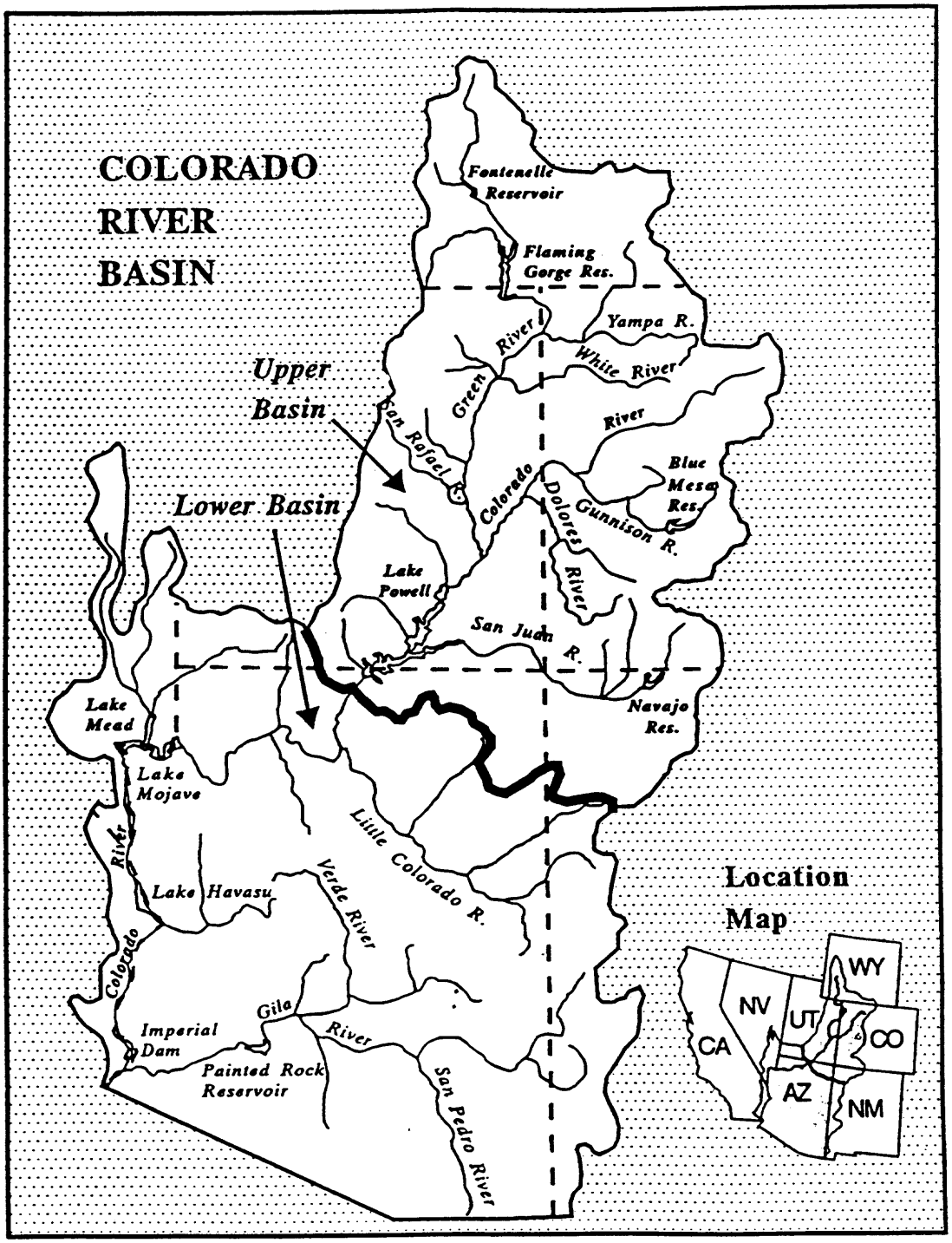
ANNUAL OPERATING PLAN
FOR
COLORADO RIVER RESERVOIRS
1997



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INTRODUCTION

Authority

This 1997 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 1997 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, 1997, 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. Downstream Lower Basin deliveries and/or flood control parameters are expected to control the releases from Hoover Dam.

Lower Basin Uses. 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 1997 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 1.850 MCM (1.5 MAF) of water will be scheduled for delivery to Mexico during calendar year 1997 in accordance with Article 15 of the 1944 Mexican Water Treaty and Minute No. 242 of the International Boundary and Water Commission.

1996 OPERATIONS SUMMARY AND RESERVOIR STATUS

Water year 1996 commenced with above normal hydrologic conditions in the basin. Basin wide precipitation during 1996 was above average and translated into an above average snowpack. At the beginning of the runoff season the basin wide snowpack was about 115 percent of average, varying between 149 percent of normal in the Upper Colorado River basin and 65 percent of normal in the San Juan Basin. However, extremely dry conditions in the late spring reduced the runoff to near normal levels. Annual runoff in the Green River basin was 103 percent of average, the Gunnison basin was 117 percent of average, the San Juan basin was 42 percent of average and Lake Powell was 95 percent of average. With this runoff during 1996 there were some reports of local flooding, but most damage was minimal.

Unregulated inflow into Lake Powell was 13,541 MCM (10.978 MAF) in water year 1996, approximately 95 percent of average. This inflow resulted in the loss of approximately 1,120 MCM (.908 MAF) of storage in Lake Powell. Approximately 657 MCM (.533 MAF) of storage was lost in upstream reservoirs, approximately 998 MCM (.809 MAF) of storage was gained in Lower Basin reservoirs, and the total Colorado storage system lost approximately 778 MCM (.631 MAF) during water year 1996. It is now estimated that with average inflow during 1997, the system will be relatively full. During 1996, all deliveries of water to meet obligations pursuant to "The Law of the River" were maintained. On July 24, 1996, the Regional Directors of the Upper and Lower Colorado regions issued a revised determination for 1996 Colorado River water use, acting under authority from the Secretary of the Interior. This determination changed the finding of 1996 being a "normal" year to that of "surplus" as defined in the 1970 Operating Criteria.

Tables 1(a) and 1(b) list the expected October 1, 1996 reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in elevation during water year 1996.

Table 1(a). Expected Reservoir Conditions on October 1, 1996 (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	54	371	1981.2	87	+2	+ ..08
Flaming Gorge	450	4,174	1838	90	- 128	- .80
Blue Mesa	171	851	2287	83	- 113	- 3.25
Navajo	591	1,501	1844	72	- 418	- 7.9
Lake Powell	3,604	26,397	1122	88	- 1120	- 1.86
Lake Mead	7,126	26,644	363	79	+ 1113	+ 2.0
Lake Mohave	292	1,940	194.5	87	- 76.5	- .71
Lake Havasu	765	687	136.3	90	- 38.2	- .50
Totals	12,366	62,589	–	84	- 779.6	–

Table 1(b). Expected Reservoir Conditions on October 1, 1996 (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	.044	.301	6500	87	+ .002	+ .26
Flaming Gorge	.365	3.384	6031	90	- .104	- 2.64
Blue Mesa	.139	.690	7503	83	- .092	- 10.67
Navajo	.479	1.217	6050	72	- .339	- 26.01
Lake Powell	2.922	21.4	3681	88	- .908	- 6.12
Lake Mead	5.777	21.6	1191	79	+ .902	+ 6.58
Lake Mohave	.237	1.573	638	87	- .062	- 2.33
Lake Havasu	.62	.557	447	90	- .031	- 1.65
Totals	10.025	50.741	–	84	- .632	–

* from October 1, 1995 to September 30, 1996

1997 WATER SUPPLY ASSUMPTIONS

For 1997 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. Soil moisture conditions throughout much of the basin were maintained by the snowpack that was experienced in early 1996, but became much drier after June from an extreme lack of precipitation. Despite these conditions, the most probable inflow in water year 1997 is expected 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 1997. 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 1997 inflow and October 1, 1996 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 1997
(Metric Units: MCM)

Time Period		Probable Maximum	Most Probable	Probable Minimum
10/96 -	12/96	2,213	1,622	1,528
1/97 -	3/97	2,362	1,729	1,400
4/97 -	7/97	15,548	9,541	5,329
8/97 -	9/97	2,461	1,342	919
10/97 -	12/97	2,475	1,850	1,689
WY	1997	22,584	14,234	9,176
CY	1997	22,846	14,463	9,337

Table 2(b). Projected Unregulated Inflow
Into Lake Powell for Water Year 1997
(English Units: MAF)

Time Period		Probable Maximum	Most Probable	Probable Minimum
10/96 -	12/96	1.794	1.315	1.239
1/97 -	3/97	1.915	1.402	1.135
4/97 -	7/97	12.605	7.735	4.320
8/97 -	9/97	1.995	1.088	.745
10/97 -	12/97	2.007	1.500	1.370
WY	1997	18.309	11.540	7.439
CY	1997	18.522	11.725	7.570

1997 RESERVOIR OPERATIONS

Minimum instream flow levels and annual operating strategies have been established at several locations in the Upper and Lower Basins 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 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 Flaming Gorge on the Green River will continue in 1997. Studies associated with these consultations will be used to better understand the flow related needs of endangered and other native species of fish. The issuance of the Record of Decision of the Glen Canyon Dam Environmental Impact Statement (GCDEIS) replaced interim flow restrictions on releases from Lake Powell with the preferred alternative of the GCDEIS.

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 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 experienced another above average year. The April through July runoff into the reservoir during water year 1996 was 1,296 MCM (1.051 MAF) or 124 percent of the long term average and Fontenelle easily filled in 1996.

Because the mean annual inflow of 1,480 MCM (1.229 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 1997. 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 meters (6463 feet) which corresponds to a volume of 115 MCM (.093 MAF) of live storage.

To meet the above-stated operational objectives, a constant release of approximately 31.2 to 34.0 cubic meters per second (cms) [or 1,100 to 1,200 cubic feet per second (cfs)] will be made through the fall and winter months. Releases at this level will provide an appropriate level of reservoir drawdown for the 1997 runoff season, while ensuring that downstream water rights and municipal and industrial needs are met.

Flaming Gorge Reservoir

Water year 1996 unregulated inflow into Flaming Gorge Reservoir was 2,166 MCM (1.76 MAF) or 103 percent of average. The April through July runoff was 1,578 MCM (1.28 MAF) or 100 percent of the long term average. With this inflow, Flaming Gorge lost approximately 128 MCM (.104 MAF) of storage in water year 1996.

In 1996, Flaming Gorge was operated in accordance with the Biological Opinion on the Operation of Flaming Gorge (BOFG), issued in November 1992. The BOFG outlines the reservoir operations during the spring, summer, and early fall months which may provide an improved habitat for endangered endemic species of fish. In accord with the BOFG, maximum powerplant releases were made from Flaming Gorge during May and June. The goal of the release in 1996 was to maintain releases from the dam at 125 cms (4,400 cfs) during the peak of the spring runoff of the Yampa River. Flows of the Green River at Jensen, Utah, were expected to be between 510 cms to 623 cms (18,000 to 22,000 cfs). Jensen is below the confluence of the Green and Yampa Rivers, and flows from the Yampa River alone in 1996 actually exceeded 507 cms (17,900 cfs), producing flows at Jensen of 631 cms (22,300 cfs).

In water year 1997 high spring releases are again expected at Flaming Gorge. Under all inflow scenarios, low stable flows between 31.2 and 51.0 cms (1,100 and 1,800 cfs) will most likely be maintained on the Green River near the Jensen, Utah, gaging station during the summer and fall months by adjusting Flaming Gorge releases. A revised biological opinion is expected to be issued to the Bureau of Reclamation and Western Area Power Administration in 1997. This revised opinion is scheduled to describe specific constraints during the spring and winter seasons, but may also refine the constraints for the entire year.

