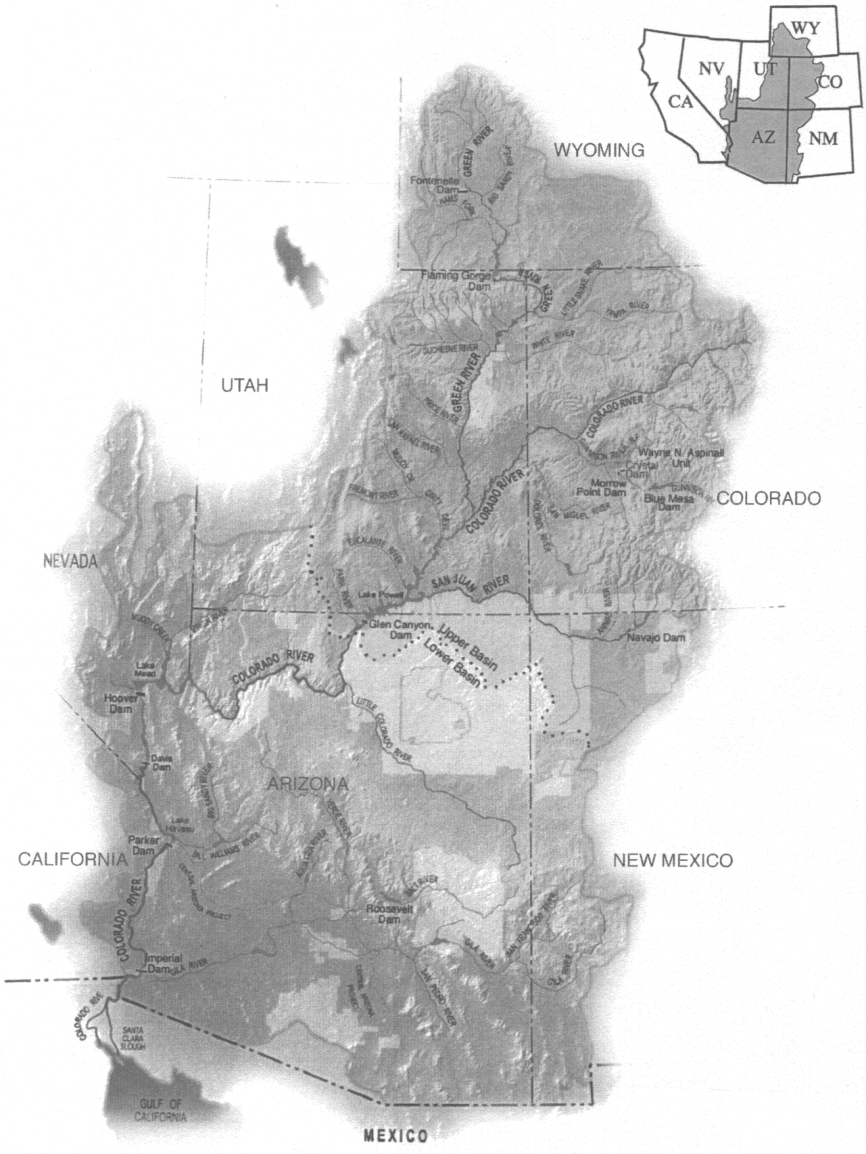
RECLAMATION

Managing Water in the West

Annual Operating Plan for Colorado River Reservoirs

2005



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2005 ANNUAL OPERATING PLAN

FOR

COLORADO RIVER SYSTEM RESERVOIRS

INTRODUCTION

Authority

This 2005 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 United States-Mexico Water Treaty), interstate compacts, court decrees, Colorado River Interim Surplus Guidelines (Interim Surplus Guidelines) (66 Federal Register 7772, January 25, 2001), Colorado River Water Delivery Agreement (69 Federal Register 12202, March 15, 2004), Interim 602(a) Storage Guideline (69 Federal Register 28945, May 19, 2004), 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 2005 AOP was prepared by the Bureau of 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 to be in storage in the Upper Basin reservoirs as of September 30, 2005, pursuant to Section 602(a) of the *Colorado River Basin Project Act*; (3) water available for delivery pursuant to the 1944 United States-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 as implemented by the Interim Surplus 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 1964 U.S. Supreme Court Decree in *Arizona v. California* (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. The minimum objective release criterion will control the annual release from Glen Canyon Dam during water year 2005 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. To maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell, releases from Lake Powell greater than the minimum objective of 8.23 maf (10,150 mcm) will be made if (1) storage in Lake Powell on September 30, 2005, is projected to be greater than 14.85 maf (water surface elevation 3,630 feet); and (2) active storage in Lake Powell is greater than active storage in Lake Mead, consistent with Section V of the Interim 602(a) Storage Guideline

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) Sections 2(A)(1) and 7 of the Interim Surplus Guidelines, the normal condition is the criterion governing the operation of Lake Mead for calendar year 2005 in accordance with Article III(3)(a) of the Operating Criteria and Article II(B)(1) of the Decree.

Reclamation does not anticipate any available unused state apportionment for calendar year 2005 at this time. However, if any unused apportionment is available, the Secretary shall allocate any available unused apportionments for calendar year 2005 in accordance with Article II(B)(6) of the Decree and Section 1(B) of the Interim Surplus Guidelines.

Water may be made available for diversion pursuant to 43 CFR Part 414[1] to entities within the Lower Division States. The Secretary shall make Intentionally Created Unused Apportionment available to districts in Arizona, California or Nevada for the off-stream storage or consumptive use

[1] 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).

of water pursuant to individual Storage and Interstate Release Agreements (SIRA) and 43 CFR Part 414.

On October 10, 2003, the Secretary approved the Record of Decision for the Inadvertent Overrun and Payback Policy (IOPP) which became effective January 1, 2004. The IOPP remains in effect during calendar year 2005.

The Colorado River Water Delivery Agreement requires payback of overruns 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 2005.

1944 United States-Mexico Water Treaty Delivery. A volume of 1.5 million acre-feet (maf), 1,850 million cubic meters (mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2005 in accordance with Article 15 of the 1944 United States-Mexico Water Treaty and Minutes No. 242 and 310 of the IBWC.

2004 OPERATIONS SUMMARY AND RESERVOIR STATUS

Once again, drier than average hydrologic conditions were observed in the Colorado River Basin in 2004, marking the fifth consecutive year of drought in the basin. Basinwide precipitation was 89 percent of average during water year 2004 with snowpack accumulations also being below normal levels. Total unregulated[(2)] inflow into Lake Powell for water year 2004 was 6.13 million acre-feet (maf) or 7,560 million cubic meters (mcm), only 51 percent of average.

Hydrologic conditions in the Colorado River Basin appeared to be more favorable in the winter of 2003–2004 than in the previous 4 years. During the winter period, basinwide snowpack was near average and at times above average. On March 1, 2004, basinwide snowpack in the Upper Colorado River Basin was 97 percent of average, with the forecasted April through July inflow to Lake Powell at 82 percent of average. However, March 2004 was an exceptionally warm and dry month throughout the basin. A significant deterioration of the snowpack occurred during the month. By April 1, 2004, basinwide snowpack had decreased to 66 percent of average, a reduction of 31 percentage points in only 1 month. At that time, inflow projections to Lake Powell were reduced to 50 percent of average. Further reductions of the inflow forecast occurred in May and June as the Upper Colorado River Basin experienced dry spring conditions for yet another year. Unregulated inflow into Lake Powell during the April through July runoff period in 2004 was 3.64 maf (4,490 mcm), or 46 percent of the 30 year average[(3)]. The volume of runoff in the basin in 2004 was reduced due to very dry antecedent soil moisture conditions resulting from four previous years of drought.

Water year 2004 marked the fifth consecutive year with below average inflow into Colorado River reservoirs. Unregulated inflow to Lake Powell was 62, 59, 25, and 51 percent of average in water years 2000, 2001, 2002, and 2003 respectively. Reservoir storage at Lake Powell and Lake Mead declined for the fifth straight year. During water year 2004, Lake Mead storage decreased by 1.681 maf (2,074 mcm), and Lake Powell storage decreased by 2.941 maf (3,628 mcm). Storage in reservoirs upstream of Lake Powell increased by approximately 0.395 maf (487 mcm) in water year 2004. At the beginning of water year 2004, Colorado River total system storage was 57 percent of capacity. As of September 30, 2004, total system storage was 50 percent of capacity, a decrease of approximately 4.238 maf (5,228 mcm).

Tables 1(a) and 1(b) list the October 1, 2004, reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in water elevation during water year 2004.

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(2) 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.

(3) Inflow statistics throughout this document will be compared to the 30-year average, 1971–2000.

Table 1(a). Reservoir Conditions on October 1, 2004 (English Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(maf)	(maf)	(ft)	(%)	(maf)	(ft)
Fontenelle	0.057	0.288	6,498.6	84	0.030	4.3
Flaming Gorge	1.070	2.679	6,011.2	71	0.044	1.3
Blue Mesa	0.322	0.507	7,480.2	61	0.120	17.8
Navajo	0.760	0.935	6,022.5	55	0.201	23.0
Lake Powell	15.153	9.169	3,570.8	38	-2.941	-33.0
Lake Mead	11.940	13.937	1,125.9	54	-1.681	-16.3
Lake Mohave	0.205	1.605	639.5	89	-0.038	-1.4
Lake Havasu	0.030	0.589	448.5	95	-0.027	1.4
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Totals	29.537	29.709		50	-4.238	

* From October 1, 2003 to September 30, 2004.

Table 1(b). Reservoir Conditions on October 1, 2004 (Metric Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(mcm)	(mcm)	(m)	(%)	(mcm)	(m)
Fontenelle	70	355	1,981	84	37	1.3
Flaming Gorge	1,320	3,305	1,832	71	54	0.4
Blue Mesa	397	625	2,280	61	148	5.4
Navajo	937	1,153	1,836	55	248	7.0
Lake Powell	18,691	11,310	1,088	38	-3,628	-10.0
Lake Mead	14,728	17,191	343	54	-2,074	-5.0
Lake Mohave	253	1,980	195	89	-47	-0.4
Lake Havasu	37	727	137	95	33	0.4
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Totals	36,434	36,646		50	-5,228	

* From October 1, 2003, to September 30, 2004.

2005 WATER SUPPLY ASSUMPTIONS

For 2005 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.

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 2005 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 five 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 2005. The ESP modeling showed that even with average temperatures and precipitation in 2005, runoff in the Colorado River Basin is likely to remain below average due to dry antecedent conditions. Most probable inflow for Lake Powell in water year 2005 is 9.23 maf (11,380 mcm) or 77 percent of average. Most probable inflow is 2.83 maf (3,490 mcm) less than the 30 year average of 12.06 maf (14,870 mcm). Minimum probable inflow to Lake Powell in water year 2005 is 3.75 maf (4,630 mcm) or 31 percent of average (2.40 maf less than the statistical 90 percent exceedance level). Maximum probable inflow is 15.3 maf (18,800 mcm) or 127 percent of average (2.89 maf less than the statistical 10 percent exceedance level). 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 2005 inflow and October 1, 2004, reservoir storage conditions were used as input to this model; and monthly releases were adjusted until release and storage levels best accomplished project purposes.

Table 2(a). Projected Unregulated Inflow
Into Lake Powell for Water Year 2005
(English Units: maf)

Time Period	Probable Maximum	Most Probable	Probable Minimum
10/04–12/04	1.42	0.93	0.85
1/05 – 3/05	1.53	1.18	0.72
4/05 – 7/05	10.88	6.26	1.89
8/05 – 9/05	1.44	0.86	0.29
10/05 – 2/05	1.37	1.37	1.37
WY 2005	15.27	9.23	3.75
CY 2005	15.22	9.67	4.27

Table 2(b). Projected Unregulated Inflow
Into Lake Powell for Water Year 2005
(Metric Units: mcm)

Time Period	Probable Maximum	Most Probable	Probable Minimum
10/04 –12/04	1,751	1,147	1,052
1/05 –3/05	1,883	1,451	884
4/05 –7/05	13,417	7,720	2,330
8/05 –9/05	1,780	1,060	363
10/05 –12/05	1,693	1,693	1,693
WY 2005	18,831	11,380	4,630
CY 2005	18,778	11,920	5,270

2005 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.

In the Upper Basin, public stakeholder work groups have been established at Fontenelle Dam, Flaming Gorge Dam, the Aspinall Unit, Navajo Dam, and Glen Canyon Dam.[4] These work groups provide a public forum for information dissemination on ongoing and projected reservoir operations throughout the year. These work groups allow stakeholders the opportunity to provide information and feedback on ongoing reservoir operations.

Modifications to planned operations may be made based on changes in forecast conditions or other relevant factors. Due to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Upper Colorado River Endangered Fish Recovery Program), Section 7 consultations under the Endangered Species Act (ESA), 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 will initiate meetings with the Fish and Wildlife Service, representatives of the Basin States, and with public stakeholder work groups to facilitate the discussions 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 is reported to the Fish and Wildlife Service. 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 (MSCP). This program permits both non-Federal and Federal parties to participate and address ESA compliance requirements under Sections 7 and 10 of the ESA. A draft Environmental Impact Statement (EIS) on the Lower Colorado River MSCP was published on June 18, 2004. The Secretary and representatives from Arizona, California, and Nevada signed a Memorandum of Agreement on September 14, 2004, committing their best efforts, staff, and resources to complete the final EIS/Environmental Impact Report by December 2004.

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[4] At Glen Canyon Dam, the Adaptive Management Work Group (AMWG), a Federal Advisory Committee, was established in 1997. Additional information on the AMWG can be found at www.usbr.gov/uc/envprog/amp.

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

Drought conditions persisted during water year 2004 in the Upper Green River Basin for a fifth consecutive year. The April through July inflow to Fontenelle Reservoir during water year 2004 was 0.482 maf (594 mcm), which was 56 percent of normal. Even with lower than average inflow, Fontenelle Reservoir filled in 2004. The inflow peaked at 5,700 cubic feet per second (cfs) or 161 cubic meters per second (cms) on June 12, 2004. Releases from Fontenelle Reservoir reached a maximum of 3000 cfs (85 cms) between July 3, 2004, and July 5, 2004. These maximum releases were a combination of bypass releases and powerplant releases. The powerplant releases during this period were approximately powerplant capacity of 1,500 cfs (40 cms). The peak elevation of Fontenelle Reservoir during water year 2004 was 6505.2 feet above sea level which occurred on July 20, 2004. This elevation is only 0.8 feet (0.24 meters) below the spillway crest elevation.

The most probable April through July inflow to Fontenelle Reservoir during water year 2005 is 0.677 maf (835 mcm). This volume far exceeds 0.345 maf (426 mcm) which is the storage capacity of Fontenelle Reservoir. For this reason, 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 very likely that Fontenelle Reservoir will fill during water year 2005. 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 the minimum pool elevation 6,463 feet above sea level (1,970 meters) by early April 2005, which corresponds to a volume of 0.093 maf (115 mcm) of live storage.

Flaming Gorge Reservoir

Inflows into Flaming Gorge Reservoir during water year 2004 were well below normal for a fifth consecutive year. The annual unregulated inflow volume for water year 2004 was 0.874 maf (1,076 mcm), which was 51 percent of normal. The annual unregulated inflow volumes during this drought period (water year 2000 through water year 2003) were 56, 43, 31, and 44 percent of normal, respectively. Flaming Gorge Reservoir did not fill during water year 2004. On October 1, 2003, (the beginning of water year 2004) the reservoir elevation was 6,009.8 feet above sea level (1,832 meters). The reservoir elevation remained relatively steady throughout water year 2004 and ended water year 2004 (on September 30, 2004) at an elevation of 6,011.2 feet (1,832.2 meters). The water year ending reservoir elevation was 28.8 feet (8.78 meters) below the full pool elevation of 6,040 feet (1,841 meters) which amounts to an available storage space of 1.070 maf (1,320 mcm).

A spring peak release of approximately 4,400 cfs (124.6 cms) was made for a period of 2 days between May 10, 2004, and May 12, 2004. This release was made through the powerplant and was closely matched to peak flows on the Yampa River. The Yampa River peaked at approximately 7,300 cfs (207 cms) on May 9, 2004. Flows on the Green River near Jensen, Utah, an important

segment of the Green River for endangered fish, peaked at about 11,200 cfs (317 cms) on May 13, 2004. The 2-day spring peak release for 2004 was a test release. The Flaming Gorge Biological Opinion (FGBO) recommends at least 1 week of power plant capacity releases during the spring. By reducing the peak to 2 days, approximately 35,000 acre-feet (43 mcm) of water was conserved. This conserved water was released during the months of June, July and August. Releases were increased from 800 cfs (22.6 cms) to 1,000 cfs (28.3 cms) during these months to provide higher base flows for endangered fish in the Green River below Flaming Gorge Dam. The release regime was considered a test release under the 1992 Biological Opinion. Reclamation, the Fish and Wildlife Service and Western Area Power Administration conducted informal consultations in setting up the parameters of the test release.

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 Recovery Program. The report compiled and summarized research conducted on endangered fish in the Green River under the Upper Colorado Recovery Program and presented 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 EIS was released to the public in August 2004. Completion of the final EIS and Record of Decision (ROD) will likely occur in the spring of 2005.

During water year 2005, Flaming Gorge Dam will be operated under the FGBO until a ROD is executed for the Flaming Gorge EIS. At that time, operations will adopt the findings of the ROD, which could impact how Flaming Gorge Dam will be operated in the future. High spring releases will likely continue to occur each year, timed with the Yampa River's spring runoff peak flow, followed by low summer and autumn base flows. Under the most probable scenario, releases in the winter and early spring during 2005 will be relatively low (approximately 800 cfs [23 cms]) 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 2004. The April through July unregulated runoff into Blue Mesa Reservoir in 2004 was 0.421 maf (519 mcm), or 59 percent of average. Water year 2004 unregulated inflow into Blue Mesa Reservoir was 0.629 maf (776 mcm) or 63 percent of average. Even though this marks the fifth consecutive year of drought, water year 2004 had considerably more runoff volume than the record low water year of 2002. The net effect of the 2004 runoff and the water conservation practices by water users in the basin during the year resulted in Blue Mesa Reservoir increasing in storage during the water year 2004 by 0.120 maf (148 mcm). Storage in Blue Mesa Reservoir on September 30, 2004, was 0.507 maf (625 mcm), or 61 percent of capacity.

