maintained until early May 2003 at which time flows in the Black Canyon were increased to 300 cfs (8.5 cms). Water year 2003 powerplant bypasses were approximately 0.084 maf (104 mcm) at Crystal Dam, the result of annual system maintenance and because the powerplant was shut down from November 2002 through March 2003. This winter shutdown was made because the low release of 250 cfs (7.1 cms) was below the minimum powerplant threshold at Crystal Dam. During the last week of March 2003, releases at Crystal Dam were increased as irrigation deliveries began through the Gunnison Tunnel. This allowed the Crystal powerplant to come back on line.

On August 16, 1995, Memorandum of Agreement (MOA) No. 95-07-40-R1760 was signed by the Bureau of Reclamation, U.S. Fish and Wildlife Service (Service), and Colorado Water Conservation Board. The purpose of the MOA was to provide water to the Redlands Fish Ladder and 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). 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 0.4 maf (493 mcm) by the end of the calendar year. Accordingly, a plan to share physical water shortages due to the extremely dry hydrological conditions occurring in the Gunnison River Basin was developed for water year 2002 and implemented among the MOA parties, along with another separate contract between the Colorado River Water Conservation District and Redlands Water and Power Company to offset hydropower losses. As was formally agreed by all parties, operations undertaken during calendar years 2002 and 2003, to lessen the impacts of the severe drought conditions to a reasonable extent, did not establish or set any precedent that such operations will continue or occur again in the future. The runoff for 2003 was sufficient enough that it was not necessary to operate under shared shortage criteria.

In July 2003, a final report titled, "Flow Recommendations to Benefit Endangered Fishes in the Colorado and Gunnison Rivers" was published by the Upper Colorado River Recovery Program.

The report compiles and summarizes the results of research conducted on endangered fish in the Gunnison and Upper Colorado Rivers under the Upper Colorado River Recovery Program. The report presents flow recommendations for two different river reaches: one for the lower Gunnison River between Delta and Grand Junction, Colorado, and the other for the Colorado River downstream of the Gunnison River confluence. Reclamation intends to initiate a National Environmental Policy Act compliance process to determine the impacts of the flow recommendations, or a reasonable alternative to them, on Aspinall Unit operations and on other resources associated with the Gunnison River. A notice of intent to develop an Environmental Impact Statement will likely be issued in January of 2004.

On January 17, 2001, the United States filed an application to quantify the Federal reserved water right decreed to the Black Canyon of the Gunnison National Monument. The water right is for flows in the Gunnison River through the Black Canyon of the Gunnison National Park downstream of the Gunnison Tunnel. On April 2, 2003, the Department of the Interior and State of Colorado reached agreement regarding water for the park. Under this agreement, the reserved water right filed for by the National Park Service will be quantified for 300 cfs (8.5 cms). The Colorado Water Conservation Board will file for additional flows, with a 2003 priority date, under the State of Colorado instream flow program, which are in excess of those required to fulfill the purposes of the Aspinall Unit, to provide additional water resources for the park.

For water year 2004, the Aspinall Unit will be operated in accordance with the Colorado River Storage Project Act to conserve storage while meeting downstream delivery requirements. Under normal conditions, the minimum release objectives of the Aspinall Unit are to meet the delivery requirements of the Uncompahgre Valley Project, maintain a minimum flow of 300 cfs (8.5 cms) in the Gunnison River through the Black Canyon, and 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 flow through the canyon and the 2-mile reach can be reduced pursuant to the appropriate decree or MOA. Under the most probable inflow conditions, flows through the Black Canyon of the Gunnison National Park will be above the minimum release objective during the summer months. To protect both the Blue Ribbon Trout Fishery in the Black Canyon and recreational interests, releases during 2004 will be planned to minimize large fluctuations in the daily and monthly flows in the Gunnison River below the Gunnison Tunnel diversion.

Under the minimum probable and most probable inflow scenarios, Blue Mesa Reservoir is not expected to fill in the summer of 2004. With the most probable inflow, Blue Mesa Reservoir will fill to within 11 feet (3.4 meters) of full pool in July 2004. Under the maximum probable inflow, Aspinall Unit Reservoirs are expected to fill.

### **Navajo Reservoir**

Drought conditions continued to persist in the San Juan River basin during 2003 which resulted in low runoff volumes into the basin. The April through July unregulated inflow into Navajo Reservoir in water year 2003 was 0.304 maf (375 mcm), or 39 percent of average. Water year 2003 unregulated inflow was 0.415 maf (512 mcm) or 37 percent of average. The San Juan River basin is continuing to experience an extended dry cycle. April through July unregulated inflow to Navajo

Reservoir in water years 1999, 2000, 2001, and 2002 were 81, 44, 107, and 4 percent of average, respectively. Reservoir storage in Navajo Reservoir has been significantly reduced due to these protracted drought conditions. Reservoir live storage on September 30, 2003, was 43 percent of capacity but only 7.2 percent of active capacity. The water surface elevation at Navajo Reservoir on September 30, 2003, was 5,999.4 feet (1,828.6 meters).

The final report titled Flow Recommendations for the San Juan River (Flow Recommendations), which outlines flow recommendations for the San Juan River below Navajo Dam, was completed by the San Juan River Basin Recovery Implementation Program (SJRIP) in May 1999. The report synthesizes research conducted on endangered fish in the San Juan River over a 7-year period. The purpose of the report is to provide flow recommendations for the San Juan River that promote the recovery of the endangered Colorado pike minnow 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 potential in the basin. It is anticipated that implementation of the Flow Recommendations, or reasonable alternative to it, will allow for a nonjeopardy biological opinion to be issued by the Service for the operations of Navajo Dam.

Due to the severity of the drought and the hydrologic conditions in the San Juan River Basin during the spring runoff period, the Flow Recommendations did not provide for making a spring peak release from Navajo Reservoir in 2003. Although there was no peak release, at times higher than normal base flows were released from Navajo Reservoir during the spring and summer months during water year 2003. Releases from Navajo Reservoir from June through August of 2003 averaged 710 cfs (20 cms) and were as high as 1,050 cfs (30 cms) in mid-July. These releases were necessary due to decreasing flows in the San Juan River endangered fish critical habitat area (Farmington to Lake Powell). The Flow Recommendations call for an average weekly flow of between 500 cfs (14 cms) and 1,000 cfs (28 cms) in this reach of the river. With minimal tributary inflow to the San Juan River below Navajo Dam (primarily the Animas River) in 2003, this flow, as well as the flow required to meet downstream demands and natural losses, had to be made up almost entirely of releases from Navajo Reservoir.

In September of 2002, in response to a request by the Navajo Nation, coupled with much below average streamflow forecasts in the San Juan River basin, Reclamation initiated discussions with the Navajo Unit Contractors (Jicarilla Apache and Navajo Nations, Hammond Conservancy District, and Public Service Company of New Mexico), along with the State of New Mexico and the U.S. Fish & Wildlife Service, to develop a cooperative solution to deal with the extreme drought conditions in the San Juan River basin. Noncontract, direct-flow diverters were subsequently brought into the discussions. Resulting from these discussions was a set of recommendations for administering San Juan River flows for the year 2003. The recommendations included limitations on diversions for 2003, criteria for determining a shortage, and shortage-sharing requirements in the event of a water supply shortfall. A total of 10 entities (the four Navajo Unit contractors, City of Farmington, Arizona Public Service Company, BHP-Bilton, Bloomfield Irrigation District, Farmers Mutual Ditch Company, and Jewett Valley Ditch Company) are endorsing parties of the recommendations. The term for applying the recommendations extends to the end of calendar year 2003.

The criteria used for determining a water shortage in 2003 was based on protecting elevation 5,990 feet (the top of the inactive pool) at Navajo Reservoir, with future inflows assumed to be at minimum probable levels (90 percent exceedance). When the water surface elevation at Navajo Reservoir was projected to fall below 5,990 feet in 2003, with projected inflows at the minimum probable level, a water supply shortfall was determined. Using this methodology, a shortage percentage was determined each month in 2003 in the San Juan River Basin for all the endorsing parties. This percent shortage was also applied toward the 500 cfs (14 cms) target flow from Shiprock to Lake Powell. The shortage was recalculated each month for planning purposes (due to changing hydrologic conditions) and varied between 0 and 33 percent in 2003; but in October of 2003 the calculated shortage was reduced to zero, as late summer rains in August and September increased inflow into Navajo Reservoir above levels forecasted earlier in the year. Storage in Navajo Reservoir remains low, however. As water year 2003 ended, storage in Navajo was the lowest it has been since 1968, before the first filling of the reservoir. It is anticipated that a similar shortage-sharing agreement will be developed in 2004.

Reclamation is proceeding through a National Environmental Policy Act (NEPA) process on the implementation of an operation at Navajo Dam that meets the Flow Recommendations or a reasonable alternative to them. A Notice of Intent to prepare an Environmental Impact Statement (EIS) was filed on October 1, 1999, in the Federal Register. A draft EIS was released on September 4, 2002. The completion of the final EIS is scheduled to occur late in December 2003 with the Record of Decision to follow in January 2004.

Navajo Reservoir is not expected to fill in 2004 under the minimum probable, most probable or even the maximum probable inflow scenario. Releases from the reservoir will be 250 cfs (7 cms) to 500 cfs (14 cms) through the fall and winter depending upon the outcome of discussions between stakeholder groups in the San Juan River Basin and the EIS. Large spring releases as provided for in the Flow Recommendations are not likely to take place in 2004 due to the continuation of severe drought conditions in the San Juan River Basin and because of scheduled maintenance on the tandem outlet gates at Navajo Dam.

### **Lake Powell**

Four years of drought in the Colorado River Basin has reduced water storage in Lake Powell. When drought conditions began in the autumn of 1999, Lake Powell was nearly full (95 percent of capacity on September 30, 1999). As water year 2003 ended on September 30, 2003, Lake Powell storage had been reduced to 12.1 maf (14,900 mcm) or 50 percent of capacity.

Lake Powell began water year 2003 with 14.5 maf (17,800 mcm) of water in storage (59 percent of capacity). Storage in Lake Powell at that time was 2.6 maf (3,200 mcm) lower than that of Lake Mead. Because of reduced storage, and Lake Powell storage being below Lake Mead, releases from Glen Canyon Dam were scheduled to maintain the minimum release objective from Lake Powell of 8.23 maf (10,150 mcm) for water year 2003 in accordance with Article II(2) of the Operating Criteria. Forecasted inflow to Lake Powell was significantly below average throughout water year 2003, and storage equalization releases between Lake Mead and Lake Powell were not required. The total release from Lake Powell in water year 2003 was 8.23 maf (10,150 mcm).

April through July unregulated inflow into Lake Powell in water year 2003 was 3.92 maf (4,830 mcm), or 49 percent of average. Water year 2003 unregulated inflow was 6.4 maf (7,845 mcm), or 53 percent of average. Lake Powell reached a peak elevation of 3,616.6 feet (1,102.3 meters), 83.4 feet from full, on June 23, 2003. The elevation of Lake Powell on September 30, 2003, was 3,603.7 feet (1,098 meters), 96.3 feet from full. The water surface of Lake Powell had not been this low since 1973, prior to the reservoir's first filling in 1980.

On April 24, 2002, members of the Glen Canyon Adaptive Management Work Group (AMWG) recommended to the Secretary that an experimental flow test be made from Glen Canyon Dam beginning in water year 2003. The recommendation addressed the decline of two key resources in the Grand Canyon: sediment and population viability of endangered humpback chub. Reclamation, the National Park Service, and the United States Geological Survey jointly prepared an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to document the impacts of these proposed experimental flows. The Proposed Experimental Releases from Glen Canyon Dam and Removal of Non-Native Fish EA (September 2002) incorporates a Biological Assessment for the Fish and Wildlife Service under the Endangered Species Act (ESA). A Finding of No Significant Impact on the experimental releases was signed by the three agencies on December 6, 2002.

Daily high fluctuating releases from Glen Canyon Dam, as part of the experimental flows, were carried out from January through March, 2003. Releases during this three month period ranged between a high of 20,000 cubic feet per second (cfs) to a low of 5,000 cfs each day. The January through March high fluctuating releases were intended to benefit the endangered humpback chub by reducing the spawning and recruitment of nonnative fish. These same high fluctuating releases are scheduled to be repeated in January through March of 2004.

Retention of sediment in the Grand Canyon is also an aspect of the experimental flows. If significant sediment input (over one million metric tons) to the Grand Canyon from the Paria River had occurred in the summer or fall of 2003, and 800,000 metric tons were retained by January 1, 2004, as described in the EA, a 2-day test release of 42,000 to 45,000 cfs from Glen Canyon Dam would have been made in 2004, as part of the experimental flows, to understand mobilization of sediment and beach and habitat creation in the Grand Canyon corridor. Additionally, the 2-day test releases of 42,000 to 45,000 cfs would occur in January through March of 2004 if winter sediment inputs exceed 800,000 metric tons as described in the EA.

During water year 2004, the minimum release objective of 8.23 maf (10,152 mcm) will be made under the most probable and minimum probable inflow conditions. Above average inflow to Lake Powell in 2004 may require that releases greater than 8.23 maf be made to equalize the storage between Lakes Powell and Mead. Under the probable maximum inflow scenario, approximately 9.19 maf (11,300 mcm) will be released. Experimental flows in 2004 will not alter the total volume of water to be released from Lake Powell during water year 2004.