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

In water year 1996 the April through July unregulated runoff into Blue Mesa Reservoir was 1,024 MCM (.830 MAF) or 118 percent of average. Water year 1996 unregulated inflow was 1,402 MCM (1.137 MAF) or 117 percent of average. Water year 1996 powerplant bypasses were approximately 350 MCM (0.284 MAF) at Crystal. Releases and spills up to 270 cms (9,540 cfs) occurred at Crystal with flows in the river below the tunnel in excess of 243 cms (8,600 cfs). Blue Mesa filled easily during water year 1996.

Section 7 consultation with the Fish and Wildlife Service on the operation of the Aspinall Unit continued in 1996. As part of this consultation, a five-year effort to study the effect of various release patterns on habitat, reproductive success, and reintroduction of endangered fish in the Gunnison River is underway.

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 1997 operations, Blue Mesa Reservoir will be drawn down to at least an elevation of 2283 meters (7490 feet) by December 31, 1996, in order to minimize icing problems in the Gunnison River. Blue Mesa will continue to be drawn down through April 1997 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 objective of the Aspinall Unit is to meet the delivery requirements of the Uncompahgre Valley Project and 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 6 cms (200 cfs) below the diversion structure at Redlands (at the confluence of the Gunnison and Colorado Rivers). Under all three inflow scenarios, Blue Mesa is expected to fill in the summer of 1997 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 1997 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 1997 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 1997 will be planned to minimize large fluctuations in the daily and monthly flows in the Gunnison River below the Uncompahgre Tunnel Diversion.

Navajo Reservoir

The April through July unregulated inflow into Navajo Reservoir in water year 1996 was 295 MCM (.239 MAF) or 35 percent of average. Water year 1996 unregulated inflow was 504 MCM (.409 MAF) or 42 percent of average. Navajo Reservoir did not fill in 1996.

Section 7 consultation with the Fish and Wildlife Service on the operation of Navajo Dam continued in 1996. Water year 1996 was the sixth year of a seven-year study to evaluate alternative operations of Navajo Reservoir to benefit endangered fish. In January 1996 a two-week test release of 250 cfs was made from Navajo Dam to ascertain potential impacts to aquatic resources immediately below Navajo Dam. In an attempt to monitor the effects of a low runoff year on the San Juan River, spring operations of Navajo were restricted and releases of up to 70 cms (2500 cfs) were made during June after the peak flows of the Animas River had passed. This resulted in peak flows of 113 cms (4,000 cfs) at Bluff, Utah. After the completion of the large spring releases, releases were gradually reduced to approximately 17 cms (600 cfs) for the remainder of the year.

In 1997, Navajo Reservoir is expected to nearly fill except under the probable minimum inflow scenario. As a follow up to the 1996 low flow test, an extended release during November through February of water year 1997 will be made to achieve flows of not less than 575 cfs at Shiprock, New Mexico, but resulting in flows of not less than 300 cfs immediately below Navajo Dam. 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. Releases from the reservoir likely will be held near 17 cms (600 cfs) through the remainder of the year.

Lake Powell

The April through July unregulated inflow into Lake Powell in water year 1996 was 9,004 MCM (7.3 MAF) or 94 percent of average. Water year 1996 unregulated inflow was 13,541 MCM (10.978 MAF) or 95 percent of average. Lake Powell ended the water year 19 feet from full.

During March and April 1996, a test of the Beach/Habitat Building Flow was conducted from Glen Canyon Dam. The test consisted of peak releases of 45,000 cfs which lasted 7 days, preceded and followed by 4-day periods of low steady flows to allow photographic mapping and monitoring of the canyon resources. While scientific understanding of the results of this test are not yet complete, data collected to date indicates that the test accomplished the goals of rebuilding sandbar deposits and reforming eddy backwaters.

This test was implemented following discussions between the Department of the Interior, the Basin States, and key scientists and researchers which resulted in a long term agreement for managing spills from Glen Canyon Dam. 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 GCDEIS. Such releases would be consistent with the 1956 Colorado River Storage Project Act, the 1968 Colorado River Basin Project Act and the 1992 Grand Canyon Protection Act. Such releases would be managed to the maximum extent possible to (1) protect river sediment storage downstream or (2) be released in such a way as to reshape river topography, redeposit sediment and enhance aquatic habitat. Pending completion of NEPA compliance, Reclamation also intends to reinstall the spillway gate extensions at Glen Canyon Dam to increase the flexibility of managing high runoff years.

During water year 1997, releases greater than the minimum release objective of 10,152 MCM (8.230 MAF) likely will be made to equalize the storage between Lakes Powell and Mead and/or to avoid anticipated spills. Under the most probable inflow conditions, releases of 12,261 MCM (9.940 MAF) would be made and the reservoir would gain 588 MCM (0.477 MAF) of storage. Under the probable maximum inflow scenario, approximately 18,872 MCM (15.300 MAF) will be released during the water year and Lake Powell would gain 2,026 MCM (1.643 MAF) of storage. This maximum probable inflow would require releases of about 708 cms (25,000 cfs) for a lengthy period of time.

A Record of Decision on the GCDEIS was signed by the Secretary of the Interior, resulting in the following restrictions on hourly and daily operations.

Table 3. Glen Canyon Dam operating restrictions

Parameter	(cms)	(cfs)	conditions
Maximum flow [1]	566.4	25,000	
Minimum flow	141.6	5,000	nighttime
	226.6	8,000	7:00 am to 7:00 pm
Ramp rates			
ascending	70.8	4,000	per hour
descending	42.5	1,500	per hour
Daily fluctuations [2]	141.6 / 226.6	5,000 to 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

With the increased releases out of Lake Powell during the late summer and fall of calendar year 1996, Lake Mead finished out the year with 26,663 MCM (21.616 MAF) in storage at elevation 362.9 meters (1190.86 feet), which is 83 percent of conservation capacity. Full conservation pool at 371.9 meters (1219.6 feet) has a capacity of 31,919 MCM (25.877 MAF).

The surplus condition is the criterion governing the operation of Lake Mead for calendar year 1997 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the decree in Arizona v. California. The outlook for lowest and highest monthly releases under the most probable inflow conditions for calendar year 1997 will be 480 MCM (.389 MAF) and 1,396 MCM (1.132 MAF) respectively.

Lake Mead water surface elevation is expected to rise to 365.4 meters (1198.8 feet) in February 1997, with 28,057 MCM (22.746 MAF) in storage, which is 88 percent of conservation capacity. Storage is projected to decline to elevation 362.8 meters (1190.2 feet) by June 1997, or 83 percent of conservation capacity with 26,560 MCM (21.533 MAF) in storage. By the end of calendar year 1997, Lake Mead storage is projected to be at elevation 363.3 meters (1192 feet) with 26,887 MCM (21.798 MAF) in storage, which is 84 percent of conservation capacity. No flood control releases above downstream water demands would be anticipated in 1997 under the most probable and minimum probable inflow conditions. Flood control releases above downstream water demands would be anticipated under maximum probable inflow conditions in 1997 for all months except August, with peak releases of about 764 cms (27,000 cfs) occurring in October.

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 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 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.

Senator Wash and Laguna Reservoirs

Operations at Senator Wash Reservoir allow regulation of water deliveries to United States water users and Mexico downstream at Imperial Dam. The reservoir is operated to meet water user demands when necessary and to prevent Colorado River flows from exceeding Mexican Treaty requirements at Morelos Dam. This includes excess flows in the river caused by water user cutbacks and sidewash inflows. Operational objectives at and below Imperial Dam are to meet water user demands, to conserve water, to control sediment, and to maintain the river channel.

Releases from Imperial Dam are regulated by Laguna Reservoir to conserve water, to meet all or part of Mexico's water demands, and 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. Larger releases from Laguna Dam are generally 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 was not operated in 1996, and will not be operated in 1997. Funding is currently not available for full-scale operation. Most of the damage to the Main Outlet Drain (MOD), the Main Outlet Drain Extension (MODE), and the bypass drain from the 1993 Gila River flood has been repaired. Some damage to the MODE near the Gila River confluence will be repaired at a later date. The Wellton-Mohawk Main Conveyance Canal was repaired in 1994. All Wellton-Mohawk Irrigation and Drainage District drainage flows should be diverted into the MODE in 1997.

The test train, used for research and the building's water service, will be run throughout 1997. The test train uses about one million gallons per day of drainage water taken from the MODE or pumped from an on-site well.

1997 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, 1997 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 1997.

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.

Storage equalization and/or spill avoidance criterion in accordance with Article II(3) of the Operating Criteria will control the releases from Glen Canyon Dam during water year 1997 unless the minimum objective release criterion in Article II(2) is controlling. Under the most probable inflow scenario Glen Canyon Dam will release 12,543 MCM (10.169 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.

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 requirement of mainstream users in the Lower Division States is met. 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.

While there is no agreed-upon surplus strategy, the most conservative strategy investigated in preparing the 1997 AOP concerned the utilization of additional water in reservoir storage resulting in the avoidance of flood control releases at the 30 percent exceedance probability of inflow to Lake Powell. This and other strategies seek to decrease the risk of flood control releases from Hoover Dam, which allows increased beneficial use of water in the United States. Possible impacts of a 1997 surplus determination were evaluated in terms of effects on reservoir elevations and releases and increased risk of future shortages. This analysis showed that the 1997 surplus determination will cause neither significant effects on reservoir contents in Lakes Powell and Mead nor significant additional risk of future shortages in Arizona.

The amount of additional mainstream water being made available during calendar year 1997 is limited to that quantity required to satisfy the reasonable beneficial consumptive use requirements of Colorado River mainstream water users in the Lower Division States with valid contracts or Federal or decreed entitlements. The making of this determination does not preclude the Secretary from adopting other determination criteria in future years. Furthermore, neither this determination nor the basis on which it was made constitutes a precedent for future determinations.

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 1997 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the decree in Arizona v. California.

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 1997.

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 not be available. Vacant storage space in mainstem reservoirs is substantially greater than that required by flood control regulations. Therefore, a volume of 1.850 MCM (1.5 MAF) of water will be scheduled for delivery to Mexico during calendar year 1997 in accordance with Article 15 of the 1944 Mexican Water Treaty and Minute No. 242 of the International Boundary and Water Commission. Minute No. 242 provides that the United States may deliver up to 173 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 that necessary to satisfy the requirements in the United States and the guaranteed quantity of 1,850 MCM (1.500 MAF) annually to Mexico.

