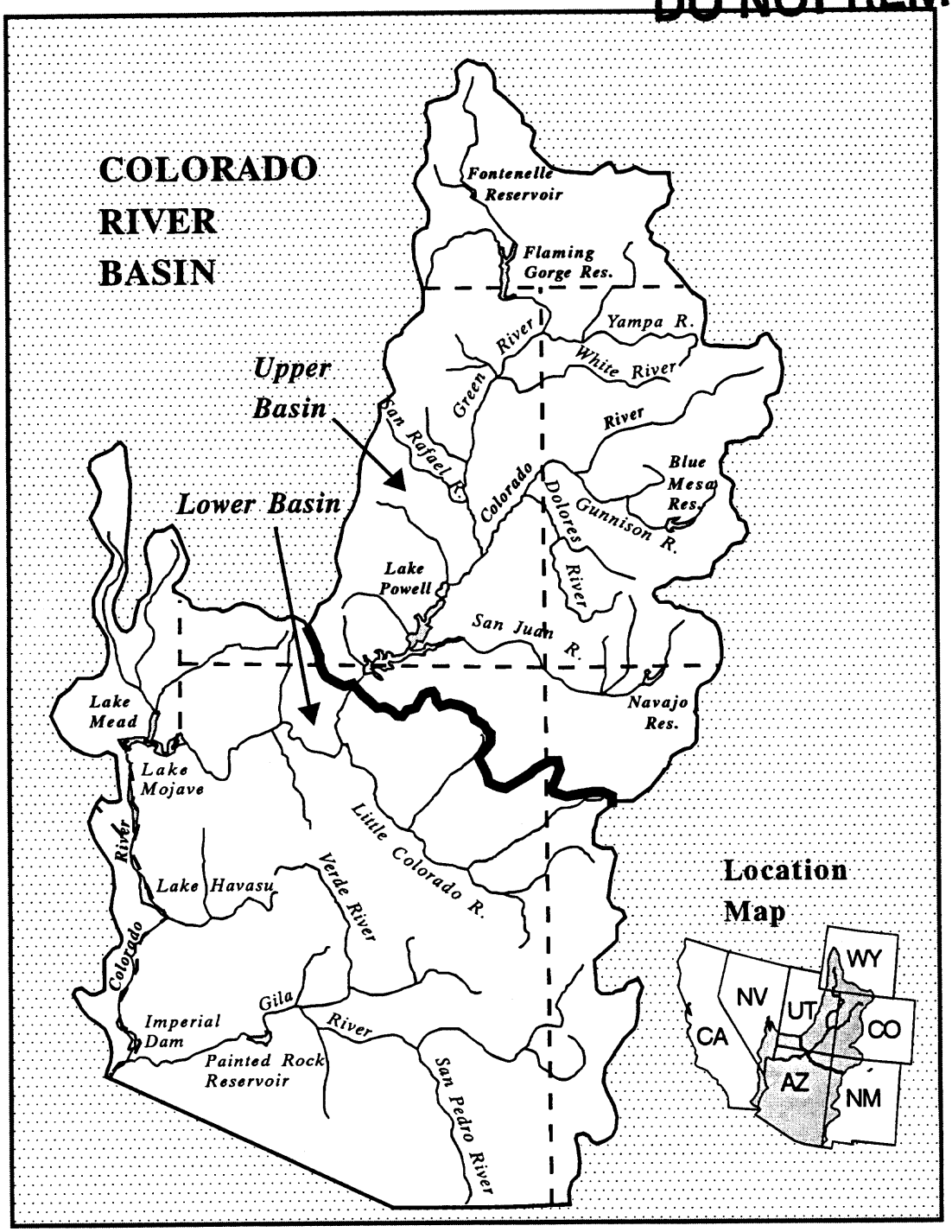
ANNUAL OPERATING PLAN
FOR
COLORADO RIVER RESERVOIRS
1995



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INTRODUCTION

Authority

This 1995 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* mandate consultation with representatives of the Governors of the seven Basin States and the Upper Colorado River Commission 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 1995 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; 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, 1995 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. The minimum objective release of 10,153 MCM, equivalent to 8.230 MAF[(1)], will be released from Glen Canyon Dam during water year 1995 in accordance with Article II(2) of the Operating Criteria unless the equalization criterion in Article II(3) is controlling.

Lower Basin Uses. Taking into account the existing and predicted water supply conditions in the basin and that the reasonable beneficial consumptive use requirements of mainstream users in the Lower Division States are expected to be less than 9,252 MCM (7.500 MAF), the normal condition is the criterion governing the operation of Lake Mead for calendar year 1995 in accordance with Article III(3)(a) of the Operating Criteria and Article II(B)(1) of the decree in *Arizona v. California.* All reasonable beneficial consumptive needs of Colorado River mainstream users will be met in calendar year 1995.

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.*

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(1) units of volume used in this document are million cubic meters (MCM), followed by equivalent million acre feet (MAF)

1944 Mexican Water Treaty Delivery. The guaranteed annual quantity of 1,850 MCM (1.500 MAF) of water will be delivered to Mexico during calendar year 1995 in accordance with Article 15 of the 1944 Mexican Water Treaty and Minute No. 242 of the IBWC.

1994 OPERATIONS SUMMARY AND RESERVOIR STATUS

Water year 1994 signalled the return of dry hydrological conditions in the basin. Basinwide precipitation during 1994 was below average. This lower precipitation also translated into a below average snowpack. At the beginning of the runoff season the basinwide snowpack was only 72 percent of average and conditions improved only slightly through the remainder of the runoff season. Once again a pattern of southerly storms developed over the basin during the snow accumulation season. As a result, the northern portion of the basin had well below average snowpack levels, and the central and southern portion of the basin had below to near average snowpack levels. These factors combined to produce a well below average runoff in the Green River (42 percent of average), a below average runoff in the Gunnison and Lake Powell (73 and 58 percent of average respectively), and a slightly below average runoff in the San Juan Basin (87 percent of average).

With the low runoff during 1994 there were no reports of flooding at any location during the water year.

Unregulated inflow into Lake Powell is expected to be 8,365 MCM (6.781 MAF) in water year 1994, approximately 58 percent of the 30 year average. This inflow, resulted in the loss of approximately 1272 MCM (1.031 MAF) of storage in Lake Powell. Approximately the same amount of storage was lost from the upstream reservoirs, 1,205 MCM (0.977 MAF). With an additional net loss of approximately 1,641 MCM (1.330 MAF) within the Lower Basin reservoirs, the total Colorado storage system lost approximately 4,118 MCM (3.338 MAF) during water year 1994. It is now estimated that it would take five years of average inflow to completely fill the storage system. During 1994, all deliveries of water to meet obligations pursuant to "The Law of the River" were maintained. Tables 1(a) and 1(b) list the expected October 1, 1994 reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in elevation during water year 1994.

Table 1(a). Expected Reservoir Conditions as of October 1, 1994 (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	138	287	1978.5	68	- 97	- 3.3
Flaming Gorge	1,004	3,621	1834.6	78	- 661	- 4.4
Blue Mesa	274	749	2283.9	73	- 139	- 4.2
Navajo	395	1,697	1848.0	81	- 307	- 5.4
Lake Powell	8,053	21,951	111.4	73	- 1272	- 2.4
Lake Mead	7,238	24,684	359.4	77	- 1,689	- 3.1
Lake Mohave	395	1,771	192.9	79	+ 75	+ 0.7
Lake Havasu	76	687	136.2	90	- 27	- .4
Totals	16,489	55,446	--	77	- 4,118	--

* from October 1, 1993 to September 30, 1994

Table 1(b). Expected Reservoir Conditions as of October 1, 1994 (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	.112	.233	6491	68	- .079	- 10.9
Flaming Gorge	.814	2.935	6019	78	- .536	- 14.4
Blue Mesa	.222	.607	7493	73	- .113	- 13.7
Navajo	.320	1.376	6063	81	- .249	- 17.8
Lake Powell	6.528	17.794	3655	73	- 1.031	- 7.9
Lake Mead	5.867	20.010	1179	77	- 1.369	- 10.1
Lake Mohave	.320	1.436	633	79	+ .061	+ 2.4
Lake Havasu	.062	.557	447	90	- .022	- 1.2
Totals	13.367	44.948	--	77	- 3.338	--

* from October 1, 1993 to September 30, 1994

1995 WATER SUPPLY ASSUMPTIONS

For 1995 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, end of month contents, and end of month elevations for each reservoir.

The National Weather Service Extended Streamflow Prediction (ESP) computer model was employed to develop each of these inflow scenarios. This model uses current basin conditions as well as historical data to predict the range of possible future streamflows. Although there is a wide confidence band associated with streamflow forecasts made a year in advance, the data are valuable in analyzing possible impacts on project uses and purposes. A soil moisture deficit developed within the basin due to the dry conditions that were experienced in 1994. This soil moisture deficit is expected to affect the magnitude of inflows in water year 1995. Therefore the magnitude of inflows in each of the three inflow scenarios are less than 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 1995. 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 1995 inflow and July 31, 1994 reservoir storage conditions were used as input to this model and monthly releases were adjusted until release and storage levels accomplished project purposes and priorities.

Table 2(a). Projected Unregulated Inflow
Into Lake Powell for Water Year 1995
(Metric Units: MCM)

Time Period		Probable Maximum	Most Probable	Probable Minimum
10/94-	12/94	843	843	764
1/95 -	3/95	1,974	1,289	894
4/95 -	7/95	14,855	8,043	3,885
8/95 -	9/95	2,069	1,110	623
10/95 -	12/95	1,850	1,850	1,850
WY	1995	19,741	11,285	6,166
CY	1995	20,748	12,292	7,252

Table 2(b). Projected Unregulated Inflow
Into Lake Powell for Water Year 1995
(English Units: MAF)

Time Period		Probable Maximum	Most Probable	Probable Minimum
10/94-	12/94	.683	.683	.620
1/95 -	3/95	1.600	1.045	.725
4/95 -	7/95	12.042	6.520	3.149
8/95 -	9/95	1.677	0.900	.505
10/95 -	12/95	1.500	1.500	1.500
WY	1995	16.002	9.148	4.999
CY	1995	16.819	9.965	5.879

1995 RESERVOIR OPERATIONS

Minimum instream flow levels have been established at several locations in the Upper and Lower Basins which are intended to preserve the present 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 sport fisheries. However, the same releases may 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, and on Flaming Gorge on the Green River will continue in 1995. Studies associated with these consultations will be used to better understand the flow related needs of endangered and other native species of fish. Additionally, interim flow restrictions on releases from Lake Powell will continue in water year 1995 and until the corresponding Record of Decision on the Glen Canyon Dam Environmental Impact Statement (GCDEIS) is completed.

Modifications to planned operations may be made based on changes in forecast conditions. However, due to the Recovery Implementation Programs for Endangered Fish Species in the Upper Colorado River Basin, Section 7 consultations, and other downstream concerns, modification to the monthly operation plans may not be based solely on 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.

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

The Upper Green River Basin continued to be the driest portion of the Colorado River Basin. The April through July runoff into the reservoir during water year 1994 was only 512 MCM (0.415 MAF) or 49 percent of the long term average. As a result of restrained releases during most of 1994, Fontenelle Reservoir nearly filled in July.

Because the mean annual inflow of 1,480 MCM (1.200 MAF) far exceeds the storage capacity of 426 MCM (.345 MAF), significant powerplant 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 1995. In order to minimize spring high releases and to maximize downstream fishery resources and power production, the reservoir will probably be drawn down to minimum pool elevation 1970.0 m (6463 feet)[2] which corresponds to a volume of 111 MCM (.090 MAF) of live storage.