Because of less than full storage conditions in Lake Powell resulting from four consecutive years of below normal runoff, releases for dam safety purposes are highly unlikely in 2004. If implemented, releases greater than powerplant capacity would be made consistent with the 1956 Colorado River



Storage Project Act, the 1968 Colorado River Basin Project Act, and 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, Mar. 3, 1997).

Daily and hourly releases in 2004 will be made according to the parameters of the ROD for the Glen Canyon Dam Final Environmental Impact Statement (GCDFEIS) preferred alternative and the Glen Canyon Dam Operating Criteria, as shown in Table 3. Exceptions to these parameters may be made during power system emergencies, or for purposes of humanitarian search and rescue. Experimental flows implemented in 2004 will also require that releases exceed the parameters of the Glen Canyon Dam Operating Criteria during the winter months of 2004.

Table 3. Glen Canyon Dam Release Restrictions (Glen Canyon Dam Operating Criteria)

<u>Parameter</u>	(cfs)	(cms)	<u>Conditions</u>
Maximum flow <sup>(3)</sup>	25,000	708.0	
Minimum flow	5,000	141.6	Nighttime
	8,000	226.6	7:00 am to 7:00 pm
Ramp rates			
Ascending	4,000	113.3	per hour
Descending	1,500	42.5	per hour
Daily fluctuations <sup>(2)</sup>	5,000 / 8,000	141.6 / 226.6	

Releases from Lake Powell in water year 2004 will continue to reflect consideration of the uses and purposes identified in the authorizing legislation for Glen Canyon Dam. Powerplant releases and Beach/Habitat Building Flows will reflect criteria based on the findings, conclusions, and recommendations made in the ROD for the GCDFEIS pursuant to the Grand Canyon Protection Act of 1992, and NEPA documentation regarding the April 24, 2002, AMWG experimental flow proposal.

<sup>(1)</sup> May be exceeded during beach/habitat building flows, habitat maintenance flows, or when necessary to manage above average hydrologic conditions.

<sup>(2)</sup> Daily fluctuations limit is 5,000 cfs (141.6 cms) for months with release volumes less than 0.600 maf (740 mcm); 6,000 cfs (169.9 cms) for monthly release volumes of 0.600 to 0.800 maf (740 to 987 mcm); and 8,000 cfs (226.6 cms) for monthly volumes over 0.800 maf (990 mcm).

The Secretary is currently considering information submitted to the Department of the Interior by the Colorado River Basin States (65 Federal Register 48537, August 8, 2000) whereby 602(a) storage requirements determined in accordance with Article II (1) of the Operating Criteria would utilize a value of not less than 14.85 maf (elevation 3,630 feet) for Lake Powell through the year 2016. Reclamation is currently conducting a NEPA process to determine the effects of the Basin States proposed 602(a) storage. A draft Environmental Assessment titled "Adoption of an Interim 602(a) Storage Guideline" was released in September 2003.

## **Lake Mead**

In accordance with Article III(3)(a) of the Operating Criteria, Article II(B)(1) of the Decree, and Section 5(B) of the Interim Surplus Guidelines, the criterion governing the operation of Lake Mead was the Normal condition from January 1, 2003, through October 9, 2003. The Full Domestic Surplus condition governed the operation of Lake Mead from October 10, 2003 through December 31, 2003, in accordance with Article III(3)(b) of the Operating Criteria, Article II(B)(2) of the Decree, and Section 2(B)(2) of the Interim Surplus Guidelines. A volume of 1.5 maf (1,850 mcm) of water was scheduled for delivery to Mexico in accordance with Article 15 of the 1944 U.S.-Mexico Treaty and Minute No. 242 of the International Boundary and Water Commission.

Lake Mead began water year 2003 at elevation 1,155.42 feet (352 meters), with 17.1 maf (21,093 mcm) in storage, 66 percent of the conservation capacity of 25.877 maf (31,919 mcm). During the year, Lake Mead steadily declined and reached its minimum elevation of 1141.93 feet (348 meters) at the end of July 2003, with 15.6 maf (19,243) in storage, 60 percent of capacity.

The total release from Lake Mead through Hoover Dam during water year 2003 was 9.46 maf (11,669 mcm). Calendar year 2003 total release is projected to be 9.39 maf (11,582 mcm). Consumptive use from Lake Mead during calendar year 2003 by the Robert Griffith Water Project is projected to be 0.280 maf (345 mcm).

Under the most probable inflow conditions during water year 2004, Lake Mead will be at its maximum elevation of 1141.22 feet (348 meters) at the end of October 2003 and will decline during the water year to reach its minimum elevation of 1127.74 feet (344 meters) at the end of July 2004. Releases from Lake Mead for water year 2004 are projected to be 9.53 maf (11,755 mcm). For the 2004 calendar year, total releases are projected to be 9.65 maf (11,903 mcm). For the purpose of projections, estimated releases are based on the Partial Domestic Surplus condition as the criterion governing the operation of Lake Mead. No flood control releases would be required during water year 2004 under any of the three inflow scenarios.

The Interim Surplus Guidelines Record of Decision included ESA conservation measures. One such conservation measure specified in Article X(4)(1) includes provisions for spawning razorback suckers in Lake Mead. Reclamation continues to provide funding and support for the ongoing Lake Mead Razorback Sucker study. The focus of the study has been on locating populations of razorbacks in Lake Mead, documenting use and availability of spawning areas at various water elevations, continuing ageing studies, and confirming recruitment events. No changes in operations were made in water year 2003 to provide rising spring water surface elevations for spawning

razorback suckers as there were no storage equalization releases or Beach/Habitat Building Flows during this timeframe. Based on the anticipated operation of Lake Powell for water year 2004, no changes in operations to provide rising elevations are expected in the spring of 2004.

### **Lakes Mohave and Havasu**

At the beginning of water year 2003, Lake Mohave was at an elevation of 638.47 feet (194.6 meters), with an active storage of 1.577 maf (1,945 mcm). The water level of Lake Mohave was regulated as needed between elevation 634 feet (193.24 meters) and 645 feet (196.06 meters) throughout the water year, ending at an elevation of 640.95 feet (195.4 meters) with 1.643 maf (2,027 mcm) in storage. The total release from Lake Mohave through Davis Dam for water year 2003 was 9.13 maf (11,262 mcm) for downstream water use requirements. Calendar year 2003 total release is projected to be 9.18 maf (11,324 mcm).

For water year 2004, Davis Dam is expected to release 9.24 maf (11,398 mcm). For the 2004 calendar year, releases are projected to be 9.28 maf (11,447 mcm). The water level in Lake Mohave will be regulated between an elevation of 630 feet (192.02 meters) and 645 feet (196.06 meters).

Lake Havasu started water year 2003 at an elevation of 447.20 feet (136.31 meters), with 0.565 maf (697 mcm) in storage. The water level of Lake Havasu was regulated as needed between elevation 445 feet (135.6 meters) and 449 feet (136.9 meters). During the water year, 6.84 maf (8,437 mcm) was released from Parker Dam. Calendar year 2003 total release is projected to be 6.86 maf (8,462 mcm). Diversions from Lake Havasu during calendar year 2003 by the Central Arizona Project (CAP) and the Metropolitan Water District (MWD) are projected to be 1.69 maf (2,085 mcm) and 0.610 maf (752 mcm), respectively.

For water year 2004, Parker Dam is expected to release 6.86 maf (8,462 mcm). For the 2004 calendar year, releases are projected to also be 6.86 maf (8,462 mcm). Diversions from Lake Havasu in calendar year 2004 by MWD and CAP are expected to be 0.853 maf (1,0952 mcm) and 1.6 maf (1,974 mcm), respectively.

Mohave and Havasu Reservoirs are scheduled to be drawn down in the late summer and winter months to provide storage space for local storm runoff and will be filled in the spring to meet higher summer water needs. This drawdown will also correspond with maintenance at both Davis and Parker powerplants which is scheduled for September through February. During 2004, Lake Mohave will continue to be operated under the constraints as described in the Biological and Conference Opinion on Lower Colorado River Operations and Maintenance. Reclamation, as provided in the Interim Surplus Guidelines Record of Decision, will continue these existing operations in Lake Mohave that benefit native fish through the effective period of the Interim Surplus Guidelines and will explore additional ways to provide benefits to native fish. The normal filling pattern of these two reservoirs coincides well with the fishery spawning period. Since lake elevations will be typical of previous years, normal conditions are expected for boating and other recreational uses.

Reclamation is the lead agency in the Native Fish Work Group, a multiagency group of scientists attempting to augment the ageing stock of the endangered razorback sucker in Lake Mohave. Larval razorback suckers are captured by hand in and around spawning areas in late winter and early spring for rearing at Willow Beach Fish Hatchery below Hoover Dam. The following year, one year old razorback suckers are placed into predator-free, lake-side backwaters for rearing through the spring and summer. When the lake is normally drawn down during the fall, these fish are harvested from these rearing areas and then released to the lake. The razorback suckers grow very quickly, usually exceeding ten inches in length by September.

In 2002, 10,473 razorback suckers (300 mm minimum size) were repatriated into Lake Mohave from all sources. In 2003, 28,486 wild larvae were captured from natural spawning congregations on Lake Mohave and delivered to Willow Beach Hatchery.

### **Senator Wash and Laguna Reservoirs**

Operations at Senator Wash Reservoir allow regulation of water deliveries to United States 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** Treaty obligations. Senator Wash Reservoir is the only major storage facility below Parker Dam (approximately 142 river miles downstream) and has storage capacity of 13,836 acre-feet at full pool elevation of 251 feet, mean sea level. Operational objectives are to store excess flows from the river which have been caused by water user cutbacks and side wash inflows due to rain. Stored waters are utilized to meet irrigation and Treaty demands.

Elevation restrictions on Senator Wash Reservoir reduce the flexibility of water storage in the lower reaches of the river. In August of 1992, a restriction at elevation 240 feet, mean sea level, (9,144 acre-feet of storage) at Senator Wash Reservoir was put in place. This was due to potential piping and liquefaction of foundation and embankment materials at West Squaw Lake Dike and Senator Wash Dam. A filter blanket at West Squaw Lake dike was constructed during the first part of CY 2000, and a reservoir fill test was started September 15 and concluded on October 19, 2000. The test had to be stopped due to piping concerns at West Squaw Lake Dike. Therefore, Senator Wash was not available most of CY 2000 to regulate river flows and excess flows to Mexico exceeded 300,000 acre-feet for the year. After the fill test in CY 2000, a new elevation restriction at 235 feet (7,330 acre-feet of storage) was put in place, and excess flows to Mexico were reduced to about 200,000 AF in CY 2001. In CY 2002 a permanent filter blanket was placed at West Squaw Lake Dike, additional instrumentation was put in place, and another fill test was conducted from April through July 7, 2002. Senator Wash was not available for river regulation essentially from the first of CY 2002 until July 7, 2002. Due to the success of this fill test, the elevation restriction was raised back to elevation 240 feet on July 8, 2002. The Denver Technical Service Center is currently reviewing data from the test to determine if operations will be allowed to exceed elevation 240 feet.

Total overdelivery to Mexico for CY 2002 was approximately 133,000 AF. As of September 2003, overdeliveries to Mexico have been about 55,400 AF and are expected to be about 60,000 AF for the year, subject to the amount of rain received. Overdeliveries in CY 2003 have been primarily due to

rejected water caused by rain in January, February, March and April. To further improve control of the deliveries of water from Parker Dam, Senator Wash will be operated at a lower elevation (below the minimum power pool) to capture additional excess flows at Imperial Dam. Improvements to the river routing software used to schedule the releases from Parker Dam may also reduce the uncertainty in the flows arriving at Imperial Dam. Other storage options are also being investigated, primarily the proposed construction of reservoir storage near the All American Canal.

Laguna Reservoir is a regulating storage facility located approximately 5 river miles downstream of Imperial Dam. Operational objectives are similar to those for Senator Wash Reservoir. The storage capability of Laguna Reservoir has diminished from about 1,500 acre-feet to about 400 acre-feet 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. Dredging of the Laguna Reservoir to increase its storage capacity is scheduled to begin around CY 2005. Maintenance dredging of the Laguna Desilting Basin, located above Laguna Dam, was started during CY2003 and will continue into CY 2004. It is also planned to lengthen the desilting basin at Laguna by about 1,500 feet in CY 2004.

### **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 American water users and Mexico 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 Pilot Knob to the Northerly International Boundary (NIB) to the Mexicali Valley in Mexico. The diversions also supply much of the domestic and industrial water needs in the Yuma area. In CY 2002, approximately 6.141 maf (7.574 mcm) arrived at Imperial Dam; approximately 5.806 maf (7.161 mcm) is estimated to arrive at Imperial Dam in CY 2003.