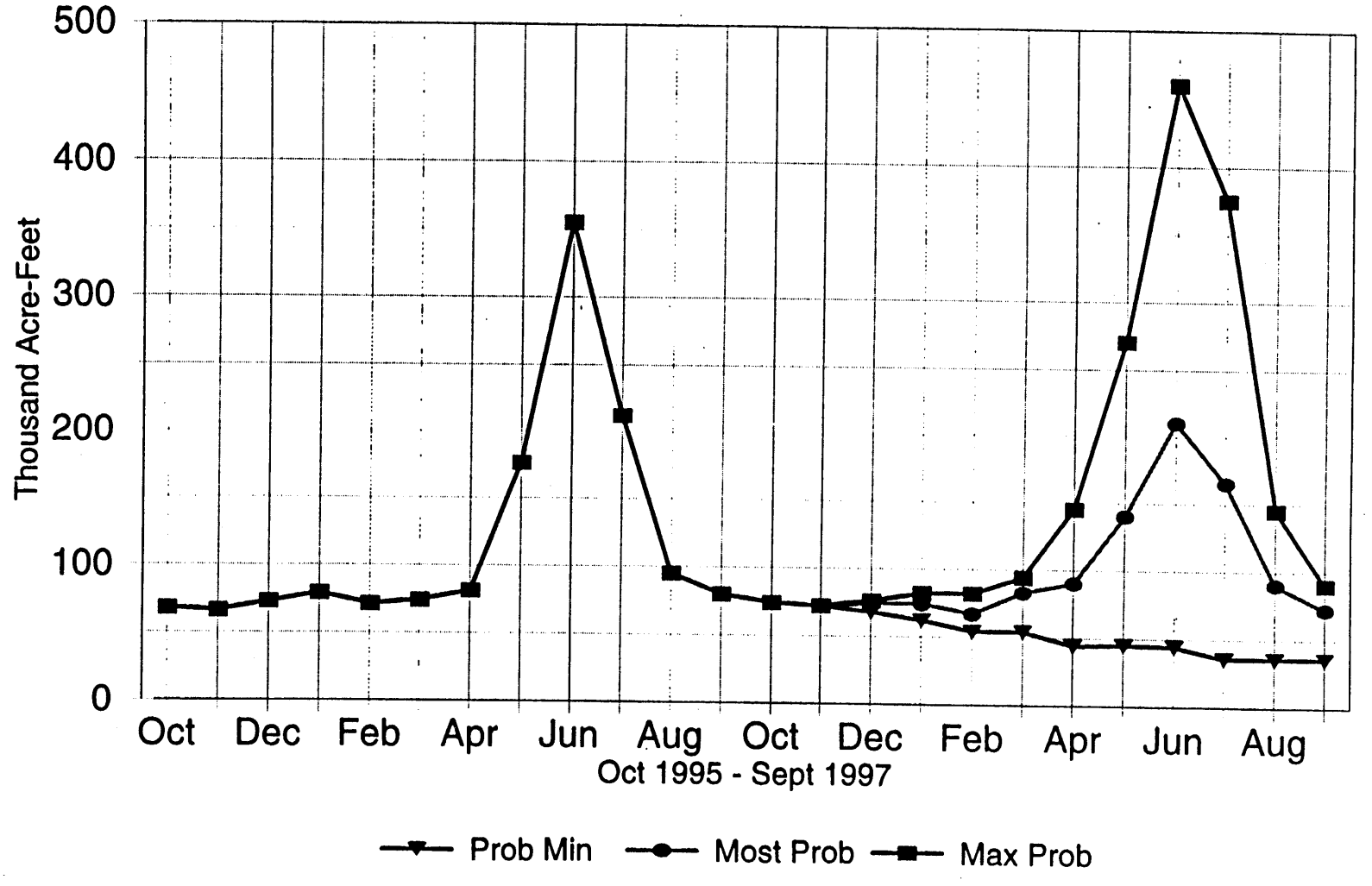
DISCLAIMER

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 1995 through September 1997) under the probable maximum, most probable, and the probable minimum inflow scenarios.