To meet the above stated operational objectives, a constant release of approximately 31.2 to 34.0 m^3/s (1,100 to 1,200 cfs) will be made through the fall and winter months. Releases at this level will provide an appropriate level of reservoir drawdown for the 1995 runoff season, while ensuring that downstream water rights and municipal and industrial needs are met. Under all three inflow assumptions, the reservoir is expected to fill in the summer of 1995.

Flaming Gorge Reservoir

Water year 1994 unregulated inflow into Flaming Gorge Reservoir is expected to be 888 MCM (0.720 MAF) or 42 percent of average. The April through July runoff was 498 MCM (0.404 MAF) or 34 percent of the long term average. With this very low inflow, Flaming Gorge is expected to lose approximately 661 MCM (0.536 MAF) of storage in water year 1994.

In 1994, Flaming Gorge was operated in accordance with the Final Draft Biological Opinion on the Operation of Flaming Gorge (FDBOFG), issued in November 1992. The FDBOFG outlines the reservoir operations during the spring, summer, and early fall months which may provide an improved habitat for endangered endemic species of fish. To accommodate the FDBOFG, releases of 121.8 m^3/s (4,300 cfs) were released from Flaming Gorge for four weeks from mid-May to mid-June to coincide with the peak flow of the Yampa River. These releases met the research objectives of a sustained flow at Jensen, Utah, of between 283 and 340 m^3/s (10,000 and 12,000 cfs). After completion of the runoff, flows between 38.2 and 51.0 m^3/s (1,350 and 1,800 cfs) were maintained at the Green River near Jensen, Utah.

In 1995, Flaming Gorge will again be operated in accordance with the FDBOFG. If water year 1995 runoff is similar to the probable minimum, most probable, or probable maximum inflow scenarios; then high spring releases for one to two weeks, two to four weeks, or in excess of six weeks duration will be made, respectively. Under all inflow scenarios, low stable flows between 31.2 and 51.0 m^3/s (1,100 and 1,800 cfs) will be maintained on the Green River near the Jensen, Utah, gaging station during the summer and fall months by adjusting Flaming Gorge releases.

Water year 1995 will be the fourth year of the five year study called for in the FDBOFG to further determine the flow needs of the endangered fish during the spring and winter months.

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[2] units of length used in this document are meters (m), followed by equivalent feet (feet)

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

In water year 1994 the April through July runoff into the Aspinall Unit was 760 MCM (0.620 MAF) or 68 percent of average. Water year 1994 unregulated inflow is expected to be 1,135 MCM (0.922 MAF) or 73 percent of average. With this level of inflow approximately 106 MCM (0.086 MAF) of water bypassed the powerplant at Crystal, but no bypasses occurred at Blue Mesa or Morrow Point. Releases of up to 113 m^3/s (4,000 cfs) occurred at Crystal with flows in the river below the tunnel in excess of 88 m^3/s (3,100 cfs). Large fluctuations in releases on a daily and hourly basis were avoided. Blue Mesa filled in water year 1994.

Section 7 consultation with the Fish and Wildlife Service on the operation of the Aspinall Unit was continued in 1994. As part of this consultation, a five year plan to study the effect of various release patterns on habitat and possibly on the reproductive success and reintroduction of endangered fish in the Gunnison River was outlined. Water year 1994 was the third year of this five year study.

Additionally, the Aspinall Unit was operated as if the draft contract between Reclamation, the National Park Service, and the State of Colorado to deliver water from the Aspinall Unit to the Black Canyon of the Gunnison National Monument were in place. The operation was also coordinated with the Fish and Wildlife Service and others interested in the operation of the Aspinall Unit.

For water year 1995 operations, Blue Mesa Reservoir will be drawn down to at least an elevation of 2283.0 m (7490 feet) by December 31, 1994 in order to minimize icing problems in the Gunnison River. Blue Mesa will continue to be drawn down through April 1995 to a level that will accommodate the most probable inflow scenario and accomplish the release objectives with minimum powerplant bypasses at Crystal.

The minimum release objective of the unit is to meet the delivery requirements of the Uncompahgre Valley Project and to keep a minimum of 8.5 m^3/s (300 cfs) flowing through the Black Canyon of the Gunnison National Monument. Under all three inflow scenarios, Blue Mesa is expected to fill in the summer of 1995 and flows through the Black Canyon of the Gunnison National Monument are expected to be above the minimum release objective during the summer months. The filling of the reservoir next year will ensure that reasonable specific releases required to study the protection and improvement of habitat for endangered fish can be accommodated. The forecast runoff for the spring of 1995 will be monitored to achieve these objectives. To protect the blue ribbon trout fishery in the Black Canyon and maximize recreation potential, releases during 1995 will be planned to minimize large fluctuations in the daily and monthly flows.

Navajo Reservoir

The April through July unregulated inflow into Navajo Reservoir in water year 1994 was 769 MCM (0.623 MAF) or 92 percent of average. Water year 1994 unregulated inflow is expected to be 1,086 MCM (0.880 MAF) or 87 percent of average. Navajo Reservoir reached its highest elevation in April 1994.

Section 7 consultation with the Fish and Wildlife Service for the operation of Navajo Dam was continued in 1994. Water year 1994 was the fourth year of a seven year study to evaluate alternative operations of Navajo Reservoir to benefit endangered fish. In accordance with this seven year study, spring operations of Navajo were modified in 1994 and large releases of up to 127.4 m^3/s (4,500 cfs) were made during much of May and June to coincide with the peak flows of the Animas River to study the effect of large spring flows on the habitat improvement and spawning success of endangered endemic species of fish. This resulted in flows of over 241 m^3/s (8,500 cfs) at Bluff, Utah. After the completion of the large spring releases, flows were reduced to approximately 17.0 m^3/s (600 cfs) for the remainder of the year.

In 1995, Navajo Reservoir is expected to nearly fill except under the probable minimum inflow scenario. Releases from the reservoir will be held near 17.0 m^3/s (600 cfs) through the fall and winter months and large releases will likely be made in May and June in order to improve the habitat and provide better spawning conditions for endangered fish in the San Juan River.

Lake Powell

During water year 1995, releases greater than the minimum release objective of 10,153 MCM (8.230 MAF) will only be made if required to equalize the storage between Lakes Powell and Mead. Under the most probable inflow conditions, the minimum objective release would be made and the reservoir would neither lose nor gain storage. Under the probable maximum inflow scenario, approximately 12,562 MCM (10.183 MAF) will be released during the water year and Lake Powell would gain 4,694 MCM (3.805 MAF) of storage. This maximum probable inflow could require releases of greater than 566.4 m^3/s (20,000 cfs) for a period of time. With the net loss of approximately 4,118 MCM (3.338 MAF) of storage from the Colorado River system during water year 1994, it is estimated that it will take five years of average inflow to refill the system storage.

The interim flow restrictions on the daily and hourly releases from Glen Canyon Dam implemented in August, 1991 (shown in Table 3) will continue during water year 1995. However, it is anticipated that a Record of Decision on the GCDEIS will be completed in 1995. Any changes to the interim flow restrictions contained in the Record of Decision will be implemented as soon as practical. A monitoring program has been implemented and will continue to measure the effect of interim flow restrictions on downstream resources.

Table 3. Glen Canyon Dam interim flow restrictions

Parameter	(m^3/s)	(cfs)	conditions
Maximum flow [3]	566.4	20,000	
Minimum flow	141.6	5,000	nighttime
	226.6	8,000	7:00 am to 7:00 pm
Ramp rates			
ascending	70.8	2,500	per hour
descending	42.5	1,500	per hour
Daily fluctuations [4]	141.6 / 226.6	5,000 / 8,000	

Based on a request from the cooperating agencies of the GCDEIS, one week of high steady flows for research purposes is scheduled from Glen Canyon Dam in April 1995. However, resolution of legal issues, National Environmental Policy Act (NEPA) compliance, Endangered Species Act requirements, and other consultations are prerequisite to this research release. The total research release (which in part exceeds the capacity of the Glen Canyon Dam powerplant) would occur during a period of 21 days and would require the release of approximately 1.2 MAF during the month of April. This research release is designed to facilitate the study of the effects of high releases on sediment transport, backwaters, and beaches.

Representative monthly releases from Glen Canyon Dam in 1995 are shown in Tables 4(a) and 4(b) for the most probable inflow scenario, in which the minimum objective release of 10,153 MCM (8.230 MAF) is required.

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[3] to be evaluated and potentially increased as necessary and in years when delivery to the Lower Basin exceeds 10,150 MCM (8.23 MAF)

[4] daily fluctuations limit of 141.6 m^3/s (5,000 cfs) for months with release volumes less than 740 MCM (.600 MAF), 169.9 m^3/s (6,000 cfs) for monthly release volumes of 740 to 987 MCM (.600 to .800 MAF) and 226.6 m^3/s (8,000 cfs) for monthly volumes over 990 MCM (.800 MAF)

Table 4(a). Representative monthly Lake Powell releases with and without the research release (Metric units)

MONTH	MINIMUM OBJECTIVE RELEASE YEAR (MCM)	
	withOUT research release	with research release
Oct	686	654
Nov	733	666
Dec	857	851
Jan	988	987
Feb	803	728
Mar	744	678
Apr	740	1456
SUB-TOTAL	5551	6020
May	735	654
Jun	833	679
Jul	1079	1024
Aug	1081	1024
Sep	873	751
WY TOTAL	10153	10153

Table 4(b). Representative monthly Lake Powell releases with and without the research release (English units)

MONTH	MINIMUM OBJECTIVE RELEASE YEAR (MAF)	
	withOUT research release	with research release
Oct	.556	.530
Nov	.594	.540
Dec	.695	.690
Jan	.801	.800
Feb	.651	.590
Mar	.603	.550
Apr	.600	1.180
SUB-TOTAL	4.500	4.880
May	.596	.530
Jun	.675	.550
Jul	.875	.830
Aug	.876	.830
Sep	.708	.610
WY TOTAL	8.230	8.230

Lake Mead

The normal condition will govern the operation of Lake Mead and all reasonable beneficial consumptive needs of Colorado River mainstream users will be met in calendar year 1995. The outlook for lowest and highest monthly releases under the most probable inflow conditions for calendar year 1995 will be 771 MCM (.625 MAF) and 1,337 MCM (1.084 MAF) respectively.

Lake Mead is expected to finish calendar year 1994 at 24,604 MCM (19.945 MAF), which is 77 percent of conservation capacity and approximately 12.8 m (42 feet) below the top of the conservation pool at 371.9 m (1220 feet) and 31,922 MCM (25.877 MAF). Reservoir storage elevation is projected to rise to 359.7 m (1180 feet) in February 1995, which is 78 percent of conservation capacity or 24,938 MCM (20.216 MAF) and approximately 12.2 m (40 feet) below the top of the conservation pool. Storage elevation is projected to decline to 356.6 m (1170 feet) in June 1995, which is 73 percent of conservation capacity or 23,284 MCM (18.875 MAF) and approximately 15.2 m (50 feet) below the top of the conservation pool. No flood control releases are anticipated in calendar year 1995 under any inflow 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. In future years, as Lake Mead refills and flood control releases are again required by the Hoover Dam Flood Control Regulations, consideration will be given to making these releases over the fall and winter months to avoid high flow releases during the January through July runoff season. 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, and river stabilization.

Lakes Mohave and Havasu

Mohave and Havasu Reservoirs are scheduled to be drawn down in the fall 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 elevation 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 replace the aging stock of endangered razorback suckers in Lake Mohave. Larval suckers are captured by hand in and around spawning areas during the spring and 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 eight inches in length by September.

