Annual Operating Plans Niobrara, Lower Platte and Kansas River Basin

Calendar Year 1998 Summary of Actual Operations

And

Calendar Year 1999 Annual Operating Plans

U.S. DEPT. OF THE INTERIOR
BUREAU OF RECLAMATION
GREAT PLAINS REGION

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SYNOPSIS

General

This year is the 46th consecutive year that an Annual Operating Plan (AOP) has been prepared for the Federally-owned dams and reservoirs serving an irrigation function in the Niobrara, Lower Platte, and Kansas River Basins. The plan has been developed by the Water Operations Group, McCook, Nebraska for the 17 dams and reservoirs that are located in Colorado, Nebraska, and Kansas. These reservoirs, together with 11 diversion dams, 11 pumping plants, and 23 canal systems, serve approximately 325,600 acres of project lands in Nebraska and Kansas. In addition to irrigation and municipal water, these features serve flood control, recreation, and fish and wildlife purposes. A map in the appendix of this report shows the location of these features.

The reservoirs in the Niobrara and Lower Platte River Basins are operated by either irrigation or reclamation districts. The reservoirs in the Kansas River Basin are operated by either the Bureau of Reclamation (Reclamation), or the Corps of Engineers. Kirwin Irrigation District provides operational and maintenance assistance for Kirwin Dam. The diversion dams, pumping plants, and canal systems are operated by either irrigation or reclamation districts.

A Programmable Master-Station Supervisory Control System (PMSC) located at McCook is used to assist in operational management of all 11 dams under Reclamation's jurisdiction that are located in the Kansas River Basin. A Hydromet system collects and stores near real-time data at selected stations in the Nebraska-Kansas Projects. The data includes water levels in streams, canals, and reservoirs and also gate openings. This data is transmitted to a satellite and downloaded to a Reclamation receiver in Boise, Idaho. The data can then be accessed by anyone interested in monitoring water levels or water usage in an irrigation system. The Nebraska-Kansas Projects currently has 75 Hydromet stations that can be accessed and plan to install 8 more in the next two years. When fully implemented, the projects will have a Hydromet station installed to provide real-time data on all reservoirs, diversion dams, and most of the measuring structures in the irrigation systems. These stations can be accessed through the use of the Internet.

The Headlines 98 that follows this synopsis is indicative of the awareness that the local people have of the natural resource development and conservation in the Niobrara, Lower Platte, and Kansas River Basins.

1998 Summary

Climatic Conditions

Precipitation at the project dams during 1998 ranged from 65 percent of normal at Red Willow Dam to 127 percent of normal at Cedar Bluff Dam. Very little precipitation was recorded in the projects area during January. February precipitation was above normal at Reclamation dams in the Kansas River Basin and below normal at dams located in north central Nebraska. Temperatures were well above normal during the first two months of the year. Dry conditions persisted at Reclamation facilities in the Upper Republican River Basin through June. Project

dams located in the Lower Republican River Basin and Solomon River Basin recorded above normal precipitation during March and April and well below normal precipitation amounts during the late spring months of May and June. Lovewell Dam recorded nearly four inches of precipitation during the first week of April. Notable runoff events occurred in north central Kansas as a result of this early April rainfall. Temperatures varied from nearly five degrees above normal in May to slightly below normal during March and June. Eight project dams located in the Kansas River Basin recorded less than two inches of precipitation during June. Dam sites in north central Nebraska averaged over six inches of precipitation during this same month.

Southwest Nebraska and northwest Kansas experienced some relief from the dry conditions in July. Five project dam sites recorded over six inches of rainfall during July, ranking these sites in the top six ever recorded for the month at the respective dams. This timely precipitation helped in reducing the demands of several irrigation districts. A thunderstorm produced from two to five inches of rain in the Smoky Hill River Basin near Cedar Bluff Dam on August 1st and 2nd. Runoff from this storm filled the conservation pool of Cedar Bluff Reservoir for the first time since 1966. Drier conditions returned in mid-August continuing through September. Temperatures were near normal during the high irrigation demand months of July and August.

September temperatures averaged nearly seven degrees above normal with highs averaging around 90 degrees. Project dams located in Kansas received from two to three inches of precipitation during the first three days of November. Four of these dams recorded either the greatest or second greatest November precipitation total ever at the respective dams. Temperatures averaged well above normal from mid-November through early December with daytime highs reaching into the 70's. Precipitation was nearly non-existent throughout the projects area during December. Project dams in southwest Nebraska averaged 81% of normal precipitation for the year, while dams located in northern Nebraska averaged 113% of normal.

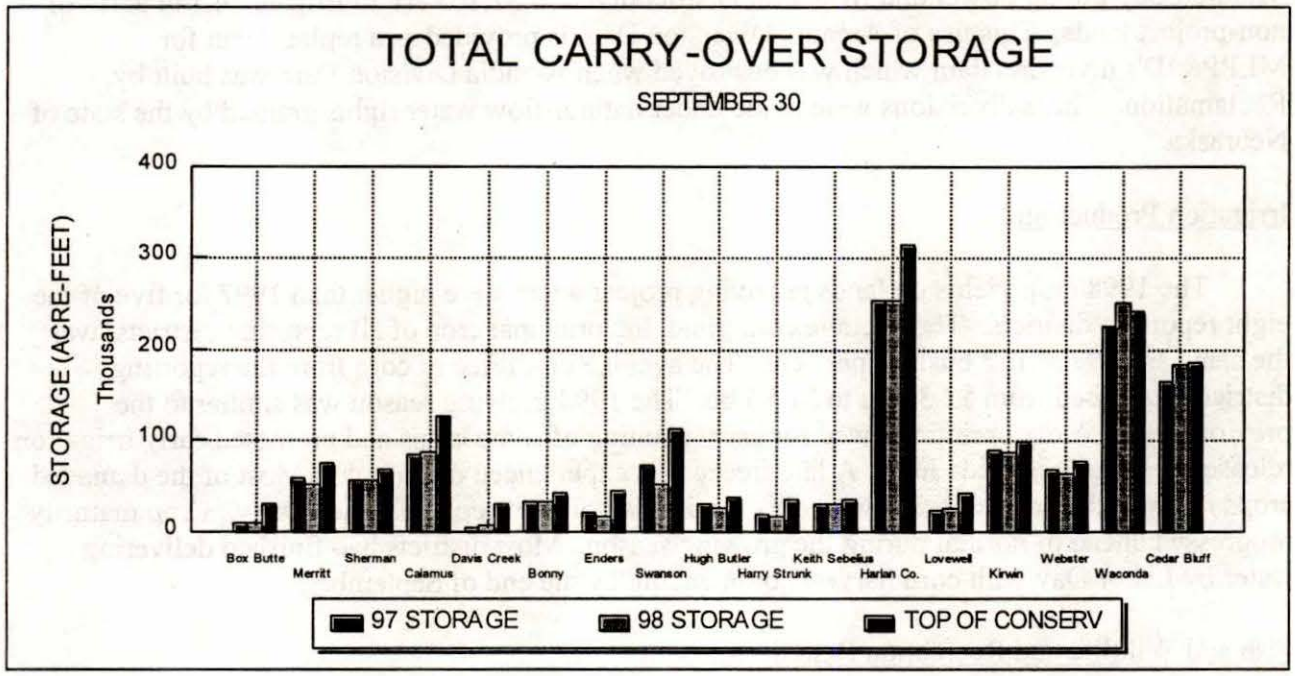
Storage Reservoirs

1. Conservation Operations. The 1998 inflow was above the dry-year forecast at all of the project reservoirs with the exception of Enders Reservoir. Box Butte and Bonny Reservoirs along with Swanson, Hugh Butler and Harry Strunk Lakes had inflows between the dry- and normal-year forecasts. Keith Sebelius, Harlan County and Waconda Lakes along with Calamus, Davis Creek, Sherman, Merritt, Lovewell, Kirwin and Webster Reservoirs had inflows between the normal- and wet-year forecasts. Cedar Bluff Reservoir had inflows above the wet-year forecast.

Nebraska-Kansas Projects reservoirs had near or above average carryover storage from the 1997 water year with the exception of Harry Strunk Lake and Lovewell Reservoir. Southwest Nebraska reservoirs along with Bonny Reservoir in eastern Colorado recorded below normal inflows for each of the first six months of 1998. Inflows to project reservoirs in Kansas were above normal through April. Reservoir releases were required from Medicine Creek, Harlan County, Lovewell, Kirwin, Webster, Glen Elder, Merritt and Virginia Smith Dams to either reduce or maintain reservoir levels prior to the 1998 irrigation season. Just prior to the irrigation season, only Enders and Box Butte Reservoirs did not have sufficient storage to provide water users with a full water supply. Sargent and Farwell Districts would receive their usual supply. The high

irrigation demand months of July and August significantly reduce storage in most project reservoirs. Timely precipitation during July of 1998 helped in reducing the demands on some of the reservoirs. Of the seven project reservoirs that had some flood storage occupied prior to the irrigation season, only Waconda Lake had water stored in the flood pool at the end of July. Reservoir storage remained near or above normal at the end of the irrigation season with the exception of Swanson Lake, Harry Strunk Lake, Enders Reservoir and Lovewell Reservoir in the Republican River Basin.

The following summarized graph shows a comparison of 1997 and 1998 carry-over storage conditions as compared to the top of conservation storage for all reservoirs in the Niobrara, Lower Platte, and Kansas River Basins as of September 30th.



2. Flood Control Operations. Harry Strunk, Keith Sebelius, Waconda and Harlan County Lakes along with Lovewell, Kirwin, Webster and Cedar Bluff Reservoirs utilized flood pool storage in 1998. With the exception of Keith Sebelius Lake, releases were made from the other seven reservoirs to reduce or maintain pool levels during the year. The total 1998 flood control benefits accrued by the operation of the Nebraska-Kansas Projects facilities was $1,064,000 as determined by the Corps of Engineers. The accumulative total of flood control benefits for the years 1951 through 1998 by facilities in this report total $1,775,061,000 (see table 5). To date no benefits have been accrued by the operation of Box Butte, Merritt, Sherman, Calamus, or Davis Creek Reservoirs.

A summary of precipitation, reservoir storage and inflows at Nebraska-Kansas Projects facilities can be found in table 7.

Water Service

There were 496,768 AF of water diverted to irrigate approximately 307,791 acres of project lands in the 14 irrigation districts (see tables 3 and 6). The project water supply was either inadequate or limited for 32,752 acres of the total project lands. This includes lands in Mirage Flats, Frenchman Valley and H&RW Irrigation Districts. The project water supplies for the other units mentioned in this report were more than adequate in 1998.

The water requirements of three municipalities, one rural water district, and two fish hatchery facilities were furnished from storage releases or natural flows.

Under a long-term contract with Reclamation for the use of Arcadia Diversion Dam, the Middle Loup Public Power and Irrigation District diverted 31,163 AF to irrigate 14,144 acres of non-project lands. This use of Arcadia Diversion Dam is provided as a replacement for MLPP&ID's diversion dam which was destroyed when Arcadia Division Dam was built by Reclamation. These diversions were made under natural-flow water rights granted by the state of Nebraska.

Irrigation Production

The 1998 crop yields on lands receiving project water were higher than 1997 for five of the eight reporting districts. The average corn yield, the principal crop of all reporting districts, was the same as 1997 at 152 bushels per acre. The average unit price of corn from the reporting districts decreased from $2.39/bu to $1.86/bu. The 1998 growing season was similar to the previous year. A dry spring allowed for early planting of some crops and promoted early irrigation releases beginning in mid- June. A late freeze was experienced on June 5th. Most of the damaged crops recovered from the freeze with only a minor amount of replanting necessary. Crop maturity progressed ahead of normal during the growing season. Most districts had finished delivering water by Labor Day with corn harvest commencing by the end of September.

Fish and Wildlife and Recreation Benefits

The National Recreational Fisheries Policy declares that the Government's vested stewardship responsibilities must work in concert with the state managing agency's recreational fisheries constituency and the general public to conserve, restore, and enhance recreational fisheries and their habitats. As a result of this policy, Reclamation has developed fishery management guidelines for reservoirs within the Nebraska-Kansas Projects. These guidelines outline a program which considers public use, fisheries, fish habitat, and improved communication and coordination. The Nebraska-Kansas Area Office is available for meetings if requested with Nebraska, Colorado, and Kansas state management agencies to discuss the Annual Operating Plans (AOP). Information is solicited that will allow Reclamation the flexibility to enhance fisheries resources while still meeting contractual obligations with the various irrigation districts.

During the early part of the 1998 season, normal reservoir operations were favorable for recreation and fish and wildlife uses. Above normal carry-over storage from the 1997 season

resulted in most reservoirs storing water above normal pool levels early in the year. Several reservoirs encroached into the flood pool during the late spring and maintained near or above normal levels throughout the summer with the exception of those located in southwest Nebraska. Normal summer drawdown due to irrigation releases allowed for late summer shoreline revegetation.

Re-authorization of the North Loup Project by the Act of October 18, 1986 [Public Law 99-591, Section 101(e)] authorized the construction of a fish hatchery below Virginia Smith Dam and Calamus Reservoir. The hatchery was constructed under Public Law 89-72 and a cost-sharing agreement with the Nebraska Game and Parks Commission with 75 percent federal and 25 percent state funds. Administration of construction was accomplished by the Commission; construction began in July 1989, and was completed in September 1991. The hatchery consists of an office/visitor center, laboratory, 2 residences, a shop and feed storage building, 51 rearing ponds lined with VLDPE and covering 45.5 acres, 24 concrete raceways, 2 lined effluent ponds, 8 groundwater wells, a 36-inch diameter buried pipeline from Virginia Smith Dam, a groundwater degassing tank, and a computerized monitoring and alarm system. The hatchery is operated and maintained by the Commission and in full operation should produce about 53 million fish per year. Water supply is provided by natural flows passed through Virginia Smith Dam and from Calamus Reservoir storage through an agreement dated July 28, 1988, between the Commission and the Twin Loups Reclamation District.

1999 Outlook

Three detailed studies have been developed for each of the reservoirs in the Niobrara, Lower Platte, and Kansas River Basins conforming with established operating criteria under various reservoir inflow conditions. These operation studies are included in table 4, sheet 1 through 17. The municipal and rural water district water supply requirements will be met under all three inflow forecast conditions for all units.

Under reasonable minimum inflow forecast conditions, irrigation districts receiving storage water from the following lakes and reservoirs are expected to receive less than a full supply: Box Butte, Sherman, Enders, Swanson, Hugh Butler, Harry Strunk, Keith Sebelius, Harlan County and Lovewell. The irrigation districts affected are Mirage Flats; Sargent and Farwell; Frenchman Valley and H&RW; Frenchman Cambridge; Almena; and Nebraska and Kansas Bostwick; respectively. If 1999 is a dry year, 206,900 of the total 313,400 acres estimated to be irrigated (66 percent) will have an inadequate water supply.

Under most probable inflow conditions, it is also expected that Frenchman Valley, H&RW, and Mirage Flats Irrigation Districts would experience some shortages to irrigation demands from Enders and Box Butte Reservoirs. Irrigators in several districts (Mirage Flats, Almena, Frenchman Valley, and H&RW) plan to use water from private wells to supplement the project water supply.

During 1999, under all inflow forecast conditions, storage water will be in excess of project needs at Bonny Reservoir and Waconda Lake. The state of Colorado will make Bonny storage water available to downstream water right appropriators.

Under reasonable minimum inflow conditions, the conservation pools at Merritt, Sherman, Calamus, Davis Creek and Lovewell Reservoirs would fill during 1999.

Even with low reservoir levels and inadequate water supplies for some project lands, the recommendations of various state agencies will be considered. As in the past, irrigation and reclamation districts will advise state agencies regarding aquatic weed control and canal operations. Reclamation will continue to operate the reservoirs and other facilities under its jurisdiction in the best interests of all project functions and for the optimum public benefit.

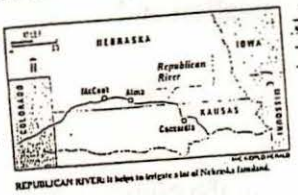
HEADLINES '98

Omaha World-Herald

Kansas Sues Nebraska

Justices Asked to Hear River Case

BY ALICE ANDERSON



REPUBLICAN RIVER: It helps to irrigate a lot of Nebraska farmland.

Irrigators Seek Say On Pact

Farmers and ranchers from three states want to be represented in working out details of Platte River agreement

Bureau meeting to discuss impact of water agreement

Conservation pools almost full

From Farm to Fun to the Suburbs, Many Interests Competing for Water

Justice: Kansas has case

Agency urges Supreme Court to hear river suit

River Management Plan Is Released For Public Review

Corps Cuts Releases to Offset Heavy Rainfall in River's Basin

Future appears promising for cloud seeding efforts

Reservoir transformed former 'desert'

Area Irrigators Oppose Well Meters

International groundwater youth summit comes to G.I. this weekend

McCOOK DAILY GAZETTE

Bureau working to preserve Harry Strunk Lake archeological sites

Farmers to measure water usage

New Area Manager Appointed At Bureau Of Reclamation's Nebraska-Kansas Office

Nebraska: No Harm, No Case

Arguing over the Republican River, Nebraska tells the U.S. Supreme Court that Kansas hasn't suffered

NRD reports decrease in valley's groundwater

McCook Daily Gazette

Releasing water is flat out wrong

Lake officials shouldn't be so hasty in pulling the switch and should relish the fact that Cedar Bluff is so full

Isolated storm in Kansas causes severe flooding in Webster County

U.S. Supreme Court Wants Input For Kansas-Nebraska Water Dispute

Reclamation Bureau invites Nebraskans to comment on habitat development

Area reservoirs are short of rainfall for year

Man-made lakes need repair

Decisions today crucial for irrigators

BOR to discuss water contracts

Bureau of Reclamation lakes draw 80 million visitors annually. The government is eager to draw even more visitors, but many of the parks and boat launches at these lakes are showing their age and need costly repairs.

Water meeting considers environment

River Management Plan Is Released For Public Review

Despite forecasts, aquifer's levels are making a comeback

Hot weather spurs irrigation demand

Rains perk up pastures, crops

Bumper wheat crop is payment qualifier

Irrigators nervous about conflict

Research in the Republican River Alluvium

Highway closed; water released from lake

Power companies join in river meetings

- Republican lawsuit worries company officials

CHAPTER I - INTRODUCTION

Purpose of This Report

This AOP advises water users, cooperating agencies, and other interested groups or persons of the actual operations during 1998 and serves as a guideline for the 1999 operations. This report also describes the responsibilities of Reclamation, Corps of Engineers, and the irrigation and reclamation districts in the Niobrara, Lower Platte, and Kansas River Basins.

Operational Responsibilities

Reclamation is responsible for irrigation operations at all federal reservoirs in the Nebraska-Kansas Projects. Reclamation is also responsible for the operation and maintenance (O&M), safety of the structure, and reservoir operations not specifically associated with regulation of the flood control storage at the reservoirs constructed by Reclamation. Regulation of the flood control storage is the responsibility of the Corps of Engineers. In addition to irrigation and flood control, these reservoirs provide recreation, fish and wildlife, and municipal benefits.

By contractual arrangements with Reclamation, the irrigation or reclamation districts in the Niobrara, Lower Platte, and Kansas River Basins are responsible for the O&M of the canals and irrigation distribution facilities constructed or rehabilitated by Reclamation. In addition, the appropriate irrigation or reclamation districts are responsible for operating and maintaining Box Butte, Merritt, Sherman, Virginia Smith and Davis Creek Dams. The operation and maintenance of Virginia Smith and Davis Creek Dams was transferred to the Twin Loups Reclamation District on January 1, 1997. The Corps of Engineers operates and maintains Harlan County Dam and Lake. The state of Colorado provides operational guidelines for Bonny Reservoir. Operational guidelines for Cedar Bluff Reservoir will be provided by the State of Kansas. Reclamation operates and maintains 11 dams and reservoirs in the Republican, Solomon, and Smoky Hill River Basins. Under a contract with Reclamation, Kirwin Irrigation District performs certain operational and maintenance functions at Kirwin Dam.

The states of Nebraska, Colorado, and Kansas are responsible for the administration and enforcement of their state laws pertaining to the water rights and priorities of all parties concerned with the use of water. The states are also responsible for administering the water surface activities and the federal lands around the reservoir. The U.S. Fish and Wildlife Service administers the water surface activities and most of the federal lands at Kirwin Reservoir.

Reclamation cooperates with all state agencies and compact commissions to ensure that all operations are in compliance with state laws and compact requirements.

Tables and Exhibits

Records for the facilities reported in the AOP are included as tables and exhibits and are located in the appendix.

Water Supply

For forecasting purposes, values of annual inflows that will be statistically equaled or exceeded 10, 50, and 90 percent of the time were selected from the probability data to be reasonable maximum (wet year), most probable (normal year), and reasonable minimum (dry year) inflow conditions, respectively.

Inflow records from 1965 through 1995 were used for the analysis of those reservoirs in the Kansas River Basin with the exception of Harlan County Lake in which records from 1976 through 1995 were used to better represent present inflows. Inflow records from 1967 through 1995 were used for the analysis of the reservoirs located in the Niobrara and Lower Platte Basins, except for Calamus Reservoir where the more recent available record of 1986 through 1995 was used.

Reservoir Operations

All operations are scheduled for optimum benefits of the authorized project functions. Monthly, or as often as runoff and weather conditions dictate, Reclamation evaluates the carry-over storage and estimated inflow at each reservoir to determine whether excess water is anticipated. If excess inflow is apparent, controlled releases will be made to maximize the downstream benefits, including flood control.

Major Features

The Mirage Flats Project was constructed under the Water Conservation and Utilization Act and includes an irrigation storage reservoir, diversion dam, and canal system. The other features discussed in this report are all a part of the Pick-Sloan Missouri Basin Program and include single and multipurpose reservoirs, diversion dams, pump stations, and canal systems. The 17 storage facilities now in operation are listed below.

Constructed by Reclamation

1. Operated by irrigation or reclamation districts--Box Butte and Merritt Dams in the Niobrara River Basin and Sherman, Virginia Smith and Davis Creek Dams in the Lower Platte River Basin. Following completion of the North Loup Project distribution works the responsibility for the operation and maintenance of Virginia Smith Dam, Davis Creek Dam and Kent Diversion Dam was transferred to the Twin Loups Reclamation District on January 1, 1997.

2. Operated by Reclamation--Bonny, Trenton, Enders, Red Willow, Medicine Creek, Norton, Lovewell, Kirwin, Webster, Glen Elder, and Cedar Bluff Dams in the Kansas River Basin. A contract provides for Kirwin Irrigation District to perform certain operational and maintenance functions at Kirwin Dam.

Constructed and Operated by the Corps of Engineers

1. Harlan County Dam in the Kansas River Basin.

Irrigation and Reclamation Districts

Fourteen irrigation districts and two reclamation districts in the Niobrara, Lower Platte, and Kansas River Basins have contracted with Reclamation for water supply and irrigation facilities. The Sargent and Farwell Irrigation Districts have contracted their O&M responsibilities to the Loup Basin Reclamation District. The Twin Loups Irrigation District has contracted their O&M responsibilities to the Twin Loups Reclamation District. Bostwick Irrigation District in Nebraska has contracted their O&M responsibilities for Courtland Canal between the headgates and the Nebraska-Kansas state line to Kansas Bostwick Irrigation District.

The contracted irrigation season for the Mirage Flats Irrigation District is April through September. The contracted irrigation season for Frenchman Valley, H&RW and Frenchman-Cambridge Irrigation Districts is from May 1st through October 15th. The contracted irrigation season for Twin Loups Reclamation District is May 1st through September 30th or such additional period from April 1st through November 15th of each year as determined between the District and Reclamation. For all other districts, the contracted irrigation season is from May 1st through September 30th.

The water service contracts for nine irrigation districts in the Nebraska-Kansas Projects will expire between 1999 and 2007. The Frenchman-Cambridge, Kansas Bostwick and Bostwick in Nebraska Irrigation Districts have water service contracts that expire on December 31, 2000. The contract for the Frenchman Valley Irrigation District will expire on December 31, 2001. The contract with the Loup Basin Reclamation District which supplies water to the Sargent and Farwell Irrigation Districts will expire on December 31, 2002. The Kirwin and Webster Irrigation District's water service contract will expire in 1999 and 2001, respectively. The contract for the Ainsworth Irrigation District will expire in 2006. The Almena Irrigation District's contract will expire in 2007.

Reclamation is in the process of renewing long-term water service contracts with the Frenchman-Cambridge, Kansas Bostwick, Bostwick in Nebraska, Frenchman Valley, Kirwin and Webster Irrigation Districts. At this time, the Loup Basin Reclamation District is seeking title transfer of facilities associated with their two districts. Renewal of the contacts constitutes an action requiring the preparation of a National Environmental Policy Act (NEPA) compliance document.

The Irrigation Projects Reauthorization Council was formed by the irrigation districts involved with contract renewal activities. Environmental, economic and hydrologic data was collected in the Republican, Solomon, and Middle Loup River Basins. A draft environmental impact statement (DEIS) for contract renewal in the Republican River Basin is expected to be distributed to the public for comments in August 1999.

President Clinton signed Public Law 104-326 on October 19, 1996. To comply with this law, Reclamation extended the existing water service contract term for four years. Each individual irrigation district contract was extended in the year they were scheduled to expire. Water service contracts have been extended for those irrigation districts in the Republican River Basin (with the exception of Almena Irrigation District). The contract for the Loup Basin Reclamation District has been extended by four years. The contract for the Kirwin Irrigation District will be extended in 1999 so that it will expire on December 31, 2003. At the appropriate time, Webster Irrigation

District's water service contract will be extended so that it expires on December 31, 2005. The Ainsworth and Almena Irrigation Districts were not included in the legislation.

The action of extending the current water service contract(s) was a significant Federal action, Reclamation was required by law to evaluate the environmental effects of the four-year extension. A draft environmental assessment (DEA) was prepared and distributed to the public for review and comments. Based on the information and analysis in the final EA, Reclamation determined that an EIS was not required to extend the contracts for four years.

The Loup Basin Reclamation District is expected to have legislation introduced this year to transfer all Reclamation facilities in the Middle Loup Basin to the Reclamation District. A DEA for title transfer of these facilities is expected to be out this year. If the transfer of Federal facilities is unsuccessful, Reclamation will initiate the appropriate action to renew the Reclamation District's long-term water service contract.

Municipal Water

Three municipalities and one rural water district have executed water service contracts for full or supplemental water supplies.

Fish and Wildlife

The State of Kansas is presently using the fish hatchery facility below Cedar Bluff Reservoir to rear Canadian geese. The Calamus Fish Hatchery located below Calamus Reservoir is operated by the State of Nebraska for fish production.

State of Colorado Division of Wildlife

The Division of Wildlife provides operational guidelines for Bonny Reservoir. The entire conservation pool storage was purchased by the state of Colorado on June 24, 1982.

State of Kansas Department of Wildlife and Parks

The State of Kansas has acquired the use and control of portions of the conservation capacity at Cedar Bluff Reservoir. The City of Russell's existing water storage right and contract with the United States will remain unchanged.

Power Interference Considerations

A Power Interference Agreement exists between Reclamation, the Twin Loups Reclamation District, and the Loup River Public Power District. Provisions of this agreement will be incorporated into the 1999 operations.

Environmental Considerations

A "Statement of Operational Objectives" for Harlan County Lake sets forth the general operational objectives and the specific reservoir uses that are desirable. The operational objectives indicate that fish and wildlife interests are best served by high reservoir levels, with minimum

fluctuations and regulation of the outflow in excess of the minimum desired flows. Although the statement recognizes flood control and irrigation as primary purposes, it indicates that comprehensive operational plans should be developed for maximum integration of the secondary uses.

These objectives are also considered in the operation of all reservoirs in the Kansas River Basin, Merritt and Box Butte Reservoirs in the Niobrara River Basin, and Sherman, Calamus and Davis Creek Reservoirs in the Lower Platte River Basin. The regulated outflow will also benefit farmers, ranchers, cities, and other interests below the reservoirs.

Emergency Management

The Nebraska-Kansas Area Office continues with the development of emergency plans which include incorporating the response level/expected actions systems. Updating Emergency Preparedness Plans to Emergency Action Plans (EAP's) began in 1996. Currently, four EAP'S (Bonny, Webster, Enders, and Lovewell) have been revised, exercised, and distributed. Norton EAP has been updated, exercised, and is currently being finalized for signatures. Box Butte EAP has been updated but not exercised. A schedule has been established which allows for the remaining ten EAP's to be updated and exercised by the end of September 1999. Exercises for dams containing identical local warning jurisdictions will be combined when viable. Draft local warning and evacuation plans have been distributed and discussed with a majority of all downstream counties affected by the 16 dams of the Nebraska-Kansas Area Office. Emergency radios to contact local 24-hour warning points have been installed at 13 of the 16 dams. These radios will be used as a backup means of communication when notifying the local emergency management officials in the event of an emergency at the dam.

Actual events during 1998 (earthquake, natural flooding and embankment slide) initiating contact with local officials occurred at Box Butte, Enders and Cedar Bluff Dams respectively.

Public Safety Reviews

The Nebraska-Kansas Area Office is involved in an ongoing safety review of project facilities to identify potential safety hazards to the public and operating personnel. Safety and security reviews performed at Nebraska-Kansas Area Office facilities have prompted initiation of several fencing projects to control public access to facilities, especially to spillway operating decks where there are gated spillways.

Mirage Flats Project in Nebraska

General

The flow of the Niobrara River and Box Butte Reservoir storage provide a water supply for the 11,662-acre Mirage Flats Project. From 1989 to 1998, the project water supply averaged 12,953 AF, which is about 1.11 acre-foot per irrigable acre. This amount is 1.21 acre-foot per acre short of the average diversion requirement of 2.32 AF per acre estimated for a full water supply in a March 1965 report. Many irrigators supplement their water supply with private wells.

The Mirage Flats Irrigation District cooperates with the Nebraska Game and Parks Commission by operating the Box Butte Dam outlet works gate and the Dunlap Diversion Dam gates in a manner to avoid sudden large changes in the flows of the Niobrara River. A 30-year agreement was made in 1990 between the district and the Nebraska Game and Parks Commission whereby the district will not draw the reservoir water level below elevation 3978.00 feet (2,819 acre-feet). In return the district received an up-front payment which was used to improve the efficiency of the project's delivery system.

Reclamation continues to finalize the Box Butte Dam Emergency Action Plan (EAP) and has provided draft copies of this plan to the Mirage Flats Irrigation District and Region 23 Emergency Management Agency. The district has reviewed and provided comments on the EAP, which includes expected actions for the district for each Response Level. A tabletop exercise is planned for May 1999. A data collection platform (DCP) was installed in May of 1992 to monitor the reservoir elevation and outflow. A telephone (primary communication system) and a radio (backup communication system) have been installed at the outlet works for contacting the Region 23 Emergency Management Agency.

1998 Summary

The flows of the Niobrara River plus the carry-over storage in Box Butte Reservoir were not adequate to provide a full water supply for the project lands. Precipitation at the Mirage Flats Irrigation District Office totaled 18.10 inches, which is 108 percent of normal. The total inflow (17,119 AF) was between the dry- and normal-year forecasts.

From July through September, diversions of 12,907 AF to the Mirage Flats Canal provided irrigation water for approximately 10,800 acres, 93 percent of the service available acreage. The farm deliveries from the project water supply totaled 7,466 AF (0.64 acre-foot per irrigable acre), which is a delivery efficiency of 58 percent. The reservoir contained only 9,324 AF of water at the end of the irrigation season. Privately owned irrigation wells supplemented the project water supply.

A hydromet station was installed at Dunlap Diversion Dam during the spring.

1999 Outlook

The project water supply is expected to be inadequate in 1999 as it has been since the early 1960's. In the spring, the district will inform their water users of the amount of water that will be available from storage in Box Butte Reservoir. The district plans for the irrigators to continue the use of water from privately-owned irrigation wells as a supplemental supply. In 1999, 11,600 acres are expected to be irrigated.

Water Conservation Field Services Program - Reclamation has provided technical assistance for the development of the district's Water Management Plan and the district's Long Range Plan. The district continues to promote the use of surge valves through the surge valve loaner program. The surge valve loaner program started with 14 surge valves in 1997 and now over 30 are in use by project irrigators. The district has installed approximately 3,000 feet of lining materials (provided by Reclamation) on a high loss section of the canal and will complete the lining project (another 2,000 feet) in the spring of 1999. An increased water measurement program is planned for the 1999 irrigation season in which additional measurement devices and recorders will be installed on the district's lateral system.

Ainsworth Unit, Sandhills Division in Nebraska

General

Within the Ainsworth Irrigation District, there are 34,539 acres with service available. The project water supply is provided by storage of Snake River flows in Merritt Reservoir. The reservoir is filled each fall after the irrigation season to elevation 2944.0 feet. This level is approximately 2 feet below the top of conservation capacity. The reservoir is regulated to maintain this level until the ice clears each spring. Upon ice-out the outlet pipe is drained, inspected, and repaired as necessary. The reservoir will then be rapidly filled to elevation 2946.0 feet to reduce shoreline erosion around the reservoir and minimize sand accumulations on the face of the dam. This reservoir level is maintained until irrigation releases begin to draw on the pool. A minimum release of 75 cubic feet per second (cfs) will be made to the river during spring filling operations. This operation also enhances the spring fish spawn. Seepage, pickup and toe drain flow normally result in flows of up to 15 cfs below Merritt Dam. Whenever possible, daily changes in releases to the river should be made in no more than 50 cfs increments. This will minimize adverse impacts on the Snake River trout fishery downstream of the dam.

The district has a basic water supply. If available, additional water can be purchased by the district as a supplemental supply.

1998 Summary

Precipitation, as recorded near Merritt Dam, totaled 23.00 inches, which was 116 percent of normal. The inflow for the year totaled 197,413 AF. This inflow was between the normal- and wet-year forecasts. The water supply was more than adequate to meet the project's irrigation requirement. There were 64,881 AF diverted from Merritt Reservoir into the Ainsworth Canal, with 38,958 AF delivered to the farm headgates (delivery efficiency of 60 percent). There were 34,623 acres of land irrigated in 1998.

The district executed several temporary water service contracts which provided a total of 224.6 AF of irrigation water from holding ponds located within the district's service area.

1999 Outlook

During the winter months, the reservoir will be regulated to maintain elevation 2944.0 feet (2.0 feet below the top of conservation capacity). This elevation is within the repaired area of soil cement on the upstream face of the dam. Maintaining the reservoir at this elevation during the winter will help avoid ice damage to the older existing soil cement at lower elevations.

In order to alleviate erosive action to the lands around the reservoir and to maximize all benefits associated with the reservoir, releases from Merritt Reservoir will be regulated to fill the conservation capacity during the early spring. As is the normal practice after ice-out in the spring, the outlet pipe will be drained, inspected, and repaired as necessary. Once inspections and repairs have been made the reservoir will be rapidly filled to elevation 2946.0 feet. This filling generally takes place during April. A minimum river release of 75 cfs will be made during this filling operation. The reservoir level will be maintained from the end of April until irrigation releases begin in late June. If weather conditions or irrigation demands dictate, it may be necessary to begin filling the reservoir prior to this time. The water supply is expected to be adequate in 1999 for the irrigation of 34,500 acres.

Reclamation is in the process of updating the Merritt Dam Emergency Preparedness Plan to an Emergency Action Plan (EAP). After a draft EAP is complete, copies will be provided to the Ainsworth Irrigation District and Cherry County Emergency Management officials for comments. An orientation meeting and tabletop exercise will be scheduled for the spring of 1999. A radio has been installed at the Merritt Dam for backup communications with Cherry County emergency management officials.

Sargent Unit, Middle Loup Division in Nebraska

General

With financial support from the Loup Basin Reclamation District, the Sargent Irrigation District performs the O&M of Milburn Diversion Dam and the Sargent Canal system which serves 13,922 acres. The water supply is diverted from the Middle Loup River into the Sargent Canal under an appropriated natural-flow water right from the State of Nebraska. These diversions may exceed the natural-flow water appropriation of 202 cfs by an exchange of storage from Sherman Reservoir, provided that water is available after all senior appropriations are satisfied, and the excess is not greater than the compensating storage releases from Sherman Reservoir.

1998 Summary

The precipitation over the Sargent Unit (21.05 inches at district headquarters) was 90 percent of normal. The irrigation diversions into the Sargent Canal totaled 24,298 AF (15,420 AF were delivered to the farm headgates for a delivery efficiency of 63 percent). The diversions exceeded the direct-flow water right for 19 days. Approximately 13,922 acres were irrigated. The irrigators grow corn as the principal crop, creating very high water demands in July and August.

Normally these high demands cannot be met within canal capacity, so the district institutes a rationing process through the peak period, as necessary.

1999 Outlook

The Sargent Irrigation District estimates that 13,900 acres in the Sargent Unit will be irrigated in 1999. Under dry-year conditions, some shortages could occur. The Farwell and Sargent Irrigation Districts are required to share shortages in accordance with their contract.

Farwell Unit, Middle Loup Division in Nebraska

General

With financial support from the Loup Basin Reclamation District, the Farwell Irrigation District operates and maintains the Arcadia Diversion Dam, Sherman Feeder Canal, Sherman Dam and Reservoir, and the Farwell Canal system, which serves 50,051 acres of land. Diversions are also made through the Arcadia Diversion Dam to 15,000 acres of non-project lands in the Middle Loup Public Power and Irrigation District under their appropriated natural-flow water rights.

Middle Loup Public Power and Irrigation District, Loup Basin Reclamation District, Farwell Irrigation District and Sargent Irrigation District have executed an agreement to temporarily cease diversions from the Middle Loup River when conservation storage space in Sherman Reservoir has been evacuated. The agreement was executed December 10, 1984.

During the winter months, Sherman Reservoir is normally regulated to five feet or more below the top of the conservation capacity. Doing so minimizes seepage from the reservoir into the groundwater table. Maintaining the pool below the top of conservation provides time for seeding of exposed shore areas to prevent wind erosion. The seedings also provide winter food and cover for wildlife, and spawning habitat for fish in the spring when these areas are inundated. Each spring, diversions into Sherman Feeder Canal from the Middle Loup River are regulated to fill the conservation capacity of Sherman Reservoir by late May. The gradually rising water surface in the spring is desirable for fish spawning.

Reclamation developed two wetland sites through mitigation of the Middle Loup Valley during 1995. Phase I involved construction of a 25 acre wetland near Sherman Feeder Canal. Water is diverted into the wetland via the Feeder Canal. Also, a 110 acre wetland tract was developed near Fullerton, Nebraska as Phase II of the mitigation.