Releases from Aspinall Unit reservoirs in 2004 were at lower than normal levels, in part to conserve reservoir storage. Releases from the Aspinall Unit were reduced on November 6, 2003, to provide for a flow of 300 cfs (7.1 cms) in the Gunnison River through the Black Canyon (below the

Gunnison Tunnel). This flow was maintained until early May 2004 at which time flows in the Black Canyon were increased to 350 cfs (8.5 cms). Water year 2004 powerplant bypasses were approximately 0.604 maf (745 mcm) at Crystal Dam. These bypass releases occurred because the powerplant was shut down from mid-October 2003 through October 2004 for generator rewind and turbine repair.

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, 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 5 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. In 2004 it was not necessary to operate under a shared shortage arrangement, because there was sufficient runoff.

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 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 Recovery Program. The report presents flow recommendations for two different river reaches: one for the lower Gunnison River between Delta and Grand Junction, Colorado, as measured at Grand Junction; and the other for the Colorado River downstream of the Gunnison River confluence as measured at the Colorado-Utah State line. In January 2004, Reclamation published a Notice of Intent to prepare an EIS on operations to assist with meeting the flow recommendations or a reasonable alternative to them. Public scoping meetings were held in February 2004. A draft EIS is likely to be released in 2006.

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 the 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) with a 1933 priority date. The Colorado Water Conservation Board will file under the State of Colorado instream flow program, for additional flows in excess of those required to fulfill the purposes of the Aspinall Unit (with a 2003 priority date) to provide additional water resources for the park However, this agreement is currently being challenged in United States District Court in Colorado. The Colorado Water Court for Water Division 4 has stayed proceedings on the amended Federal claim for the 300 cfs flow pending the outcome of the case before the District Court. The State of Colorado and others have challenged the Colorado Water Court stay in the Colorado Supreme Court. No action has been pursued on the Colorado Water Conservation Board's filing for the peak flows (flows in excess of those required to fulfill the purposes of the Aspinall Unit) in the Colorado Water Court for Water Division 4, and no action is anticipated until the amended Federal claim is settled. In short,

the reserved water right claim for the Black Canyon of the Gunnison National Park has not yet been quantified.

For water year 2005 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 to maintain a year round minimum flow of 300 cfs (8.5 cms) in the Gunnison River through the Black Canyon and to 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 can be reduced pursuant to the appropriate decree or MOA. In 2005, 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 2005 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 inflow scenario, Blue Mesa Reservoir is not expected to fill in 2005. Under the most probable and maximum probable inflow scenarios, Blue Mesa Reservoir is expected to fill in 2005.

Navajo Reservoir

Drought conditions continued to persist in the San Juan River Basin during 2004 which resulted in less than average runoff volumes into the basin. The April through July unregulated inflow into Navajo Reservoir in water year 2004 was 0.529 maf (652 mcm), or 67 percent of average. Water year 2004 unregulated inflow was 0.806 maf (993 mcm) or 72 percent of average. The San Juan River Basin is continuing to experience an extended dry cycle. Unregulated inflow to Navajo Reservoir in water years 2000, 2001, 2002, and 2003 was 40, 93, 10, and 43 percent of average, respectively. Storage in Navajo Reservoir has been significantly reduced due to these protracted drought conditions. Reservoir live storage on September 30, 2004, was 55 percent of capacity, but only 27 percent of active capacity. The water surface elevation at Navajo Reservoir on September 30, 2004, was 6,022.5 feet (1,835.7 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 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 potential in the basin. The Fish and Wildlife Service in June 2004 issued a non-jeopardy draft biological opinion for the operations of Navajo Dam to meet the Flow Recommendations, or reasonable alternative.

The Flow Recommendations did not provide for making a spring peak release from Navajo Reservoir in 2004 due to the severity of the drought and the hydrologic conditions in the San Juan River Basin. 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 2004. Releases from Navajo Reservoir from June through August 2004 averaged 548 cfs (15.5 cms) and were as high as 806 cfs (22.8 cms) in mid-August. 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; however, because of the poor water supply conditions at Navajo Reservoir, the SJRIP and the Fish and Wildlife Service concurred in providing a lesser base flow of 400 cfs through the critical habitat reach during the 2004 irrigation season only, which flow is deemed sufficient to maintain endangered fish populations and habitat in the San Juan River through the critical habitat reach for the designated time period. With minimal tributary inflow to the San Juan River below Navajo Dam (primarily the Animas River) in 2004, 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 response to the extremely low storage level in Navajo Reservoir, coupled with a less-than-average predicted inflow in 2004, a shortage sharing agreement was developed among water users in 2004. The 2004 shortage sharing recommendations were similar to the agreement that was developed in 2003. Ten major water users, including 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 which included limitations on diversions for 2004, 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 Fish and Wildlife Service, and the SJRIP all provided input to the recommendations, and the recommendations were accepted for reservoir operation and river administration purposes by Reclamation and the New Mexico State Engineer.

The criteria used for determining a water shortage in 2004 at Navajo Reservoir was based on protecting an elevation of 5,990 feet (the top of the inactive pool), 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, with projected inflows at the minimum probable level, a water supply shortfall was determined. The shortage calculations were updated frequently as runoff forecasts changed and actual runoff materialized. Because of sufficient inflow into Navajo Reservoir in 2004, no shortages were required during the 2004 water year.

Reclamation is proceeding through a NEPA process on the implementation of operations at Navajo Dam that meet the Flow Recommendations, or a reasonable alternative to them. A Notice of Intent to prepare an 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 in March 2005 with the ROD to follow a minimum of 30 days later.

In March 2004, a contract was awarded to Gracon Corporation for the repair of the 4' x 4' tandem outlet gates at Navajo Dam. The work is expected to be completed in November 2004.

Navajo Reservoir is not expected to fill in 2005 under the minimum probable, most probable or maximum probable inflow scenario. Releases from the reservoir will likely be 250 cfs (7 cms) through the fall and winter, subject to NEPA compliance. Under most probable inflow conditions in 2005, a large spring release as provided for in the Flow Recommendations is likely in 2005.

Lake Powell

Five years of drought in the Colorado River Basin has significantly 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).

Lake Powell began water year 2004 with 12.1 maf (14,900 mcm) of water in storage (50 percent of capacity), 3.51 maf (4,330 mcm) lower than that of Lake Mead. As water year 2004 ended on September 30, 2004, Lake Powell storage had been reduced to 9.169 maf (11,310 mcm) or 38 percent of capacity. Because of reduced storage, and Lake Powell storage being less than Lake Mead storage at the beginning of water year 2004, releases from Glen Canyon Dam were scheduled to maintain the minimum release objective from Lake Powell of 8.23 maf (10,150 mcm) in accordance with Article II(2) of the Operating Criteria. Forecasted inflow to Lake Powell was below average throughout water year 2004, and storage equalization releases between Lake Mead and Lake Powell were not required. The total release from Lake Powell in water year 2004 was 8.23 maf (10,150 mcm).

April through July unregulated inflow into Lake Powell in water year 2004 was 3.64 maf (4,490 mcm), or 46 percent of average. Water year 2004 unregulated inflow was 6.13 maf (7,560 mcm), or 51 percent of average. Lake Powell reached a seasonal peak elevation of 3,587.4 feet (1,093.4 meters), 112.6 feet from full, on June 14, 2004. The elevation of Lake Powell on September 30, 2004, was 3,570.8 feet (1,088.4 meters), 129.2 feet from full. The water surface of Lake Powell had not been this low since 1970, prior to the reservoir's first filling in 1980.

In 2003 and 2004, Reclamation conducted a NEPA process to study the effects of implementing an interim 602(a) storage guideline to assist in the determination of the quantity of water considered necessary to be in storage as of September 30 of each year as required by Section 602(a) of the *Colorado River Basin Project Act*. The guideline was originally proposed by the Colorado River Basin States (65 Federal Register 48537, August 8, 2000). A Final Environmental Assessment titled "Adoption of an Interim 602(a) Storage Guideline" was completed in March 2004. A Finding of No Significant Impact was approved by the Regional Directors of Reclamation's Upper and Lower Colorado Regions in March 2004. Under the Interim 602(a) Guideline, 602(a) storage requirements determined in accordance with Article II(1) of the Operating Criteria will utilize a value of not less than 14.85 maf (elevation 3,630 feet) for Lake Powell through the year 2016.

On April 24, 2002, members of the Glen Canyon Adaptive Management Work Group (AMWG)

recommended to the Secretary that a 2-year 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. To document the proposed experimental flows, Reclamation, the National Park Service, and the United States Geological Survey jointly prepared the Proposed Experimental Releases from Glen Canyon Dam and Removal of Non-Native Fish EA (September 2002), under NEPA. The EA incorporates a Biological Assessment for the Fish and Wildlife Service under the 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 these experimental flows, were carried out from January through March 2003, and January through March 2004. Releases during these three month periods ranged between a high of 20,000 cfs (566 cms) to a low of 5,000 cfs (142 cms) each day under revised ramping rates as described in the EA. These high fluctuating releases were intended to benefit the endangered humpback chub by reducing the spawning and recruitment of nonnative fish.

Another aspect of these experimental flows is the retention of sediment in the Grand Canyon To better understand mobilization of sediment and beach and habitat creation in the Grand Canyon corridor, if significant sediment input (over one million metric tons) to the Grand Canyon from the Paria River occurs in the summer or fall of 2004, and 800,000 metric tons are retained by January 1, 2005, as described in the EA, then a 2-day test release of 40,000 to 44,000 cfs (1,130 cms to 1,250 cms) from Glen Canyon Dam will be made in January 2005. Additionally, a 2-day test release of 40,000 to 44,000 cfs (1,130 cms to 1,250 cms) would occur during the period of January through March of 2005 if winter sediment inputs exceed 800,000 metric tons as described in the EA. Test releases to mobilize sediment did not occur in 2004 because the required sediment input from the Paria River was not achieved.

On August 11, 2004, members of the AMWG recommended to the Secretary that replication of the daily high fluctuating releases (5,000 to 20,000 cfs) continue adaptively from January through April, 2005. The AMWG also proposed that if the Secretary proceeds to implement a high flow release to mobilize sediment in water year 2005, that such release take place in November 2004 rather than January 2005. In making these recommendations, the AMWG expressed a desire to formulate a water year 2005 flow regime from Glen Canyon Dam that is effective at testing the hypotheses of sediment conservation and humpback chub protection in a way that considers the financial condition of the Upper Colorado River Basin Fund. An operation at Glen Canyon Dam may be adopted in water year 2005, pending appropriate environmental compliance to implement the August 11, 2004, recommendations of the AMWG.[5] Experimental flows will not alter the total volume of water to be released from Lake Powell during water year 2005.

In 2005, scheduled maintenance activities at Glen Canyon Dam power plant will require that one or more of the eight generating units at Glen Canyon Dam periodically be offline. Coordination between Reclamation offices in Salt Lake City, Utah, and Page, Arizona, will take place in the

[5] Plots of the monthly release pattern and water surface elevation at Lake Powell under the revised experimental flow proposal are displayed in the attachments to this AOP.

scheduling of maintenance activities to minimize impacts, including those on experimental releases.

During water year 2005, the minimum release objective of 8.23 maf (10,150 mcm) will be made under the most probable, minimum probable, and maximum probable inflow conditions. If inflow to Lake Powell is greater than the maximum probable inflow volume, releases greater than 8.23 maf (10,150 mcm) will be made in 2005 to equalize storage between Lakes Powell and Mead, if storage in Lake Powell is projected to be greater than 14.85 maf (elevation 3,630 feet) on September 30, 2005, and active storage in Lake Powell is greater than active storage in Lake Mead. Under most probable inflow in 2005, the projected water surface elevation at Lake Powell on September 30, 2005, will be 3,569 feet (1,088 meters) with 9.01 maf (11,100 mcm) of storage (37 percent of capacity).

Because of less than full storage conditions in Lake Powell resulting from five consecutive years of below normal runoff, releases for dam safety purposes are highly unlikely in 2005. 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 2005 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 2005 may also require that releases exceed the parameters of the Glen Canyon Dam Operating Criteria during the winter months of 2005.

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

Parameter	(cfs)	(cms)	Conditions
Maximum flow [6]	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 [7]	5,000 / 8,000	141.6 / 226.6	

Releases from Lake Powell in water year 2005 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.

Lake Mead

For calendar year 2004, the Partial Domestic 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 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 United States-Mexico Treaty and Minutes No. 242 and 310 of the International Boundary and Water Commission.

Lake Mead began water year 2004 at elevation 1,142.12 feet (348 meters), with 15.6 maf (19,243 mcm) in storage, 60 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 1,125.73 feet

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

[7] 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).

(343 meters) at the end of July 2004 with 13.924 maf (17,146 mcm) in storage, 54 percent of capacity.

The total release from Lake Mead through Hoover Dam during water year 2004 was 9.635 maf (11,885 mcm). Calendar year 2004 total release is projected to be 9.340 maf (11,521 mcm). Consumptive use from Lake Mead during calendar year 2004 diverted through the Robert Griffith Water Project is projected to be 0.293 maf (361 mcm).

Under the most probable inflow conditions during water year 2005, Lake Mead will be at its maximum elevation of 1,127.61 feet (344 meters) at the end of October 2004 and will decline during the water year to reach its minimum elevation of 1,110.34 feet (338 meters) at the end of July 2005. Releases from Lake Mead for water year 2005 are projected to be 9.277 maf (11,443 mcm). For the 2005 calendar year, total releases are projected to be 9.358 maf (11,543 mcm). For the purpose of projections, estimated releases are based on the Normal condition as the criterion governing the operation of Lake Mead. No flood control releases would be required during water year 2005 under any of the three inflow scenarios.

The Interim Surplus Guidelines ROD 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 2004 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 2005, no changes in operations to provide rising elevations in Lake Mead are expected in the spring of 2005.

Lakes Mohave and Havasu

At the beginning of water year 2004, Lake Mohave was at an elevation of 640.95 feet (195.4 meters), with an active storage of 1.643 maf (2,027 mcm). The water level of Lake Mohave was regulated between elevation 634 feet (193.24 meters) and 645 feet (196.06 meters) throughout the water year, ending at an elevation of 639.54 feet (194.9 meters) with 1.605 maf (1,980 mcm) in storage. The total release from Lake Mohave through Davis Dam for water year 2004 was 9.43 maf (11,632 mcm) for downstream water use requirements. Calendar year 2004 total release is projected to be 9.16 maf (11,300 mcm).

For water year 2005, Davis Dam is expected to release 9.00 maf (11,101 mcm). For the 2005 calendar year, releases are projected to be 9.08 maf (11,206 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 2004 at an elevation of 447.05 feet (136.26 meters) with 0.562 maf (693 mcm) in storage. The water level of Lake Havasu was regulated between elevation 445 feet (135.6 meters) and 449 feet (136.9 meters). During the water year, 6.80 maf (8,388 mcm) was released from Parker Dam. Calendar year 2004 total release is projected to be 6.86 maf (8,462 mcm). Diversions from Lake Havasu during calendar year 2004 by the Central Arizona Project (CAP) and the Metropolitan Water District (MWD) are projected to be 1.60 maf (1,974 mcm) and 0.591 maf (729 mcm), respectively.

For water year 2005, Parker Dam is expected to release 6.94 maf (8,560 mcm). For the 2005 calendar year, releases are projected to be 6.93 maf (8,548 mcm). Diversions from Lake Havasu in calendar year 2005 by the CAP and the MWD are expected to be 1.6 maf (1,974 mcm) and 0.512 maf (632 mcm), respectively.

Mohave and Havasu Reservoirs 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 Parker Dam, a major overhaul of Unit No. 3 is scheduled for October 2004 through March 2005. This overhaul will include replacing the turbine, re-winding the generator, replacing the excitation system with a new solid state system, and installing solid state relaying for the generator and transformers. Although the capacity will not be increased, the unit output should be more efficient, with less cavitation and reduced outages. After Unit No.3 is rehabilitated, operating criteria will be analyzed and shared with the funding board customers who will decide whether to continue with the other three units for rehabilitation.

During 2005, 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 ROD, 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 multi-agency 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, 1-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 August through October, these fish are harvested from these rearing areas and then released to the lake. The razorback suckers grow very quickly, usually exceeding 10 inches in length by September.

In 2003, 16,843 razorback suckers (300 mm minimum size) were repatriated into Lake Mohave from all sources. In 2004, 25,418 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. 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 demands.

Since 1992, elevation restrictions have been placed on Senator Wash due to potential piping and liquefaction of foundation and embankment materials at West Squaw Lake Dike and Senator Wash Dam. Currently, Senator Wash is restricted to an elevation of 240 feet (9,144 acre-feet of storage). Excursions to 240 feet are allowed for no more than 10 consecutive days. The risk analysis update report, "Report of Findings Senator Wash Dam," dated June 30, 2003, from Reclamation's Technical Service Center recommended that Senator Wash be restricted to elevation 235 feet (7,330 acre-feet of storage) unless the permanent West Squaw Lake Dike filter blanket that was constructed in calendar year 2002 is extended to the east. This filter blanket extension was completed in October 2004.

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. 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 currently being evaluated. Maintenance dredging of the Laguna Desilting Basin, located above Laguna Dam, was started during calendar year 2003 and was completed in calendar year 2004. The desilting basin at Laguna is currently being extended by about 1,500 feet. This work should be completed by October 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 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) to the Mexicali Valley in Mexico. The

diversions also supply much of the domestic and industrial water needs in the Yuma area. In calendar year 2003 approximately 5.780 maf (7,123 mcm) arrived at Imperial Dam; approximately 5.764 maf (7,101 mcm) is estimated to arrive at Imperial Dam in calendar year 2004.

Additional Regulatory Storage

Reclamation has initiated a study that evaluates the needs and develops options for additional water storage facilities to be used to improve water resource management on the main stem of the Colorado River below Parker Dam and near the All-American Canal. The report, "Preliminary Study of Lower Colorado River Storage Alternatives," is being developed in cooperation with the Imperial Irrigation District, Coachella Valley Water District, San Diego County Water Authority, and Metropolitan Water District of Southern California.

Yuma Desalting Plant

The Yuma Desalting Plant (YDP) was not operated in calendar year 2004 and is being maintained in a ready reserve status. In calendar year 2003, the amount of water discharged through the Main Outlet Drain (bypass flows) was 116,477 acre-feet at an approximate concentration of total dissolved solids of 2,553 ppm. Water demands in the Colorado River Basin have raised concerns over the continued discharge of bypass flows into Mexico because these flows have not been counted as part of Mexico's 1.5 maf (1,850 mcm) allotment under the Treaty of 1944.