### **Yuma Desalting Plant**

The Yuma Desalting Plant (YDP) was not operated in CY 2003 and is being maintained in a ready reserve status. In calendar year 2002, the amount of water discharged through the Main Outlet Drain (bypass flows) was 119,410 acre-feet at an approximate concentration of total dissolved solids (TDS) of 2800 ppm. The U.S. recognizes that it has an obligation to replace, as appropriate, the bypass flows. Reclamation is preparing a report for Congress that explores options for replacement of the bypass flows from Wellton-Mohawk, including options that would not require operation of the Yuma Desalting Plant. Existing data suggests that operation of the YDP would negatively affect the Cienega de Santa Clara, a wetland of approximately 14,000 acres that is within a Biosphere Reserve in the Republic of Mexico. Reclamation's Yuma Area Office has initiated an environmental planning effort that will determine the extent of the effects.

A short section of the Main Outlet Drain Extension (MODE) near the confluence with the Gila River was damaged during the 1993 Gila River flood and still needs to be repaired. However, seepage

from the drain is less than one percent of the ground water flow in the area and is not significantly affecting the quality of the ground water or the Colorado River water. All of Wellton-Mohawk's drainage flows are expected to be contained in the MODE for CY 2003 and CY 2004.

Measures that are being taken to ensure that the salinity differential requirements at NIB will be met include reducing drainage pumping in the South Gila Valley in areas with more than adequate depths to groundwater; returning some drainage flows from the Yuma Mesa Conduit to the Yuma Valley Drainage System and thence to the boundary pumping plant at the Southerly International Boundary with Mexico; ensuring that no drainage water from the MODE will be spilled to the Colorado River; and reducing drainage pumping from the Yuma Mesa Well Field when necessary near areas with acceptable depths to groundwater (generally wells YM 10-13).

Several Yuma Valley Drainage wells that used to discharge to the Southerly International Boundary (SIB) have been connected to the Yuma Mesa Conduit. In addition, 6 Yuma County drainage wells constructed in the late 1980's are now discharging to the Yuma Mesa Conduit, when formerly they were operated only during flood or space building years, causing salinity levels at the NIB to increase as the quantity of drainage inflow to the Colorado River above NIB increases. At the same time, the quality of water arriving at Imperial Dam improved, even though the amount of water released from Parker Dam has been reduced beginning in CY 2000. These issues combined together are currently resulting in a forecasted salinity differential near the maximum allowed under Minute 242.

Located at the Yuma Desalting Plant is a research facility known as the Water Quality Improvement Center (WQIC). The primary role of the WQIC is to find ways to reduce operating costs of the YDP. To do this, Reclamation personnel who work in the WQIC investigate new technologies and processes, and explore improvements in operational and maintenance efficiencies. The WQIC also serves as a key component in Reclamation's Science and Technology program-hosting third party research to enhance the spread of publicly-developed water treatment technology into private industry. This program serves Reclamation in two ways: it reduces the overall cost of maintaining the YDP by performing research for paying outside parties pursuing similar interests, and it helps guarantee additional water supplies by supporting the proliferation of water-stretching treatment technology throughout the U.S. In addition, the WQIC serves as the primary water provider to the Yuma Area Office. The facility purifies about one million gallons per day of drainage water delivered either from the MODE, groundwater pumped from an on-site well, or Colorado River water. The WQIC will continue to operate during calendar year 2004.

### **Colorado River Channel Aggradation Below Gila River Confluence**

The 1993 Gila River flood deposited approximately 10 million cubic yards of sediment in the Colorado River between its confluence with the Gila River and Morelos Dam. An additional unspecified volume of sediment was deposited in the river channel below Morelos Dam. The aggradation of the channel substantially reduced the river's capability to carry flood flows and to act as a drain for groundwater, and has occasionally caused operational problems with the delivery of Treaty water to Mexico at Morelos Dam.

The Yuma Area Office developed a project proposal to address the aggradation problems in cooperation with local irrigation districts, the IBWC, Native American tribes, local environmental organizations, local governments, and other State and Federal agencies.

The overall project has been developed in phases. Phase 1 of the project was completed in late 1997 so the channel below Morelos Dam could accommodate flood control releases from Hoover Dam during the winters of 1997 and 1998. Phase 1 consisted of limited clearing of a flow path in the channel below Morelos Dam and realignment of the channel upstream of Yuma at River Mile 31, where the levee was in danger of being breached during high flows.

Phase 2 of the project began in September 1999. Phase 2 consisted of dredging in the river channel immediately upstream of Morelos Dam to a location about one mile above the NIB. The dredging alleviated most of the operational problems due to sediment being delivered to Mexico at Morelos Dam, and the channel capacity was increased in this reach of the river. Phase 2 was completed in April of 2001.

Current sediment load analysis indicates that the work described for Phases 3 and 4 will not be necessary in the foreseeable future. Due to the dynamic nature of the river system, periodic review would be prudent, especially after a natural flood event or after space building and flood control releases.

**Limitrophe Division Below Morelos Dam**

The IBWC has initiated the development of an Environmental Impact Statement (EIS) to address the work necessary to develop and undertake a boundary preservation project within the Limitrophe section of the Colorado River. The flood events of 1983 and 1993 have changed the course of the river and deposited approximately 10 million cubic yards of material within the first 5.5 miles of the river below Morelos Dam, affecting the carrying capacity of the river and contributing to higher groundwater levels in the Yuma Valley. The EIS will identify the best U.S./Mexico alternative to be undertaken for the proposed project.

The following schedule is proposed for the IBWC EIS.

Feb 3, 1999	Meeting with cooperators and resource agencies
May 21, 1999	Notice of Intent
Jun 9, 1999	Public scoping meeting
Aug 15, 2000	Development of maps for boundary alignments and significant habitat
Dec 7, 2001	Bi-national meeting on proposed alignments and land use and environmental data from Mexico
Jan 22, 2002	Presentation to all Resource agencies on preliminary alignment alternatives/plan
July 8, 2004	Notice of availability of draft EIS in Federal Register
July 27, 2004	Public meeting on draft EIS
Nov 16, 2004	File final EIS
Jan 3, 2005	Record of Decision



## 2004 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 requirements, 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

The minimum objective release criterion will control the annual release from Glen Canyon Dam during water year 2004 in accordance with Article II(2) of the Operating Criteria unless spill avoidance and/or the storage equalization criteria in Article II(3) is controlling. Under the most probable inflow scenario, Glen Canyon Dam will release the minimum objective of 8.23 maf (10,150 mcm).

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. Section 602(a)(3) of the *Colorado River Basin Project Act* provides for the storage of Colorado River water in Upper Basin reservoirs that the Secretary finds necessary to assure deliveries to comply with Articles III(c) and III(d) of the 1922 *Colorado River Compact*, without impairment to the annual consumptive use in the Upper Basin. Pursuant to Section 602(b), as amended, the Secretary is required to make this determination after consultation with the Upper Colorado River Commission and representatives from the three Lower Division States, and after taking into consideration all relevant factors including historic stream flows, the most critical period of record, the 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 the Operating Criteria, it is determined that the active storage in Upper Basin reservoirs forecast for September 30, 2004, under the most probable inflow scenario, exceeds the storage required under Section 602(a) of the *Colorado River Basin Project Act*. Under the minimum probable inflow scenario, active storage in Upper Basin reservoirs on September 30, 2004, would not exceed the storage required under section 602(a) of the *Colorado River Basin Project Act*. However, active storage in Lake Powell is likely to be lower than that of Lake Mead on September 30, 2004, and the minimum objective release of 8.23 maf (10,150 mcm) would be the controlling criterion. During water year 2004, following completion of

appropriate environmental compliance, a guideline may be established whereby a value of not less than 14.85 maf (elevation 3,630 feet) at Lake Powell would be used for 602(a) storage. If this guideline is established, it could be applied in 2004, following appropriate consultation, in the operation of Glen Canyon Dam.

### **Lower Basin Reservoirs**

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

- (a) 1944 U.S.-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
- (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. The 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 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) consumptive use in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Decree.

The Interim Surplus Guidelines, which became effective February 26, 2001 and were first utilized in CY 2002, serve to implement the narrative provisions of Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Decree for the period through 2016. These specific interim surplus guidelines will be used annually by the Secretary to determine the quantity of water available for use within the Lower Division States.

Article II(B)(6) of the 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. As provided in the Interim Surplus Guidelines, Section 1(B), before making a determination of a Surplus condition under these Guidelines, the Secretary will determine the quantity of apportioned but unused water from the basic apportionments, based on the best available information at the time. Reclamation does not anticipate any available unused apportionment for calendar year 2004 at this time. However, if any unused apportionment is available the Secretary shall allocate **any available** unused apportionment for calendar year 2004 in accordance with Article II(B)(6) of the Decree and Section 1(B) of the Interim Surplus Guidelines.

In accordance with 43 CFR Part 414 (Offstream Storage of Colorado River Water; Development and Release of Intentionally Created Unused Apportionment in the Lower Division States: Final Rule), Intentionally Created Unused Apportionment (ICUA) may be made available by a Lower Division state for use in another Lower Division state via a Storage and Interstate Release Agreement (SIRA) with the Secretary. On December 18, 2002, the United States, acting through the Secretary of the Interior, executed a SIRA with the Arizona Water Banking Authority (AWBA), the Southern Nevada Water Authority, and the Colorado River Commission of Nevada. Assuming all requirements are met, the Secretary will make up to 20,000 acre-feet of ICUA available to the consuming entity (Southern Nevada Water Authority) from the storing entity (Arizona Water Banking Authority) in 2004. A SIRA is currently under development between AWBA and MWD.

Consistent with Section 5(B) of the Interim Surplus Guidelines, surplus determinations under Section 2(B)(1) Partial Domestic Surplus and Section 2(B)(2) Full Domestic Surplus were suspended on January 1, 2003. The suspension of surplus determinations under Sections 2(B)(1) and 2(B)(2) of the Interim Surplus Guidelines remained in effect until October 10, 2003, at which time California completed all required actions pursuant to Section 5(B) of the Interim Surplus Guidelines. Consistent with Section 5(B) of the Interim Surplus Guidelines, the interim surplus determinations under Sections 2(B)(1) and 2(B)(2) were reinstated on October 10, 2003. The October 10, 2003 Colorado River Water Delivery Agreement provides for California to make the water use reductions reflected in Section 5(C) of the Interim Surplus Guidelines.

Consistent with Section 7 of the Interim Surplus Guidelines, the August 2003 24-Month Study was used to project the system storage and projected uses on January 1, 2004. Based on this projection, the Partial Domestic Surplus will govern releases for use in the States of Arizona, Nevada, and California during calendar year 2004 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Decree, subject to Section 5(C) of the Interim Surplus Guidelines.

Given the limitation of available supply, and the low inflow amounts within the Colorado River basin, 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 Decree, applicable statutes, contracts, rules, and agreements.

For informational purposes, the natural inflow required to reach a Quantified Surplus (70R value strategy) on January 1, 2004, is 34.0 maf (41,939 mcm), which has been exceeded in the historical record less than 1 percent of the time. As provided in Article IV(1) of the Interim Surplus Guidelines, the 70R strategy involves assuming a 70 percent nonexceedance inflow into Lake Powell, subtracting out the consumptive uses and system losses and checking the results to see if all of the water could be stored or if flood control releases from Lake Mead would be required. If flood control releases from Lake Mead would be required, additional water is made available to the Lower Division States beyond a Full Domestic Surplus. The notation 70R refers to the natural inflow into Lake Powell that has been exceeded 30 percent of the time (17.4 maf).

As provided in Section 3 of the Interim Surplus Guidelines, the Secretary shall undertake a “mid-year review” pursuant to Article I(2) of the Operating Criteria, allowing for the revision of the

current AOP, as appropriate, based on actual runoff conditions which are greater than projected, or demands which are lower than projected. The Secretary shall revise the determination for the current year only to allow for additional deliveries. Any revision in the AOP may occur only after a reinitiation of the AOP consultation process as required by law.