1998 Summary

The diversions from the Middle Loup River at Arcadia Diversion Dam were 31,163 AF to the Middle Loup Public Power and Irrigation District and 87,298 AF into the Sherman Feeder Canal. During the fall of 1985 the Middle Loup Public Power and Irrigation District constructed a turnout in the Sherman Feeder Canal near mile post 11.4. The turnout diverts water directly to the Number 4 Canal. Releases to the turnout amounted to 230 AF and the losses charged as a result of these deliveries totaled 23 AF.

Sherman Feeder Canal diversions into Sherman Reservoir were started on April 21st, and the conservation capacity was filled on June 2nd. The annual precipitation at Sherman Dam totaled 27.42 inches, which is 121 percent of normal. Releases into the Farwell Canals totaled 60,611 AF (32,177 AF were delivered to the farm headgates for a delivery efficiency of 53 percent). The Farwell Irrigation District reported that 49,685 acres of land were irrigated in 1998. Sherman Feeder Canal was shut off September 25th.

Under an ongoing program the Farwell Irrigation District has installed a total of about 164 miles of pipe to replace open laterals including approximately 3.0 miles this past year. Also, approximately 4.5 miles of plastic lining has been installed in canal reaches on the Farwell Canal system.

The McCook Field Office was notified of a problem with Toe Drain No. 3 at Sherman Dam in June. The pipe between the lower manhole and the outlet of the toe drain had separated at the first joint above the outlet weir box due to movement of the saturated soils. The district was seeking advice on methods to repair the pipe. Further investigation of this toe drain along with the records indicate that the drain may not be functioning as anticipated when it was constructed. The district has cleaned the drain and instituted monitoring in preparation for dewatering the area for repair of the pipe. Evaluations of this toe drain are being handled by Reclamation's Denver Office.

1999 Outlook

Diversions from the Middle Loup River into Sherman Feeder Canal are expected to start in the spring for normal filling of the conservation capacity of Sherman Reservoir prior to the irrigation season.

Under dry-year inflow conditions, irrigation shortages are expected in 1999. These shortages are attributable to large irrigation requirements for corn production during the months of July and August. Farwell and Sargent Irrigation Districts are required to share shortages in accordance with their contract.

North Loup Division in Nebraska

General

The North Loup Division is located in the Loup River drainage basin. Water is diverted from both the Calamus and North Loup Rivers for the irrigation of approximately 53,000 acres of project lands. Operation of the division will also provide a sustained groundwater supply for an additional 17,000 acres. Principal features of the division include Virginia Smith Dam and Calamus Reservoir, Calamus Fish Hatchery, Kent Diversion Dam, Davis Creek Dam and Reservoir, five principal canals, one major and one small pumping plant and numerous open ditch and buried pipe laterals.

Calamus Reservoir is normally regulated at three to four feet below the top of conservation capacity during the winter months. Maintaining the reservoir at this elevation during the winter will help avoid ice damage to the soil cement on the upstream face of the dam. After the ice clears in the spring, the reservoir will be filled to conservation capacity. The North Loup Division

Armel Unit, Upper Republican Division in Colorado

General

Normal reservoir operations for Bonny Reservoir are primarily for recreation and fish and wildlife support, although water will be available for water right administration and irrigation purposes.

Bonny Reservoir inflows from the South Fork of the Republican River and Landsman Creek are released into Hale Ditch as requested by the Colorado State Engineer. The state will make Bonny storage water available to Hale Ditch and other natural flow appropriators under short-term water service contracts. Most of the 700 acres served by Hale Ditch are now owned and operated by the Division of Wildlife, Colorado Department of Natural Resources.

The normal operation pattern of Bonny Reservoir, with a slowly rising or stable pool, enhances fish spawning in the spring and provides excellent fishing opportunities during the summer and hunting conditions each fall.

1998 Summary

The precipitation of 18.55 inches at Bonny Dam was 108 percent of normal. Precipitation during July totaled 6.32 inches, the greatest ever recorded at the dam for the month. The annual computed inflow of 13,712 AF to Bonny Reservoir was between the dry- and normal-year forecasts. Below normal inflows were recorded during every month except July. The reservoir level was 3.6 feet below the top of conservation at the first of the year. Due to dry conditions during the first five months of the year the reservoir level increased only 1.4 feet by mid-May. The reservoir level reached a maximum of 3669.77 feet (2.2 feet below top of conservation) on May 12th. The minimum elevation of 3666.85 feet recorded on October 31st was the lowest pool level since 1969. Inflow during December was the lowest recorded for the month since dam construction. On December 31, 1998, the reservoir elevation was 4.9 feet below the top of conservation. End of year storage was the second lowest since initial filling. The Corps of Engineers determined that Bonny Reservoir prevented $10,000 in flood damages during 1998.

As directed by the Colorado Water Commissioner, 1,362 AF of reservoir inflows from the South Fork of the Republican River and Landsman Creek passed through Bonny Reservoir into Hale Ditch. In addition, the Colorado Department of Natural Resources requested storage releases of 1,058 AF for irrigation purposes into Hale Ditch. Releases to the Hale Ditch began on June 16th and ended on December 4th.

Toe drains were added at Bonny Dam in 1988 and 1994 to address Safety of Dams concerns. These drains were constructed to minimize the potential for dam failure due to piping when the reservoir elevation exceeds 3691.0 feet. An Early Warning System (EWS) was selected as the preferred hydrologic alternative for the danger of the dam overtopping. The EWS will greatly reduce the threat to downstream populations if the dam were to overtop and fail due to large floods.

A new dam operator is expected to report for duty at Bonny Dam early in 1999 and will be briefed on emergency management activities and plans. The Bonny Dam Emergency Action Plan (EAP) was published and distributed in January of 1998. An orientation meeting was held on April 20, 1998, to review the Bonny Dam Emergency Action Plan. Those participating in the meeting included the Bonny Dam Operator, McCook Field Office, City of St. Francis, Cheyenne County Emergency Management, Yuma County Emergency Management, Yuma County Sheriff's Office, the National Weather Service, and the Kansas Division of Emergency Management. A radio has been installed at Bonny Dam for backup communications with local emergency management officials.

Guardrail was installed on the Bonny Dam spillway bridge in 1998. The standby generator at the outlet works was also replaced this past year.

1999 Outlook

Water stored in Bonny Reservoir will be available for sale to Hale Ditch and other private irrigators under short-term water service contracts executed with the state.

Inflows will be stored during the winter until filling of the conservation pool is certain. Releases can be made during this period to maintain a constant reservoir elevation when filling of the reservoir is imminent or if icing were to become a problem.

Rebuilding the Hollow Jet Valve in the Hale Ditch outlet house is planned for 1999.

Frenchman Unit, Frenchman-Cambridge Division in Nebraska

General

The Culbertson Canal and the Culbertson Extension Canal systems serve 9,600 acres in the Frenchman Valley Irrigation District and 11,490 acres in the H&RW Irrigation District. The water supply for these lands is furnished by flows from Frenchman and Stinking Water Creeks and off-season storage in Enders Reservoir.

The normal operation of Enders Reservoir, with the gradual rise in water surface during the spring months, provides desirable fish spawning conditions. Irrigation releases will normally deplete the conservation storage by late summer, thereby limiting the fishing and recreational usage.

New Area-Capacity Tables for Enders Reservoir will be in effect beginning January 1st, 1999. These revised tables resulted from a sedimentation survey conducted in May of 1997.

1998 Summary

The precipitation of 18.51 inches at Enders Dam was below normal (98 percent). The 1998 inflow into Enders Reservoir of 15,357 AF was below the dry-year forecast. This inflow was the lowest ever recorded at the site. All twelve months recorded below normal inflows during 1998. January, March, June and December monthly inflows were the lowest recorded for the respective

The precipitation of 12.88 inches at Red Willow Dam was 65 percent of normal, the lowest ever recorded at this site. The inflow of 15,170 AF into Hugh Butler Lake was between the dry- and normal-year forecasts. The annual computed inflow was the second lowest since first filling of the lake began in 1962. The computed inflow was below normal during eleven of the twelve months. The reservoir level at the first of the year was 3.5 feet below the top of conservation. Inflows gradually increased the level of the reservoir to 2580.64 feet (1.2 feet below full) on May 28th. Irrigation releases began on June 14th and continued through September 10th. Approximately 10,000 AF was released from the reservoir for irrigation. The level of Hugh Butler Lake was 5.9 feet below the top of conservation at the end of the year. The Corps of Engineers determined that Hugh Butler Lake prevented $11,000 in flood damages during 1998. The water supply was adequate to meet the diversion requirements for Red Willow Canal. The district diverted 8,247 AF of water to irrigate 4,849 acres of land served by Red Willow Canal. The farm headgate delivery was 5,458 AF for a delivery efficiency of 66 percent.

The annual precipitation total of 15.43 inches at Medicine Creek Dam was 75 percent of normal. The inflow of 35,612 AF was between the dry- and normal-year forecasts. The reservoir level at the beginning of 1998 was above normal and only 4.2 feet below the top of conservation. Harry Strunk Lake filled to the top of active conservation on March 9th. The reservoir pool continued to increase and a release of 45 cfs was started on March 20th to maintain the pool level at approximately .5 foot above full. This release was discontinued on April 22nd and the reservoir was allowed to fill to an elevation of two feet into the flood pool, peaking at 2368.34 feet on May 26th. Controlled river releases and uncontrolled spillway releases were used in regulating the reservoir level until irrigation releases began on June 9th. Flood pool storage was regulated in cooperation with the Nebraska Game and Parks Commission. High irrigation demands during July and August reduced reservoir storage significantly. Nearly 29,000 AF of water was released from the reservoir for irrigation through September 4th. The construction of a dike to protect an archaeologic site on the upper end of the reservoir resulted in inflows being bypassed from September 30th through October 16th. Generous rainfall during early November resulted in Medicine Creek Dam recording the fifth greatest precipitation total for the month. Harry Strunk Lake was 8.4 feet below the top of conservation at the end of the year. The Corps of Engineers determined that the reservoir prevented $37,000 in flood damages. The water supply was adequate with 27,464 AF of water diverted to irrigate 17,318 acres of land served by the Cambridge Canal (farm delivery efficiency was 61 percent).

Construction of the dike to protect an archaeologic site located at Harry Strunk Lake was completed during the fall of 1998. Guardrail installation on the bridge deck at Medicine Creek Dam was also completed this past year.

1999 Outlook

Forecasts show that carry-over storage, streamflow gains, plus reasonable minimum inflows for the three lakes supplying the Frenchman-Cambridge Irrigation District will be inadequate to meet the full dry-year irrigation requirement by 14,500 AF. It is estimated that 16,400 acres will be served from the Meeker-Driftwood Canal; 17,000 acres will be served from the Cambridge Canal; 4,900 acres will be served from the Red Willow Canal; and 6,500 acres will be served from the Bartley Canal.

Installation of a hydromet station at Cambridge Diversion Dam is expected sometime this year. De-watering and inspection of the Medicine Creek Dam outlet works stilling basin is expected this spring. If funding and time permits, concrete repairs to the spillway at Medicine Creek Dam may take place this fall.

Radios have been installed at Trenton, Red Willow, and Medicine Creek Dams for backup communications with local emergency management officials. Reclamation will be meeting with local emergency management officials to develop their local warning and evacuation plans. A tabletop exercise is scheduled for April 1999.

Water Conservation Field Services Program - Reclamation has met with the district and toured the district's facilities and will provide technical assistance to update the district's Water Management Plan.

Almena Unit, Kanaska Division in Kansas

General

Service is available to 5,763 acres in the Almena Irrigation District. The project water supply is provided by Prairie Dog Creek flows and Keith Sebelius Lake storage.

The water service contract for the city of Norton, Kansas, provides for a maximum annual use of 1,600 AF from Keith Sebelius Lake.

1998 Summary

The precipitation at Norton Dam totaled 24.36 inches, which is 99 percent of normal. The total inflow of 10,979 AF, was between the normal- and wet-year forecasts. The reservoir level was well above normal at 1.3 feet below the top of conservation on December 31, 1997. Inflows gradually increased the reservoir level, filling the active conservation pool on April 23rd. The reservoir pool continued to increase reaching a peak elevation of 2304.49 feet on May 25th (.19 foot above full pool). Irrigation releases began on June 20th with demands reducing the level of Keith Sebelius Lake to 2302.06 feet by the end of the season. Precipitation during the month of July totaled 6.78 inches at Norton Dam, the fourth greatest ever recorded at this site during July. This timely precipitation greatly reduced irrigation demands in the district. Norton Dam recorded the greatest November precipitation total on record for the dam with 3.59 inches. Keith Sebelius Lake was only 2.5 feet below the top of conservation at the end of the year. The Corps of Engineers determined that $10,000 in flood prevention benefits were accrued by the operation of Keith Sebelius Lake during 1998.

The district delivered 1,639 AF to approximately 4,865 acres of farmland. Farm delivery averaged .34 acre-foot per irrigated acre from the project water supply. Water was being supplied from privately-owned irrigation wells to conserve reservoir water storage for future use. The city of Norton used 512 AF of municipal water during 1998.

Reclamation held an orientation meeting in June to review the updated Emergency Action Plan for Norton Dam and to discuss a tabletop exercise. A draft of the EAP for Norton Dam was

provided to the local emergency management officials for review and to assist them in coordinating their local plans. Reclamation worked with the Kansas Division of Emergency Management and the National Weather Service to design the tabletop exercise that took place in November 1998. A radio was installed at Norton Dam for a backup communication system to contact local emergency management officials during emergency events.

Installation of a hydromet station at Almena Diversion Dam was completed this past year.

1999 Outlook

The district expects to deliver water to 5,700 acres. If 1999 is a dry year without significant run-off producing storms above Keith Sebelius Lake, it is anticipated that the water supply may be inadequate by as little as 1,400 AF. Requirements for the city of Norton will be met in full in 1999.

Installation of guardrail and safety/security fencing on the spillway deck is scheduled for 1999. De-watering and inspection of the Norton Dam outlet works stilling basin is also scheduled this year.

Water Conservation Field Services Program - In 1998 Reclamation entered into an agreement with the district for the installation of approved water conservation measures. The first project involved the replacement of a high loss section of open ditch lateral with buried pipe. The pipe was placed in the fall of 1998 and the transitions will be completed in the spring of 1999. The agreement provides assistance for other approved water conservation measures as identified in the district's Water Management Plan. Reclamation will provide technical assistance in the updating of the plan.

Franklin, Superior-Courtland, and Courtland Units, Bostwick Division in Nebraska and Kansas

General

Harlan County Lake storage and Republican River flows provide a project water supply for 22,787 acres in the Bostwick Irrigation District in Nebraska, and 13,550 acres in the Kansas-Bostwick Irrigation District No. 2 above Lovewell Reservoir. These flows, together with White Rock Creek flows and Lovewell Reservoir storage, furnish a water supply for 28,338 acres below Lovewell Reservoir in the Kansas-Bostwick Irrigation District.

The lands in the Franklin and Superior-Courtland Units are in the Bostwick Irrigation District in Nebraska. The lands in the Courtland Unit downstream of the Kansas state line are in the Kansas-Bostwick Irrigation District.

In accordance with the off-season flow alternative outlined in Reclamation's final environmental assessment dated December 16, 1983, releases will be 10 cfs during the months of December, January, and February, except when the reservoir is at low levels. During water-short years releases for these three months will be either zero or 5 cfs depending on reservoir levels. At the request of the state of Nebraska, releases of 30 cfs for a maximum 5-day period may be made to relieve icing conditions in the river.

Natural gain in streamflow, plus irrigation return flows, and operational bypass at Superior-Courtland Diversion Dam will provide some flow downstream.

The Kansas Department of Wildlife and Parks has requested that the Kansas-Bostwick Irrigation District and Reclamation maintain, when possible, a flow of 20 cfs into Lovewell Reservoir when the Courtland Canal is in operation and the conservation pool is below capacity. This recommended inflow provides excellent fishing around the canal inlet to the reservoir. The seepage below Lovewell Dam into White Rock Creek maintains a small live stream throughout the year.

1998 Summary - Bostwick Division - Harlan County Lake Operations

The precipitation at Harlan County Dam totaled 23.12 inches of rainfall, which is 102 percent of normal. The inflow of 155,772 AF was between the normal- and wet-year forecasts. A 10 cfs release was required during January, February and December in accordance to the environmental assessment and the annual operating plan.

Harlan County Lake began 1998 above normal, approximately 2.3 feet below the top of conservation pool, at 1943.69 feet. Inflows averaged near normal during the first four months of the year and the pool level gradually filled to 1947.82 feet on April 9th (1.8 feet into the flood pool). A flood release was started on April 6th to drop the pool level to 1947.5 feet. This reservoir level of 1.5 feet above conservation was maintained until irrigation releases began on June 4th. Inflows were well below normal during May and June. Precipitation totaled 8.51 inches at Harlan County Dam during July, the third greatest ever recorded for the month. Over four inches of rainfall was recorded from July 7th through the 10th. The peak average daily inflow for the month was approximately 900 cfs. At the end of the irrigation season on September 8th the reservoir level had been drawn to elevation 1941.32 feet. The level of Harlan County Lake at the end of 1998 was 3.6 feet below the top of conservation. Harlan County Lake prevented $158,000 of downstream flood damages during 1998 according to the Corps of Engineers.

Approximately 35,489 irrigated acres of the Bostwick District in Nebraska and the Kansas-Bostwick District above Lovewell Dam were furnished a full water supply. A total of 28,570 AF (approximately 37 percent of total inflow) was delivered to Lovewell Reservoir through the Courtland Canal.

1998 Summary - Bostwick Division - Nebraska

The Bostwick Irrigation District in Nebraska diverted 53,135 AF for the irrigation of 22,787 acres. Farm delivery efficiency averaged 37 percent in the district.

1998 Summary - Bostwick Division - Kansas

The 1998 precipitation at Lovewell Dam totaled 26.22 inches, which was 94 percent of normal. Lovewell Reservoir began 1998 with a water surface elevation only one foot below the top of conservation. The reservoir pool gradually filled to elevation 1583.69 feet (1.1 feet into the flood pool) on March 20th with White Rock Creek inflows. A release was made at this time to maintain the pool level near this elevation. Natural flow diversion from the Republican River into

Lovewell Reservoir was not required in the spring of 1998. Lovewell Dam received 3.71 inches of rainfall during the first nine days of April. On April 6th and 7th, 2.0 to 2.5 inches of rainfall was reported in the drainage basin above Lovewell Reservoir. The reservoir level increased some 3.8 feet into the flood pool (elevation of 1586.38 feet) due to the storm runoff. The average daily inflow from April 7th through the 8th reached nearly 2,000 cfs. Approximately 7,800 AF was stored in the reservoir as a result of the storm. A river release was staged from 150 cfs to 500 cfs on April 9th to evacuate the flood pool. The release was reduced to 50 cfs by early May as the water surface level approached elevation 1583.6 feet. Lovewell Dam recorded the third highest April precipitation in 43 years (5.34 inches). April computed inflow was the second greatest recorded for the month. The flood release continued through May 26th at which time canal releases began. High irrigation demands during August combined with scarce rainfall in decreasing the reservoir storage. Natural flow was diverted from the Republican River until September 25th to partially fill Lovewell reservoir. The water surface level at Lovewell Reservoir was nearly 1.7 feet below the top of active conservation on December 31, 1998. The Corps of Engineers estimated the reservoir reduced local and downstream damages by $41,000.

The Kansas-Bostwick Irrigation District diverted a total of 75,502 AF to serve approximately 12,702 acres above Lovewell Dam and about 25,784 acres below Lovewell Dam. Farm delivery efficiency averaged 55 percent in the district.

A tabletop exercise was held on May 13, 1998 to test the interface between the Lovewell Dam Emergency Action Plan (EAP) and the local emergency operations plans and to identify any weaknesses in the Lovewell EAP. The scenario used for this exercise went through the Response Levels system and emphasized coordination and communication. The Lovewell EAP has been revised and was distributed in December 1998. A radio has been installed at Lovewell Dam for a backup communication system to contact local emergency management officials during emergency events.

1999 Outlook - Bostwick Division

The Bostwick Irrigation District in Nebraska and the Kansas-Bostwick Irrigation District No. 2 expect to deliver water to 22,700 and 39,000 acres, respectively. The storage in Harlan County Lake and Lovewell Reservoir and flows of the Republican River and White Rock Creek may be inadequate to meet the full dry-year irrigation requirement for the Bostwick lands. An operation plan will not be required in 1999 because both reservoirs are expected to be full prior to the irrigation season. If a shortage should develop due to extremely dry conditions, an interim operation plan may become necessary.

Natural flow in the Republican River will be diverted into Lovewell Reservoir via Courtland Canal as necessary. Removing sediment from the spillway inlet channel at Lovewell Dam is scheduled for this fall.

Water Conservation Field Services Program - Reclamation has met with both the districts, toured the district's facilities, and will provide technical assistance to update the district's Water Management Plans.

Kirwin Unit, Solomon Division in Kansas

General

The water supply for the 11,435 acres of land in the Kirwin Irrigation District is furnished by Kirwin Reservoir storage and inflows from the North Fork Solomon River and Bow Creek.

The operation of Kirwin Dam and Reservoir affords many opportunities for recreation, fishing, hunting, water sports, fish spawning, and preservation of waterfowl species.

1998 Summary

The precipitation total of 22.51 inches at Kirwin Dam was 96 percent of normal. The inflow of 42,165 AF was between the normal- and wet-year forecasts. Kirwin Reservoir was only one foot below the top of conservation pool at the first of the year. A river release varying from 54 to 40 cfs was made from February 17th through April 22nd to maintain the pool level near full (1729.25 feet). A release resumed from May 20th through June 2nd to maintain a reservoir level that did not exceed two feet into the flood pool. The reservoir level peaked at 1731.21 feet on May 20th. Irrigation releases began on June 15th and continued through the end of August reducing the pool level to 1727.42 feet. Kirwin Dam received 6.55 inches of precipitation in July, the fifth greatest record at the site for the month. Nearly four inches of rainfall occurred from July 6th through the 9th. Approximately 6,400 AF was released to the river and 21,288 AF to the canal during 1998. The reservoir level reached 1727.75 feet (1.5 feet below the top of conservation) at the end of the year. The reservoir prevented $88,000 in flood damages as determined by the Corps of Engineers.

Demands for project water were met in full during the irrigation season. A total of 8,572 acres received project water during 1998 with 8,700 AF delivered to farms. Farm delivery efficiency was 41 percent.

1999 Outlook

The district estimates that 10,000 acres may be irrigated in 1999. Even with below normal precipitation and dry-year forecasted inflows from the North Fork Solomon River the water supply will be more than adequate to irrigate these lands.

Reclamation is in the process of updating the Emergency Action Plan for Kirwin Dam. The Emergency Action Plan for Kirwin Dam is in draft form and has been distributed to each county emergency manager and the Kansas Emergency Management Agency for comments. A tabletop exercise will be scheduled for the spring of 1999. A radio has been installed at Kirwin Dam for backup communications with local emergency management officials.

Water Conservation Field Services Program - In 1998 Reclamation entered into an agreement with the district for the installation of approved water conservation measures. The first project was the replacement of a high loss section of open ditch lateral which allowed one irrigator to install a center pivot, improved the delivery locations of other irrigators, and improved the district's lateral

operations. This agreement provides additional assistance for other approved water conservation measures as outlined in the district's Water Management Plan. Reclamation will provide technical assistance for updating the plan.

Webster Unit, Solomon Division in Kansas

General

The Webster Irrigation District has service available to 8,500 acres. The project water supply is provided by Webster Reservoir storage and flows of the South Fork Solomon River.

1998 Summary

In 1998, the precipitation at Webster Dam was 91 percent of normal (21.56 inches). The inflow of 44,339 AF was between the normal- and wet-year forecasts. Webster Reservoir began 1998 only .6 foot (1891.82 feet) below the top of conservation pool. A release varying from 45 to 148 cfs was made from January 22nd through June 16th to maintain a reservoir level that did not exceed 2.35 feet into the flood pool. The reservoir level peaked at 1894.84 feet on May 18th. Irrigation releases began on June 16th and continued through the end of August dropping the pool to elevation 1889.59 feet. Approximately 19,700 AF was released from flood storage early in the year and 17,100 AF for irrigation. Precipitation during November ranked as the second highest ever recorded at the site for the month (3.20 inches). The reservoir level reached 1890.11 feet (only 2.3 feet below the top of conservation) on December 31, 1998. The Corps of Engineers determined that the reservoir prevented $68,000 in flood damages.

The district diverted 13,209 acre-feet for irrigation of 5,240 acres. Project water demands were met in full. A new Hydraulic Facilities Superintendent arrived at Webster Dam in June.

The Emergency Action Plan for Webster Dam was distributed in April 1998. The EAP includes a Response Level system with expected actions, which are to be used during unusual or emergency events. A radio has been installed at Webster Dam for backup communications with local emergency management officials.

1999 Outlook

The carry-over storage and the flows in the South Fork Solomon River will be more than adequate under the dry-year forecast to irrigate 6,500 acres in the district in 1999.

A hydromet station is scheduled to be installed at Woodston Diversion Dam in 1999. De-watering and inspection of the Webster Dam outlet works stilling basins is also planned this year.

Glen Elder Unit, Solomon Division in Kansas

General

Releases from Waconda Lake will be regulated as outlined in two memorandums of understanding between the State of Kansas and Reclamation. Releases are made for the city of Beloit, the long-term water service contract with Glen Elder Irrigation District, and water right administration.

The water service contract with Beloit, Kansas, provides for the annual use of up to 2,000 AF of Waconda Lake storage. Water is measured at the Glen Elder Dam river outlet works. In any water year that the city's water supply is insufficient and there is surplus water in Waconda Lake, such additional water may be released for the city at a rate of $15.00 per acre-foot.

The water service contract with the Mitchell County Rural Water District No. 2 provides for use of storage water as available from Waconda Lake. Water usage is not to exceed 1,009 AF per calendar year.

The water service contract with the Glen Elder Irrigation District provides for the use of up to 18,000 AF of storage water each year. Water is released and measured through the river outlet works.

To lessen ice damage to the upstream face of Glen Elder Dam during the winter months, releases from Waconda Lake will be regulated each year to maintain a constant water surface level while the lake is ice-covered.

The available facilities along the shores of Waconda Lake and the large water surface area afford opportunities to thousands of people for picnics, sightseeing, recreation, water sports, hunting, and fishing.

When compatible with flood control operations, the operating criteria for Waconda Lake provide for a stable or rising pool level during the fish spawning period each spring.

When possible, drawdowns will be scheduled for late summer and early fall so that exposed shore areas can be seeded. This seeding helps prevent wind erosion, provides both winter food and cover for wildlife, and provides spawning habitat for fish in the spring when these areas are inundated.

1998 Summary

The annual precipitation total of 26.30 inches at Glen Elder Dam was 101 percent of normal. The inflow of 277,558 AF was between the normal- and wet-year forecasts. Waconda Lake began 1998 near normal, approximately 1.9 feet below the top of conservation. A 150 to 350 cfs release was made to offset inflows and maintain the reservoir level through early April. The reservoir level gradually increased to 1454.80 feet on April 6th. Glen Elder Dam recorded 2.25 inches of rainfall early in April. The most significant storm system occurred on April 6th and 7th with 1.5 to 2.0 inches of rain reported in the Solomon River Basin. Waconda Lake level increased

approximately 2.2 feet due to the storm runoff (28,700 AF). The average daily inflow peaked at about 5,000 cfs from April 7th through the 8th. The reservoir level peaked at elevation 1457.06 feet on April 13th (1.5 feet into the flood pool). The release to the river was staged up from 100 cfs to 1,000 cfs on April 9th and 10th to evacuate the flood pool. The release was reduced to 750 cfs on April 29th as the water surface neared the top of conservation and to 400 cfs on May 15th to maintain the reservoir pool near full. Rainfall in the Solomon River Basin during July and early August once again increased the level of Waconda Lake to an elevation of 1457.47 feet. A 300 cfs release being made during this time was increased to 500 cfs on August 3rd and to 1,000 cfs on August 4th to evacuate the flood pool. The release was gradually staged down as the reservoir level neared 1456.4 feet late in the month. This pool level was maintained through October in cooperation with the Kansas Wildlife and Parks. Glen Elder Dam recorded 3.00 inches of precipitation during the first four days of November. This precipitation contributed to the second greatest recorded at the dam for the month. A river release was staged from 20 to 500 cfs early in November to evacuate the remaining flood pool storage. The 500 cfs continued through late December and was reduced to 150 cfs at this time when the reservoir level neared 1454.6 feet (one foot below top of conservation). This pool level was maintained through the end of the year in cooperation with the Kansas Wildlife and Parks. The reservoir level is normally drawn to an elevation of 1453.6 feet prior to ice up. Maintaining this level during the winter months minimizes ice damage and provides storage space for spring runoff. The reservoir level of Waconda Lake on December 31st was 1454.75 feet. The Corps of Engineers determined that the reservoir reduced local and downstream damages by $605,000.

Approximately 221,000 AF of water was released from Glen Elder Dam in 1998. No storage releases were made for the City of Beloit, however, 2,409 AF was bypassed for quality control as directed by the State Water Commissioner. Storage releases totaling 3,144 AF combined with 4,445 AF of natural flow releases for irrigation of 5,392 acres. Releases to the Mitchell County Rural Water District No. 2 totaled 634 AF.

1999 Outlook

The municipal requirement of Beloit and the requirements of the Mitchell County Rural Water District No. 2 will be met in full with releases as required from Waconda Lake. It is expected that the Kansas Water Commissioner will request that inflows be passed through the lake for water right administration. The Glen Elder Irrigation District estimates that 6,000 acres will be irrigated in 1999. The storage in Waconda Lake and flows in the North and South Forks of the Solomon River will furnish an adequate water supply to the district. River releases will be increased after ice-out to reduce the pool level to elevation 1453.6 feet, providing storage space for spring runoff. The active conservation pool will be allowed to fill prior to the irrigation season. The reservoir will be regulated to maintain a constant level during the winter months when the reservoir is ice-covered to minimize ice damage. Under normal-year conditions, the lake is expected to be maintained at about two to three feet below the top of the conservation pool for next winter.

Eight of the twelve spillway radial gates at Glen Elder Dam have been repainted. The four remaining spillway radial gates have been contracted to be sandblasted and painted in 1999.

Reclamation is in the process of updating the Glen Elder Dam Emergency Preparedness Plan to an Emergency Action Plan (EAP). After a draft EAP is complete, copies will be provided to the local emergency management officials for comments. An orientation meeting and tabletop exercise will be scheduled for spring of 1999. A radio was installed at Glen Elder Dam for a backup communication system to contact local emergency management officials during emergency events.

Cedar Bluff Unit, Smoky Hill Division in Kansas

General

Cedar Bluff storage furnishes a maximum of 2,000 AF each year for the city of Russell, Kansas when required. Prior to 1993, Cedar Bluff Reservoir storage and Smoky Hill River flows had provided a water supply for 6,800 acres in the Cedar Bluff Irrigation District. No water had been available for delivery to the district since 1978. Reformulation of the Cedar Bluff Unit in October of 1992 allowed the Cedar Bluff Irrigation District to begin the proceedings to disband, and the Kansas Water Office and Kansas Department of Wildlife and Parks to acquire the use and control of portions of the reservoir conservation capacity. The district completed all activities necessary to accomplish disbandment in 1994. A "designated operating pool" has been established for Cedar Bluff Reservoir and includes the following suballocation pools: The City of Russell's existing water storage right which remained unchanged; an artificial recharge pool under control of the Kansas Water Office; and a fish, wildlife and recreation pool under control of the Kansas Department of Wildlife and Parks. The "designated operating pool" consists of water stored between the dead pool and elevation 2109.05 feet. A "joint-use pool" has been established between the operating pool and the flood control pool for water supply, flood control, environmental and fish, wildlife and recreation purposes. Water rights for the "joint-use pool" will be held jointly between the Kansas Department of Wildlife and Parks and the Kansas Water Office.

1998 Summary

The precipitation at Cedar Bluff Dam was 26.28 inches which is 127 percent of normal. The inflow (63,603 AF) was above the wet-year forecast. At the beginning of the year, the level of Cedar Bluff Reservoir was 2140.77 feet (3.23 feet below the top of active conservation). Inflows to the reservoir from January through April were well above normal. Computed inflows during both February and March ranked as the third highest recorded for the respective months.

On April 13, 1998 the Nebraska-Kansas Area Office was notified that a significant landslide had occurred on the downstream face of the embankment near the right abutment. Apparently, water from heavy rains that occurred during the previous weeks seeped into the cracks in the road surface and partially saturated the fill material lying above the shale causing a large section of the embankment to slide. A river release was made at Cedar Bluff Dam from April 13th through April 29th to maintain the reservoir level near 2142.46 feet while the slide was examined. The release was the first made to the river since 1980. The slide was deemed to be a Safety of Dams issue and was repaired using Safety of Dams funds. The repair of this landslide required the excavation and replacement of approximately 24,000 cubic yards of embankment material, installation of a subsurface drain on the upstream side of the embankment and a filter drain in the embankment

replacement area to control seepage in the embankment. The work was accomplished through a cooperative agreement with the Kansas Department of Transportation. Work on the repairs were completed on September 11, 1998.

The water surface level of Cedar Bluff Reservoir was approximately 1.8 feet below the top of conservation at the end of April. Cedar Bluff Dam recorded 7.05 inches of precipitation during July, the sixth greatest on record for the month. The reservoir level gradually increased to 2143.45 feet by the first of August. Thunderstorms moved through the Smoky Hill River Basin above Cedar Bluff Dam on the evening of August 1st and early morning August 2nd. Reports of 2 to 3 inches of rain were common in the drainage area immediately above the dam. Several reports of 4 to 5 inches were reported northwest of the dam. The reservoir level at Cedar Bluff increased to 2145.04 feet on August 3rd (1.04 feet into the flood pool). This was the first time the conservation pool had filled in Cedar Bluff Reservoir since 1966. The average daily inflow at the reservoir peaked at over 4,000 cfs. The reservoir level peaked at 2145.31 feet on the morning of August 5th. A 200 cfs release was made to the river on August 4th and was boosted to 400 cfs on August 10th to evacuate the flood pool. Releases from the dam were discontinued on August 25th as the reservoir level approached the top of conservation. The August computed inflow was the second greatest recorded for the month since 1961. Cedar Bluff Dam recorded 3.17 inches of precipitation during November, the greatest ever at the site for the month. On December 31, 1998, the reservoir level was 2143.99 feet (.01 foot below the top of active conservation). This was the greatest end of year elevation since 1965. Cedar Bluff Reservoir was estimated to have prevented $18,000 in flood damages by the Corps of Engineers.

The State of Kansas used the fish hatchery facility for Canadian geese with 321 AF released to the facility. Approximately 15,000 AF was released to the river during 1998. No releases were made for the city of Russell.

1999 Outlook

The reservoir content of 185,022 AF on December 31, 1998 is in the joint use pool, with 147,032 AF of storage above the designated operating pool. The Kansas Department of Wildlife and Parks estimates up to 400 acre-feet of water could be used in the operations of the fish hatchery facility. The Kansas Water Office may request a minimal release to the river for recharge in 1999.

The Hydraulic Facilities Superintendent at Cedar Bluff Dam retired this past spring. A new Superintendent is expected to report for duty at Cedar Bluff Dam prior to this summer.

Reclamation is in the process of updating the Cedar Bluff Dam Emergency Preparedness Plan to an Emergency Action Plan (EAP). A draft copy of the EAP will be provided to the local emergency management officials for comments. An orientation meeting and tabletop exercise will be scheduled this summer. A radio was installed at Cedar Bluff Dam for a backup communication system to contact local emergency management officials during emergency events.

TABLE 1

RESERVOIR DATA - NIOBRARA, LOWER PLATTE AND KANSAS RIVER BASINS

RESERVOIR		CAPACITY ALLOCATIONS 1/ DEAD	LIVE CONSERVATION Inactive	LIVE CONSERVATION Active	FLOOD CONTROL
Box Butte	- Elevation Ft.	3969.0	3976.5	4007.0	---
	Total Acre-feet	640	2,275	31,060	---
	Net Acre-feet	640	1,635	28,785	---
Merritt	- Elevation Ft.	2875.0	2896.0	2946.0	---
	Total Acre-feet	1,614	6,800	74,486	---
	Net Acre-feet	1,614	5,186	67,686	---
Sherman	- Elevation Ft.	2118.5	2129.0	2162.3	---
	Total Acre-feet	3,839	10,496	69,076	---
	Net Acre-feet	3,839	6,657	58,580	---
Calamus	- Elevation Ft.	2185.0	2213.3	2244.0	---
	Total Acre-feet	817	24,646	127,400	---
	Net Acre-feet	817	23,829	102,754	---
Davis Creek	- Elevation Ft.	1998.5	2003.0	2076.0	---
	Total Acre-feet	76	172	31,158	---
	Net Acre-feet	76	96	30,986	---
Bonny	- Elevation Ft.	3635.5	3638.0	3672.0	3710.0
	Total Acre-feet	1,418	2,134	41,340	170,160
	Net Acre-feet	1,418	716	39,206	128,820
Enders 4/	- Elevation Ft.	3080.0	3082.4	3112.3	3127.0
	Total Acre-feet	7,516	8,948	42,910	72,958
	Net Acre-feet	7,516	1,432	33,962	30,048
Swanson	- Elevation Ft.	2710.0	2720.0	2752.0	2773.0
Lake	Total Acre-feet	2,118	12,430	112,214	246,291
	Net Acre-feet	2,118	10,312	99,784	134,077
Hugh Butler	- Elevation Ft.	2552.0	2558.0	2581.8	2604.9
Lake 4/	Total Acre-feet	5,185	8,921	36,224	85,070
	Net Acre-feet	5,185	3,736	27,303	48,846
Harry Strunk	- Elevation Ft.	2335.0	2343.0	2366.1	2386.2
Lake	Total Acre-feet	4,160	8,859	35,705	88,420
	Net Acre-feet	4,160	4,699	26,846	52,715
Keith Sebelius	- Elevation Ft.	2275.0	2280.4	2304.3	2331.4
Lake	Total Acre-feet	2,718	5,284	35,935	134,738
	Net Acre-feet	2,718	2,566	30,651	98,803
Harlan County	- Elevation Ft.	1885.0	1927.0 3/	1946.0	1973.5
Lake	Total Acre-feet	0	120,790	315,090	811,808
	Net Acre-feet	0	120,790	194,300	496,718
Lovewell	- Elevation Ft.	1562.07	1571.7	1582.6	1595.3
	Total Acre-feet	1,659	11,644	35,666	86,131
	Net Acre-feet	1,659	9,985	24,022	50,465
Kirwin	- Elevation Ft.	1693.0	1697.0	1729.25	1757.3
	Total Acre-feet	4,969	8,515	98,154	313,290
	Net Acre-feet	4,969	3,546	89,639	215,136
Webster	- Elevation Ft.	1855.5	1860.0	1892.45	1923.7
	Total Acre-feet	1,256	4,231	76,157	259,510
	Net Acre-feet	1,256	2,975	71,926	183,353
Waconda	- Elevation Ft.	1407.8	1428.0	1455.6	1488.3
Lake	Total Acre-feet	1,236	36,671	241,460	963,775
	Net Acre-feet	1,236	35,435	204,789	722,315
Cedar Bluff	- Elevation Ft.	2090.0	2107.8	2144.0	2166.0
	Total Acre-feet	8,261	35,320	185,090	376,950
	Net Acre-feet	8,261	27,059	149,770	191,860
Total Storage (A.F.)		47,482	308,136	1,589,125	3,942,281 2/
Total Net Acre-feet		47,482	260,654	1,280,989	2,353,156

1/ Includes space for sediment storage.