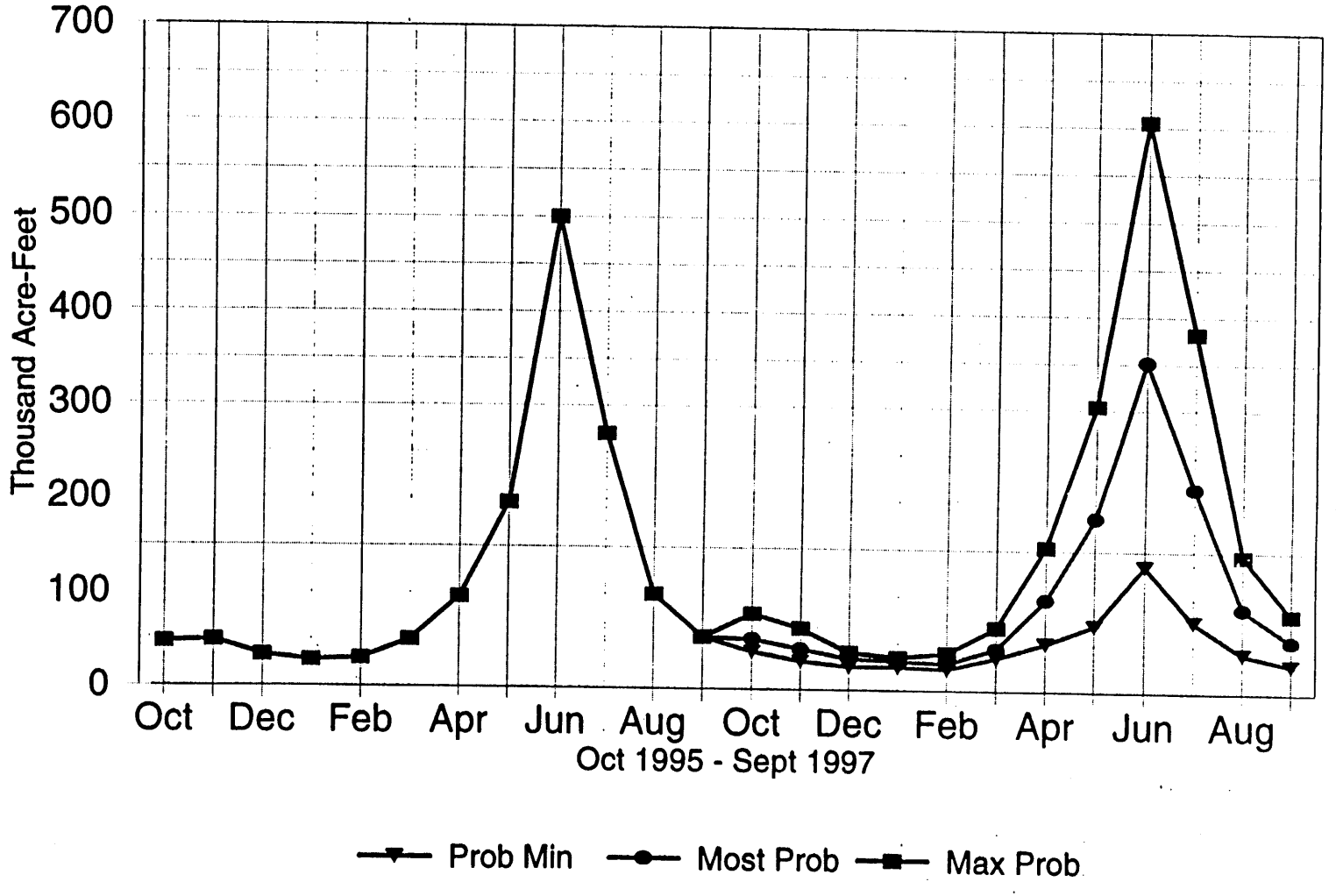
Fontenelle

Fontenelle Monthly Releases



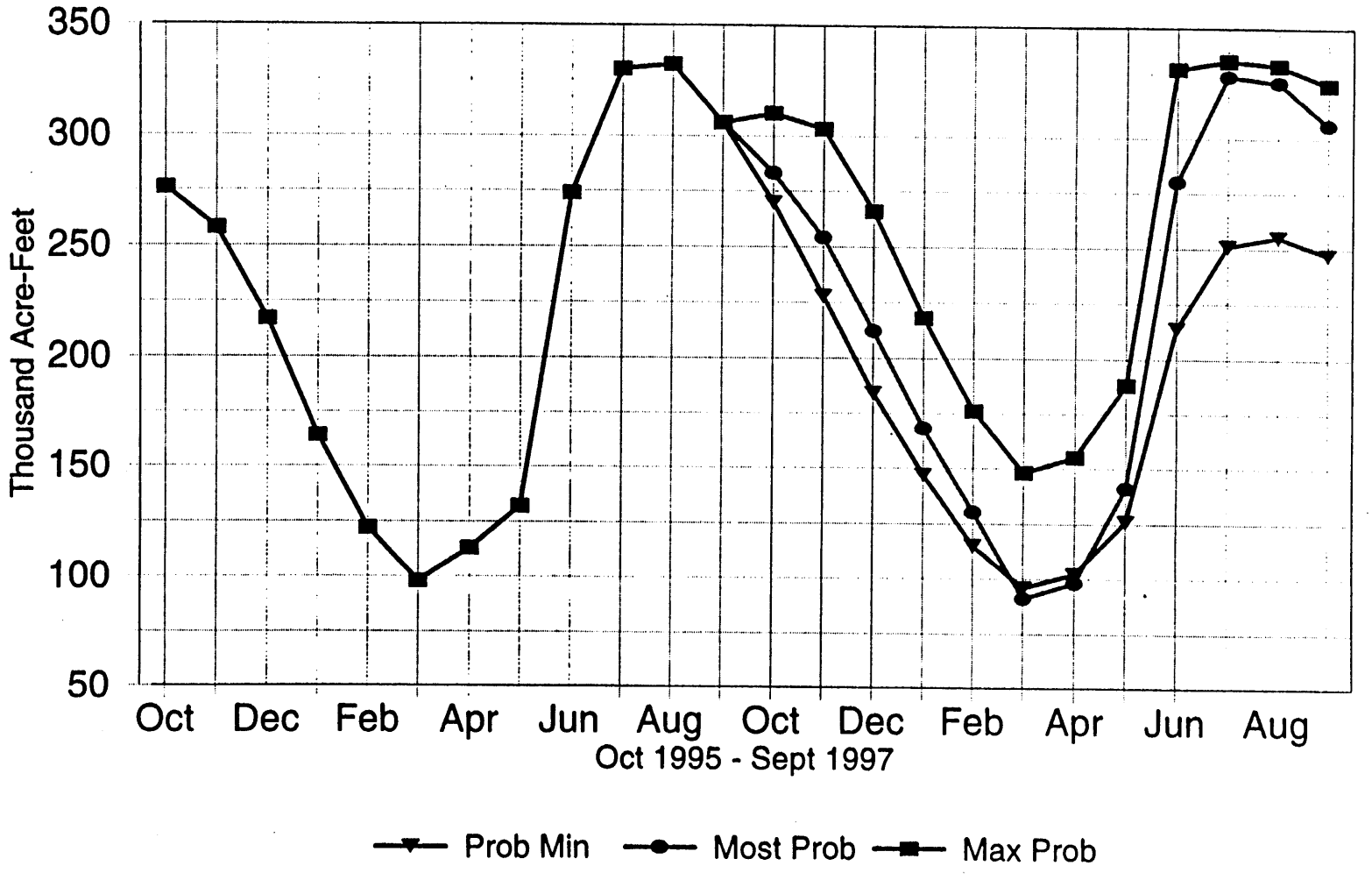
Fontenelle

Monthly Inflow



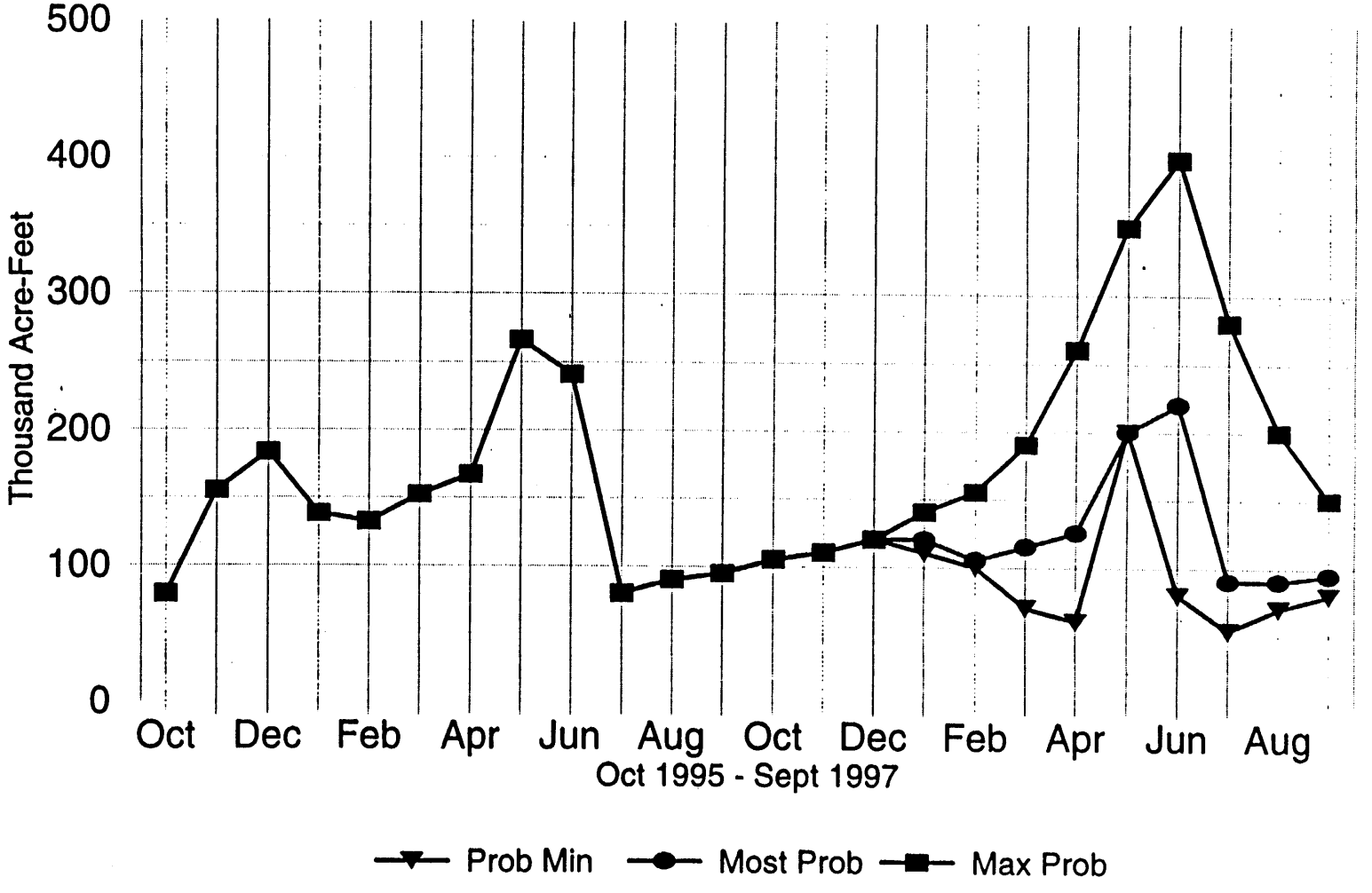
Fontenelle

End of Month Storage

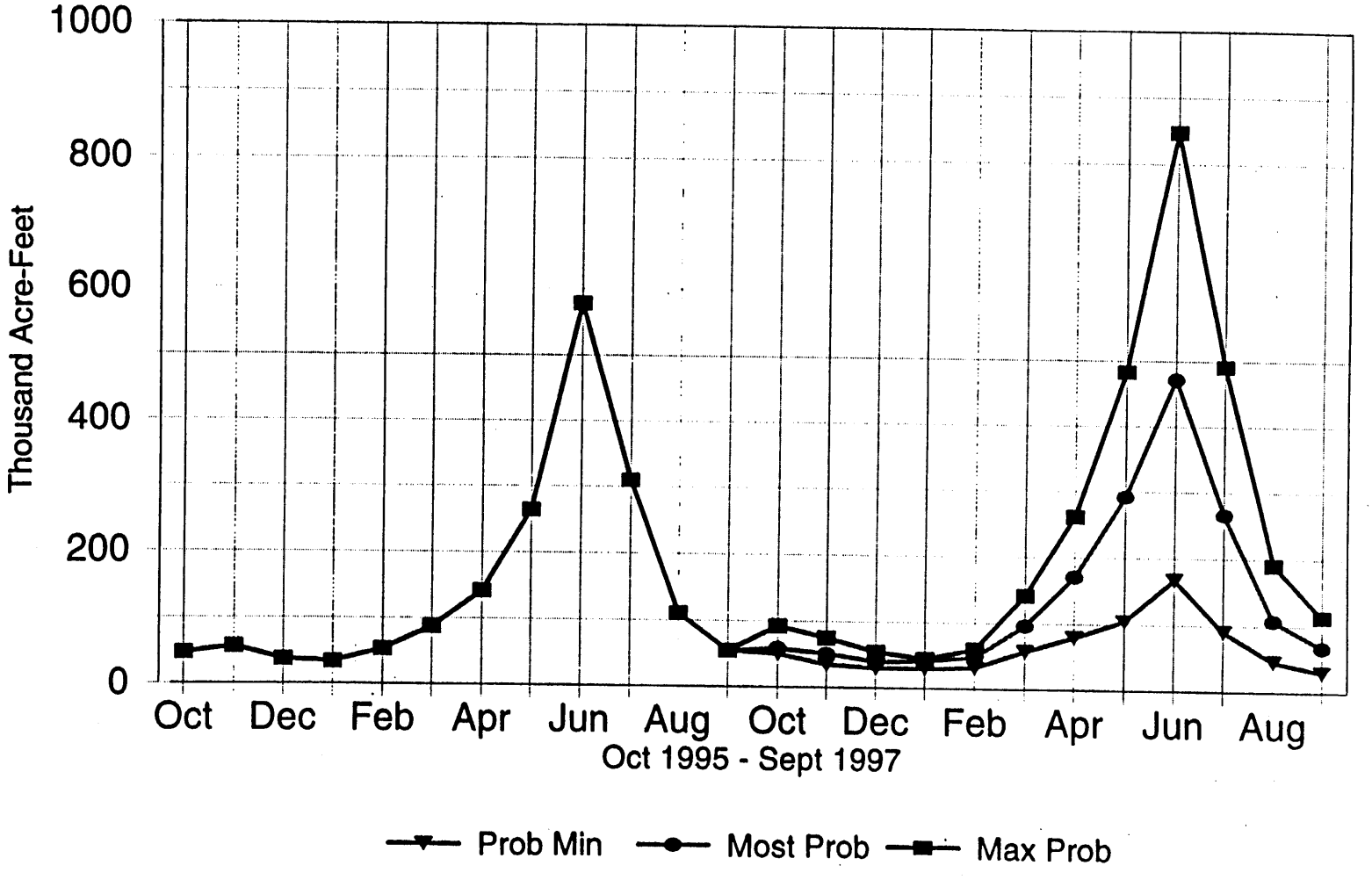