At the request of Congress, Reclamation is preparing a report that describes activities required to achieve state-of-the-art operations of the YDP, provides an estimate of how long those activities would take, and presents a current estimate of their anticipated cost. In addition, this report will explore interim and/or supplemental opportunities for replacement of water that is bypassed into Mexico, including opportunities that do not negatively affect the Cienga de Santa Clara, a wetland of approximately 14,000 acres that is within a Biosphere Reserve in Mexico.

Delivery of Water to Mexico

Total delivery to Mexico for calendar year 2003 was approximately 1.561 maf (1,925 mcm), an over-delivery of approximately 0.061 maf (75.2 mcm). Of the total delivery, approximately 0.140 maf (173 mcm) were delivered at the Southerly International Boundary (SIB) and 641 acre-feet (0.79 mcm) (including conveyance losses) to Tijuana. Through July 2004, over-deliveries to Mexico have been about 0.033 maf (41 mcm) and are expected to be about 0.072 maf (89 mcm) for calendar year 2004. It is anticipated that approximately 0.140 maf (173 mcm) will be delivered at SIB and 651 acre-feet (0.80 mcm) will be delivered for Tijuana in calendar year 2004.

In accordance with Minute No. 242 of the IBWC, up to 140,000 acre-feet (173 mcm) will be delivered to Mexico at the SIB. In accordance with Minute No. 310 and the agreement[8] for

[8] "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 calendar year 2008.

delivery, up to 1,200 acre-feet per month (1.48 mcm) will be delivered for Tijuana, Baja California in 2005.

To further improve control of the deliveries of water from Parker Dam, Senator Wash Reservoir and the reservoirs behind Imperial Dam and Laguna Dam will continue to be operated at lower elevations during periods of potential rain storms to capture flows in excess of water demand at Imperial Dam. Improvements to the river routing software used to schedule the releases from Parker Dam have also reduced the uncertainty in estimating the flows arriving at Imperial Dam, further helping to reduce non-storable flows arriving at Imperial Dam. As mentioned previously, other storage options are also being investigated which will improve the control of deliveries below Parker Dam when constructed.

Measures that are being taken to ensure that the salinity differential requirements at the NIB will be met include 1) reducing drainage pumping in the South Gila Valley in areas with more than adequate depths to groundwater when necessary; 2) returning some drainage flows from the Yuma Mesa Conduit to the Yuma Valley Drainage System and then to the boundary pumping plant at the SIB with Mexico; 3) ensuring that no drainage water from the Main Outlet Drain Extension will be spilled to the Colorado River; and 4) reducing drainage pumping from the Yuma Mesa Well Field when necessary near areas with acceptable depths to groundwater (generally wells YM 10-13). These reductions are generally made during periods when Mexico's water order is the lowest — normally September, October, and November. In December of 2003, several drainage wells in the Yuma area were shut off to ensure that the salinity differential would not exceed the maximum allowed. As stated in Minute 242, the maximum allowable differential is 145 ppm by the United States' measurement or count and 151 ppm by the Mexican count. The final salinity differential in 2003 was 136 ppm by the United States' count and 147 ppm by the Mexican count.

Mexico has identified four critical months, October through January, regarding 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. To accomplish the reduction in salinity, the United States constructed a diversion channel to bypass up to 8,000 af of Yuma Valley drainage water during the four critical months. This water will be replaced by better quality water from the Minute 242 well field to reduce the salinity at SIB. Currently, the facilities required to monitor the flow and salinity of water delivered to SIB have not been installed or calibrated. Work on these facilities at SIB will take place in water year 2005.

2005 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.

Article I(2) of the Operating Criteria allows for revision of this 2005 AOP to reflect the current hydrologic conditions by June of 2005. Any revision in the AOP would occur only after a re-initiation of the AOP consultation process as required by law.

Upper Basin Reservoirs

The minimum objective release criterion will control the annual release from Glen Canyon Dam during water year 2005 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, probable minimum, and probable maximum inflow scenario, Glen Canyon Dam will release the minimum objective of 8.23 maf (10,150 mcm).

Section 602(a) 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), 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. 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 Section 602(a)(3) of the *Colorado River Basin Project Act*, the Operating Criteria, and the Interim 602(a) Storage Guideline, it is determined that the active storage in Upper Basin reservoirs forecast for September 30, 2005, under the most

probable inflow scenario would not exceed the storage required under Section 602(a) of the *Colorado River Basin Project Act.* Consistent with Section V of the Interim 602(a) Storage Guideline, releases from Lake Powell greater than the minimum objective of 8.23 maf (10,150 mcm), to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell will be made if storage in Lake Powell, on September 30, 2005, is projected to be greater then 14.85 maf (water surface elevation 3,630 feet) and active storage in Lake Powell is greater than active storage in Lake Mead.

Due to the severe drought and the reduction in available reservoir storage in the Colorado River Basin, pursuant to Article I(2) of the Operating Criteria, the Secretary will review the 2005 annual release amount from Lake Powell in April 2005 to determine if the runoff forecast warrants an adjustment to the release amount for water year 2005. Any revision to the AOP may occur only through the AOP consultation process as required by applicable Federal law.

Lower Basin Reservoirs

Pursuant to Article III of the Operating Criteria and consistent with the 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
(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 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 calendar year 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.

Consistent with Section 7 of the Interim Surplus Guidelines, the August 2004 24-Month Study was used to forecast the system storage as of January 1, 2005. Based on this projection, the Normal condition will govern releases for use in the States of Arizona, Nevada, and California during calendar year 2005 in accordance with Article III(3)(a) of the Operating Criteria and Article II(B)(1) of the Decree.

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 1 year only, and no rights to recurrent use of the water accrue to the state that receives the allocated water. Reclamation does not anticipate any available unused state apportionment for calendar year 2005 at this time. However, if any unused apportionment is available the Secretary shall allocate any available unused apportionment for calendar year 2005 in accordance with Article II(B)(6) of the Decree and Section 1(B) of the Interim Surplus Guidelines.

Water may be made available for diversion pursuant to 43 CFR Part 414[9] to entities within the Lower Division States. The Secretary shall make Intentionally Created Unused Apportionment available to districts in Arizona, California, or Nevada for the off-stream storage or consumptive use of water pursuant to individual SIRA agreements and 43 CFR Part 414.

On October 10, 2003, the Secretary of the Interior approved the ROD for the Inadvertent Overrun and Payback Policy (IOPP) which became effective January 1, 2004. This IOPP remains in effect for calendar year 2005.

The Colorado River Water Delivery Agreement requires payback of overruns 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 2005.

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.

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 to the AOP may occur only through the AOP consultation process as required by applicable Federal law.

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[9] Offstream Storage of Colorado River Water; Development and Release of Intentionally Created Unused Apportionment in the Lower Division States: Final Rule (43 CFR Part 414).

1944 U.S.-Mexico Water Treaty

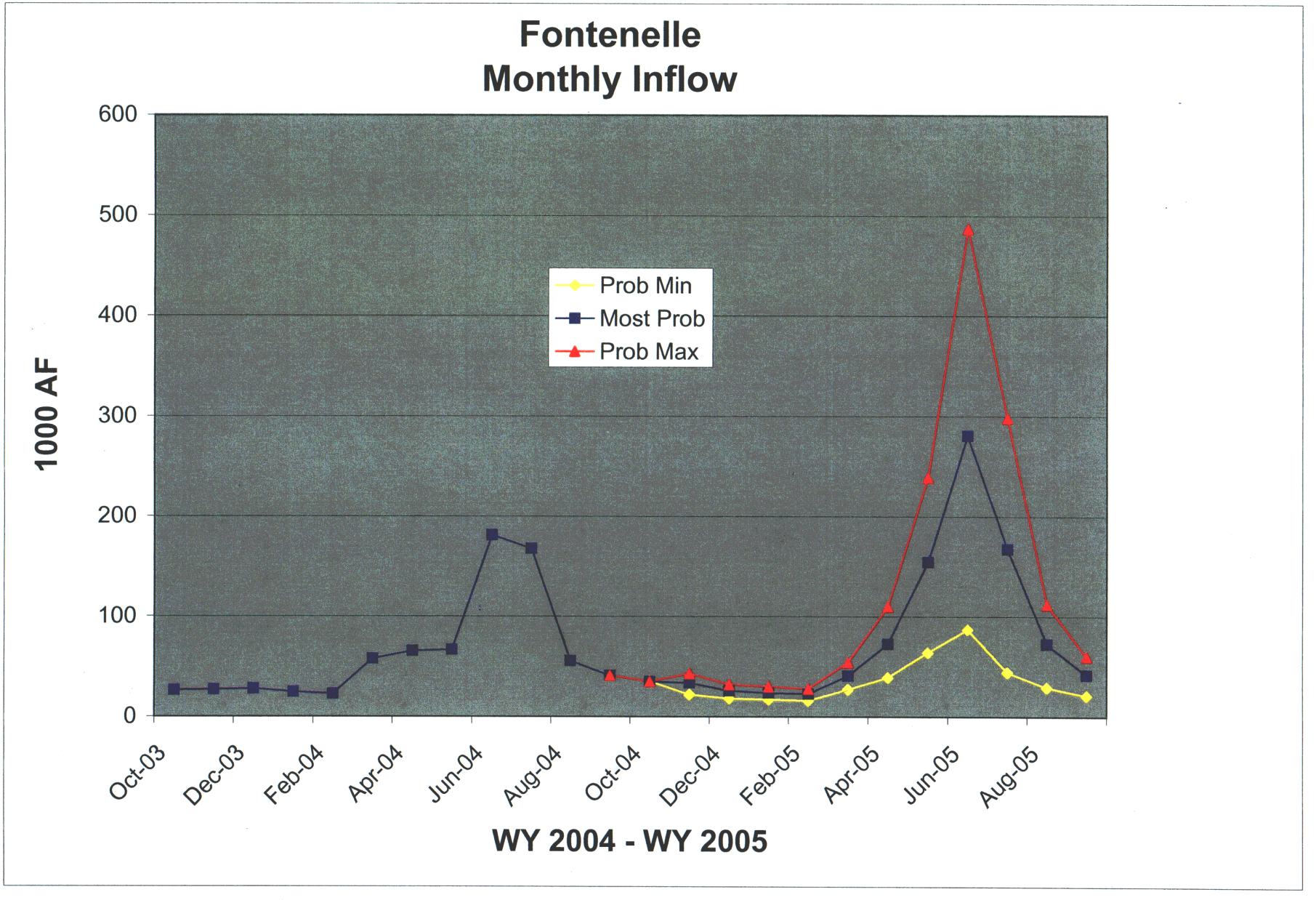
Under the most probable, minimum probable, and maximum probable inflow scenarios, water in excess of that required to supply uses in the United States will not be available. Vacant storage space in mainstem reservoirs is substantially greater than that required by flood control regulations. Therefore, a volume of 1.5 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2005 in accordance with Article 15 of the 1944 United States-Mexico Water Treaty and-Minutes No. 242 and 310 of the IBWC.

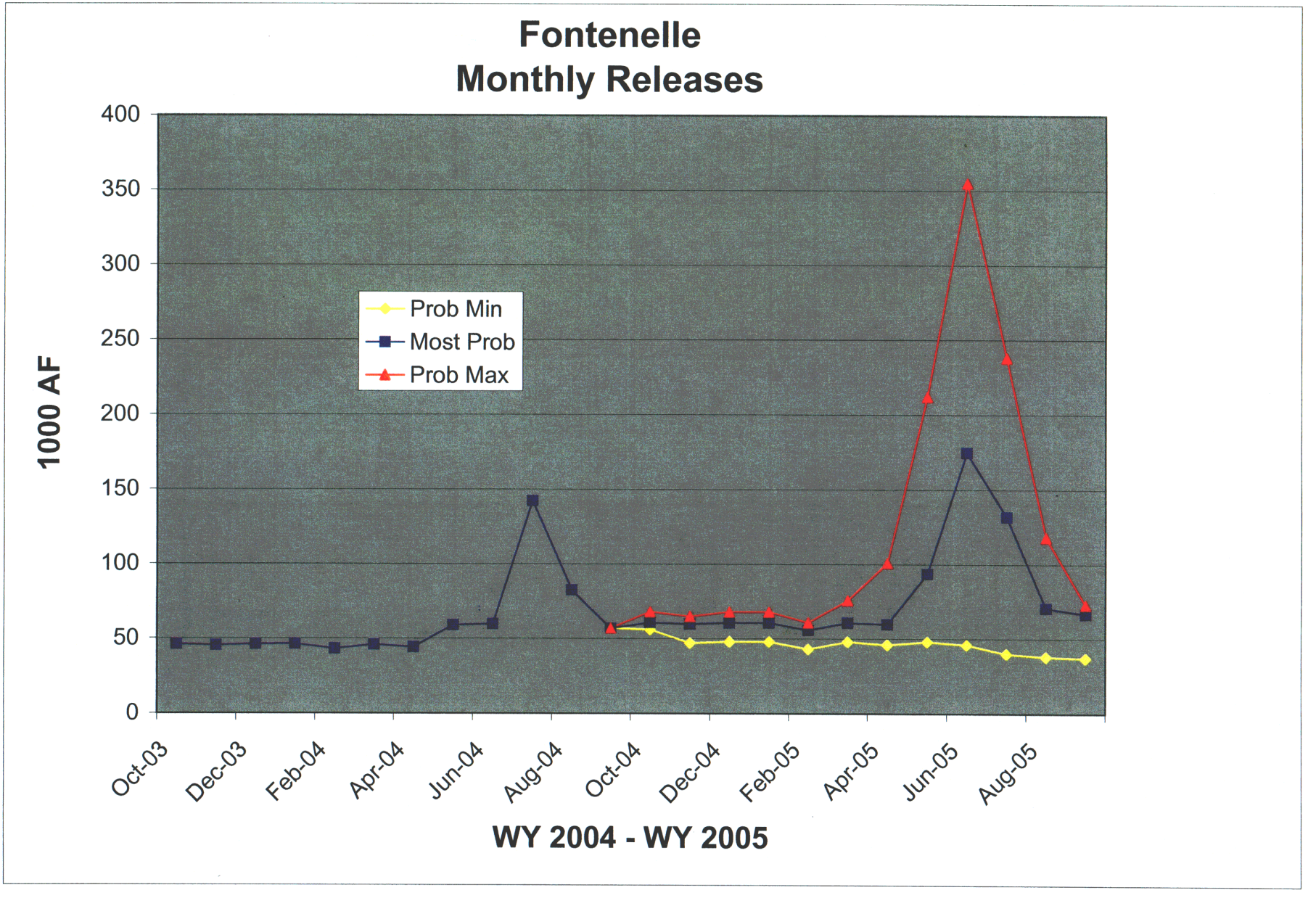
Calendar year schedules of the monthly deliveries of Colorado River water are formulated by the Mexican Section of the IBWC and presented to the United States Section before the beginning of each calendar year.

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 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 2003 through September 2005) under the probable maximum, most probable, and the probable minimum inflow scenarios, and historic end of month contents.