2/ Includes total active storage for Box Butte, Merritt, Sherman, Calamus, and Davis Creek Reservoirs.

3/ Bottom of irrigation pool for Harlan County Lake is 1932.4 feet.

4/ New Area-Capacity Tables in effect 1-1-99. Sedimentation survey conducted in May 1997.

TABLE 2
SUMMARY OF 1998 OPERATIONS
MIRAGE FLATS PROJECT

BOX BUTTE RESERVOIR — MIRAGE FLATS CANAL

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	1,729	58	94	0.23	15,751	0	0
Feb.	1,401	63	124	0.39	16,965	0	0
Mar.	2,454	69	231	1.97	19,119	0	0
Apr.	2,012	71	395	0.54	20,665	0	0
May	907	79	494	2.09	20,999	0	0
June	524	79	483	2.96	20,961	0	0
July	535	6,585	530	2.89	14,381	6,870	3,668
Aug.	1,321	4,842	378	1.52	10,482	5,405	3,402
Sep.	317	605	356	0.60	9,838	632	396
Oct.	1,789	68	226	3.27	11,333	0	0
Nov.	2,622	83	135	1.42	13,737	0	0
Dec.	1,508	67	84	0.22	15,094	0	0
TOTAL	17,119	12,669	3,530	18.10	–	12,907	7,466

NOTE – Acres irrigated 1998: Mirage Flats Canal - 10,800 acres.

SANDHILLS DIVISION
AINSWORTH UNIT

MERRITT RESERVOIR — AINSWORTH CANAL

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)
Jan.	15,388	14,868	241	0.14	69,110	0	0
Feb.	15,608	15,582	305	0.14	68,831	0	0
Mar.	16,776	16,352	424	0.86	68,831	0	0
Apr.	18,010	11,917	725	1.59	74,199	0	0
May	15,543	14,198	1,058	3.57	74,486	4,048	67
June	16,592	15,677	915	5.13	74,486	3,967	88
July	15,552	29,752	1,121	4.03	59,165	26,291	17,884
Aug.	15,844	24,184	897	1.17	49,928	21,586	14,168
Sep.	15,906	13,000	949	0.87	51,885	8,989	6,751
Oct.	18,470	2,162	719	3.02	67,474	0	0
Nov.	18,301	16,760	455	2.33	68,560	0	0
Dec.	15,423	13,995	320	0.15	69,668	0	0
TOTAL	197,413	188,447	8,129	23.00	–	64,881	38,958

NOTE – Acres irrigated 1998: Ainsworth Canal - 34,623 acres.

MIDDLE LOUP DIVISION

MIDDLE LOUP UNIT

SARGENT UNIT — SARGENT CANAL

Month	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	0	0
Feb.	0	0
Mar.	0	0
Apr.	0	0
May	0	0
June	1,297	74
July	12,288	8,512
Aug.	8,454	5,849
Sep.	2,259	985
Oct.	0	0
Nov.	0	0
Dec.	0	0
TOTAL	24,298	15,420

NOTE–Acres irrigated 1998: Sargent Canal - 13,925 acres.

MIDDLE LOUP PUBLIC POWER CANALS

Month	Diversions To Canals (AF)	Diversions To Sherman Feeder Canal (AF)
Jan.	0	0
Feb.	0	0
Mar.	0	0
Apr.	0	3,059
May	3,040	22,925
June	4,369	15,898
July	10,193	18,008
Aug.	8,709	11,288
Sep.	4,852	16,120
Oct.	0	0
Nov.	0	0
Dec.	0	0
TOTAL	31,163	87,298

Middle Loup P.P. Canals - 14,144 acres.

FARWELL UNIT

SHERMAN RESERVOIR — FARWELL CANALS

Month	Inflow (AF)	Outflow 1309 (AF)	Gross Evap. 258 (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Canals (AF)	Delivered To Farms (AF)
Jan.	620	1,309	258	0.13	51,531	0	0
Feb.	899	1,291	319	0.36	50,820	0	0
Mar.	1,632	1,309	559	3.97	50,584	0	0
Apr.	3,637	1,303	914	3.95	52,004	0	0
May	18,951	1,533	923	2.09	68,499	882	0
June	14,256	12,210	1,180	6.15	69,365	10,583	21
July	15,646	20,089	1,158	3.90	63,764	18,751	10,717
Aug.	12,516	26,602	947	2.65	48,731	25,575	17,722
Sep.	14,081	5,712	1,179	0.51	55,921	4,820	3,717
Oct.	371	1,083	780	1.64	54,429	0	0
Nov.	991	1,303	419	2.00	53,698	0	0
Dec.	328	1,309	239	0.07	52,478	0	0
TOTAL	83,928	75,053	8,875	27.42	–	60,611	32,177

Farwell Canals - 49,685 acres.

NORTH LOUP DIVISION
CALAMUS RESERVOIR — ABOVE DAVIS CREEK MIRDAN CANAL

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release to Calamus Fish Hatch. (AF)	Release to Canal (AF)	Canal Use (AF)	Delivered To Farms (AF)
Jan.	21,131	20,705	475	0.10	117,954	189	0	0	0
Feb.	21,917	20,396	593	0.29	118,882	187	0	0	0
Mar.	24,034	21,503	1,056	2.19	120,357	214	0	0	0
Apr.	28,870	19,611	1,754	2.18	127,862	423	0	0	0
May	25,471	22,973	2,138	3.38	128,222	335	0	2,111	123
June	35,040	33,439	1,498	6.57	128,325	249	3,945	2,319	132
July	28,735	40,528	2,529	1.55	114,003	268	17,230	13,509	8,244
Aug	24,495	39,757	1,990	1.64	96,751	318	15,921	13,449	7,813
Sep.	20,037	28,842	1,722	0.48	86,224	334	5,476	3,775	2,382
Oct.	25,899	5,734	1,200	4.12	105,189	307	0	0	0
Nov.	25,182	12,327	722	1.94	117,322	175	0	0	0
Dec.	22,866	21,459	434	0.23	118,295	145	0	0	0
TOTAL	303,677	287,274	16,111	24.67	–	3,144	42,572	35,163	18,694

NOTE – Acres irrigated 1998: Mirdan Canal - 30,345 acres.

NORTH LOUP DIVISION (Continued)
DAVIS CREEK RESERVOIR — BELOW DAVIS CREEK FULLERTON CANAL

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Mo. Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)
Jan.	5	52	37	0.15	6,194	0	0
Feb.	19	79	46	0.62	6,088	0	0
Mar.	156	30	81	2.72	6,133	0	0
Apr.	6,603	482	169	4.19	12,085	0	0
May	14,953	3,487	313	2.45	23,238	1,829	9
June	11,690	3,162	403	7.53	31,363	1,702	24
July	3,239	8,255	523	3.86	25,824	7,014	4,230
Aug.	1,443	10,352	322	2.06	16,593	10,413	5,320
Sep.	1,464	11,002	177	0.22	6,878	10,649	928
Oct.	176	0	115	2.17	6,939	0	0
Nov.	79	0	63	1.15	6,955	0	0
Dec.	3	105	36	0.13	6,817	0	0
TOTAL	39,830	37,006	2,285	27.25	–	31,607	10,511

NOTE - Acres irrigated 1998: Fullerton Canal - 17,942 acres.

TABLE 2
SUMMARY OF 1998 OPERATIONS

UPPER REPUBLICAN DIVISION
ARMEL UNIT
BONNY RESERVOIR

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Outflow To Hale Ditch (AF)
Jan.	1,440	492	169	0.20	35,188	0
Feb.	1,294	444	204	0.74	35,834	0
Mar.	1,262	492	296	0.09	36,308	0
Apr.	1,376	476	729	1.19	36,479	0
May	1,525	492	995	2.50	36,517	0
June	722	893	1,251	1.67	35,095	417
July	2,342	1,255	1,178	6.32	35,004	763
Aug.	1,270	1,035	1,011	3.06	34,228	543
Sep.	32	818	941	0.47	32,501	341
Oct.	288	660	508	1.12	31,621	169
Nov.	1,162	642	328	1.19	31,813	165
Dec.	999	514	203	0	32,095	22
TOTAL	13,712	8,213	7,813	18.55	--	2,420

TABLE 2
SUMMARY OF 1998 OPERATIONS

FRENCHMAN-CAMBRIDGE DIVISION
FRENCHMAN UNIT

	ENDERS RESERVOIR					CULBERTSON CANAL		CULBERTSON EXT.CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	1,412	61	91	0.16	25,608	0	0	0	0
Feb.	1,318	56	104	0.67	26,766	0	0	0	0
Mar.	1,424	61	183	0.76	27,946	0	0	0	0
Apr.	1,153	60	397	0.27	28,642	1,974	259	0	0
May	1,431	61	568	3.16	29,444	2,458	534	0	0
June	1,024	3,197	627	2.98	26,644	1,329	299	2,440	420
July	1,171	8,489	556	3.63	18,770	2,099	1,763	5,587	2,472
Aug.	1,373	3,644	417	3.04	16,082	1,926	1,580	3,477	1,823
Sep.	980	60	370	0.52	16,632	0	0	0	0
Oct.	1,323	61	180	1.62	17,714	0	0	0	0
Nov.	1,518	60	170	1.70	19,002	0	0	0	0
Dec.	1,230	61	95	0.00	20,076	0	0	0	0
TOTAL	15,357	15,871	3,758	18.51	–	9,786	4,435	11,504	4,715

NOTE: Acres irrigated 1998: Culbertson Canal - 8,849 acres; Culbertson Extension Canal - 11,155 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
MEEKER-DRIFTWOOD UNIT

	SWANSON LAKE					MEEKER-DRIFTWOOD		BARTLEY CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	5,112	61	303	0.12	82,645	0	0	0	0
Feb.	5,877	56	365	0.73	88,101	0	0	0	0
Mar.	5,408	61	636	0.44	92,812	0	0	0	0
Apr.	5,350	60	1,445	1.65	96,657	0	0	0	0
May	5,463	61	2,027	1.77	100,032	0	0	0	0
June	1,848	12,357	2,580	1.08	86,943	6,991	3,224	2,445	1,152
July	2,347	18,738	2,125	3.87	68,427	11,831	7,308	3,137	2,040
Aug.	2,537	14,707	1,675	3.43	54,582	9,971	5,683	3,247	2,322
Sep.	138	2,005	1,501	0.26	51,214	1,351	982	352	306
Oct.	140	61	753	1.39	50,540	0	0	0	0
Nov.	3,686	60	543	2.08	53,623	0	0	0	0
Dec.	2,766	61	310	0.12	56,018	0	0	0	0
TOTAL	40,672	48,288	14,263	16.94	–	30,144	17,197	9,181	5,820

NOTE: Acres irrigated 1998: Meeker-Driftwood Canal - 16,535 acres; Bartley Canal - 6,423 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
RED WILLOW UNIT

	HUGH BUTLER LAKE					RED WILLOW CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	1,154	246	99	0.11	33,083	0	0
Feb.	1,434	222	122	0.46	34,173	0	0
Mar.	1,270	246	212	0.30	34,985	0	0
Apr.	1,233	238	570	0.76	35,410	0	0
May	1,464	246	745	0.86	35,883	0	0
June	1,490	2,352	940	1.69	34,081	2,048	1,133
July	1,635	4,080	824	3.36	30,812	2,988	2,164
Aug.	1,368	3,501	695	1.58	27,984	2,699	1,790
Sep.	714	1,006	706	0.20	26,986	512	371
Oct.	1,006	246	302	1.84	27,444	0	0
Nov.	1,501	238	209	1.64	28,498	0	0
Dec.	901	246	115	0.08	29,038	0	0
TOTAL	15,170	12,867	5,539	12.88	–	8,247	5,458

NOTE – Acres irrigated 1998: Red Willow Canal - 4,849 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
CAMBRIDGE UNIT

	HARRY STRUNK LAKE					CAMBRIDGE CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	3,185	61	109	0.20	31,610	0	0
Feb.	3,488	56	139	0.79	34,903	0	0
Mar.	3,343	897	242	0.46	37,107	0	0
Apr.	2,932	1,981	666	0.45	37,392	0	0
May	4,462	1,303	952	2.50	39,599	0	0
June	3,348	7,987	1,320	0.73	33,640	6,879	3,447
July	2,493	11,080	819	3.98	24,234	10,287	7,091
Aug.	2,422	9,693	578	1.19	16,385	9,650	5,959
Sep.	1,586	1,095	451	0.34	16,425	648	368
Oct.	2,651	1,258	282	2.62	17,536	0	0
Nov.	3,164	60	175	2.07	20,465	0	0
Dec.	2,538	61	100	0.10	22,842	0	0
TOTAL	35,612	35,532	5,833	15.43	–	27,464	16,865

NOTE – Acres irrigated 1998: Cambridge Canal - 17,318 acres.

TABLE 2
SUMMARY OF 1998 OPERATIONS

KANASKA DIVISION
ALMENA UNIT

KEITH SEBELIUS LAKE

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To City Of Norton (AF)	ALMENA CANAL Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	838	25	139	0.19	33,865	25	0	0
Feb.	931	22	172	0.81	34,602	22	0	0
Mar.	957	24	301	1.13	35,234	24	0	0
Apr.	1,691	33	869	3.74	36,023	33	0	0
May	1,497	49	1,140	2.54	36,331	49	0	0
June	797	1,666	1,450	1.52	34,012	66	1,314	465
July	1,869	3,063	1,124	6.78	31,694	60	2,729	1,174
Aug.	649	62	1,051	1.25	31,230	62	402	0
Sep.	236	63	1,006	1.27	30,397	63	252	0
Oct.	211	41	536	1.48	30,031	41	0	0
Nov.	967	34	316	3.59	30,648	34	0	0
Dec.	336	33	169	0.06	30,782	33	0	0
TOTAL	10,979	5,115	8,273	24.36	–	512	4,697	1,639

NOTE: Acres irrigated 1998: Almena Canal - 4,865 acres.

BOSTWICK DIVISION
FRANKLIN UNIT

HARLAN COUNTY LAKE
Data from Corps of Engineers

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	FRANKLIN CANAL Release To Canal (AF)	FRANKLIN CANAL Delivered To Farms (AF)	NAPONEE CANAL Release To Canal (AF)	NAPONEE CANAL Delivered To Farms (AF)
Jan.	14,059	615	780	0.33	298,328	0	0	0	0
Feb.	16,582	555	863	0.32	313,492	0	0	0	0
Mar.	21,659	615	1,359	2.82	333,177	0	0	0	0
Apr.	21,493	14,389	3,174	2.40	337,107	0	0	0	0
May	15,281	11,727	4,435	1.72	336,226	0	0	0	0
June	8,813	24,347	5,736	2.24	314,956	7,913	2,171	746	403
July	19,388	44,299	5,851	8.51	284,194	10,736	3,484	815	438
Aug.	12,056	30,803	5,591	1.34	259,856	11,304	3,456	758	379
Sep.	2,265	1,651	5,536	0.52	254,934	1,652	303	0	0
Oct.	4,798	0	3,433	1.04	256,299	0	0	0	0
Nov.	10,760	0	2,650	1.83	264,409	0	0	0	0
Dec.	8,618	554	2,521	0.05	269,952	0	0	0	0
TOTAL	155,772	129,555	41,929	23.12	–	31,605	9,414	2,319	1,220

NOTE: Acres irrigated 1998: Franklin Canal - 11,196 acresNaponee Canal - 1,618 acres.

BOSTWICK DIVISION (Continued)
SUPERIOR-COURTLAND UNIT

Month	FRANKLIN PUMP CANAL Diverted To Canal (AF)	FRANKLIN PUMP CANAL Delivered To Farms (AF)	SUPERIOR CANAL Diverted To Canal (AF)	SUPERIOR CANAL Delivered To Farms (AF)	Total Diversion (AF)	COURTLAND CANAL - ABOVE LOVEWELL NEBRASKA USE Total (AF)	NEBRASKA USE Delivered To Farms (AF)	KANSAS USE Diversion To Canal (AF)	KANSAS USE Delivered To Farms (AF)
Jan.	0	0	0	0	0	0	0	0	0
Feb.	0	0	0	0	0	0	0	0	0
Mar.	0	0	0	0	0	0	0	0	0
Apr.	0	0	0	0	0	0	0	0	0
May	0	0	0	0	658	0	0	0	0
June	538	339	3,791	1,401	14,729	680	497	7,020	2,211
July	1,153	690	6,268	2,684	26,952	939	696	10,892	5,827
Aug.	939	586	4,118	1,536	18,492	715	506	8,070	4,475
Sep.	0	0	23	20	4,954	47	41	462	204
Oct.	0	0	0	0	0	0	0	0	0
Nov.	0	0	0	0	0	0	0	0	0
Dec.	0	0	0	0	0	0	0	0	0
TOTAL	2,630	1,615	14,200	5,641	65,785	2,381	1,740	26,444	12,717

NOTE: Acres irrigated 1998: Franklin Pump Canal - 2,106 acres; Superior Canal - 5,800 acres.
Courtland Canal-Nebraska use - 2,067 acres.
Courtland Canal-Kansas use - 12,702 acres.

BOSTWICK DIVISION (Continued)
COURTLAND UNIT

Month	Est. Flow from White Rock Creek (AF)	Inflow from Courtland 34.8 (AF)	LOVEWELL RESERVOIR Total Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	COURTLAND (Below) Release To Canal (AF)	COURTLAND (Below) Delivered To Farms (AF)
Jan.	2,082	0	2,082	6	169	0.43	34,747	0	0
Feb.	2,871	0	2,871	6	219	0.87	37,393	0	0
Mar.	4,964	0	4,964	1,162	394	3.18	40,801	0	0
Apr.	17,194	0	17,194	18,389	720	5.34	38,886	0	0
May	3,285	0	3,285	2,909	908	1.15	38,354	369	0
June	2,317	4,742	7,059	12,101	1,122	3.09	32,190	12,347	6,715
July	7,246	12,075	19,321	20,310	721	4.58	30,480	19,286	12,267
Aug.	2,687	7,876	10,563	15,038	729	1.06	25,276	14,912	8,609
Sep.	1,005	3,877	4,882	2,600	630	1.74	26,928	2,144	884
Oct.	783	0	783	12	367	1.80	27,332	0	0
Nov.	2,828	0	2,828	12	395	2.95	29,753	0	0
Dec.	1,317	0	1,317	12	197	0.03	30,861	0	0
TOTAL	48,579	28,570	77,149	72,557	6,571	26.22	–	49,058	28,475

NOTE: Acres irrigated 1998: Courtland Canal below Lovewell - 25,784 acres.

TABLE 2
SUMMARY OF 1998 OPERATIONS

SOLOMON DIVISION
KIRWIN UNIT

	KIRWIN RESERVOIR					KIRWIN CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)
Jan.	3,008	0	330	0.27	95,988	0	0
Feb.	3,514	1,164	438	1.24	97,900	0	0
Mar.	5,415	2,045	715	2.83	100,555	0	0
Apr.	8,131	1,827	1,550	3.14	105,309	0	0
May	5,648	1,212	2,135	1.47	107,610	0	0
June	2,834	4,389	2,750	0.93	103,305	4,435	1,472
July	4,769	10,481	2,304	6.55	95,289	10,191	4,486
Aug.	2,837	6,952	2,321	1.54	88,853	6,662	2,742
Sep.	587	0	1,964	0.40	87,476	0	0
Oct.	728	0	1,011	0.86	87,193	0	0
Nov.	3,280	0	758	3.25	89,715	0	0
Dec.	1,414	0	402	0.03	90,727	0	0
TOTAL	42,165	28,070	16,678	22.51	–	21,288	8,700

NOTE: Acres irrigated 1998: Kirwin Canal - 8,572 acres.

SOLOMON DIVISION (Continued)
WEBSTER UNIT

	WEBSTER RESERVOIR					OSBORNE CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	3,444	936	270	0.22	76,044	0	0
Feb.	4,027	3,055	330	0.96	76,686	0	0
Mar.	6,026	2,828	562	1.90	79,322	0	0
Apr.	12,522	6,829	1,261	2.88	83,754	0	0
May	7,625	4,623	2,001	1.86	84,755	0	0
June	2,493	5,457	2,276	1.84	79,515	3,548	798
July	2,208	7,732	1,763	5.33	72,228	5,750	2,492
Aug.	826	5,393	2,019	1.29	65,642	3,911	1,956
Sep.	194	0	1,392	1.45	64,444	0	0
Oct.	454	0	895	0.63	64,003	0	0
Nov	2,922	0	559	3.20	66,366	0	0
Dec.	1,598	0	311	0.00	67,653	0	0
TOTAL	44,339	36,853	13,639	21.56	–	13,209	5,246

NOTE: Acres irrigated 1998: Osborne Canal - 5,240 acres.

SOLOMON DIVISION (Continued)
GLEN ELDER UNIT

	WACONDA LAKE					OUTFLOW TO RIVER				
						City of Beloit		Irrig.District		
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Storage Release (AF)	Quality Bypass (AF)	Storage Release (AF)	Other Controlled Releases (AF)	Release To Mitchell Co. RWD No. 2 (AF)
Jan.	11,373	10,071	716	0.34	218,971	0	0	0	10,017	54
Feb.	19,198	15,105	921	1.65	222,143	0	0	0	15,065	40
Mar.	28,235	18,923	1,662	3.02	229,793	0	0	0	18,874	49
Apr.	67,048	46,481	3,875	3.14	246,485	0	0	0	46,433	48
May	32,081	32,923	5,942	1.83	239,701	0	0	0	32,865	58
June	18,400	7,671	7,714	3.09	242,716	0	0	248	7,363	60
July	36,793	13,963	6,097	4.52	259,449	0	0	793	13,111	59
Aug.	23,562	26,478	5,640	1.66	250,893	0	0	1,706	24,713	59
Sep.	6,639	1,485	5,154	1.78	250,893	0	1,031	397	0	57
Oct.	6,124	1,278	3,031	1.43	252,708	0	1,230	0	0	48
Nov.	18,674	21,963	2,027	3.74	247,392	0	148	0	21,767	48
Dec.	9,431	24,951	986	0.10	230,886	0	0	0	24,897	54
TOTAL	277,558	221,292	43,765	26.30	–	0	2,409	3,144	215,105	634

NOTE: Acres irrigated 1998: Glen Elder District - 5,392 acres.

SMOKY HILL DIVISION
ELLIS UNIT

	CEDAR BLUFF RESERVOIR					
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Fish Hatchery (AF)
Jan.	2,061	0	538	0.00	165,274	0
Feb.	3,793	0	637	1.48	168,430	0
Mar.	4,021	0	1,031	1.55	171,420	0
Apr.	6,062	2,122	2,295	2.73	173,065	0
May	6,767	0	3,398	3.47	176,434	0
June	2,093	0	3,953	1.52	174,574	0
July	11,177	19	4,596	7.05	181,136	3
Aug.	20,139	12,640	3,407	2.52	185,228	3
Sep.	1,434	72	3,550	1.64	183,040	72
Oct.	636	144	1,988	1.15	181,544	144
Nov.	4,376	64	1,174	3.17	184,682	64
Dec.	1,044	35	669	0.00	185,022	35
TOTAL	63,603	15,096	27,236	26.28	–	321

No releases were made for the City of Russell, Kansas.

TABLE 3

ACRES IRRIGATED IN 1998 AND ESTIMATES FOR 1999

Irrigation District and Canal	Acres With Service Available	Acres Irrigated in 1998	Estimated Acres to be Irrigated in 1999
Mirage Flats Irrigation District			
Mirage Flats Canal	11,662	10,800	11,000
Ainsworth Irrigation District			
Ainsworth Canal	34,539	34,623	34,500
Sargent Irrigation District			
Sargent Canal	13,922	13,925	13,900
Farwell Irrigation District			
Farwell Canal	50,051	49,685	49,700
Twin Loups Irrigation District			
Above Davis Creek	31,817	30,345	30,500
Below Davis Creek	21,183	17,942	19,000
Total Twin Loups Irrigation District	53,000	48,287	49,500
Frenchman Valley Irrigation District			
Culbertson Canal	9,600	8,849	8,900
H & RW Irrigation District			
Culbertson Extension Canal	11,490	11,155	11,200
Frenchman-Cambridge Irrigation District			
Meeker-Driftwood Canal	16,476	16,535	16,400
Red Willow Canal	4,932	4,849	4,900
Bartley Canal	6,539	6,423	6,500
Cambridge Canal	17,053	17,318	17,000
Total Frenchman-Cambridge Irrigation District	45,000	45,125	44,800
Almena Irrigation District			
Almena Canal	5,763	4,865	5,700
Bostwick Irrigation District in Nebraska			
Franklin Canal	11,116	11,196	11,100
Naponee Canal	1,737	1,618	1,700
Franklin Pump Canal	2,091	2,106	2,100
Superior Canal	5,863	5,800	5,800
Courtland Canal (Nebraska)	1,980	2,067	2,000
Total Bostwick Irrigation Dist. in Nebraska	22,787	22,787	22,700
Kansas-Bostwick Irrigation District			
Courtland Canal above Lovewell	13,550	12,702	13,200
Courtland Canal below Lovewell	28,338	25,784	25,800
Total Kansas-Bostwick Irrigation District	41,888	38,486	39,000
Kirwin Irrigation District			
Kirwin Canal	11,435	8,572	10,000
Webster Irrigation District			
Osborne Canal	8,500	5,240	6,500
Glen Elder Irrigation District	6,000	5,392	6,000
TOTAL PROJECT USES	325,637	307,791	313,400
Non-Project Uses			
Middle Loup Public Power & Irrig. Dist. Canals	15,000	14,144	14,100
Hale Ditch	700	700	700
TOTAL NON-PROJECT USES	15,700	14,844	14,800
TOTAL PROJECT AND NON-PROJECT	341,337	322,635	328,200

BOX BUTTE RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	18	1.1	1.1	0.1	2	0.1	0.0	0.0	3995.8	16.0	0.9
FEB	25	1.4	1.3	0.1	2	0.1	0.0	0.0	3996.9	17.2	1.2
MAR	33	2.0	2.3	0.2	2	0.1	0.0	0.0	3998.3	18.9	1.7
APR	25	1.5	3.8	0.4	2	0.1	0.0	0.0	3999.1	19.9	1.0
MAY	11	0.7	5.8	0.6	2	0.1	0.0	0.0	3999.1	19.9	0.0
JUN	0	0.0	7.1	0.6	173	10.3	0.0	0.0	3988.5	9.0	-10.9
JUL	0	0.0	7.7	0.4	226	13.9	0.0	8.1	3978.0	2.8	-6.2
AUG	10	0.6	6.7	0.2	226	13.9	0.0	13.5	3978.0	2.8	0.0
SEP	8	0.5	5.8	0.2	64	3.8	0.0	3.5	3978.0	2.8	0.0
OCT	11	0.7	3.1	0.1	2	0.1	0.0	0.0	3979.1	3.3	0.5
NOV	22	1.3	1.7	0.1	2	0.1	0.0	0.0	3981.3	4.4	1.1
DEC	21	1.3	1.0	0.0	2	0.1	0.0	0.0	3983.5	5.6	1.2
TOTAL		11.1	47.3	3.0		42.7	0.0	25.1			-9.5
MOST PROBABLE INFLOW CONDITIONS											
JAN	24	1.5	1.1	0.1	2	0.1	0.0	0.0	3996.2	16.4	1.3
FEB	32	1.8	1.3	0.1	2	0.1	0.0	0.0	3997.6	18.0	1.6
MAR	44	2.7	2.3	0.2	2	0.1	0.0	0.0	3999.5	20.4	2.4
APR	37	2.2	3.8	0.4	2	0.1	0.0	0.0	4000.8	22.1	1.7
MAY	29	1.8	4.6	0.5	2	0.1	0.0	0.0	4001.7	23.3	1.2
JUN	5	0.3	5.7	0.6	34	2.0	0.0	0.0	4000.0	21.0	-2.3
JUL	2	0.1	6.4	0.5	221	13.6	0.0	0.0	3985.7	7.0	-14.0
AUG	21	1.3	5.8	0.3	216	13.3	0.0	8.1	3978.0	2.8	-4.2
SEP	24	1.4	4.2	0.1	35	2.1	0.0	0.8	3978.0	2.8	0.0
OCT	26	1.6	3.1	0.1	2	0.1	0.0	0.0	3981.0	4.2	1.4
NOV	32	1.9	1.7	0.1	2	0.1	0.0	0.0	3984.0	5.9	1.7
DEC	28	1.7	1.0	0.1	2	0.1	0.0	0.0	3986.3	7.4	1.5
TOTAL		18.3	40.9	3.1		31.8	0.0	8.9			-7.7
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	33	2.0	1.1	0.1	2	0.1	0.0	0.0	3996.6	16.9	1.8
FEB	43	2.4	1.3	0.1	2	0.1	0.0	0.0	3998.5	19.1	2.2
MAR	55	3.4	2.3	0.2	2	0.1	0.0	0.0	4000.9	22.2	3.1
APR	50	3.0	3.8	0.4	2	0.1	0.0	0.0	4002.7	24.7	2.5
MAY	44	2.7	3.0	0.4	2	0.1	0.0	0.0	4004.3	26.9	2.2
JUN	101	6.0	4.2	0.5	18	1.1	0.2	0.0	4007.0	31.1	4.2
JUL	54	3.3	4.9	0.6	185	11.4	0.0	0.0	4001.1	22.4	-8.7
AUG	36	2.2	4.4	0.4	177	10.9	0.0	0.0	3993.2	13.3	-9.1
SEP	32	1.9	2.7	0.2	20	1.2	0.0	0.0	3993.7	13.8	0.5
OCT	33	2.0	3.1	0.3	2	0.1	0.0	0.0	3995.3	15.4	1.6
NOV	42	2.5	1.7	0.2	2	0.1	0.0	0.0	3997.2	17.6	2.2
DEC	33	2.0	1.0	0.1	2	0.1	0.0	0.0	3998.7	19.4	1.8
TOTAL		33.4	33.4	3.5		25.4	0.2	0.0			4.3

MERRITT RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT CANAL 1000 AF	RELEASE REQUIREMENT RIVER 1000 AF	TOTAL MEAN CFS	TOTAL 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS													
JAN	200	12.3	1.1	0.2	0.0	1.0	16	1.0	12.0	0.0	2944.0	68.8	-0.9
FEB	218	12.1	1.3	0.3	0.0	1.0	18	1.0	10.8	0.0	2944.0	68.8	0.0
MAR	229	14.1	1.9	0.4	0.0	4.6	75	4.6	6.3	0.0	2945.0	71.6	2.8
APR	224	13.3	3.1	0.7	0.0	4.5	76	4.5	5.2	0.0	2946.0	74.5	2.9
MAY	213	13.1	5.5	1.3	5.2	4.6	159	9.8	2.0	0.0	2946.0	74.5	0.0
JUN	213	12.7	6.2	1.5	6.9	3.0	166	9.9	1.3	0.0	2946.0	74.5	0.0
JUL	213	13.1	7.1	1.5	36.6	3.0	644	39.6	0.0	0.0	2934.6	46.5	-28.0
AUG	210	12.9	6.3	0.8	35.9	3.0	633	38.9	0.0	0.0	2915.7	19.7	-26.8
SEP	208	12.4	5.2	0.4	9.0	3.0	202	12.0	0.0	0.0	2915.7	19.7	0.0
OCT	221	13.6	3.5	0.3	0.0	1.0	16	1.0	0.0	0.0	2926.1	32.0	12.3
NOV	215	12.8	2.0	0.3	0.0	1.0	17	1.0	0.0	0.0	2933.1	43.5	11.5
DEC	207	12.7	1.4	0.2	0.0	1.0	16	1.0	0.0	0.0	2938.6	55.0	11.5
TOTAL		155.1	44.5	7.9	93.6	30.7		124.3	37.6	0.0			-14.7
MOST PROBABLE INFLOW CONDITIONS													
JAN	228	14.0	1.1	0.2	0.0	1.0	16	1.0	13.7	0.0	2944.0	68.8	-0.9
FEB	243	13.5	1.3	0.3	0.0	1.0	18	1.0	12.2	0.0	2944.0	68.8	0.0
MAR	262	16.1	1.9	0.4	0.0	4.6	75	4.6	8.3	0.0	2945.0	71.6	2.8
APR	266	15.8	3.1	0.7	0.0	4.5	76	4.5	7.7	0.0	2946.0	74.5	2.9
MAY	249	15.3	4.2	1.0	2.8	4.6	120	7.4	6.9	0.0	2946.0	74.5	0.0
JUN	240	14.3	5.3	1.3	5.9	3.0	150	8.9	4.1	0.0	2946.0	74.5	0.0
JUL	239	14.7	6.1	1.4	26.9	3.0	486	29.9	0.0	0.0	2939.8	57.9	-16.6
AUG	246	15.1	5.2	0.9	27.3	3.0	493	30.3	0.0	0.0	2932.2	41.8	-16.1
SEP	249	14.8	4.2	0.6	9.3	3.0	207	12.3	0.0	0.0	2933.2	43.7	1.9
OCT	252	15.5	3.5	0.6	0.0	1.0	16	1.0	0.0	0.0	2939.7	57.6	13.9
NOV	237	14.1	2.0	0.4	0.0	1.0	17	1.0	1.5	0.0	2944.0	68.8	11.2
DEC	229	14.1	1.4	0.3	0.0	1.0	16	1.0	12.8	0.0	2944.0	68.8	0.0
TOTAL		177.3	39.2	8.1	72.2	30.7		102.9	67.2	0.0			-0.9
REASONABLE MAXIMUM INFLOW CONDITIONS													
JAN	263	16.2	1.1	0.2	0.0	1.0	16	1.0	15.9	0.0	2944.0	68.8	-0.9
FEB	283	15.7	1.3	0.3	0.0	1.0	18	1.0	14.4	0.0	2944.0	68.8	0.0
MAR	296	18.2	1.9	0.4	0.0	4.6	75	4.6	10.4	0.0	2945.0	71.6	2.8
APR	311	18.5	3.1	0.7	0.0	4.5	76	4.5	10.4	0.0	2946.0	74.5	2.9
MAY	309	19.0	3.1	0.8	1.7	4.6	102	6.3	11.9	0.0	2946.0	74.5	0.0
JUN	286	17.0	4.4	1.1	6.6	3.0	161	9.6	6.3	0.0	2946.0	74.5	0.0
JUL	289	17.8	4.9	1.1	23.5	3.0	431	26.5	0.0	0.0	2942.5	64.7	-9.8
AUG	307	18.9	4.1	0.9	21.0	3.0	390	24.0	0.0	0.0	2940.1	58.7	-6.0
SEP	286	17.0	3.1	0.7	4.8	3.0	131	7.8	0.0	0.0	2943.4	67.2	8.5
OCT	283	17.4	3.5	0.8	0.0	1.0	16	1.0	14.0	0.0	2944.0	68.8	1.6
NOV	262	15.6	2.0	0.5	0.0	1.0	17	1.0	14.1	0.0	2944.0	68.8	0.0
DEC	250	15.4	1.4	0.3	0.0	1.0	16	1.0	14.1	0.0	2944.0	68.8	0.0
TOTAL		206.7	33.9	7.8	57.6	30.7		88.3	111.5	0.0			-0.9

SHERMAN RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	0	0.0	1.3	0.3	21	1.3	0.0	0.0	2155.3	50.9	-1.6
FEB	0	0.0	1.6	0.3	23	1.3	0.0	0.0	2154.6	49.3	-1.6
MAR	0	0.0	2.9	0.5	21	1.3	0.0	0.0	2153.9	47.5	-1.8
APR	163	9.7	4.6	0.9	22	1.3	0.0	0.0	2157.0	55.0	7.5
MAY	314	19.3	5.4	1.2	65	4.0	0.0	0.0	2162.3	69.1	14.1
JUN	321	19.1	6.3	1.5	296	17.6	0.0	0.0	2162.3	69.1	0.0
JUL	153	9.4	7.3	1.3	904	55.6	0.0	0.0	2139.3	21.6	-47.5
AUG	246	15.1	6.4	0.6	649	39.9	0.0	14.3	2129.0	10.5	-11.1
SEP	501	29.8	4.8	0.5	139	8.3	0.0	0.0	2145.8	31.5	21.0
OCT	387	23.8	3.8	0.7	18	1.1	0.0	0.0	2156.4	53.5	22.0
NOV	0	0.0	2.1	0.4	22	1.3	0.0	0.0	2155.7	51.8	-1.7
DEC	0	0.0	1.2	0.2	21	1.3	0.0	0.0	2155.1	50.3	-1.5
TOTAL		126.2	47.6	8.4		134.3	0.0	14.3			-2.2
MOST PROBABLE INFLOW CONDITIONS											
JAN	0	0.0	1.3	0.3	21	1.3	0.0	0.0	2155.3	50.9	-1.6
FEB	0	0.0	1.6	0.3	23	1.3	0.0	0.0	2154.6	49.3	-1.6
MAR	3	0.2	2.9	0.5	21	1.3	0.0	0.0	2153.9	47.7	-1.6
APR	146	8.7	4.6	0.9	22	1.3	0.0	0.0	2156.7	54.2	6.5
MAY	283	17.4	4.4	1.0	24	1.5	0.0	0.0	2162.3	69.1	14.9
JUN	299	17.8	4.9	1.2	279	16.6	0.0	0.0	2162.3	69.1	0.0
JUL	376	23.1	5.7	1.3	589	36.2	0.0	0.0	2156.9	54.7	-14.4
AUG	449	27.6	4.9	1.0	568	34.9	0.0	0.0	2153.4	46.4	-8.3
SEP	274	16.3	3.7	0.7	106	6.3	0.0	0.0	2157.3	55.7	9.3
OCT	0	0.0	3.8	0.8	18	1.1	0.0	0.0	2156.5	53.8	-1.9
NOV	0	0.0	2.1	0.4	22	1.3	0.0	0.0	2155.8	52.1	-1.7
DEC	0	0.0	1.2	0.2	21	1.3	0.0	0.0	2155.2	50.6	-1.5
TOTAL		111.1	40.9	8.6		104.4	0.0	0.0			-1.9
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	23	1.4	1.3	0.3	21	1.3	0.0	0.0	2155.9	52.3	-0.2
FEB	43	2.4	1.6	0.3	23	1.3	0.0	0.0	2156.3	53.1	0.8
MAR	96	5.9	2.9	0.6	21	1.3	0.0	0.0	2157.9	57.1	4.0
APR	99	5.9	4.6	1.0	22	1.3	0.0	0.0	2159.2	60.7	3.6
MAY	172	10.6	3.1	0.7	24	1.5	0.0	0.0	2162.3	69.1	8.4
JUN	202	12.0	3.9	0.9	187	11.1	0.0	0.0	2162.3	69.1	0.0
JUL	210	12.9	4.4	1.0	459	28.2	0.0	0.0	2156.1	52.8	-16.3
AUG	210	12.9	3.8	0.7	276	17.0	0.0	0.0	2154.1	48.0	-4.8
SEP	218	13.0	2.6	0.5	81	4.8	0.0	0.0	2157.3	55.7	7.7
OCT	31	1.9	3.8	0.8	18	1.1	0.0	0.0	2157.3	55.7	0.0
NOV	24	1.4	2.1	0.4	22	1.3	0.0	0.0	2157.2	55.4	-0.3
DEC	24	1.5	1.2	0.2	21	1.3	0.0	0.0	2157.2	55.4	0.0
TOTAL		81.8	35.1	7.4		71.5	0.0	0.0			2.9