Flaming Gorge

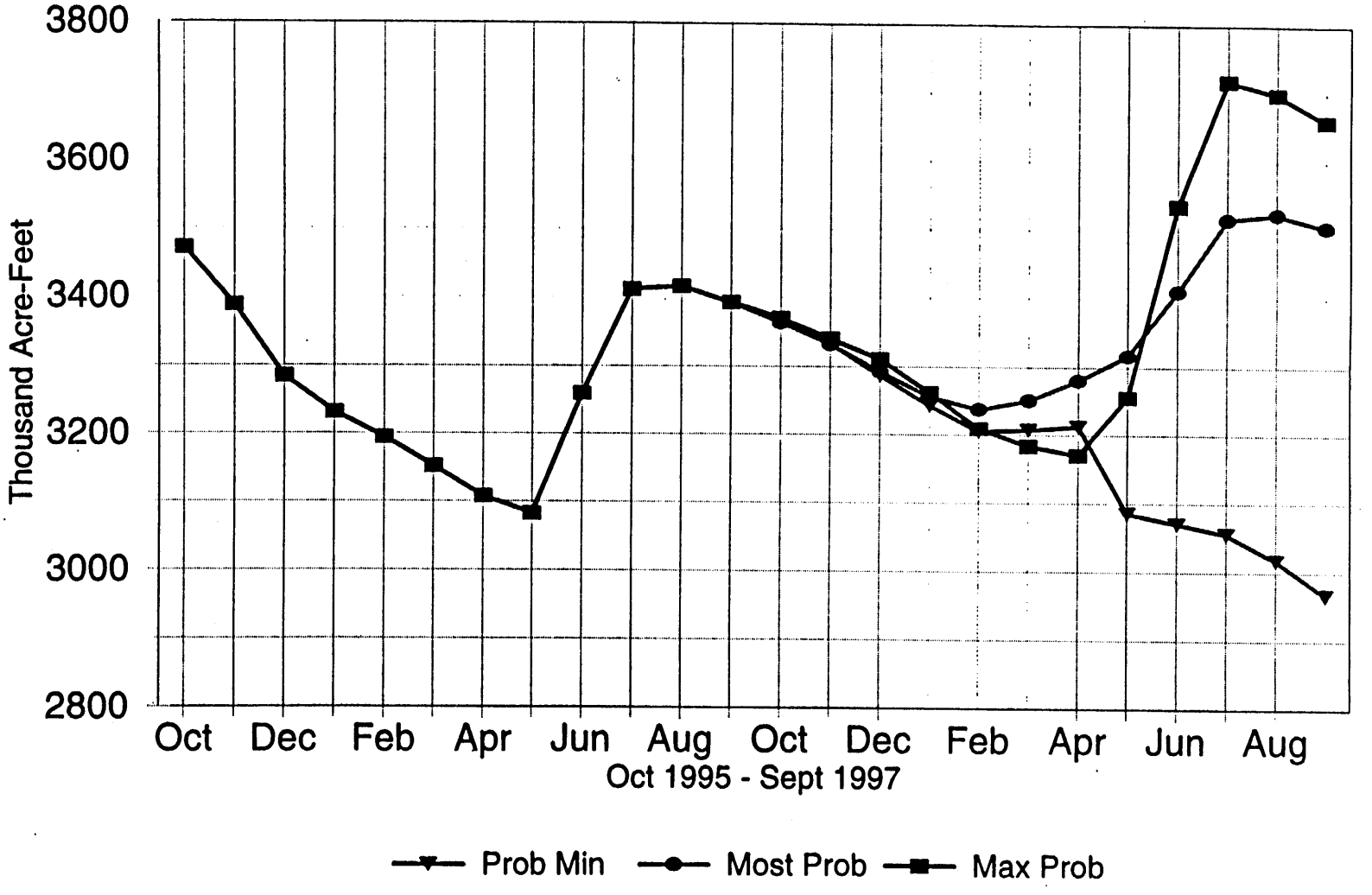
Flaming Gorge Monthly Release

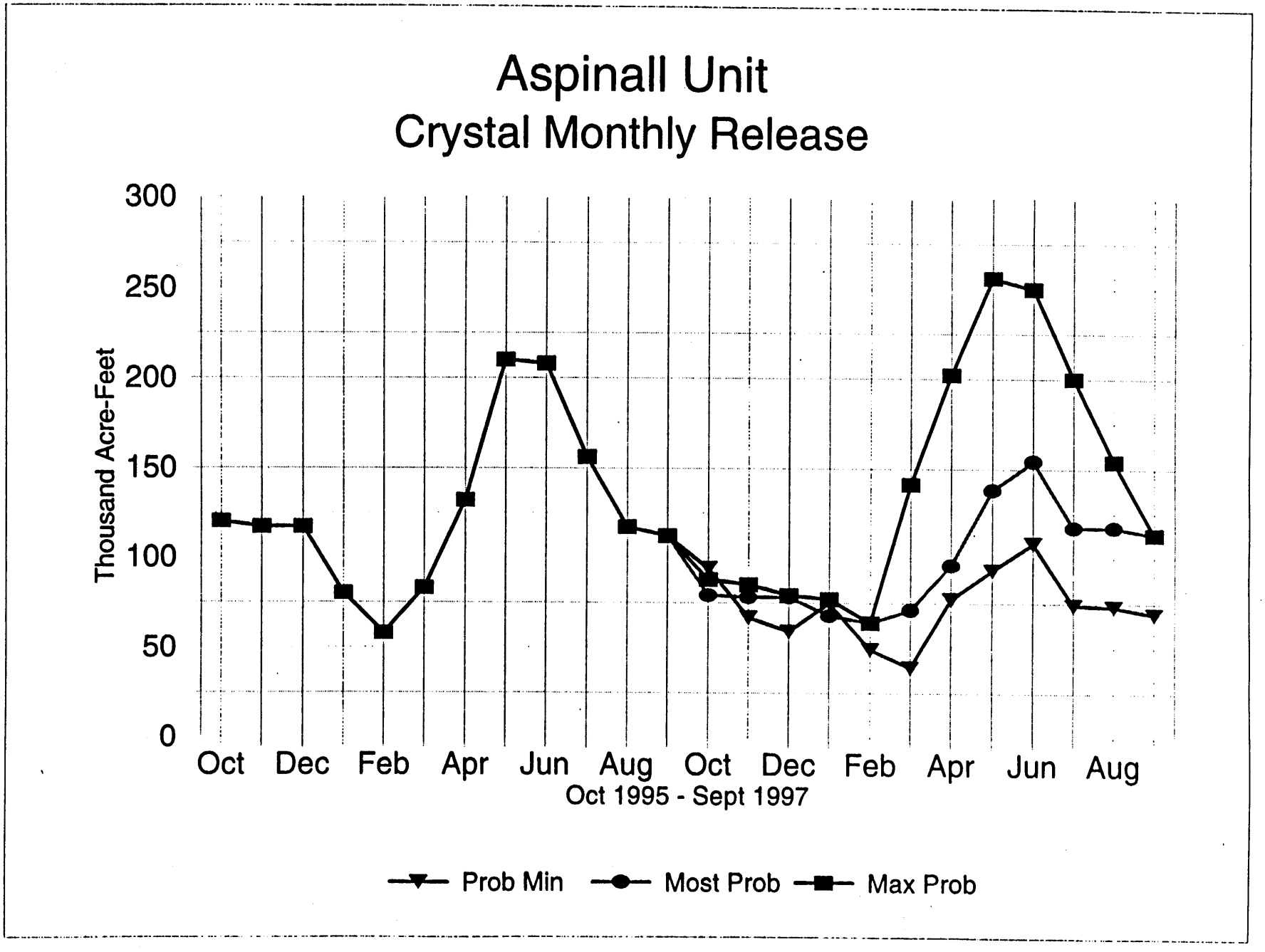


Flaming Gorge
Monthly Unregulated Inflow

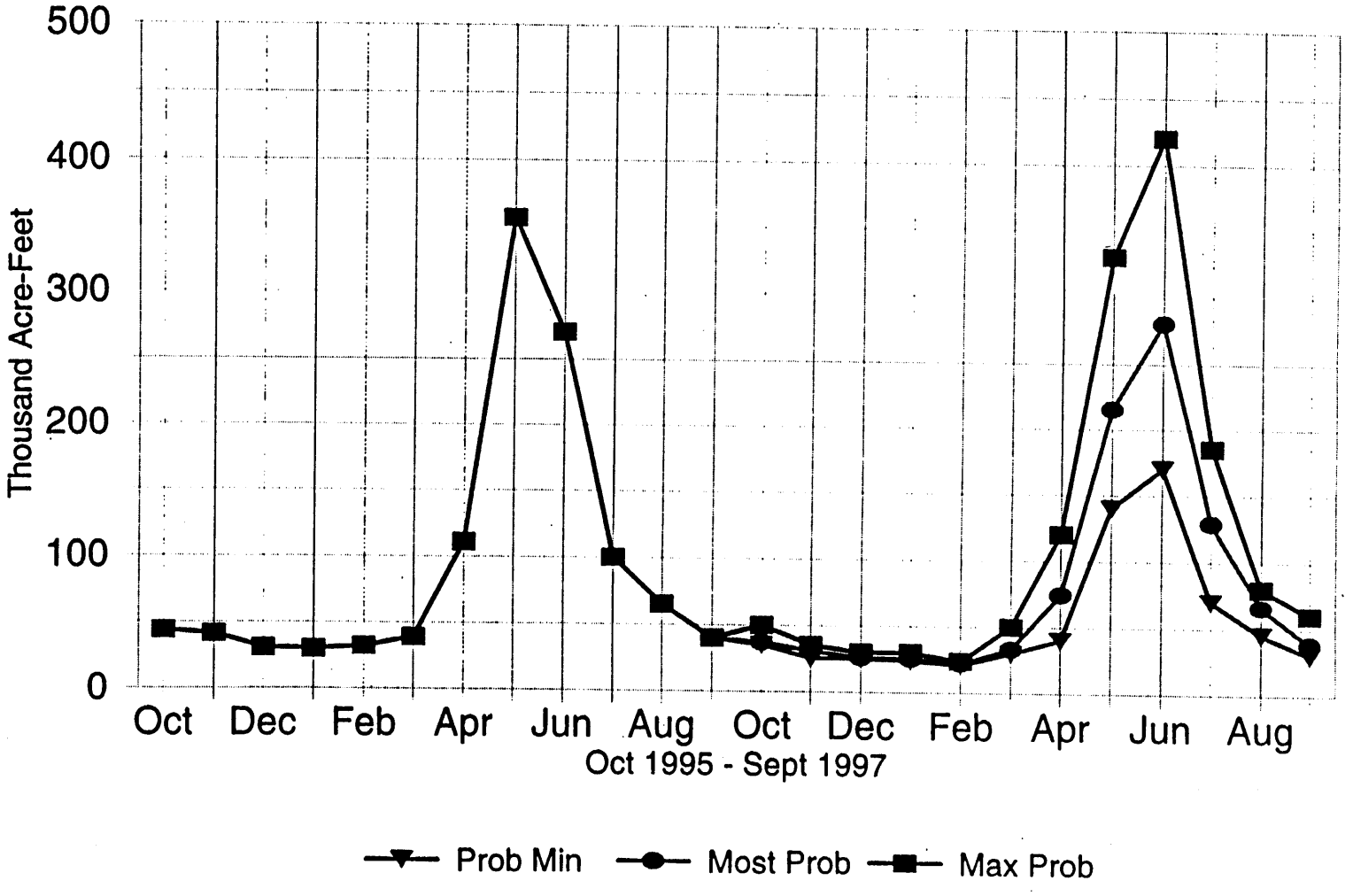


Flaming Gorge
End of Month Storage