Fontenelle
Monthly Inflow
1000 AF
600
500
400
300
200
100
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Fontenelle
Monthly Releases
1000 AF
400
350
300
250
200
150
100
50
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
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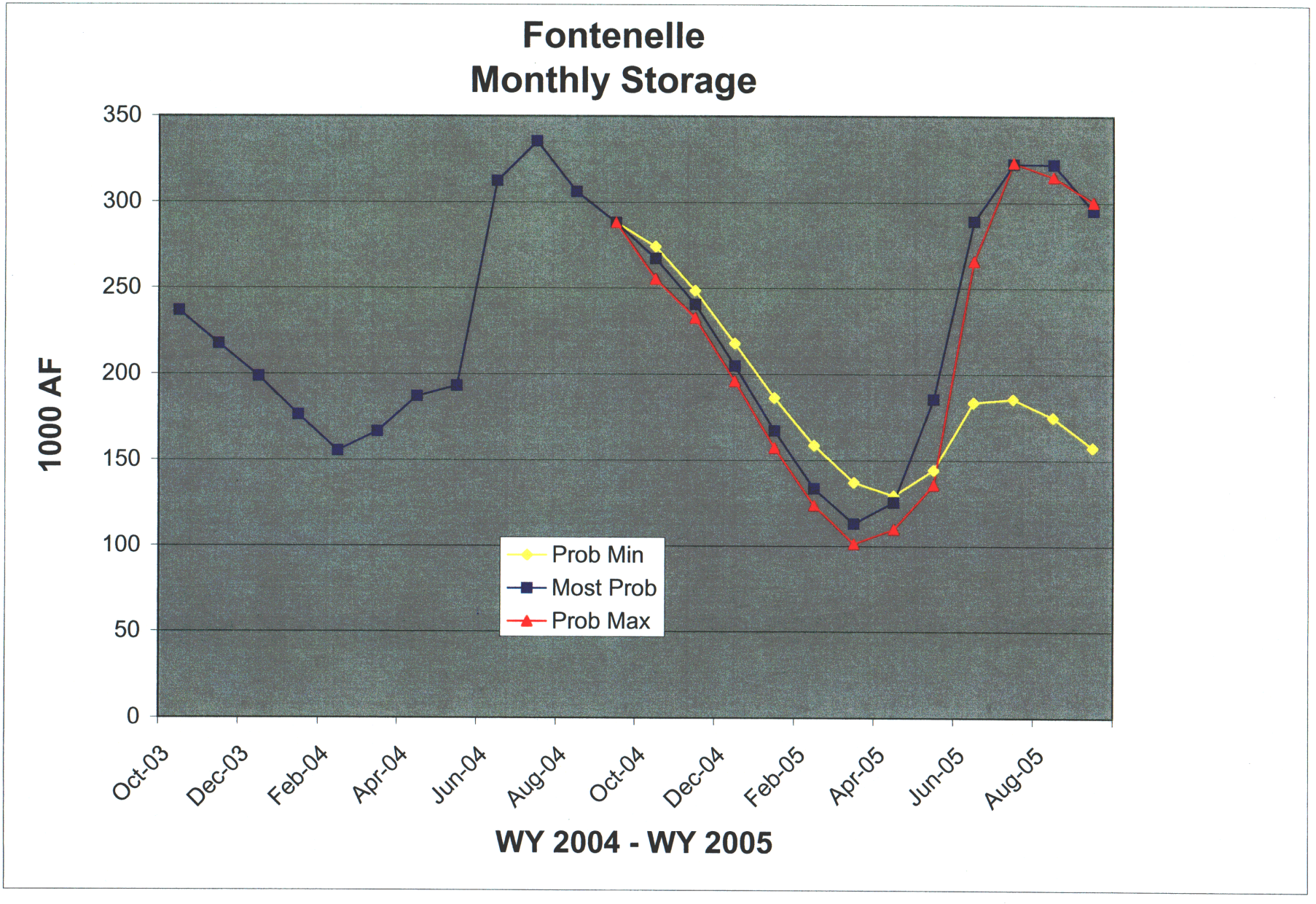
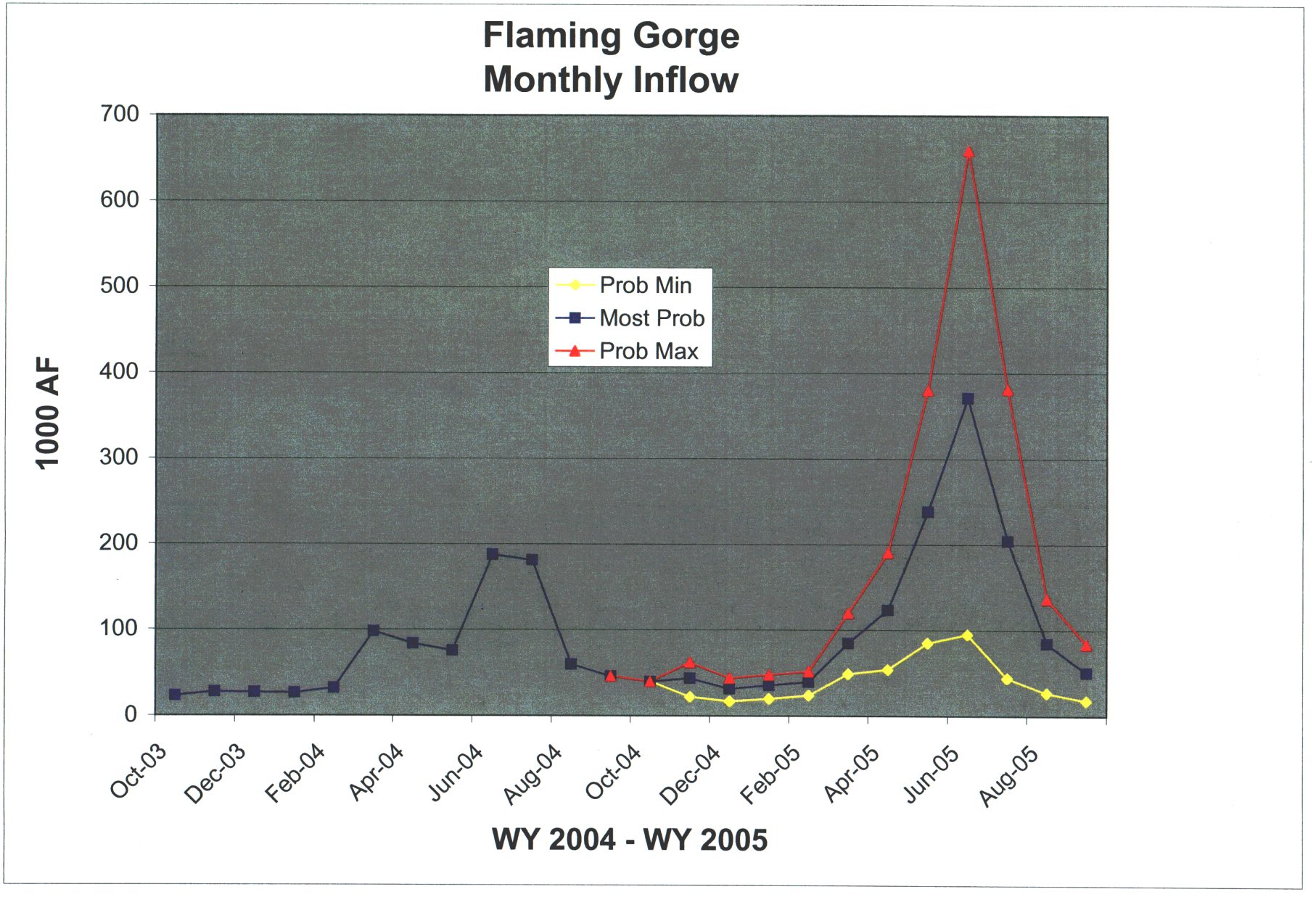
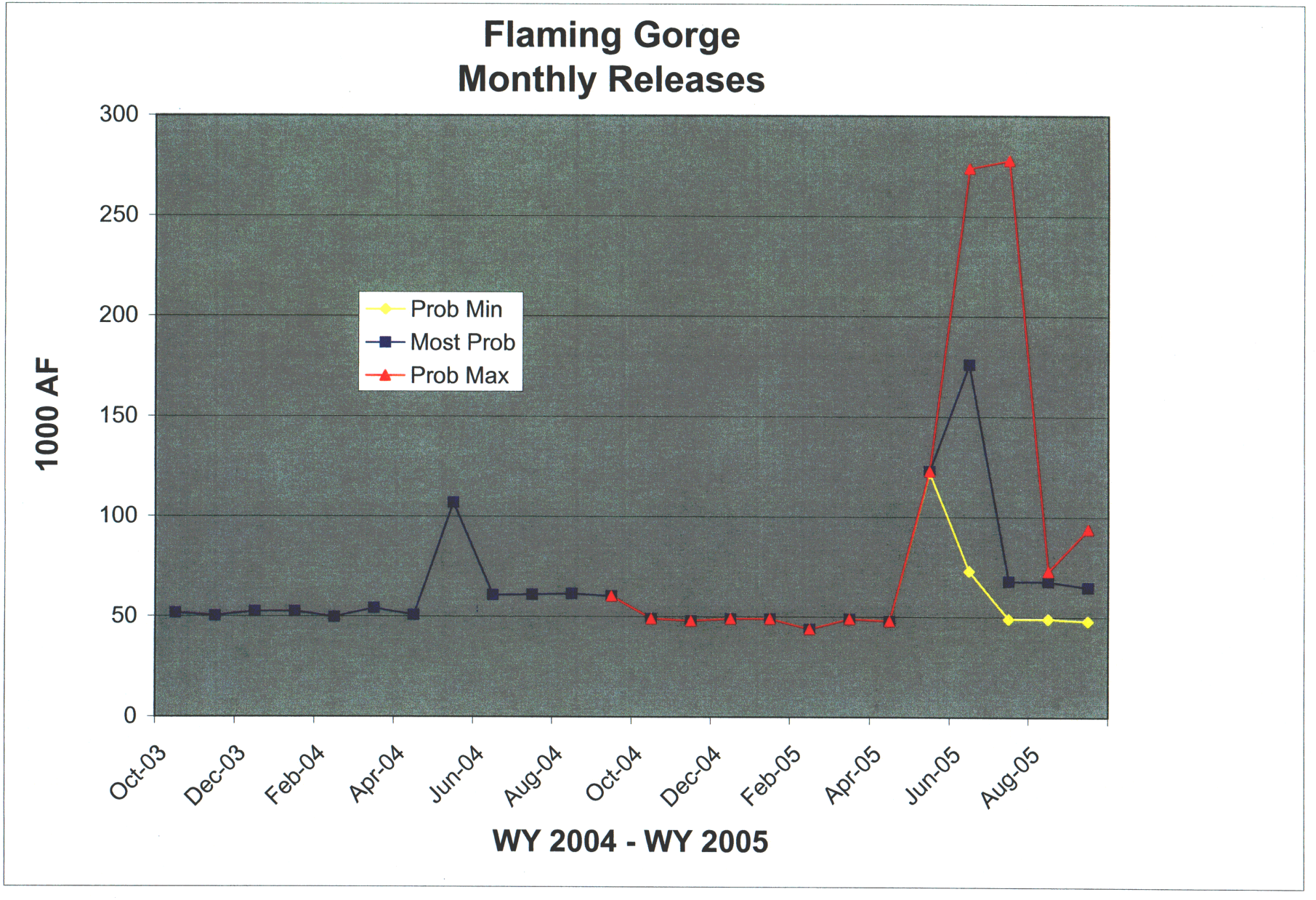
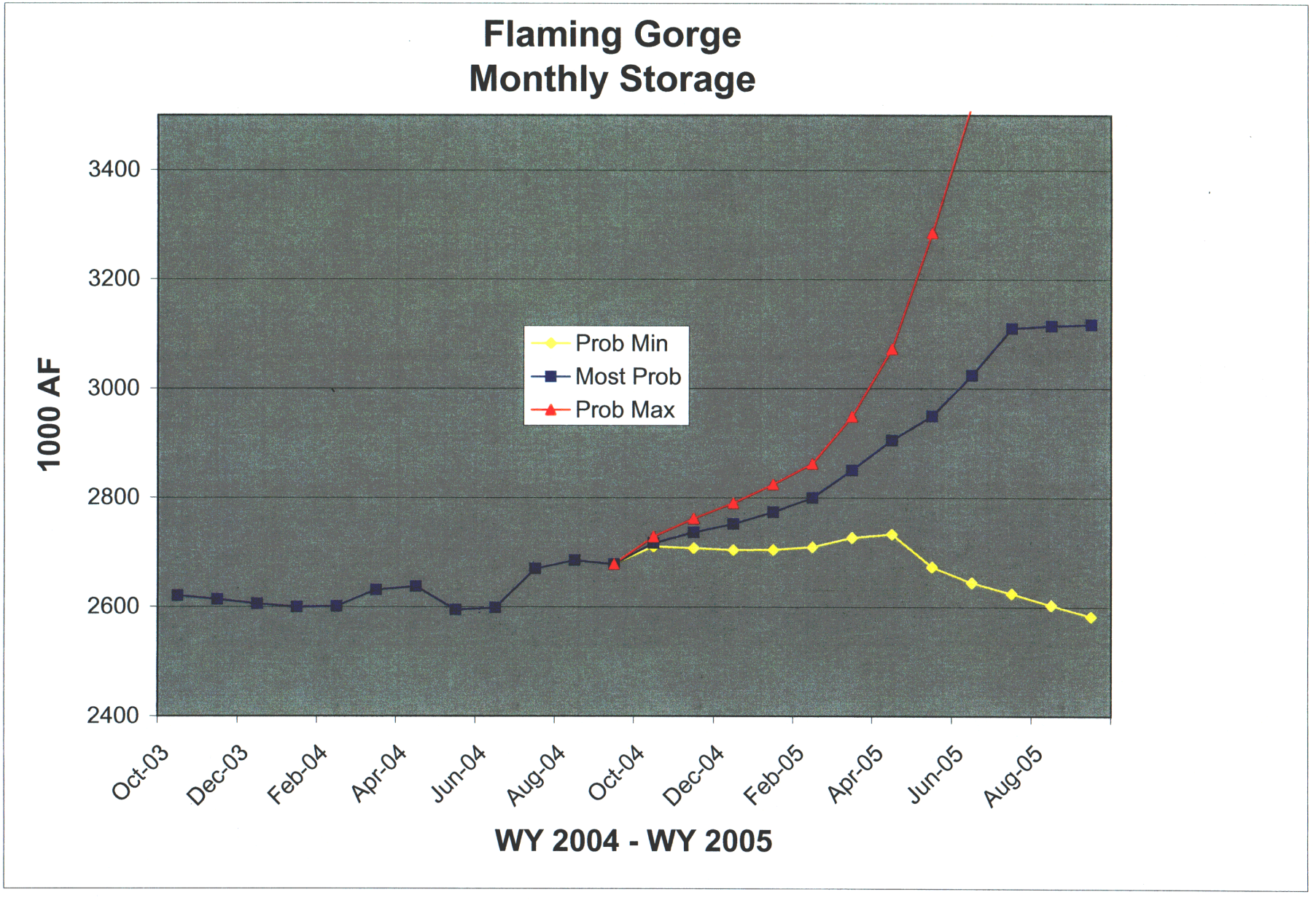
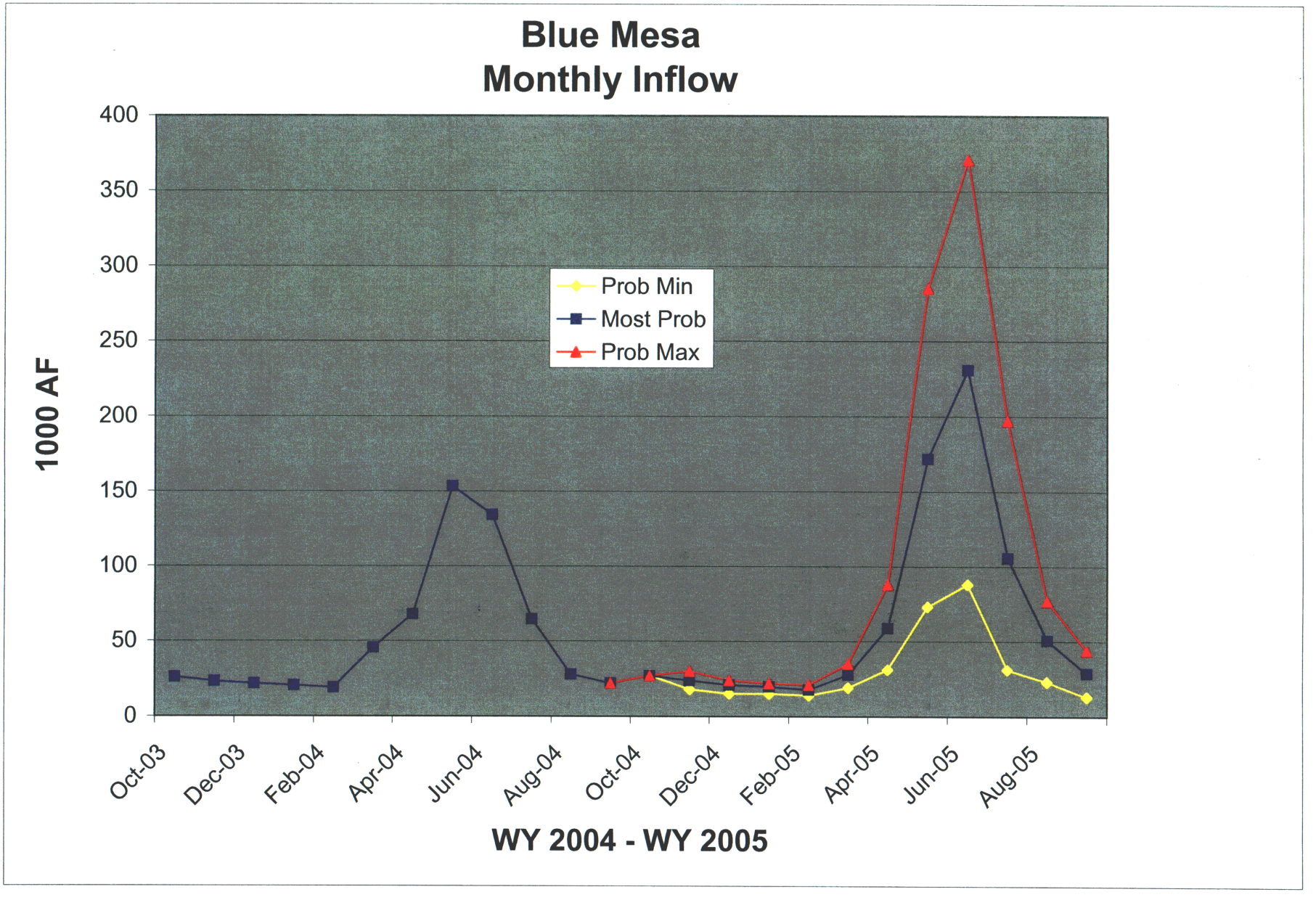
Jun-05
Aug-05
WY 2004 - WY 2005

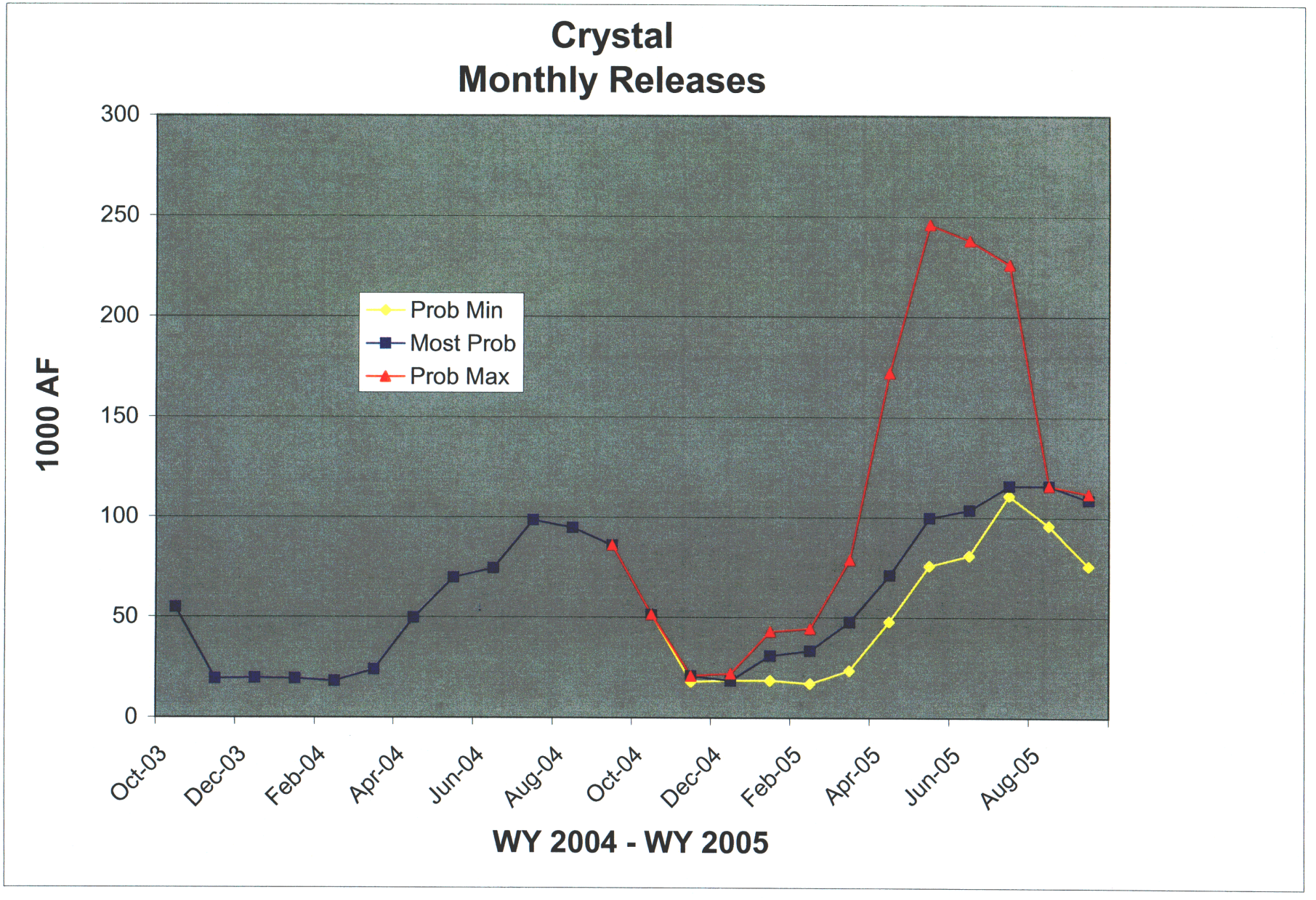

Fontenelle
Monthly Storage
1000 AF
350
300
250
200
150
100
50
0
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
Prob Min
Most Prob
Prob Max
WY 2004 - WY 2005