Central Arizona Project
Information on New Waddell Dam Operations

A key feature of the Central Arizona Project (CAP) is New Waddell Dam and Reservoir. This reservoir is located just northwest of the Phoenix metropolitan area and will serve as the primary regulatory storage facility for the CAP. Colorado River water will be pumped into and released from the reservoir via the Waddell Pumping-Generating Plant (P-G Plant). New Waddell Dam and P-G Plant will allow most of CAP's Colorado River water entitlement to be pumped into the Phoenix area and stored during the winter months when energy and water needs are low, and then released for delivery in the summer months when energy and water needs are high. Revenues associated with marketing of power available due to this operating plan are an important part of Central Arizona Water Conservation District's financial plan. Firm power contracts have been executed for all of the available energy and capacity in excess of that needed for CAP.

The dam and P-G Plant are scheduled to be fully operational in 1995. During the months of January through March, in addition to normal CAP water deliveries, Colorado River water will be pumped through the CAP system for storage in the reservoir. During April and May, all CAP demands will be met with water pumped directly from the Colorado River and there will be little or no Colorado River water pumped into New Waddell Reservoir for storage during these two months. From June through September it is anticipated that most CAP water needs downstream from the New Waddell turnout will be satisfied with CAP water stored in New Waddell Reservoir. Beginning in October 1995, Colorado River water will be pumped through the CAP system into New Waddell Reservoir for use during the summer of 1996. Total 1995 CAP diversions from the Colorado River are not expected to exceed 1,049 MCM (.850 MAF).

Senator Wash and Laguna Reservoirs

Water storage operations at Senator Wash Reservoir allow regulation of water deliveries to United States irrigation agencies and Mexico. The reservoir is operated to prevent Colorado River flows from exceeding Mexican Treaty requirements at Morelos Dam; and to reduce these excess flows when practicable during rainstorms or other unusual events. Operational

objectives at and below Laguna Dam are to conserve water, control sediment, and to maintain the river channel.

Releases from Imperial Dam are reregulated by Laguna Reservoir to maintain river flows downstream near Yuma. Laguna releases combined with agricultural seepage and drainage provide a continuous live stream serving recreational and fish and wildlife purposes from Laguna Dam to Morelos Dam. Occasionally higher than normal releases are required from Laguna Dam due to excess water from rain flooding upstream, or from rejected water orders due to rain. These higher releases serve to maintain the river channel capacity. This occasional practice reduces channel maintenance expense without impairment of water conservation or power production.

Yuma Desalting Plant

The Yuma Desalting Plant will not be operated in 1995. Funding is currently not available for full-scale operation. Damages to the Main Outlet Drain (MOD) and the Main Outlet Drain Extension (MODE) from the 1993 Gila flood have been repaired. The Wellton-Mohawk Main Conveyance Canal is scheduled to be repaired in 1994. All Wellton-Mohawk Irrigation and Drainage District drainage flows will be diverted into the MODE in 1995.

The test train, used for research and the building's water service, will be run throughout 1995. The test train uses about one million gallons per day of water pumped from an on-site well.

1995 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 as forecast inflows change in response to climatic variability and to provide additional benefits 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, 1995 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 1995.

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. 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.

The minimum objective release of 10,153 MCM, equivalent to 8.230 MAF[5], will be released from Glen Canyon Dam during water year 1995 in accordance with Article II(2) of the Operating Criteria unless the equalization criterion in Article II(3) is controlling. If the equalization criterion is controlling, Glen Canyon Dam will be operated to release sufficient water during water year 1995 to equalize, as nearly as practical, the active reservoir contents of Lakes Powell and Mead on September 30, 1995.

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.

The Operating Criteria provide that after the commencement of delivery of mainstream water by means of the CAP, the extent to which the reasonable beneficial consumptive use requirement of mainstream users in the Lower Division States is met is to be determined by the Secretary of the Interior. The reasonable beneficial consumptive use requirements are

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[5] units of volume used in this document are million cubic meters (MCM), followed by equivalent million acre feet (MAF)

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 9,252 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 in *Arizona v. California*.

Taking into account the existing and predicted water supply conditions in the basin and that the reasonable beneficial consumptive use requirements of mainstream users in the Lower Division States are expected to be less than 9,252 MCM (7.500 MAF), the normal condition is the criterion governing the operation of Lake Mead for calendar year 1995 in accordance with Article III(3)(a) of the Operating Criteria and Article II(B)(1) of the decree in *Arizona v. California*. All reasonable beneficial consumptive needs of Colorado River mainstream users will be met in calendar year 1995.

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 1995.

If the final Supreme Court decree accounting data for calendar year 1995 indicate that more than 9,252 MCM (7.500 MAF) were consumed in the Lower Division States, compensation for overuse of such water will be required from any State exceeding its apportionment during the first year of determined shortage unless a surplus/shortage strategy which provides otherwise is agreed to by July 1995. The need for compensation will be eliminated if either of the following occur prior to a shortage determination: 1) a surplus determination, or 2) a flood control release. Compensation will be in the form of an adjustment to that State's consumptive use apportionment.

1944 Mexican Water Treaty

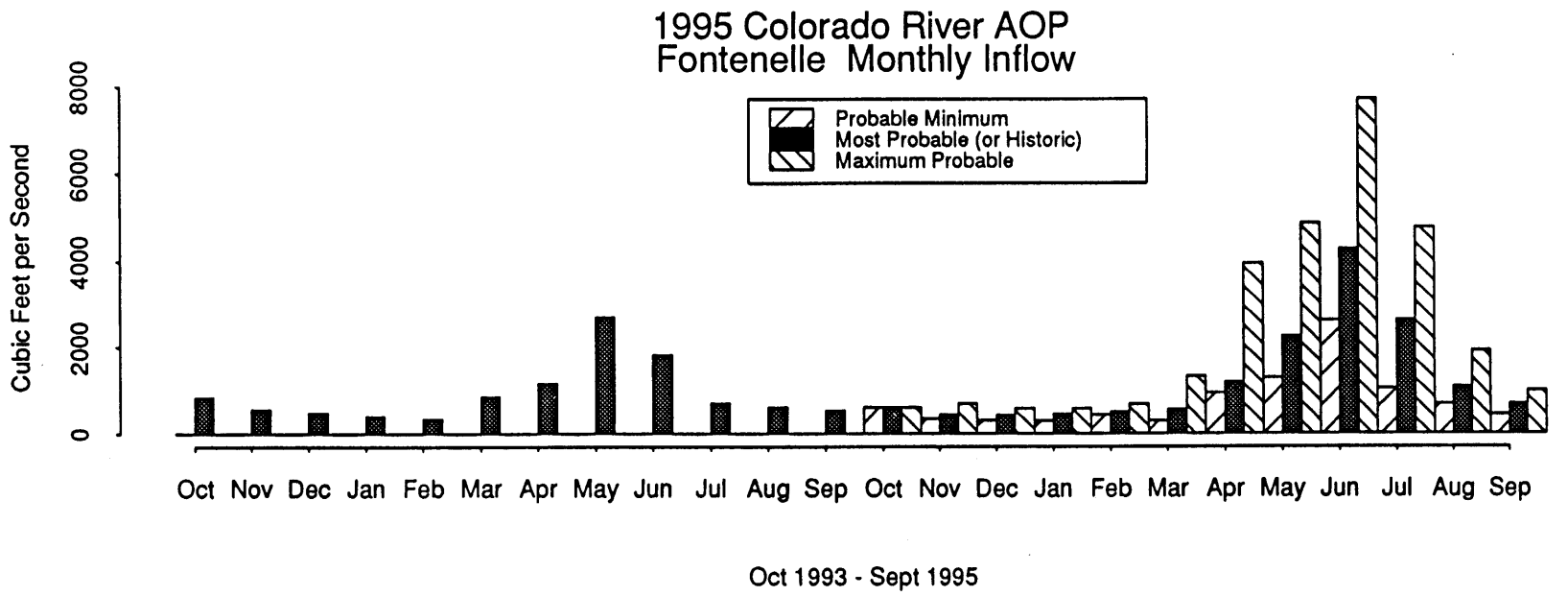
Pursuant to the 1944 Mexican Water Treaty it has been determined that the guaranteed quantity of 1,850 MCM (1.500 MAF) of water will be delivered to Mexico during calendar year 1995. The delivery of 1,850 MCM (1.500 MAF) of water to Mexico will be in accordance with Article 15 of the 1944 Mexican Water Treaty and Minute No. 242 of the IBWC. Minute No. 242 provides that the United States may deliver up to 170 MCM (.140 MAF) of water across the land boundary at San Luis, Sonora, and in the limitrophe section of the Colorado River downstream of Morelos Dam, in partial satisfaction of the 1944 Mexican Water Treaty. 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. Additional scheduled deliveries to Mexico can be made only if there exists Colorado River water in excess of the amount necessary to supply all uses within the United States and the guaranteed quantity of 1,850 MCM (1.500 MAF) annually to Mexico.

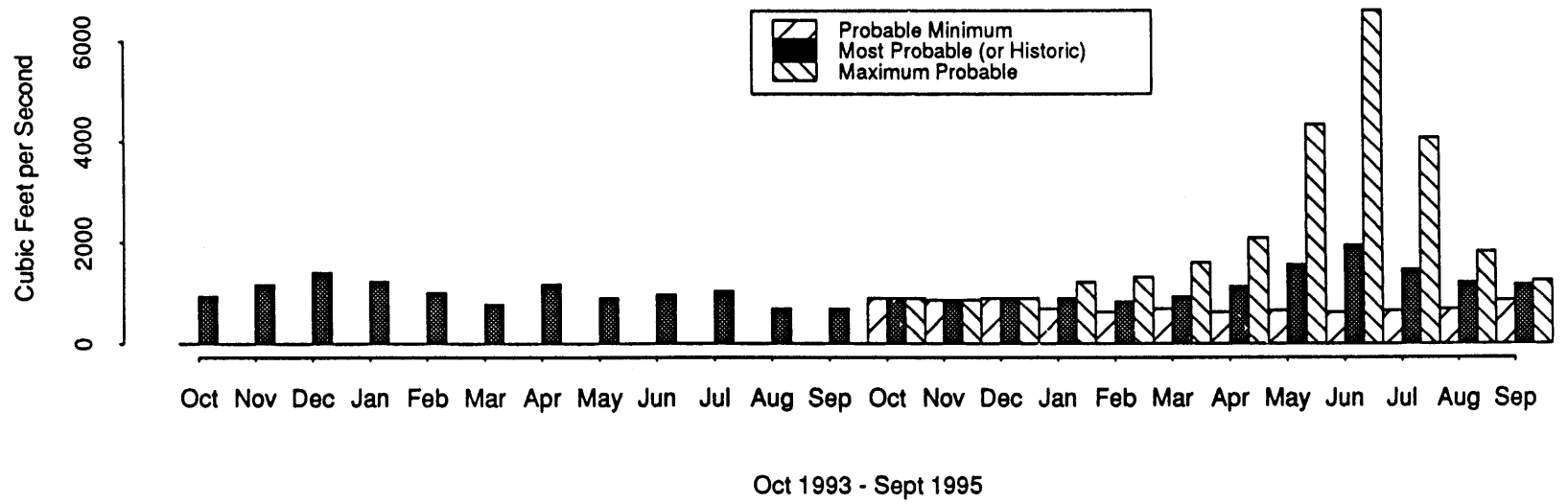
DISCLAIMER

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), *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 Reclamation Projects Authorization and Adjustment Act of 1992* (106 Stat. 4669).

