29th ANNUAL REPORT
AND
2000 ANNUAL OPERATING PLAN

FOR

COLORADO RIVER SYSTEM RESERVOIRS

INTRODUCTION

Authority

This 2000 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 pursuant thereto and other applicable statutes. 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 Mexican Water Treaty), interstate compacts, court decrees, 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* mandates 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 2000 AOP was prepared by the Bureau of Reclamation (Reclamation) in consultation with the seven Basin States Governors' representatives; the Upper Colorado River Commission; 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.

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, 2000, 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 Mexican 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*.

Consistent with the above determinations and in accordance with other 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. Storage equalization and the avoidance of spills will control the annual releases from Glen Canyon Dam in accordance with Article II(3) of the Operating Criteria unless the minimum objective release criterion in Article II(2) is controlling.

Lower Basin Delivery. Downstream deliveries and/or flood control parameters 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) that the beneficial consumptive use requirements of Colorado River mainstream users in the Lower Division States are expected to be more than 9,250 MCM (7.5 MAF), the surplus condition is the criterion governing the operation of Lake Mead for calendar year 2000 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the decree in *Arizona v. California.*

Any Lower Division State will be allowed to utilize water apportioned to, but unused by, another Lower Division State, in accordance with Article II(B)(6) of the decree in *Arizona v. California*.

1944 Mexican Water Treaty Delivery. A volume of 2,097 MCM (1.7 MAF) of water will be allowed to be scheduled for delivery to Mexico during calendar year 2000 in accordance with Article 15 of the 1944 Mexican Water Treaty and Minute No. 242 of the International Boundary and Water Commission.

1999 OPERATIONS SUMMARY AND RESERVOIR STATUS

Water year 1999 observed near normal hydrologic conditions in the basin. The distribution of precipitation and snowpack accumulation through the water year, however, was quite varied. Very dry and abnormally warm weather in late February and March resulted in snowpack levels being very low by April 1, 1999. The final April inflow forecast issued by the National Weather Service was calling for only 62 percent of average April through July unregulated inflow into Lake Powell. This warm dry pattern was quickly reversed, however, as April and May were cooler than average months with abundant precipitation. April was particularly wet, with precipitation in the Upper Colorado River Basin more than twice average. By mid-May, basin wide snowpacks had risen to levels moderately above average. The end result was a near average inflow year for Lake Powell.

While the Upper Colorado River basin was near average as a whole in water year 1999, there was a contrast between the northern and southern river basins. The Upper Green River basin experienced inflow that was much above average. Alternatively, the Gunnison and San Juan River basins experienced moderately below-average conditions in water year 1999.

Unregulated inflow into Lake Powell was 15,680 MCM (12.71 MAF) in water year 1999, approximately 108 percent of average. This inflow resulted in a gain of approximately 732 MCM (0.593 MAF) of storage in Lake Powell. Approximately 164 MCM (0.133 MAF) of storage was gained in reservoirs upstream of Lake Powell, approximately 900 MCM (0.729 MAF) was lost in Lower Basin reservoirs, and the total Colorado storage system lost approximately 4 MCM (0.003 MAF) during water year 1999. It is estimated that with average inflow during 2000, the system will remain relatively full. During 1999, all deliveries of water to meet obligations pursuant to "The Law of the River" were maintained.

Tables 1(a) and 1(b) list the October 1, 1999 reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in water elevation during water year 1999.

Table 1(a). Reservoir Conditions on October 1, 1999 (Metric Units)

Reservoir	Vacant Space (MCM)	Live Storage (MCM)	Water Elevation (meters)	Percent of Capacity (percent)	Change in Storage* (MCM)	Change in Elevation* (meters)
Fontenelle	52	374	1981	88	-7	-0.25
Flaming Gorge	400	4,225	1838	91	-190	-1.18
Blue Mesa	110	913	2289	89	143	4.25
Navajo	170	1,922	1852	92	218	3.93
Lake Powell	1,636	28,365	1125	95	732	1.18
Lake Mead	3,435	30,334	369	90	-659	-1.06
Lake Mohave	364	1,869	194	84	-264	-2.44
Lake Havasu	44	720	137	94	23	0.31
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Totals	6,211	68,722	--	92	-4	--

Table 1(b). Reservoir Conditions on October 1, 1999 (English Units)

Reservoir	Vacant Space (MAF)	Live Storage (MAF)	Water Elevation (feet)	Percent of Capacity (percent)	Change in Storage* (MAF)	Change in Elevation* (feet)
Fontenelle	0.042	0.303	6501	88	-0.006	-0.82
Flaming Gorge	0.324	3.425	6032	91	-0.154	-3.86
Blue Mesa	0.089	0.740	7509	89	0.116	13.93
Navajo	0.138	1.558	6076	92	0.177	12.90
Lake Powell	1.326	22.998	3692	95	0.593	3.88
Lake Mead	2.785	24.592	1211	90	-0.534	-3.49
Lake Mohave	0.295	1.515	636	84	-0.214	-8.00
Lake Havasu	0.035	.584	448	94	0.019	1.01
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Totals	5.034	55.715	--	92	-0.003	--

* from October 1, 1998 to September 30, 1999

2000 WATER SUPPLY ASSUMPTIONS

For 2000 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 possible impacts on project uses and purposes. The most probable inflow in water year 2000 is projected to be near normal. Therefore, the magnitude of inflows in each of the three inflow scenarios are near the historical upper decile, mean, and lower decile (10 percent exceedance, 50 percent exceedance, and 90 percent exceedance, respectively) for each reservoir for water year 2000. 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 2000 inflow and October 1, 1999, 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 2000
(Metric Units: MCM)

Time Period		Probable Maximum	Most Probable	Probable Minimum
10/99 -	12/99	2,339	1,881	1,511
1/00 -	3/00	2,176	1,744	1,497
4/00 -	7/00	15,802	9,541	4,199
8/00 -	9/00	2,043	1,342	797
10/00 -	12/00	1,850	1,850	1,850
WY	2000	22,359	14,508	8,004
CY	2000	21,871	14,478	8,343

Table 2(b). Projected Unregulated Inflow
Into Lake Powell for Water Year 2000
(English Units: MAF)

Time Period		Probable Maximum	Most Probable	Probable Minimum
10/99 -	12/99	1.896	1.525	1.225
1/00 -	3/00	1.764	1.414	1.214
4/00 -	7/00	12.811	7.735	3.404
8/00 -	9/00	1.656	1.088	0.646
10/00 -	12/00	1.500	1.500	1.500
WY	2000	18.127	11.762	6.489
CY	2000	17.731	11.737	6.764

2000 RESERVOIR OPERATIONS

Minimum instream flow levels and annual operating strategies have been established at several locations in the Upper Basin which are intended to protect the aquatic resources downstream of specific dams. The regulation of the Colorado River has had both positive and negative effects on aquatic resources. Controlled cool water releases from dams have provided for increased productivity of some aquatic resources and the development of significant introduced sport fisheries. However, the same releases may be found to be detrimental to endangered and other native species of fishes.

Consultations with the Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act (Section 7 consultations) on the operation of the Aspinall Unit on the Gunnison River, Navajo Dam on the San Juan River, Flaming Gorge on the Green River, and Glen Canyon Dam will continue in 2000. Studies associated with these consultations will be used to better understand the flow related needs of endangered and other native species of fish.

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, 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. All operations will be undertaken subject to the primary water storage and delivery requirements established by "The Law of the River" and other applicable statutes, including water quality control, recreation, enhancement of fish and wildlife, and other environmental factors.

Reclamation completed Section 7 consultation with the Fish and Wildlife Service in April 1997 on current and projected discretionary routine lower Colorado River operations and maintenance activities for a period of up to 5 years. 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 under Sections 7 and 10 of the Endangered Species Act.

The following paragraphs discuss the operation of each of the reservoirs with respect to compact, decree and 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 1999 was above average. The April through July runoff into Fontenelle during water year 1999 was 1,499 MCM (1.215 MAF) or 143 percent of normal. Inflow peaked at 357 cubic meters per second

(12,610 cfs) on June 24, 1999. Releases of 223 cubic meters per second (7,865 cfs) were made during much of June. No flooding occurred in the city of Green River, Wyoming, located 60 river miles below the dam. The flood stage is exceeded when flows at Green River exceed 354 cubic meters per second (12,500 cfs). Fontenelle Reservoir essentially filled in July of 1999 when the elevation of the reservoir came within 0.67 meters (2.2 feet) of reaching the crest of the spillway.

Because the mean annual inflow of 1,516 MCM (1.229 MAF) far exceeds Fontenelle's storage capacity of 426 MCM (.345 MAF), significant power plant bypasses are expected under the most probable and maximum probable inflow scenarios. Additionally, there is little chance that the reservoir will not fill during water year 2000. In order to minimize spring high releases, and to maximize downstream resources and power production, the reservoir will probably be drawn down to minimum pool elevation, 1970.0 meters (6463 feet) which corresponds to a volume of 115 MCM (0.093 MAF) of live storage.

Flaming Gorge Reservoir

Inflow into Flaming Gorge was above average during water year 1999. April through July unregulated inflow was 2,103 MCM (1.705 MAF) or 143 percent of normal. High inflows, coupled with the carryover storage from water year 1998, required releases in excess of powerplant capacity to be made from Flaming Gorge in water year 1999. Releases reached 297 cubic meters per second (10,500 cfs) in mid June. Releases at this time were being made through the powerplant, the river bypass tubes, and the spillway. This marked the first time all three of these release capabilities have been used together since 1983. A total of 300 MCM (0.243 MAF) was released in excess of powerplant capacity in water year 1999.

In May of 1999, a final draft report entitled "Flow Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam" (Flaming Gorge Flow Recommendations) was submitted to the Upper Colorado River Recovery Program Management Committee. The report, prepared by a multi-disciplinary team, synthesizes research conducted on endangered fish in the Green River under the Upper Colorado River Recovery Program and also presents flow recommendations for three reaches of the Green River. It is expected that the Flaming Gorge Flow Recommendations report will be finalized by the Upper Colorado River Recovery Program in the spring of 2000. Reclamation intends to initiate a National Environmental Policy Act (NEPA) process on the implementation of an operation plan at Flaming Gorge Dam that meets these flow recommendations.

In water year 2000, Flaming Gorge will be operated in accordance with the Biological Opinion on the Operation of Flaming Gorge (BOFG), issued in November 1992. The BOFG calls for high spring releases to occur each year, timed with the peak of the Yampa River, so as to mimic historic Green River flows.

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

In water year 1999, the April through July unregulated runoff into Blue Mesa Reservoir was 834 MCM (0.676 MAF), or 97 percent of average. Water year 1999 unregulated inflow was 1,293 MCM (1.048 MAF), or 108 percent of average. Water year 1999 powerplant bypasses were approximately 232 MCM (0.188 MAF) at Crystal, the result of annual system maintenance and spring runoff exceeding powerplant capacity. Releases and spills up to 109 cms (3,840 cfs) occurred at Crystal with flows in the river below the Gunnison Tunnel in excess of 85 cms (2,900 cfs). Blue Mesa nearly filled in water year 1999, reaching a peak elevation of 2291.96 meters (7,519.21 feet) on July 31, 1999.

Section 7 consultation with the Fish and Wildlife Service on the operation of the Aspinall Unit continued in 1999. A 5 year effort to study the effect of various release patterns on habitat, reproductive success, and reintroduction of endangered fish in the Gunnison River was completed in 1998. The Fish and Wildlife Service is expected to issue a draft biological opinion on the operation of the Aspinall Unit in 2000. Additionally, negotiations between Reclamation, the National Park Service, and the State of Colorado to develop a contract to deliver water from the Aspinall Unit to the Black Canyon of the Gunnison National Monument, in recognition of the reserved right for the monument, are expected to continue.

For water year 2000 operations, Blue Mesa Reservoir will be drawn down to at least an elevation of 2,283 meters (7490 feet) by December 31, 1999, in order to minimize icing problems in the Gunnison River. Blue Mesa will continue to be drawn down through April 2000 to a level that will accommodate the current most probable inflow scenario and accomplish the release objectives with minimal powerplant bypasses at Crystal.

The minimum release objectives of the Aspinall Unit are to meet the delivery requirements of the Uncompahgre Valley Project, to keep a minimum of 8.5 cms (300 cfs) flowing through the Black Canyon of the Gunnison National Monument, and to maintain a minimum of 8.5 cms (300 cfs) below the diversion structure at Redlands (at the confluence of the Gunnison and Colorado Rivers) during the summer months. Under all three inflow scenarios, Blue Mesa is expected to fill in the summer of 2000 and flows through the Black Canyon of the Gunnison National Monument are expected to be above the minimum release objective during the summer months. Filling of the reservoir in water year 2000 will ensure that reasonable specific releases required to study the protection and improvement of habitat for endangered fish can be accommodated. The forecasted runoff for the spring of 2000 will be closely monitored to achieve these objectives. To protect both the blue ribbon trout fishery in the Black Canyon and recreation potential, releases during 2000 will be planned to minimize large fluctuations in the daily and monthly flows in the Gunnison River below the Gunnison Tunnel diversion.

Navajo Reservoir

The San Juan River basin experienced a very dry winter, and in early April, inflow forecasts were calling for April through July inflow to be only 49 percent of average. April and May, however, turned out to be months with abundant precipitation in the San Juan Basin. April through July

inflow into Navajo Reservoir in water year 1999 ended up being 774 MCM (0.627 MAF) or 81 percent of average. Water year 1999 regulated inflow was 1,486 MCM (1.204 MAF) or 112 percent of average. Navajo Reservoir reached a peak elevation of 1854.05 meters (6082.83 feet) on August 12, 1999.

During the spring, large releases of up to 142 cms (5,000 cfs) were made during May and June to coincide with the peak flows of the Animas River. This resulted in peak flows of 210 cubic meters per second (7,400 cfs) at Bluff, Utah.

Section 7 consultation with the Fish and Wildlife Service on the operation of Navajo Dam continued in 1999. Water year 1997 was the last year of a 7 year study to evaluate alternative operations of Navajo Reservoir to benefit endangered fish. A report entitled "Flow Recommendations for the San Juan River", which outlines flow recommendations for the San Juan River below Navajo Dam, has been completed by the San Juan Recovery Implementation Program (SJRIP). This report was finalized in 1999 by the SJRIP.

In water year 2000, Navajo Reservoir is expected to nearly fill under the probable maximum inflow scenario. The reservoir should fill above 80 percent of full under the most probable and probable minimum scenarios. Releases from the reservoir will be held near 14 cms (500 cfs) through the fall and winter months and large releases will likely be made in May and June pursuant to the flow recommendations to improve the habitat and provide better spawning conditions for endangered fish in the San Juan River.

Lake Powell

The April through July unregulated inflow into Lake Powell in water year 1999 was 9,400 MCM (7.62 MAF) or 99 percent of average. Water year 1999 unregulated inflow was 15,680 MCM (12.71 MAF) or 108 percent of average. Lake Powell nearly filled in water year 1999 reaching a peak elevation of 1126.15 meters (3694.72 feet) on July 16, 1999 (5.28 feet from full).