CALAMUS RESERVOIR OPERATION ESTIMATES - 1999

	INFLOW		EVAPORATION		RELEASE REQUIREMENT CANAL	RIVER	TOTAL		RESERVOIR SPILL	REQUIREMENT SHORTAGE	END OF MONTH ELEV	CONT	RESERVOIR CHANGE
	MEAN	1000		1000	1000	1000	MEAN	1000	1000	1000		1000	1000
MONTH	CFS	AF	INCHES	AF	AF	AF	CFS	AF	AF	AF	FT	AF	AF
REASONABLE MINIMUM INFLOW CONDITIONS													
JAN	298	18.3	1.2	0.5	0.7	3.1	62	3.8	14.0	0.0	2242.2	118.3	0.0
FEB	292	16.2	1.5	0.6	0.7	2.8	63	3.5	12.1	0.0	2242.2	118.3	0.0
MAR	329	20.2	2.6	1.0	0.7	3.1	62	3.8	15.4	0.0	2242.2	118.3	0.0
APR	308	18.3	4.2	1.7	0.7	3.0	62	3.7	3.8	0.0	2244.0	127.4	9.1
MAY	298	18.3	5.7	2.4	1.9	3.1	81	5.0	10.9	0.0	2244.0	127.4	0.0
JUN	304	18.1	7.0	3.0	11.0	3.0	235	14.0	1.1	0.0	2244.0	127.4	0.0
JUL	272	16.7	7.8	3.0	40.5	16.7	930	57.2	0.0	0.0	2234.3	83.9	-43.5
AUG	291	17.9	8.2	2.3	37.4	17.9	899	55.3	0.0	0.0	2222.1	44.2	-39.7
SEP	282	16.8	6.4	1.2	25.7	9.5	592	35.2	0.0	0.0	2213.3	24.6	-19.6
OCT	273	16.8	3.4	0.6	0.7	1.2	31	1.9	0.0	0.0	2220.0	38.9	14.3
NOV	277	16.5	1.9	0.4	0.7	1.2	32	1.9	0.0	0.0	2225.3	53.1	14.2
DEC	272	16.7	1.1	0.3	0.7	1.2	31	1.9	0.0	0.0	2229.9	67.6	14.5
TOTAL		210.8	50.8	17.0	121.4	65.8		187.2	57.3	0.0			-50.7
MOST PROBABLE INFLOW CONDITIONS													
JAN	327	20.1	1.2	0.5	0.7	3.1	62	3.8	15.8	0.0	2242.2	118.3	0.0
FEB	333	18.5	1.5	0.6	0.7	2.8	63	3.5	14.4	0.0	2242.2	118.3	0.0
MAR	374	23.0	2.6	1.0	0.7	3.1	62	3.8	18.2	0.0	2242.2	118.3	0.0
APR	375	22.3	4.2	1.7	0.7	3.0	62	3.7	7.8	0.0	2244.0	127.4	9.1
MAY	377	23.2	4.2	1.8	0.7	3.1	62	3.8	17.6	0.0	2244.0	127.4	0.0
JUN	345	20.5	4.8	2.0	1.9	3.0	82	4.9	13.6	0.0	2244.0	127.4	0.0
JUL	348	21.4	5.9	2.3	24.9	21.4	753	46.3	0.0	0.0	2238.3	100.2	-27.2
AUG	337	20.7	5.9	2.0	23.6	20.7	720	44.3	0.0	0.0	2231.8	74.6	-25.6
SEP	323	19.2	4.8	1.4	12.6	19.2	534	31.8	0.0	0.0	2227.7	60.6	-14.0
OCT	320	19.7	3.4	1.0	0.7	3.1	62	3.8	0.0	0.0	2232.1	75.5	14.9
NOV	329	19.6	1.9	0.6	0.7	3.0	62	3.7	0.0	0.0	2236.0	90.8	15.3
DEC	317	19.5	1.1	0.4	0.7	3.1	62	3.8	0.0	0.0	2239.6	106.1	15.3
TOTAL		247.7	41.2	15.3	68.6	88.6		157.2	87.4	0.0			-12.2
REASONABLE MAXIMUM INFLOW CONDITIONS													
JAN	356	21.9	1.2	0.5	0.7	3.1	62	3.8	17.6	0.0	2242.2	118.3	0.0
FEB	366	20.3	1.5	0.6	0.7	2.8	63	3.5	16.2	0.0	2242.2	118.3	0.0
MAR	473	29.1	2.6	1.0	0.7	3.1	62	3.8	24.3	0.0	2242.2	118.3	0.0
APR	489	29.1	4.2	1.7	0.7	3.0	62	3.7	14.6	0.0	2244.0	127.4	9.1
MAY	610	37.5	3.1	1.3	0.7	3.1	62	3.8	32.4	0.0	2244.0	127.4	0.0
JUN	466	27.7	3.3	1.4	0.7	3.0	62	3.7	22.6	0.0	2244.0	127.4	0.0
JUL	465	28.6	4.3	1.8	10.3	28.6	633	38.9	0.0	0.0	2241.6	115.3	-12.1
AUG	397	24.4	5.0	1.9	11.9	24.4	590	36.3	0.0	0.0	2238.6	101.5	-13.8
SEP	380	22.6	3.4	1.2	2.5	22.6	422	25.1	0.0	0.0	2237.7	97.8	-3.7
OCT	369	22.7	3.4	1.3	0.7	3.1	62	3.8	7.4	0.0	2240.0	108.0	10.2
NOV	358	21.3	1.9	0.7	0.7	3.0	62	3.7	16.9	0.0	2240.0	108.0	0.0
DEC	356	21.9	1.1	0.4	0.7	3.1	62	3.8	17.7	0.0	2240.0	108.0	0.0
TOTAL		307.1	34.7	13.8	31.0	102.9		133.9	169.7	0.0			-10.3

DAVIS CREEK RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	0	0.0	1.3	0.0	5	0.3	0.0	0.0	2042.2	6.5	-0.3
FEB	0	0.0	1.6	0.1	5	0.3	0.0	0.0	2041.1	6.1	-0.4
MAR	0	0.0	2.9	0.1	10	0.6	0.0	0.0	2039.2	5.4	-0.7
APR	224	13.3	4.6	0.2	25	1.5	0.0	0.0	2060.9	17.0	11.6
MAY	239	14.7	5.4	0.4	50	3.1	0.0	0.0	2073.3	28.2	11.2
JUN	240	14.3	6.3	0.6	180	10.7	0.0	0.0	2076.0	31.2	3.0
JUL	211	13.0	7.3	0.7	291	17.9	0.0	0.0	2070.8	25.6	-5.6
AUG	166	10.2	6.4	0.5	320	19.7	0.0	0.0	2059.0	15.6	-10.0
SEP	113	6.7	4.8	0.2	257	15.3	0.0	0.0	2043.0	6.8	-8.8
OCT	0	0.0	3.8	0.1	5	0.3	0.0	0.0	2041.9	6.4	-0.4
NOV	0	0.0	2.1	0.1	5	0.3	0.0	0.0	2040.9	6.0	-0.4
DEC	0	0.0	1.2	0.0	5	0.3	0.0	0.0	2040.1	5.7	-0.3
TOTAL		72.2	47.6	3.0		70.3	0.0	0.0			-1.1
MOST PROBABLE INFLOW CONDITIONS											
JAN	0	0	1.3	0	5	0.3	0.0	0.0	2042.2	6.5	-0.3
FEB	0	0	1.6	0.1	5	0.3	0.0	0.0	2041.1	6.1	-0.4
MAR	0	0	2.9	0.1	10	0.6	0.0	0.0	2039.2	5.4	-0.7
APR	74	4.4	4.6	0.2	25	1.5	0.0	0.0	2045.9	8.1	2.7
MAY	239	14.7	4.4	0.2	34	2.1	0.0	0.0	2065.3	20.5	12.4
JUN	240	14.3	4.9	0.4	54	3.2	0.0	0.0	2076.0	31.2	10.7
JUL	111	6.8	5.7	0.5	194	11.9	0.0	0.0	2070.8	25.6	-5.6
AUG	68	4.2	4.9	0.4	224	13.8	0.0	0.0	2059.0	15.6	-10
SEP	13	0.8	3.7	0.2	158	9.4	0.0	0.0	2043.0	6.8	-8.8
OCT	0	0	3.8	0.1	5	0.3	0.0	0.0	2041.9	6.4	-0.4
NOV	0	0	2.1	0.1	5	0.3	0.0	0.0	2040.9	6.0	-0.4
DEC	0	0	1.2	0	5	0.3	0.0	0.0	2040.1	5.7	-0.3
TOTAL		45.2	40.9	2.3		44.0	0.0	0.0			-1.1
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	0	0.0	1.3	0.0	5	0.3	0.0	0.0	2042.2	6.5	-0.3
FEB	0	0.0	1.6	0.1	5	0.3	0.0	0.0	2041.1	6.1	-0.4
MAR	0	0.0	2.9	0.1	10	0.6	0.0	0.0	2039.2	5.4	-0.7
APR	52	3.1	4.6	0.1	25	1.5	0.0	0.0	2043.2	6.9	1.5
MAY	239	14.7	3.1	0.2	34	2.1	0.0	0.0	2063.9	19.3	12.4
JUN	240	14.3	3.9	0.3	35	2.1	0.0	0.0	2076.0	31.2	11.9
JUL	20	1.2	4.4	0.4	128	7.9	0.0	0.0	2069.2	24.1	-7.1
AUG	20	1.2	3.8	0.3	143	8.8	0.0	0.0	2059.9	16.2	-7.9
SEP	10	0.6	2.6	0.1	166	9.9	0.0	0.0	2043.0	6.8	-9.4
OCT	0	0.0	3.8	0.1	5	0.3	0.0	0.0	2041.9	6.4	-0.4
NOV	0	0.0	2.1	0.1	5	0.3	0.0	0.0	2040.9	6.0	-0.4
DEC	0	0.0	1.2	0.0	5	0.3	0.0	0.0	2040.1	5.7	-0.3
TOTAL		35.1	35.1	1.8		34.4	0.0	0.0			-1.1

BONNY RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT CANAL 1000 AF	RELEASE REQUIREMENT RIVER 1000 AF	TOTAL MEAN CFS	TOTAL 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS													
JAN	23	1.4	1.2	0.2	0.0	0.5	8	0.5	0.0	0.0	3667.5	32.8	0.7
FEB	22	1.2	1.4	0.2	0.0	0.4	7	0.4	0.0	0.0	3667.8	33.4	0.6
MAR	21	1.3	2.0	0.3	0.0	0.5	8	0.5	0.0	0.0	3668.1	33.9	0.5
APR	24	1.4	5.6	0.8	0.0	0.4	7	0.4	0.0	0.0	3668.2	34.1	0.2
MAY	21	1.3	7.0	1.1	0.4	0.5	15	0.9	0.0	0.0	3667.8	33.4	-0.7
JUN	12	0.7	8.4	1.3	0.3	0.4	12	0.7	0.0	0.0	3667.1	32.1	-1.3
JUL	5	0.3	9.1	1.3	1.0	0.5	24	1.5	0.0	0.0	3665.7	29.6	-2.5
AUG	0	0.0	8.1	1.1	0.6	0.5	18	1.1	0.0	0.0	3664.3	27.4	-2.2
SEP	0	0.0	7.2	1.0	0.3	0.4	12	0.7	0.0	0.0	3663.3	25.7	-1.7
OCT	7	0.4	5.0	0.7	0.2	0.5	11	0.7	0.0	0.0	3662.6	24.7	-1.0
NOV	17	1.0	2.2	0.3	0.0	0.4	7	0.4	0.0	0.0	3662.8	25.0	0.3
DEC	20	1.2	1.4	0.2	0.0	0.5	8	0.5	0.0	0.0	3663.2	25.5	0.5
TOTAL		10.2	58.5	8.5	2.8	5.5		8.3	0.0	0.0			-6.6
MOST PROBABLE INFLOW CONDITIONS													
JAN	28	1.7	1.1	0.2	0.0	0.5	8	0.5	0.0	0.0	3667.7	33.1	1.0
FEB	31	1.7	1.3	0.2	0.0	0.4	7	0.4	0.0	0.0	3668.3	34.2	1.1
MAR	31	1.9	1.9	0.3	0.0	0.5	8	0.5	0.0	0.0	3668.9	35.3	1.1
APR	35	2.1	4.4	0.7	0.0	0.4	7	0.4	0.0	0.0	3669.4	36.3	1.0
MAY	39	2.4	5.8	0.9	0.1	0.5	10	0.6	0.0	0.0	3669.9	37.2	0.9
JUN	25	1.5	6.9	1.1	0.3	0.4	12	0.7	0.0	0.0	3669.7	36.9	-0.3
JUL	16	1.0	8.2	1.3	0.7	0.5	20	1.2	0.0	0.0	3668.9	35.4	-1.5
AUG	8	0.5	6.8	1.0	0.6	0.5	18	1.1	0.0	0.0	3668.1	33.8	-1.6
SEP	3	0.2	5.4	0.8	0.3	0.4	12	0.7	0.0	0.0	3667.3	32.5	-1.3
OCT	15	0.9	3.6	0.5	0.1	0.5	10	0.6	0.0	0.0	3667.2	32.3	-0.2
NOV	25	1.5	2.2	0.3	0.0	0.4	7	0.4	0.0	0.0	3667.7	33.1	0.8
DEC	24	1.5	1.3	0.2	0.0	0.5	8	0.5	0.0	0.0	3668.1	33.9	0.8
TOTAL		16.9	48.9	7.5	2.1	5.5		7.6	0.0	0.0			1.8
REASONABLE MAXIMUM INFLOW CONDITIONS													
JAN	36	2.2	1.1	0.2	0.0	0.5	8	0.5	0.0	0.0	3668.0	33.6	1.5
FEB	40	2.2	1.2	0.2	0.0	0.4	7	0.4	0.0	0.0	3668.8	35.2	1.6
MAR	42	2.6	1.9	0.3	0.0	0.5	8	0.5	0.0	0.0	3669.8	37.0	1.8
APR	52	3.1	3.1	0.5	0.0	0.4	7	0.4	0.0	0.0	3670.9	39.2	2.2
MAY	60	3.7	4.3	0.7	0.2	0.5	11	0.7	0.2	0.0	3672.0	41.3	2.1
JUN	84	5.0	5.3	0.9	0.2	0.4	10	0.6	3.5	0.0	3672.0	41.3	0.0
JUL	46	2.8	6.2	1.1	0.4	0.5	15	0.9	0.8	0.0	3672.0	41.3	0.0
AUG	63	3.9	5.7	1.0	0.4	0.5	15	0.9	2.0	0.0	3672.0	41.3	0.0
SEP	50	3.0	4.2	0.7	0.2	0.4	10	0.6	1.7	0.0	3672.0	41.3	0.0
OCT	33	2.0	3.6	0.6	0.2	0.5	11	0.7	0.7	0.0	3672.0	41.3	0.0
NOV	39	2.3	2.2	0.4	0.0	0.4	7	0.4	1.5	0.0	3672.0	41.3	0.0
DEC	34	2.1	1.2	0.2	0.0	0.5	8	0.5	1.4	0.0	3672.0	41.3	0.0
TOTAL		34.9	40.2	6.8	1.6	5.5		7.1	11.8	0.0			9.2

ENDERS RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	28	1.7	0.9	0.1	0	0.0	0.0	0.0	3095.9	20.2	1.6
FEB	27	1.5	1.1	0.1	0	0.0	0.0	0.0	3097.1	21.6	1.4
MAR	26	1.6	1.8	0.2	0	0.0	0.0	0.0	3098.3	23.0	1.4
APR	27	1.6	5.3	0.5	0	0.0	0.0	0.0	3099.2	24.1	1.1
MAY	24	1.5	6.5	0.7	0	0.0	0.0	0.0	3099.9	24.9	0.8
JUN	25	1.5	7.8	0.6	329	19.6	0.0	2.7	3082.3	8.9	-16.0
JUL	26	1.6	8.5	0.4	533	32.8	0.0	31.6	3082.3	8.9	0.0
AUG	24	1.5	7.6	0.4	540	33.2	0.0	32.1	3082.3	8.9	0.0
SEP	22	1.3	5.6	0.3	8	0.5	0.0	0.0	3083.1	9.4	0.5
OCT	24	1.5	4.2	0.2	0	0.0	0.0	0.0	3085.0	10.7	1.3
NOV	27	1.6	2.0	0.1	0	0.0	0.0	0.0	3087.1	12.2	1.5
DEC	26	1.6	1.2	0.1	0	0.0	0.0	0.0	3089.0	13.7	1.5
TOTAL		18.5	52.3	3.7		86.1	0.0	66.4			-4.9
MOST PROBABLE INFLOW CONDITIONS											
JAN	44	2.7	0.9	0.1	0	0.0	0.0	0.0	3096.8	21.2	2.6
FEB	41	2.3	1.0	0.1	0	0.0	0.0	0.0	3098.7	23.4	2.2
MAR	37	2.3	1.7	0.2	0	0.0	0.0	0.0	3100.4	25.5	2.1
APR	40	2.4	4.3	0.5	0	0.0	0.0	0.0	3101.9	27.4	1.9
MAY	42	2.6	5.4	0.6	0	0.0	0.0	0.0	3103.4	29.4	2.0
JUN	39	2.3	6.5	0.7	82	4.9	0.0	0.0	3100.9	26.1	-3.3
JUL	52	3.2	7.2	0.6	379	23.3	0.0	3.5	3082.3	8.9	-17.2
AUG	42	2.6	6.2	0.3	371	22.8	0.0	20.5	3082.3	8.9	0.0
SEP	44	2.6	4.5	0.2	42	2.5	0.0	0.1	3082.3	8.9	0.0
OCT	41	2.5	3.0	0.2	0	0.0	0.0	0.0	3085.7	11.2	2.3
NOV	42	2.5	2.0	0.1	0	0.0	0.0	0.0	3088.9	13.6	2.4
DEC	42	2.6	1.1	0.1	0	0.0	0.0	0.0	3091.8	16.1	2.5
TOTAL		30.6	43.6	3.7		53.5	0.0	24.1			-2.5
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	70	4.3	0.8	0.1	0	0.0	0.0	0.0	3098.2	22.8	4.2
FEB	67	3.7	0.9	0.1	0	0.0	0.0	0.0	3101.1	26.4	3.6
MAR	57	3.5	1.7	0.2	0	0.0	0.0	0.0	3103.6	29.7	3.3
APR	61	3.6	3.2	0.4	0	0.0	0.0	0.0	3105.9	32.9	3.2
MAY	63	3.9	4.1	0.5	0	0.0	0.0	0.0	3108.2	36.3	3.4
JUN	84	5.0	5.3	0.7	0	0.0	0.0	0.0	3110.9	40.6	4.3
JUL	98	6.0	6.0	0.8	211	13.0	0.0	0.0	3105.9	32.8	-7.8
AUG	80	4.9	5.1	0.6	216	13.3	0.0	0.0	3099.0	23.8	-9.0
SEP	86	5.1	3.4	0.4	0	0.0	0.0	0.0	3102.7	28.5	4.7
OCT	72	4.4	2.1	0.2	0	0.0	0.0	0.0	3105.8	32.7	4.2
NOV	71	4.2	2.0	0.2	0	0.0	0.0	0.0	3108.5	36.7	4.0
DEC	72	4.4	1.0	0.1	0	0.0	0.0	0.0	3111.2	41.0	4.3
TOTAL		53.0	35.4	4.3		26.3	0.0	0.0			22.4

SWANSON LAKE OPERATION ESTIMATES- 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT CANAL 1000 AF	RELEASE REQUIREMENT RIVER 1000 AF	RELEASE REQUIREMENT TOTAL MEAN CFS	RELEASE REQUIREMENT TOTAL 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS													
JAN	50	3.1	0.9	0.3	0.0	0.1	2	0.1	0.0	0.0	2739.2	58.7	2.7
FEB	94	5.2	1.1	0.3	0.0	0.1	2	0.1	0.0	0.0	2740.5	63.5	4.8
MAR	109	6.7	1.8	0.5	0.0	0.1	2	0.1	0.0	0.0	2742.2	69.6	6.1
APR	99	5.9	5.4	1.7	0.0	0.1	2	0.1	0.0	0.0	2743.2	73.7	4.1
MAY	70	4.3	6.6	2.2	0.0	0.1	2	0.1	0.0	0.0	2743.8	75.7	2.0
JUN	55	3.3	7.5	2.4	8.9	1.5	175	10.4	0.0	0.0	2741.3	66.2	-9.5
JUL	13	0.8	8.8	2.4	19.2	9.6	468	28.8	0.0	0.0	2731.6	35.8	-30.4
AUG	2	0.1	7.8	1.4	14.6	10.1	402	24.7	0.0	2.6	2720.0	12.4	-23.4
SEP	0	0.0	5.8	0.7	2.0	2.6	77	4.6	0.0	4.5	2719.4	11.6	-0.8
OCT	0	0.0	3.8	0.4	0.0	0.1	2	0.1	0.0	0.0	2719.0	11.1	-0.5
NOV	24	1.4	2.0	0.2	0.0	0.1	2	0.1	0.0	0.0	2719.8	12.2	1.1
DEC	46	2.8	1.2	0.1	0.0	0.1	2	0.1	0.0	0.0	2721.6	14.8	2.6
TOTAL		33.6	52.8	12.6	44.7	24.6		69.3	0.0	7.1			-41.2
MOST PROBABLE INFLOW CONDITIONS													
JAN	94	5.8	0.9	0.3	0.0	0.1	2	0.1	0.0	0.0	2739.9	61.4	5.4
FEB	140	7.8	1.0	0.3	0.0	0.1	2	0.1	0.0	0.0	2742.0	68.8	7.4
MAR	153	9.4	1.7	0.6	0.0	0.1	2	0.1	0.0	0.0	2744.2	77.5	8.7
APR	155	9.2	4.3	1.5	0.0	0.1	2	0.1	0.0	0.0	2746.1	85.1	7.6
MAY	153	9.4	5.2	1.9	0.0	0.1	2	0.1	0.0	0.0	2747.8	92.5	7.4
JUN	116	6.9	6.4	2.4	3.9	0.1	67	4.0	0.0	0.0	2747.9	93.0	0.5
JUL	59	3.6	7.4	2.6	12.8	4.9	288	17.7	0.0	0.0	2743.9	76.3	-16.7
AUG	36	2.2	6.5	2.0	13.3	5.3	303	18.6	0.0	0.0	2738.9	57.9	-18.4
SEP	5	0.3	4.8	1.3	2.5	1.4	66	3.9	0.0	0.0	2737.5	53.0	-4.9
OCT	21	1.3	3.1	0.8	0.0	0.1	2	0.1	0.0	0.0	2737.6	53.4	0.4
NOV	72	4.3	2.0	0.6	0.0	0.1	2	0.1	0.0	0.0	2738.7	57.0	3.6
DEC	75	4.6	1.1	0.3	0.0	0.1	2	0.1	0.0	0.0	2739.9	61.2	4.2
TOTAL		64.8	44.4	14.6	32.5	12.5		45.0	0.0	0.0			5.2
REASONABLE MAXIMUM INFLOW CONDITIONS													
JAN	122	7.5	0.9	0.2	0.0	0.1	2	0.1	0.0	0.0	2740.4	63.2	7.2
FEB	184	10.2	0.9	0.3	0.0	0.1	2	0.1	0.0	0.0	2743.1	73.0	9.8
MAR	216	13.3	1.7	0.6	0.0	0.1	2	0.1	0.0	0.0	2746.2	85.6	12.6
APR	260	15.5	3.2	1.2	0.0	0.1	2	0.1	0.0	0.0	2749.4	99.8	14.2
MAY	280	17.2	3.9	1.5	0.0	0.1	2	0.1	3.2	0.0	2752.0	112.2	12.4
JUN	237	14.1	5.2	2.1	3.3	0.1	57	3.4	8.6	0.0	2752.0	112.2	0.0
JUL	187	11.5	6.2	2.5	9.7	3.5	215	13.2	0.0	0.0	2751.1	108.0	-4.2
AUG	85	5.2	5.3	2.1	8.4	3.5	194	11.9	0.0	0.0	2749.2	99.2	-8.8
SEP	104	6.2	3.8	1.4	1.5	0.1	27	1.6	0.0	0.0	2749.9	102.4	3.2
OCT	117	7.2	2.2	0.9	0.0	0.1	2	0.1	0.0	0.0	2751.2	108.6	6.2
NOV	134	8.0	2.0	0.8	0.0	0.1	2	0.1	3.5	0.0	2752.0	112.2	3.6
DEC	111	6.8	1.0	0.4	0.0	0.1	2	0.1	6.3	0.0	2752.0	112.2	0.0
TOTAL		122.7	36.1	14.0	22.9	8.0		30.9	21.6	0.0			56.2

HUGH BUTLER LAKE OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	16	1.0	0.8	0.1	5	0.3	0.0	0.0	2576.4	28.0	0.6
FEB	22	1.2	1.0	0.1	5	0.3	0.0	0.0	2576.9	28.8	0.8
MAR	23	1.4	1.7	0.2	5	0.3	0.0	0.0	2577.6	29.7	0.9
APR	22	1.3	5.7	0.7	5	0.3	0.0	0.0	2577.8	30.0	0.3
MAY	21	1.3	6.9	0.8	5	0.3	0.0	0.0	2577.9	30.2	0.2
JUN	20	1.2	8.3	1.0	40	2.4	0.0	0.0	2576.4	28.0	-2.2
JUL	15	0.9	9.2	1.0	104	6.4	0.0	0.0	2571.4	21.5	-6.5
AUG	11	0.7	8.0	0.6	213	13.1	0.0	0.4	2558.0	8.9	-12.6
SEP	7	0.4	6.0	0.4	18	1.1	0.0	0.8	2557.6	8.6	-0.3
OCT	13	0.8	4.5	0.3	5	0.3	0.0	0.0	2557.8	8.8	0.2
NOV	17	1.0	1.9	0.1	5	0.3	0.0	0.0	2558.7	9.4	0.6
DEC	18	1.1	1.1	0.1	5	0.3	0.0	0.0	2559.6	10.1	0.7
TOTAL		12.3	55.1	5.4		25.4	0.0	1.2			-17.3
MOST PROBABLE INFLOW CONDITIONS											
JAN	21	1.3	0.8	0.1	5	0.3	0.0	0.0	2576.6	28.3	0.9
FEB	27	1.5	0.9	0.1	5	0.3	0.0	0.0	2577.4	29.4	1.1
MAR	31	1.9	1.6	0.2	5	0.3	0.0	0.0	2578.3	30.8	1.4
APR	32	1.9	4.8	0.6	5	0.3	0.0	0.0	2579.0	31.8	1.0
MAY	33	2.0	5.8	0.7	5	0.3	0.0	0.0	2579.6	32.8	1.0
JUN	32	1.9	6.8	0.9	27	1.6	0.0	0.0	2579.2	32.2	-0.6
JUL	26	1.6	7.5	0.9	62	3.8	0.0	0.0	2577.1	29.1	-3.1
AUG	24	1.5	6.6	0.8	63	3.9	0.0	0.0	2574.8	25.9	-3.2
SEP	18	1.1	5.0	0.6	18	1.1	0.0	0.0	2574.4	25.3	-0.6
OCT	20	1.2	3.3	0.4	5	0.3	0.0	0.0	2574.8	25.8	0.5
NOV	22	1.3	1.9	0.2	5	0.3	0.0	0.0	2575.4	26.6	0.8
DEC	21	1.3	1.0	0.1	5	0.3	0.0	0.0	2576.0	27.5	0.9
TOTAL		18.5	46.2	5.6		12.8	0.0	0.0			0.1
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	29	1.8	0.8	0.1	5	0.3	0.0	0.0	2576.9	28.8	1.4
FEB	38	2.1	0.8	0.1	5	0.3	0.0	0.0	2578.1	30.5	1.7
MAR	49	3.0	1.6	0.2	5	0.3	0.0	0.0	2579.8	33.0	2.5
APR	47	2.8	3.4	0.4	5	0.3	0.0	0.0	2581.1	35.1	2.1
MAY	50	3.1	4.3	0.6	5	0.3	1.1	0.0	2581.8	36.2	1.1
JUN	61	3.6	5.2	0.7	18	1.1	1.8	0.0	2581.8	36.2	0.0
JUL	59	3.6	6.3	0.8	42	2.6	0.2	0.0	2581.8	36.2	0.0
AUG	44	2.7	5.5	0.7	42	2.6	0.0	0.0	2581.4	35.6	-0.6
SEP	35	2.1	3.9	0.5	15	0.9	0.1	0.0	2581.8	36.2	0.6
OCT	29	1.8	2.2	0.3	5	0.3	1.2	0.0	2581.8	36.2	0.0
NOV	29	1.7	1.9	0.3	5	0.3	1.1	0.0	2581.8	36.2	0.0
DEC	28	1.7	0.9	0.1	5	0.3	1.3	0.0	2581.8	36.2	0.0
TOTAL		30.0	36.8	4.8		9.6	6.8	0.0			8.8

HARRY STRUNK LAKE OPERATON ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	41	2.5	0.9	0.1	2	0.1	0.0	0.0	2359.4	25.1	2.3
FEB	47	2.6	1.0	0.1	2	0.1	0.0	0.0	2361.1	27.5	2.4
MAR	49	3.0	1.6	0.2	2	0.1	0.0	0.0	2362.9	30.2	2.7
APR	54	3.2	5.6	0.8	2	0.1	0.0	0.0	2364.3	32.5	2.3
MAY	50	3.1	6.8	1.0	2	0.1	0.0	0.0	2365.4	34.5	2.0
JUN	45	2.7	8.0	1.2	76	4.5	0.0	0.0	2363.7	31.5	-3.0
JUL	21	1.3	8.9	0.9	372	22.9	0.0	0.0	2343.1	9.0	-22.5
AUG	31	1.9	8.0	0.5	125	7.7	0.0	6.2	2343.0	8.9	-0.1
SEP	24	1.4	6.1	0.4	5	0.3	0.0	0.0	2344.0	9.6	0.7
OCT	34	2.1	4.3	0.3	2	0.1	0.0	0.0	2346.3	11.3	1.7
NOV	40	2.4	1.9	0.1	2	0.1	0.0	0.0	2348.9	13.5	2.2
DEC	41	2.5	1.0	0.1	2	0.1	0.0	0.0	2351.4	15.8	2.3
TOTAL		28.7	54.3	5.7		36.2	0.0	6.2			-7.0
MOST PROBABLE INFLOW CONDITIONS											
JAN	52	3.2	0.8	0.1	2	0.1	0.0	0.0	2359.9	25.8	3.0
FEB	63	3.5	0.9	0.1	2	0.1	0.0	0.0	2362.2	29.1	3.3
MAR	62	3.8	1.6	0.2	2	0.1	0.0	0.0	2364.3	32.6	3.5
APR	69	4.1	4.6	0.7	2	0.1	0.2	0.0	2366.1	35.7	3.1
MAY	72	4.4	5.6	0.9	2	0.1	3.4	0.0	2366.1	35.7	0.0
JUN	69	4.1	6.7	1.0	54	3.2	0.0	0.0	2366.0	35.6	-0.1
JUL	73	4.5	7.7	1.0	220	13.5	0.0	0.0	2359.7	25.6	-10.0
AUG	52	3.2	6.6	0.6	220	13.5	0.0	0.0	2350.2	14.7	-10.9
SEP	35	2.1	4.9	0.4	12	0.7	0.0	0.0	2351.3	15.7	1.0
OCT	44	2.7	3.3	0.3	2	0.1	0.0	0.0	2353.5	18.0	2.3
NOV	49	2.9	1.9	0.2	2	0.1	0.0	0.0	2355.8	20.6	2.6
DEC	47	2.9	1.0	0.1	2	0.1	0.0	0.0	2358.0	23.3	2.7
TOTAL		41.4	45.5	5.6		31.7	3.6	0.0			0.5
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	63	3.9	0.8	0.1	2	0.1	0.0	0.0	2360.4	26.5	3.7
FEB	92	5.1	0.8	0.1	2	0.1	0.0	0.0	2363.6	31.4	4.9
MAR	101	6.2	1.5	0.2	2	0.1	2.5	0.0	2365.6	34.8	3.4
APR	86	5.1	3.6	0.5	2	0.1	3.6	0.0	2366.1	35.7	0.9
MAY	104	6.4	4.2	0.7	2	0.1	5.6	0.0	2366.1	35.7	0.0
JUN	156	9.3	5.3	0.8	20	1.2	7.3	0.0	2366.1	35.7	0.0
JUL	146	9.0	6.2	0.9	145	8.9	0.0	0.0	2365.7	34.9	-0.8
AUG	94	5.8	5.4	0.8	137	8.4	0.0	0.0	2363.7	31.5	-3.4
SEP	61	3.6	3.7	0.5	2	0.1	0.0	0.0	2365.4	34.5	3.0
OCT	60	3.7	2.5	0.4	2	0.1	2.9	0.0	2365.6	34.8	0.3
NOV	64	3.8	1.9	0.3	2	0.1	3.4	0.0	2365.6	34.8	0.0
DEC	59	3.6	0.9	0.1	2	0.1	3.4	0.0	2365.6	34.8	0.0
TOTAL		65.5	36.8	5.4		19.4	28.7	0.0			12.0

KEITH SEBELIUS LAKE OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	2	0.1	0.9	0.1	2	0.1	0.0	0.0	2301.8	30.7	-0.1
FEB	2	0.1	1.0	0.2	2	0.1	0.0	0.0	2301.7	30.5	-0.2
MAR	3	0.2	1.7	0.3	2	0.1	0.0	0.0	2301.5	30.3	-0.2
APR	3	0.2	5.7	0.9	2	0.1	0.0	0.0	2301.1	29.5	-0.8
MAY	7	0.4	7.4	1.2	2	0.1	0.0	0.0	2300.6	28.6	-0.9
JUN	3	0.2	8.6	1.2	101	6.0	0.0	0.0	2296.5	21.6	-7.0
JUL	0	0.0	9.9	1.1	132	8.1	0.0	0.0	2289.2	12.4	-9.2
AUG	0	0.0	8.7	0.6	132	8.1	0.0	0.6	2278.6	4.3	-8.1
SEP	0	0.0	6.2	0.3	15	0.9	0.0	0.8	2277.8	3.9	-0.4
OCT	0	0.0	5.0	0.2	2	0.1	0.0	0.0	2277.1	3.6	-0.3
NOV	0	0.0	2.0	0.1	2	0.1	0.0	0.0	2276.6	3.4	-0.2
DEC	2	0.1	1.1	0.0	2	0.1	0.0	0.0	2276.6	3.4	0.0
TOTAL		1.3	58.0	6.2		23.9	0.0	1.4			-27.4
MOST PROBABLE INFLOW CONDITIONS											
JAN	5	0.3	0.8	0.1	2	0.1	0.0	0.0	2301.9	30.9	0.1
FEB	5	0.3	1.0	0.2	2	0.1	0.0	0.0	2301.9	30.9	0.0
MAR	5	0.3	1.7	0.3	2	0.1	0.0	0.0	2301.8	30.8	-0.1
APR	10	0.6	5.0	0.8	2	0.1	0.0	0.0	2301.7	30.5	-0.3
MAY	13	0.8	5.8	0.9	2	0.1	0.0	0.0	2301.5	30.3	-0.2
JUN	10	0.6	7.1	1.1	32	1.9	0.0	0.0	2300.3	27.9	-2.4
JUL	13	0.8	8.2	1.1	111	6.8	0.0	0.0	2296.0	20.8	-7.1
AUG	5	0.3	7.1	0.8	89	5.5	0.0	0.0	2291.4	14.8	-6.0
SEP	0	0.0	5.3	0.5	2	0.1	0.0	0.0	2290.9	14.2	-0.6
OCT	2	0.1	3.6	0.3	2	0.1	0.0	0.0	2290.6	13.9	-0.3
NOV	5	0.3	2.0	0.2	2	0.1	0.0	0.0	2290.6	13.9	0.0
DEC	3	0.2	1.0	0.1	2	0.1	0.0	0.0	2290.6	13.9	0.0
TOTAL		4.6	48.3	6.4		15.1	0.0	0.0			-16.9
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	5	0.3	0.8	0.1	2	0.1	0.0	0.0	2301.9	30.9	0.1
FEB	13	0.7	0.9	0.2	2	0.1	0.0	0.0	2302.1	31.3	0.4
MAR	21	1.3	1.7	0.3	2	0.1	0.0	0.0	2302.5	32.2	0.9
APR	20	1.2	4.1	0.7	2	0.1	0.0	0.0	2302.7	32.6	0.4
MAY	36	2.2	4.4	0.8	2	0.1	0.0	0.0	2303.3	33.9	1.3
JUN	39	2.3	5.5	1.0	13	0.8	0.0	0.0	2303.6	34.4	0.5
JUL	80	4.9	6.6	1.2	46	2.8	0.0	0.0	2304.0	35.3	0.9
AUG	65	4.0	5.8	1.0	47	2.9	0.0	0.0	2304.1	35.4	0.1
SEP	32	1.9	4.2	0.8	2	0.1	0.5	0.0	2304.3	35.9	0.5
OCT	24	1.5	2.6	0.5	2	0.1	0.9	0.0	2304.3	35.9	0.0
NOV	7	0.4	2.0	0.4	2	0.1	0.0	0.0	2304.3	35.8	-0.1
DEC	7	0.4	1.0	0.2	2	0.1	0.0	0.0	2304.3	35.9	0.1
TOTAL		21.1	39.5	7.2		7.4	1.4	0.0			5.1