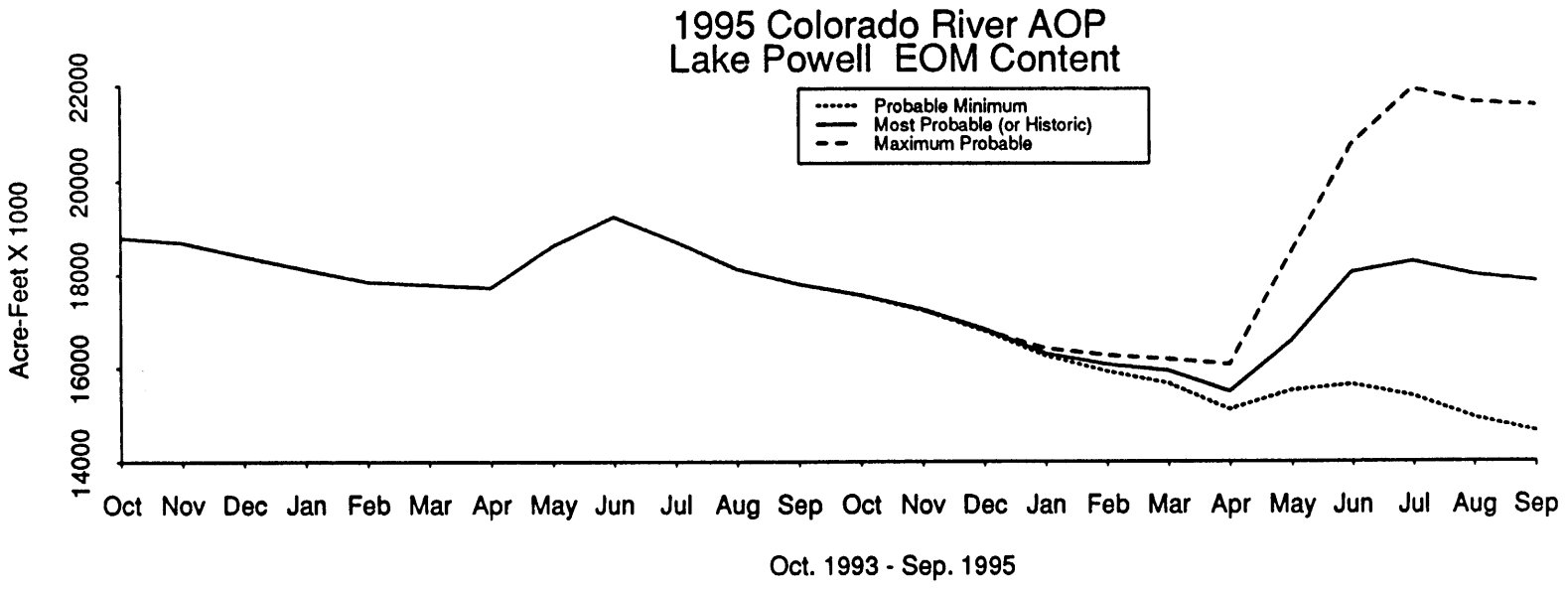
Attachment. Monthly inflow, monthly release, end of month contents, and end of month elevations for Colorado River reservoirs (October 1993 through September 1995) under the probable maximum, most probable, and the probable minimum inflow scenarios.

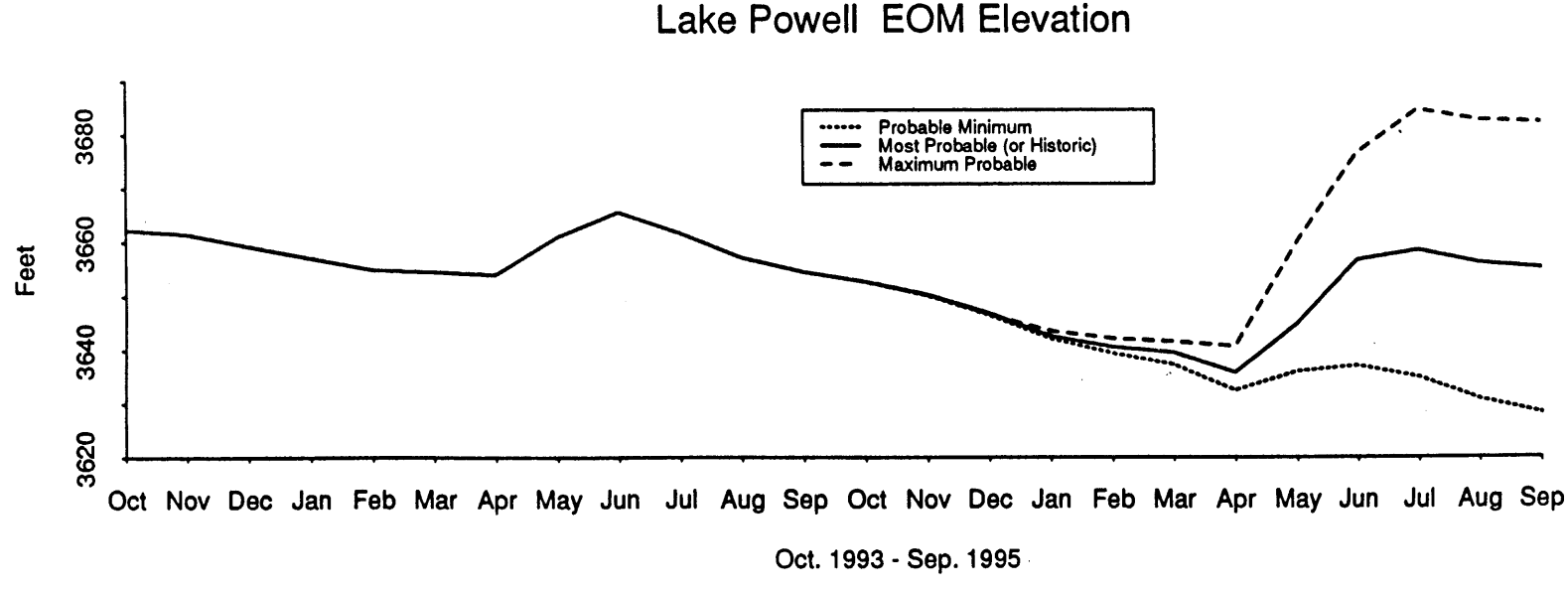
Fontenelle


1995 Colorado River AOP
Fontenelle Monthly Inflow
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Cubic Feet per Second
0
2000
4000
6000
8000
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct 1993 - Sept 1995


Fontenelle Monthly Release
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Cubic Feet per Second
0
2000
4000
6000
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct 1993 - Sept 1995

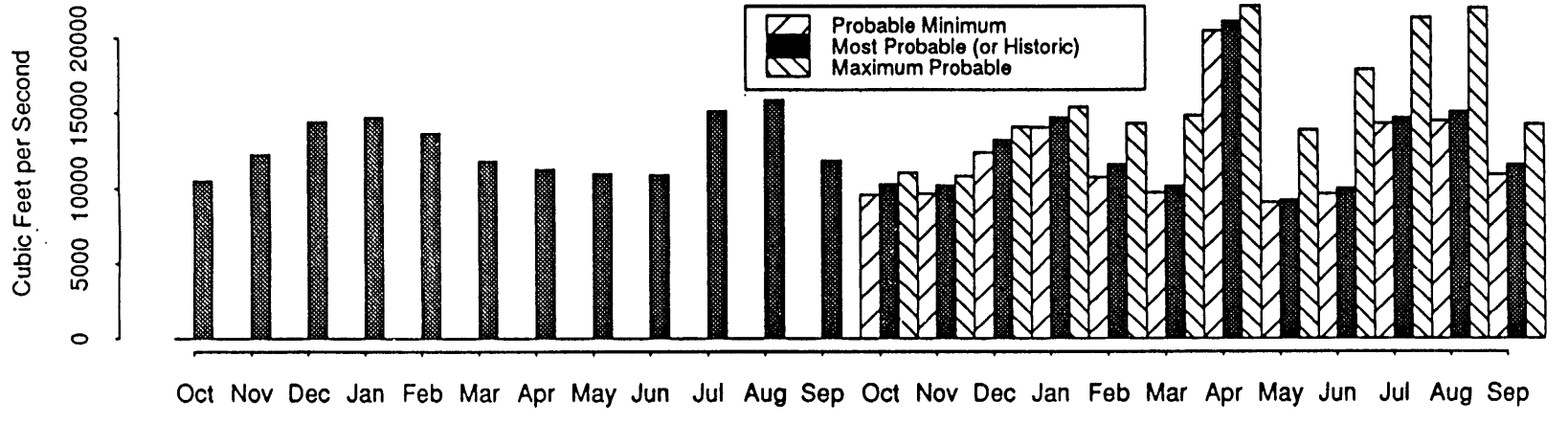
Lake Powell


1995 Colorado River AOP
Lake Powell EOM Content
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Acre-Feet X 1000
14000
16000
18000
20000
22000
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct. 1993 - Sep. 1995


Lake Powell EOM Elevation
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Feet
3620
3640
3660
3680
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct. 1993 - Sep. 1995