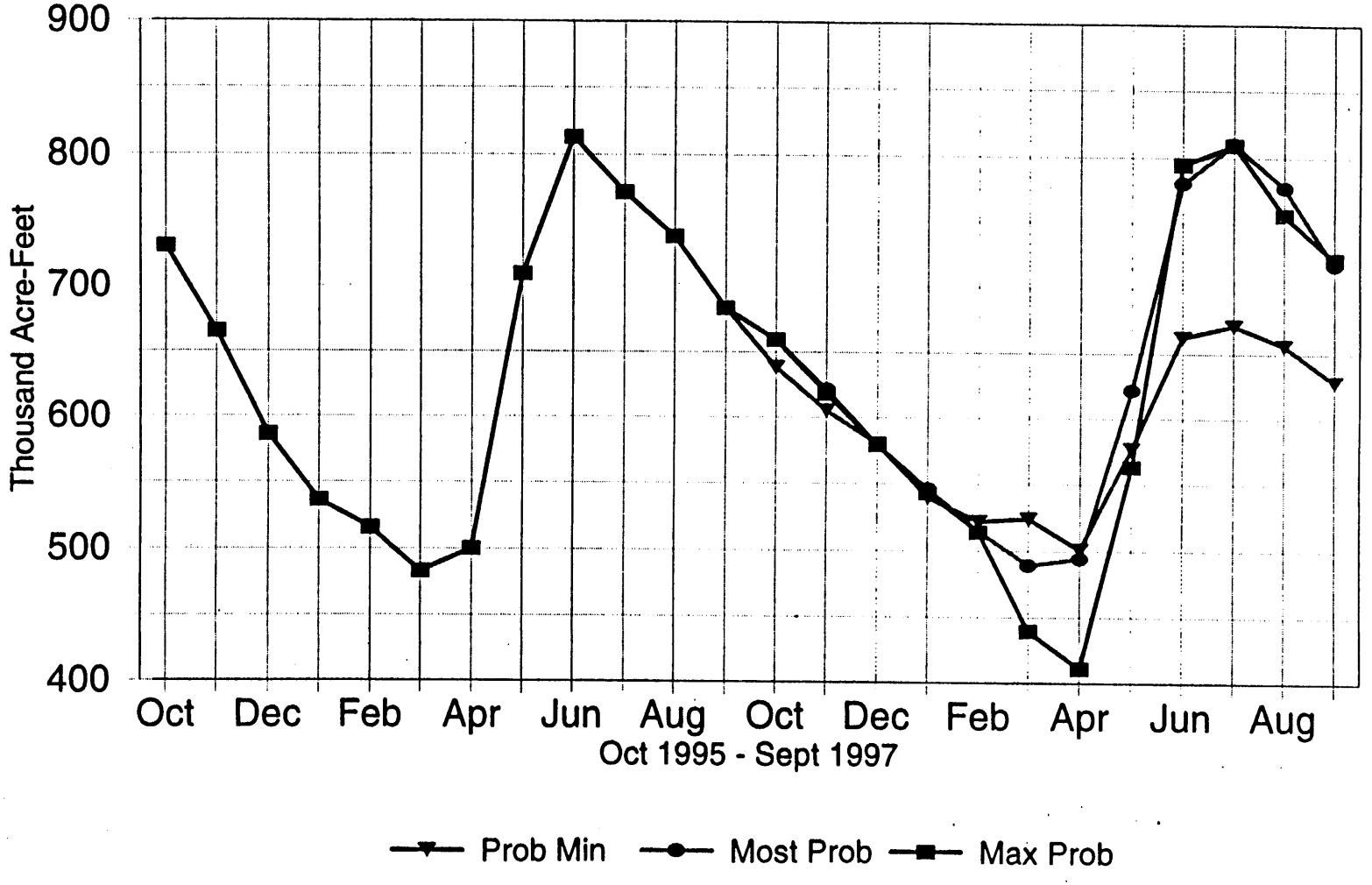


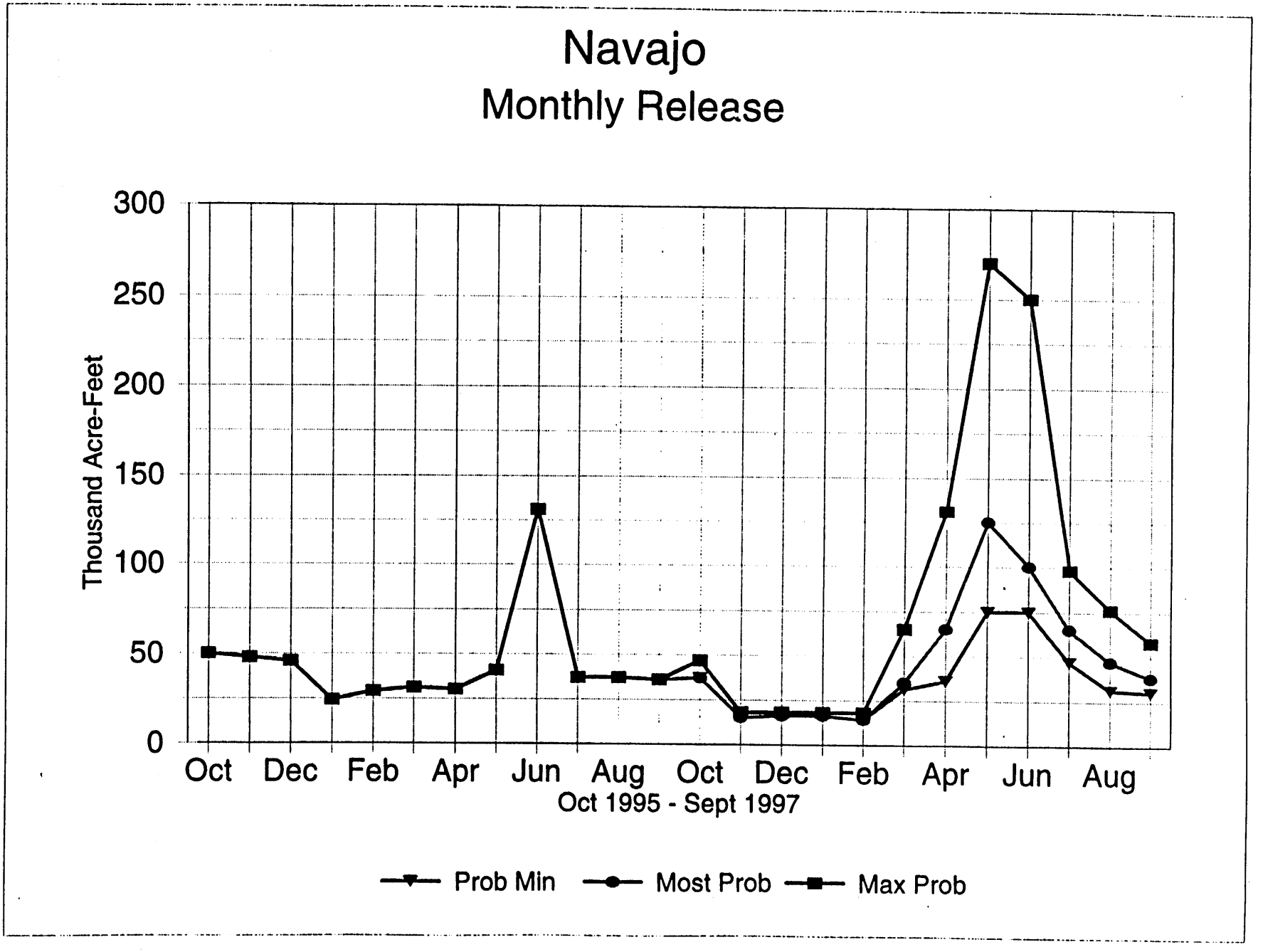

Aspinall Unit
Crystal Monthly Release
Thousand Acre-Feet
300
250
200
150
100
50
0
Oct
Dec
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Oct 1995 - Sept 1997
Prob Min
Most Prob
Max Prob