During water year 2000, releases greater than the minimum release objective of 10,152 MCM (8.230 MAF) will likely be made to avoid anticipated spills and/or to equalize the storage between Lakes Powell and Mead. Under the most probable inflow conditions, releases of 14,370 MCM (11.650 MAF) would be made, while under the probable maximum inflow scenario, approximately 21,650 MCM (17.550 MAF) will be released. With current full reservoir system conditions, releases above powerplant capacity are possible in 2000. Such releases would be made consistent with the 1956 Colorado River Storage Project Act, the 1968 Colorado River Basin Project Act, the 1992 Grand Canyon Protection Act, and the Secretary of the Interior's agreement for managing spills from Glen Canyon Dam, initially made in the 1996 AOP. This agreement provides for the use of reservoir releases in excess of powerplant capacity required for dam safety purposes during high reservoir conditions to accomplish the objectives of the Beach/Habitat Building Flow described in the Record of Decision for the Glen Canyon Dam Final Environmental Impact Statement (GCDFEIS).

Releases from Lake Powell in water year 2000 will continue to reflect consideration of the uses and purposes identified in the authorizing legislation for Glen Canyon Dam. Power plant releases and Beach/Habitat Building Flows will reflect criteria based on the findings, conclusions and recommendations made in the Record of Decision for the GCDFEIS pursuant to the Grand Canyon Protection Act of 1992.

Daily and hourly releases will continue to be made according to the parameters of the ROD for the GCDFEIS preferred alternative, and published in the Glen Canyon Dam Operating Criteria (62 Fed. Reg. 9447, Mar. 3, 1997), as shown in the following table:

Table 3. Glen Canyon Dam release restrictions

Parameter	(cms)	(cfs)	conditions
Maximum flow [1]	708.0	25,000	
Minimum flow	141.6	5,000	nighttime
	226.6	8,000	7:00 am to 7:00 pm
Ramp rates			
ascending	113.3	4,000	per hour
descending	42.5	1,500	per hour
Daily fluctuations [2]	141.6 / 226.6	5,000 / 8,000	

[1] to be evaluated and potentially increased as necessary and in years when delivery to the Lower Basin exceeds 10,152 MCM (8.23 MAF)

[2] Daily fluctuations limit is 141.6 cms (5,000 cfs) for months with release volumes less than 740 MCM (.600 MAF); 169.9 cms (6,000 cfs) for monthly release volumes of 740 to 987 MCM (.600 to .800 MAF); and 226.6 cms (8,000 cfs) for monthly volumes over 990 MCM (.800 MAF)

Lake Mead

For calendar year 1999 the surplus condition was the criterion governing the operation of Lake Mead in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the decree in *Arizona v. California*. A volume of 2,097 MCM (1.7 MAF) of water was scheduled for delivery to Mexico in accordance with Article 15 of the 1944 Mexican Treaty and Minute No. 242 of the International Boundary and Water Commission.

Lake Mead began water year 1999 at elevation 370 meters (1214.8 feet), with 30,993 MCM (25.126 MAF) in storage, 97 percent of the conservation capacity of 31,919 MCM (25.877 MAF). During the year, Lake Mead reached its maximum elevation of 371 meters (1215.8 feet) at the end of October, 1998, with 31,180 MCM (25.278 MAF) in storage, 98 percent of capacity. Lake Mead reached its minimum elevation of 368 meters (1206.4 feet) at the end of June 1999.

Starting in July 1998, the Bureau's monthly operation plan indicated that flood control releases would be required in January, February, and March of 1999. On September 9, 1998, non-damaging, space-building, flood control releases were initiated, ending around the middle of January 1999. Reduced river channel capacity in the Yuma area and maintenance requirements at Parker and Davis dams contributed to initiating the space-building releases earlier than normal. Non-damaging, space-building, flood control releases were once again initiated in September 1999. These releases are expected to continue through December 1999. In total 2,109 MCM (1.71 MAF) were released above downstream demands in water year 1999. The total release from Lake Mead through Hoover Dam during water year 1999 was 14,059 MCM (11.398 MAF) with an additional 319 MCM (0.259 MAF) being diverted from Lake Mead by the Robert Griffith Water Project.

Under the most probable inflow conditions during water year 2000, Lake Mead is expected to rise to elevation 370 meters (1214.3 feet) by the end of December 2000, with 30,944 MCM (25.086 MAF) in storage, 97 percent of conservation capacity. Lake Mead is expected to drop to 367 meters (1203.7 feet) by the end of June 2000, with 28,937 MCM (23.459 MAF) in storage, 91 percent of conservation capacity.

Flood control releases are projected under the most probable scenario in January and February 2000 at the 19,000 cfs level. Hoover Dam is expected to release 14,566 MCM (11.809 MAF) during water year 2000. Downstream demands are expected to be about 12,976 MCM (10.520 MAF) for water year 2000.

No flood control releases are anticipated in calendar year 2000 under the minimum probable scenario. Under the maximum probable, flood control releases, all above the 19,000 cfs level and up to the 35,000 cfs level, are required January through June. Space building is required from September through December 2000, under the maximum probable scenario.

Drawdown during the peak largemouth bass spawning period in April and May is planned to be near the limits of decline recommended in the July 1982, final report of a five-year study by the Arizona Game and Fish Department and the Nevada Department of Wildlife.

As Lake Mead remains near capacity and flood control releases are required by the Hoover Dam Flood Control Regulations, consideration will be given to making these releases over the fall and winter months of 1999 to avoid high flow releases during the January through July runoff season in year 2000. This distribution of water reduces the chance of bypassing hydroelectric powerplants below Hoover Dam and avoids the adverse impacts of higher flood control releases on fish and wildlife, recreation, water quality, property, and river stabilization.

Lakes Mohave and Havasu

At the beginning of water year 1999, Lake Mohave was at elevation 196 meters (644.1 feet) with an active storage of 2,133 MCM (1.729 MAF). The water level of Lake Mohave was regulated as needed between elevation 194 meters (636 feet) and 196 meters (644 feet) throughout the water year ending at elevation 194 meters (636 feet) with 1,869 MCM (1.515 MAF) in storage. The total release from Lake Mohave through Davis Dam was 13,902 MCM (11.270 MAF) for downstream water use requirements, flood control, and space building.

For water year 2000, Lake Mohave is expected to release 14,031 MCM (11.375 MAF). The water level will be regulated between elevation 192 meters (630 feet) and 196 meters (643 feet).

Lake Havasu started water year 1999 at elevation 136.3 meters (447.2 feet) with 697 MCM (0.565 MAF) in storage. During the year, 10,734 MCM (8.702 MAF) was released from Parker Dam. In addition to these releases, 1,632 MCM (1.323 MAF) was diverted from Lake Havasu into the Central Arizona Project (CAP) and 1,485 MCM (1.204 MAF) by the Metropolitan Water District (MWD).

For water year 2000, Lake Havasu is expected to release 10,803 MCM (8.758 MAF). Diversions from Lake Havasu by MWD and into CAP are expected to be 1,612 MCM (1.307 MAF) and 1,759 MCM (1.426 MAF), 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. 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 aging stock of the endangered razorback sucker in Lake Mohave. Larval 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 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 suckers grow very quickly, usually exceeding ten inches in length by September.

Senator Wash and Laguna Reservoirs

Operations at Senator Wash Reservoir allow regulation of water deliveries to United States and Mexican water users downstream at Imperial Dam. The reservoir is utilized as an off-stream storage facility to meet downstream water demands and to prevent waters above the Mexican order from flowing across the Northerly International Boundary (NIB) with Mexico. Senator Wash Reservoir is the first storage facility below Parker Dam, located approximately 142 river miles upstream. Operational objectives are to store excess flows in the river which have been caused by water user cutbacks and sidewash inflows due to rain. Stored waters are utilized to meet irrigation and recreational demands. An elevation restriction at Senator Wash Reservoir, due to potential piping at West Squaw Lake Dike and Senator Wash Dam, currently diminishes the storage capability of the Reservoir by about 4,000 acre feet.

Laguna Reservoir is a regulating storage facility located approximately 7 river miles downstream of Senator Wash. Operational objectives are similar to those for Senator Wash Reservoir. The storage capability of Laguna Reservoir is currently diminished due to sediment accumulation and vegetation growth. Sediment accumulation in the reservoir has occurred primarily due to flooding that occurred in 1983 and 1984.

Yuma Desalting Plant

The Yuma Desalting Plant (YDP) was not operated in 1999 and will not be operated in 2000. Damage to most of the YDP's associated facilities caused by the 1993 Gila River flood has been repaired. Those associated facilities are the Main Outlet Drain (MOD) the Main Outlet Drain Extension (MODE), and the Bypass Drain, which extends from the YDP to the Cienega de Santa Clara on the coast of the Sea of Cortez. Approximately one-quarter mile of concrete lining in the MOD, and several broken panels throughout the MODE and Bypass Drain, remain to be repaired. It is anticipated this repair will be performed by contract during the fall of 1999. All Wellton-Mohawk Irrigation & Drainage District drainage flows should be diverted into the MODE in 2000. There is a potential that a portion of the drainage return flows may be diverted to the Colorado River during short periods while repairs to the MODE and Bypass Drain are being made. These releases are not expected to impact the salinity differential requirements for the year.

The Water Quality Improvement Center (WQIC) formerly referred to as the test train, has been expanded for research and for treatment of the YAO Administration Building's service water. The WQIC processes about one million gallons per day of drainage water, delivered either from the MODE, pumped from an on-site well, or taken from the Cooper Lateral. The WQIC will continue to operate during calendar year 2000. An Education Center affiliated with the WQIC was constructed during 1999 to offer classes to the public in water treatment by reverse osmosis. The first class started in August 1999 in cooperation with Arizona Western College in Yuma.

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 and Morelos Dam. An additional unspecified volume of sediment was deposited in the river channel below Morelos Dam. The aggradation of the channel has substantially reduced the river's capability to carry flood flows, 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 solve the aggradation problems, in cooperation with local irrigation districts, the International Boundary and Water Commission, 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 is scheduled to begin in September 1999. Phase 2 consists of dredging a sediment basin in the river channel immediately upstream of Morelos Dam to a location about one mile above the NIB. The sediment basin will alleviate most of the operational problems due to sediment laden waters being delivered to Mexico at Morelos Dam. Dredging of this basin is scheduled to last until September 2000.

The need for completing Phases 3 and 4 of the project is currently being reviewed and studied. The space-building and flood control releases experienced during the winters of 1997 and 1998, as well as the natural dynamic nature of the river system, make this review prudent.

Limitrophe Division Below Morelos Dam

The International Boundary and Water Commission (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 has 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 ground water levels in the Yuma Valley. The EIS will identify the best U.S./Mexican alternative to be undertaken for the proposed project.

2000 DETERMINATIONS

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

Upper Basin Reservoirs

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. Taking into consideration all relevant factors required by the Operating Criteria, it has been determined that the active storage in Upper Basin reservoirs forecast for September 30, 2000, exceeds the storage required under Section 602(a) of the *Colorado River Basin Project Act* under any reasonable range of assumptions which might be applied. Therefore, "602(a) Storage" is not the criterion controlling the release of water from Glen Canyon Dam during water year 2000.

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 of the Interior 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.

Spill avoidance and/or storage equalization criterion in accordance with Article II(3) of the Operating Criteria will control the releases from Glen Canyon Dam during water year 2000 unless the minimum objective release criterion in Article II(2) is controlling. Under the most probable inflow scenario Glen Canyon Dam will release 14,370 MCM (11.650 MAF).

Lower Basin Reservoirs

Water shall be released or pumped from Lake Mead to meet the following requirements:

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

The Operating Criteria provide that after the commencement of delivery of mainstream water by means of the CAP, the Secretary of the Interior 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 9,251 MCM (7.500 MAF) of consumptive use in accordance with Article III(3)(a) of the Operating Criteria and Article II(B)(1) of the U.S. Supreme Court decree in *Arizona v. California*. The surplus condition is defined as annual pumping and release from Lake Mead sufficient to satisfy in excess of 9,251 MCM (7.500 MAF) of consumptive use in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the U.S. Supreme Court decree in *Arizona v. California.*

The current water supply conditions forecast mandatory flood control releases that are projected to be above downstream requirements in January and February of calendar year 2000. Using a most probable inflow forecast for 2000, flood control releases are also projected in the beginning of calendar year 2001. Therefore, 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) that the beneficial consumptive use requirements of Colorado River mainstream users in the Lower Division States are expected to be more than 9,250 MCM (7.5 MAF), the surplus condition is the criterion governing the operation of Lake Mead for calendar year 2000 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the decree in *Arizona v. California*.

While there still is no agreed upon long term strategy for the determination of surplus conditions, the making of this determination, based on flood control and spill avoidance considerations, does not preclude the Secretary from adopting other determination criteria in future years. Reclamation has initiated the National Environmental Policy Act process and has solicited comments on the development of specific surplus criteria for management of the Colorado River in a Federal Register notice on May 18, 1999 (64 Fed. Reg., No. 95, p. 27008). Reclamation continues to work on the development of specific surplus criteria.

Nothing in the decree in *Arizona v. California* prohibits the Secretary of the Interior from releasing water apportioned, but unused, in any Lower Division State for that year for consumptive use in any other Lower Division State. No rights to the recurrent use of such water accrue by reason of the use of such water. In light of this provision and in accordance with Article II(B)(6) of the decree, any Lower Division State will be allowed to utilize water apportioned to, but unused by, another Lower Division State in calendar year 2000.

1944 Mexican Water Treaty

Pursuant to the 1944 Mexican Water Treaty it has been determined that under most probable inflow conditions, water in excess of that required to supply uses in the United States will be available. Therefore, a volume of 2,096 MCM (1.7 MAF) of water will be allowed to be scheduled for delivery to Mexico during calendar year 2000 in accordance with Article 15 of the 1944 Mexican Water Treaty and Minute No. 242 of the International Boundary and Water Commission. Calendar year schedules of 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.

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DISCLAIMER

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 1998 through September 2000) under the probable maximum, most probable, and the probable minimum inflow scenarios, and historic end of month contents.