Flaming Gorge
Monthly Inflow
1000 AF
700
600
500
400
300
200
100
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Flaming Gorge
Monthly Releases
1000 AF
300
250
200
150
100
50
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Flaming Gorge
Monthly Storage
1000 AF
3400
3200
3000
2800
2600
2400
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Blue Mesa
Monthly Inflow
1000 AF
400
350
300
250
200
150
100
50
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Crystal
Monthly Releases
300
250
200
150
100
50
0
1000 AF
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
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Jun-04
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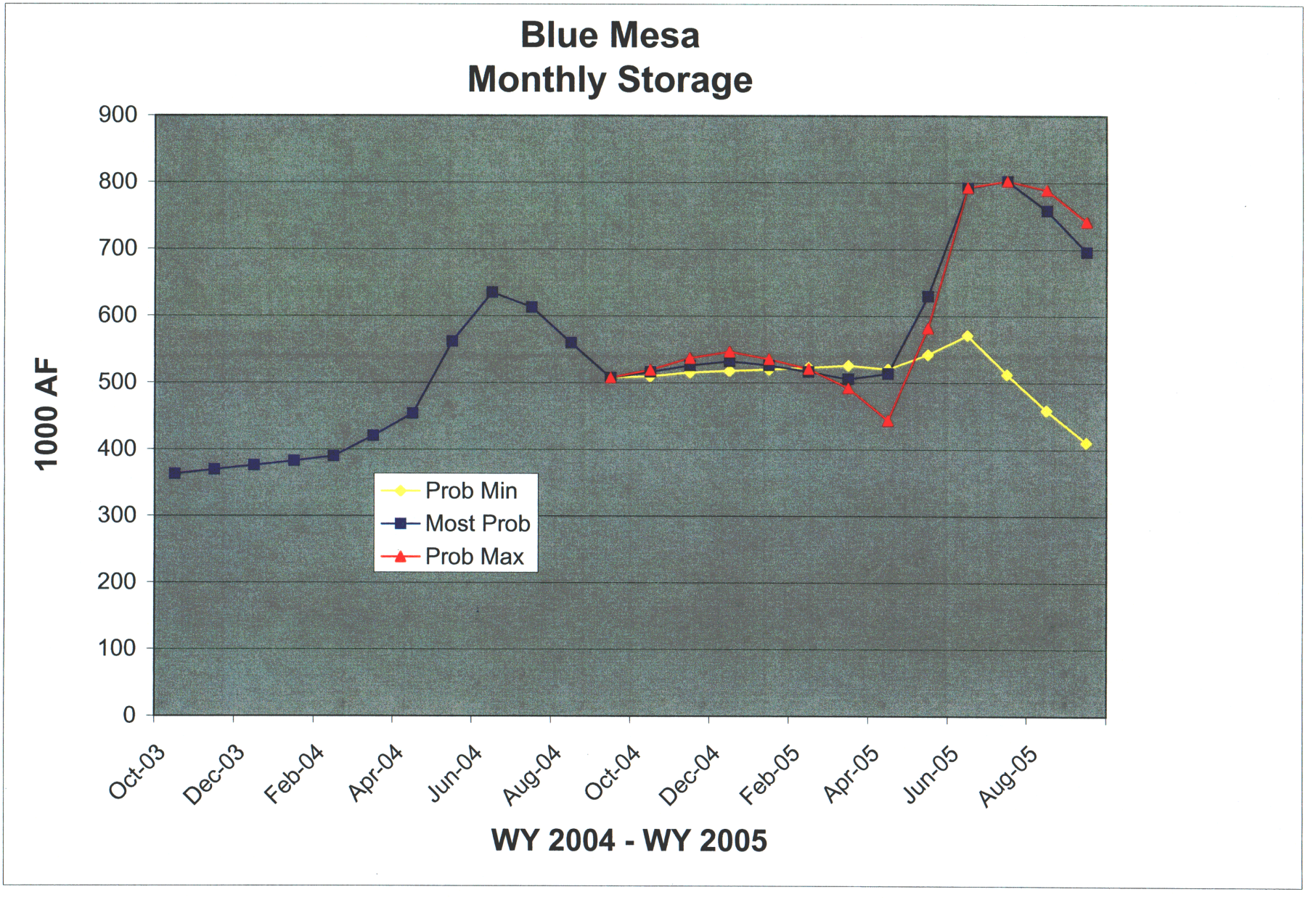
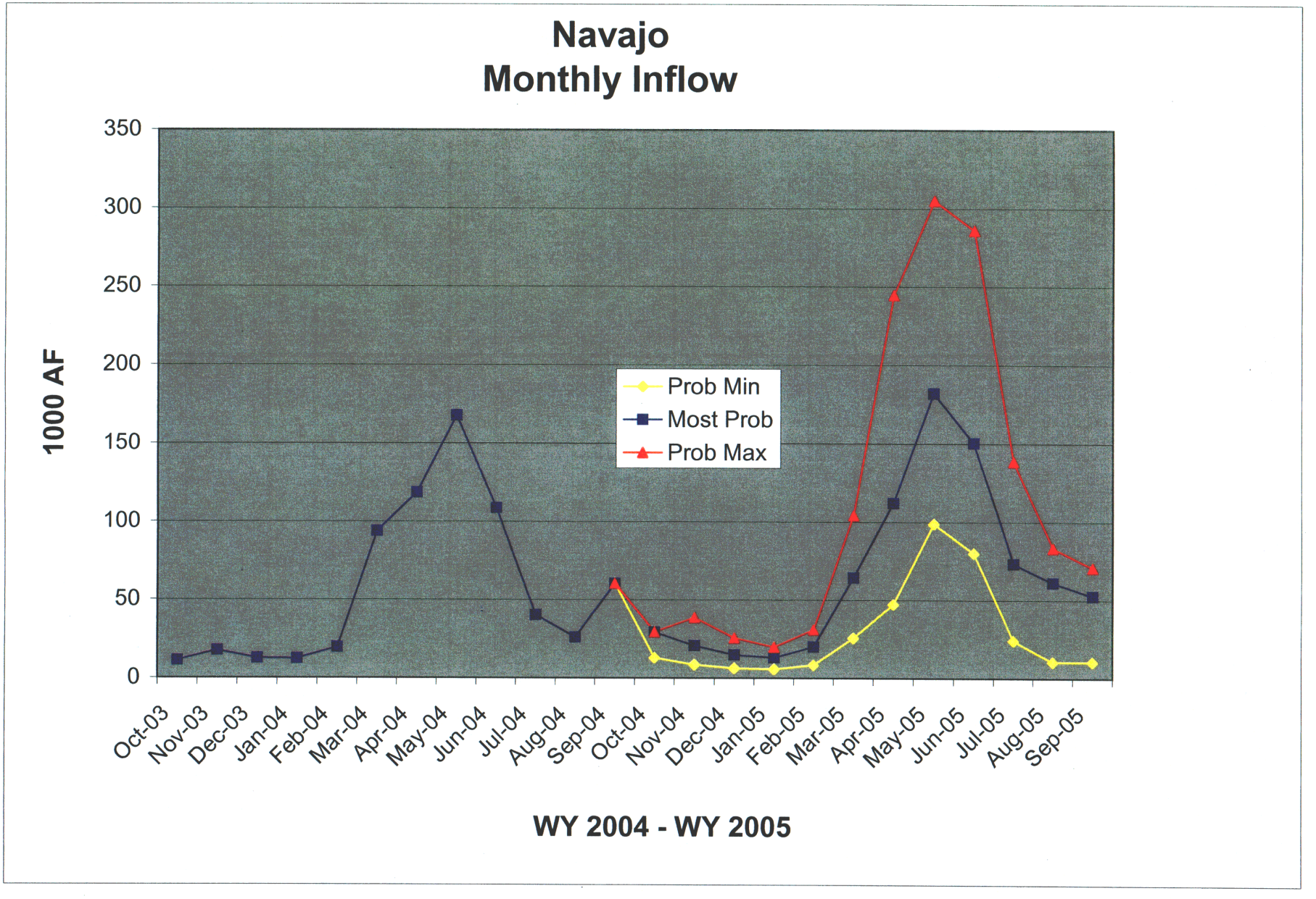
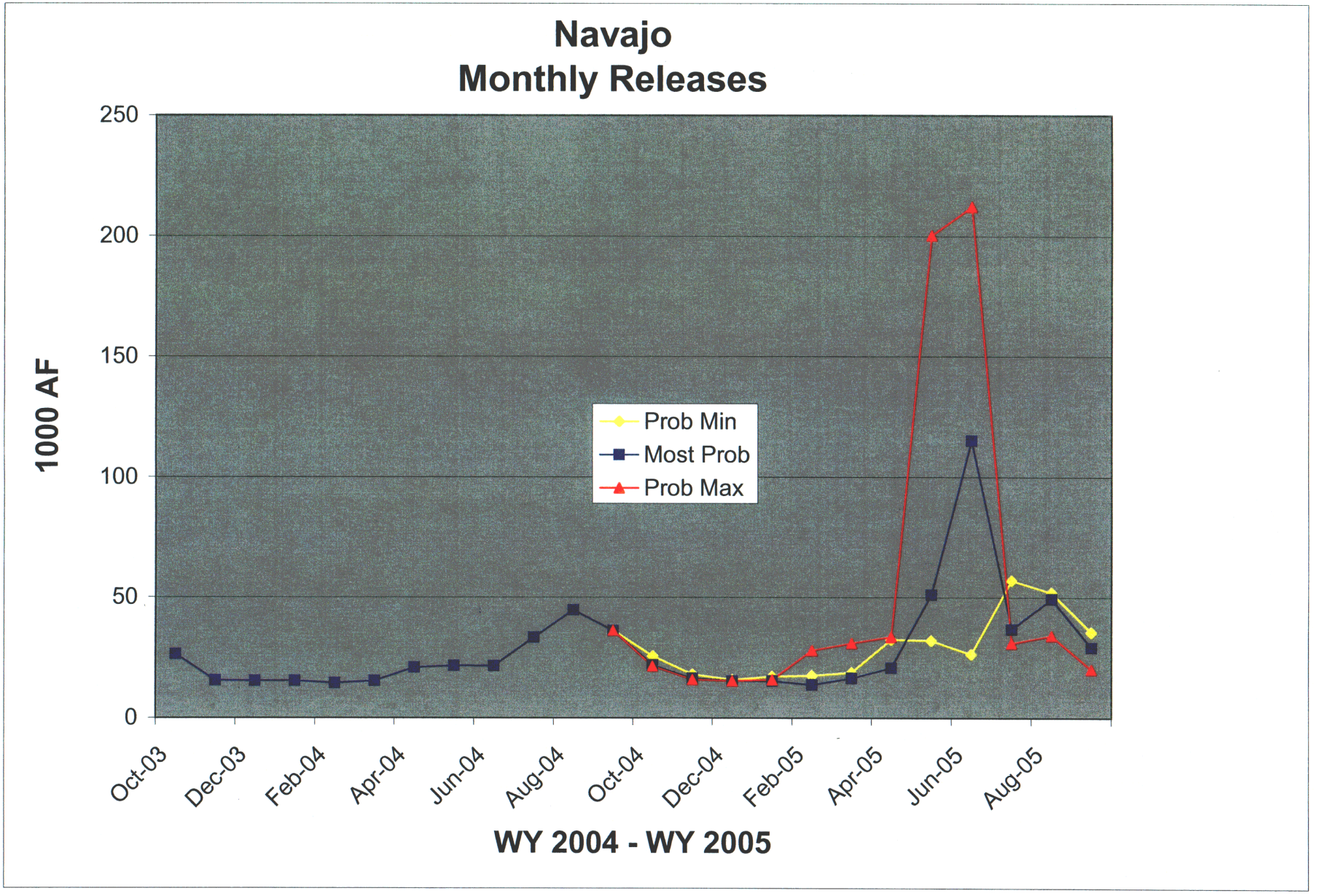
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Blue Mesa
Monthly Storage
1000 AF
900
800
700
600
500
400
300
200
100
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Navajo
Monthly Inflow
1000 AF
350
300
250
200
150
100
50
0
Prob Min
Most Prob
Prob Max
Oct-03
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
Sep-04
Oct-04
Nov-04
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
WY 2004 - WY 2005