Aspinall Unit
Blue Mesa Unregulated Monthly Inflow

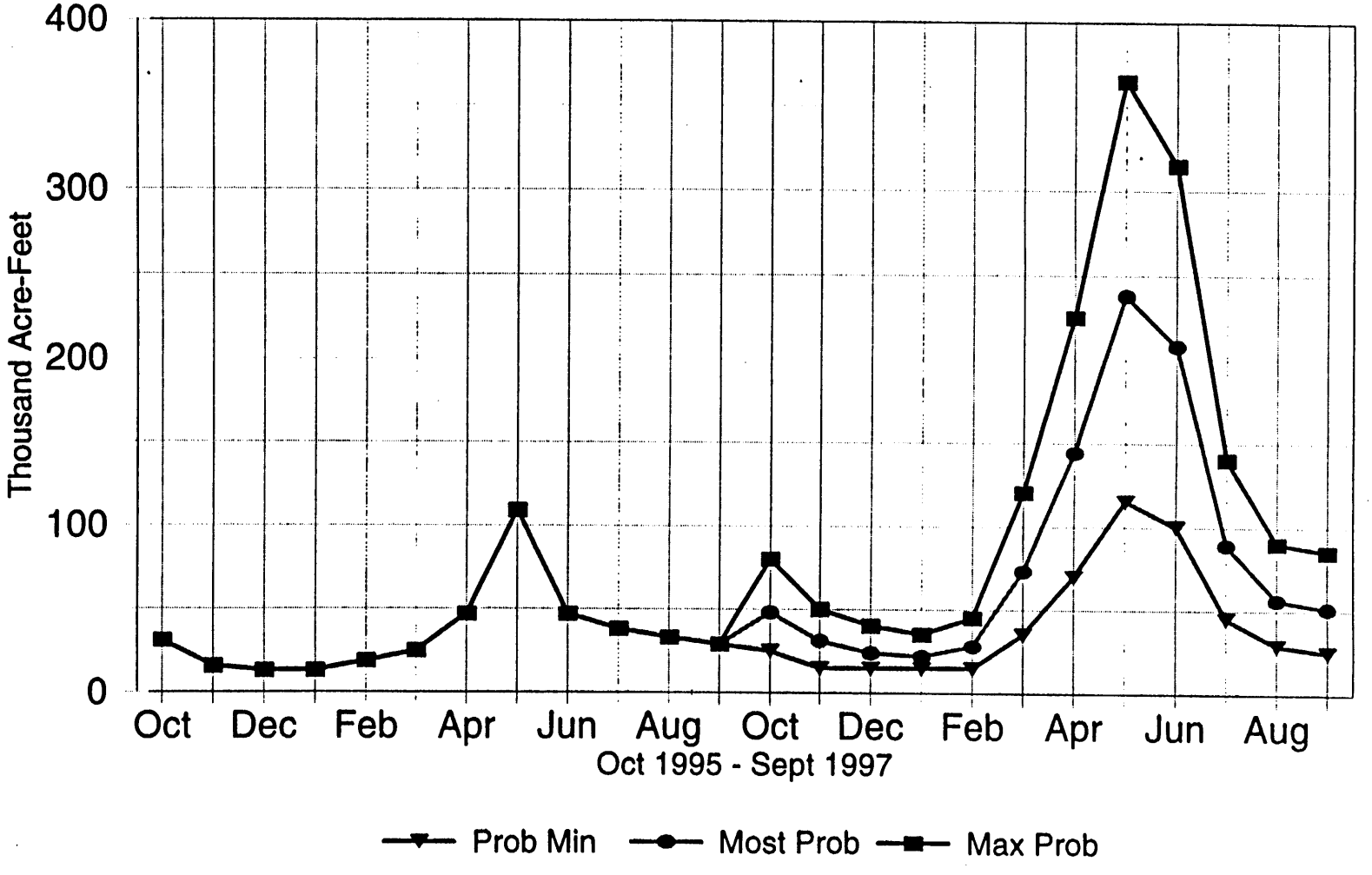


Blue Mesa
End of Month Storage

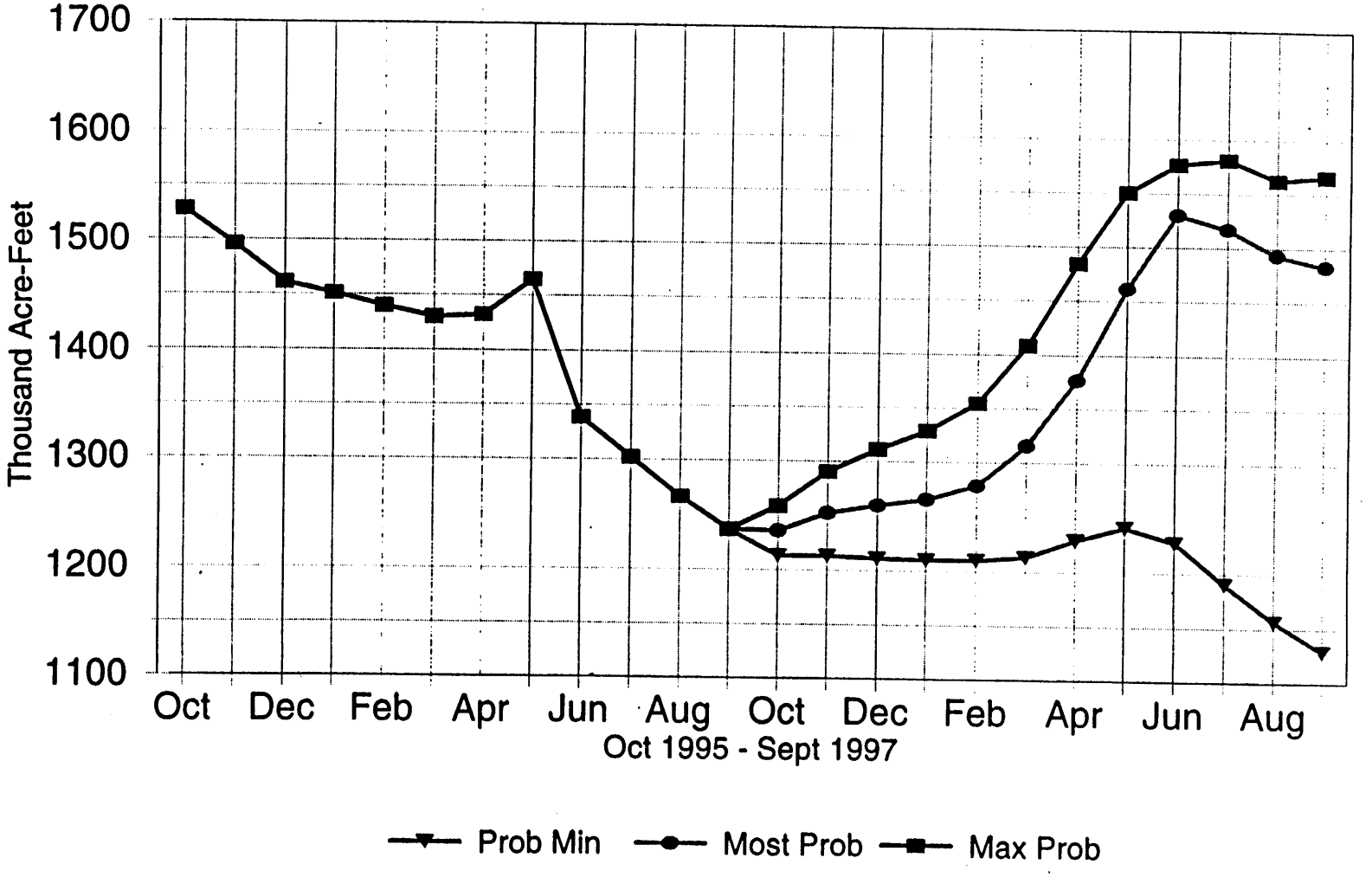


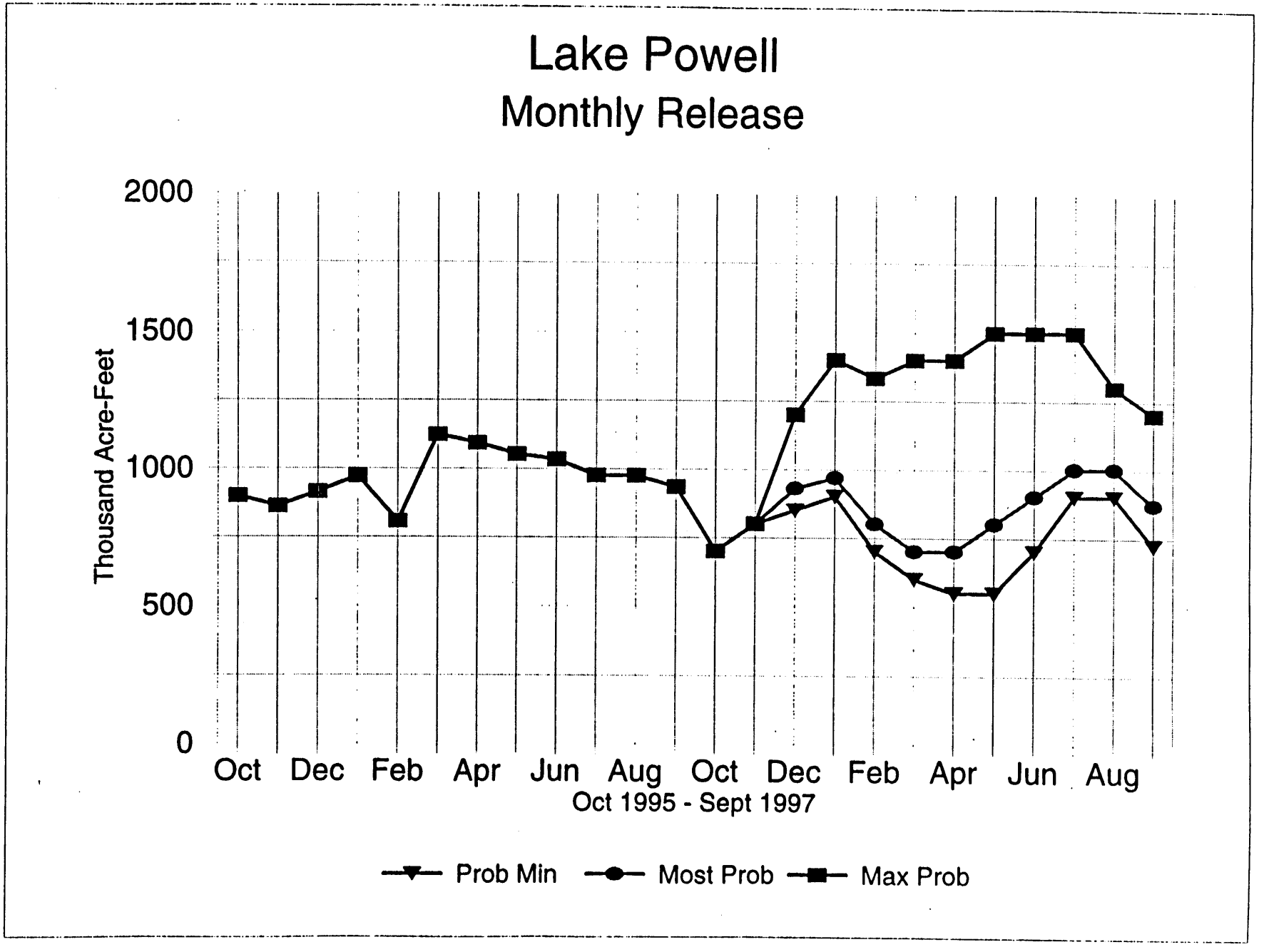

Navajo
Monthly Release
300
250
200
150
100
50
0
Thousand Acre-Feet
Oct
Dec
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Oct 1995 - Sept 1997
Prob Min
Most Prob
Max Prob