### **1944 U.S.-Mexico Water Treaty**

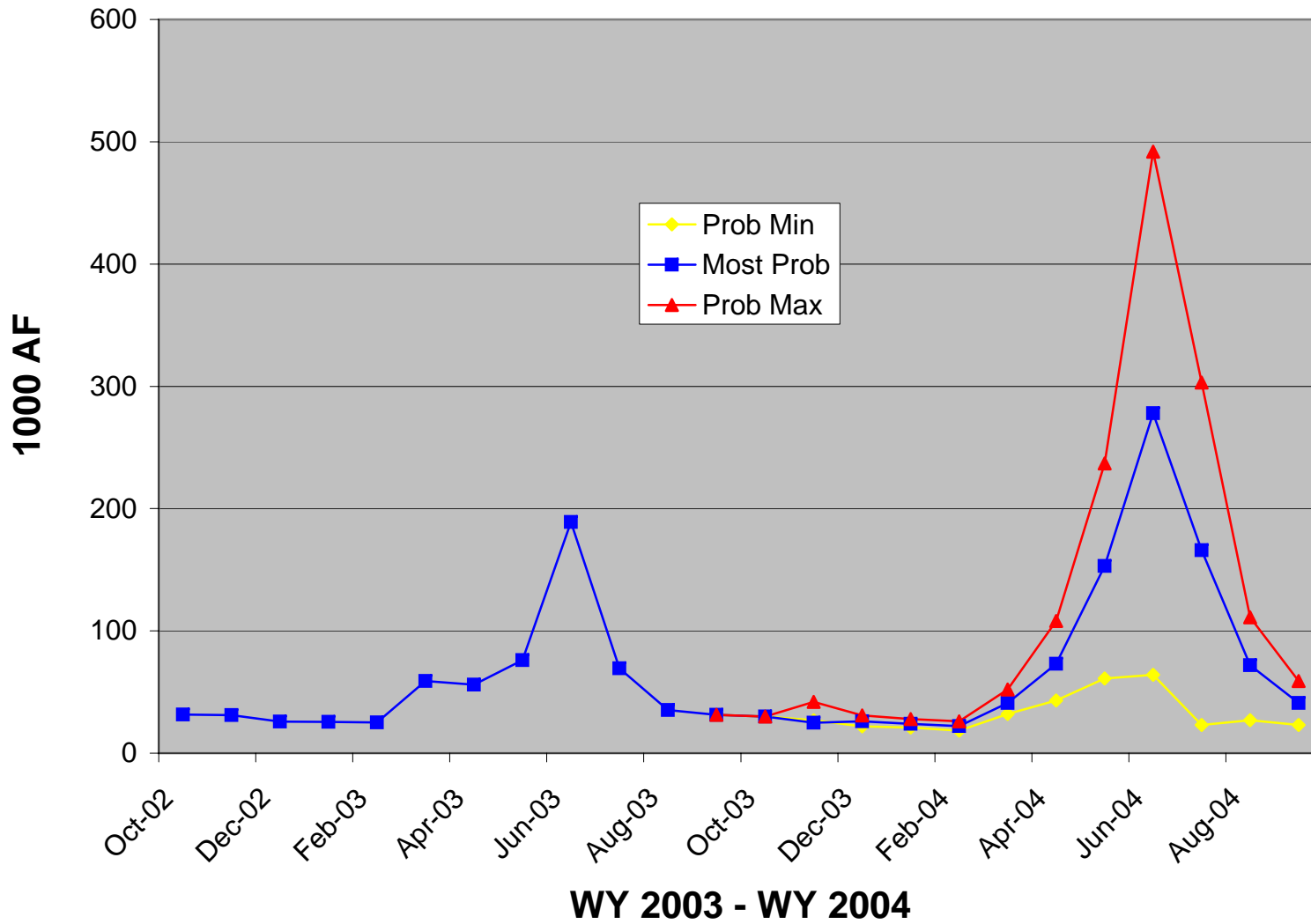
Under most probable inflow conditions, water in excess of that required to supply uses in the United States will not be available, therefore there will be no Colorado River Surplus, as defined by the 1944 U.S.-Mexico Water Treaty, for delivery to Mexico. Vacant storage space in mainstem reservoirs is substantially greater than that required by flood control regulations. Therefore, a volume of 1.5 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2003 in accordance with Article 15 of the 1944 U.S.-Mexico Water Treaty and Minute No. 242 of the International Boundary and Water Commission. 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.

The International Boundary and Water Commission concluded Minute No. 310 entitled "Emergency Delivery of Colorado River Water for Use in Tijuana, Baja California," on July 28, 2003. The Minute allows for the delivery of approximately 1,200 acre-feet per month of Colorado River water through the California agencies' distribution system facilities to Tijuana, Baja California. In conformance with the provisions of the Minute, the volume of water delivered and the system conveyance losses will be charged against the total volume of Colorado River water apportioned under the 1944 U.S.-Mexico Water Treaty. The Tijuana utility, CESPT, pays all financial costs incurred in making such deliveries. This arrangement will be implemented via an agreement among the Otay Water District, the Metropolitan Water District of Southern California, the San Diego County Water Authority, the United States Section of the International Boundary and Water Commission, and the Bureau of Reclamation and will be applicable through calendar year 2008.

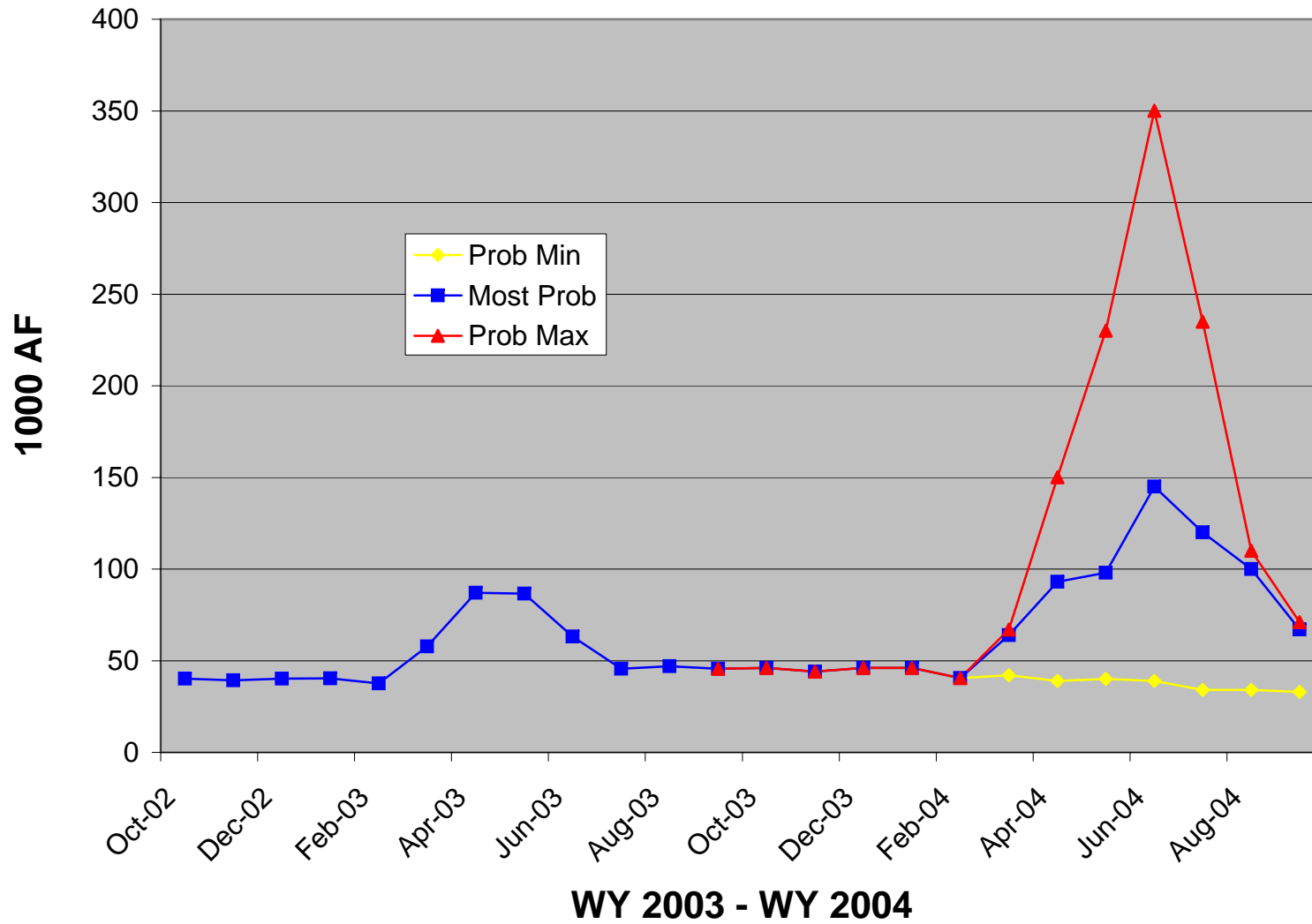
Nothing in this Annual Operating Plan is intended to interpret the provisions of *The Colorado River Compact* (45 Stat. 1057), *The Upper Colorado River Basin Compact* (63 Stat. 31), *The Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Treaty Between the United States 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 Decree entered by the Supreme Court of the United States in *Arizona v. California et al.* (376 U.S. 340), as amended and supplemented, *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. Monthly inflow, monthly release, and end of month contents for Colorado River reservoirs (October 2002 through September 2004) under the probable maximum, most probable, and the probable minimum inflow scenarios, and historic end of month contents.