Navajo
Monthly Releases
1000 AF
250
200
150
100
50
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
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Jun-04
Aug-04
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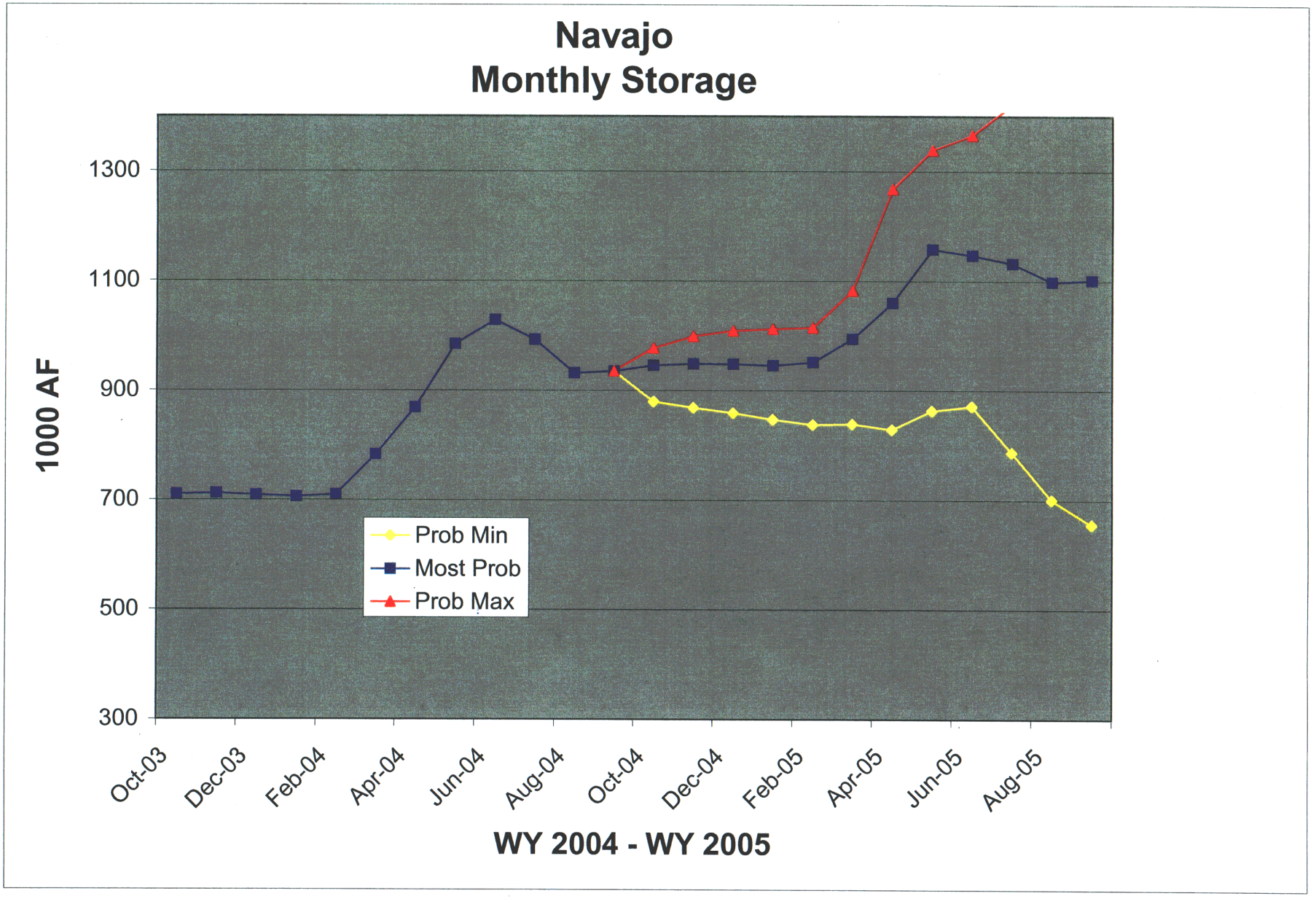
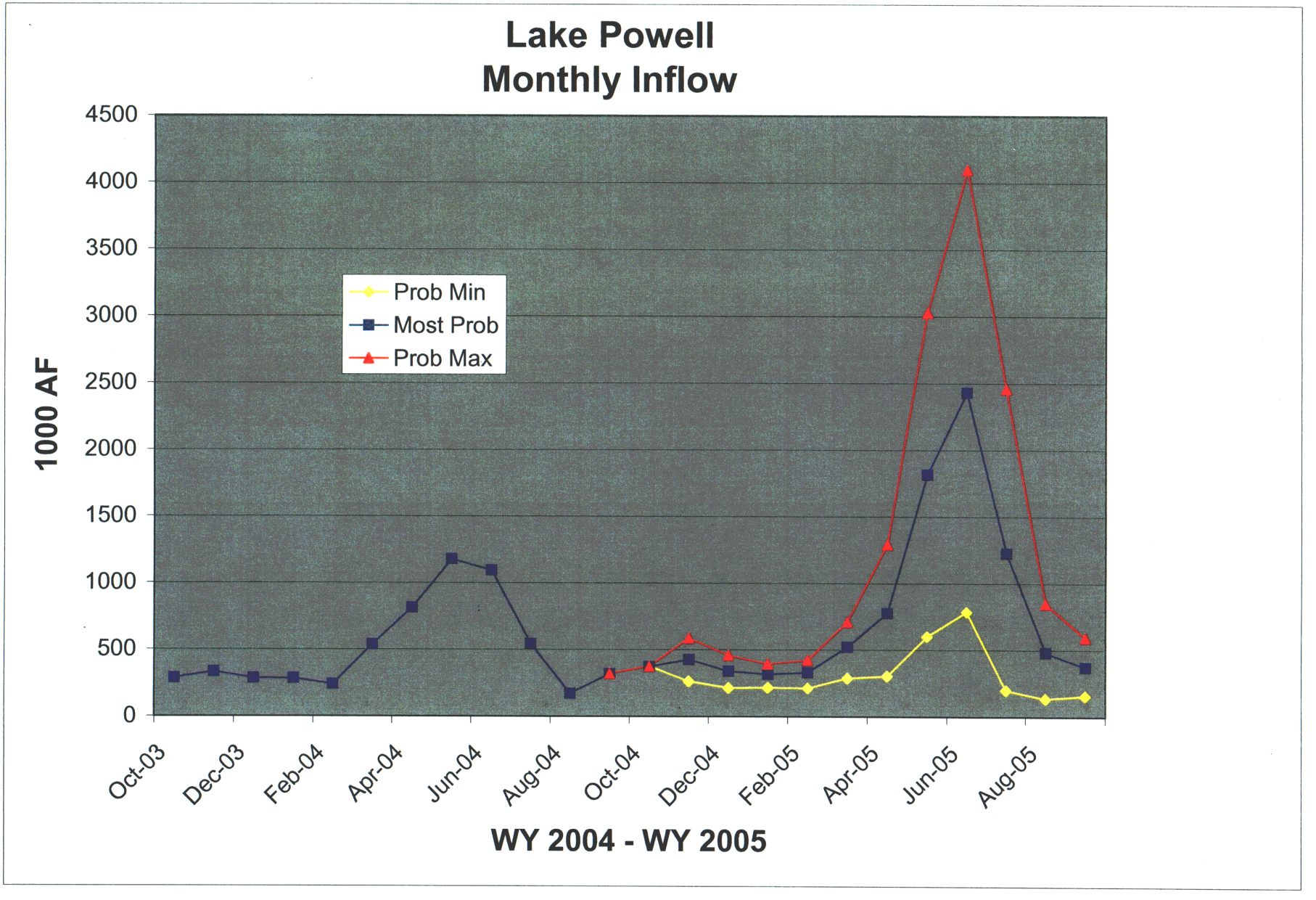
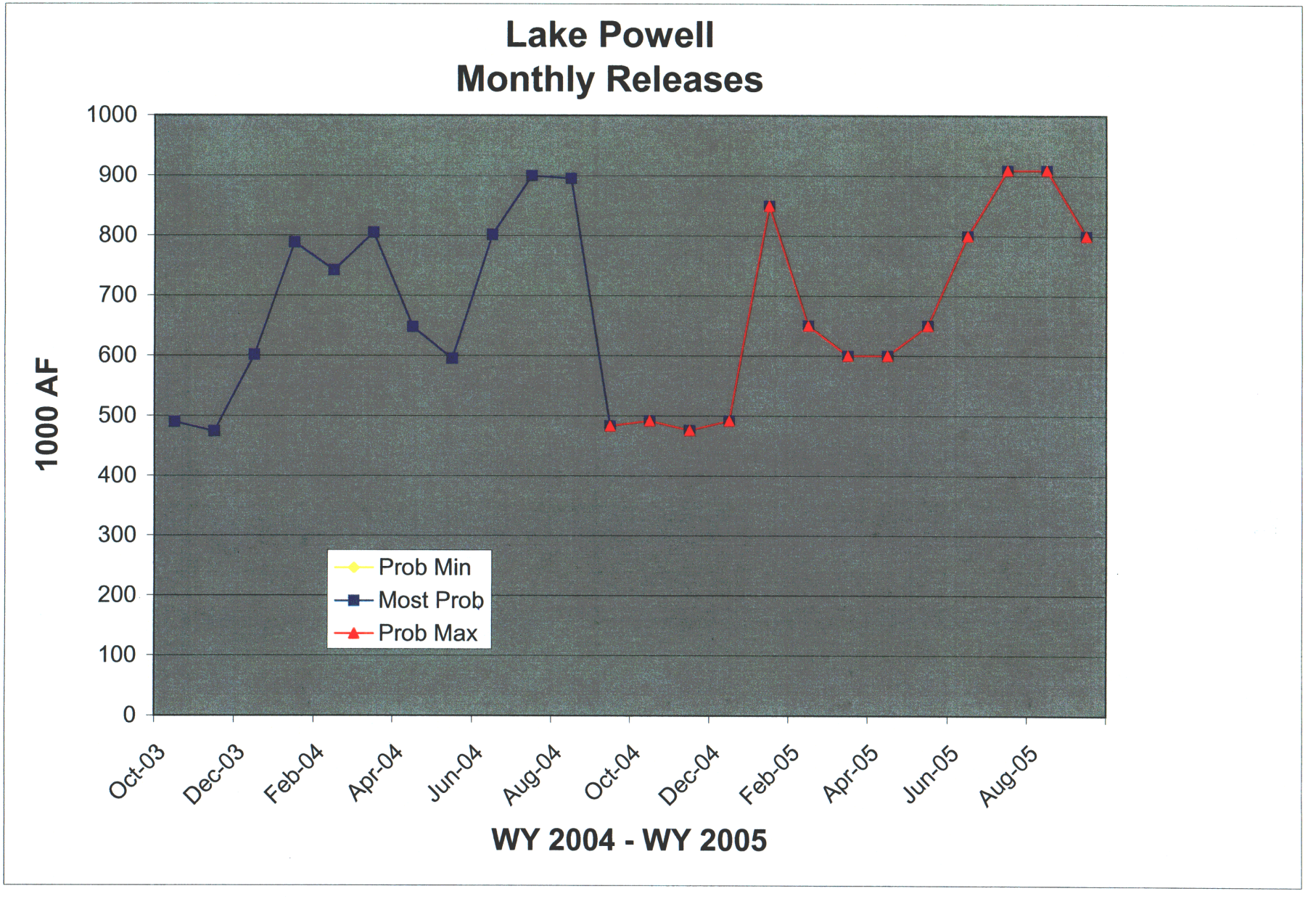
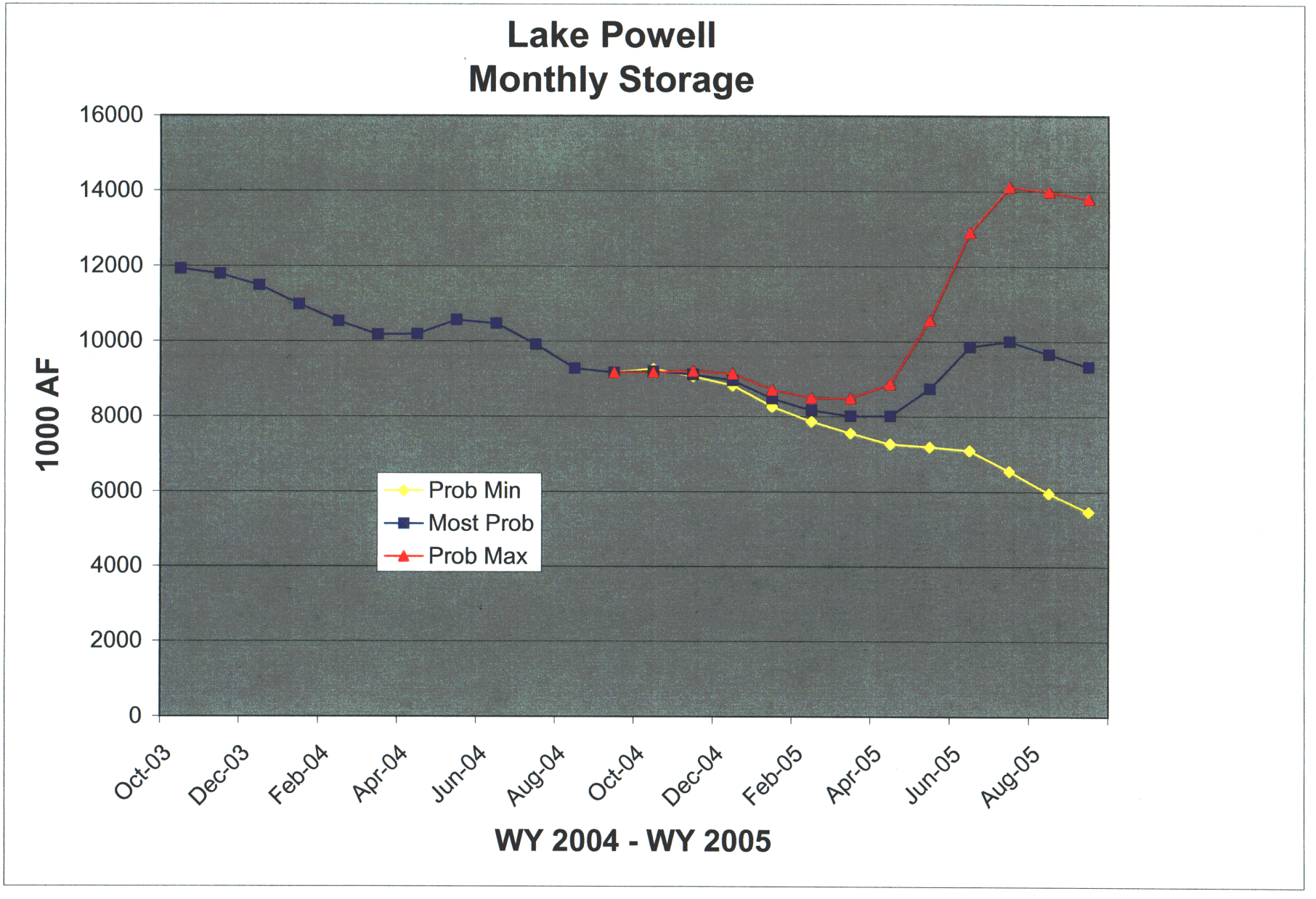
Jun-05
Aug-05
WY 2004 - WY 2005