Navajo
Monthly Inflow

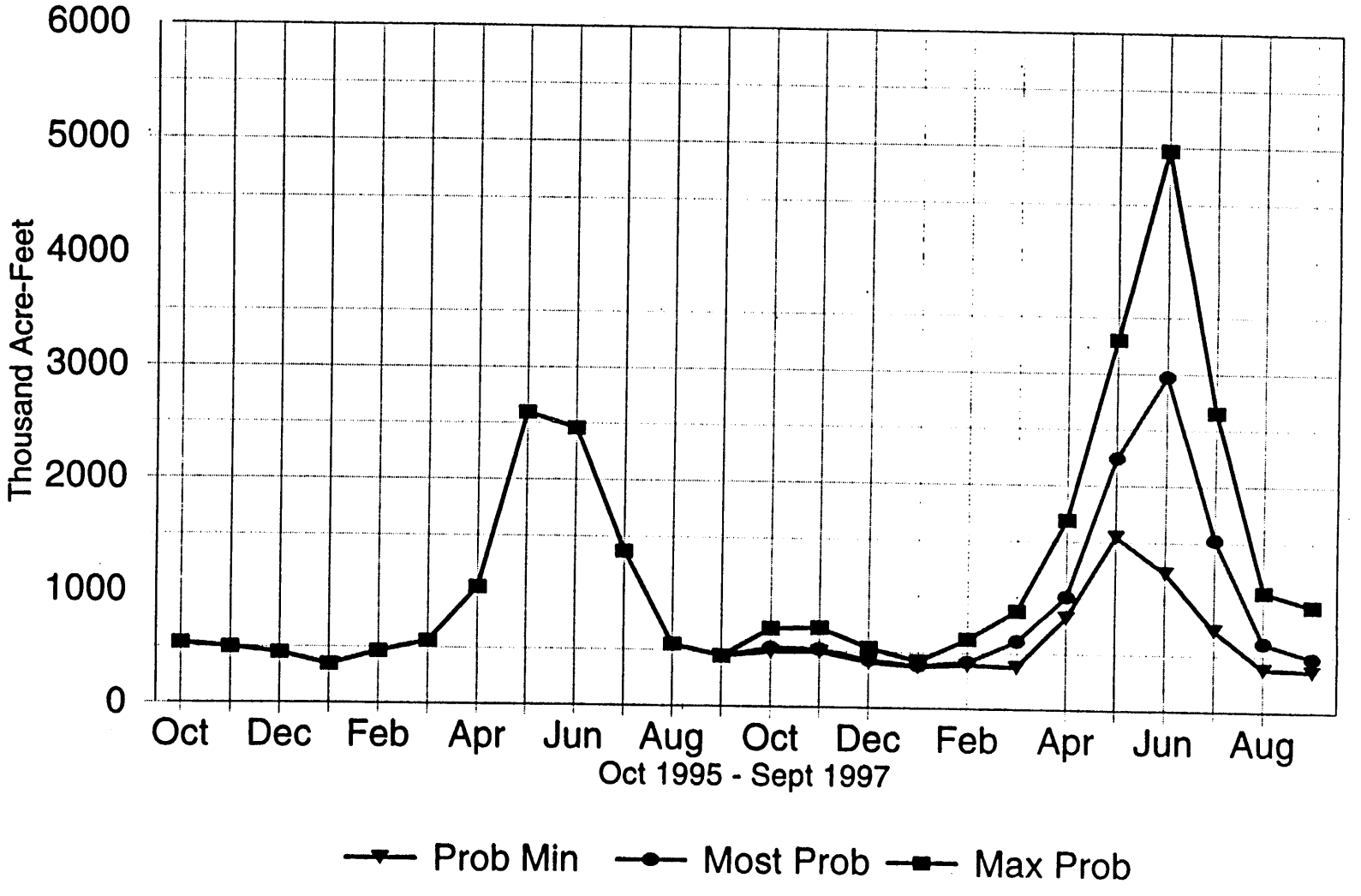


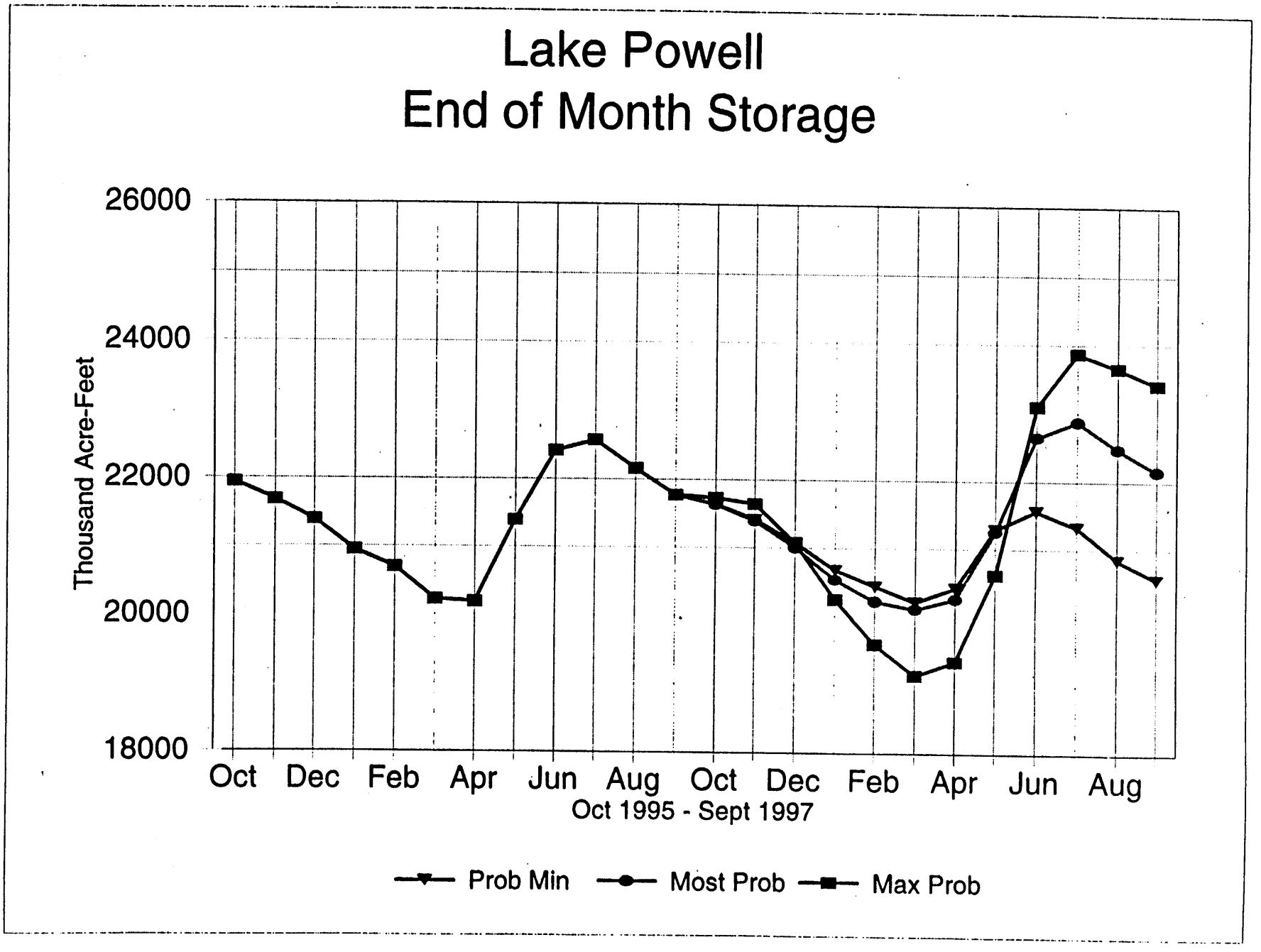
Navajo
End of Month Storage

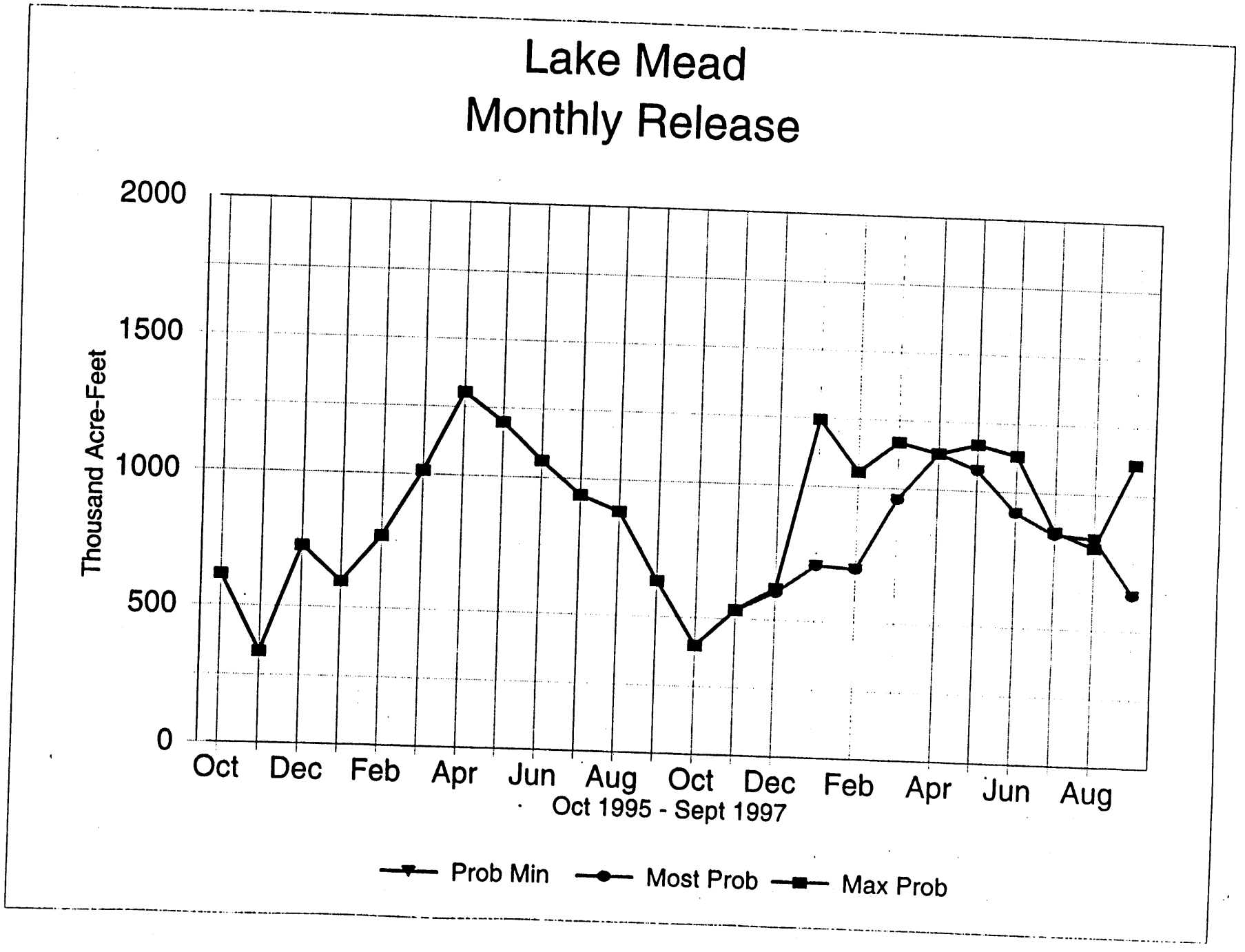


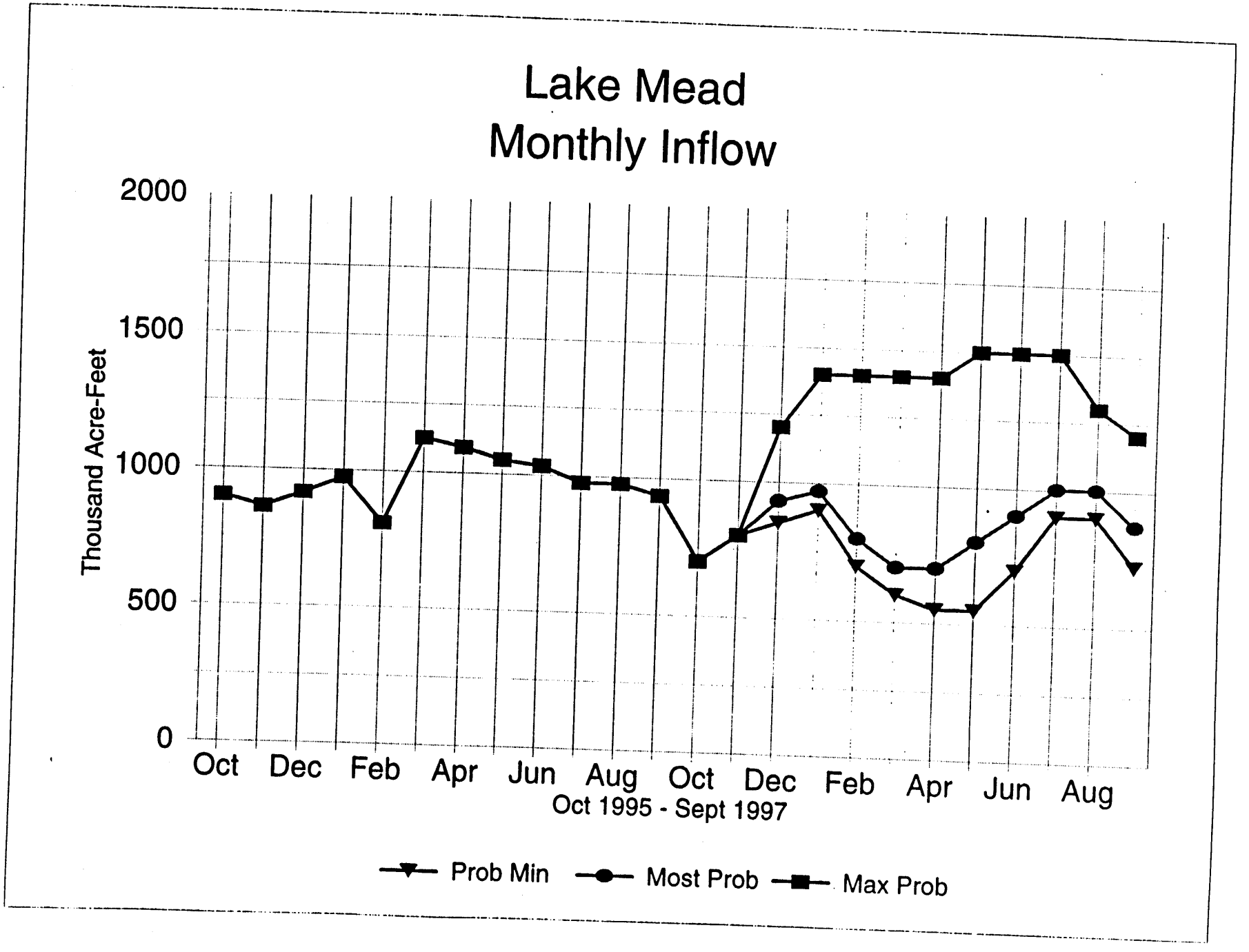

Lake Powell
Monthly Release
2000
1500
1000
500
0
Thousand Acre-Feet
Oct
Dec
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Oct 1995 - Sept 1997
Prob Min
Most Prob
Max Prob

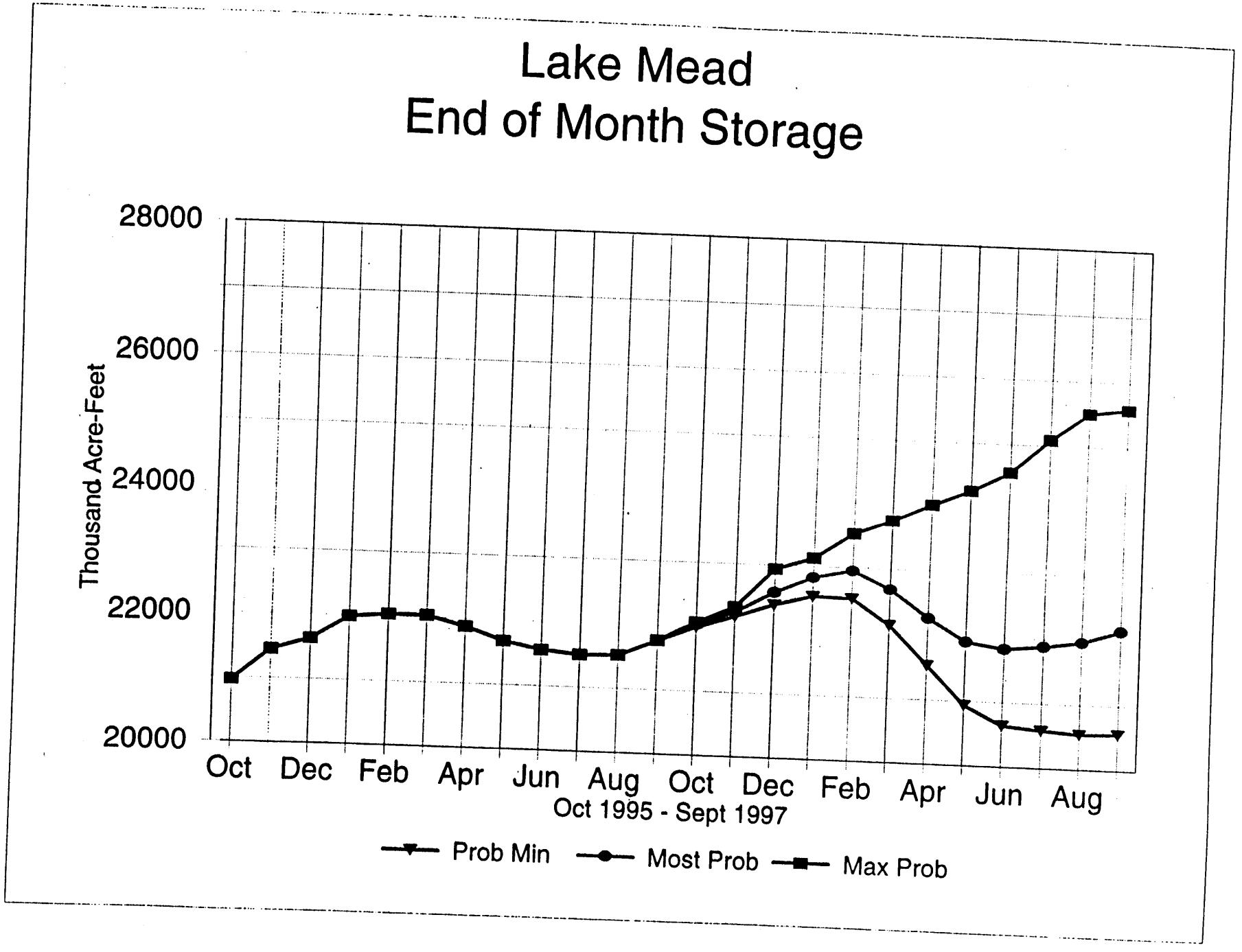
Lake Powell
Monthly Unregulated Inflow




Lake Powell
End of Month Storage
Thousand Acre-Feet
26000
24000
22000
20000
18000
Oct
Dec
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Oct 1995 - Sept 1997
Prob Min
Most Prob
Max Prob


Lake Mead
Monthly Release
2000
1500
1000
500
0
Thousand Acre-Feet
Oct
Dec
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Oct 1995 - Sept 1997
Prob Min
Most Prob
Max Prob


Lake Mead
Monthly Inflow
2000
1500
1000
500
0
Thousand Acre-Feet
Oct
Dec
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Oct 1995 - Sept 1997
Prob Min
Most Prob
Max Prob


Lake Mead
End of Month Storage
28000
26000
24000
22000
20000
Thousand Acre-Feet
Oct
Dec
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Oct 1995 - Sept 1997
Prob Min
Most Prob
Max Prob