HARLAN COUNTY LAKE OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	80	4.9	1.0	1.0	10	0.6	0.0	0.0	1942.6	273.2	3.3
FEB	146	8.1	1.0	0.9	11	0.6	0.0	0.0	1943.2	279.8	6.6
MAR	195	12.0	1.8	1.8	0	0.0	0.0	0.0	1944.0	290.0	10.2
APR	182	10.8	5.2	5.4	0	0.0	0.0	0.0	1944.5	295.4	5.4
MAY	166	10.2	6.4	6.7	8	0.5	0.0	0.0	1944.7	298.4	3.0
JUN	131	7.8	7.9	7.9	566	33.7	0.0	0.0	1941.9	264.6	-33.8
JUL	88	5.4	8.9	7.9	1251	76.9	0.0	0.0	1934.4	185.2	-79.4
AUG	78	4.8	7.8	6.2	857	52.7	0.0	34.6	1932.4	165.7	-19.5
SEP	18	1.1	5.6	4.3	69	4.1	0.0	4.1	1932.1	162.5	-3.2
OCT	20	1.2	4.2	3.2	0	0.0	0.0	0.0	1931.8	160.5	-2.0
NOV	71	4.2	1.9	1.5	0	0.0	0.0	0.0	1932.1	163.2	2.7
DEC	80	4.9	1.5	1.2	0	0.0	0.0	0.0	1932.5	166.9	3.7
TOTAL		75.4	53.3	48.0		169.1	0.0	38.7			-103.0
MOST PROBABLE INFLOW CONDITIONS											
JAN	137	8.4	0.8	0.8	10	0.6	0.0	0.0	1942.9	276.9	7.0
FEB	218	12.1	0.9	0.9	11	0.6	0.0	0.0	1943.8	287.5	10.6
MAR	291	17.9	1.5	1.6	0	0.0	0.0	0.0	1945.1	303.8	16.3
APR	297	17.7	4.2	4.5	0	0.0	1.9	0.0	1946.0	315.1	11.3
MAY	364	22.4	5.2	5.7	0	0.0	16.7	0.0	1946.0	315.1	0.0
JUN	212	12.6	6.3	7.0	49	2.9	2.7	0.0	1946.0	315.1	0.0
JUL	198	12.2	7.2	7.4	888	54.6	0.0	0.0	1942.0	265.3	-49.8
AUG	164	10.1	6.1	5.7	641	39.4	0.0	0.0	1938.8	230.3	-35.0
SEP	86	5.1	4.7	4.2	45	2.7	0.0	0.0	1938.7	228.5	-1.8
OCT	88	5.4	3.2	2.8	0	0.0	0.0	0.0	1938.9	231.1	2.6
NOV	111	6.6	1.9	1.7	0	0.0	0.0	0.0	1939.3	236.0	4.9
DEC	119	7.3	1.0	1.0	10	0.6	0.0	0.0	1939.9	241.7	5.7
TOTAL		137.8	42.8	43.3		101.4	21.3	0.0			-28.2
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	220	13.5	0.7	0.7	10	0.6	0.0	0.0	1943.4	282.1	12.2
FEB	364	20.2	0.6	0.6	11	0.6	0.0	0.0	1944.9	301.1	19.0
MAR	615	37.8	1.2	1.3	0	0.0	22.5	0.0	1946.0	315.1	14.0
APR	504	30.0	3.2	3.5	0	0.0	26.5	0.0	1946.0	315.1	0.0
MAY	727	44.7	4.0	4.4	0	0.0	40.3	0.0	1946.0	315.1	0.0
JUN	491	29.2	4.8	5.3	42	2.5	21.4	0.0	1946.0	315.1	0.0
JUL	556	34.2	5.4	5.9	158	9.7	18.6	0.0	1946.0	315.1	0.0
AUG	397	24.4	4.8	5.3	122	7.5	11.6	0.0	1946.0	315.1	0.0
SEP	262	15.6	3.7	4.1	5	0.3	11.2	0.0	1946.0	315.1	0.0
OCT	187	11.5	2.3	2.6	0	0.0	8.9	0.0	1946.0	315.1	0.0
NOV	215	12.8	1.6	1.8	0	0.0	11.0	0.0	1946.0	315.1	0.0
DEC	220	13.5	0.9	1.0	10	0.6	11.9	0.0	1946.0	315.1	0.0
TOTAL		287.4	33.2	36.5		21.8	183.9	0.0			45.2

LOVEWELL RESERVOIR OPERATION ESTIMATES - 1999

MONTH	WHITE ROCK CREEK INFLOW 1000 AF	COURTLAND CANAL INFLOW 1000 AF	TOTAL INFLOW MEAN CFS	TOTAL INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RES SPILL 1000 AF	REQ SHORT 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS													
JAN	0.0	0.0	0	0.0	0.7	0.2	0	0.0	0.0	0.0	1580.9	30.7	-0.2
FEB	0.2	0.0	4	0.2	0.9	0.2	0	0.0	0.0	0.0	1580.9	30.7	0.0
MAR	0.4	3.0	55	3.4	1.6	0.4	0	0.0	0.0	0.0	1581.9	33.7	3.0
APR	0.5	2.3	47	2.8	4.5	1.1	0	0.0	0.0	0.0	1582.5	35.4	1.7
MAY	0.3	2.6	47	2.9	5.7	1.4	21	1.3	0.0	0.0	1582.6	35.6	0.2
JUN	0.3	10.9	188	11.2	7.0	1.7	160	9.5	0.0	0.0	1582.6	35.6	0.0
JUL	0.1	20.4	333	20.5	8.3	1.6	698	42.9	0.0	0.0	1571.7	11.6	-24.0
AUG	0.0	9.1	148	9.1	7.2	0.9	426	26.2	0.0	18.0	1571.7	11.6	0.0
SEP	0.0	0.0	0	0.0	4.9	0.6	47	2.8	0.0	2.8	1571.3	11.0	-0.6
OCT	0.0	1.9	31	1.9	3.5	0.4	0	0.0	0.0	0.0	1572.3	12.5	1.5
NOV	0.0	2.5	42	2.5	1.8	0.2	0	0.0	0.0	0.0	1573.7	14.8	2.3
DEC	0.0	2.6	42	2.6	0.9	0.1	0	0.0	0.0	0.0	1575.1	17.3	2.5
TOTAL	1.8	55.3		57.1	47.0	8.8		82.7	0.0	20.8			-13.6
MOST PROBABLE INFLOW CONDITIONS													
JAN	0.7	0.0	11	0.7	0.7	0.2	0	0.0	0.0	0.0	1581.1	31.4	0.5
FEB	1.4	0.0	25	1.4	0.8	0.2	0	0.0	0.0	0.0	1581.5	32.6	1.2
MAR	2.2	0.0	36	2.2	1.5	0.4	0	0.0	0.0	0.0	1582.2	34.4	1.8
APR	2	0.0	34	2.0	3.7	0.9	0	0.0	0.0	0.0	1582.5	35.5	1.1
MAY	5.4	0.0	88	5.4	4.6	1.1	8	7.0	3.6	0.0	1582.6	35.7	0.2
JUN	4.7	2.4	119	7.1	5.7	1.4	96	5.7	0.0	0.0	1582.6	35.7	0.0
JUL	4.1	18.8	372	22.9	6.5	1.5	507	31.2	0.0	0.0	1579.0	25.9	-9.8
AUG	0.9	11.2	197	12.1	5.4	1.0	324	19.9	0.0	0.0	1575.0	17.1	-8.8
SEP	0.5	0.6	18	1.1	3.8	0.6	35	2.1	0.0	0.0	1574.1	15.5	-1.6
OCT	0.6	4.7	86	5.3	2.5	0.4	0	0.0	0.0	0.0	1576.6	20.4	4.9
NOV	0.6	4.1	79	4.7	1.8	0.3	0	0.0	0.0	0.0	1578.5	24.8	4.4
DEC	0.8	4.6	88	5.4	0.9	0.2	0	0.0	0.0	0.0	1580.6	30.0	5.2
TOTAL	23.9	46.4		70.3	37.9	8.2		59.4	3.6	0.0			-0.9
REASONABLE MAXIMUM INFLOW CONDITIONS													
JAN	4	0.0	65	4.0	0.7	0.2	0	0.0	0.0	0.0	1582.3	34.7	3.8
FEB	6.1	0.0	110	6.1	0.8	0.2	0	0.0	4.9	0.0	1582.6	35.7	1.0
MAR	12.8	0.0	208	12.8	1.5	0.4	0	0.0	12.4	0.0	1582.6	35.7	0.0
APR	8.8	0.0	148	8.8	2.7	0.7	0	0.0	8.1	0.0	1582.6	35.7	0.0
MAY	10.5	0.0	171	10.5	3.4	0.8	8	0.5	9.2	0.0	1582.6	35.7	0.0
JUN	8	1.2	155	9.2	4.5	1.1	47	2.8	5.3	0.0	1582.6	35.7	0.0
JUL	14	1.2	247	15.2	4.8	1.2	205	12.6	1.4	0.0	1582.6	35.7	0.0
AUG	11.8	1.2	211	13.0	4.0	1.0	155	9.5	2.5	0.0	1582.6	35.7	0.0
SEP	11.1	0.6	197	11.7	2.8	0.7	17	1.0	15.7	0.0	1580.6	30.0	-5.7
OCT	9.3	0.0	151	9.3	1.7	0.4	0	0.0	8.9	0.0	1580.6	30.0	0.0
NOV	4.9	0.0	82	4.9	1.8	0.4	0	0.0	4.5	0.0	1580.6	30.0	0.0
DEC	4.3	0.0	70	4.3	0.8	0.2	0	0.0	4.1	0.0	1580.6	30.0	0.0
TOTAL	105.6	4.2		109.8	29.4	7.3		26.4	77.0	0.0			-0.9

KIRWIN RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	0	0.0	0.8	0.3	0	0.0	0.0	0.0	1727.7	90.4	-0.3
FEB	4	0.2	1.1	0.4	0	0.0	0.0	0.0	1727.6	90.2	-0.2
MAR	8	0.5	1.7	0.7	0	0.0	0.0	0.0	1727.6	90.0	-0.2
APR	5	0.3	4.7	1.9	0	0.0	0.0	0.0	1727.3	88.4	-1.6
MAY	15	0.9	5.9	2.3	0	0.0	0.0	0.0	1727.0	87.0	-1.4
JUN	7	0.4	7.2	2.7	76	4.5	0.0	0.0	1725.5	80.2	-6.8
JUL	2	0.1	8.4	2.9	192	11.8	0.0	0.0	1722.0	65.6	-14.6
AUG	0	0.0	7.5	2.3	169	10.4	0.0	0.0	1718.6	52.9	-12.7
SEP	0	0.0	5.3	1.5	0	0.0	0.0	0.0	1718.2	51.4	-1.5
OCT	0	0.0	4.0	1.1	0	0.0	0.0	0.0	1717.8	50.3	-1.1
NOV	0	0.0	1.9	0.5	0	0.0	0.0	0.0	1717.7	49.8	-0.5
DEC	0	0.0	1.0	0.3	0	0.0	0.0	0.0	1717.6	49.5	-0.3
TOTAL		2.4	49.3	16.9		26.7	0.0	0.0			-41.2
MOST PROBABLE INFLOW CONDITIONS											
JAN	10	0.6	0.8	0.3	0	0.0	0.0	0.0	1727.8	91.0	0.3
FEB	18	1.0	1.0	0.4	0	0.0	0.0	0.0	1727.9	91.6	0.6
MAR	29	1.8	1.7	0.7	0	0.0	0.0	0.0	1728.2	92.7	1.1
APR	50	3.0	3.9	1.6	0	0.0	0.0	0.0	1728.4	94.1	1.4
MAY	50	3.1	4.9	2.0	0	0.0	0.0	0.0	1728.7	95.2	1.1
JUN	40	2.4	6.1	2.5	50	3.0	0.0	0.0	1728.0	92.1	-3.1
JUL	42	2.6	6.9	2.7	138	8.5	0.0	0.0	1726.2	83.5	-8.6
AUG	16	1.0	6.0	2.2	106	6.5	0.0	0.0	1724.5	75.8	-7.7
SEP	5	0.3	4.2	1.5	0	0.0	0.0	0.0	1724.2	74.6	-1.2
OCT	2	0.1	2.9	1.0	0	0.0	0.0	0.0	1724.0	73.7	-0.9
NOV	7	0.4	1.9	0.7	0	0.0	0.0	0.0	1723.9	73.4	-0.3
DEC	8	0.5	1.0	0.3	0	0.0	0.0	0.0	1724.0	73.6	0.2
TOTAL		16.8	41.2	15.9		18.0	0.0	0.0			-17.1
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	29	1.8	0.7	0.3	0	0.0	0.0	0.0	1728.0	92.2	1.5
FEB	67	3.7	0.9	0.4	0	0.0	0.0	0.0	1728.7	95.5	3.3
MAR	96	5.9	1.6	0.7	0	0.0	2.5	0.0	1729.3	98.2	2.7
APR	77	4.6	3.2	1.3	0	0.0	3.3	0.0	1729.3	98.2	0.0
MAY	190	11.7	3.8	1.6	0	0.0	10.1	0.0	1729.3	98.2	0.0
JUN	197	11.7	4.8	2.0	32	1.9	7.8	0.0	1729.3	98.2	0.0
JUL	171	10.5	5.6	2.4	86	5.3	2.8	0.0	1729.3	98.2	0.0
AUG	231	14.2	4.7	2.0	65	4.0	8.2	0.0	1729.3	98.2	0.0
SEP	158	9.4	3.3	1.4	0	0.0	8.0	0.0	1729.3	98.2	0.0
OCT	93	5.7	2.1	0.9	0	0.0	4.8	0.0	1729.3	98.2	0.0
NOV	61	3.6	1.9	0.8	0	0.0	2.8	0.0	1729.3	98.2	0.0
DEC	46	2.8	0.9	0.4	0	0.0	2.4	0.0	1729.3	98.2	0.0
TOTAL		85.6	33.7	14.2		11.2	52.7	0.0			7.5

WEBSTER RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	0	0.0	0.9	0.3	0	0.0	0.0	0.0	1890.0	67.4	-0.3
FEB	2	0.1	1.0	0.3	0	0.0	0.0	0.0	1890.0	67.2	-0.2
MAR	2	0.1	1.8	0.5	0	0.0	0.0	0.0	1889.9	66.8	-0.4
APR	8	0.5	5.2	1.5	0	0.0	0.0	0.0	1889.6	65.8	-1.0
MAY	13	0.8	6.4	1.8	0	0.0	0.0	0.0	1889.3	64.8	-1.0
JUN	2	0.1	8.0	2.2	92	5.5	0.0	0.0	1887.0	57.2	-7.6
JUL	0	0.0	9.1	2.2	221	13.6	0.0	0.0	1881.5	41.4	-15.8
AUG	0	0.0	8.2	1.6	168	10.3	0.0	0.0	1876.5	29.5	-11.9
SEP	0	0.0	5.8	1.0	0	0.0	0.0	0.0	1876.0	28.5	-1.0
OCT	0	0.0	4.4	0.8	0	0.0	0.0	0.0	1875.6	27.7	-0.8
NOV	0	0.0	2.0	0.3	0	0.0	0.0	0.0	1875.5	27.4	-0.3
DEC	0	0.0	1.1	0.2	0	0.0	0.0	0.0	1875.4	27.2	-0.2
TOTAL		1.6	53.9	12.7		29.4	0.0	0.0			-40.5
MOST PROBABLE INFLOW CONDITIONS											
JAN	5	0.3	0.9	0.2	0	0.0	0.0	0.0	1890.1	67.8	0.1
FEB	18	1.0	1.0	0.3	0	0.0	0.0	0.0	1890.3	68.5	0.7
MAR	31	1.9	1.8	0.5	0	0.0	0.0	0.0	1890.7	69.9	1.4
APR	39	2.3	4.2	1.2	0	0.0	0.0	0.0	1891.1	71.0	1.1
MAY	44	2.7	5.3	1.6	0	0.0	0.0	0.0	1891.3	72.1	1.1
JUN	35	2.1	6.7	2.0	62	3.7	0.0	0.0	1890.3	68.5	-3.6
JUL	10	0.6	7.6	2.1	153	9.4	0.0	0.0	1887.1	57.6	-10.9
AUG	15	0.9	6.6	1.7	111	6.8	0.0	0.0	1884.6	50.0	-7.6
SEP	2	0.1	4.9	1.2	0	0.0	0.0	0.0	1884.2	48.9	-1.1
OCT	2	0.1	3.4	0.8	0	0.0	0.0	0.0	1884.0	48.2	-0.7
NOV	2	0.1	2.0	0.5	0	0.0	0.0	0.0	1883.8	47.8	-0.4
DEC	8	0.5	1.1	0.3	0	0.0	0.0	0.0	1883.9	48.0	0.2
TOTAL		12.6	45.1	12.4		19.9	0.0	0.0			-19.7
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	34	2.1	0.8	0.2	0	0.0	0.0	0.0	1890.7	69.6	1.9
FEB	54	3.0	0.9	0.3	0	0.0	0.0	0.0	1891.4	72.3	2.7
MAR	85	5.2	1.7	0.5	0	0.0	0.8	0.0	1892.4	76.2	3.9
APR	121	7.2	3.4	1.1	0	0.0	6.1	0.0	1892.4	76.2	0.0
MAY	181	11.1	4.2	1.3	0	0.0	9.8	0.0	1892.4	76.2	0.0
JUN	111	6.6	5.2	1.6	27	1.6	3.4	0.0	1892.4	76.2	0.0
JUL	246	15.1	6.2	1.9	70	4.3	8.9	0.0	1892.4	76.2	0.0
AUG	104	6.4	5.4	1.7	55	3.4	1.3	0.0	1892.4	76.2	0.0
SEP	69	4.1	3.7	1.2	0	0.0	2.9	0.0	1892.4	76.2	0.0
OCT	47	2.9	2.4	0.7	0	0.0	2.2	0.0	1892.4	76.2	0.0
NOV	49	2.9	2.0	0.6	0	0.0	2.3	0.0	1892.4	76.2	0.0
DEC	31	1.9	1.0	0.3	0	0.0	1.6	0.0	1892.4	76.2	0.0
TOTAL		68.5	36.9	11.4		9.3	39.3	0.0			8.5

WACONDA LAKE OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	26	1.6	0.8	0.8	10	0.6	14.0	0.0	1453.6	217.1	-13.8
FEB	38	2.1	1.0	0.9	9	0.5	0.7	0.0	1453.6	217.1	0.0
MAR	44	2.7	1.7	1.6	3	0.2	0.0	0.0	1453.7	218.0	0.9
APR	54	3.2	5.6	5.4	3	0.2	0.0	0.0	1453.5	215.6	-2.4
MAY	83	5.1	6.8	6.6	3	0.2	0.0	0.0	1453.3	213.9	-1.7
JUN	81	4.8	8.6	8.2	52	3.1	0.0	0.0	1452.8	207.4	-6.5
JUL	36	2.2	10.4	9.6	124	7.6	0.0	0.0	1451.4	192.4	-15.0
AUG	36	2.2	9.0	7.9	130	8.0	0.0	0.0	1450.1	178.7	-13.7
SEP	3	0.2	6.5	5.5	39	2.3	0.0	0.0	1449.3	171.1	-7.6
OCT	2	0.1	4.6	3.8	5	0.3	0.0	0.0	1449.0	167.1	-4.0
NOV	22	1.3	1.9	1.5	7	0.4	0.0	0.0	1448.9	166.5	-0.6
DEC	20	1.2	1.0	0.8	10	0.6	0.0	0.0	1448.9	166.3	-0.2
TOTAL		26.7	57.7	52.6		24.0	14.7	0.0			-64.6
MOST PROBABLE INFLOW CONDITIONS											
JAN	57	3.5	0.7	0.7	5	0.3	16.3	0.0	1453.6	217.1	-13.8
FEB	113	6.3	0.9	0.9	5	0.3	5.1	0.0	1453.6	217.1	0.0
MAR	159	9.8	1.7	1.7	2	0.1	0.0	0.0	1454.3	225.1	8.0
APR	171	10.2	4.5	4.6	2	0.1	0.0	0.0	1454.7	230.6	5.5
MAY	246	15.1	5.5	5.6	2	0.1	0.0	0.0	1455.5	240.0	9.4
JUN	235	14.0	7.1	7.4	18	1.1	4.0	0.0	1455.6	241.5	1.5
JUL	168	10.3	8.3	8.7	76	4.7	0.0	0.0	1455.4	238.4	-3.1
AUG	138	8.5	7.1	7.4	60	3.7	0.0	0.0	1455.1	235.8	-2.6
SEP	133	7.9	5.3	5.5	22	1.3	0.0	0.0	1455.2	236.9	1.1
OCT	85	5.2	3.5	3.7	2	0.1	0.0	0.0	1455.3	238.3	1.4
NOV	55	3.3	1.9	1.9	3	0.2	22.4	0.0	1453.6	217.1	-21.2
DEC	63	3.9	0.9	0.9	5	0.3	2.7	0.0	1453.6	217.1	0.0
TOTAL		98.0	47.4	49.0		12.3	50.5	0.0			-13.8
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	223	13.7	0.7	0.7	2	0.1	26.7	0.0	1453.6	217.1	-13.8
FEB	439	24.4	0.8	0.8	2	0.1	23.5	0.0	1453.6	217.1	0.0
MAR	865	53.2	1.6	1.6	2	0.1	27.1	0.0	1455.6	241.5	24.4
APR	785	46.7	3.6	3.8	2	0.1	42.8	0.0	1455.6	241.5	0.0
MAY	932	57.3	4.3	4.5	2	0.1	52.7	0.0	1455.6	241.5	0.0
JUN	938	55.8	5.5	5.8	5	0.3	49.7	0.0	1455.6	241.5	0.0
JUL	1285	79.0	6.4	6.7	31	1.9	70.4	0.0	1455.6	241.5	0.0
AUG	532	32.7	5.8	6.1	15	0.9	25.7	0.0	1455.6	241.5	0.0
SEP	418	24.9	4.2	4.4	13	0.8	19.7	0.0	1455.6	241.5	0.0
OCT	377	23.2	2.6	2.7	2	0.1	20.4	0.0	1455.6	241.5	0.0
NOV	218	13.0	1.9	1.9	2	0.1	35.4	0.0	1453.6	217.1	-24.4
DEC	247	15.2	0.9	0.9	2	0.1	14.2	0.0	1453.6	217.1	0.0
TOTAL		439.1	38.3	39.9		4.7	408.3	0.0			-13.8

CEDAR BLUFF RESERVOIR OPERATION ESTIMATES - 1999

MONTH	INFLOW MEAN CFS	INFLOW 1000 AF	EVAPORATION INCHES	EVAPORATION 1000 AF	RELEASE REQUIREMENT MEAN CFS	RELEASE REQUIREMENT 1000 AF	RESERVOIR SPILL 1000 AF	REQUIREMENT SHORTAGE 1000 AF	END OF MONTH ELEV FT	END OF MONTH CONT 1000 AF	RESERVOIR CHANGE 1000 AF
REASONABLE MINIMUM INFLOW CONDITIONS											
JAN	0	0.0	1.1	0.6	0	0.0	0.0	0.0	2143.9	184.4	-0.6
FEB	0	0.0	1.3	0.7	0	0.0	0.0	0.0	2143.8	183.7	-0.7
MAR	0	0.0	1.9	1.1	2	0.1	0.0	0.0	2143.6	182.5	-1.2
APR	5	0.3	6.4	3.6	2	0.1	0.0	0.0	2143.1	179.1	-3.4
MAY	8	0.5	7.7	4.3	7	0.4	0.0	0.0	2142.5	174.9	-4.2
JUN	5	0.3	9.3	5.1	7	0.4	0.0	0.0	2141.7	169.7	-5.2
JUL	0	0.0	11.0	5.9	13	0.8	0.0	0.0	2140.6	163.0	-6.7
AUG	0	0.0	9.6	5.0	11	0.7	0.0	0.0	2139.7	157.3	-5.7
SEP	0	0.0	7.6	3.9	3	0.2	0.0	0.0	2139.1	153.2	-4.1
OCT	0	0.0	6.1	3.1	0	0.0	0.0	0.0	2138.5	150.1	-3.1
NOV	0	0.0	2.1	1.0	0	0.0	0.0	0.0	2138.4	149.1	-1.0
DEC	0	0.0	1.2	0.6	0	0.0	0.0	0.0	2138.3	148.5	-0.6
TOTAL		1.1	65.3	34.9		2.7	0.0	0.0			-36.5
MOST PROBABLE INFLOW CONDITIONS											
JAN	3	0.2	1.0	0.5	0	0.0	0.0	0.0	2143.9	184.7	-0.3
FEB	7	0.4	1.0	0.6	0	0.0	0.0	0.0	2143.9	184.5	-0.2
MAR	8	0.5	1.9	1.1	2	0.1	0.0	0.0	2143.8	183.8	-0.7
APR	22	1.3	5.1	2.9	2	0.1	0.0	0.0	2143.6	182.1	-1.7
MAY	29	1.8	6.2	3.5	5	0.3	0.0	0.0	2143.3	180.1	-2.0
JUN	27	1.6	7.7	4.3	5	0.3	0.0	0.0	2142.8	177.1	-3.0
JUL	21	1.3	8.8	4.9	11	0.7	0.0	0.0	2142.2	172.8	-4.3
AUG	16	1.0	7.7	4.2	7	0.4	0.0	0.0	2141.6	169.2	-3.6
SEP	2	0.1	6.1	3.3	2	0.1	0.0	0.0	2141.1	165.9	-3.3
OCT	0	0.0	4.5	2.4	0	0.0	0.0	0.0	2140.7	163.5	-2.4
NOV	0	0.0	2.1	1.1	0	0.0	0.0	0.0	2140.5	162.4	-1.1
DEC	2	0.1	1.1	0.6	0	0.0	0.0	0.0	2140.5	161.9	-0.5
TOTAL		8.3	53.3	29.4		2.0	0.0	0.0			-23.1
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	18	1.1	0.9	0.5	0	0.0	0.5	0.0	2144.0	185.1	0.1
FEB	38	2.1	1.0	0.6	0	0.0	1.5	0.0	2144.0	185.1	0.0
MAR	72	4.4	1.8	1.1	2	0.1	3.2	0.0	2144.0	185.1	0.0
APR	86	5.1	4.1	2.3	2	0.1	2.7	0.0	2144.0	185.1	0.0
MAY	112	6.9	4.5	2.6	5	0.3	4.0	0.0	2144.0	185.1	0.0
JUN	146	8.7	5.9	3.4	5	0.3	5.0	0.0	2144.0	185.1	0.0
JUL	263	16.2	7.1	4.1	3	0.2	11.9	0.0	2144.0	185.1	0.0
AUG	112	6.9	6.2	3.5	0	0.0	3.4	0.0	2144.0	185.1	0.0
SEP	61	3.6	4.7	2.7	0	0.0	0.9	0.0	2144.0	185.1	0.0
OCT	50	3.1	3.1	1.8	0	0.0	1.3	0.0	2144.0	185.1	0.0
NOV	32	1.9	2.1	1.2	0	0.0	0.7	0.0	2144.0	185.1	0.0
DEC	24	1.5	1.0	0.6	0	0.0	0.9	0.0	2144.0	185.1	0.0
TOTAL		61.5	42.3	24.4		1.0	36.0	0.0			0.1

TABLE 5

FLOOD DAMAGES PREVENTED BY NEBRASKA-KANSAS PROJECTS RESERVOIRS

BONNY

Year	$ Damages Prevented	Cumulative Total
1957	1,050,000	1,050,000
1960	169,000	1,219,000
1965	273,000	1,492,000
1967	42,000	1,534,000
1969	200,000	1,734,000
1995	496,000	2,230,000
1996	1,000	2,231,000
1998	10,000	2,241,000

ENDERS

Year	$ Damages Prevented	Cumulative Total
1951	220,000	220,000
1956	104,000	324,000
1960	412,000	736,000
1962	37,000	773,000
1965	137,000	910,000
1967	42,000	952,000
1969	1,000	953,000
1995	29,000	982,000
1996	2,255,000	3,237,000
1998	4,000	3,241,000

SWANSON

Year	$ Damages Prevented	Cumulative Total
1957	233,000	233,000
1960	900,000	1,133,000
1962	126,000	1,259,000
1964	50,000	1,309,000
1965	477,000	1,786,000
1967	182,000	1,968,000
1969	1,000	1,969,000
1994	1,135,000	3,104,000
1995	5,391,000	8,495,000
1996	5,953,000	14,448,000
1997	25,000	14,473,000
1998	14,000	14,487,000

HUGH BUTLER

Year	$ Damages Prevented	Cumulative Total
1962	2,000	2,000
1965	137,000	139,000
1967	42,000	181,000
1995	496,000	677,000
1996	1,848,000	2,525,000
1998	11,000	2,536,000

HARRY STRUNK

Year	$ Damages Prevented	Cumulative Total
1951	8,000	8,000
1957	5,000	13,000
1960	198,000	211,000
1962	29,000	240,000
1967	129,000	369,000
1969	6,000	375,000
1994	24,000	399,000
1995	540,000	939,000
1996	2,256,000	3,195,000
1997	3,000	3,198,000
1998	37,000	3,235,000

KEITH SEBELIUS

Year	$ Damages Prevented	Cumulative Total
1966	132,000	132,000
1967	885,000	1,017,000
1995	563,000	1,580,000
1996	1,849,000	3,429,000
1998	10,000	3,439,000

HARLAN COUNTY

Year	$ Damages Prevented	Cumulative Total
1957	1,045,000	1,045,000
1960	4,853,000	5,898,000
1961	255,000	6,153,000
1962	45,000	6,198,000
1964	182,000	6,380,000
1965	60,000	6,440,000
1966	1,658,000	8,098,000
1967	3,539,000	11,637,000
1969	14,000	11,651,000
1971	83,000	11,734,000
1973	1,310,000	13,044,000
1974	1,000	13,045,000
1975	200,000	13,245,000
1978	134,000	13,379,000
1979	21,000	13,400,000
1981	21,000	13,421,000
1982	464,000	13,885,000
1983	1,874,000	15,759,000
1984	1,639,000	17,398,000
1985	13,000	17,411,000
1986	6,756,000	24,167,000
1987	2,376,000	26,543,000
1989	674,000	27,217,000
1990	183,000	27,400,000
1991	105,000	27,505,000
1992	607,000	28,112,000
1993	55,261,000	83,373,000
1994	1,233,000	84,606,000
1995	28,182,000	112,788,000
1996	14,579,000	127,367,000
1997	11,404,000	138,771,000
1998	158,000	138,929,000

LOVEWELL

Year	$ Damages Prevented	Cumulative Total
1957	349,000	349,000
1960	178,000	527,000
1961	165,000	692,000
1962	5,000	697,000
1973	1,728,000	2,425,000
1975	98,000	2,523,000
1978	25,000	2,548,000
1979	13,000	2,561,000
1981	8,000	2,569,000
1982	18,000	2,587,000
1983	511,000	3,098,000
1984	276,000	3,374,000
1985	18,000	3,392,000
1986	354,000	3,746,000
1987	1,225,000	4,971,000
1989	2,259,000	7,230,000
1990	77,000	7,307,000
1992	1,264,000	8,571,000
1993	124,769,000	133,340,000
1994	24,000	133,364,000
1995	7,098,000	140,462,000
1996	1,223,000	141,685,000
1997	317,000	142,002,000
1998	41,000	142,043,000

KIRWIN

Year	$ Damages Prevented	Cumulative Total
1957	522,000	522,000
1958	10,000	532,000
1960	499,000	1,031,000
1961	1,000	1,032,000
1962	1,000	1,033,000
1964	34,000	1,067,000
1965	325,000	1,392,000
1967	191,000	1,583,000
1968	44,000	1,627,000
1969	2,000	1,629,000
1973	40,000	1,669,000
1975	618,000	2,287,000
1978	4,000	2,291,000
1979	35,000	2,326,000
1982	25,000	2,351,000
1983	1,000	2,352,000
1986	60,000	2,412,000
1987	441,000	2,853,000
1989	236,000	3,089,000
1990	54,000	3,143,000
1992	370,000	3,513,000
1993	54,794,000	58,307,000
1994	1,126,000	59,433,000
1995	13,514,000	72,947,000
1996	2,264,000	75,211,000
1997	64,000	75,275,000
1998	88,000	75,363,000

WEBSTER

Year	$ Damages Prevented	Cumulative Total
1957	326,000	326,000
1958	114,000	440,000
1960	1,018,000	1,458,000
1961	1,000	1,459,000
1962	1,000	1,460,000
1964	17,000	1,477,000
1965	325,000	1,802,000
1967	85,000	1,887,000
1968	2,000	1,889,000
1969	1,000	1,890,000
1973	54,000	1,944,000
1975	885,000	2,829,000
1978	2,000	2,831,000
1979	16,000	2,847,000
1982	36,000	2,883,000
1987	447,000	3,330,000
1989	286,000	3,616,000
1990	54,000	3,670,000
1992	192,000	3,862,000
1993	68,390,000	72,252,000
1994	1,160,000	73,412,000
1995	26,867,000	100,279,000
1996	4,918,000	105,197,000
1997	14,000	105,211,000
1998	68,000	105,279,000

WACONDA

Year	$ Damages Prevented	Cumulative Total
1968	280,000	280,000
1969	606,000	886,000
1973	3,797,000	4,683,000
1974	1,000	4,684,000
1975	967,000	5,651,000
1978	11,000	5,662,000
1979	959,000	6,621,000
1981	24,000	6,645,000
1982	1,398,000	8,043,000
1983	360,000	8,403,000
1984	1,363,000	9,766,000
1985	8,000	9,774,000
1986	1,269,000	11,043,000
1987	5,816,000	16,859,000
1989	1,779,000	18,638,000
1990	194,000	18,832,000
1991	31,000	18,863,000
1992	7,264,000	26,127,000
1993	889,702,000	915,829,000
1994	8,952,000	924,781,000
1995	171,843,000	1,096,624,000
1996	51,981,000	1,148,605,000
1997	11,389,000	1,159,994,000
1998	605,000	1,160,599,000

CEDAR BLUFF

Year	$ Damages Prevented	Cumulative Total
1957	4,812,000	4,812,000
1958	829,000	5,641,000
1960	1,573,000	7,214,000
1961	101,000	7,315,000
1962	1,000	7,316,000
1964	17,000	7,333,000
1965	38,000	7,371,000
1967	42,000	7,413,000
1969	1,000	7,414,000
1973	536,000	7,950,000
1975	11,000	7,961,000
1979	2,000	7,963,000
1981	1,000	7,964,000
1982	48,000	8,012,000
1983	1,000	8,013,000
1987	31,000	8,044,000
1992	3,000	8,047,000
1993	101,444,000	109,491,000
1995	6,810,000	116,301,000
1996	7,276,000	123,577,000
1997	74,000	123,651,000
1998	18,000	123,669,000

PROJECT TOTALS

Year	$ Damages Prevented	Cumulative Total
1951	228,000	228,000
1956	104,000	332,000
1957	8,342,000	8,674,000
1958	953,000	9,627,000
1960	9,800,000	19,427,000
1961	523,000	19,950,000
1962	247,000	20,197,000
1964	300,000	20,497,000
1965	1,772,000	22,269,000
1966	1,790,000	24,059,000
1967	5,179,000	29,238,000
1968	326,000	29,564,000
1969	832,000	30,396,000
1971	83,000	30,479,000
1973	7,465,000	37,944,000
1974	2,000	37,946,000
1975	2,779,000	40,725,000
1978	176,000	40,901,000
1979	1,046,000	41,947,000
1981	54,000	42,001,000
1982	1,989,000	43,990,000
1983	2,747,000	46,737,000
1984	3,278,000	50,015,000
1985	39,000	50,054,000
1986	8,439,000	58,493,000
1987	10,336,000	68,829,000
1989	5,234,000	74,063,000
1990	562,000	74,625,000
1991	136,000	74,761,000
1992	9,700,000	84,461,000
1993	1,294,360,000	1,378,821,000
1994	13,654,000	1,392,475,000
1995	261,829,000	1,654,304,000
1996	96,403,000	1,750,707,000
1997	23,290,000	1,773,997,000
1998	1,064,000	1,775,061,000

NOTE: Construction Cost of storage dams -- $208,954,130. The reservoirs upstream from Harlan County Lake did not receive benefits for damages prevented from 1972 to 1993.