Navajo
Monthly Storage
1000 AF
1300
1100
900
700
500
300
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Powell
Monthly Inflow
1000 AF
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Powell
Monthly Releases
1000 AF
1000
900
800
700
600
500
400
300
200
100
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Powell
Monthly Storage
1000 AF
16000
14000
12000
10000
8000
6000
4000
2000
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
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Aug-04
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Dec-04
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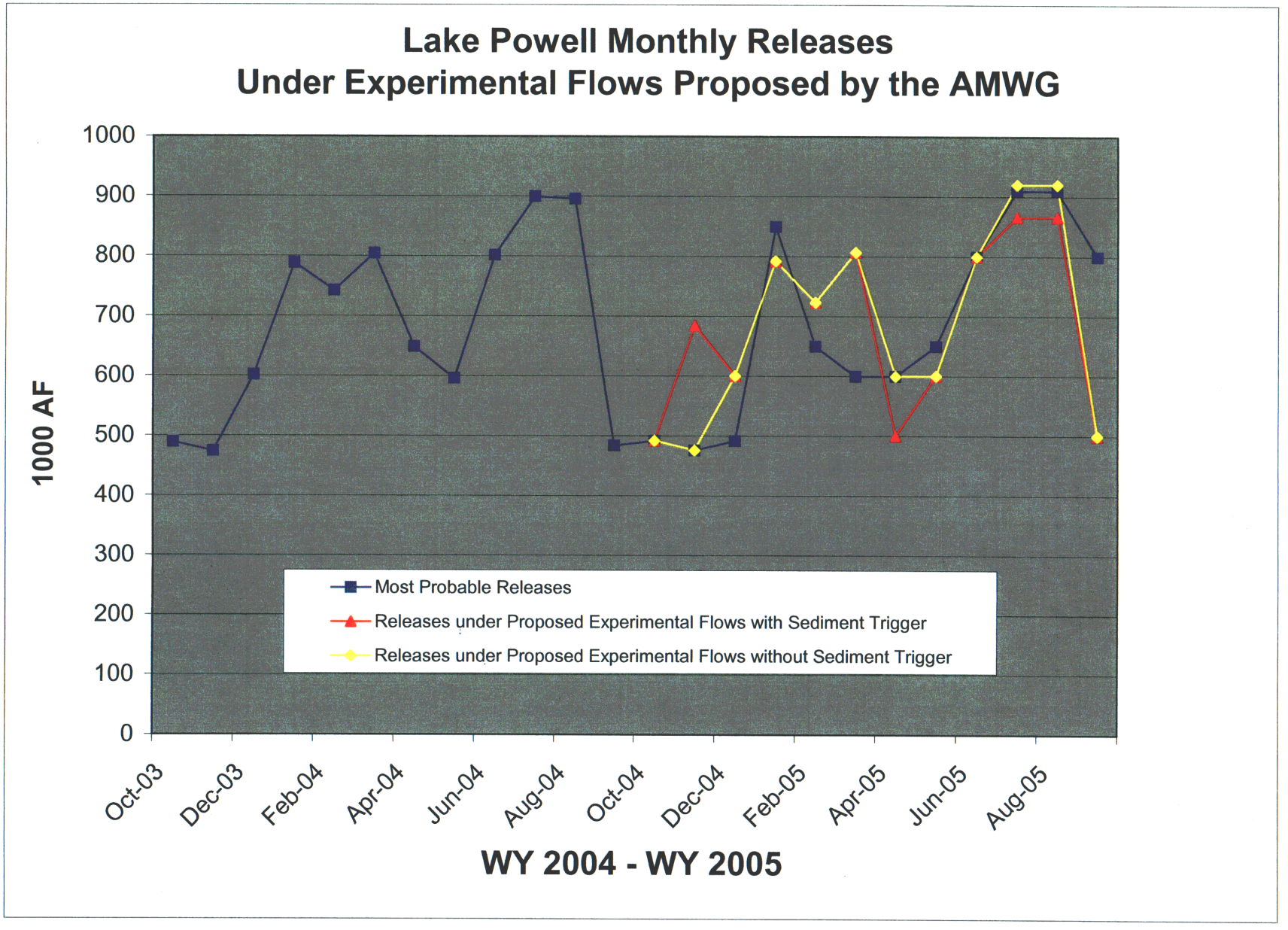
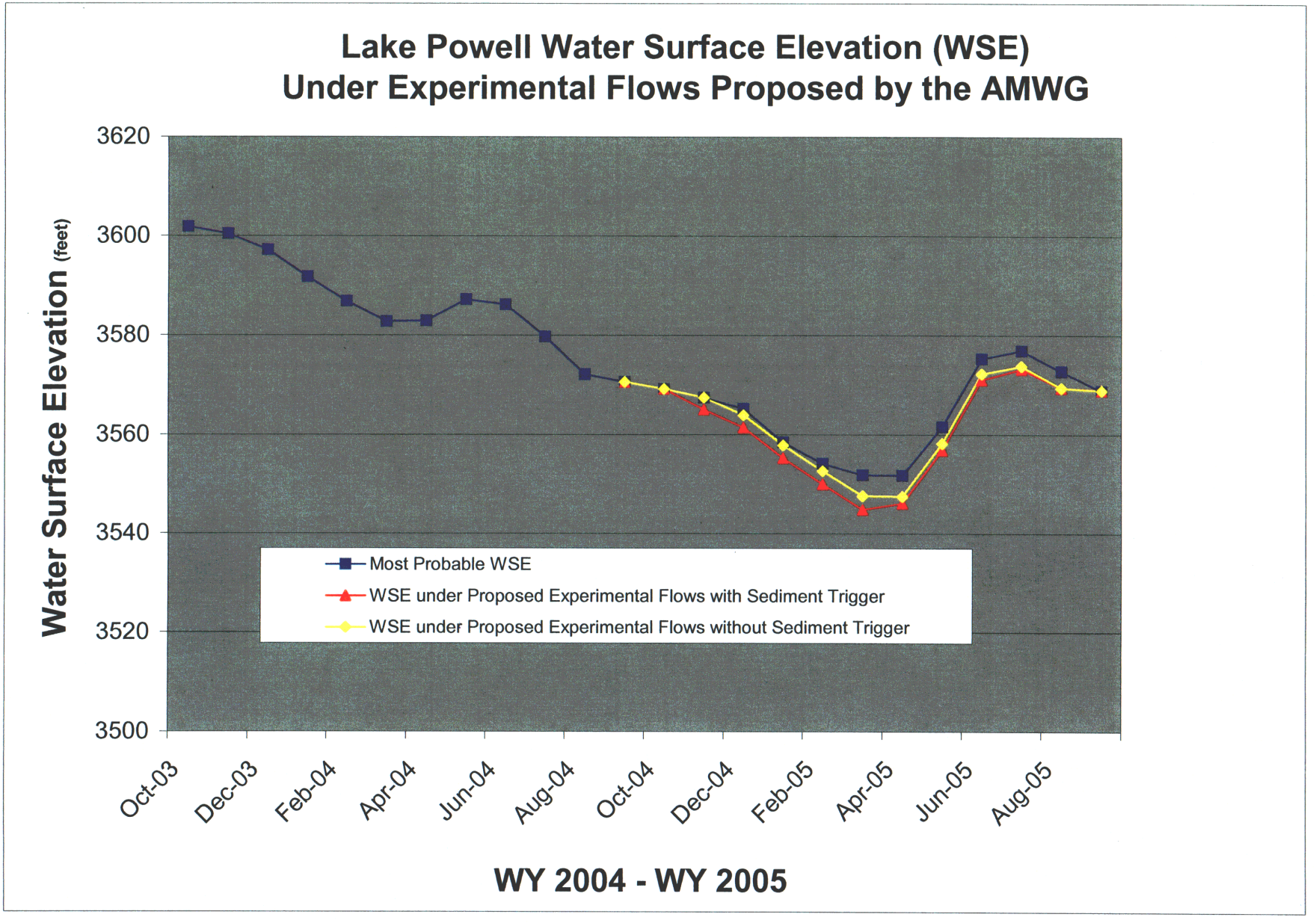
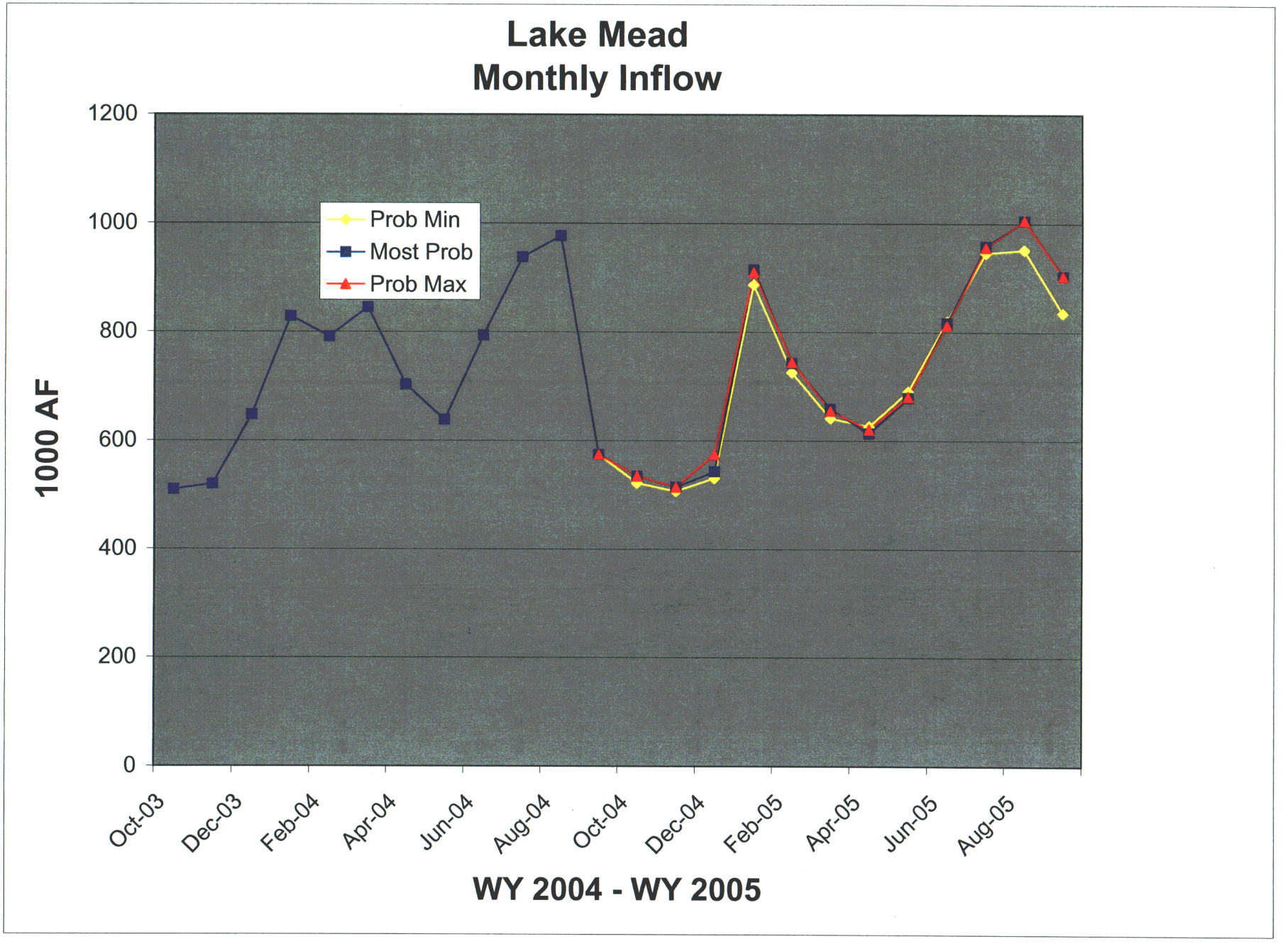
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Powell Monthly Releases
Under Experimental Flows Proposed by the AMWG
1000 AF
1000
900
800
700
600
500
400
300
200
100
0
Most Probable Releases
Releases under Proposed Experimental Flows with Sediment Trigger
Releases under Proposed Experimental Flows without Sediment Trigger
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Powell Water Surface Elevation (WSE)
Under Experimental Flows Proposed by the AMWG
Water Surface Elevation (feet)
3620
3600
3580
3560
3540
3520
3500
Most Probable WSE
WSE under Proposed Experimental Flows with Sediment Trigger
WSE under Proposed Experimental Flows without Sediment Trigger
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Mead
Monthly Inflow
1200
1000
800
600
400
200
0
1000 AF
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
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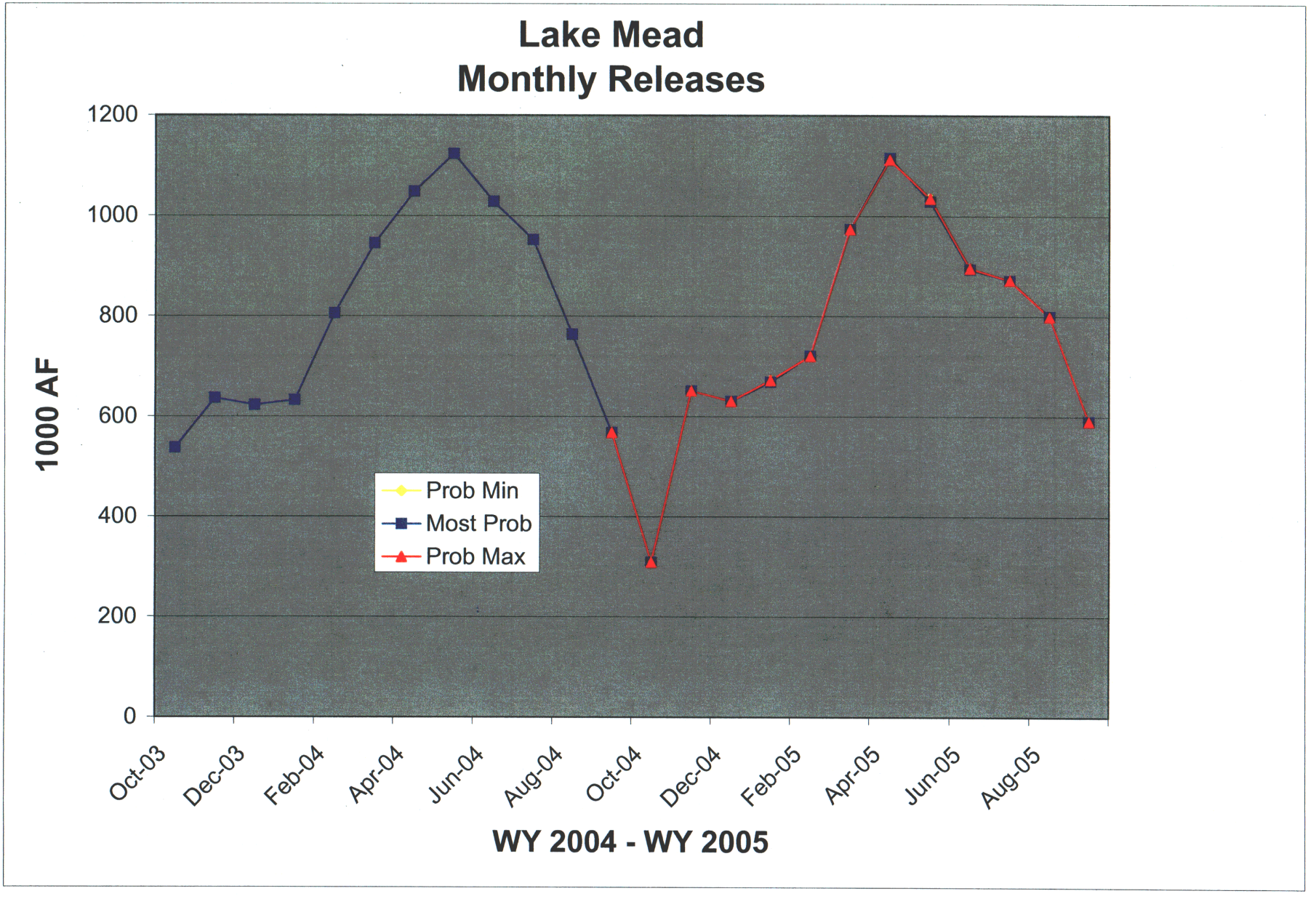
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Mead
Monthly Releases
1000 AF
1200
1000
800
600
400
200
0
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
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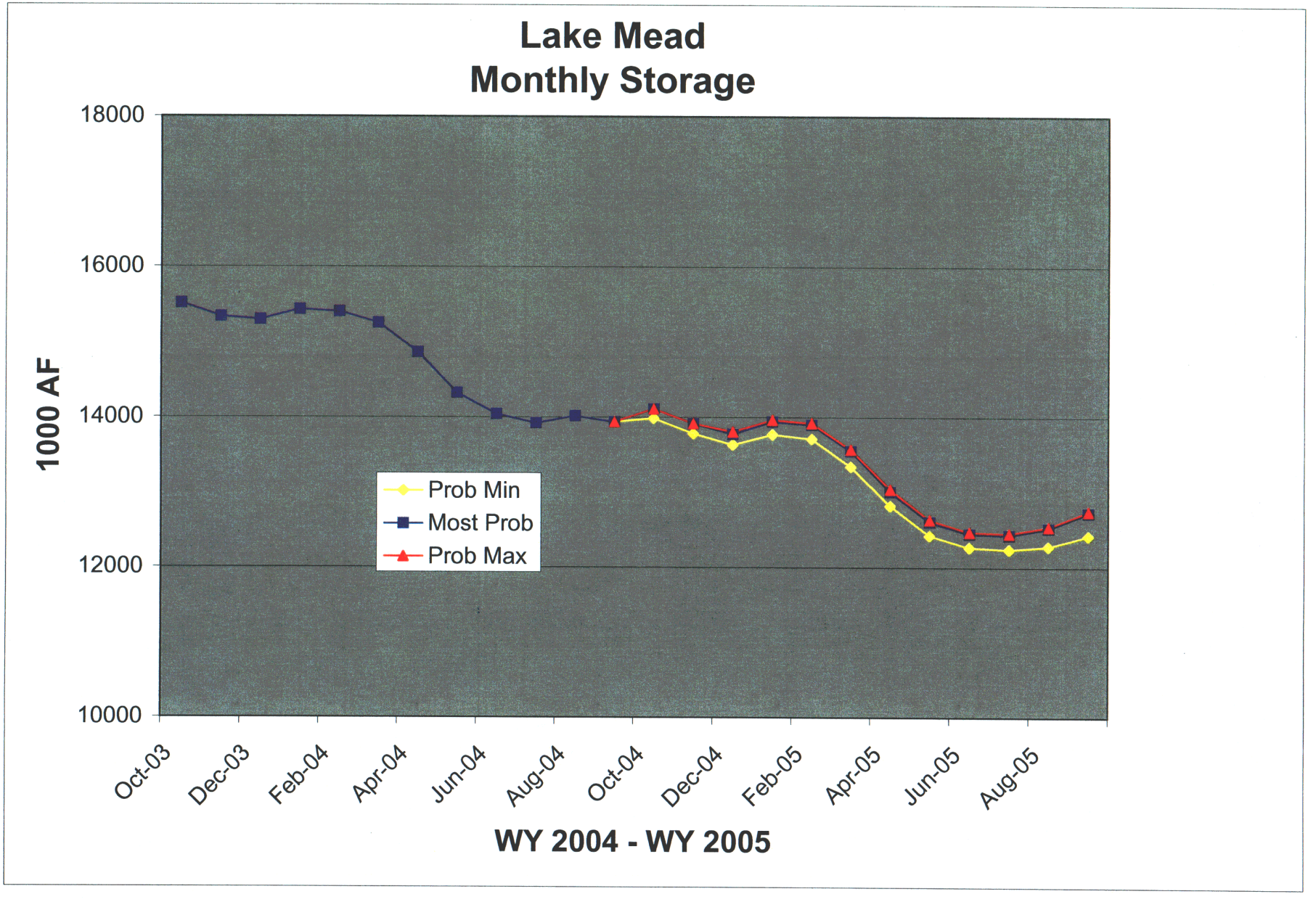
Jun-05
Aug-05
WY 2004 - WY 2005


Lake Mead
Monthly Storage
18000
16000
14000
12000
10000
1000 AF
Prob Min
Most Prob
Prob Max
Oct-03
Dec-03
Feb-04
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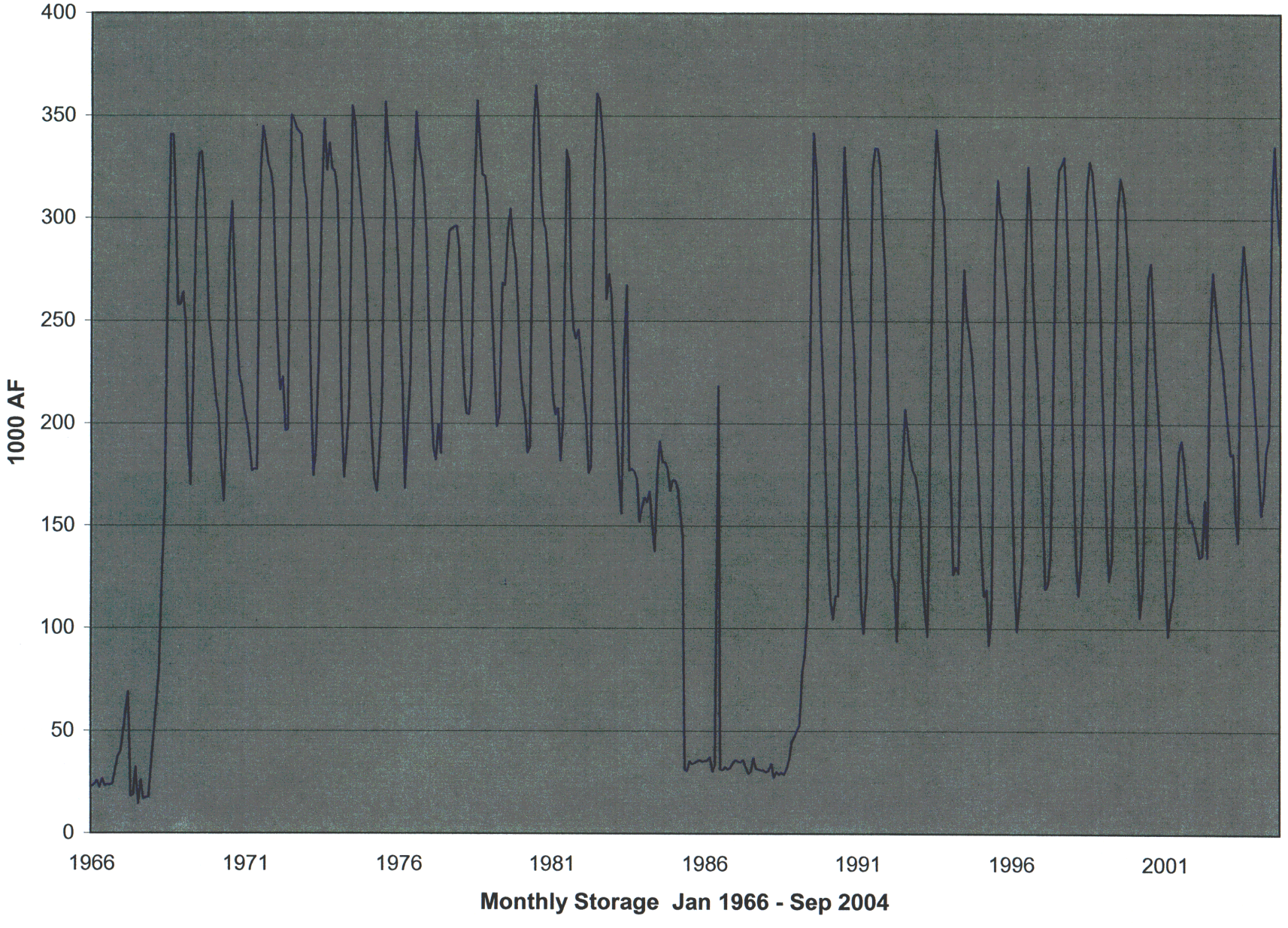
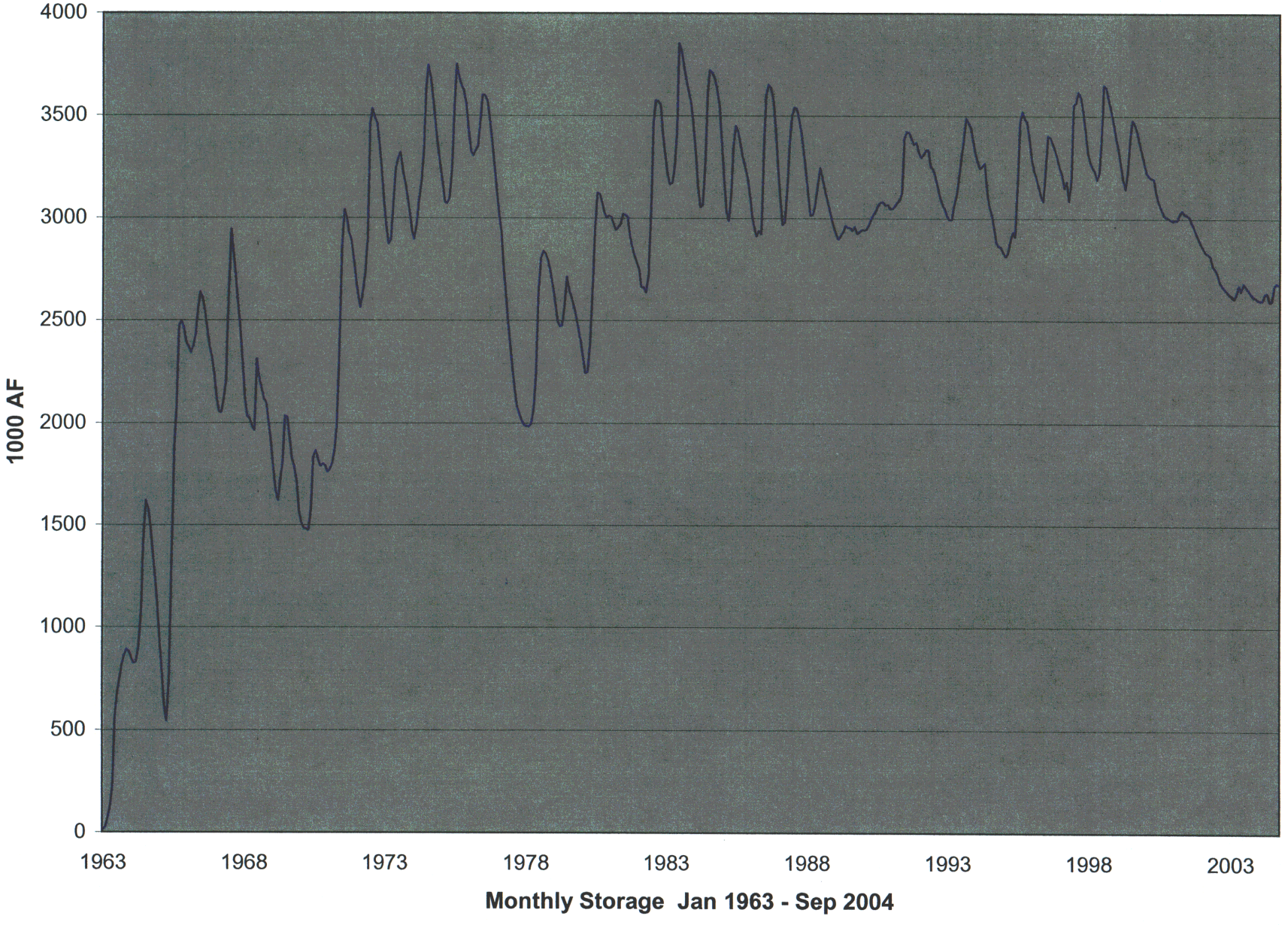
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Aug-05
WY 2004 - WY 2005