# Fontenelle Monthly Inflow

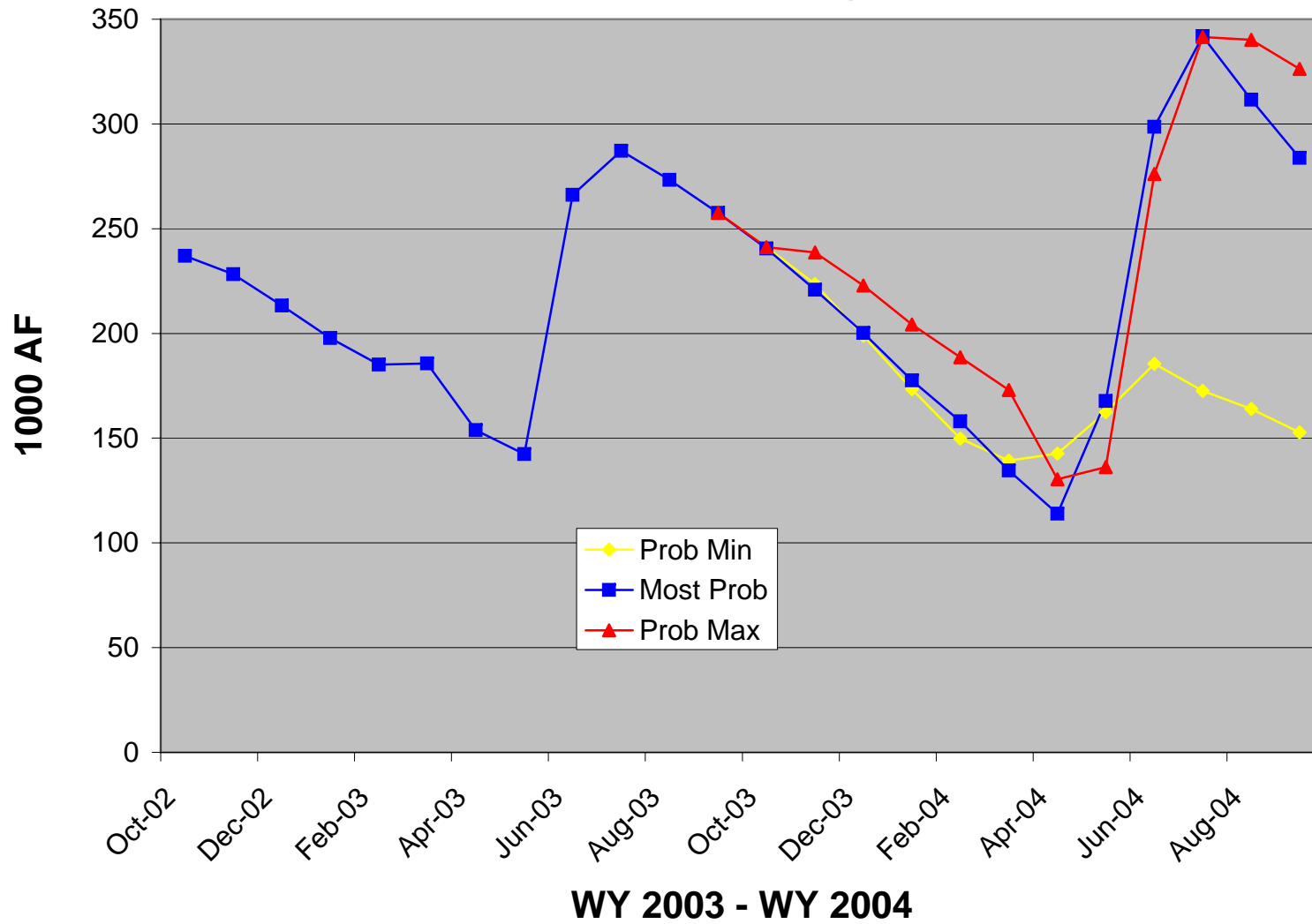


# Fontenelle Monthly Releases

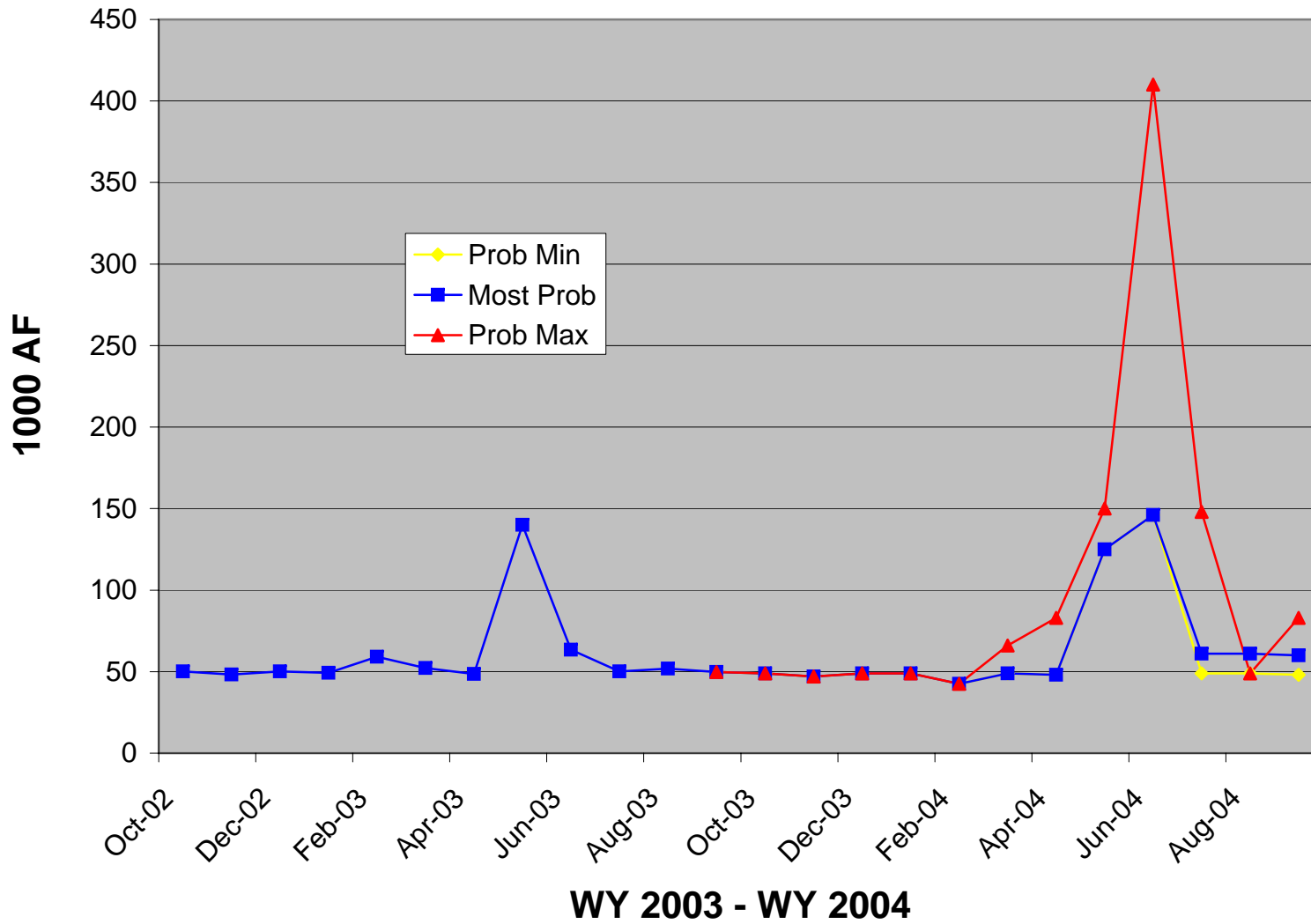




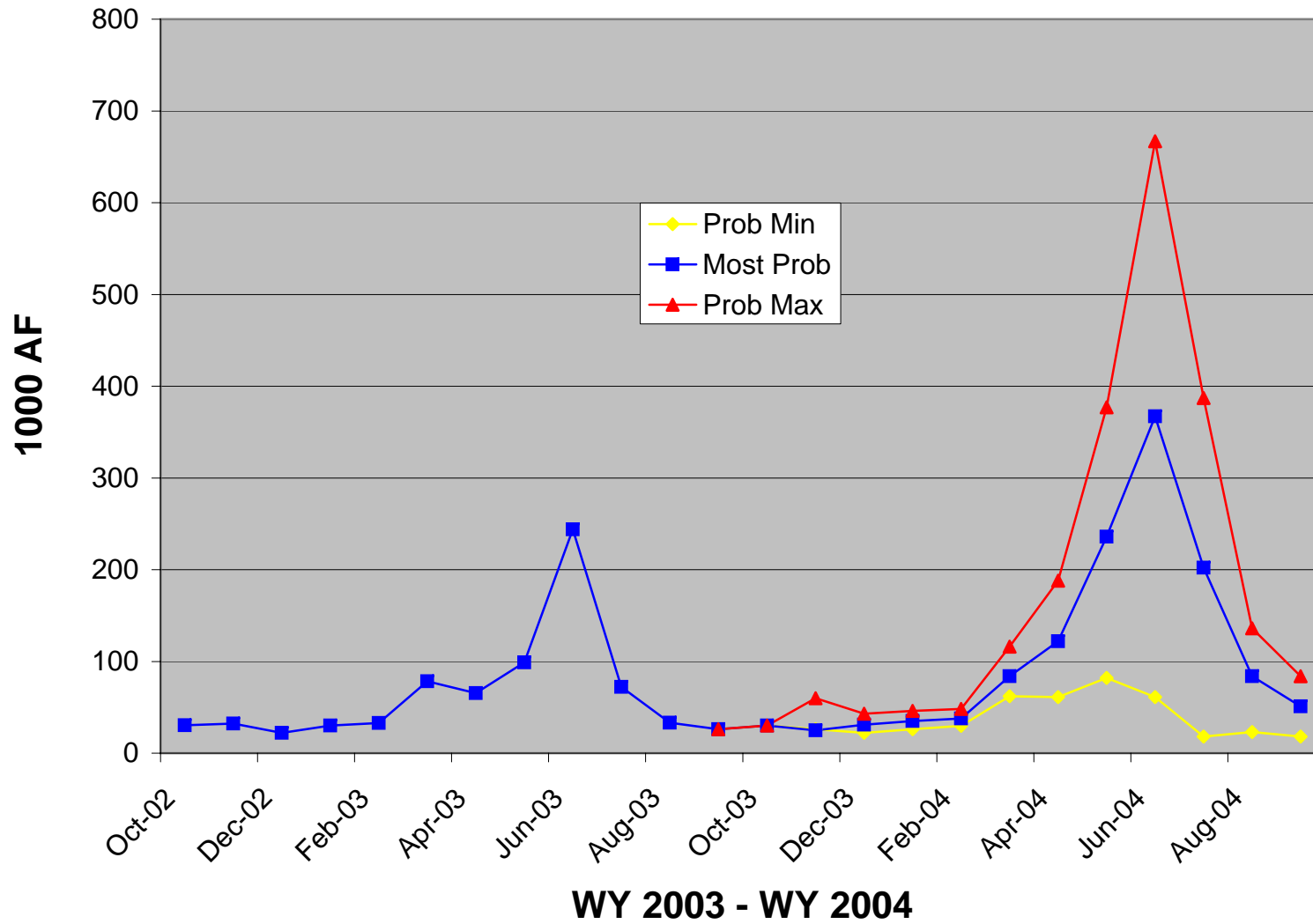
# Fontenelle Monthly Storage



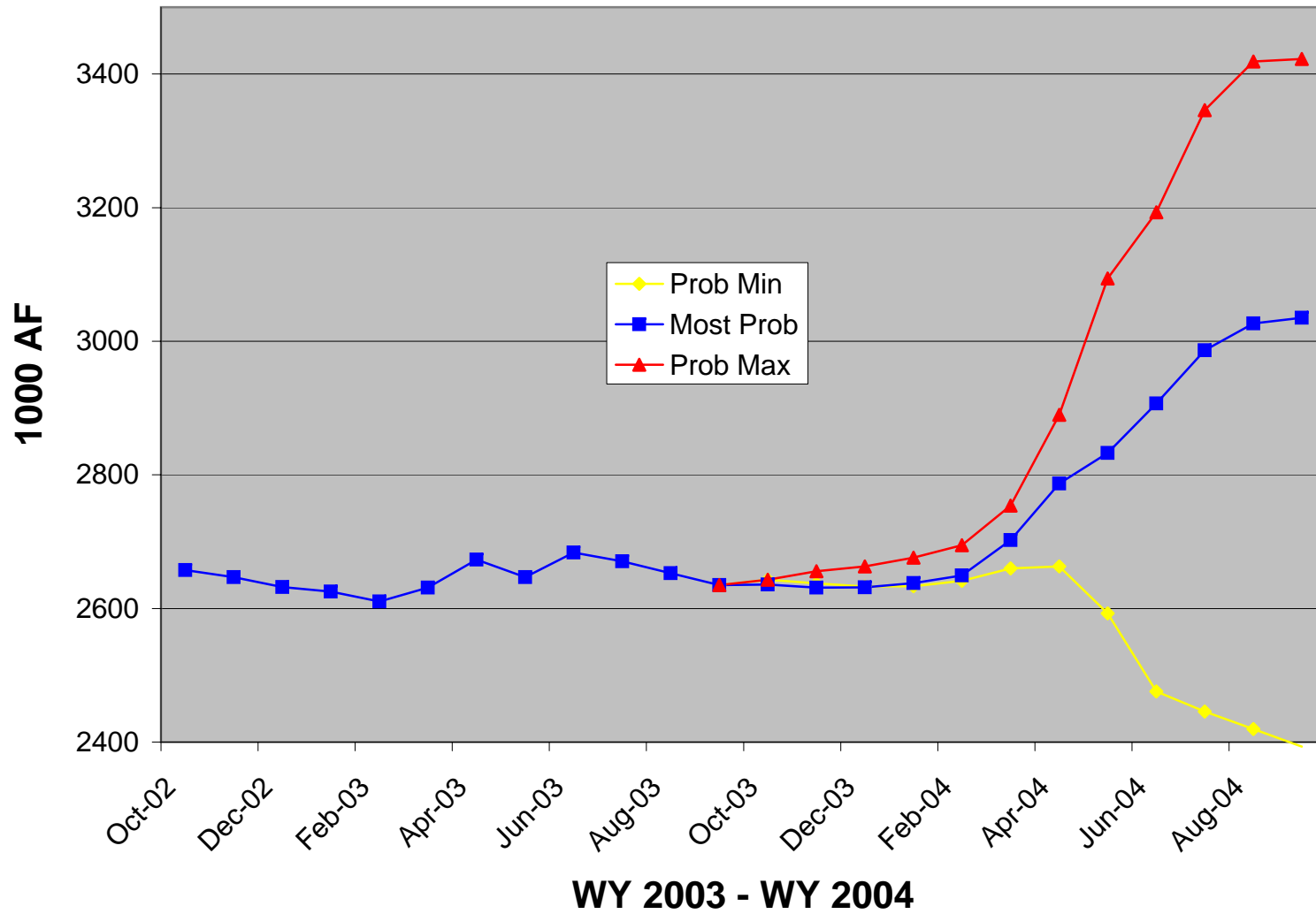