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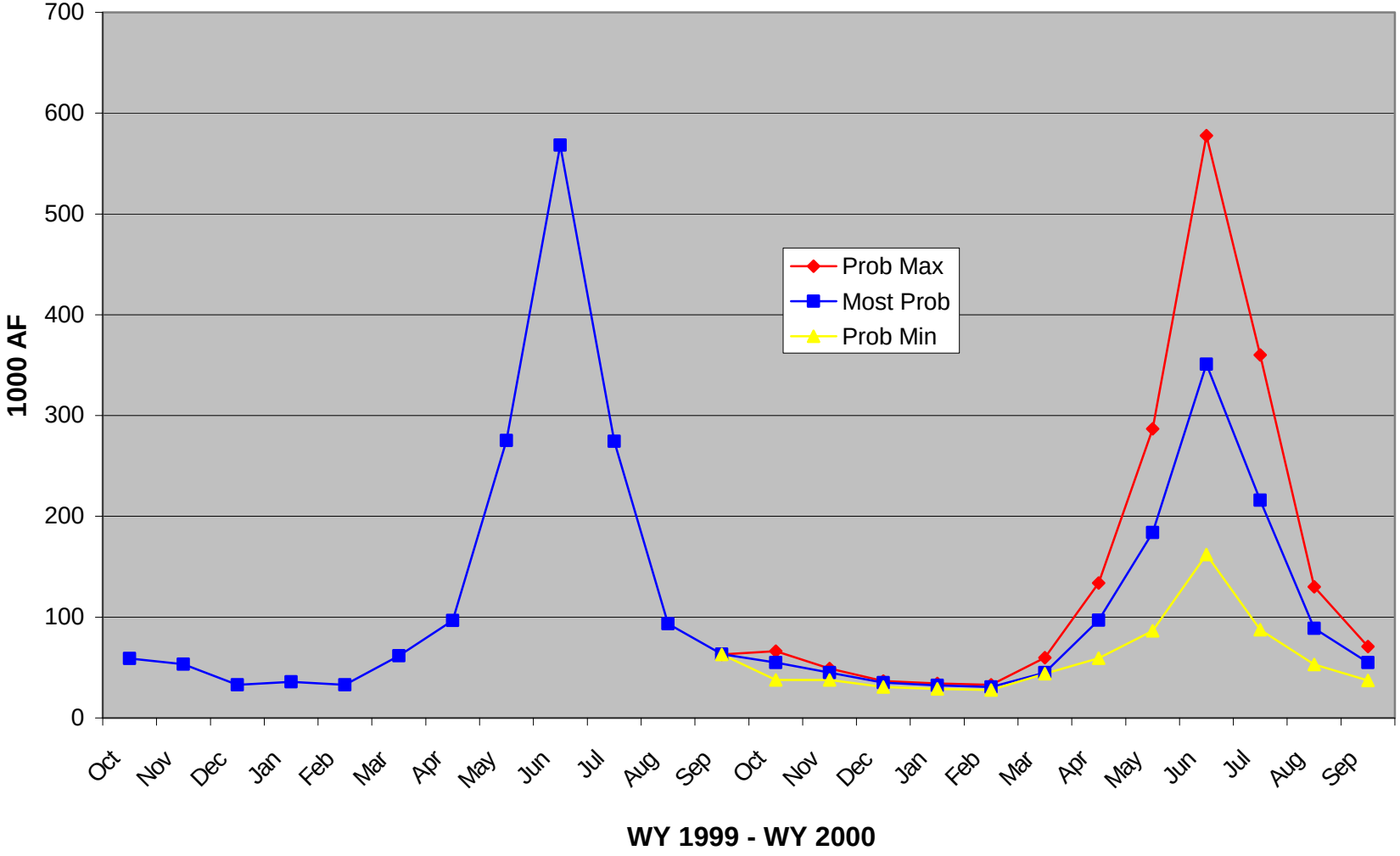
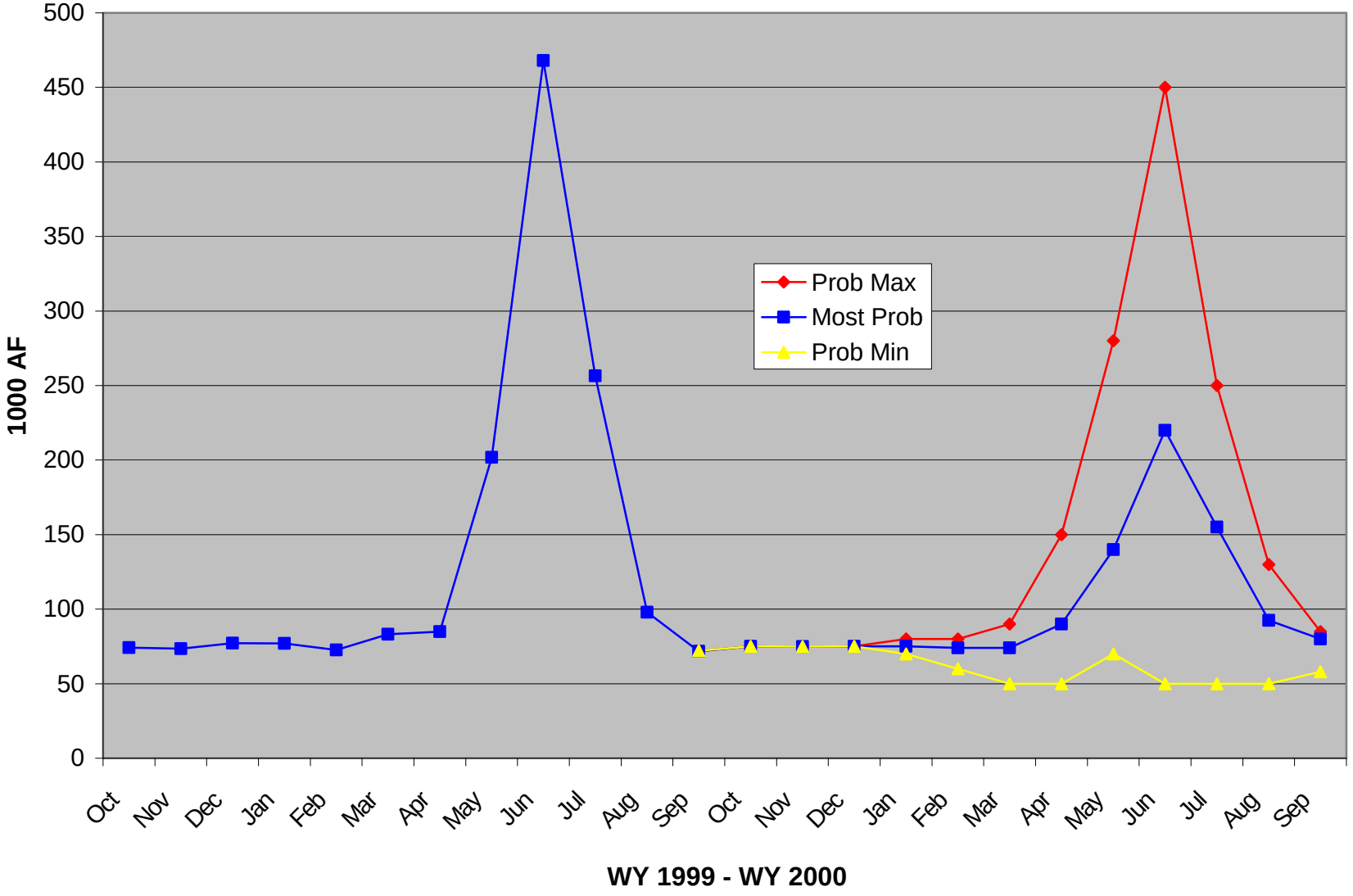
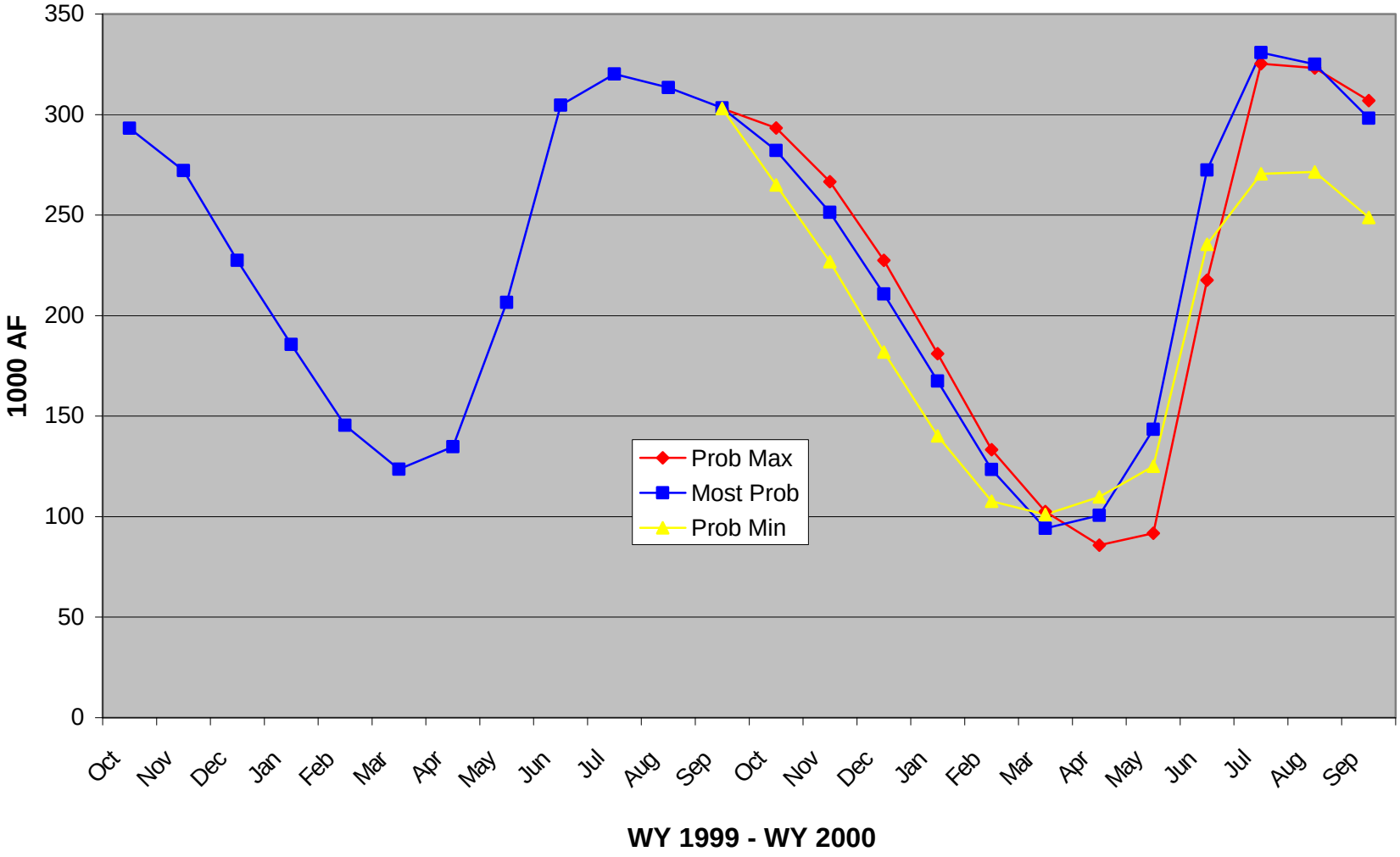
Monthly Inflow