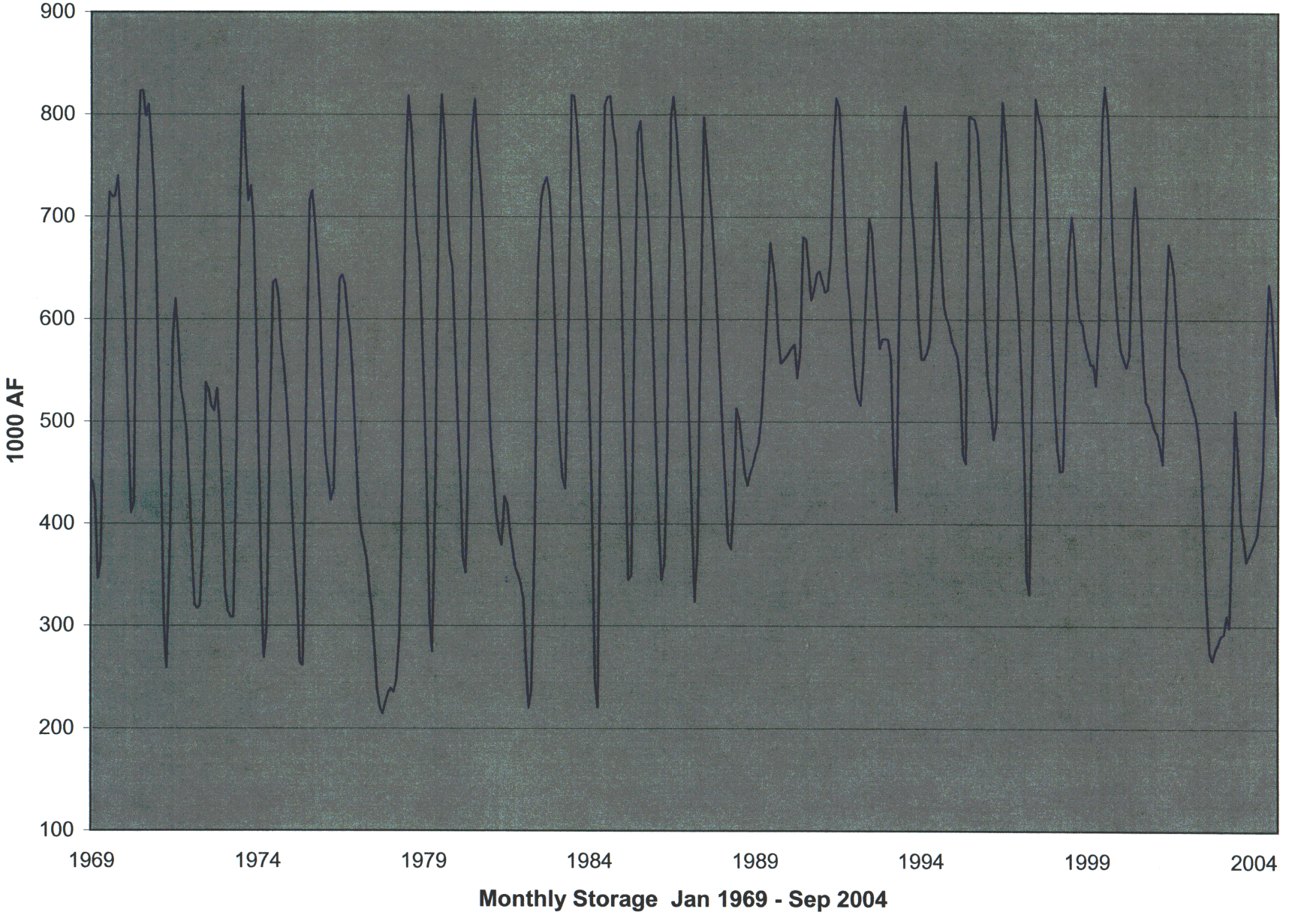
Fontenelle


400
350
300
250
200
150
100
50
0
1000 AF
1966
1971
1976
1981
1986
1991
1996
2001
Monthly Storage Jan 1966 - Sep 2004

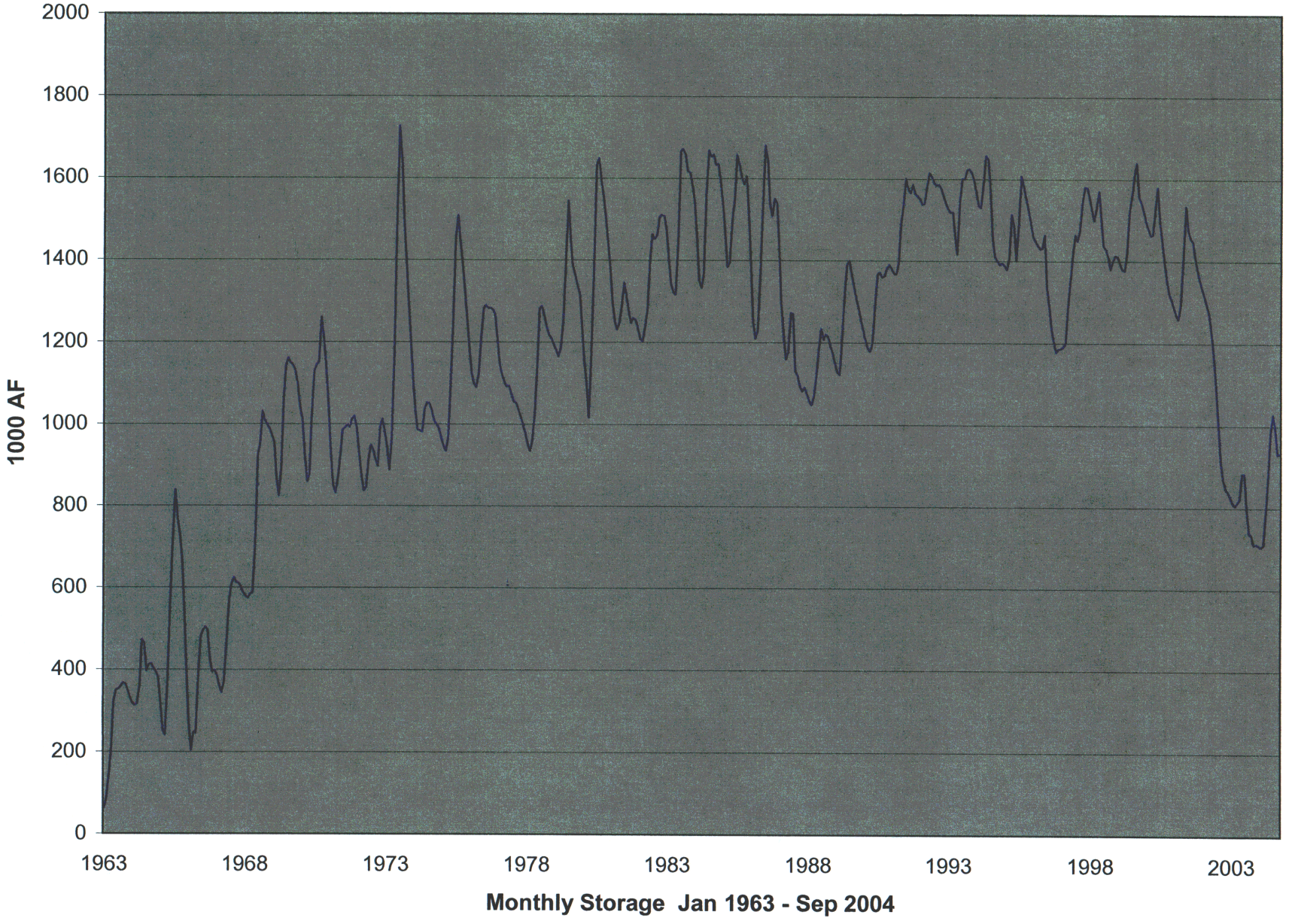
Flaming Gorge



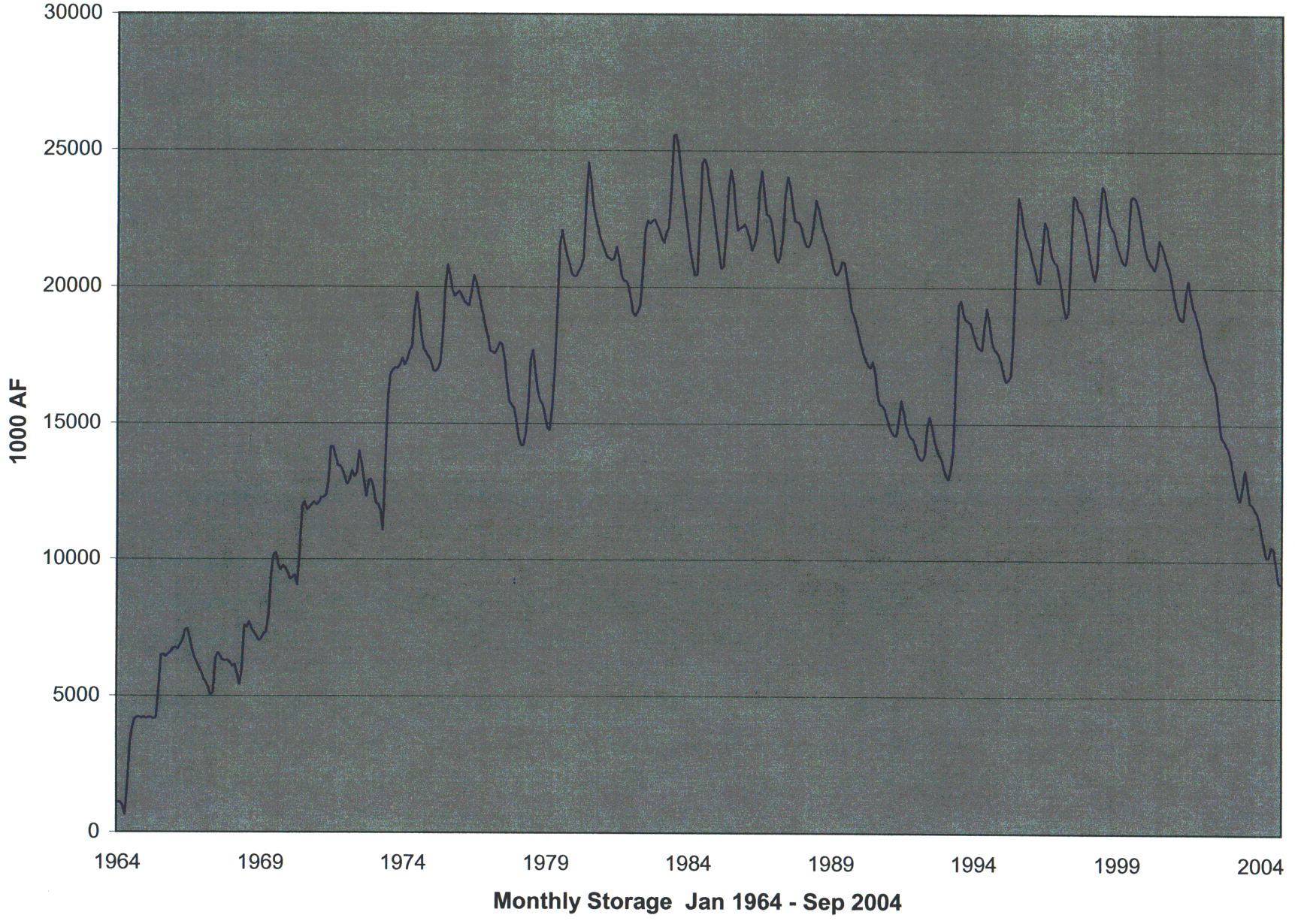
Blue Mesa


900
800
700
600
500
400
300
200
100
1000 AF
1969
1974
1979
1984
1989
1994
1999
2004
Monthly Storage Jan 1969 - Sep 2004

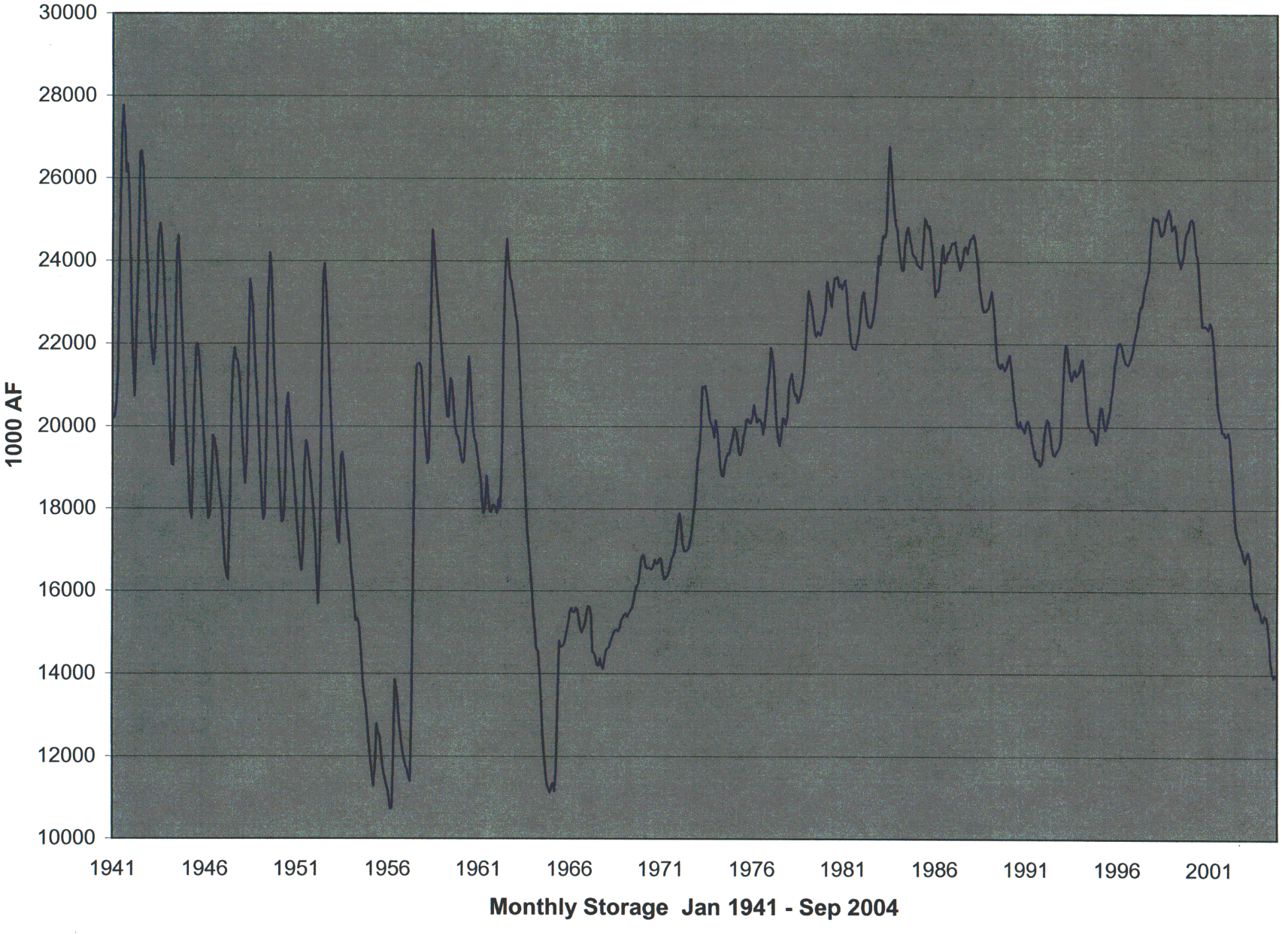
Navajo


2000
1800
1600
1400
1200
1000
800
600
400
200
0
1000 AF
1963
1968
1973
1978
1983
1988
1993
1998
2003
Monthly Storage Jan 1963 - Sep 2004

Lake Powell


30000
25000
20000
15000
10000
5000
0
1000 AF
1964
1969
1974
1979
1984
1989
1994
1999
2004
Monthly Storage Jan 1964 - Sep 2004

Lake Mead


30000
28000
26000
24000
22000
20000
18000
16000
14000
12000
10000
1000 AF
1941
1946
1951
1956
1961
1966
1971
1976
1981
1986
1991
1996
2001
Monthly Storage Jan 1941 - Sep 2004