# Flaming Gorge Monthly Releases



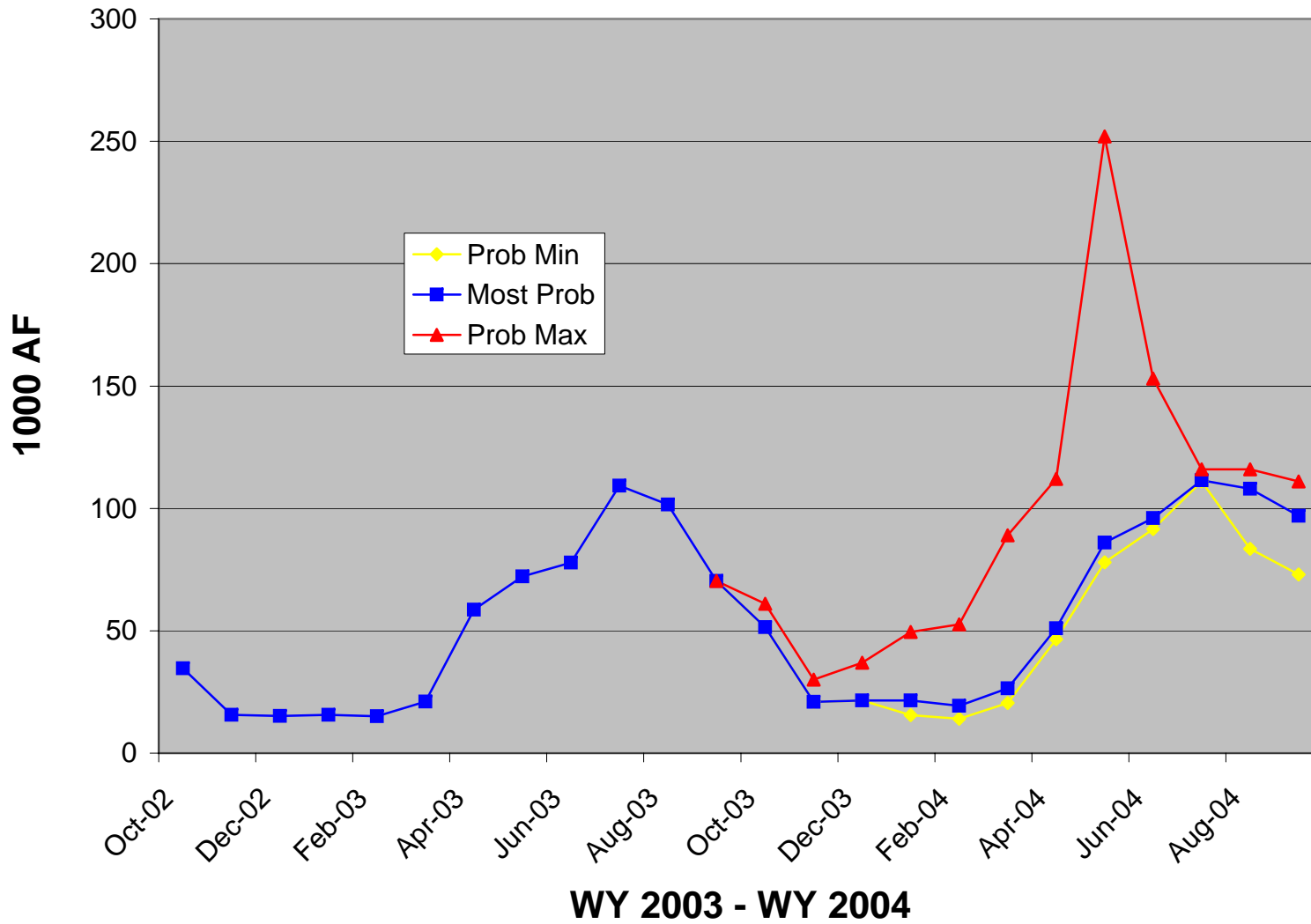
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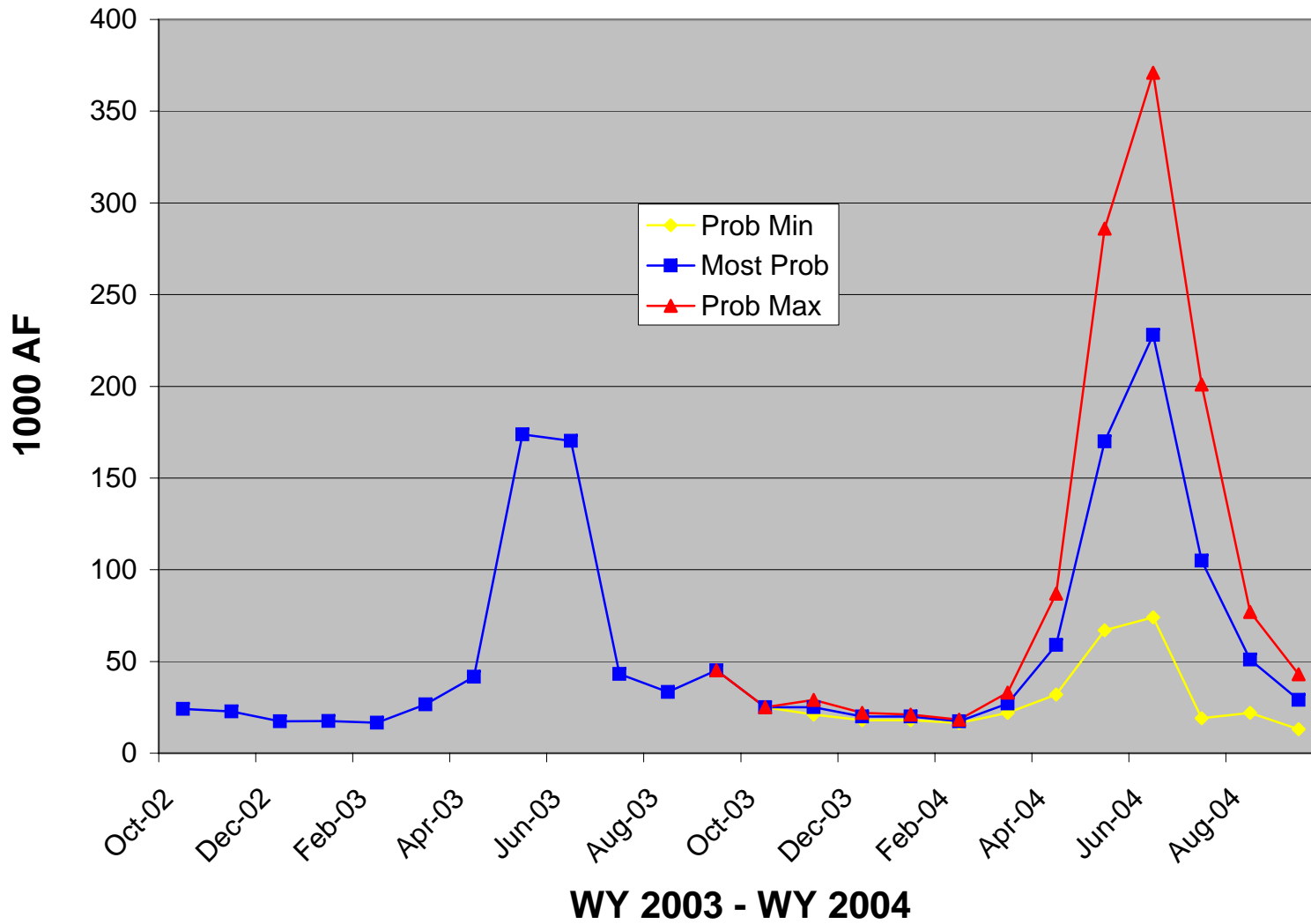
# Flaming Gorge Monthly Storage