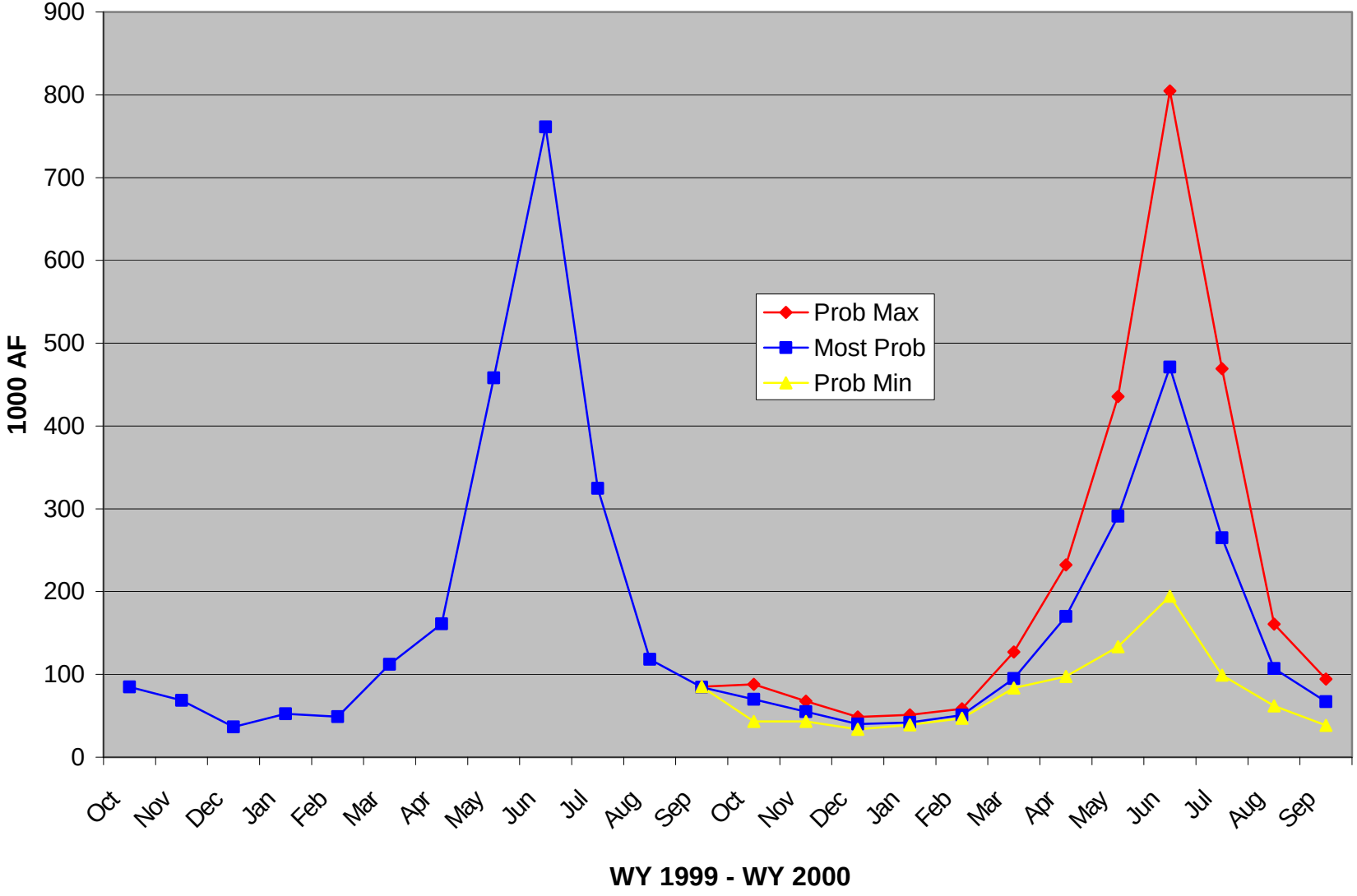
Fontenelle
Monthly Releases



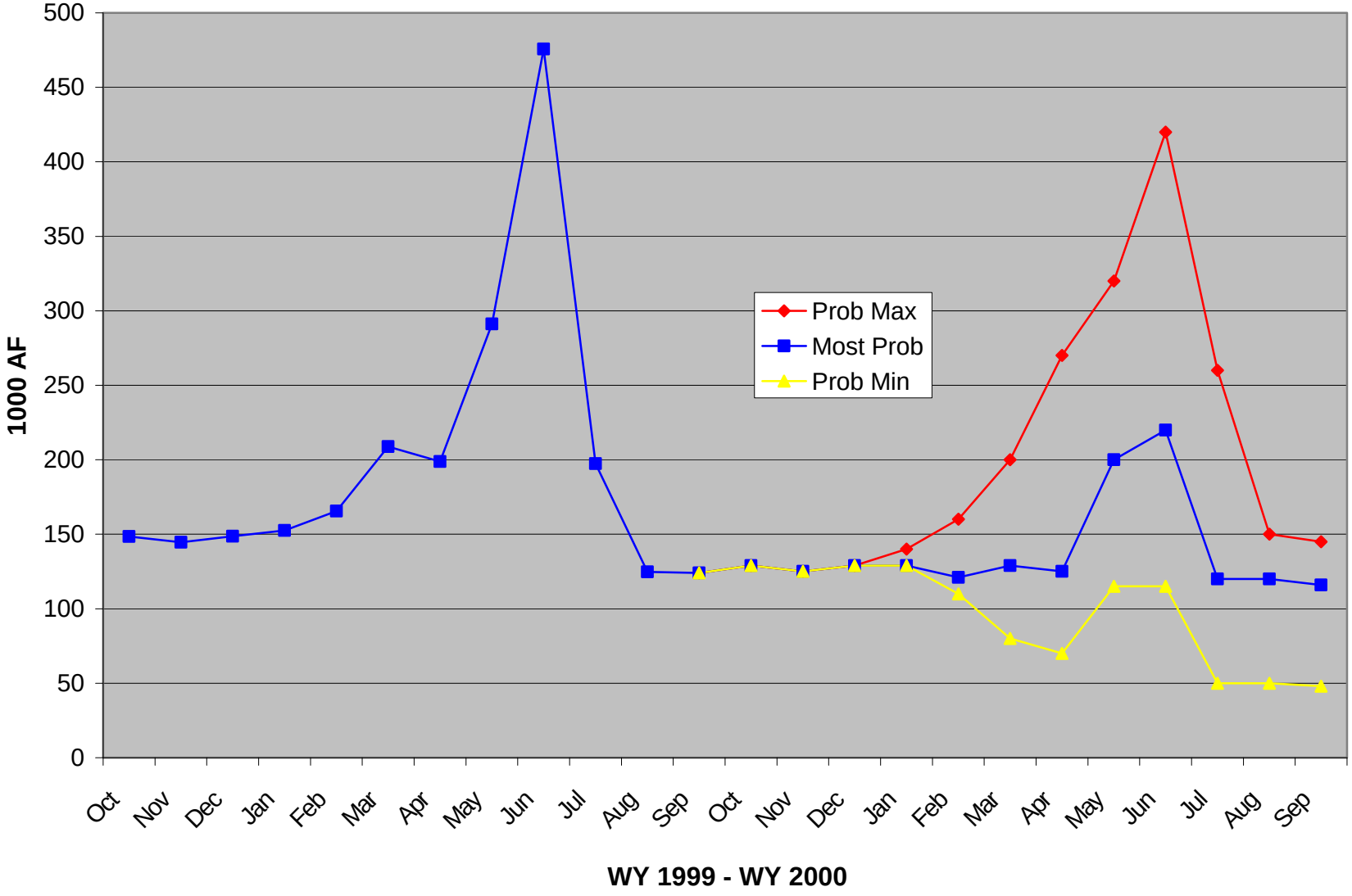
Fontenelle
Monthly Storage



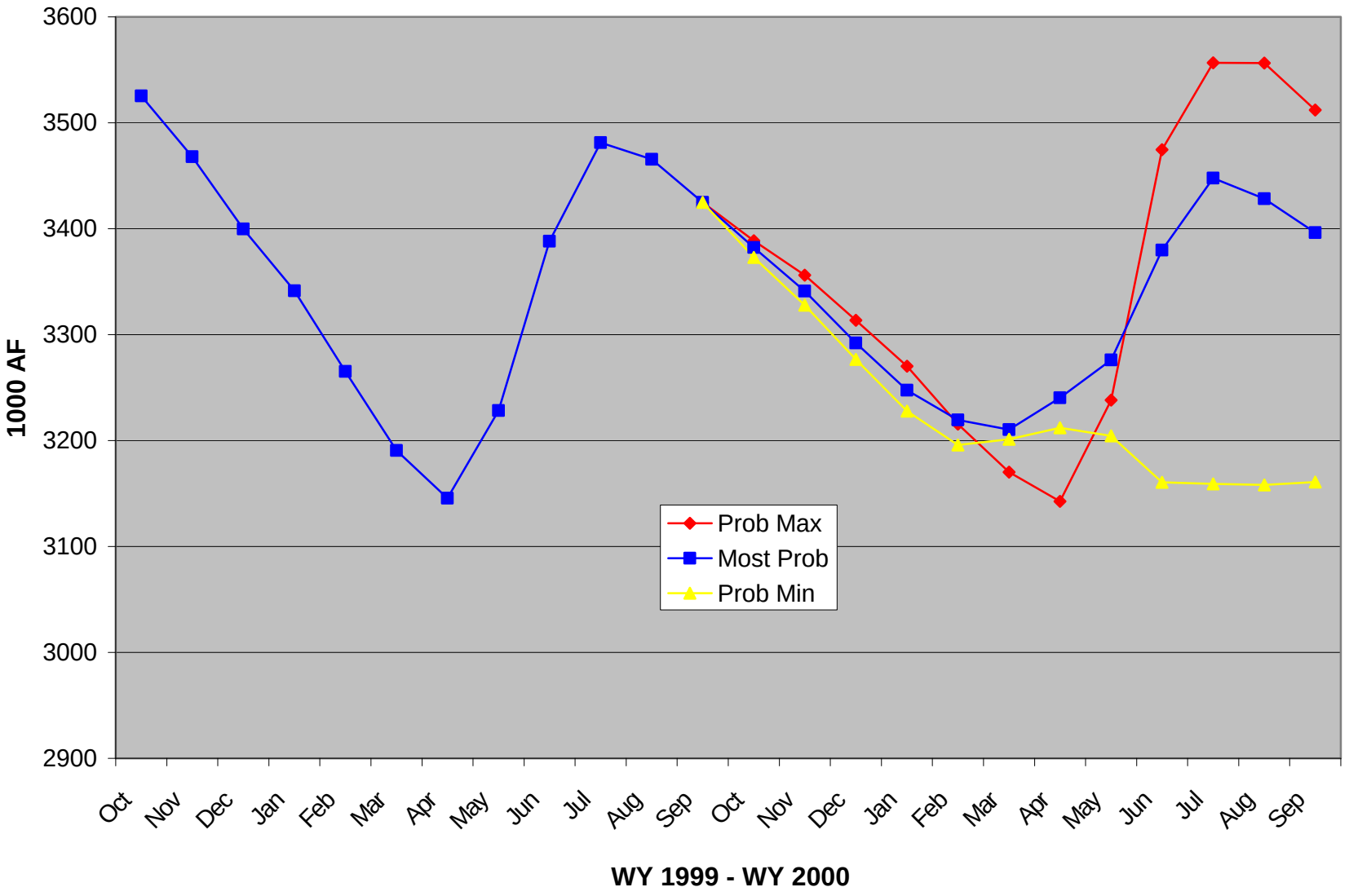
Flaming Gorge
Monthly Inflow



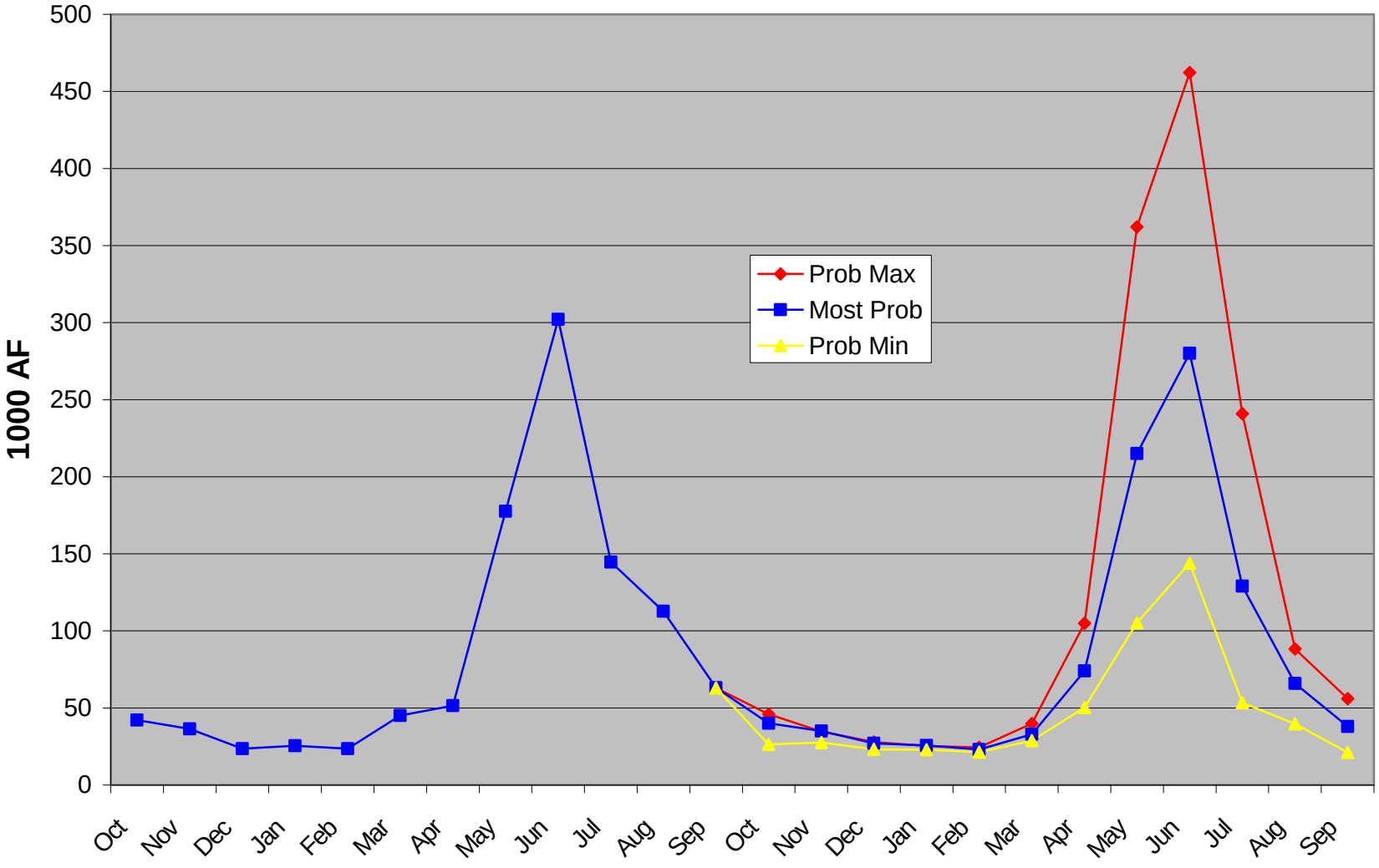
Flaming Gorge
Monthly Releases



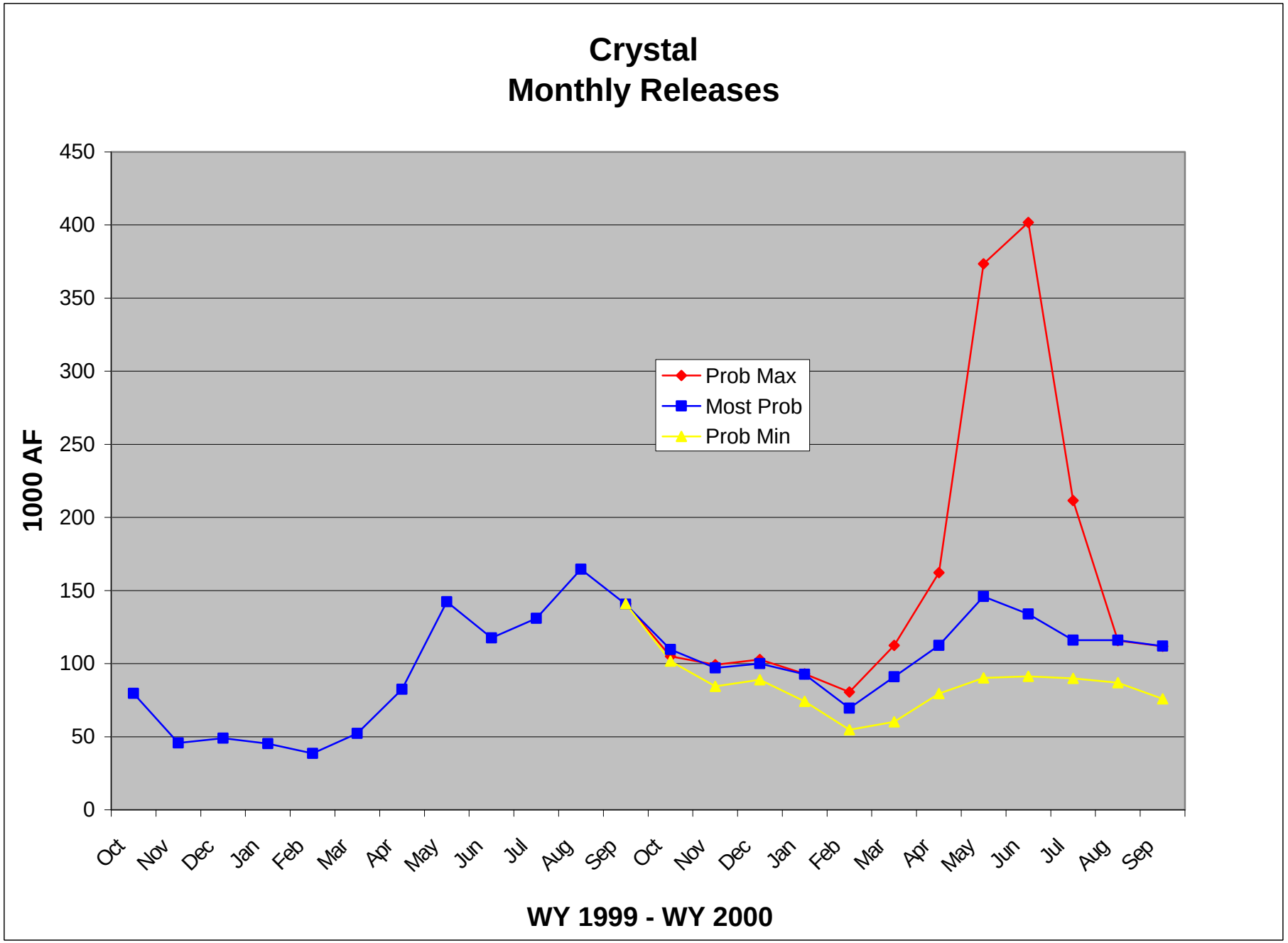
Flaming Gorge
Monthly Storage



Blue Mesa
Monthly Inflow



WY 1999 - WY 2000


Crystal
Monthly Releases
1000 AF
450
400
350
300
250
200
150
100
50
0
Prob Max
Most Prob
Prob Min
Oct
Nov
Dec
Jan
Feb
Mar
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May
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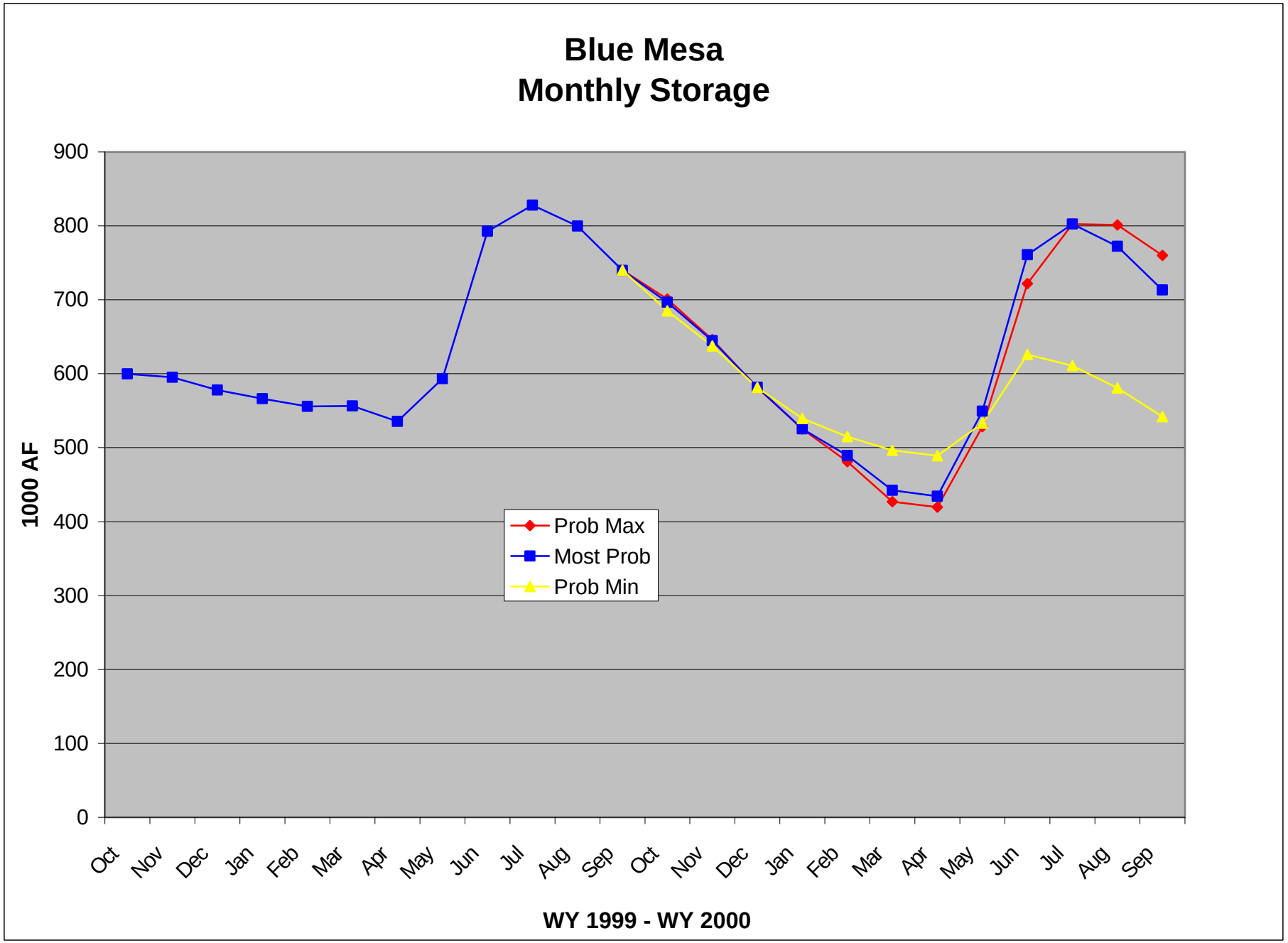
WY 1999 - WY 2000