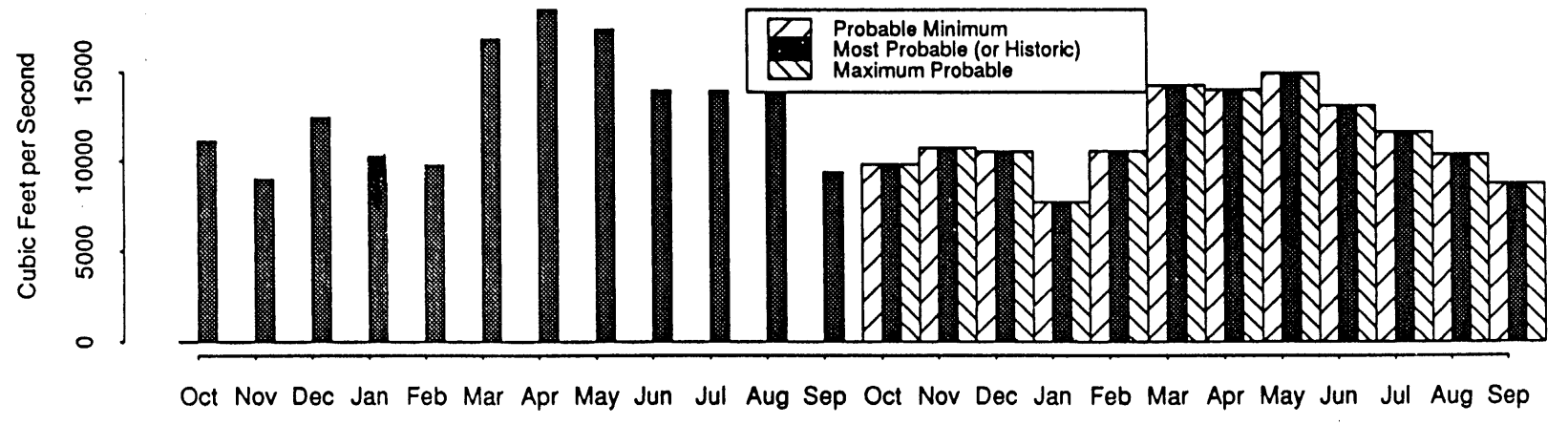
Lake Mead

1995 Colorado River AOP
Lake Mead Monthly Inflow



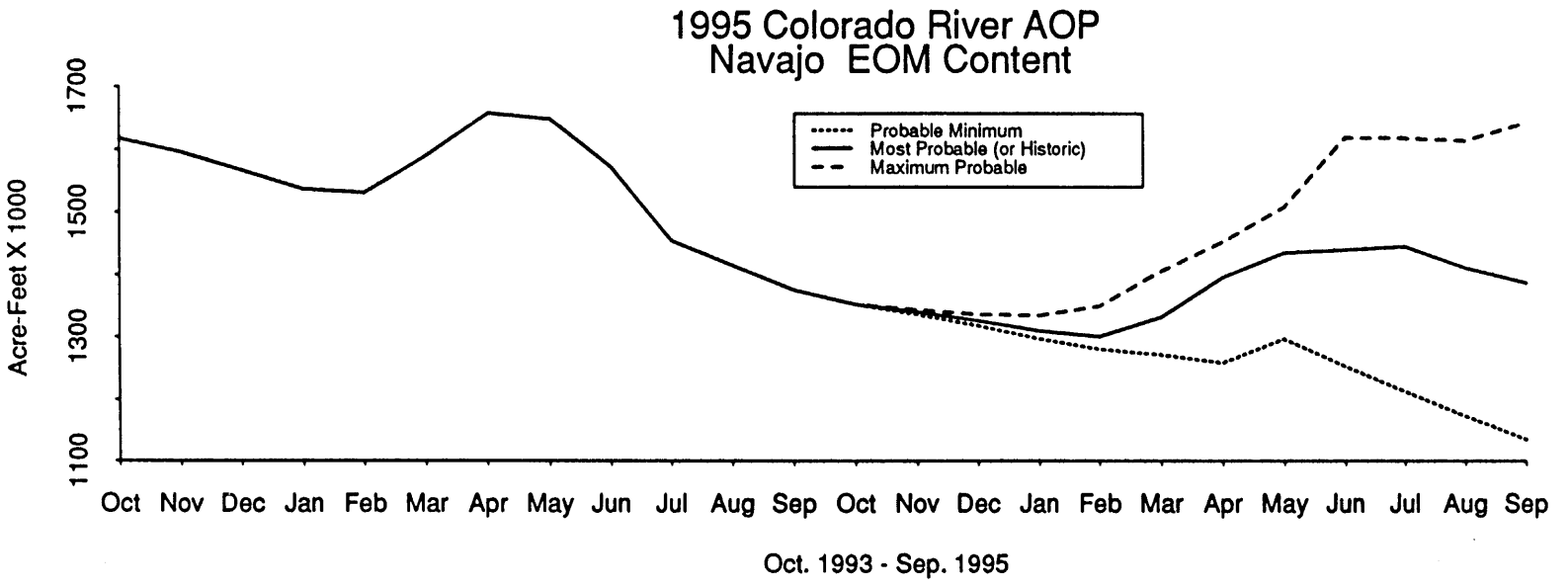
Oct 1993 - Sept 1995

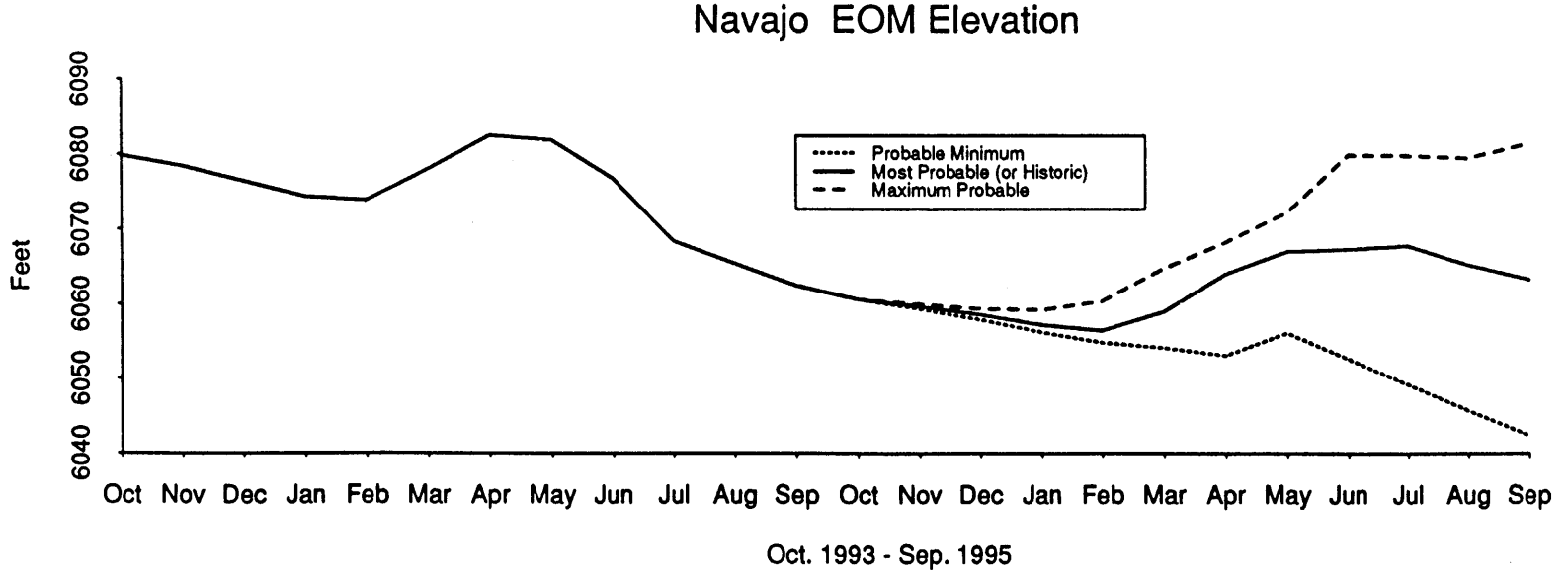
Lake Mead Monthly Release



Oct 1993 - Sept 1995

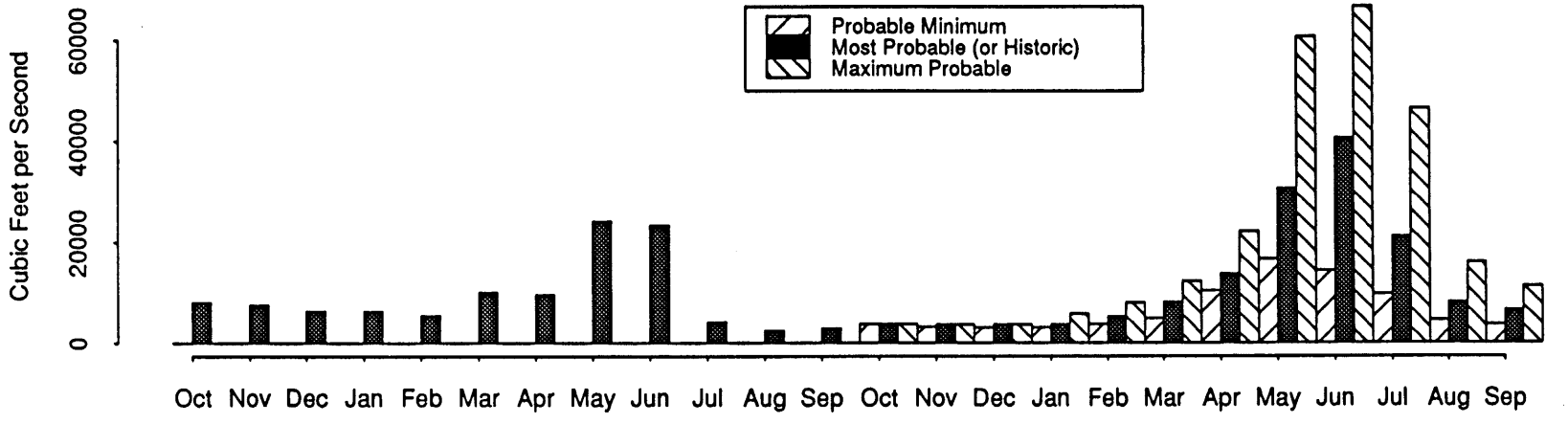
Navajo


1995 Colorado River AOP
Navajo EOM Content
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Acre-Feet X 1000
1700
1500
1300
1100
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct. 1993 - Sep. 1995


Navajo EOM Elevation
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Feet
6090
6080
6070
6060
6050
6040
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct. 1993 - Sep. 1995