TABLE 6
WATER DIVERTED IN 1998 AND THE
ESTIMATED DIVERSION FOR 1999
(Units - Acre-Feet)

Irrigation District and Canal	1998 Irrigation Operations From	To	10-Year Average Diversion (1988-97)	1998 Diversion	Estimated Diversion in 1999
Mirage Flats Irrigation District					
Mirage Flats Canal	7/02	9/04	13,127	12,907	14,000
Ainsworth Irrigation District					
Ainsworth Canal	5/03	9/18	66,864	64,881	68,000
Sargent Irrigation District					
Sargent Canal	6/11	9/14	21,907	24,298	24,000
Farwell Irrigation District					
Farwell Canal	5/29	9/08	70,417	60,611	75,000
Twin Loups Irrigation District					
Above Davis Creek	5/11	9/16	35,682 *	35,163	40,000
Below Davis Creek	5/11	9/20	31,395 *	31,607	34,000
Total Twin Loups Irrigation District			67,077	66,770	74,000
Frenchman Valley Irrigation District					
Culbertson Canal	4/06	8/24	10,352	9,786	11,000
H & RW Irrigation District					
Culbertson Extension Canal	6/08	8/21	12,386	11,504	13,000
Frenchman-Cambridge Irrigation District					
Meeker-Driftwood Canal	6/09	9/04	29,156	30,144	32,000
Red Willow Canal	6/15	9/11	7,365	8,247	9,000
Bartley Canal	6/09	9/04	8,260	9,181	10,000
Cambridge Canal	6/10	9/04	25,796	27,464	29,000
Total Frenchman-Cambridge Irrigation District			70,577	75,036	80,000
Almena Irrigation District					
Almena Canal	6/05	9/26	2,808	4,697	5,000
Bostwick Irrigation District in Nebraska					
Franklin Canal	6/15	9/08	25,316	31,605	33,000
Naponee Canal	6/18	9/03	2,293	2,319	3,000
Franklin Pump Canal	6/22	8/26	2,735	2,630	3,000
Superior Canal	6/15	9/01	13,361	14,200	15,000
Courtland Canal (Nebraska)	5/26	9/23	1,630	2,381	2,000
Total Bostwick Irrigation District in Nebraska			45,335	53,135	56,000
Kansas-Bostwick Irrigation District					
Courtland Canal above Lovewell	6/04	9/23	24,082	26,444	28,000
Courtland Canal below Lovewell	5/26	9/09	41,068	49,058	49,000
Total Kansas-Bostwick Irrigation District			65,150	75,502	77,000
Kirwin Irrigation District					
Kirwin Canal	6/16	8/28	13,694	21,288	25,000
Webster Irrigation District					
Osborne Canal	6/10	8/28	9,094	13,209	16,000
Glen Elder Irrigation District	6/14	9/04	2,506 *	3,144	6,000
TOTAL			471,294	496,768	544,000

* Average diversion is from 1995 through 1998 for Twin Loups and Glen Elder Irrigation Districts.

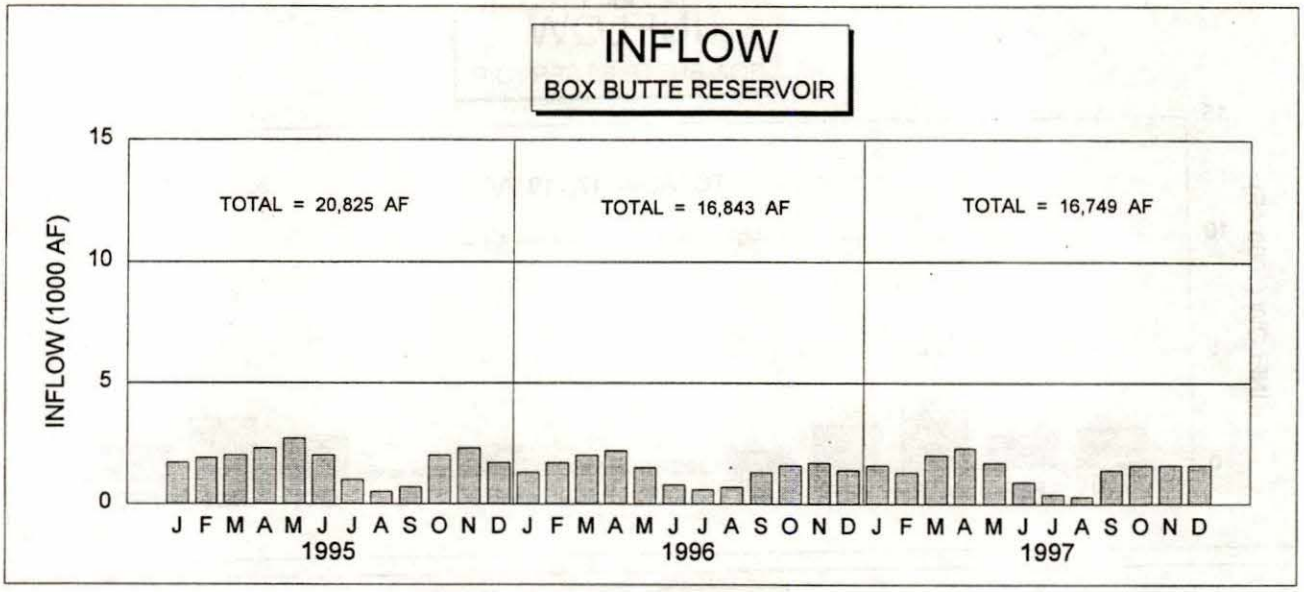
TABLE 7
NEBRASKA-KANSAS PROJECTS
Summary of Precipitation, Reservoir Storage and Inflows

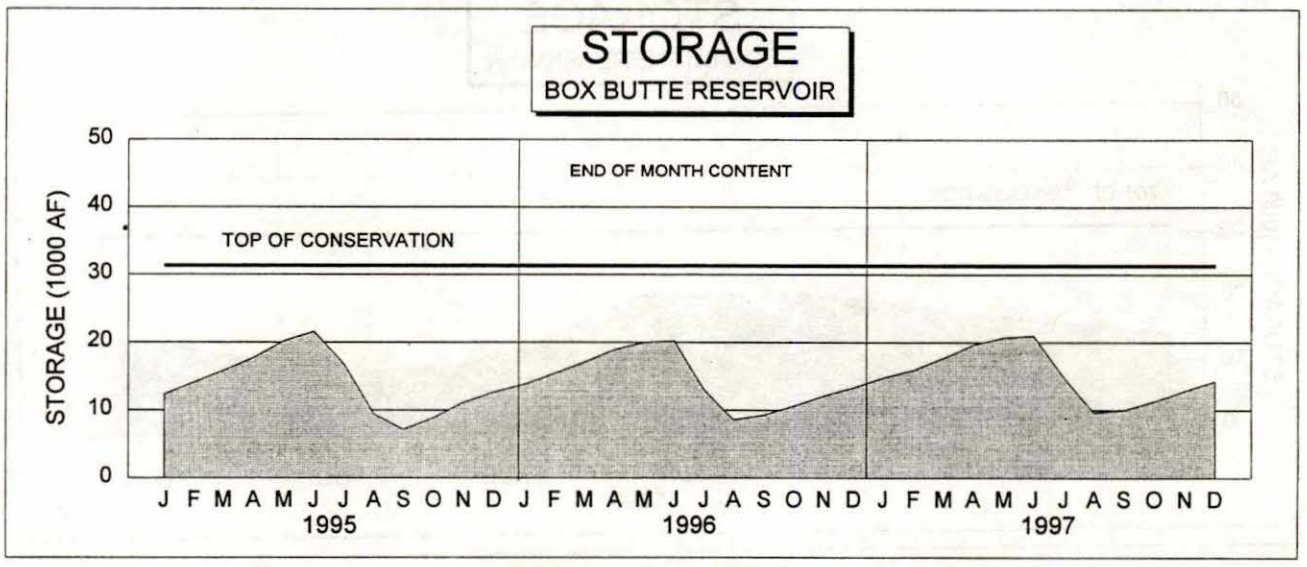
CALENDAR YEAR 1998

Reservoir	Total Precip. Inches	Percent Of Average %	Storage 12-31-97 AF	Storage 12-31-98 AF	Gain or Loss AF	Maximum Storage Content AF	Maximum Storage Date	Minimum Storage Content AF	Minimum Storage Date	Total Inflow AF	Percent Of Most Probable %
Box Butte	18.10	108	14,174	15,094	920	21,142	MAY 22	9,324	SEP 4	17,119	94
Merritt	23.00	116	68,831	69,668	837	75,075	MAY 11	46,014	SEP 13	197,413	111
Sherman	27.42	121	52,478	52,478	0	69,653	JUN 9	47,143	SEP 8	83,928	76
Calamus	24.67	104	118,003	118,295	292	129,771	JUNE 9	85,908	OCT 1	303,677	123
Davis Creek	27.25	118	6,278	6,817	539	31,512	JUN 25	6,014	MAR 26	39,830	87
Bonny	18.55	108	34,409	32,095	(2,314)	36,947	MAY 12	31,621	OCT 31	13,712	81
Enders	18.51	98	24,348	20,076	(4,272)	29,675	JUN 12	15,650	AUG 18	15,357	50
Swanson	16.94	85	77,897	56,018	(21,879)	100,032	MAY 30	50,476	OCT 26	40,672	63
Hugh Butler	12.88	65	32,274	29,038	(3,236)	35,915	MAY 28	26,961	OCT 1	15,170	82
Harry Strunk	15.43	75	28,595	22,842	(5,753)	40,020	MAY 26	15,589	SEP 5	35,612	86
Keith Sebelius	24.36	99	33,191	30,782	(2,409)	36,353	MAY 25	30,031	OCT 31	10,979	239
Harlan County	23.12	102	285,664	269,947	(15,717)	339,887	APR 9	254,482	OCT 1	155,772	113
Lovewell	26.22	94	32,840	30,861	(1,979)	48,038	APR 10	24,036	SEP 9	77,149	115
Kirwin	22.51	96	94,592	90,727	(3,865)	108,420	MAY 20	87,099	OCT 23	42,165	251
Webster	21.56	91	75,024	67,653	(7,371)	85,480	MAY 18	64,003	OCT 23	44,339	352
Waconda	26.30	101	218,385	230,886	12,501	265,734	AUG 4	218,151	JAN 14	277,558	283
Cedar Bluff	26.28	127	163,751	185,022	21,271	194,220	AUG 5	163,814	JAN 1	63,603	766

EXHIBIT 1A

BOX BUTTE RESERVOIR
OPERATION





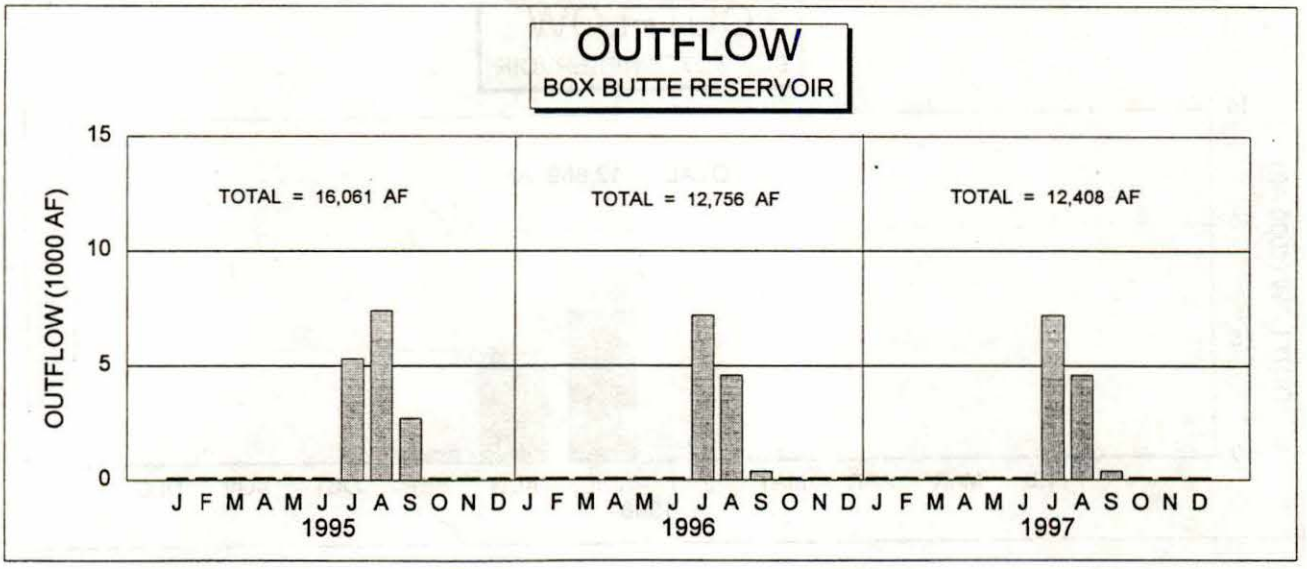
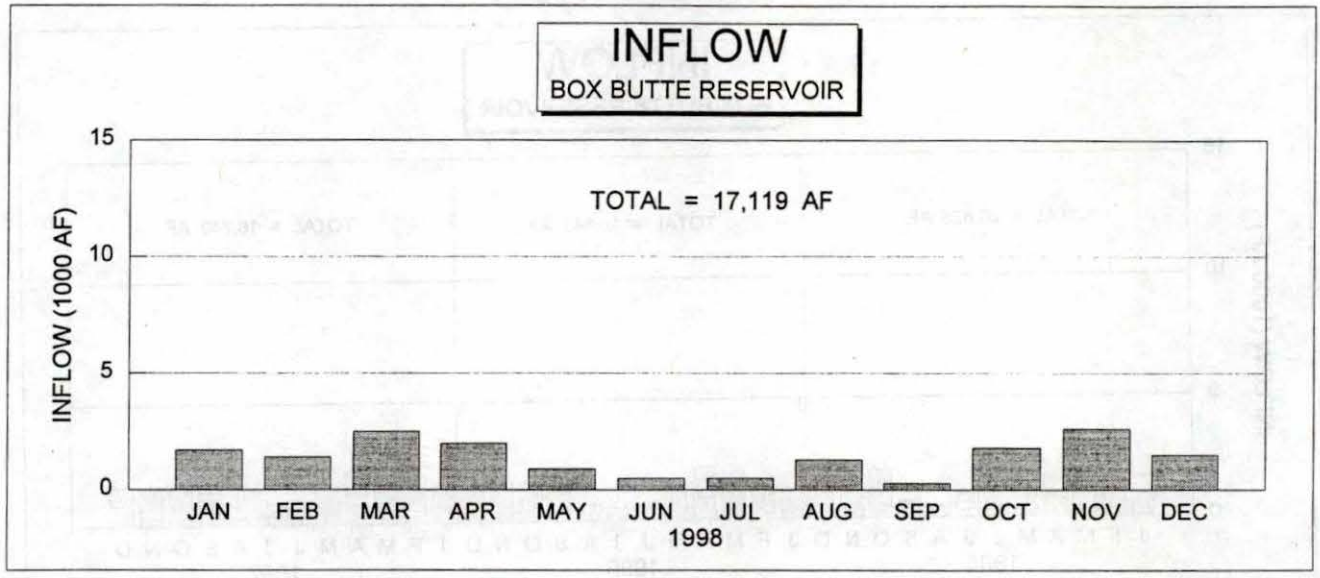
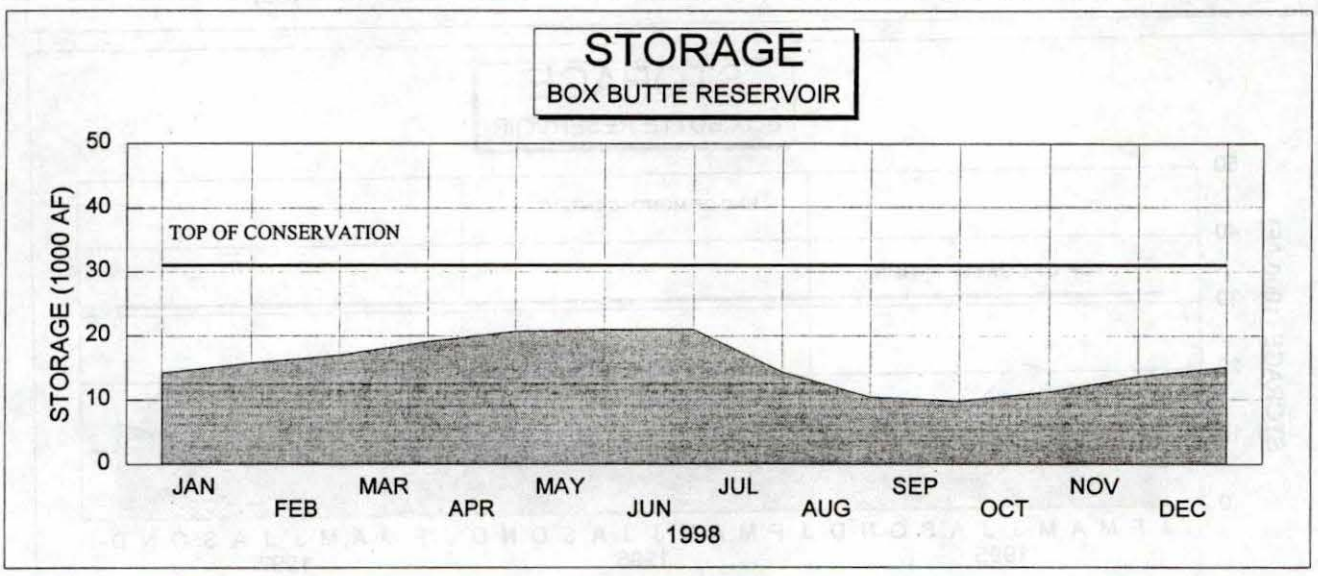


EXHIBIT 1B

BOX BUTTE RESERVOIR

1998 OPERATION





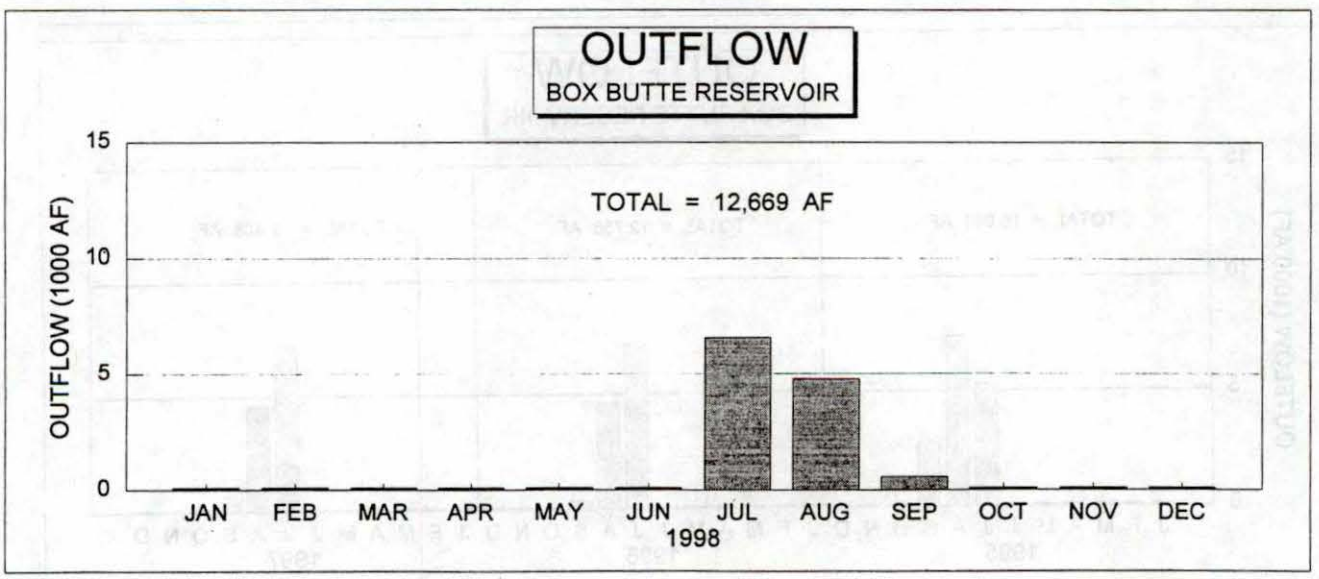
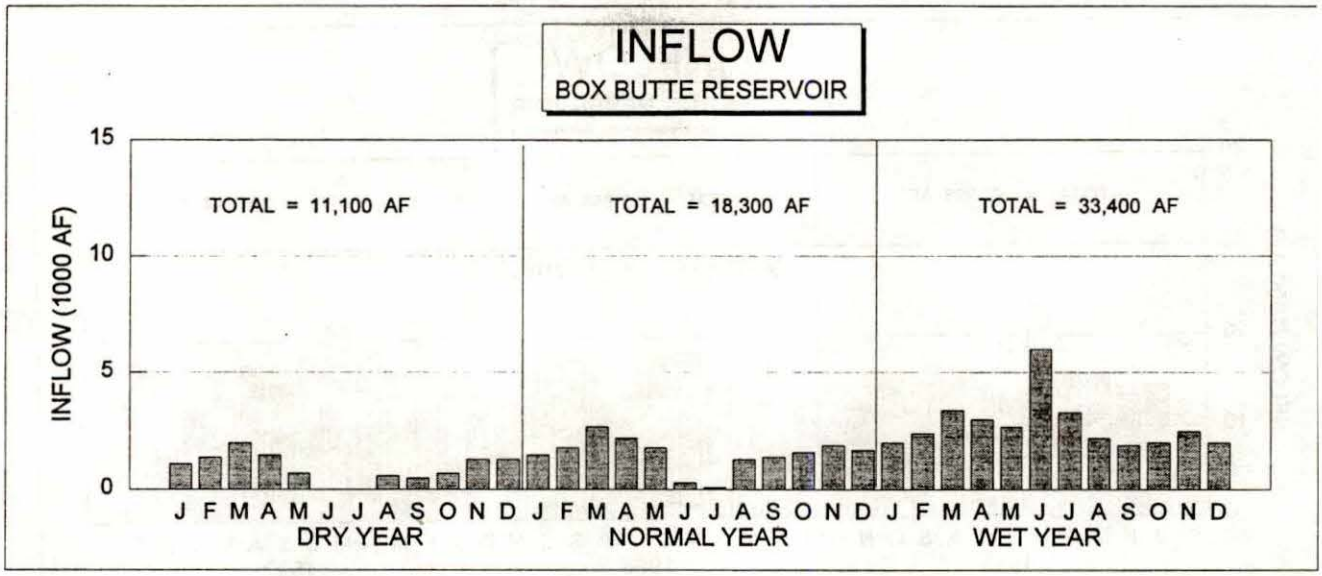
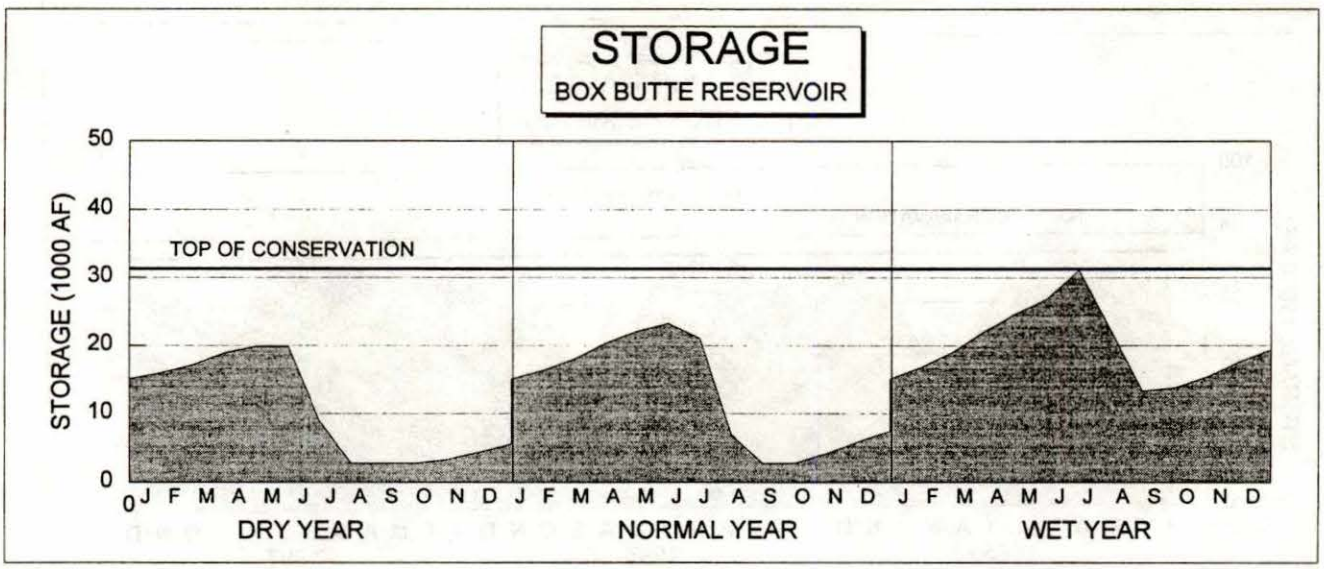


EXHIBIT 1C

BOX BUTTE RESERVOIR

1999 OPERATION PLAN





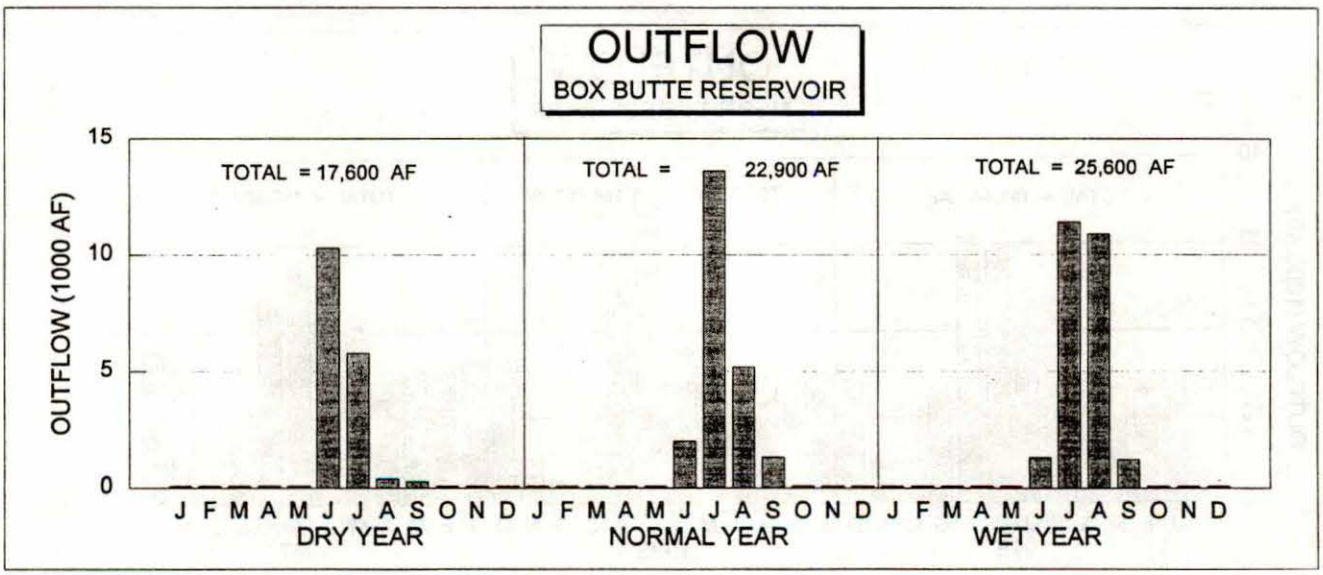
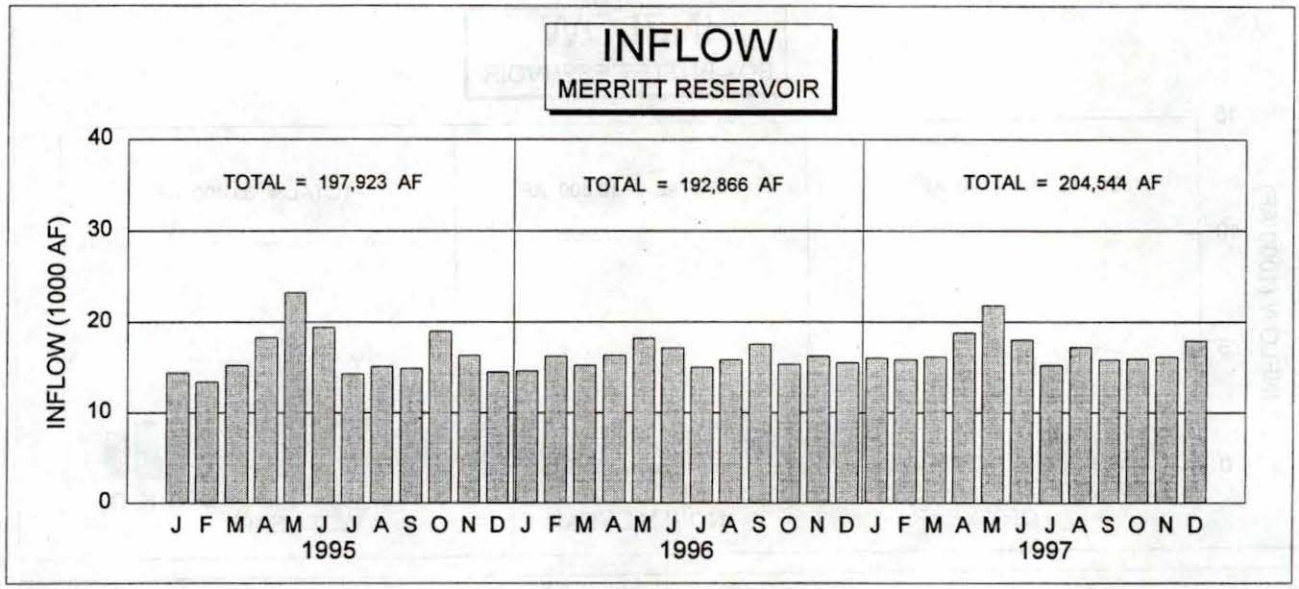
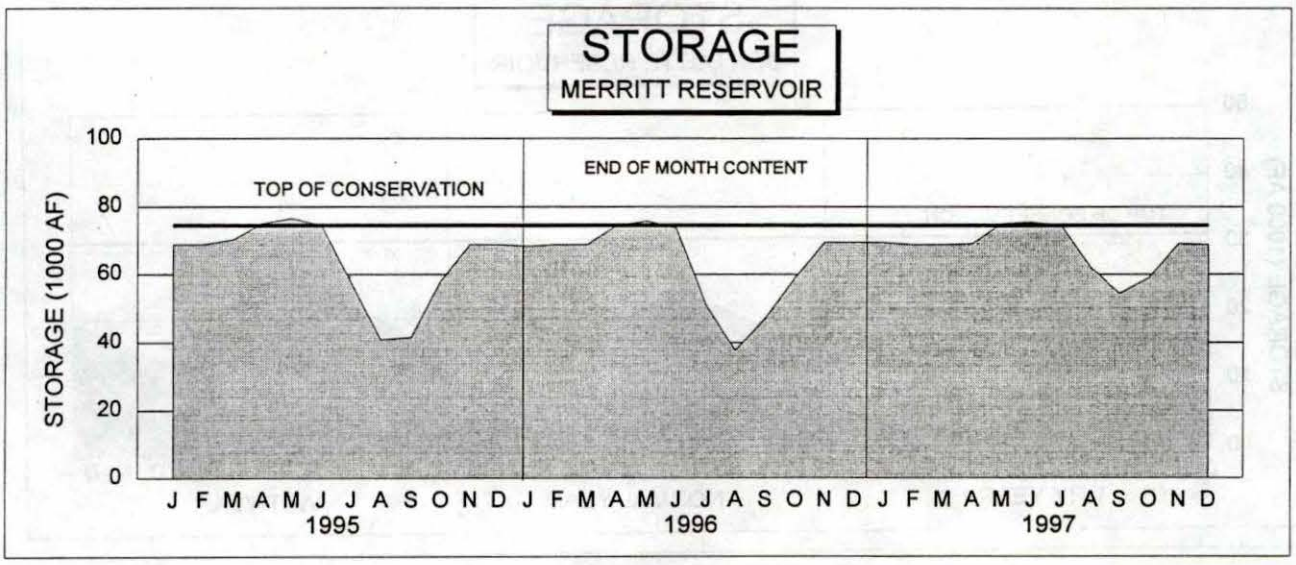


EXHIBIT 2A

MERRITT RESERVOIR
OPERATION





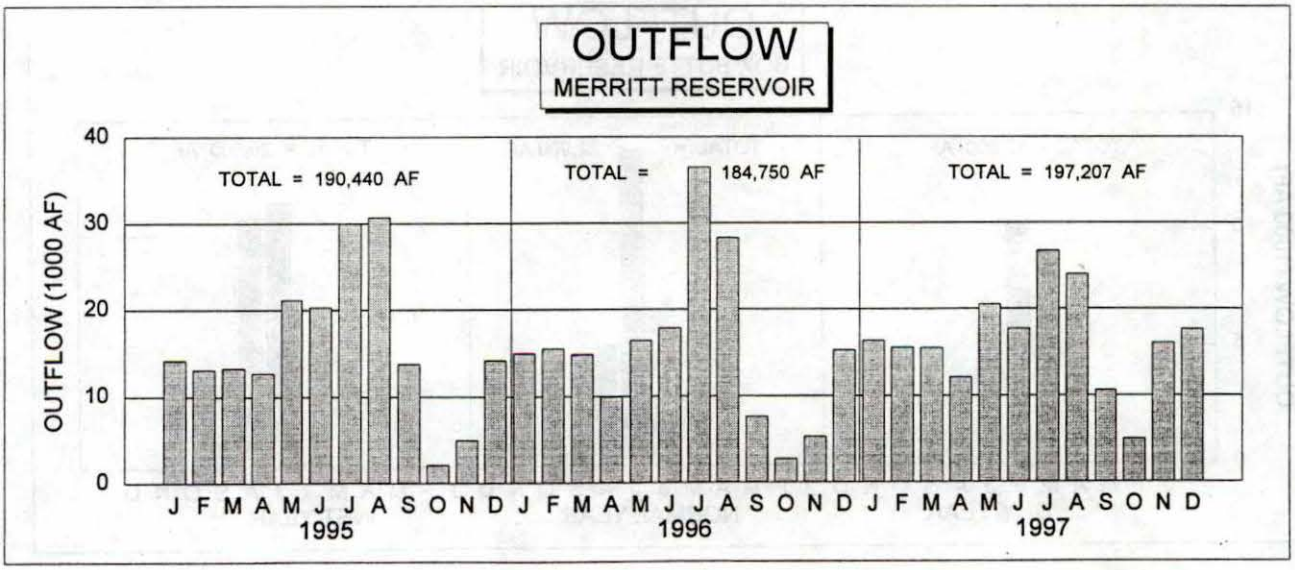
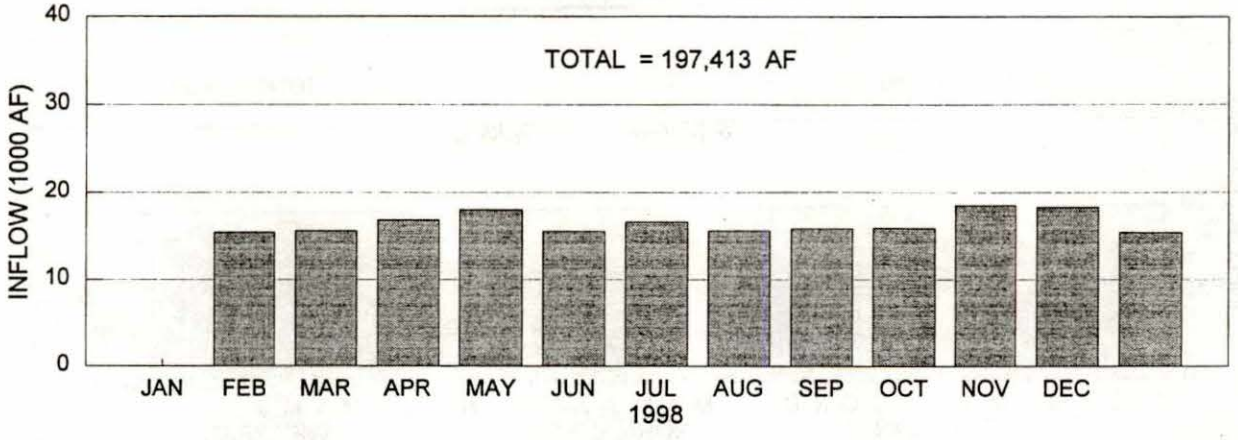