Blue Mesa
Monthly Storage
1000 AF
900
800
700
600
500
400
300
200
100
0
Prob Max
Most Prob
Prob Min
Oct
Nov
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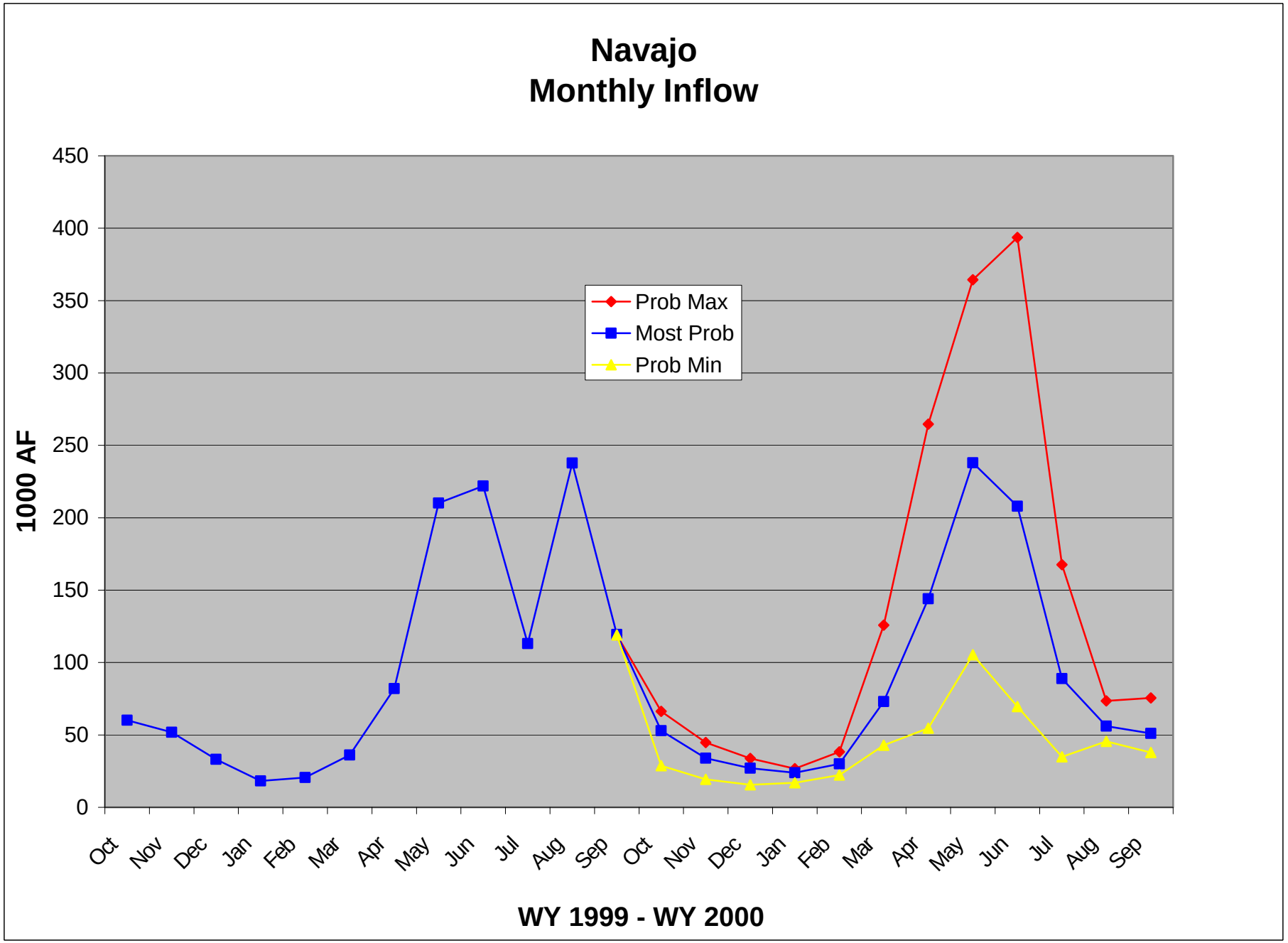
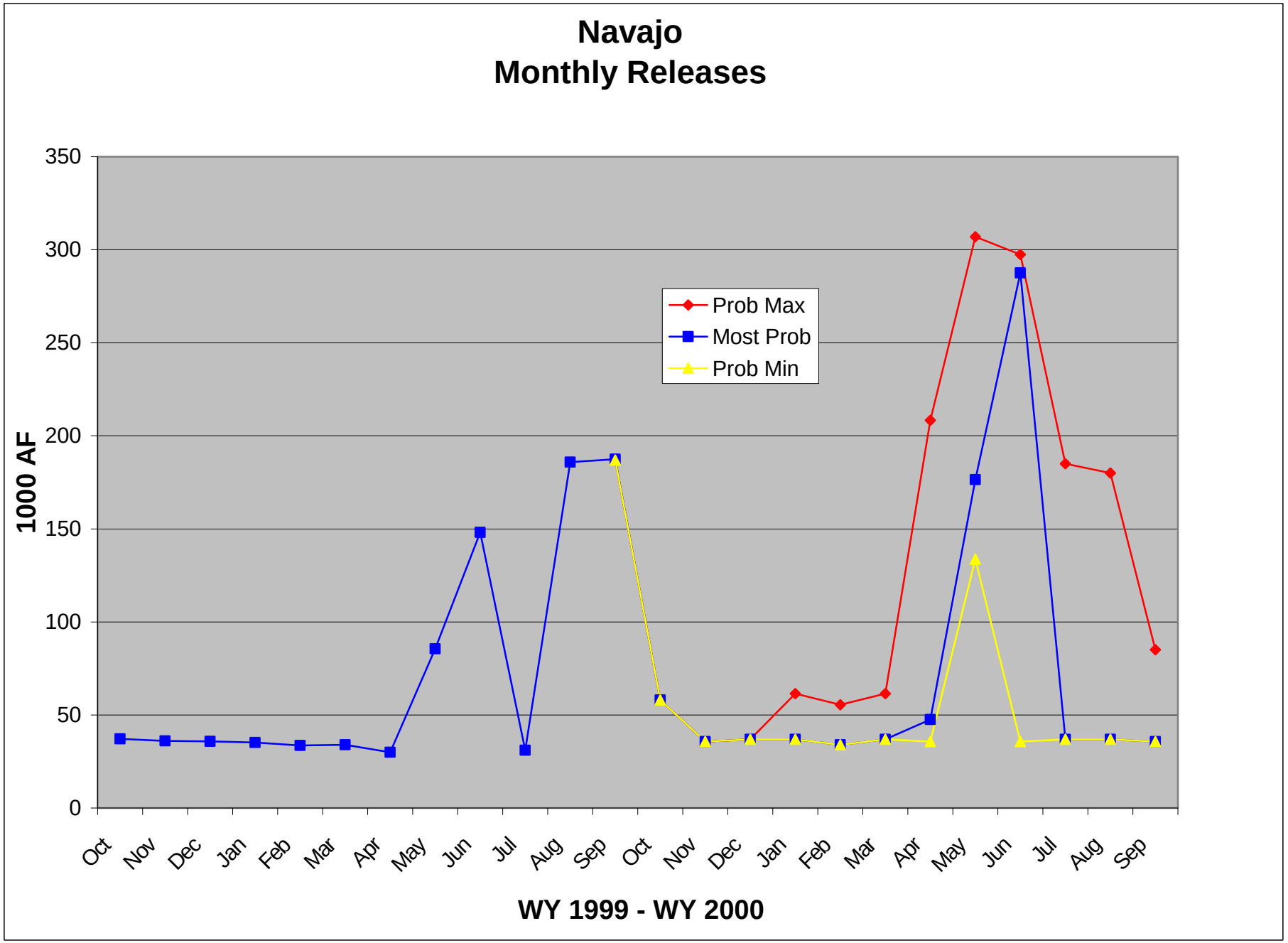
WY 1999 - WY 2000

Navajo
Monthly Inflow




Navajo
Monthly Releases
1000 AF
350
300
250
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150
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0
Prob Max
Most Prob
Prob Min
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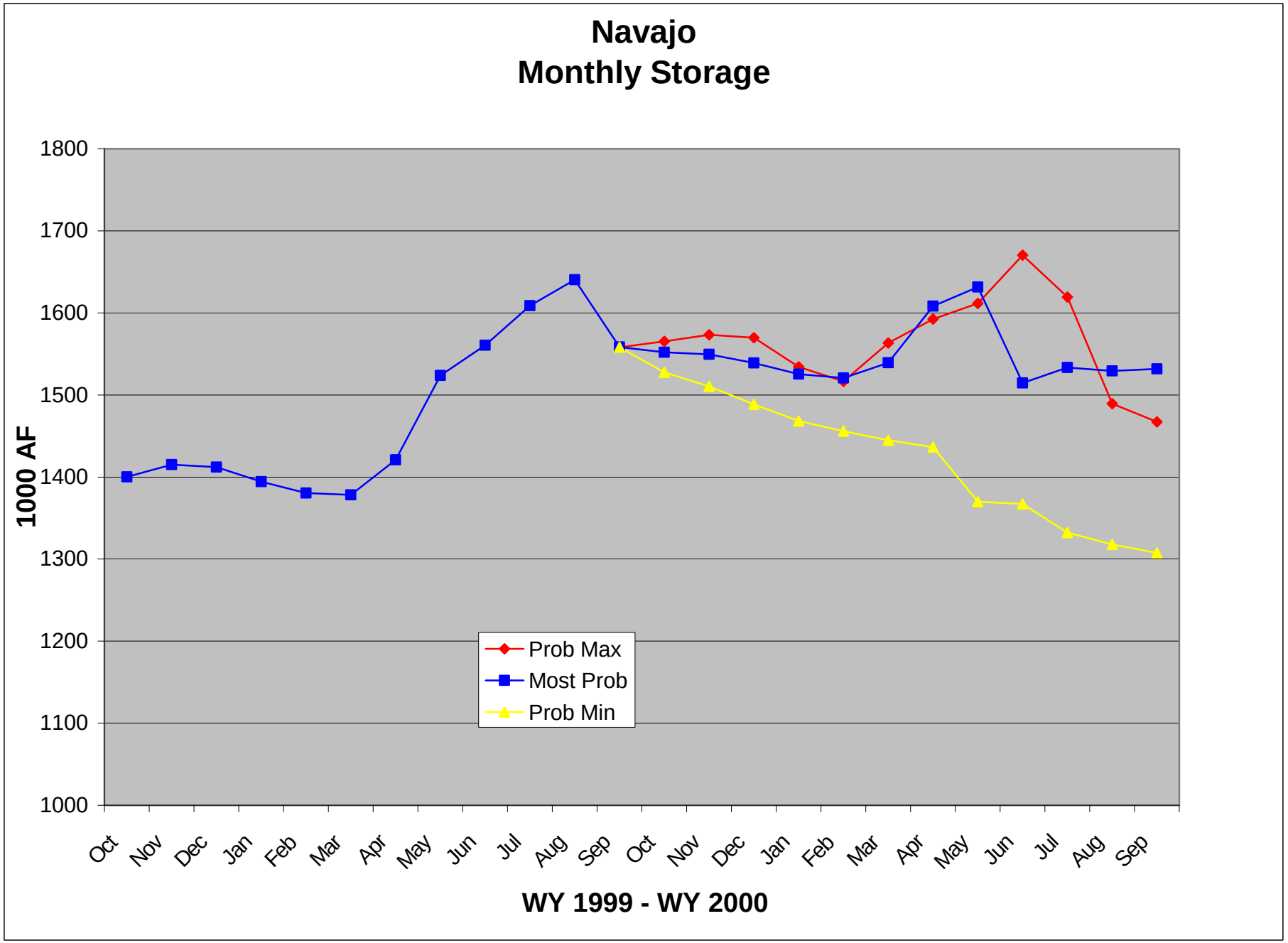
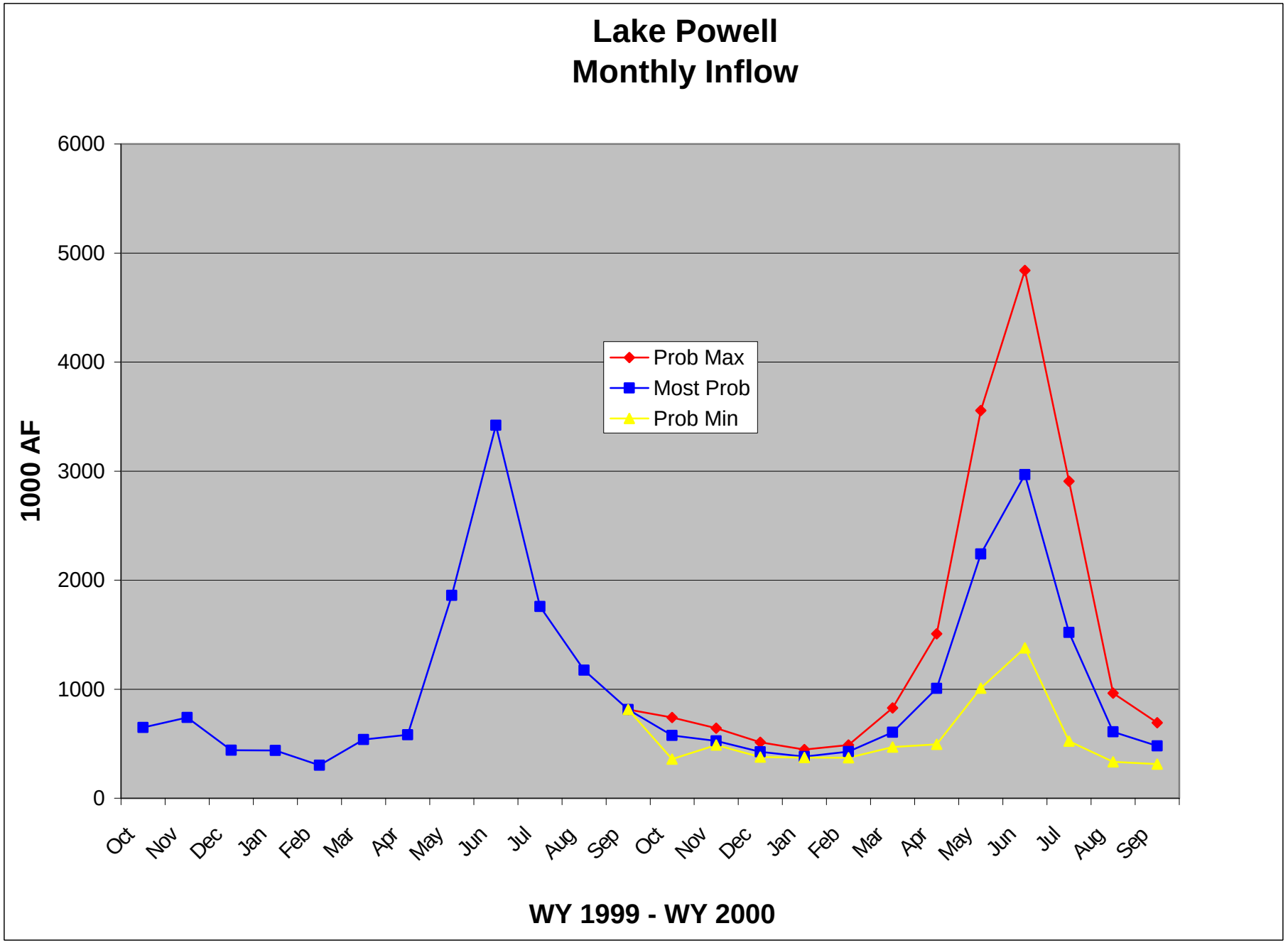
WY 1999 - WY 2000