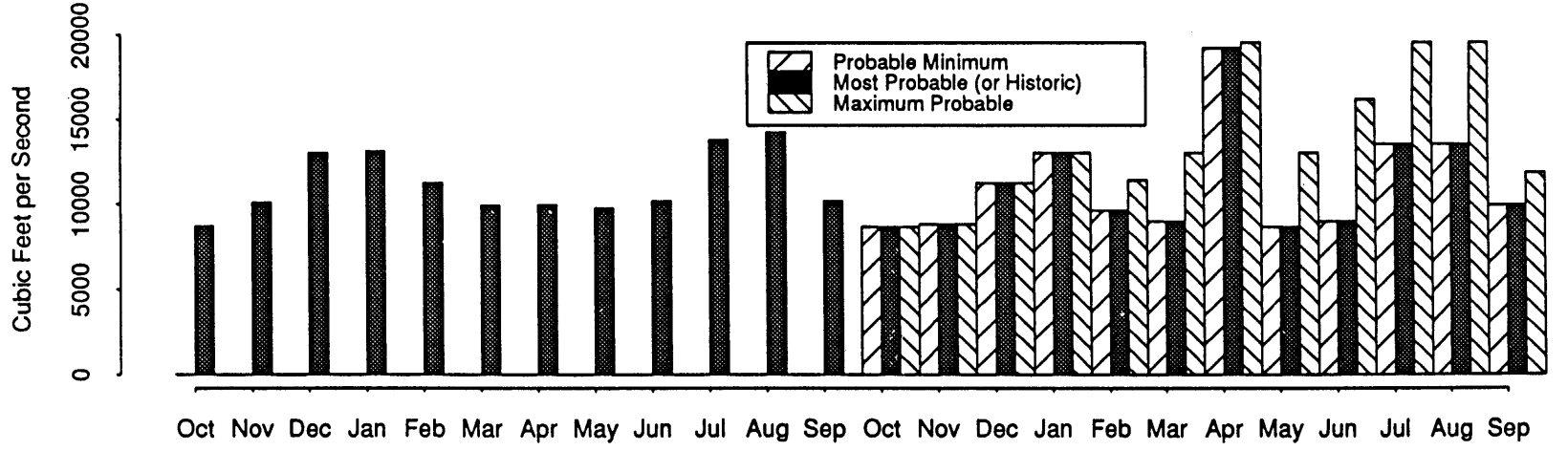
Lake Powell

1995 Colorado River AOP
Lake Powell Monthly Inflow



Oct 1993 - Sept 1995

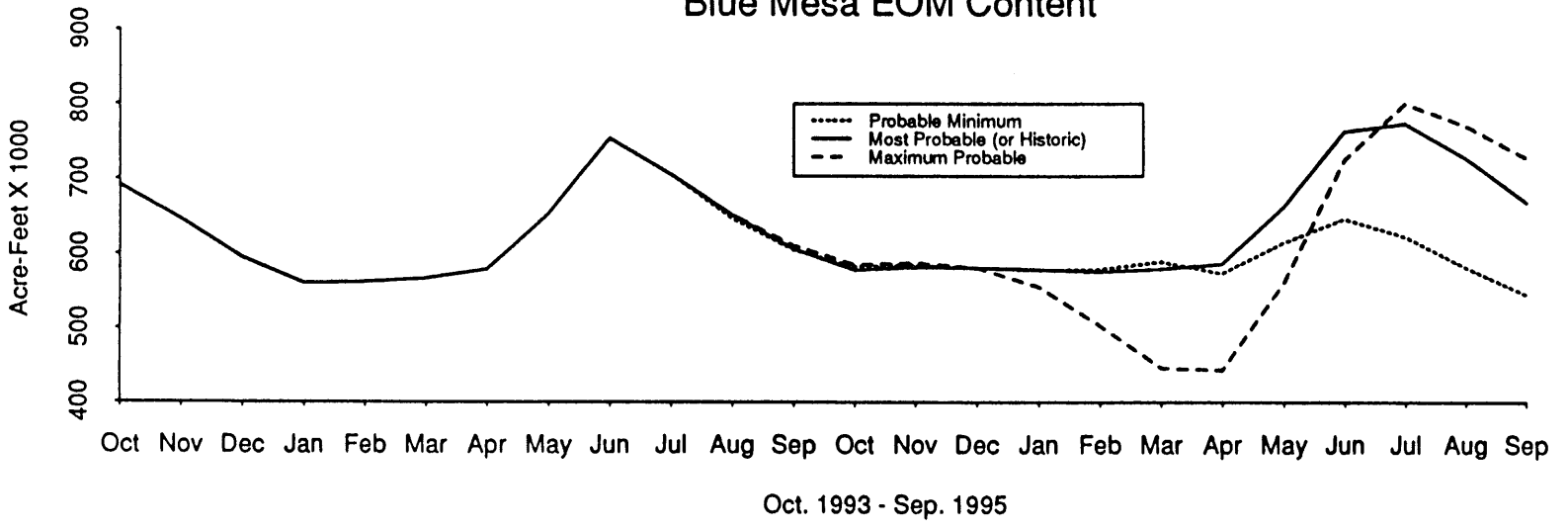
Lake Powell Monthly Release



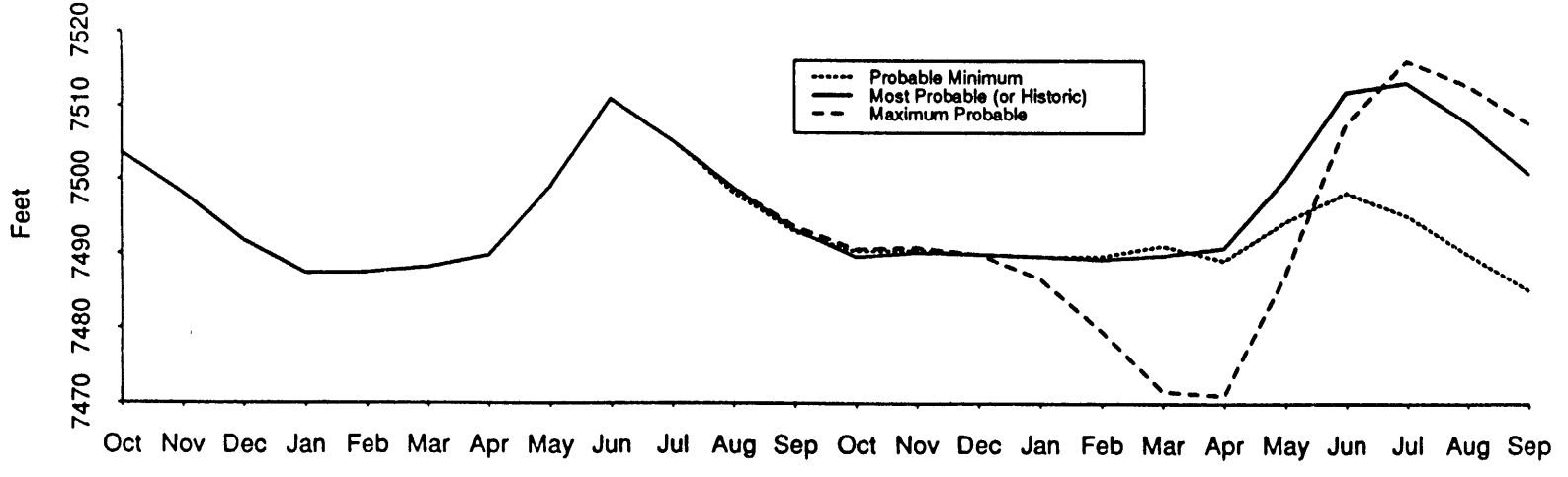
Oct 1993 - Sept 1995

Blue Mesa

1995 Colorado River AOP
Blue Mesa EOM Content

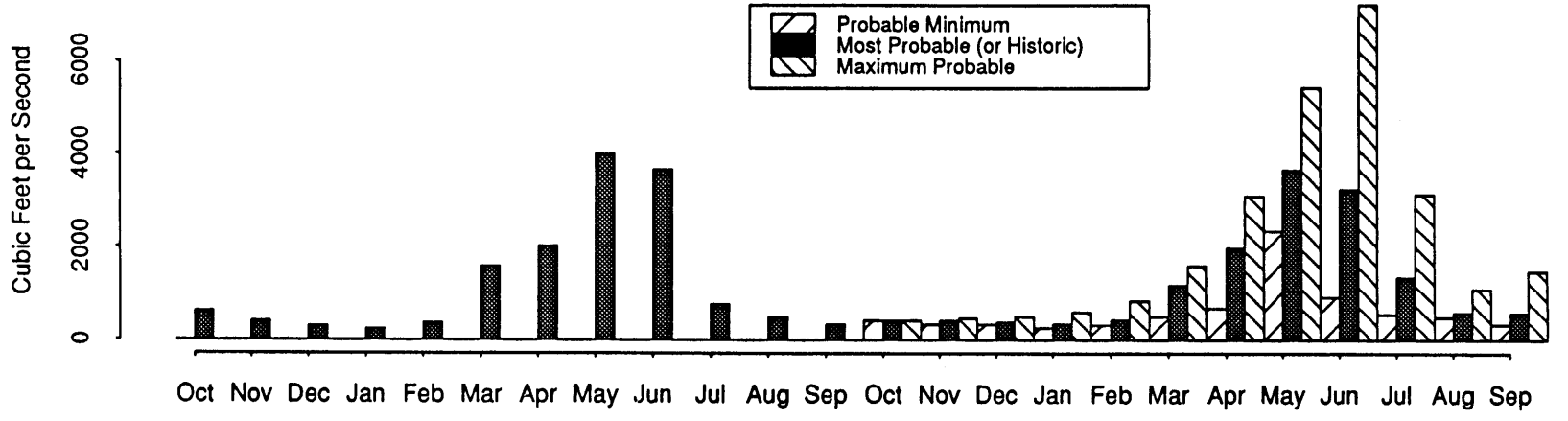


Blue Mesa EOM Elevation



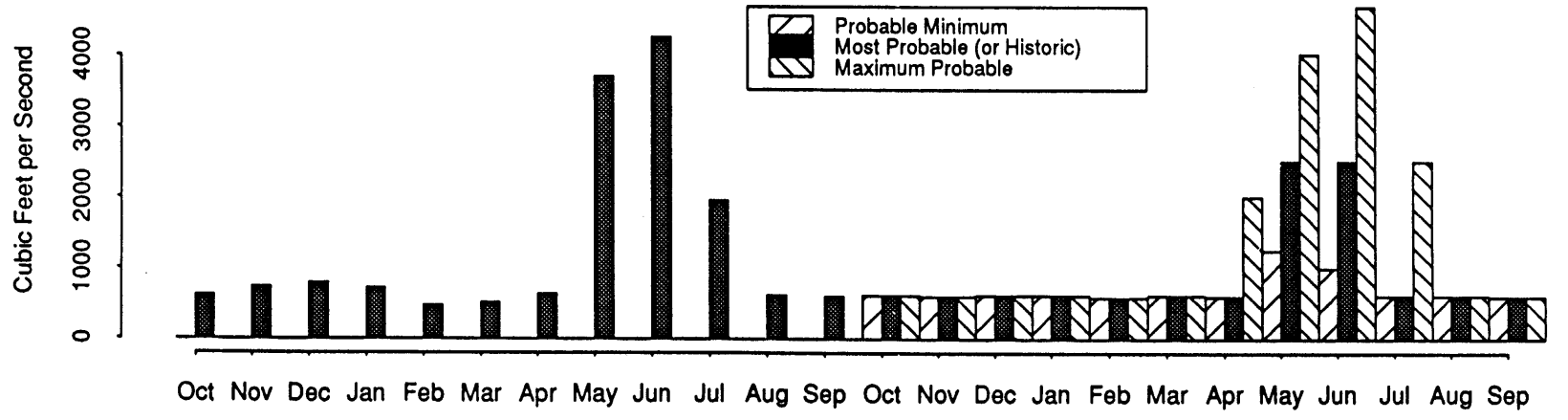
Navajo

1995 Colorado River AOP
Navajo Monthly Inflow



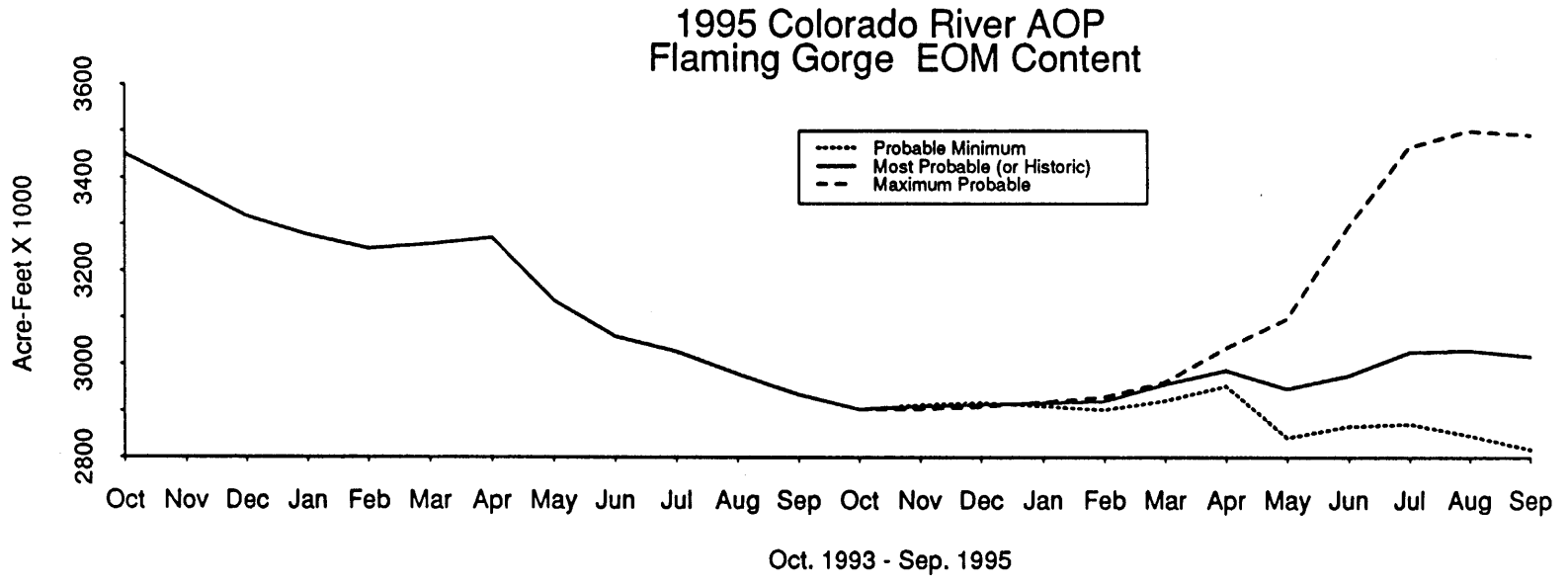
Oct 1993 - Sept 1995

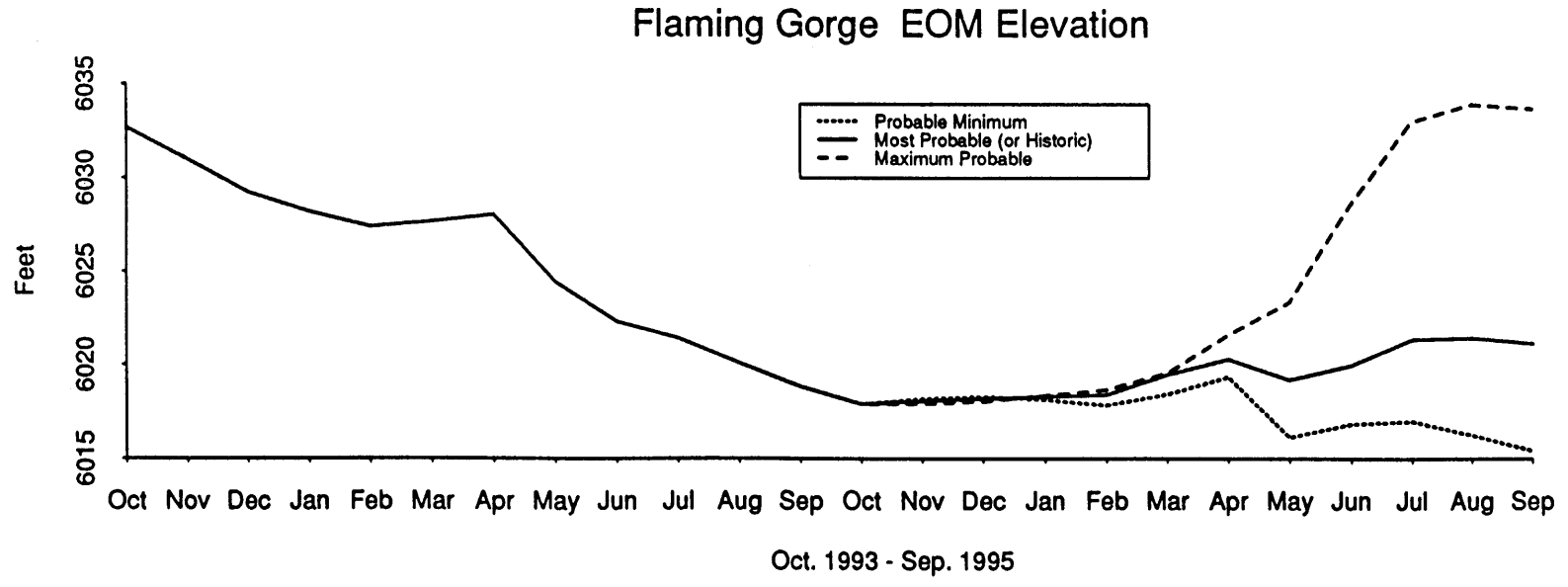