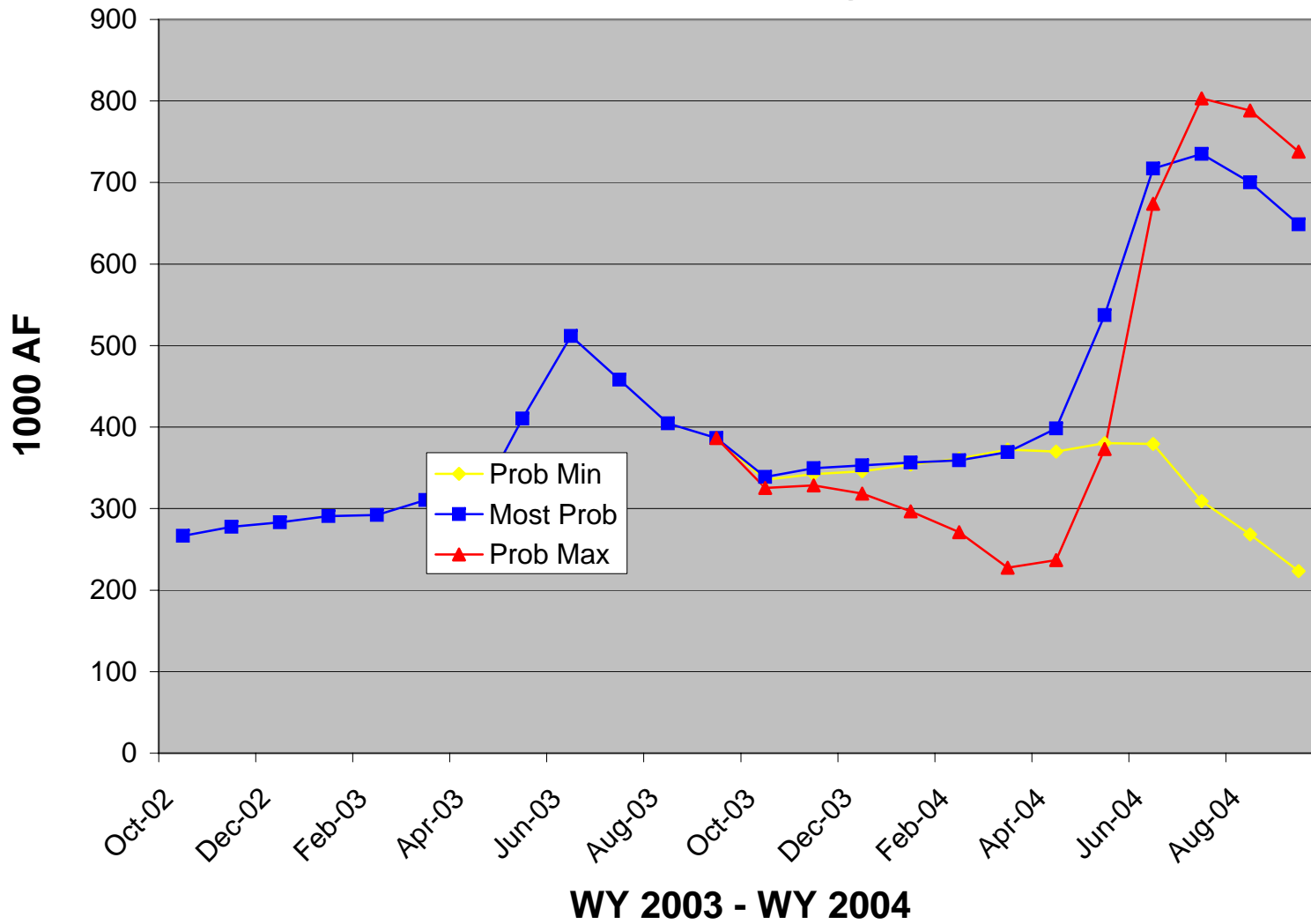
# Crystal Monthly Releases



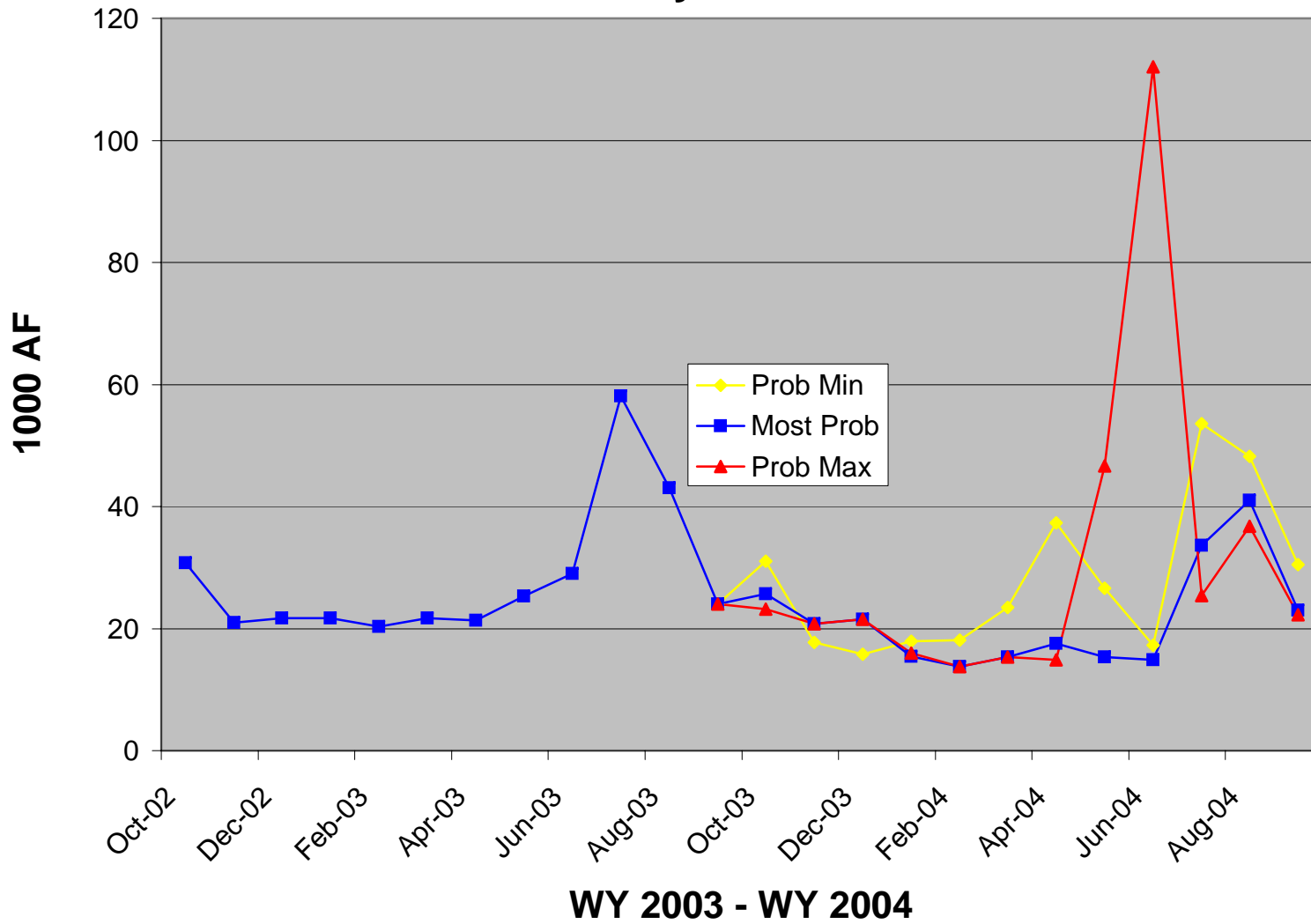
# Blue Mesa Monthly Inflow



# Blue Mesa Monthly Storage

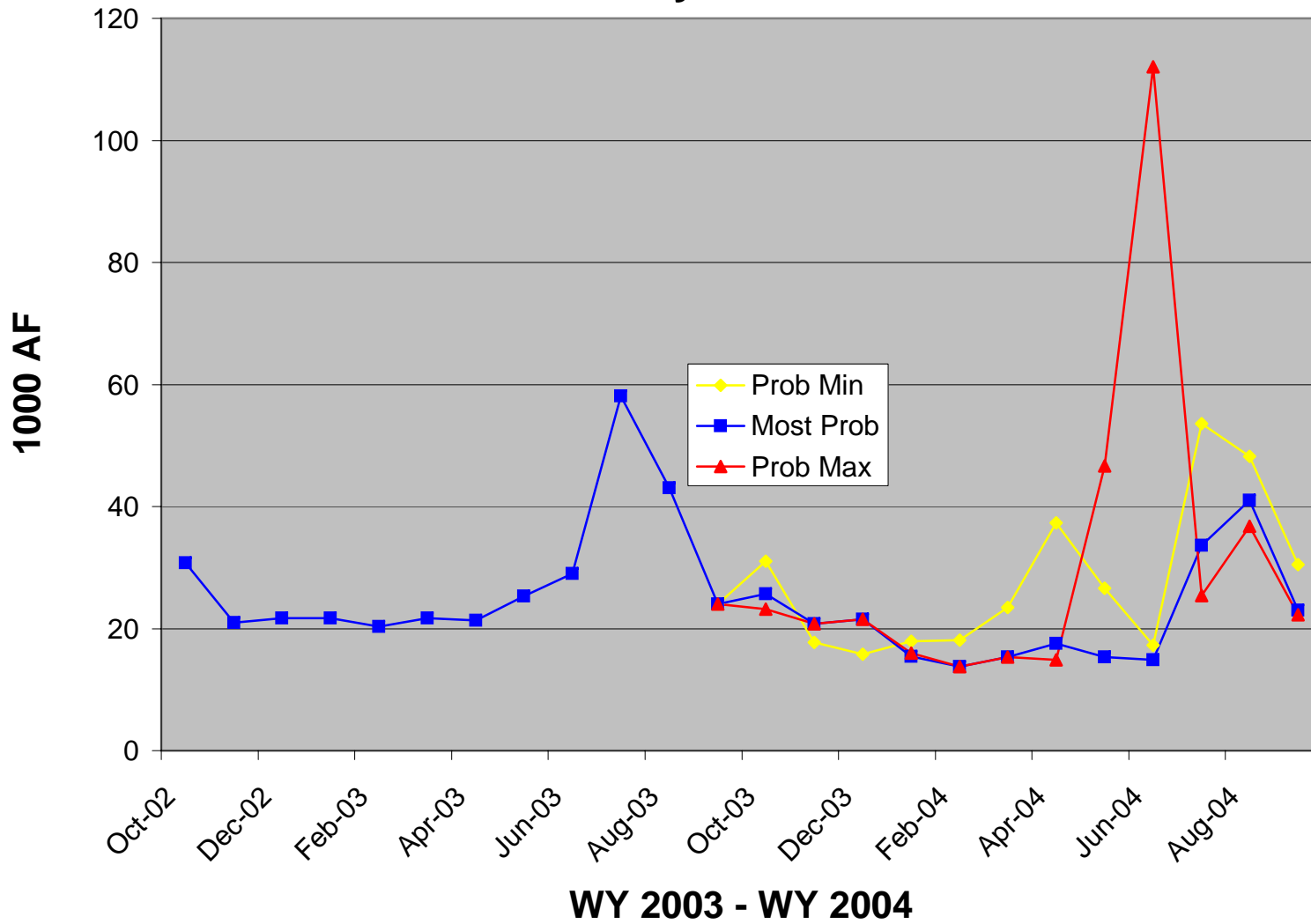


# Navajo Monthly Releases

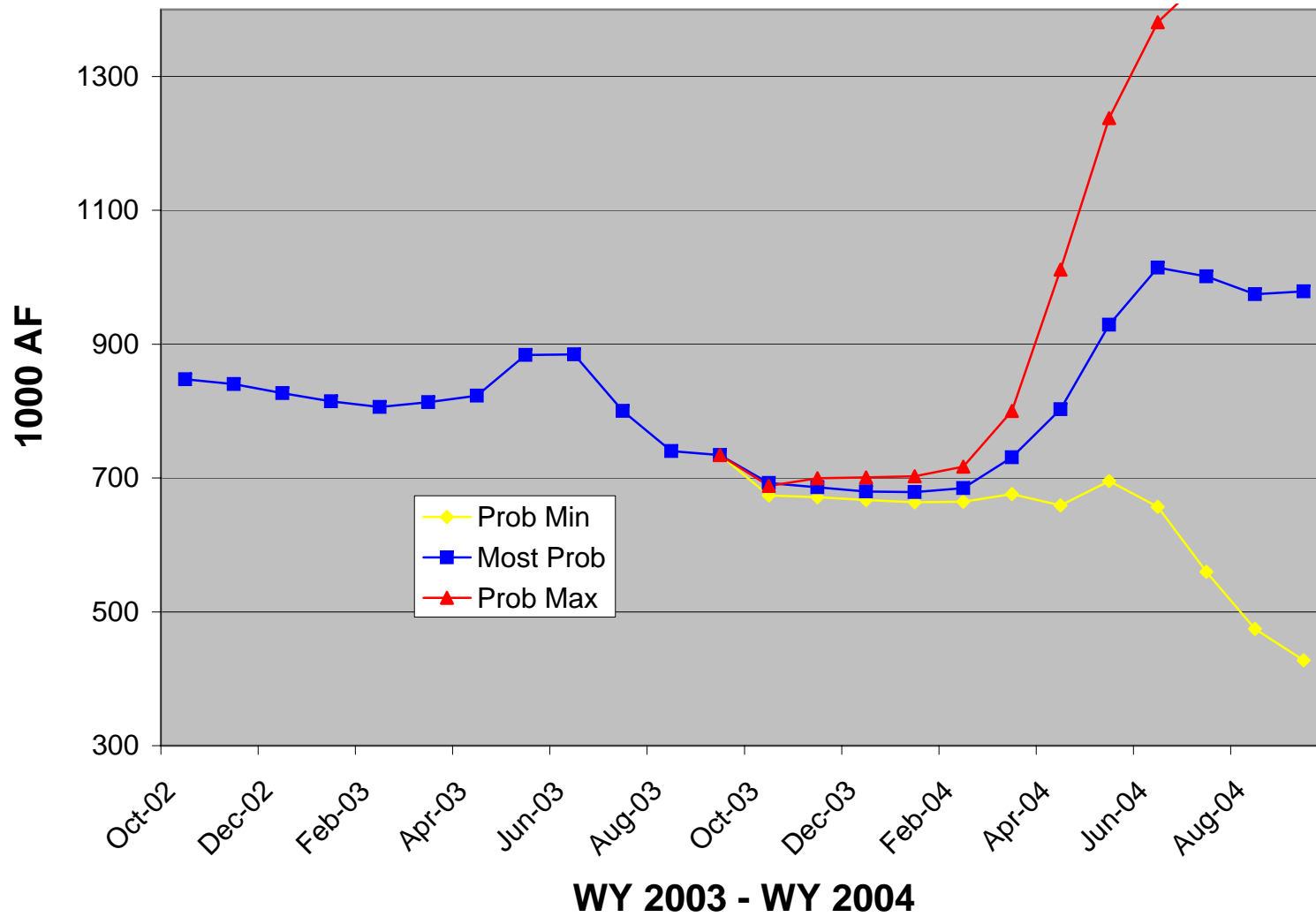




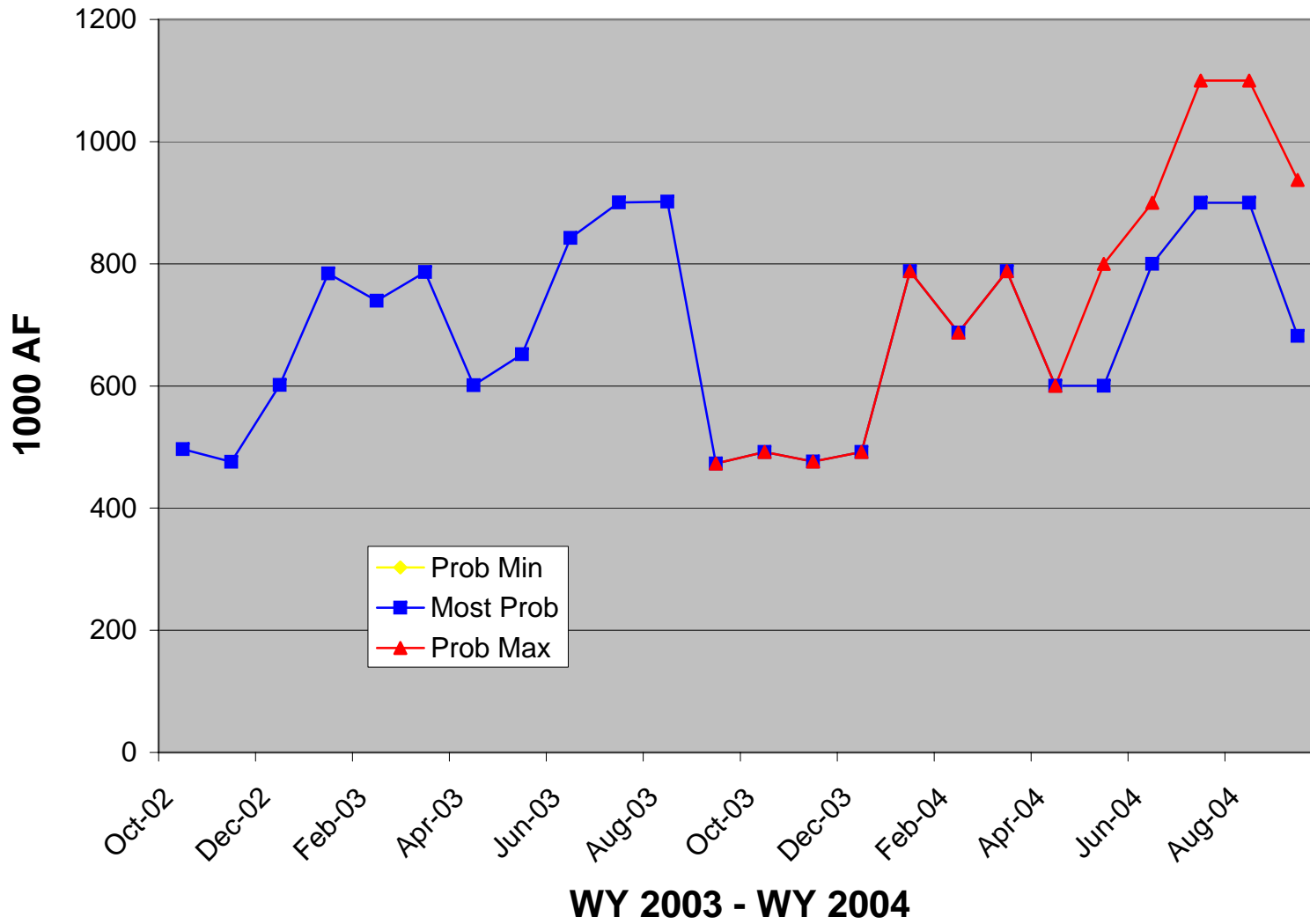
# Navajo Monthly Releases



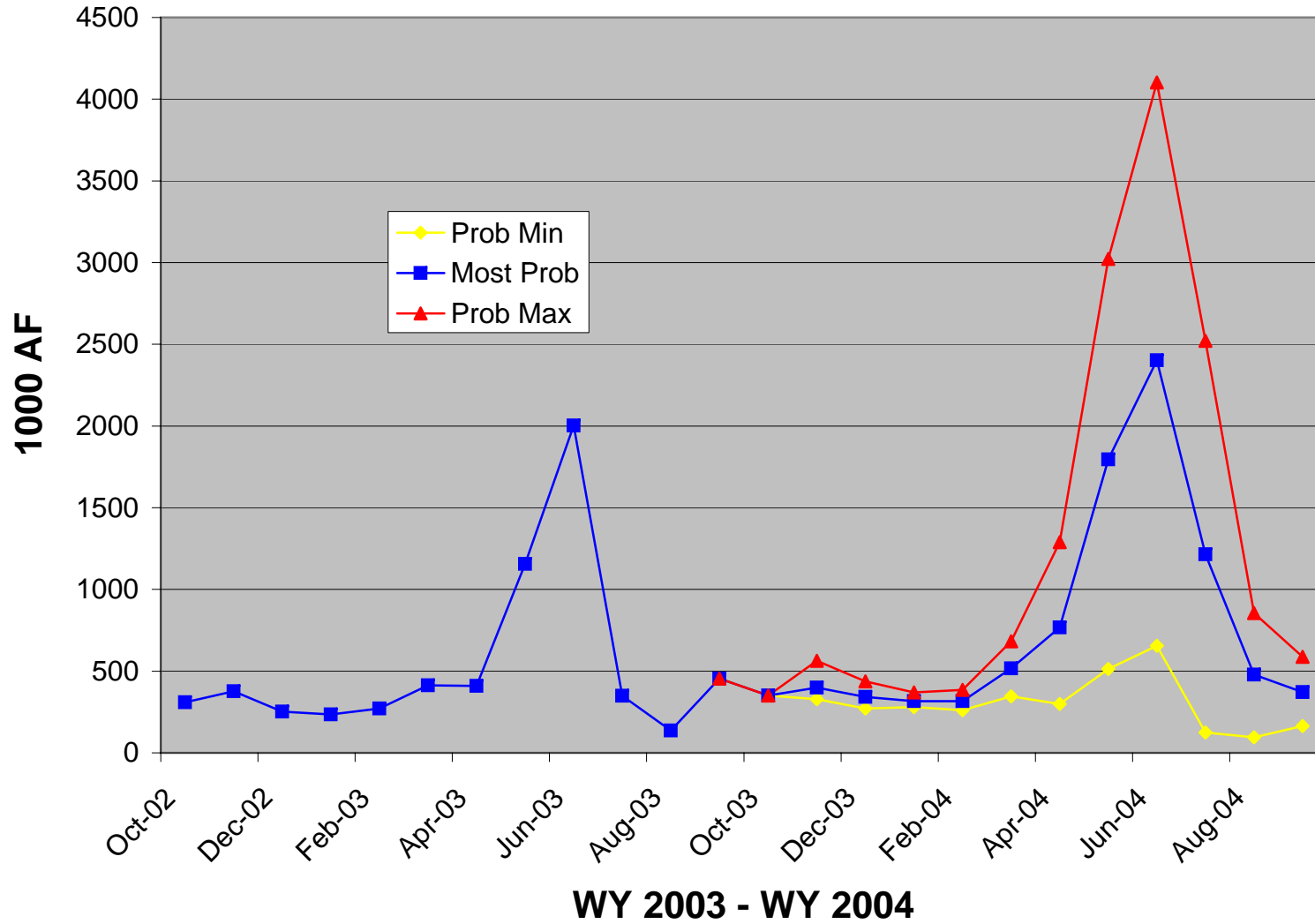