Navajo
Monthly Storage




Lake Powell
Monthly Inflow
1000 AF
6000
5000
4000
3000
2000
1000
0
Prob Max
Most Prob
Prob Min
Oct
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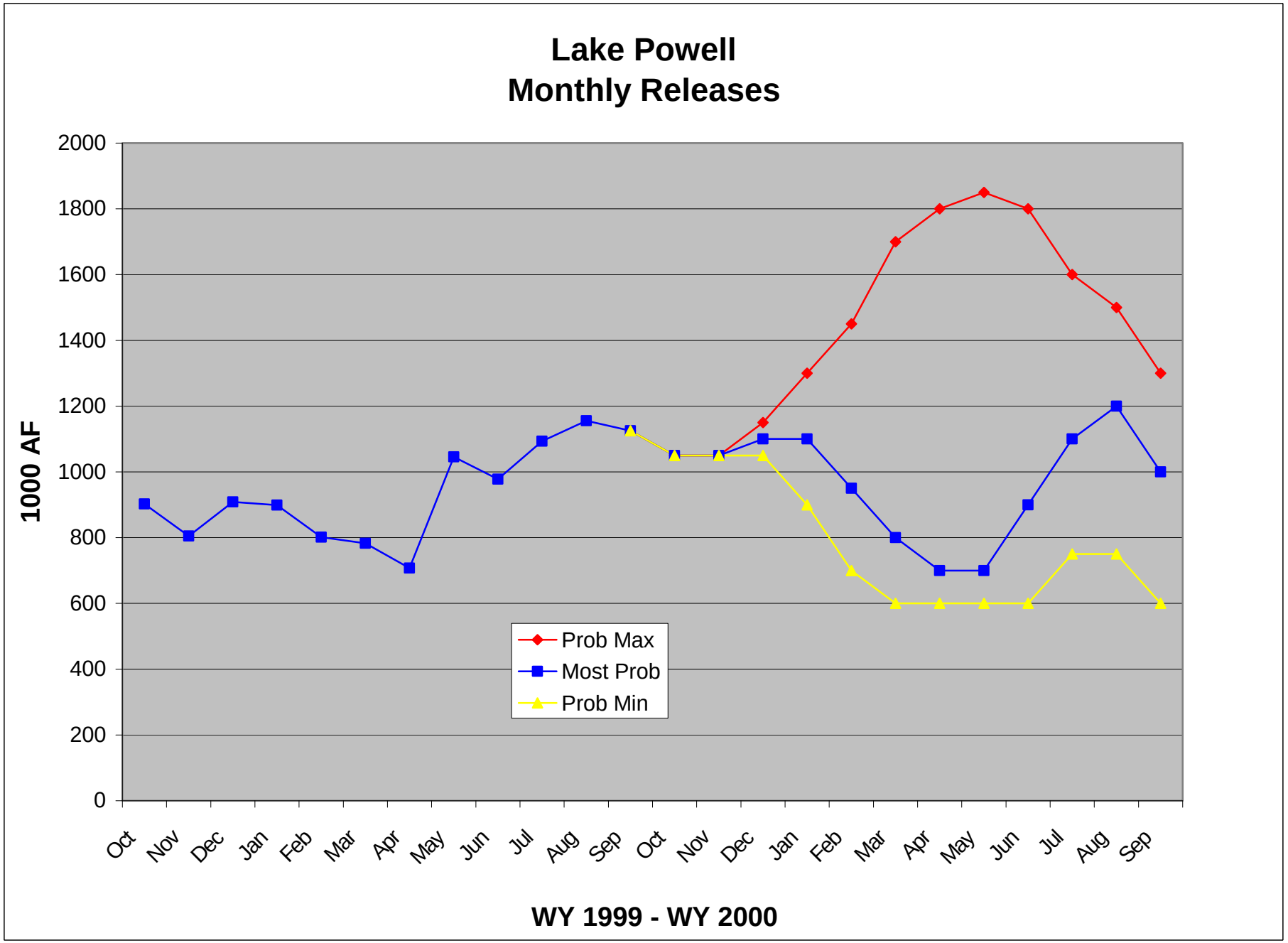
WY 1999 - WY 2000


Lake Powell
Monthly Releases
1000 AF
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Oct
Nov
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Jan
Feb
Mar
Apr
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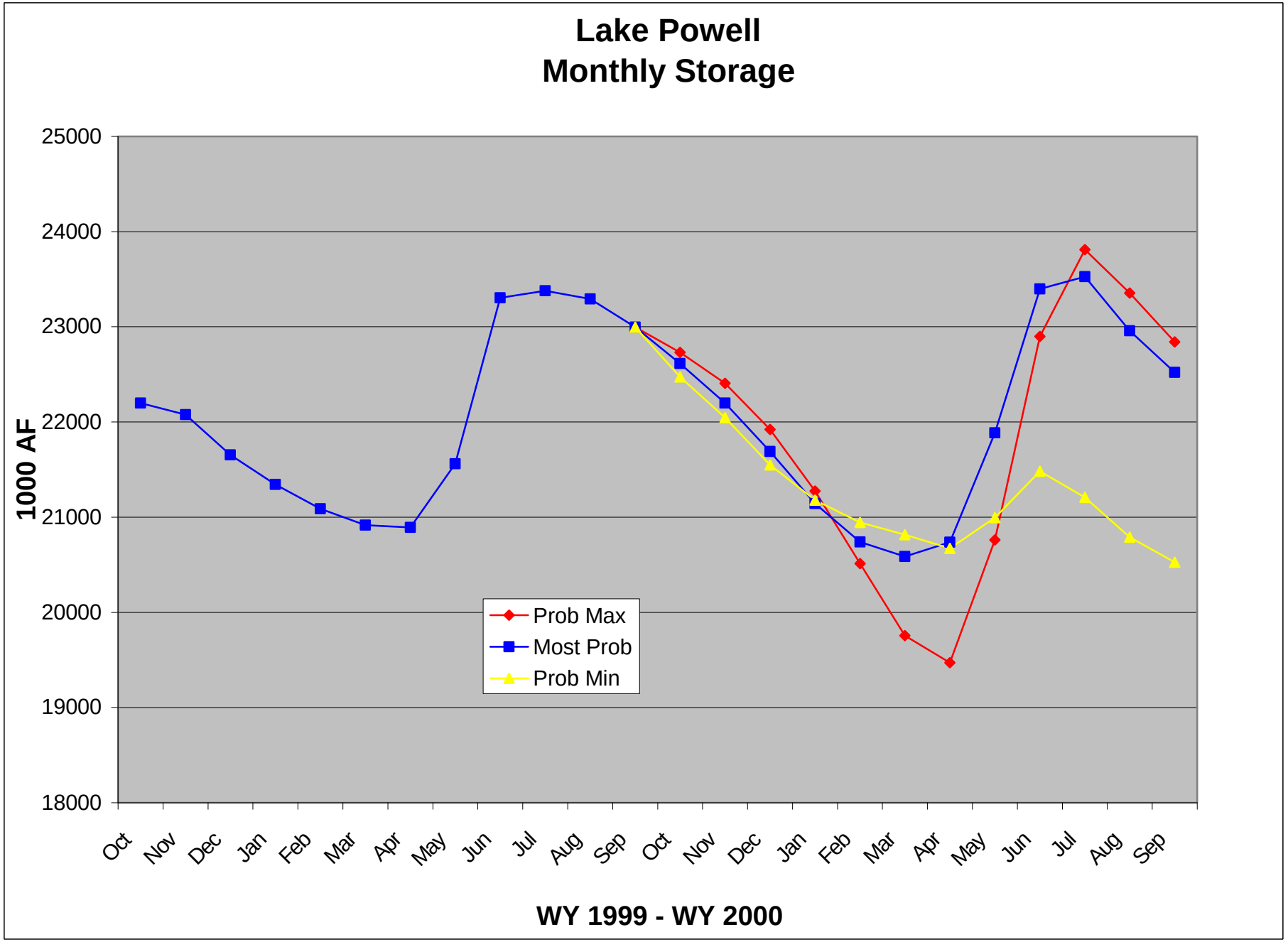
Prob Max
Most Prob
Prob Min
WY 1999 - WY 2000


Lake Powell
Monthly Storage
25000
24000
23000
22000
21000
20000
19000
18000
1000 AF
Prob Max
Most Prob
Prob Min
Oct
Nov
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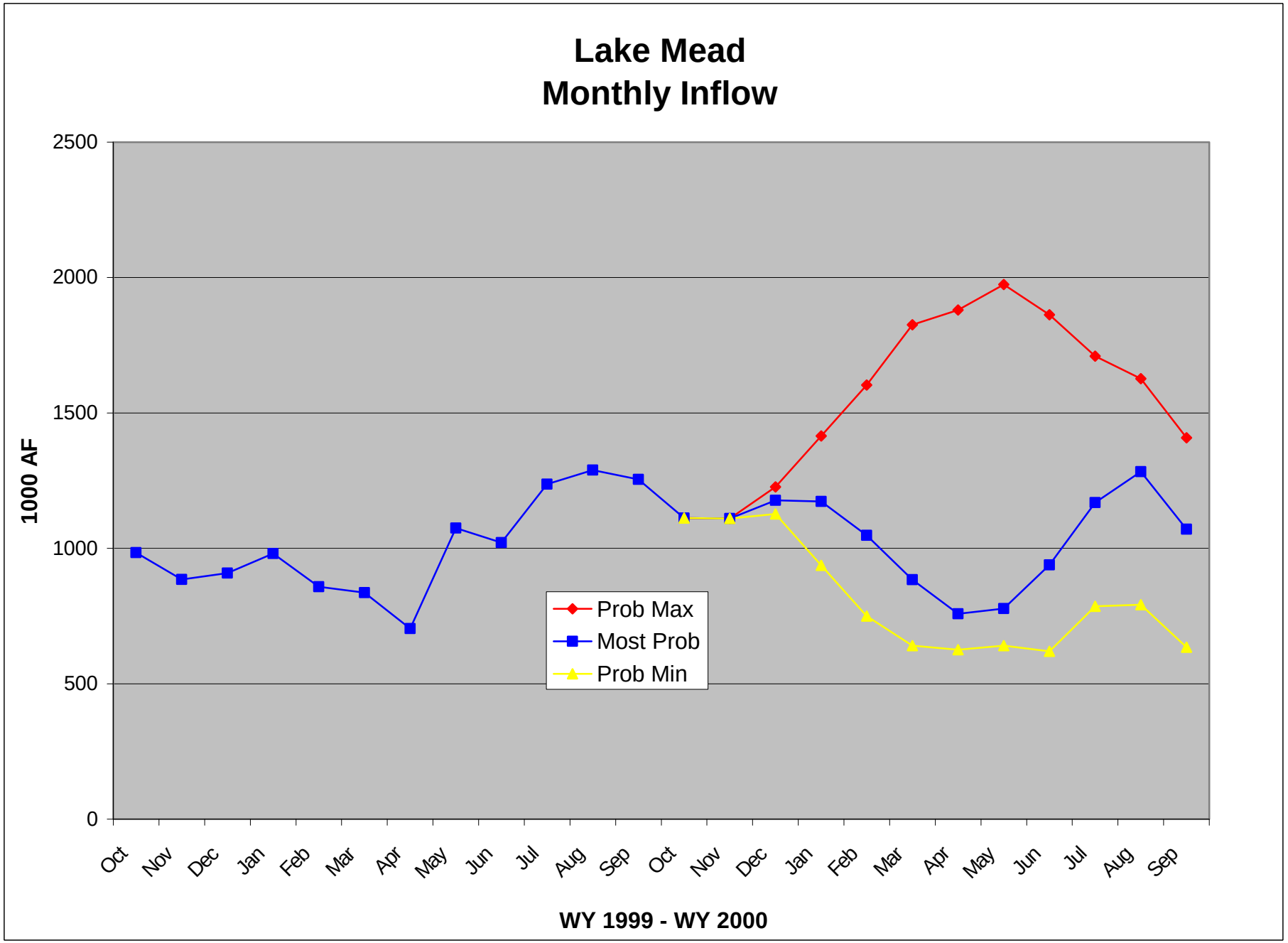
WY 1999 - WY 2000