EXHIBIT 2B

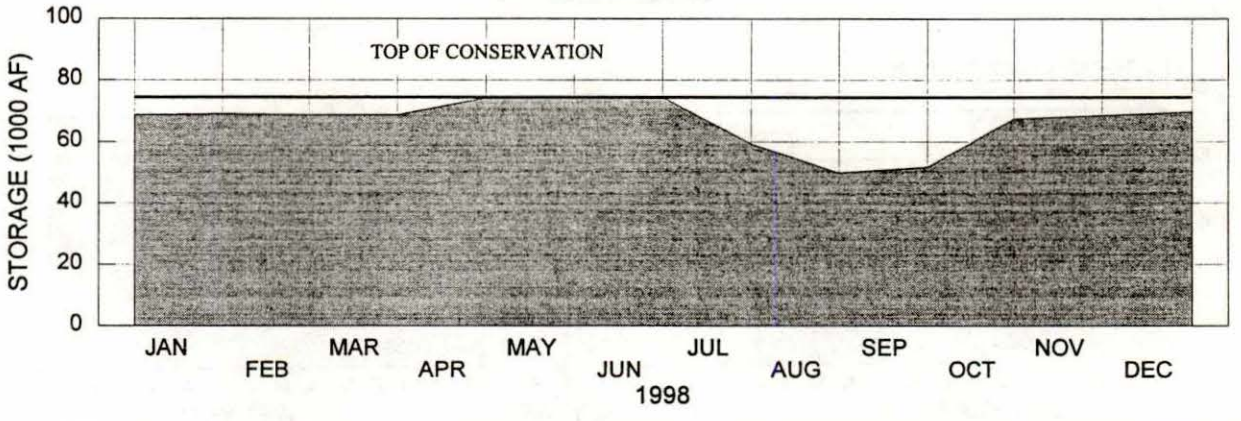
MERRITT RESERVOIR

1998 OPERATION

INFLOW
MERRITT RESERVOIR



STORAGE
MERRITT RESERVOIR



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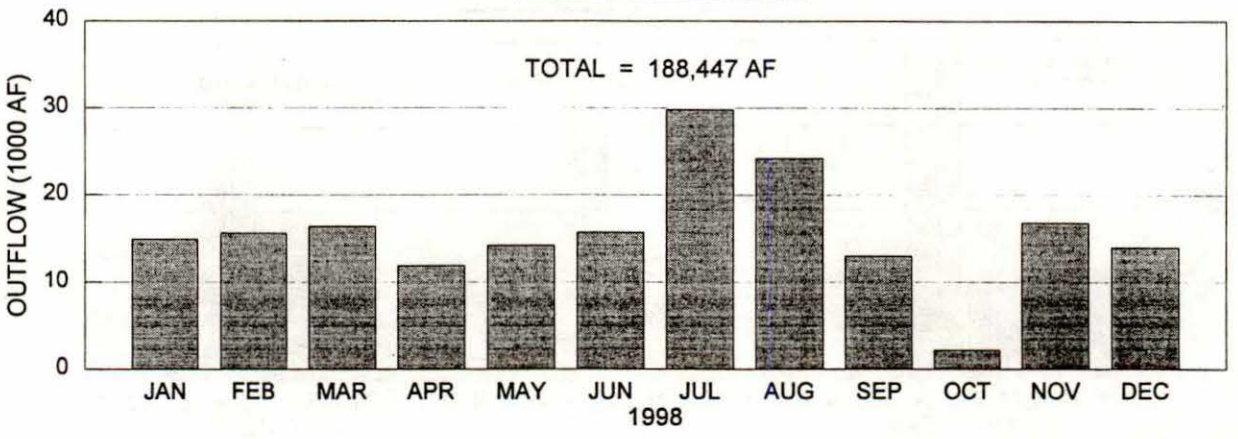
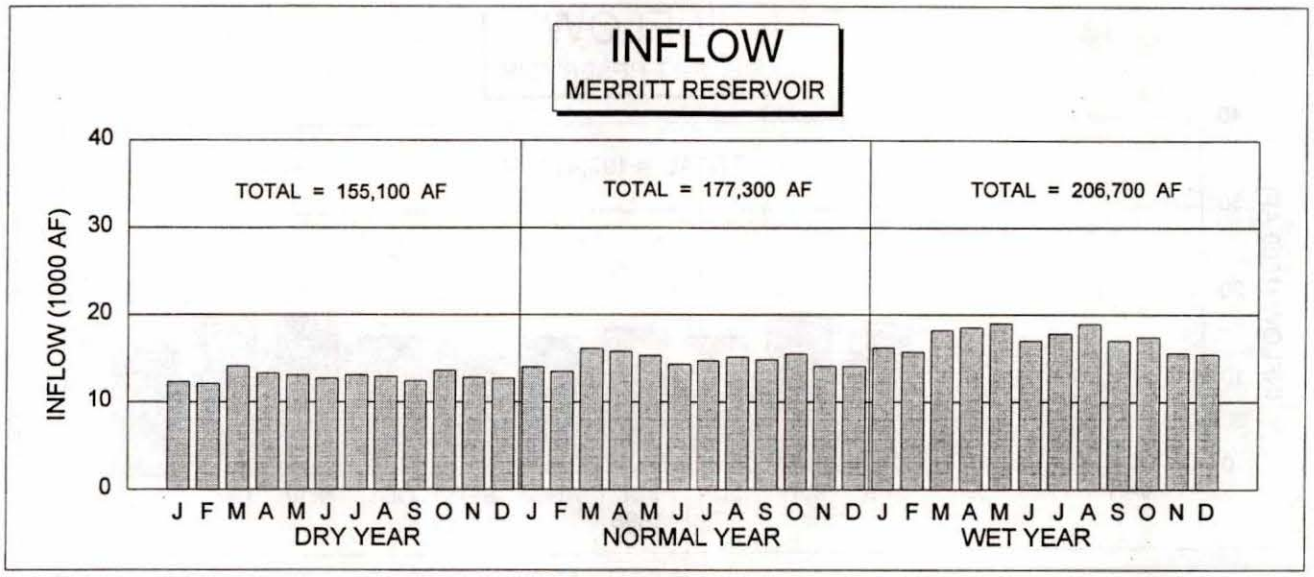
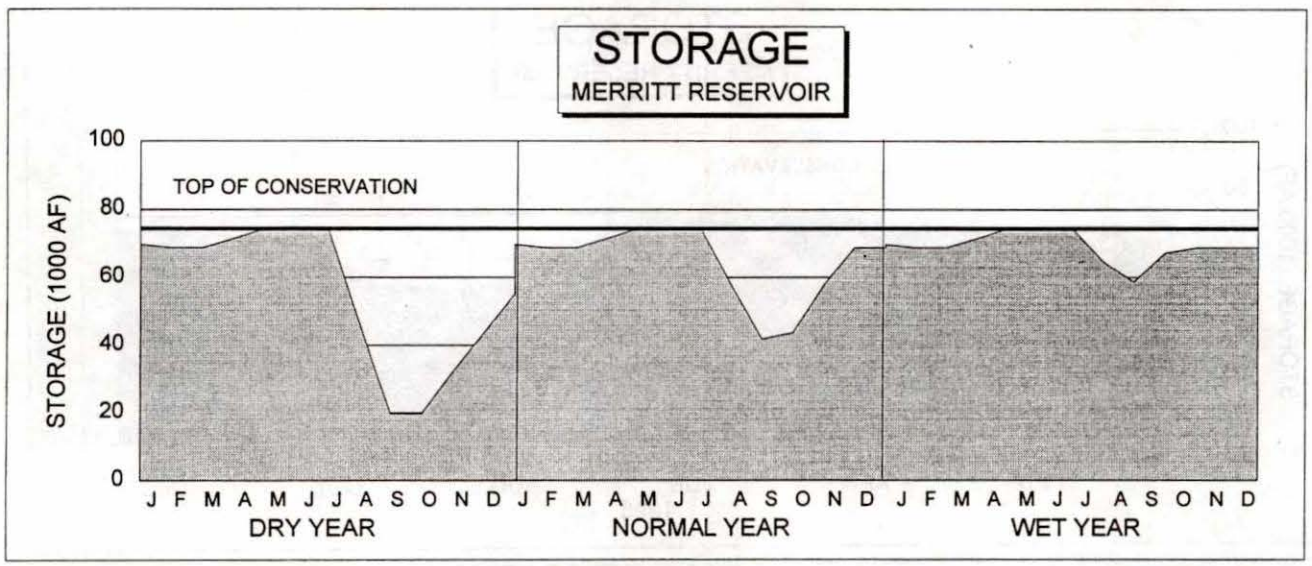
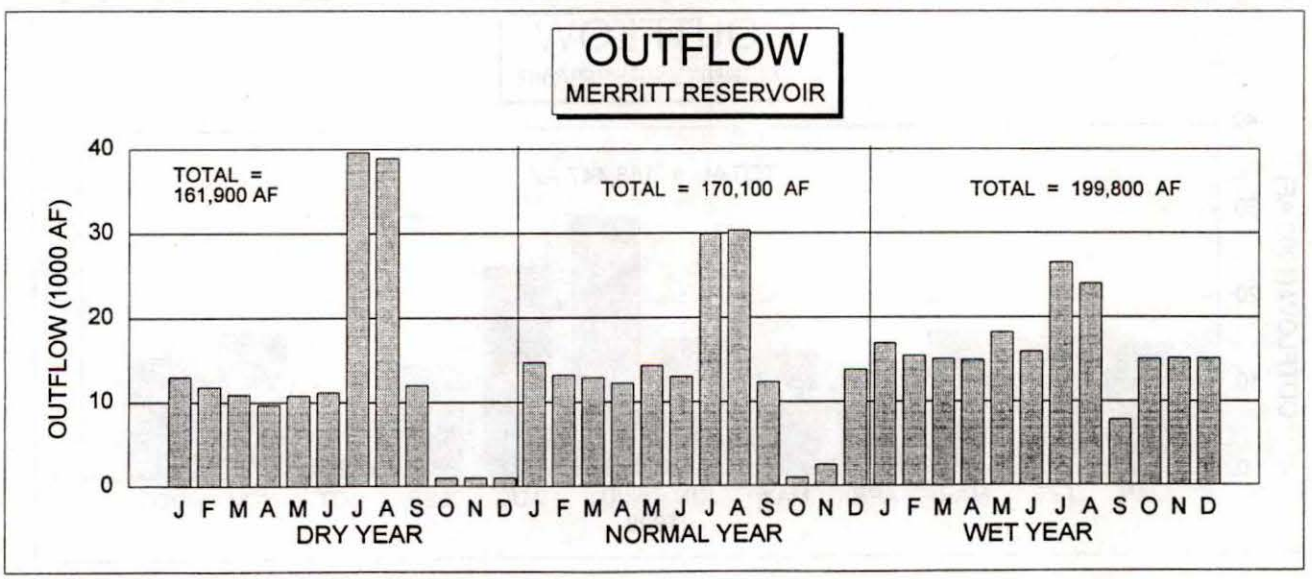


EXHIBIT 2C

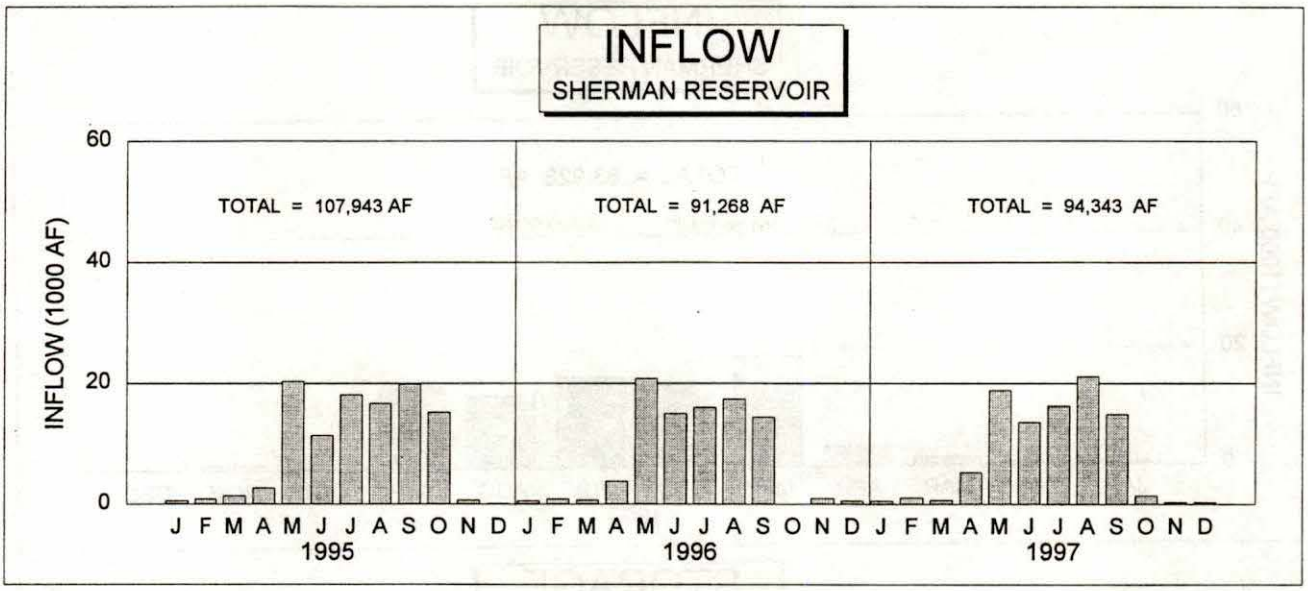
MERRITT RESERVOIR
1999 OPERATION PLAN

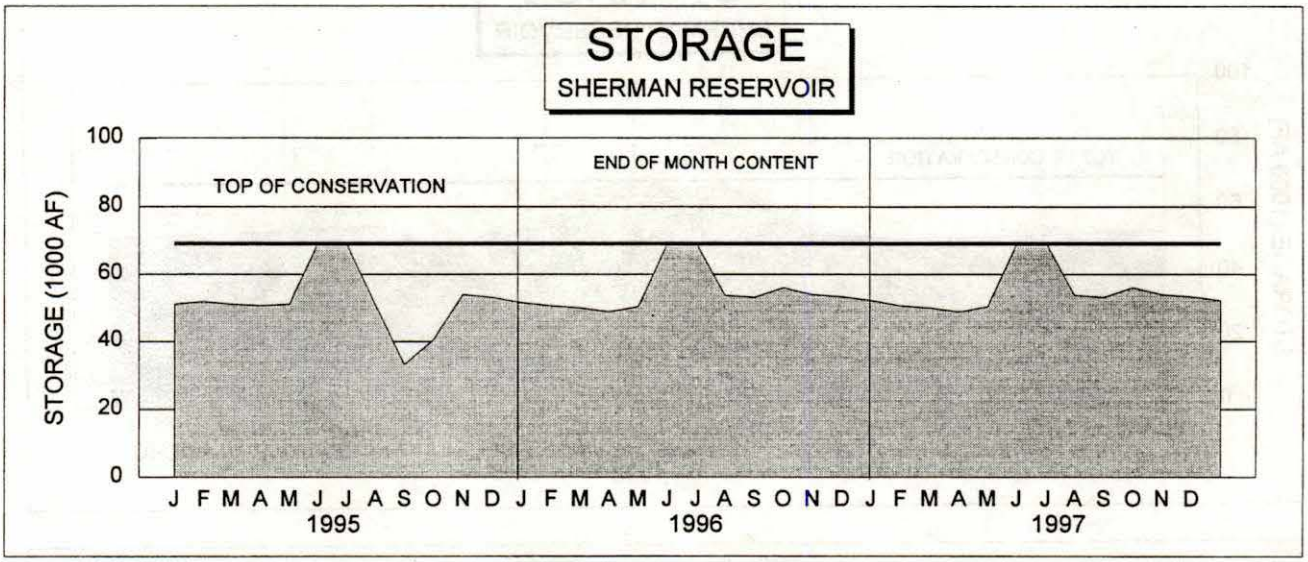






SHERMAN RESERVOIR
OPERATION





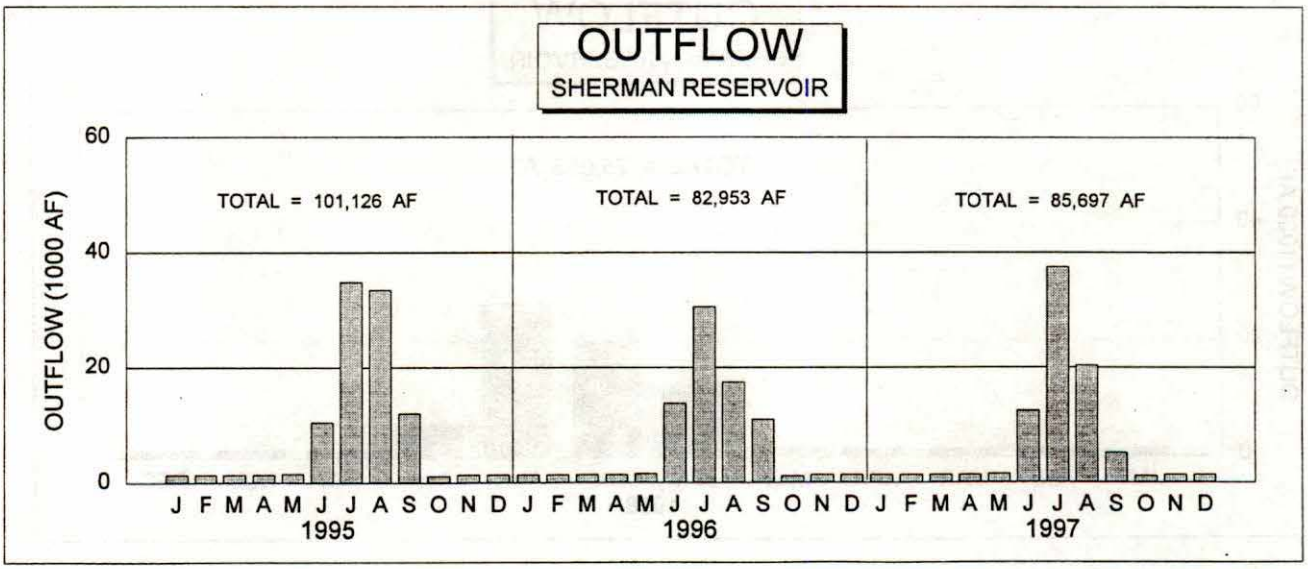
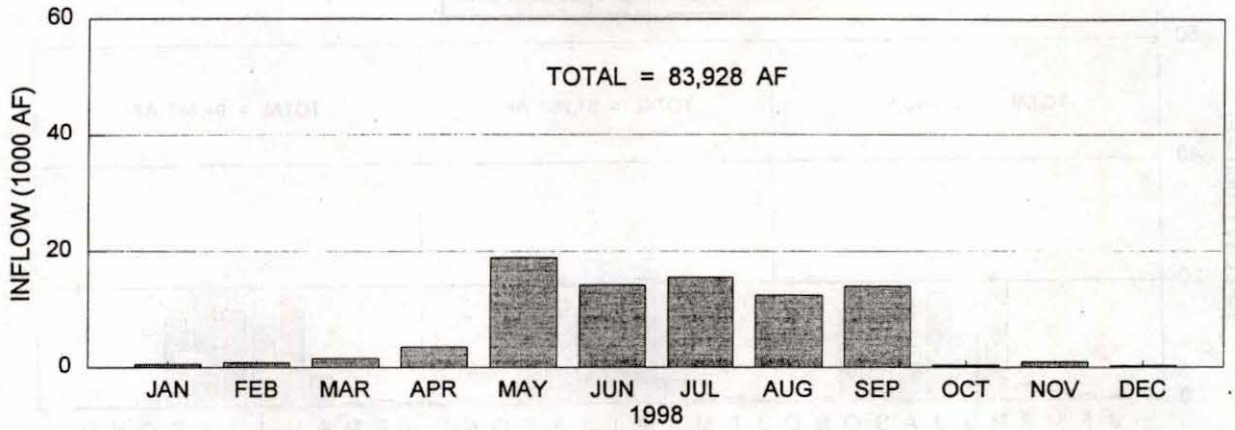


EXHIBIT 3B

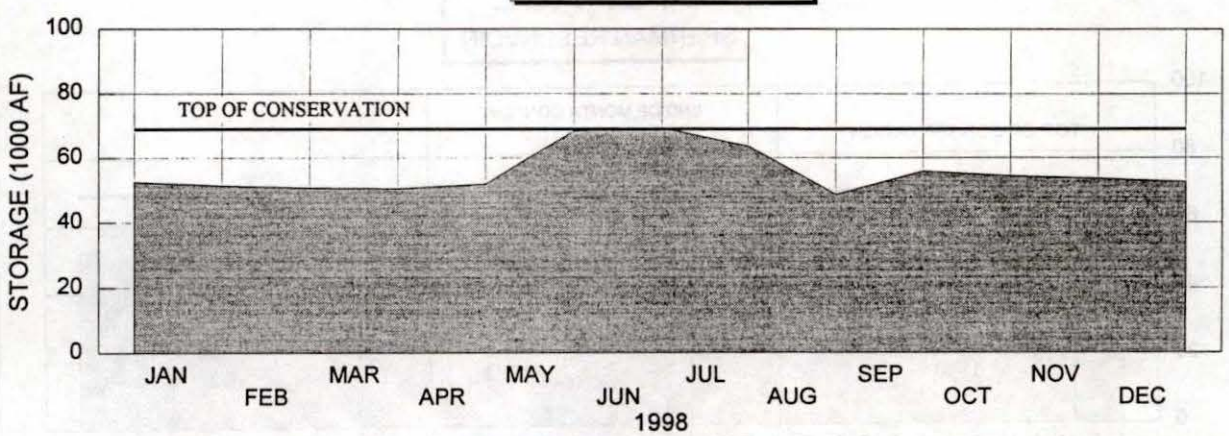
SHERMAN RESERVOIR

1998 OPERATION

INFLOW
SHERMAN RESERVOIR



STORAGE
SHERMAN RESERVOIR



OUTFLOW
SHERMAN RESERVOIR

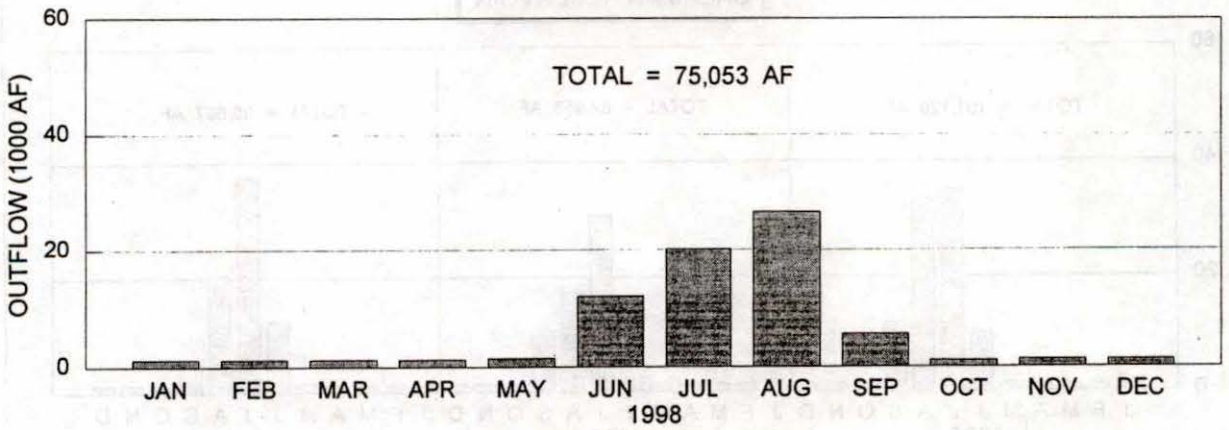
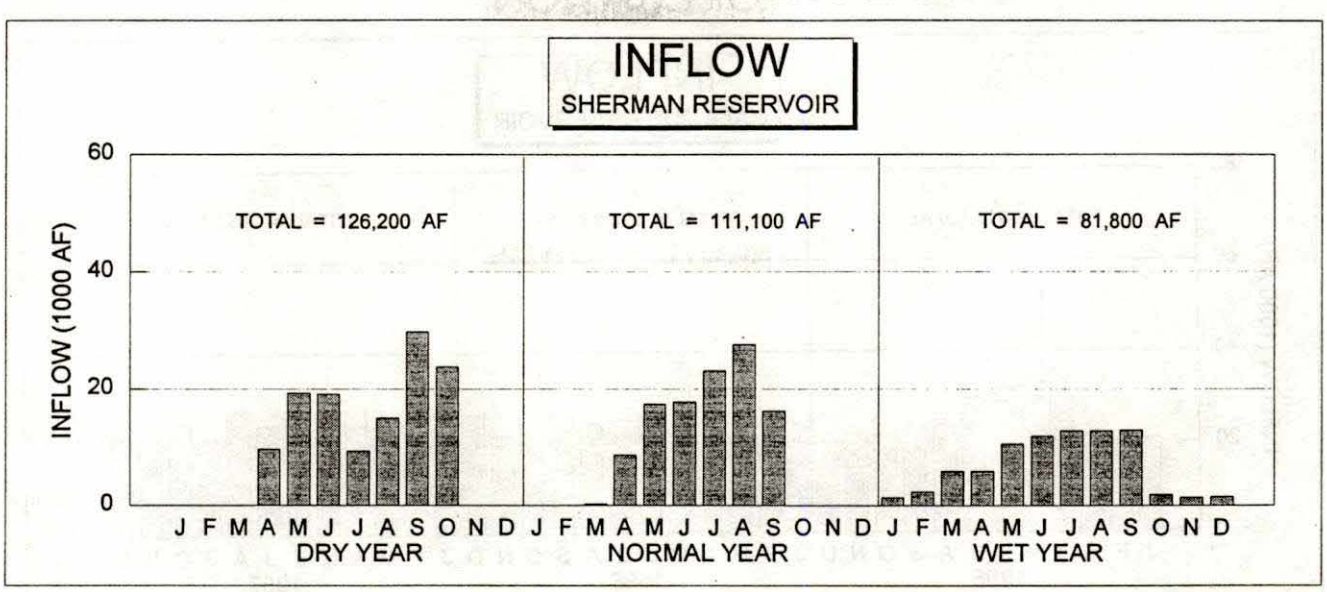
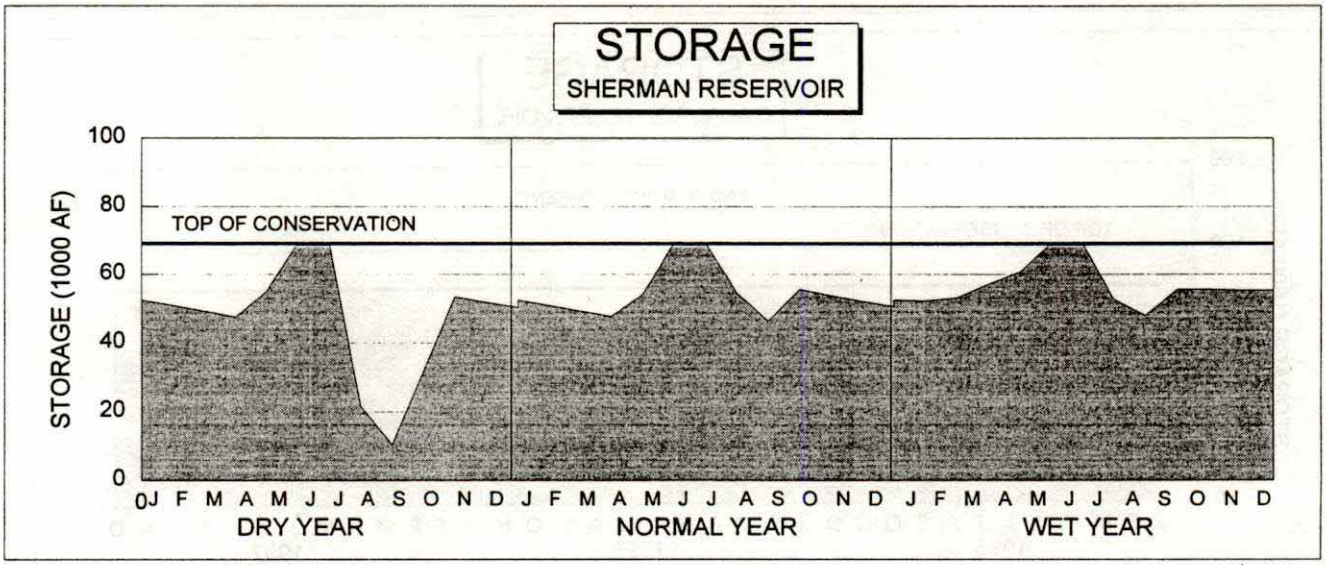


EXHIBIT 3C

SHERMAN RESERVOIR
1999 OPERATION PLAN





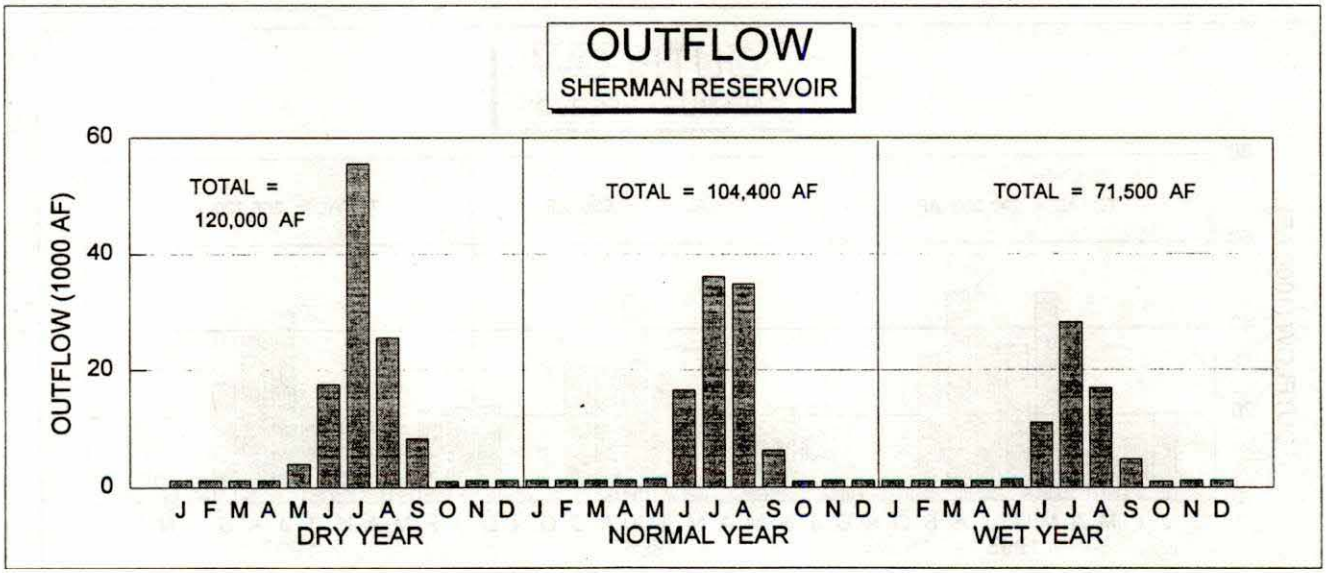
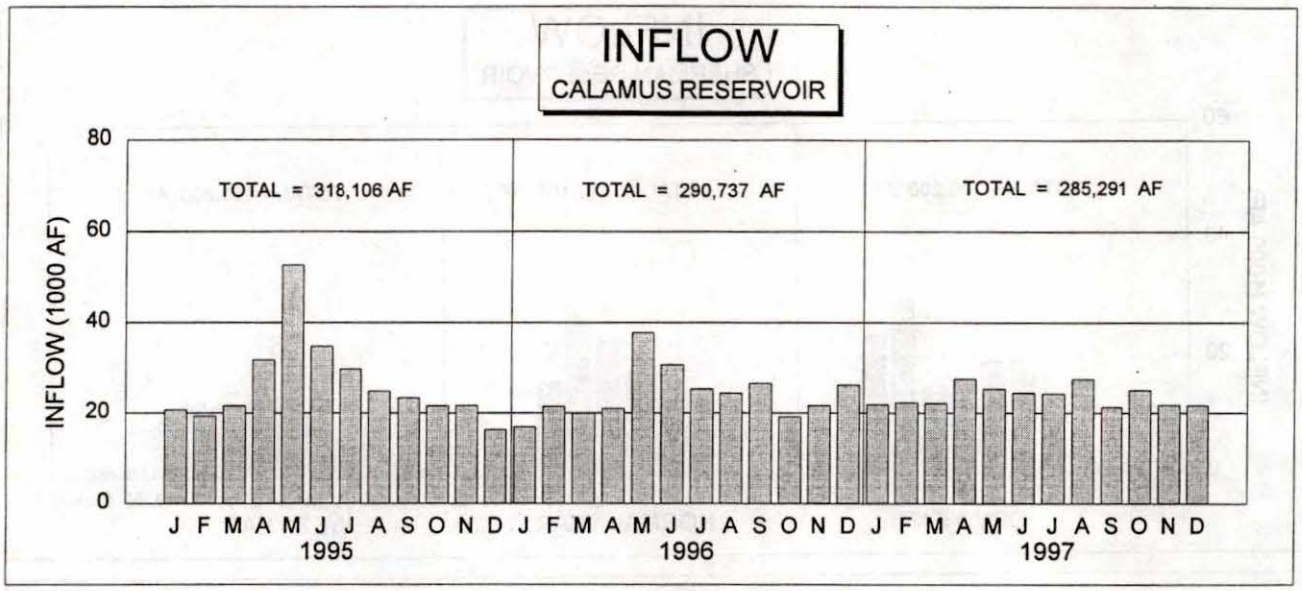
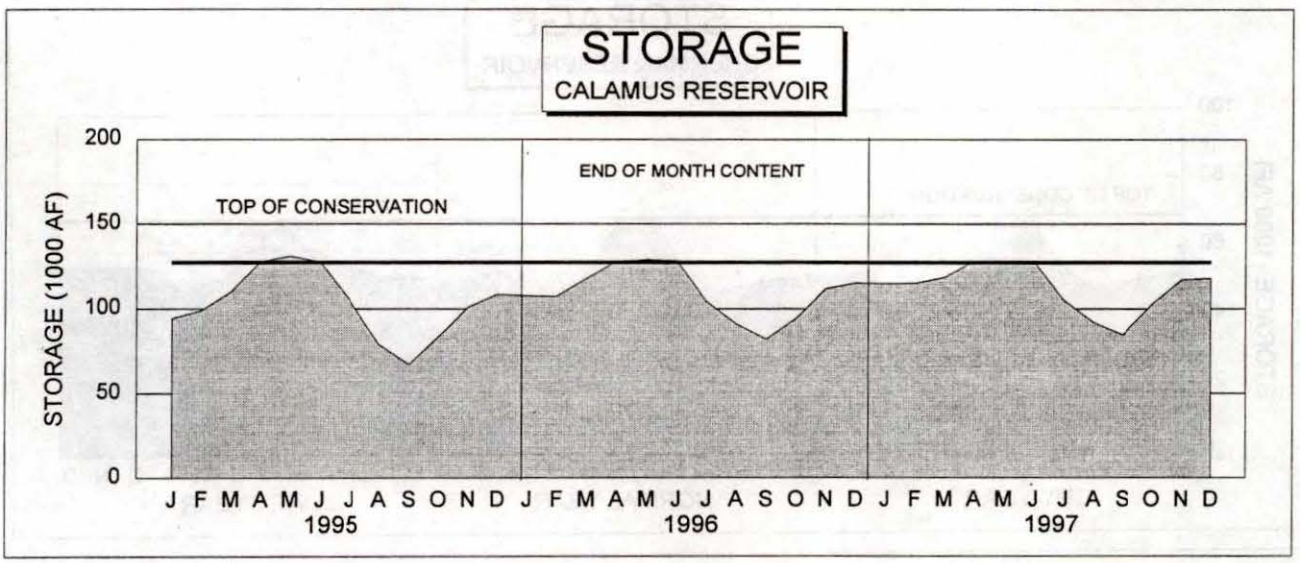


EXHIBIT 4A

CALAMUS RESERVOIR
OPERATION





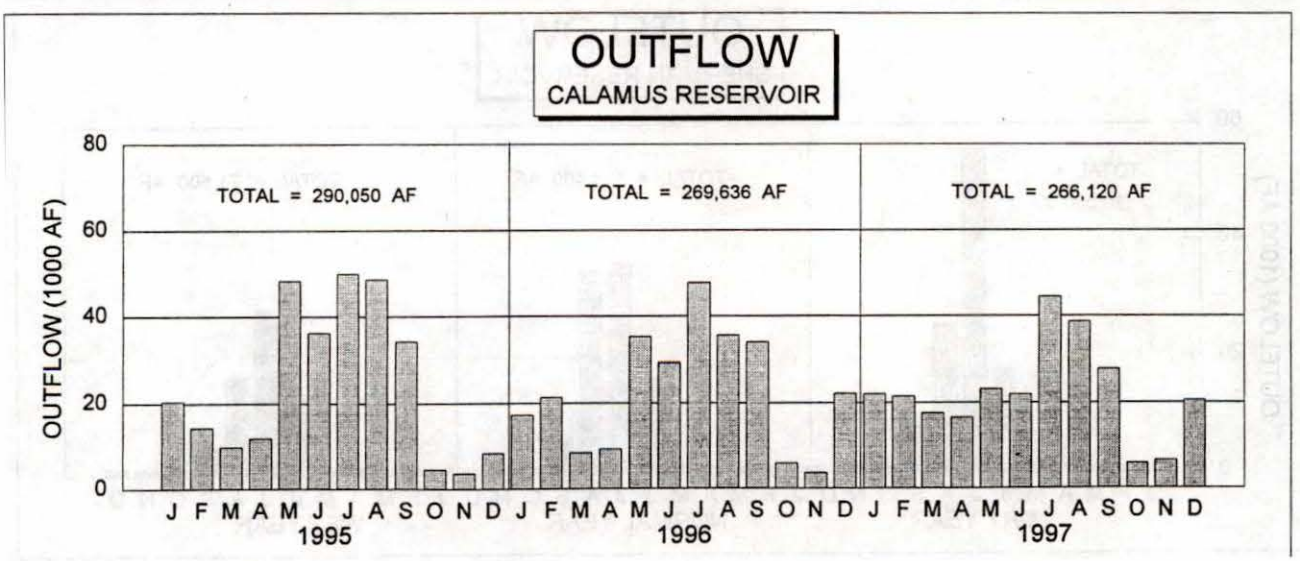
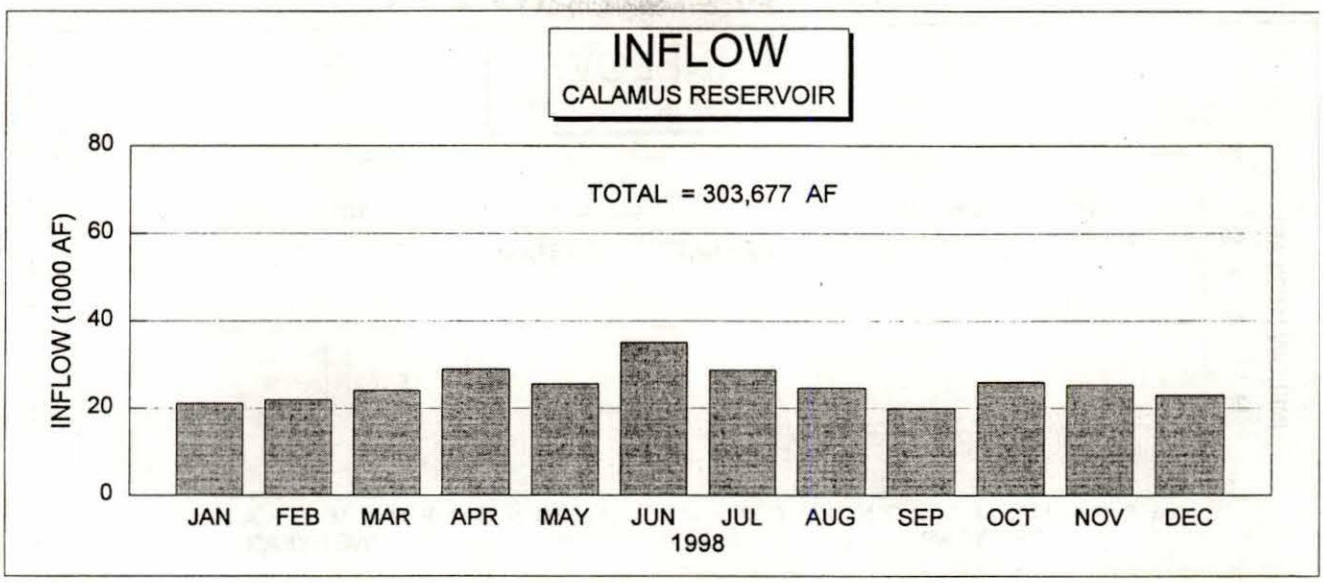
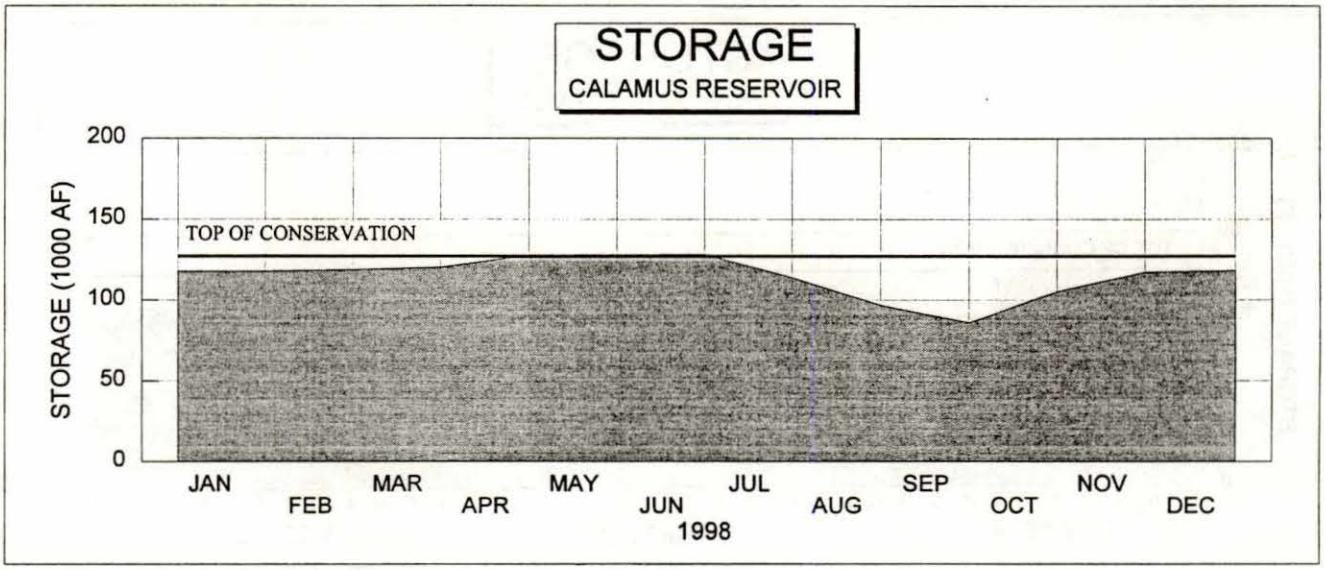