Navajo Monthly Release



Oct 1993 - Sept 1995

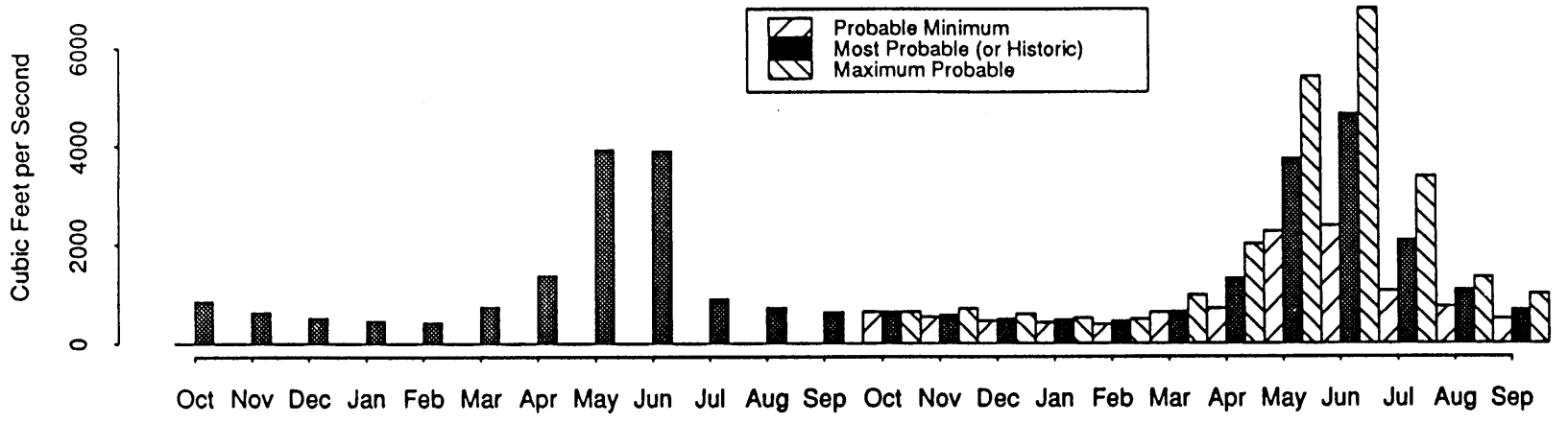
Flaming Gorge





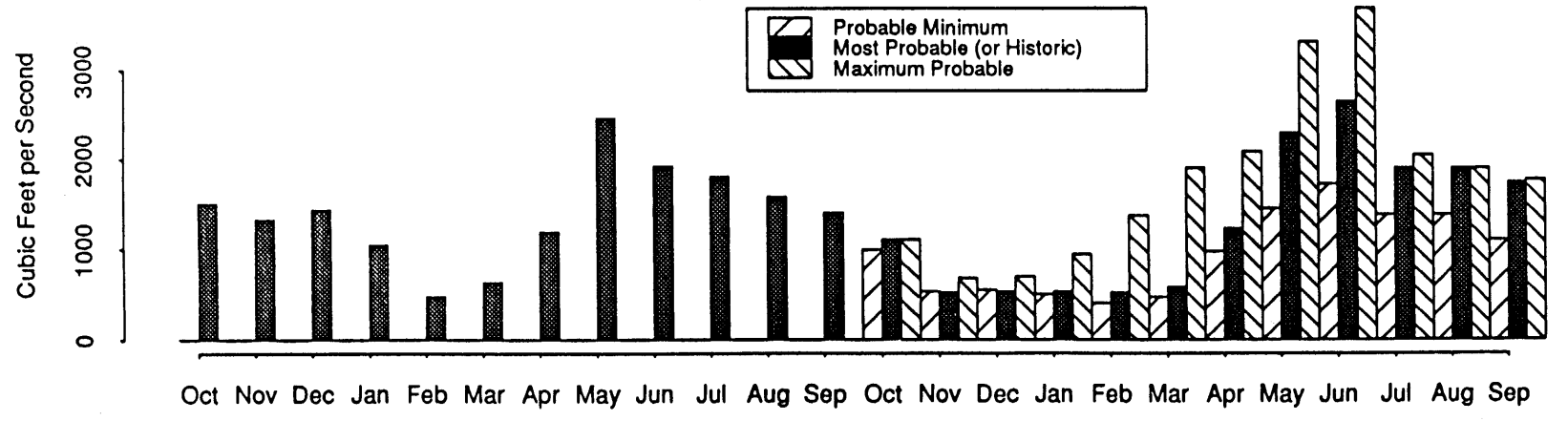
Aspinall Unit

1995 Colorado River AOP
Aspinall Unit Monthly Inflow



Oct 1993 - Sept 1995

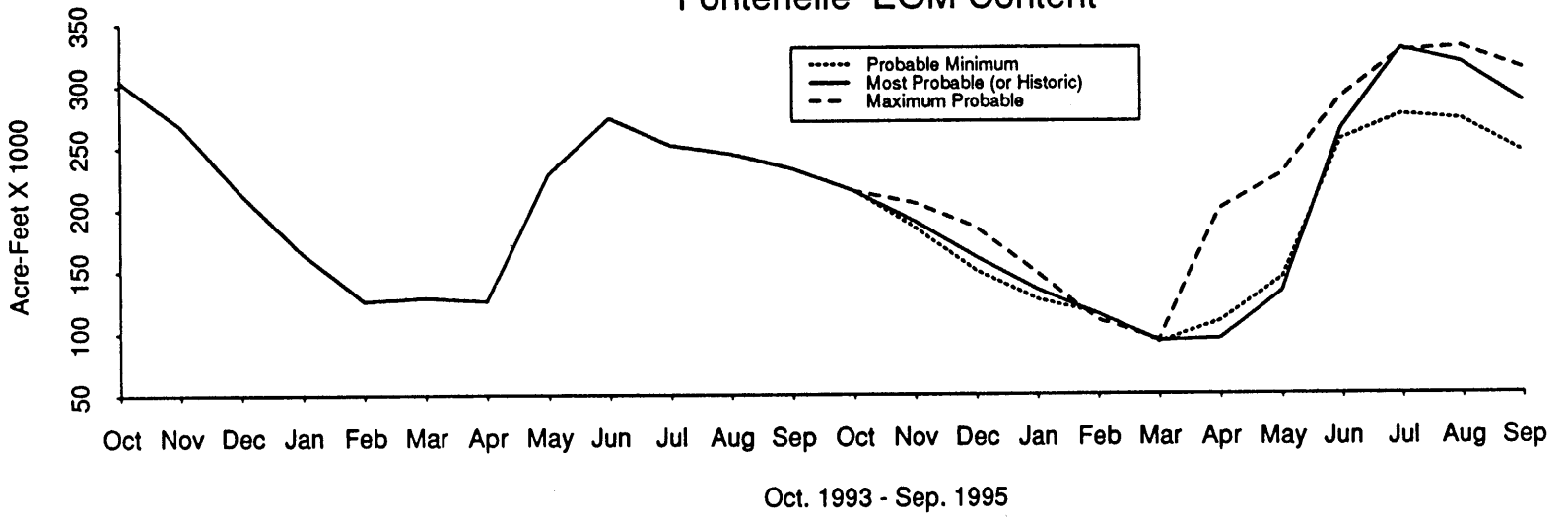
Aspinall Unit Monthly Release



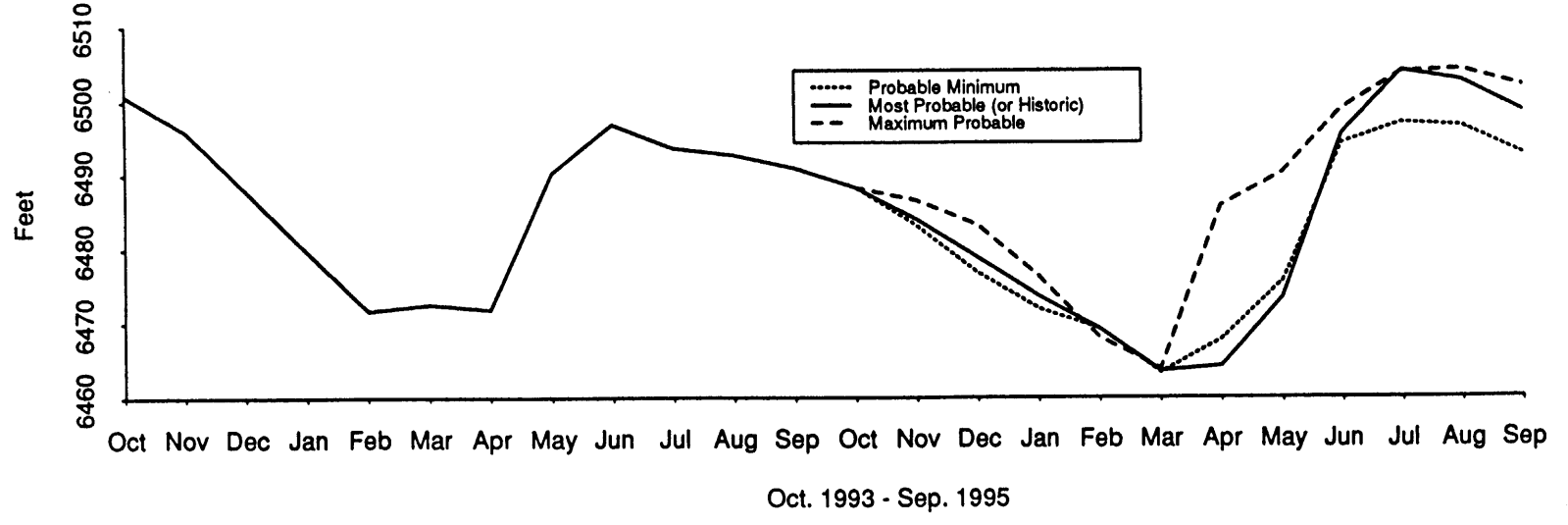
Oct 1993 - Sept 1995

Fontenelle

1995 Colorado River AOP
Fontenelle EOM Content

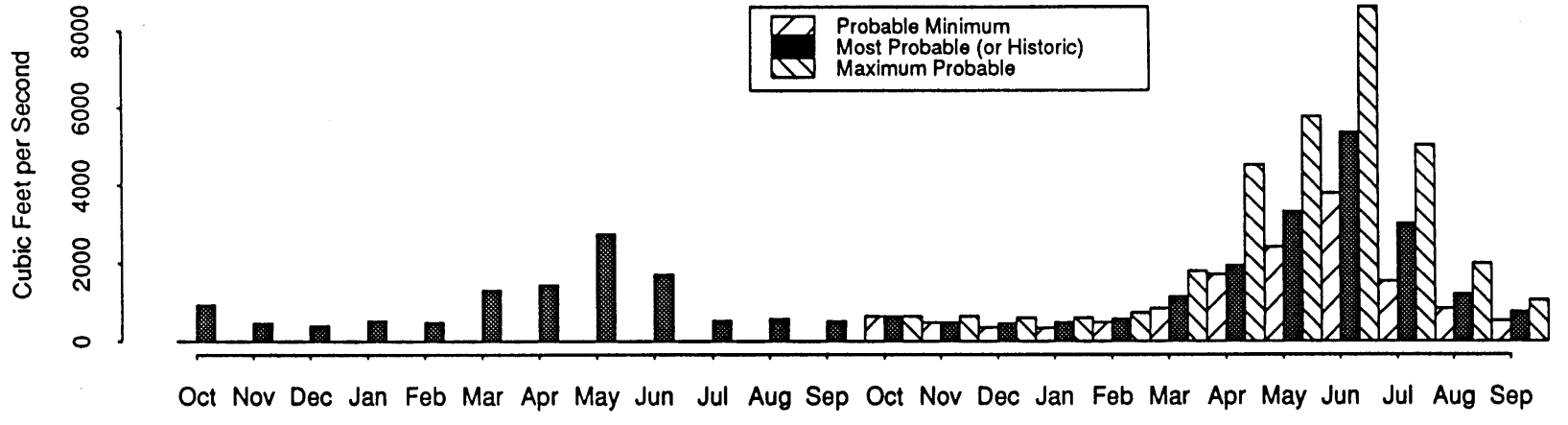


Fontenelle EOM Elevation



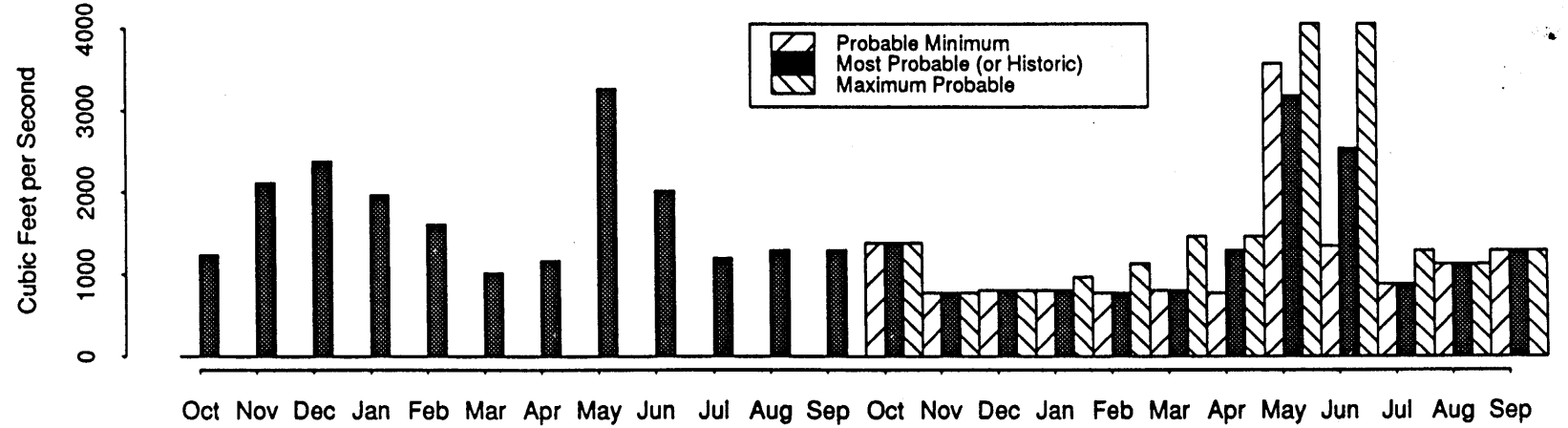
Flaming Gorge

1995 Colorado River AOP