Lake Mead
Monthly Inflow
2500
2000
1500
1000
500
0
1000 AF
Prob Max
Most Prob
Prob Min
Oct
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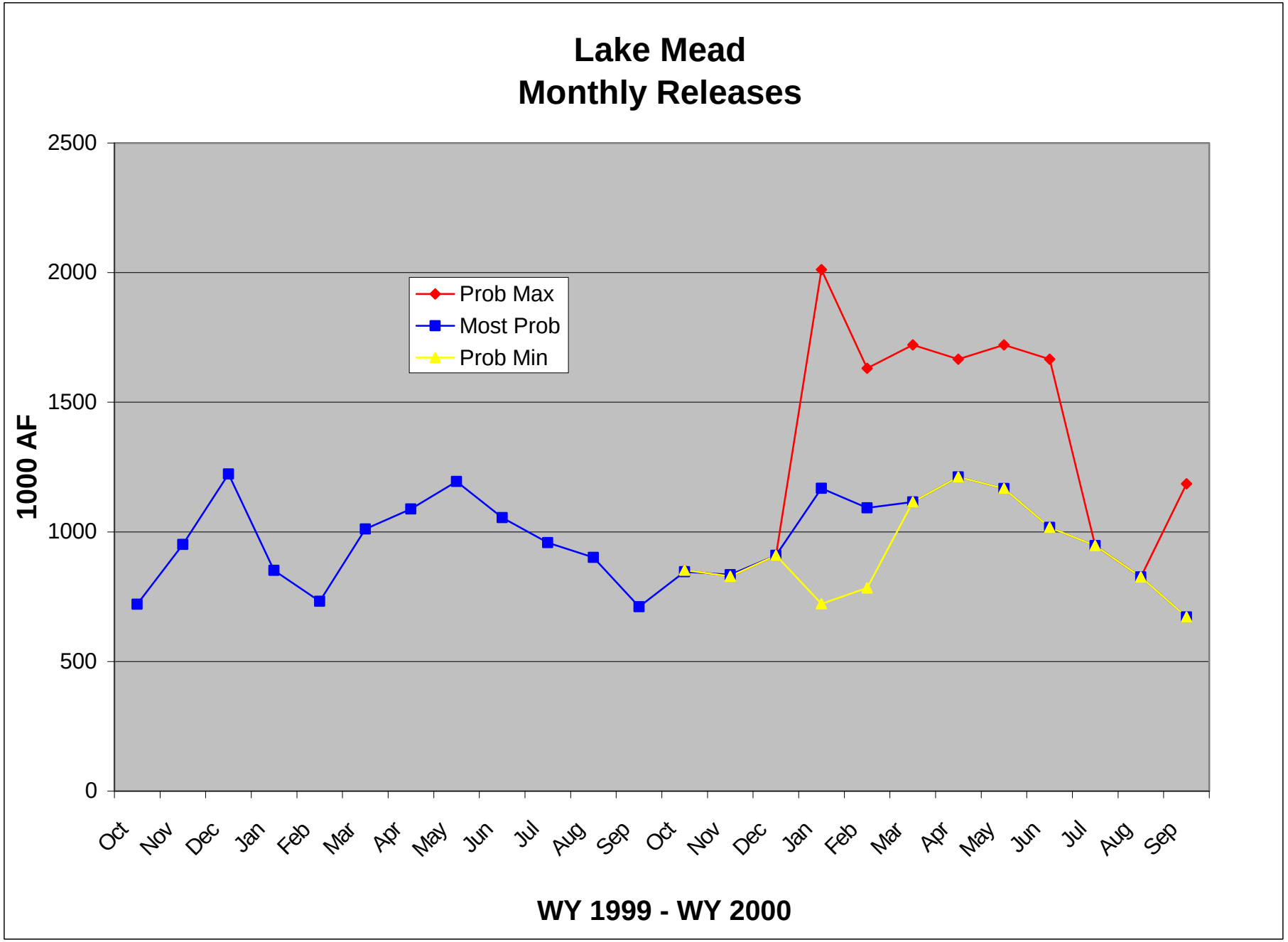
WY 1999 - WY 2000


Lake Mead
Monthly Releases
2500
2000
1500
1000
500
0
1000 AF
Prob Max
Most Prob
Prob Min
Oct
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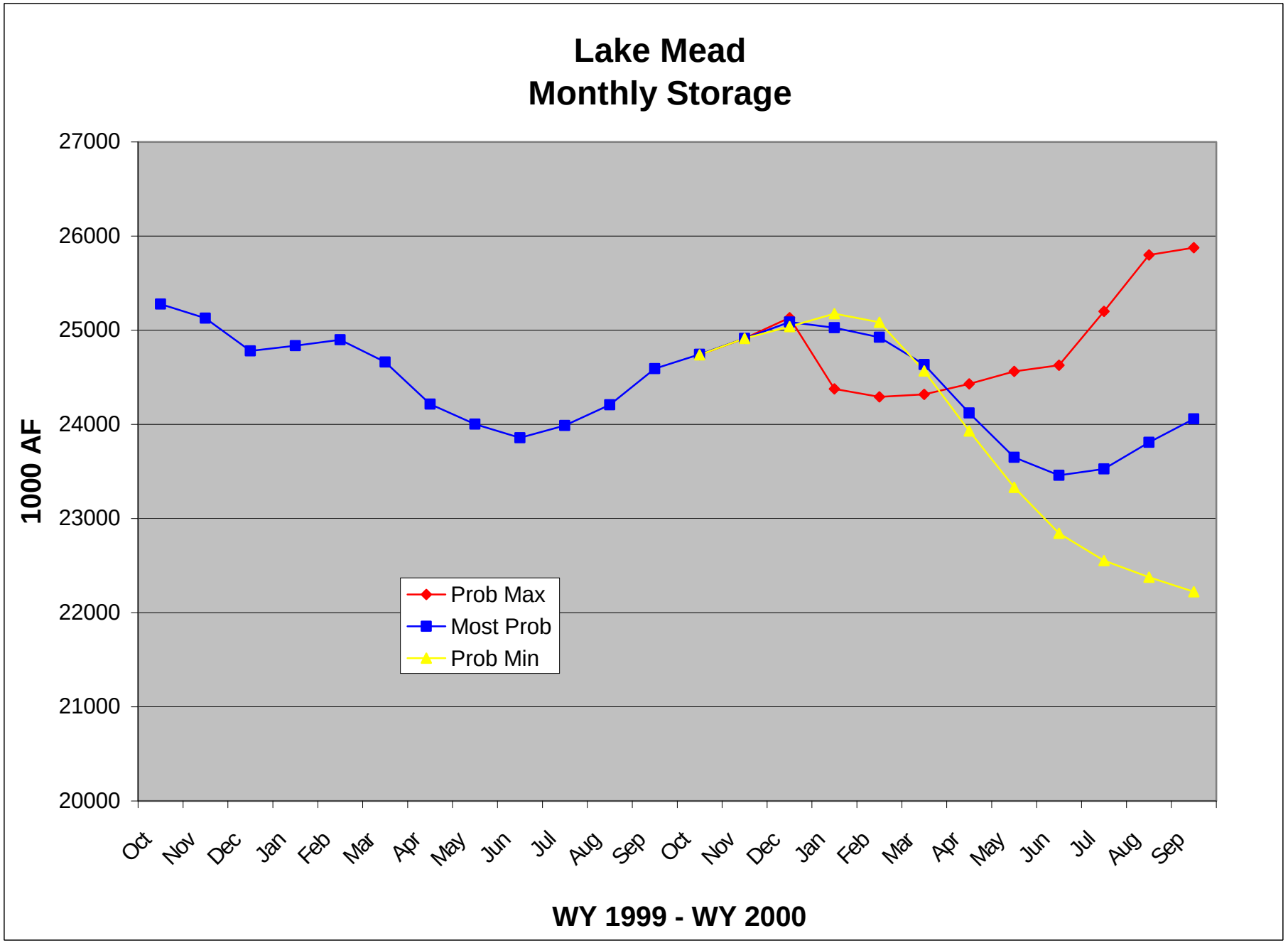
WY 1999 - WY 2000


Lake Mead
Monthly Storage
1000 AF
27000
26000
25000
24000
23000
22000
21000
20000
Prob Max
Most Prob
Prob Min
Oct
Nov
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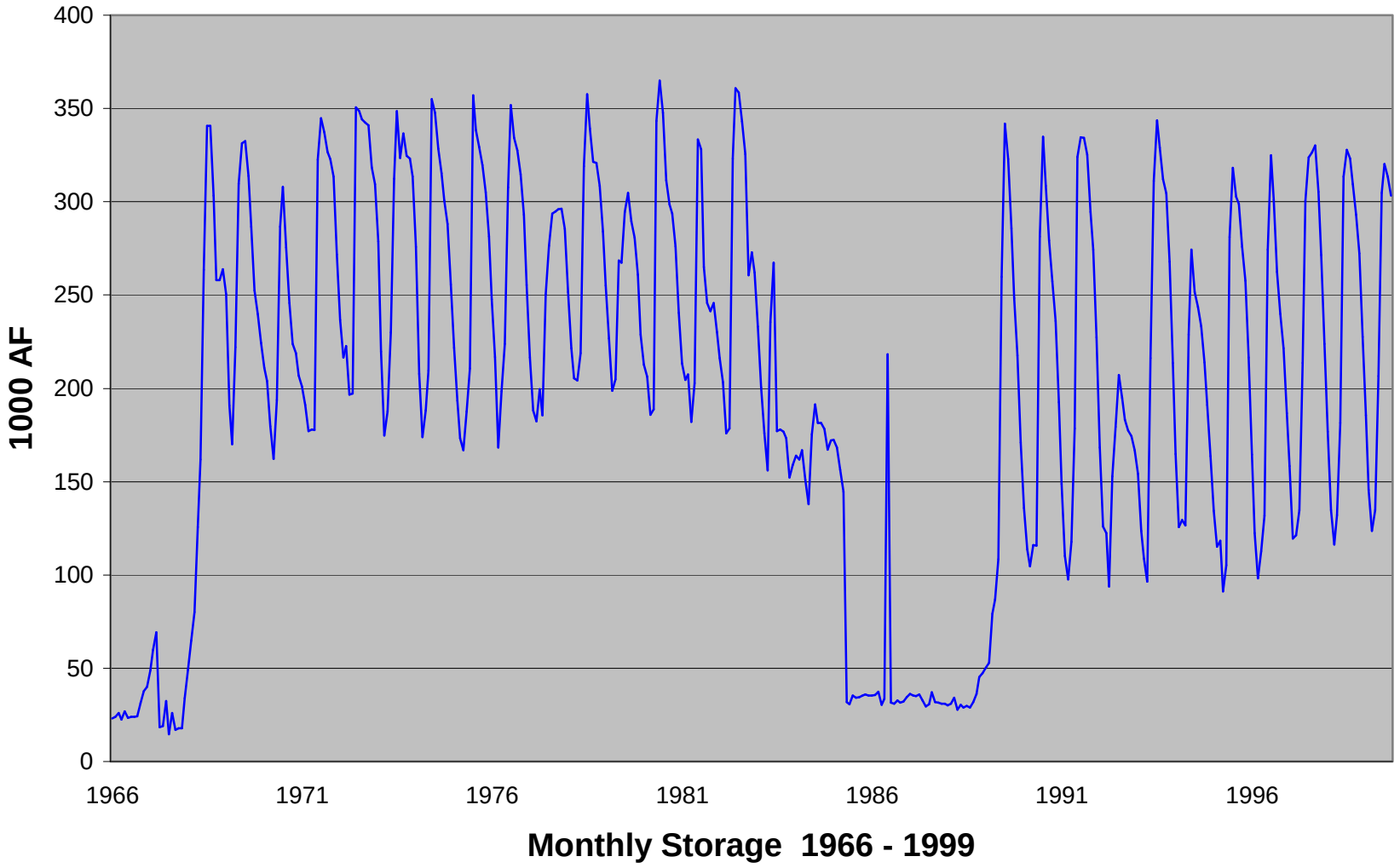
WY 1999 - WY 2000

Fontenelle


400
350
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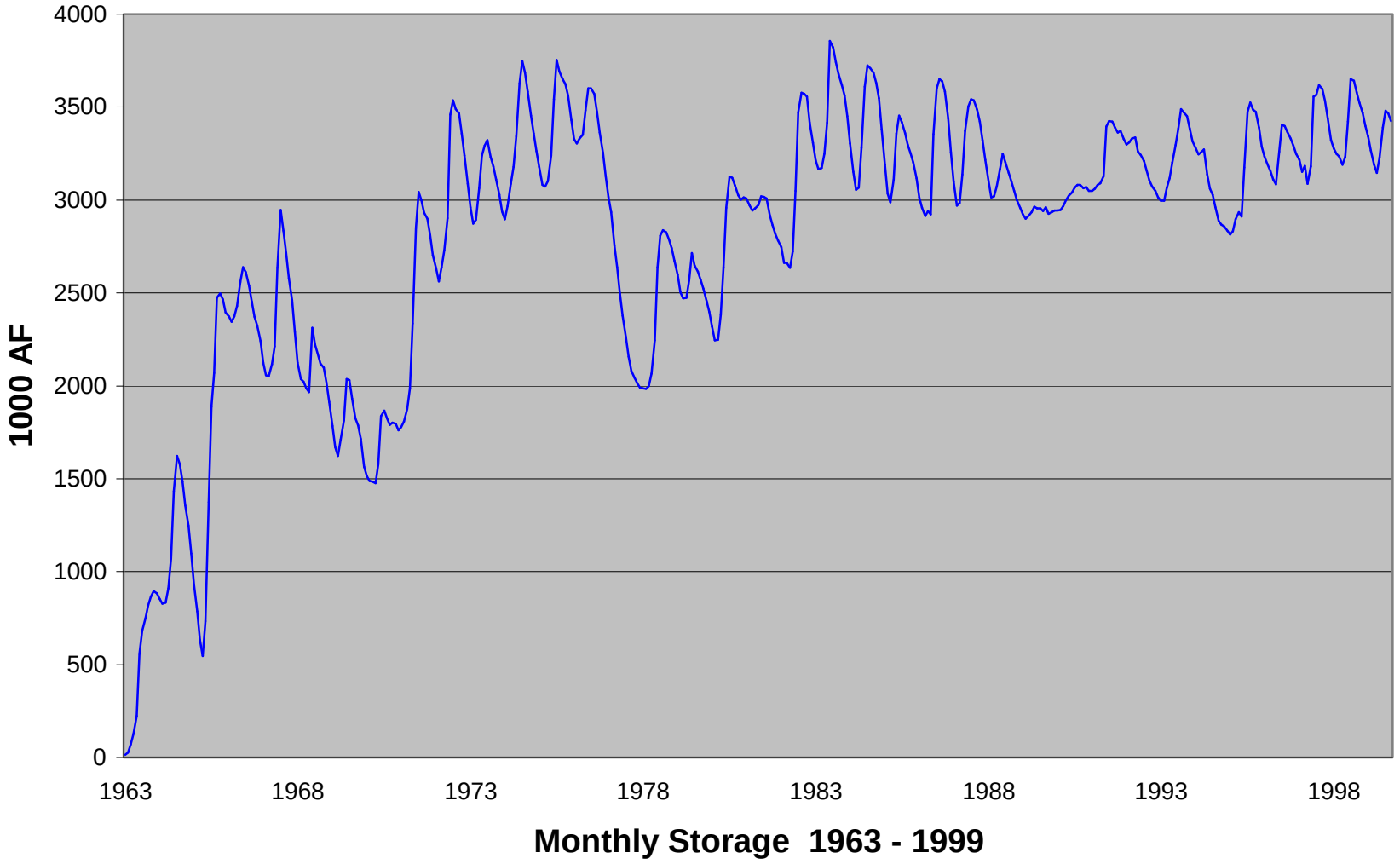
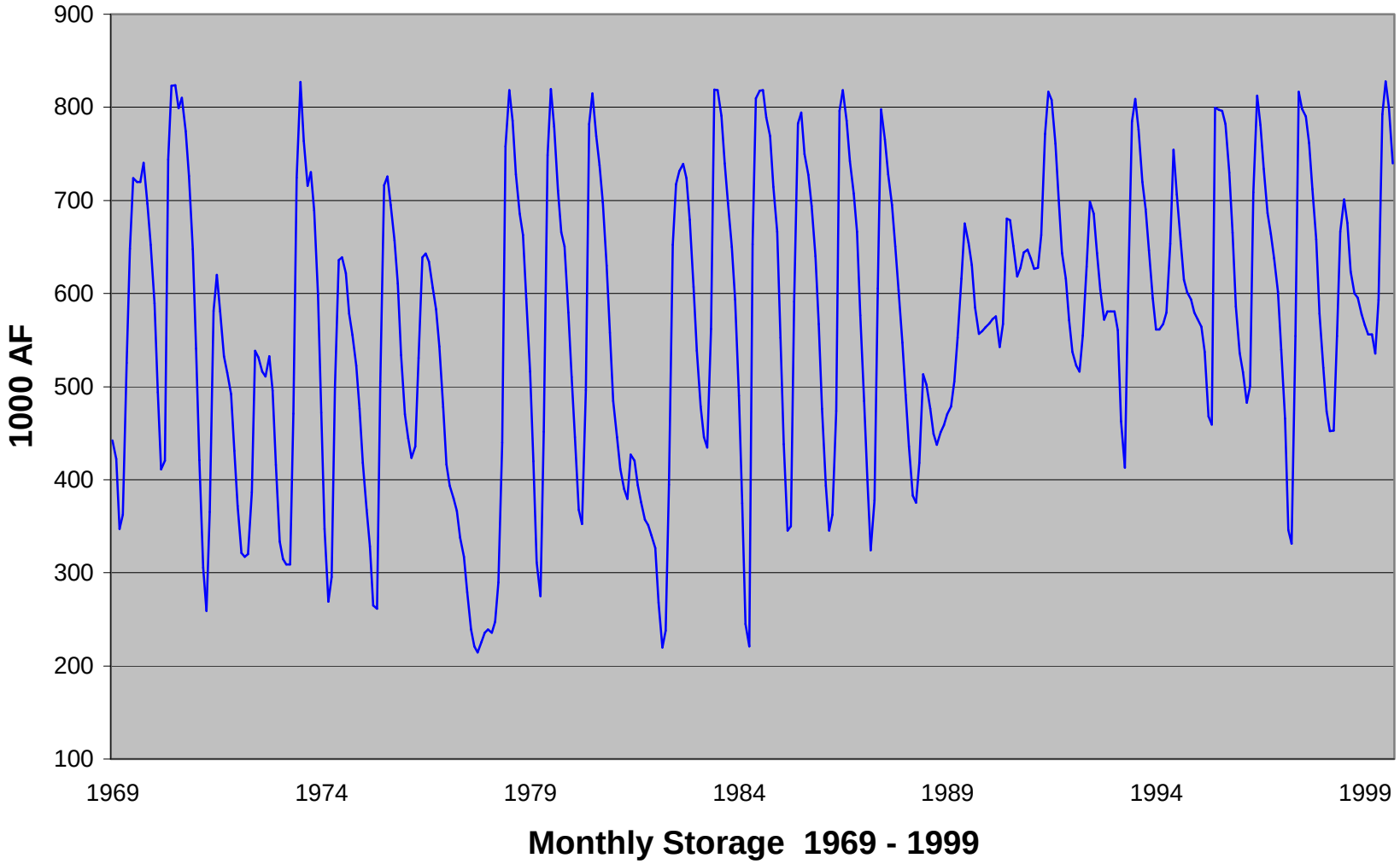
250
200
150
100
50
0
1000 AF
1966
1971
1976
1981
1986
1991
1996
Monthly Storage 1966 - 1999