# Navajo Monthly Storage



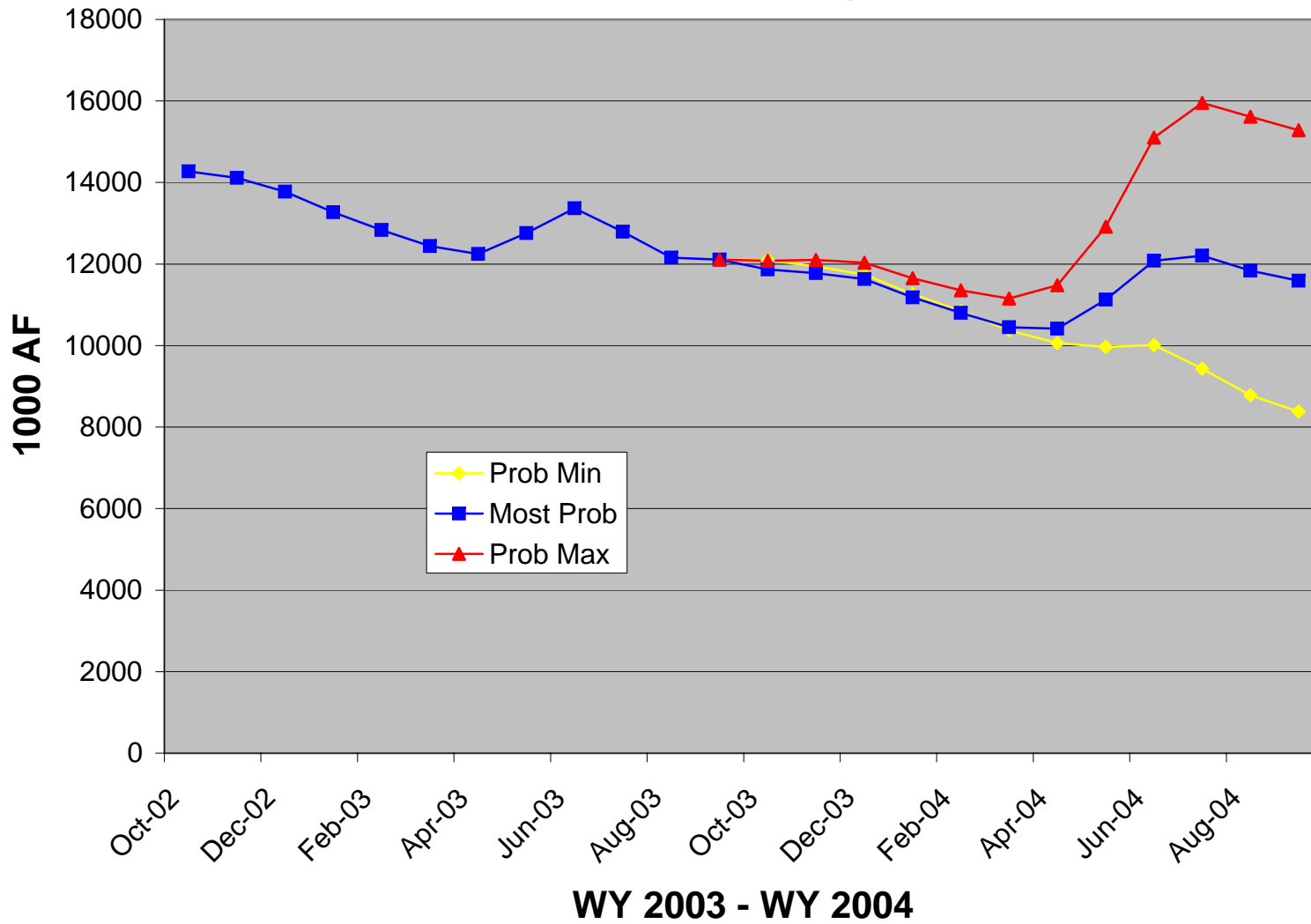
# Lake Powell Monthly Releases



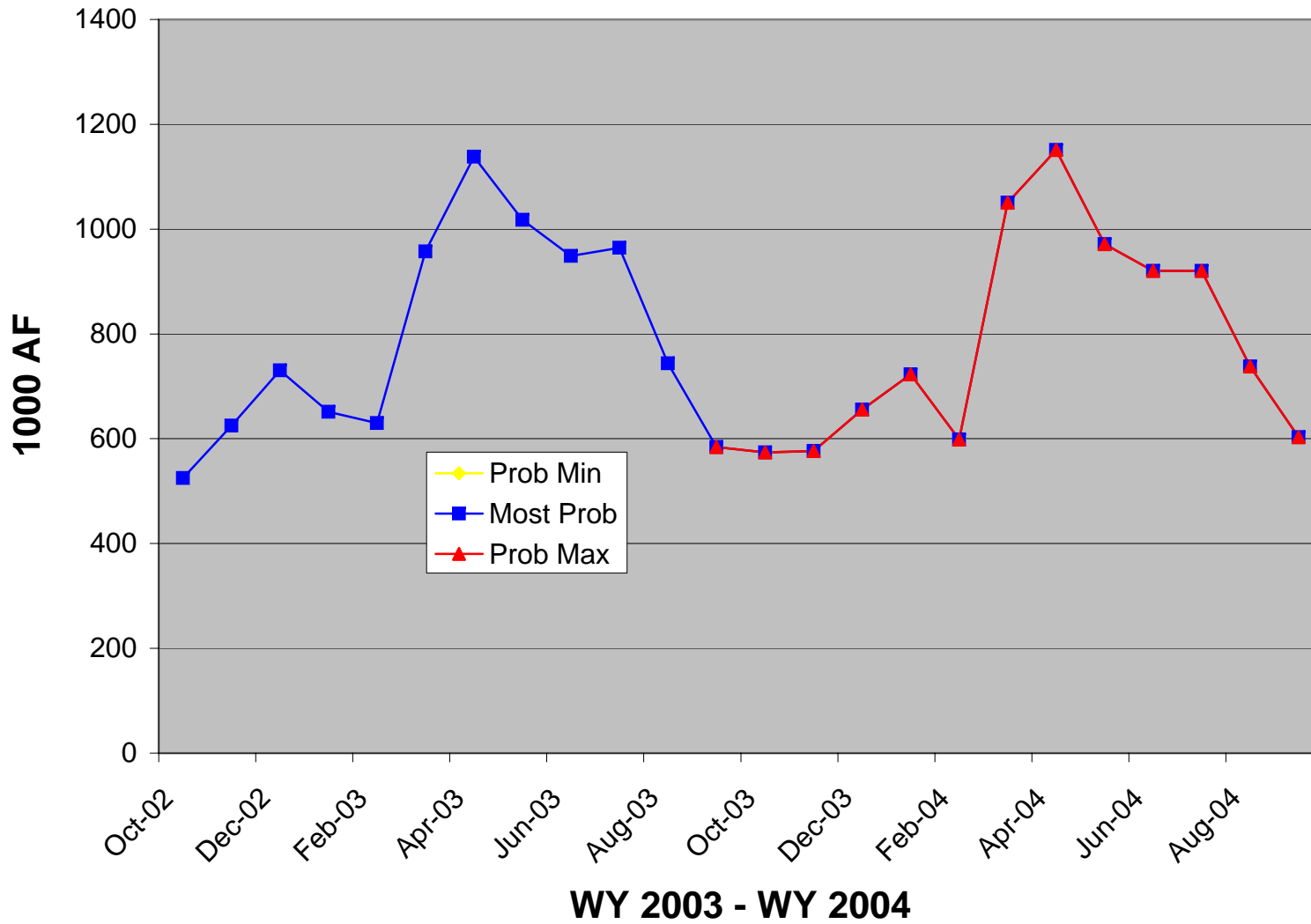
# Lake Powell Monthly Inflow



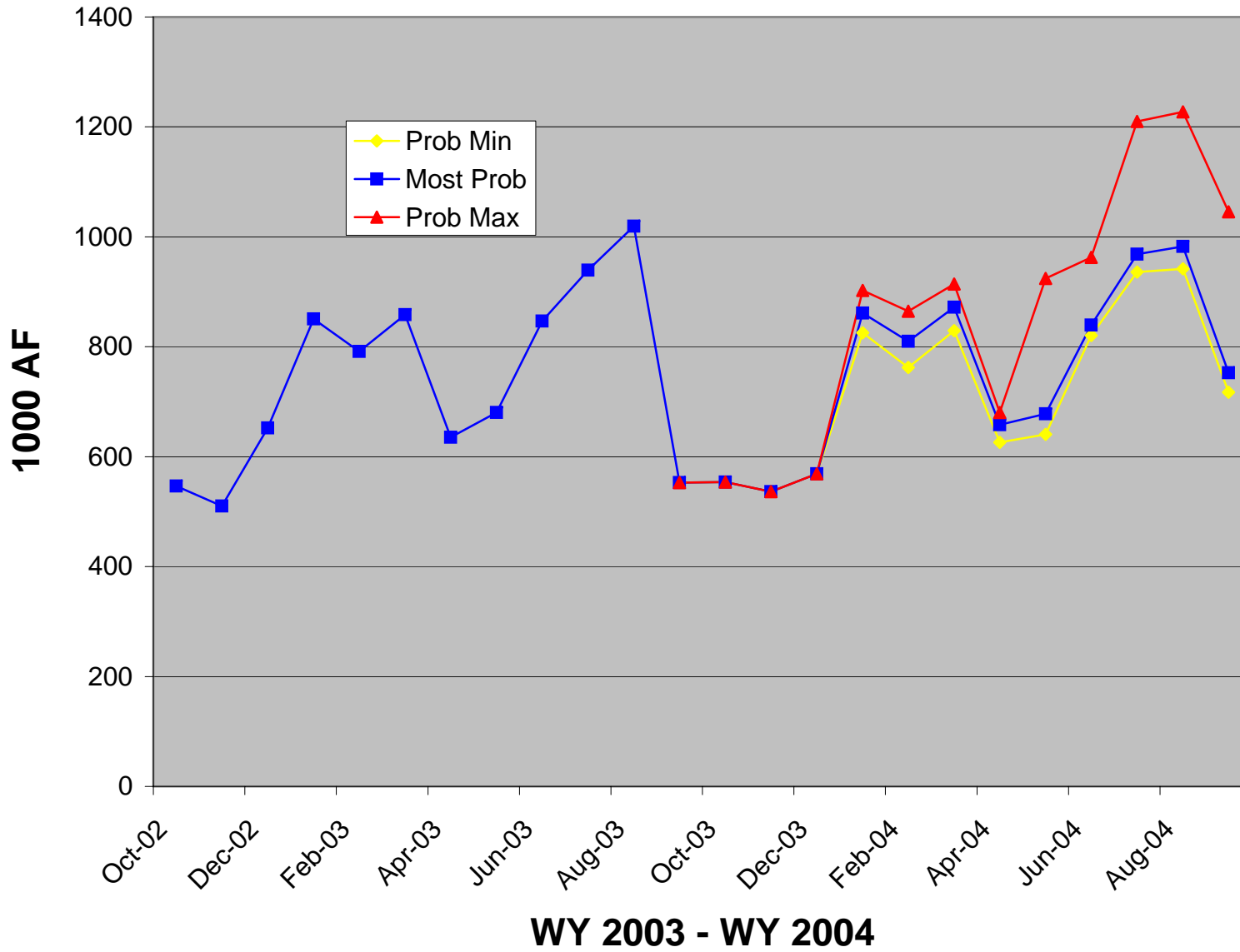
# Lake Powell Monthly Storage



# Lake Mead Monthly Releases



# Lake Mead Monthly Inflow



# Lake Mead Monthly Storage