Flaming Gorge Monthly Inflow



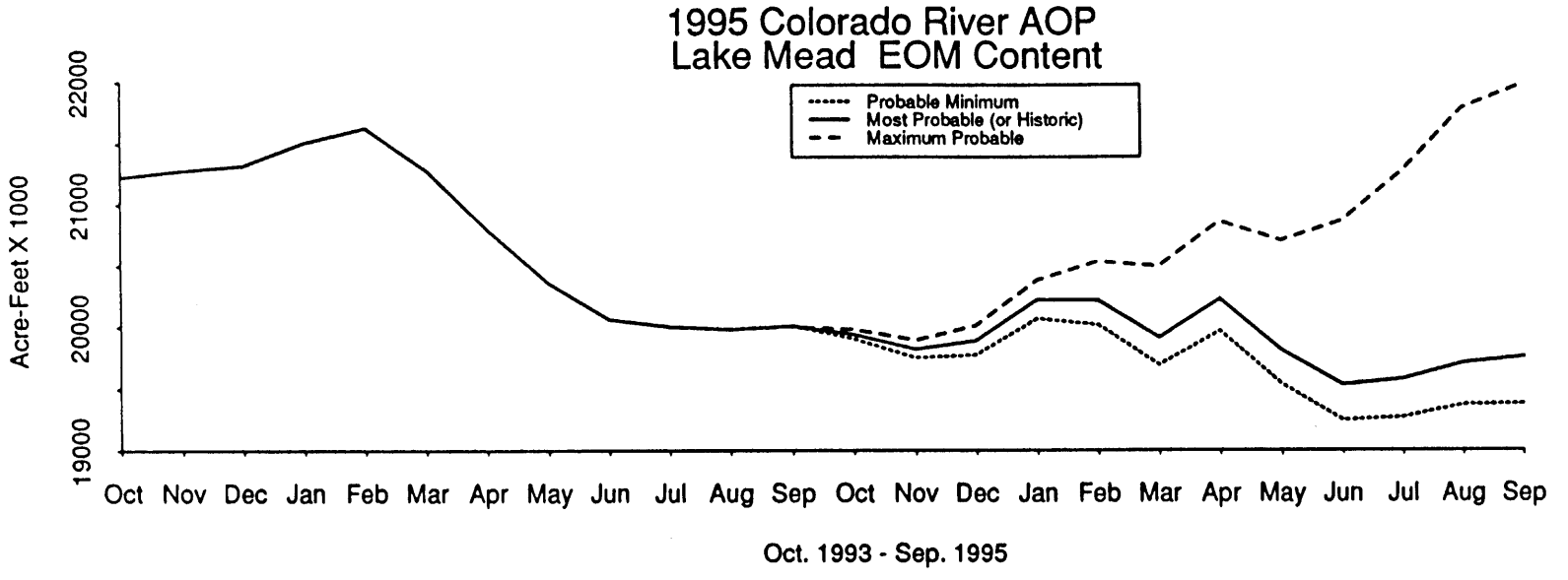
Oct 1993 - Sept 1995

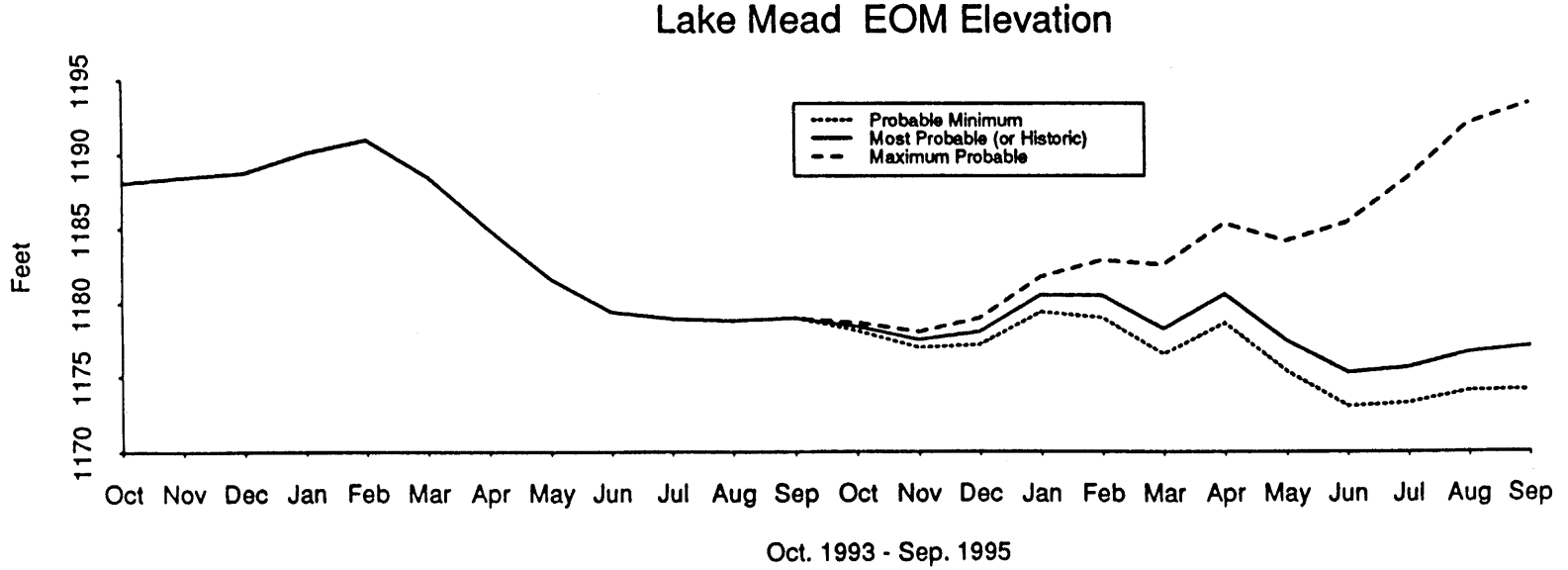
Flaming Gorge Monthly Release



Oct 1993 - Sept 1995

Lake Mead


1995 Colorado River AOP
Lake Mead EOM Content
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Acre-Feet X 1000
22000
21000
20000
19000
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct. 1993 - Sep. 1995


Lake Mead EOM Elevation
Probable Minimum
Most Probable (or Historic)
Maximum Probable
Feet
1195
1190
1185
1180
1175
1170
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Oct. 1993 - Sep. 1995