Flaming Gorge



Blue Mesa


900
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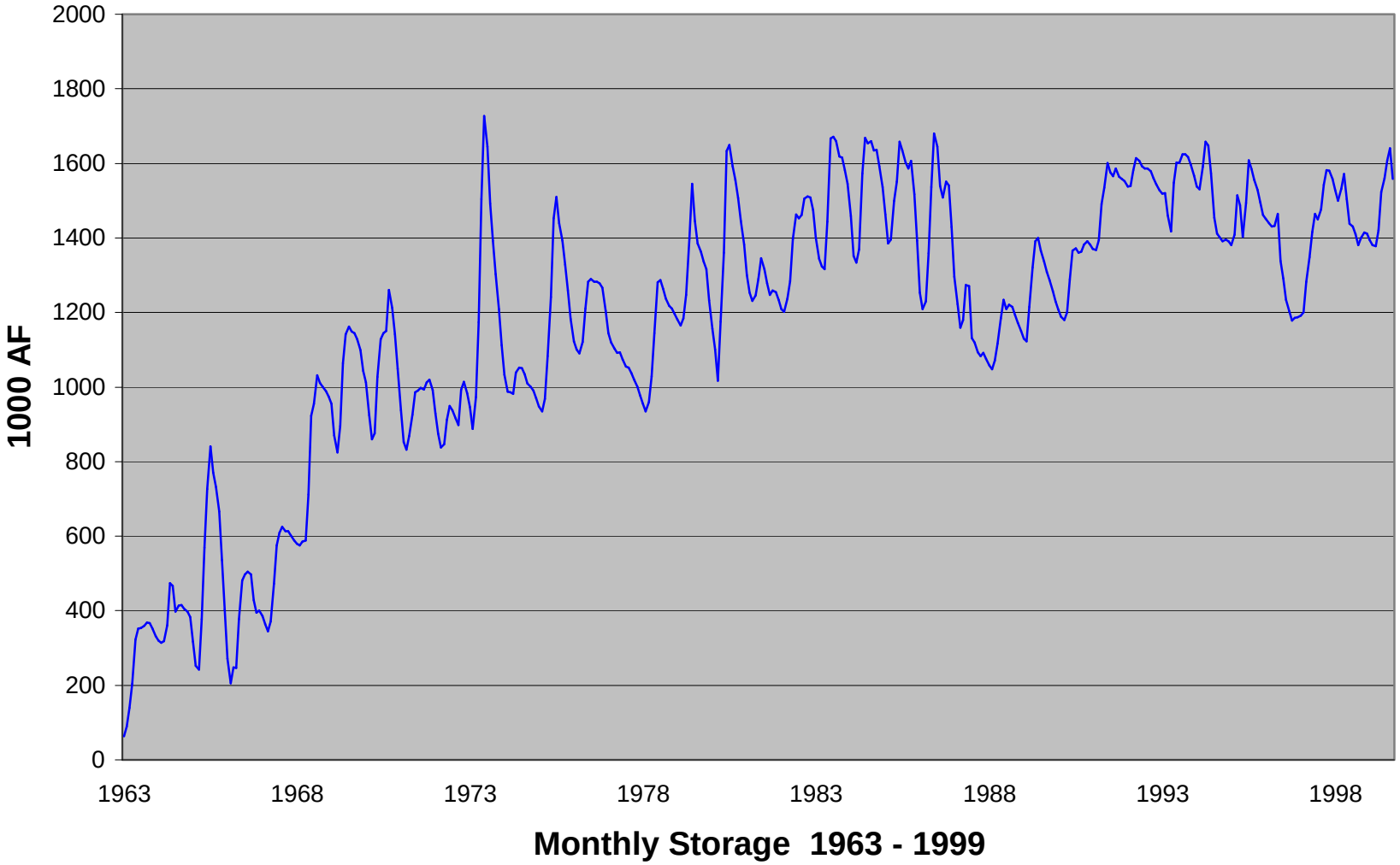
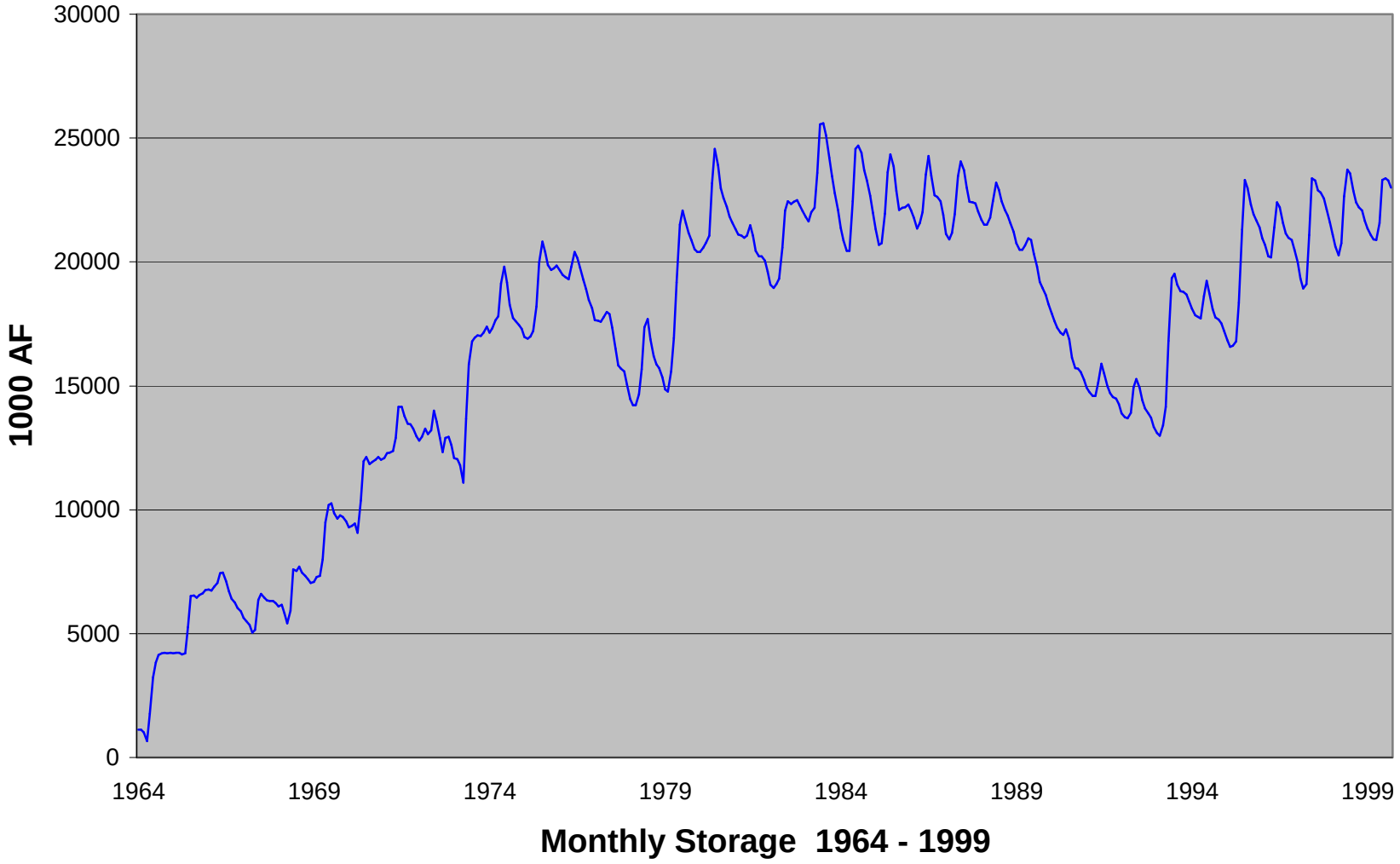
400
300
200
100
1000 AF
1969
1974
1979
1984
1989
1994
1999
Monthly Storage 1969 - 1999

Navajo


2000
1800
1600
1400
1200
1000
800
600
400
200
0
1000 AF
1963
1968
1973
1978
1983
1988
1993
1998
Monthly Storage 1963 - 1999

Lake Powell


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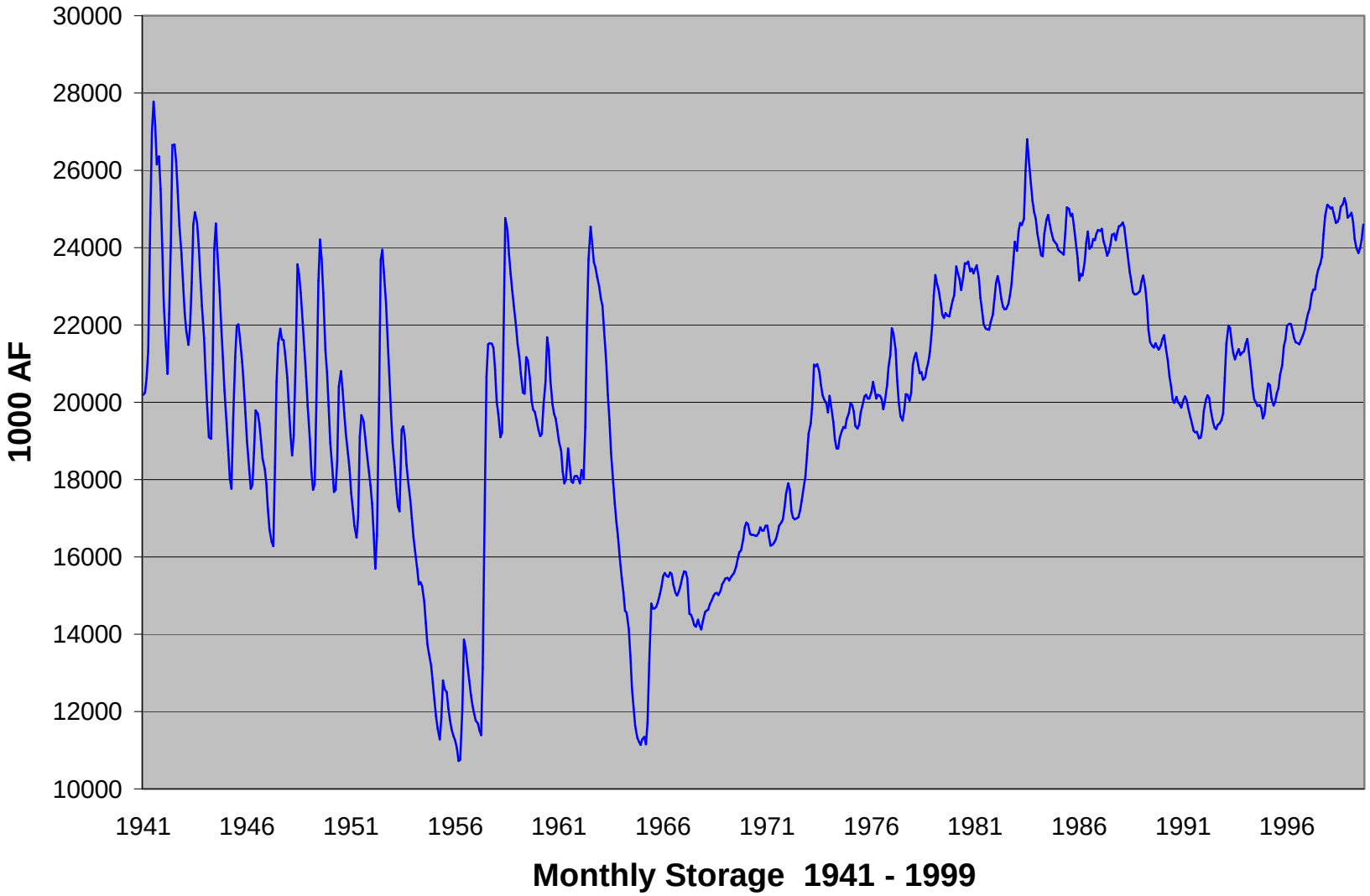
10000
5000
0
1000 AF
1964
1969
1974
1979
1984
1989
1994
1999
Monthly Storage 1964 - 1999

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
Monthly Storage 1941 - 1999