EXHIBIT 4B

CALAMUS RESERVOIR

1998 OPERATION





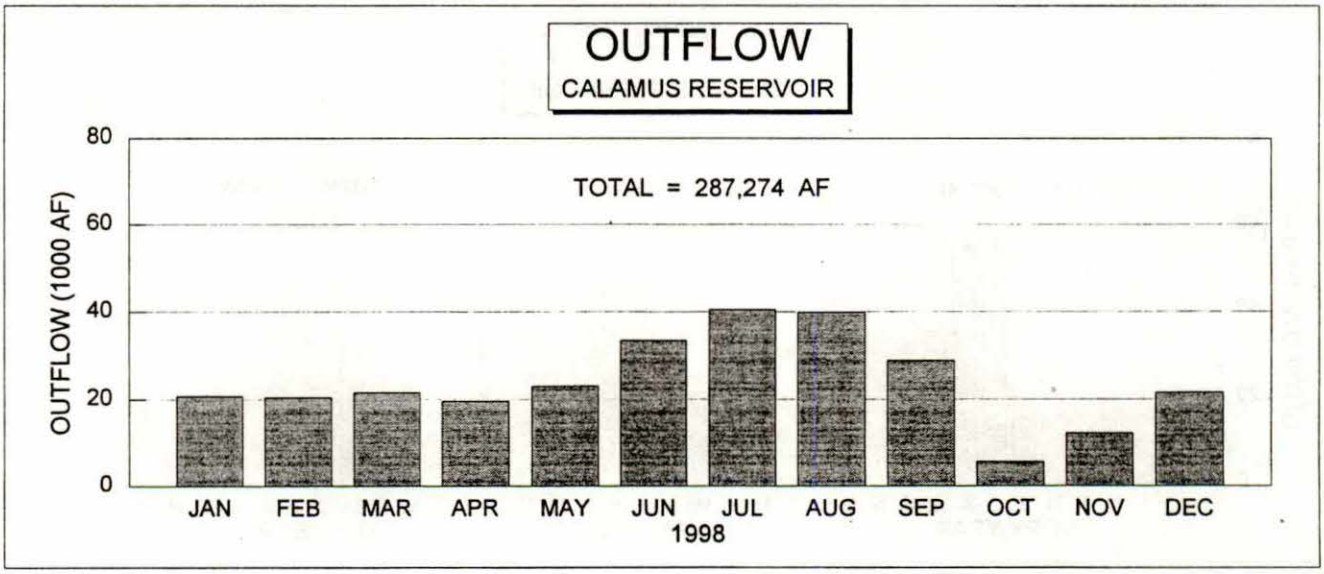
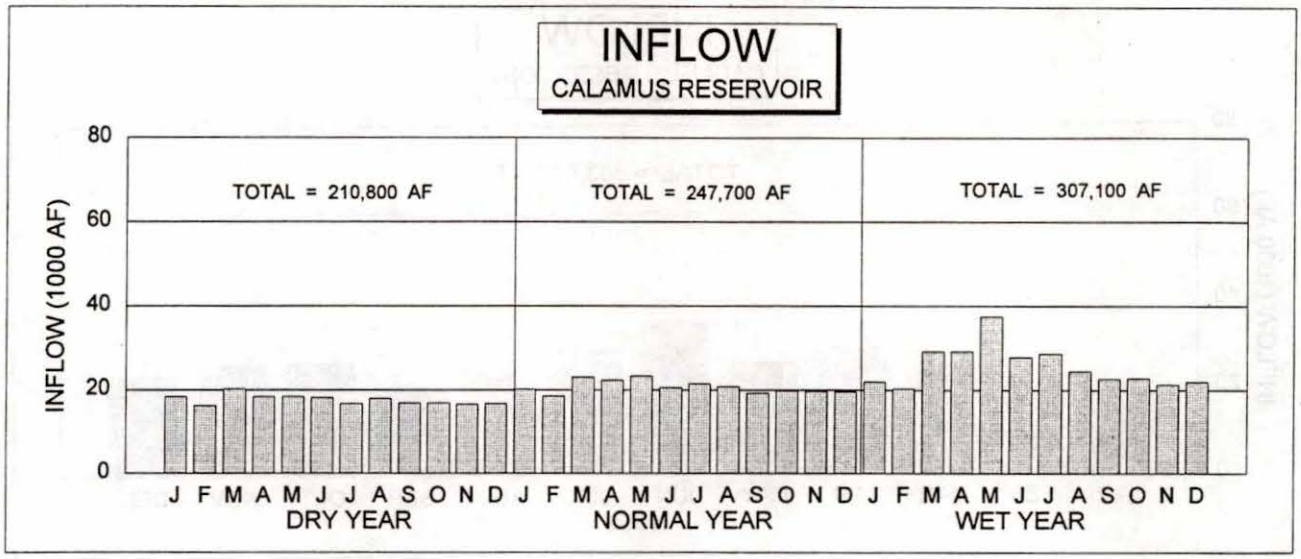
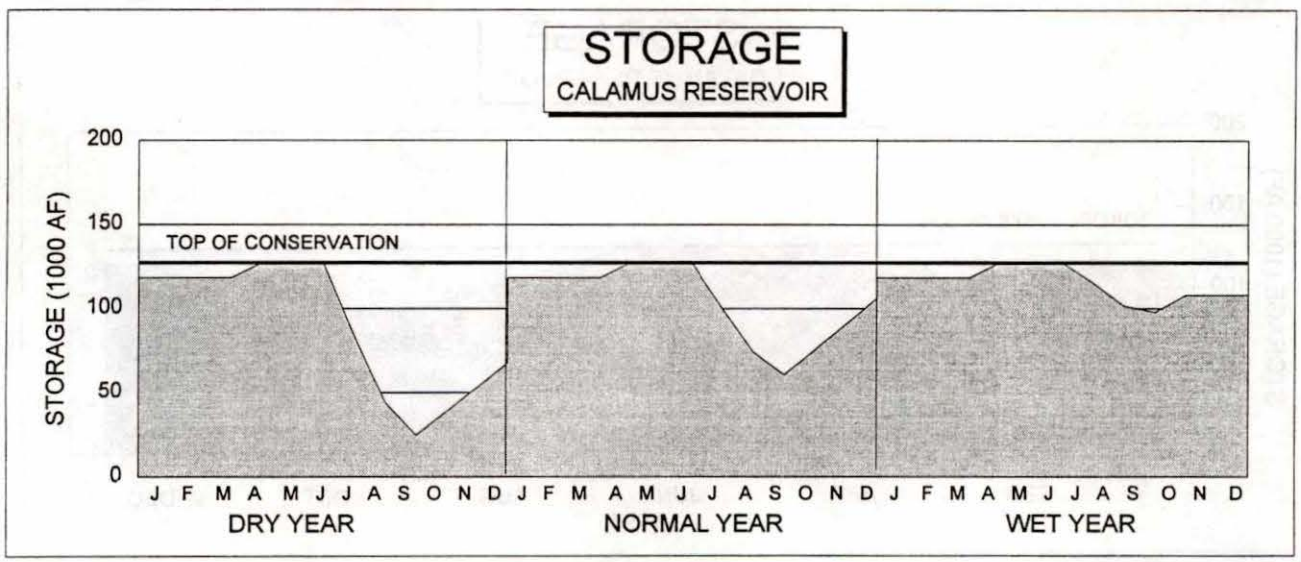


EXHIBIT 4C

CALAMUS RESERVOIR
1999 OPERATION PLAN





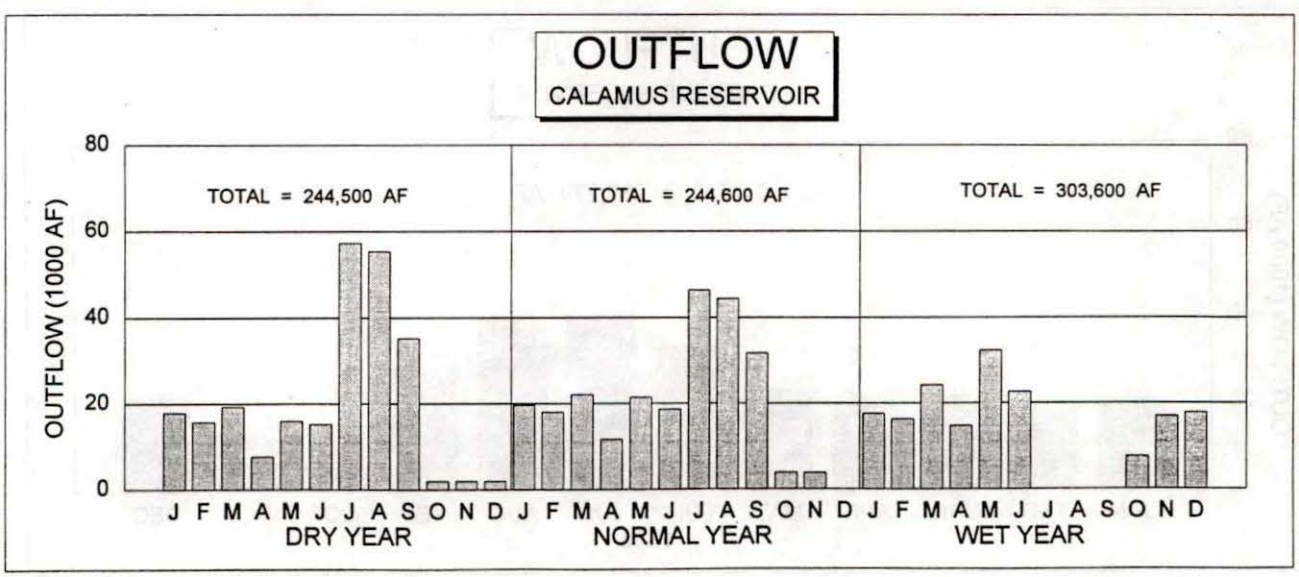
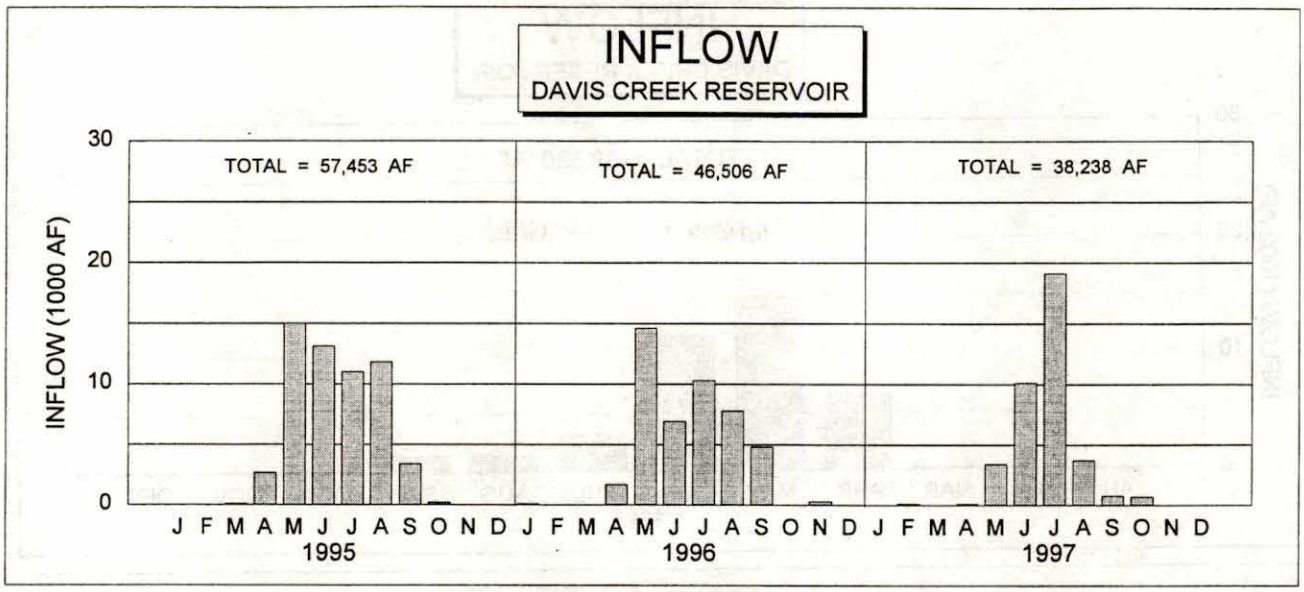
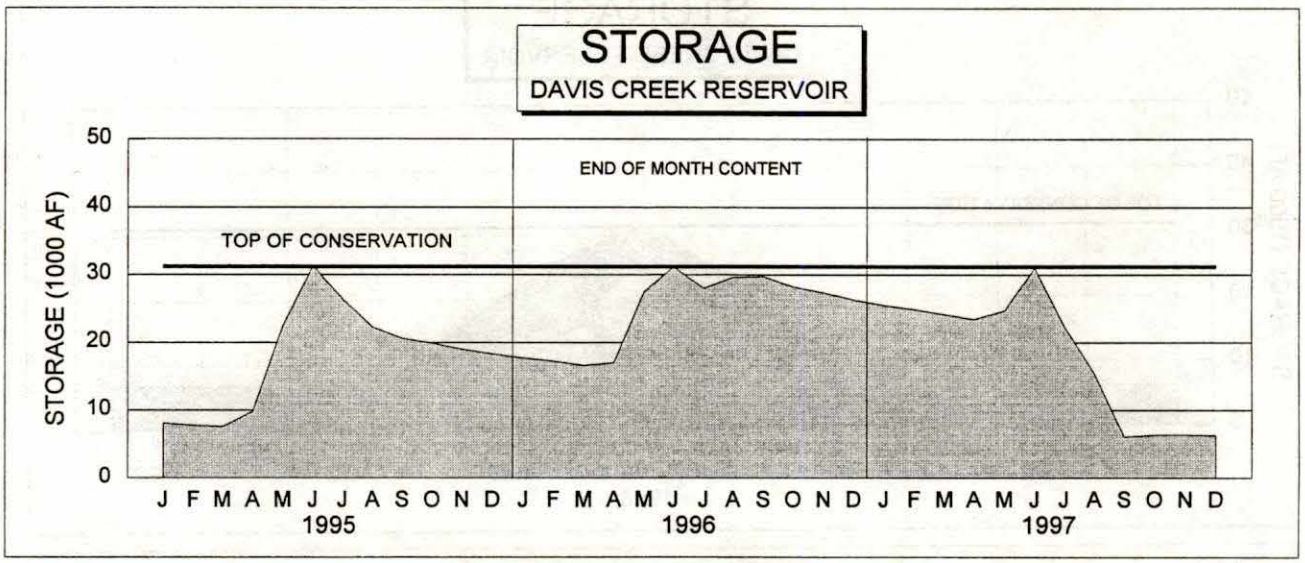


EXHIBIT 5A

DAVIS CREEK RESERVOIR
OPERATION





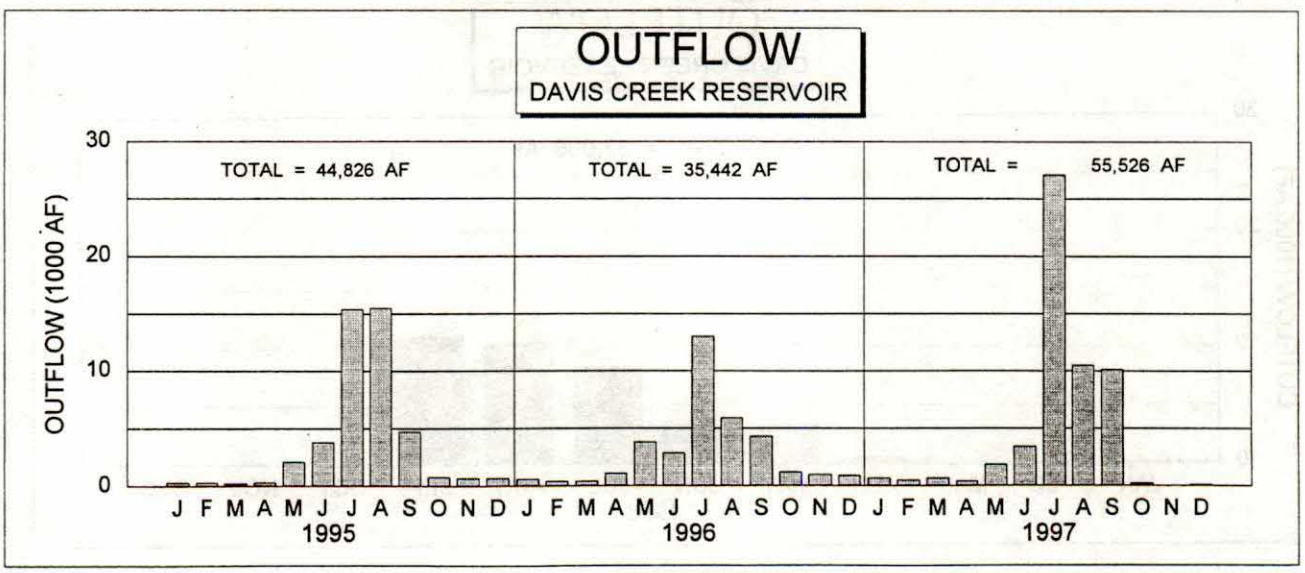
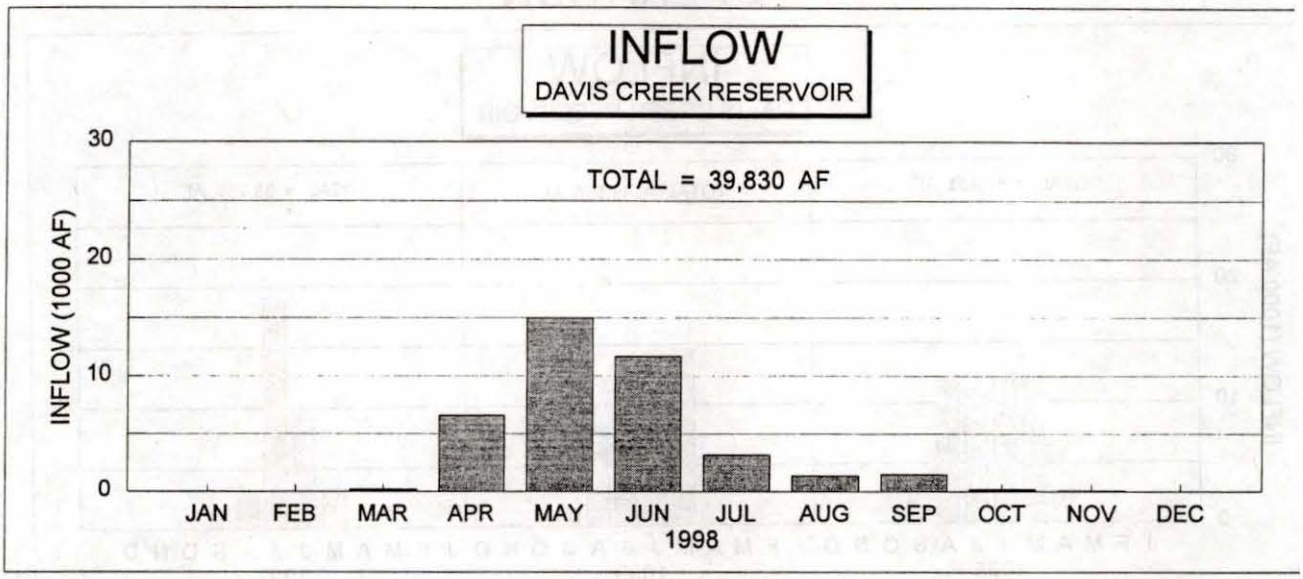
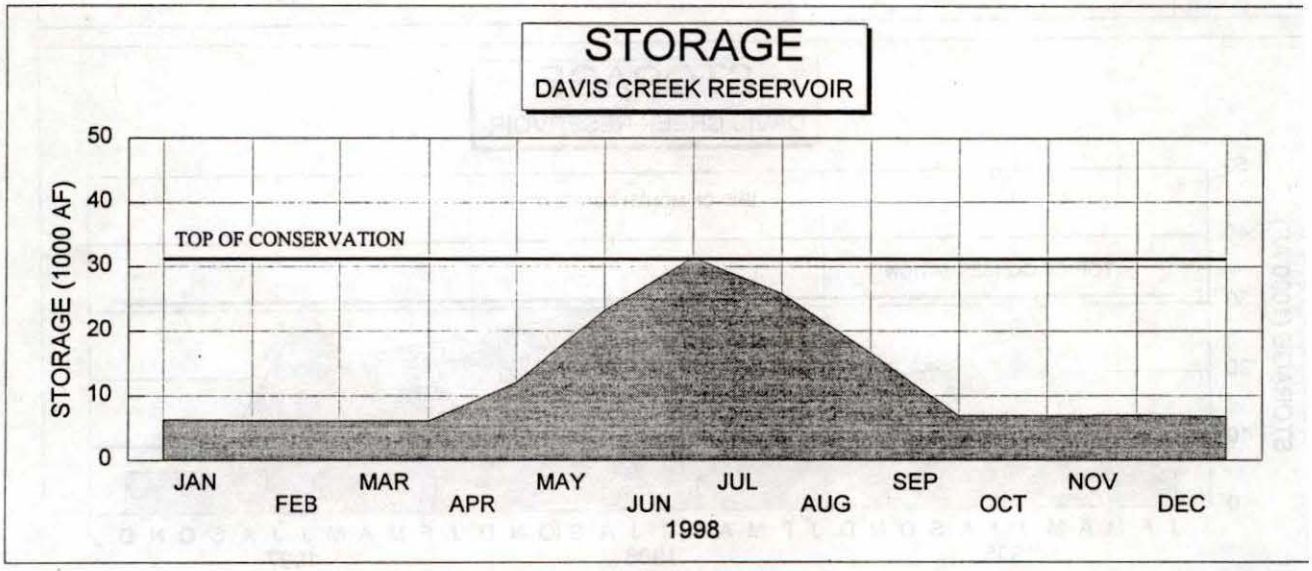


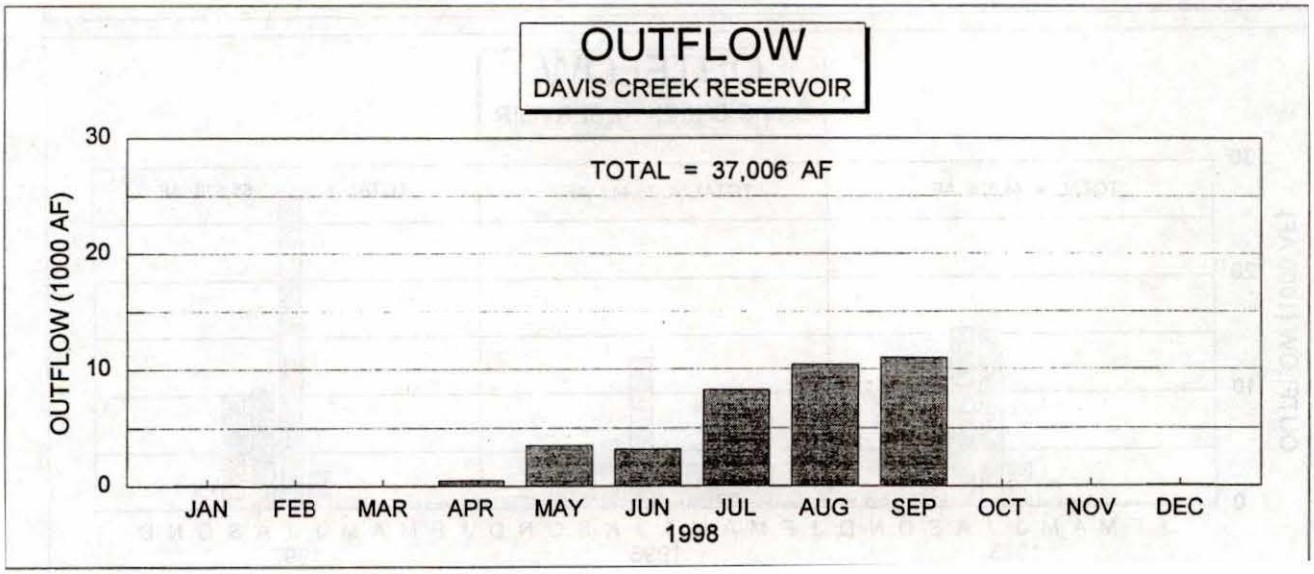
EXHIBIT 5B

DAVIS CREEK RESERVOIR

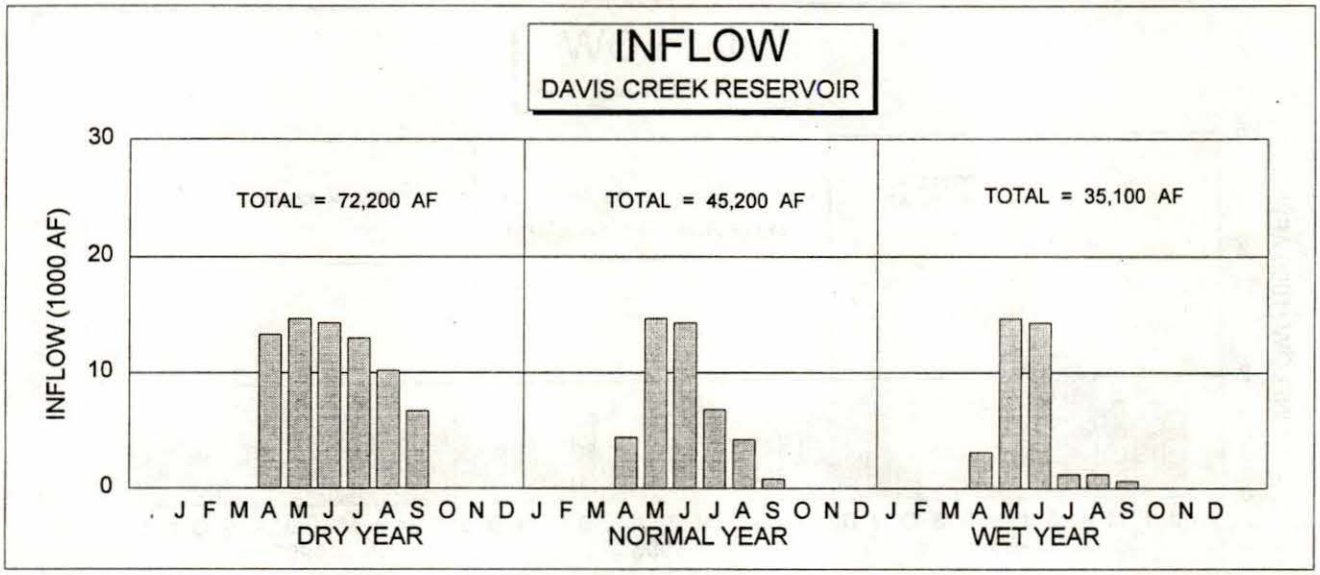
1998 OPERATION

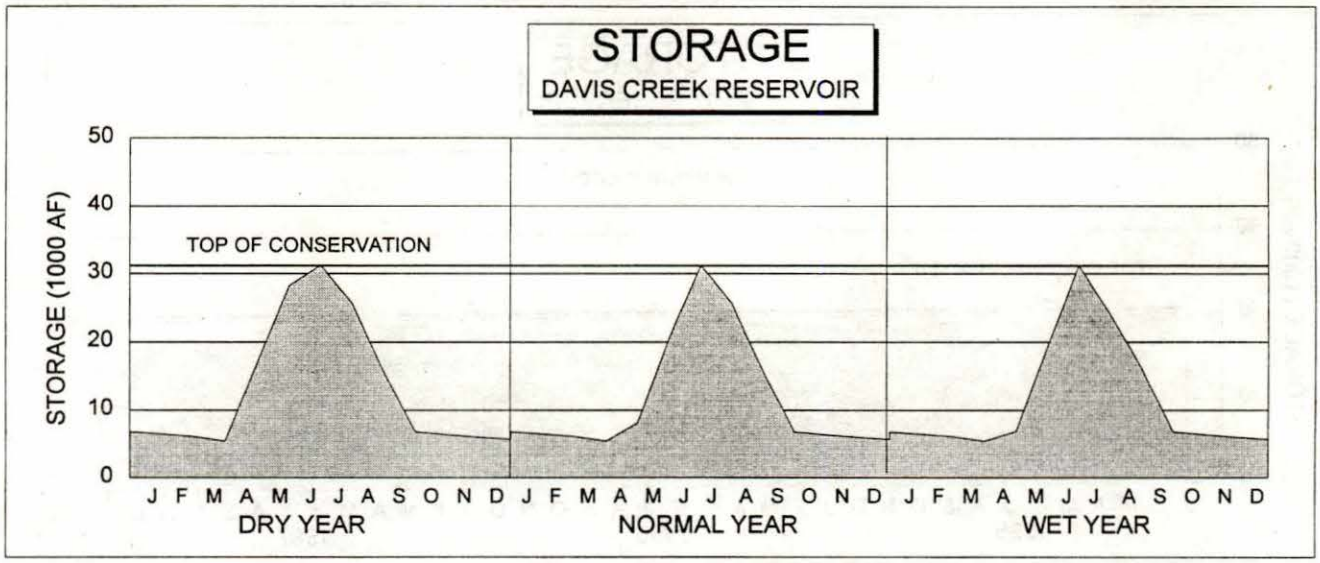






DAVIS CREEK RESERVOIR
1999 OPERATION PLAN





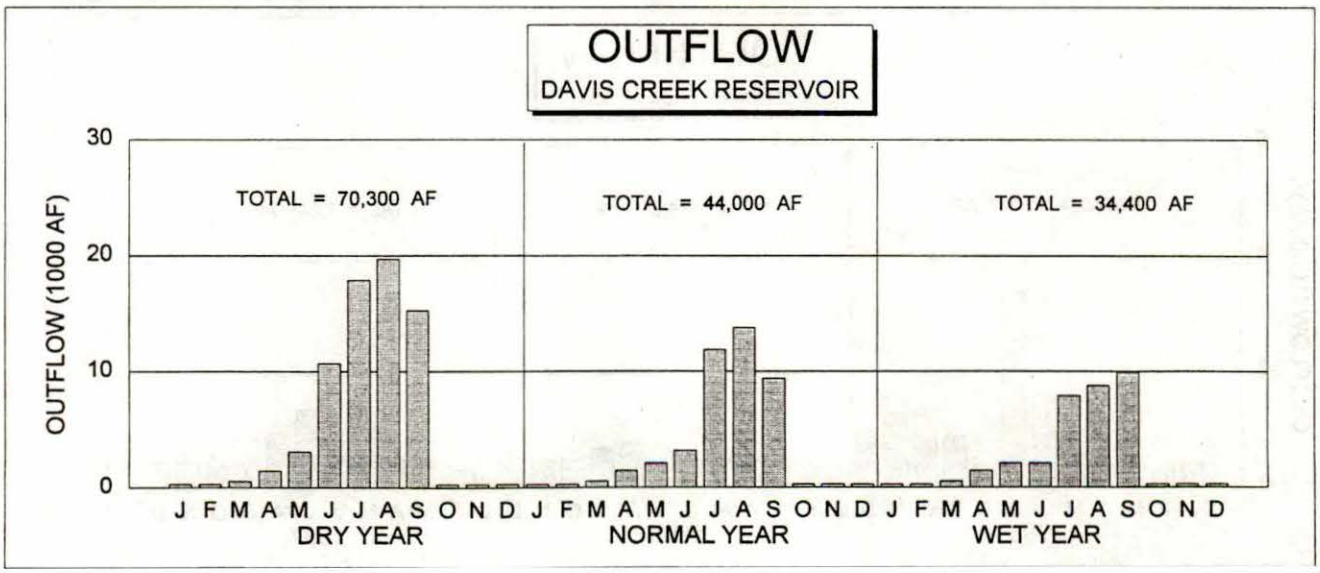
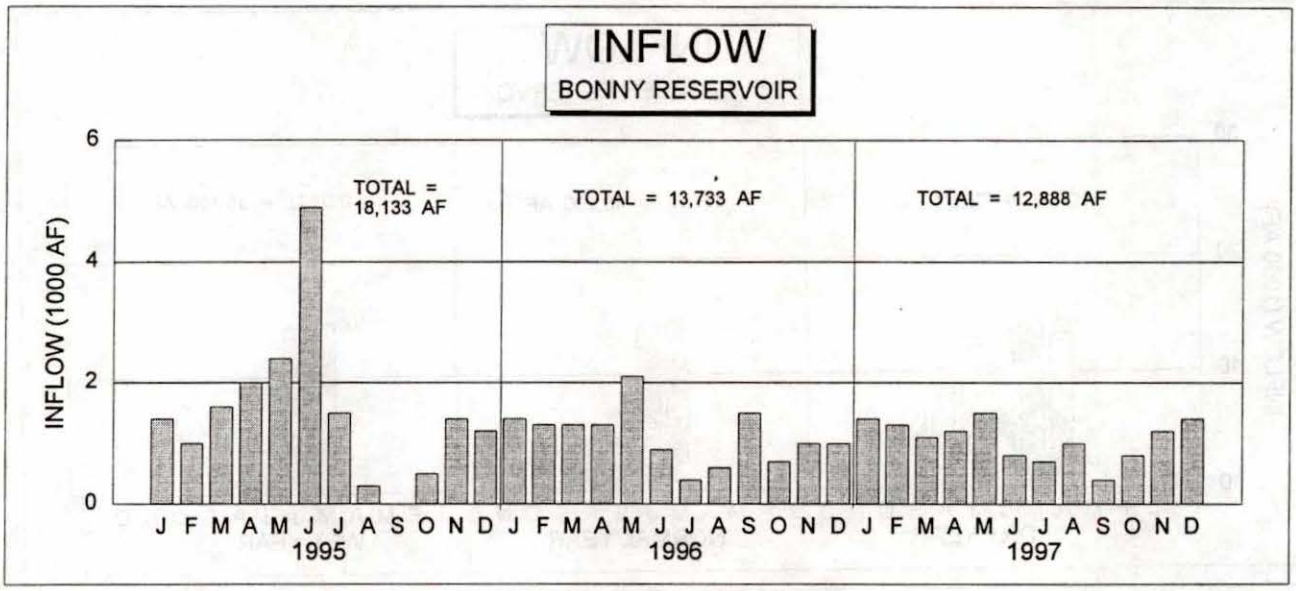
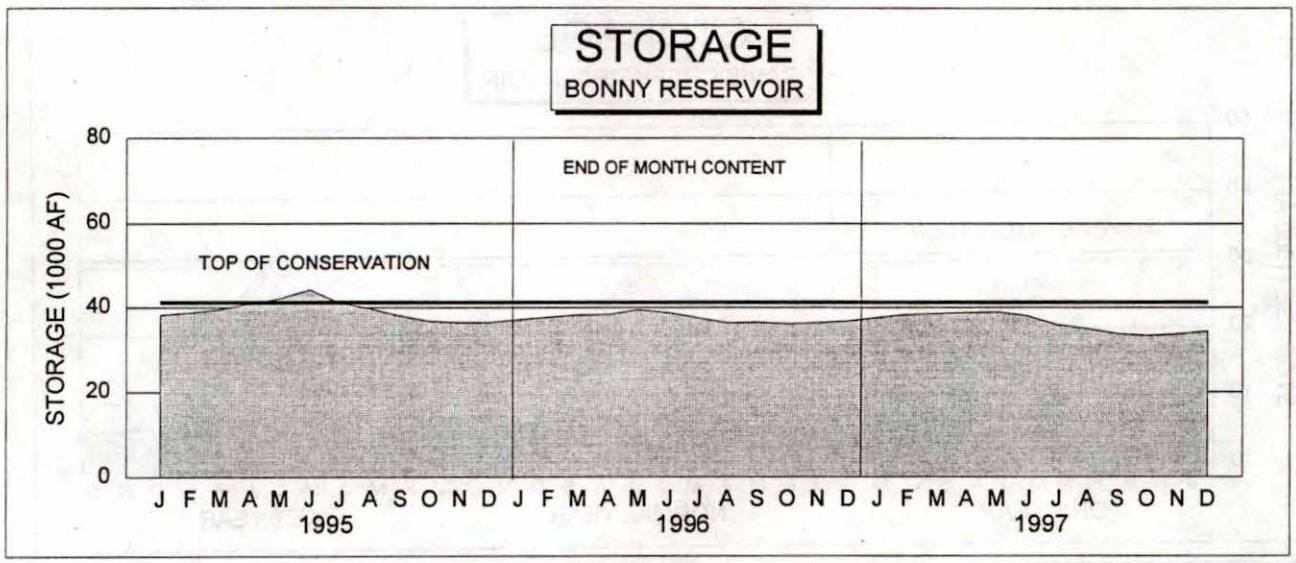
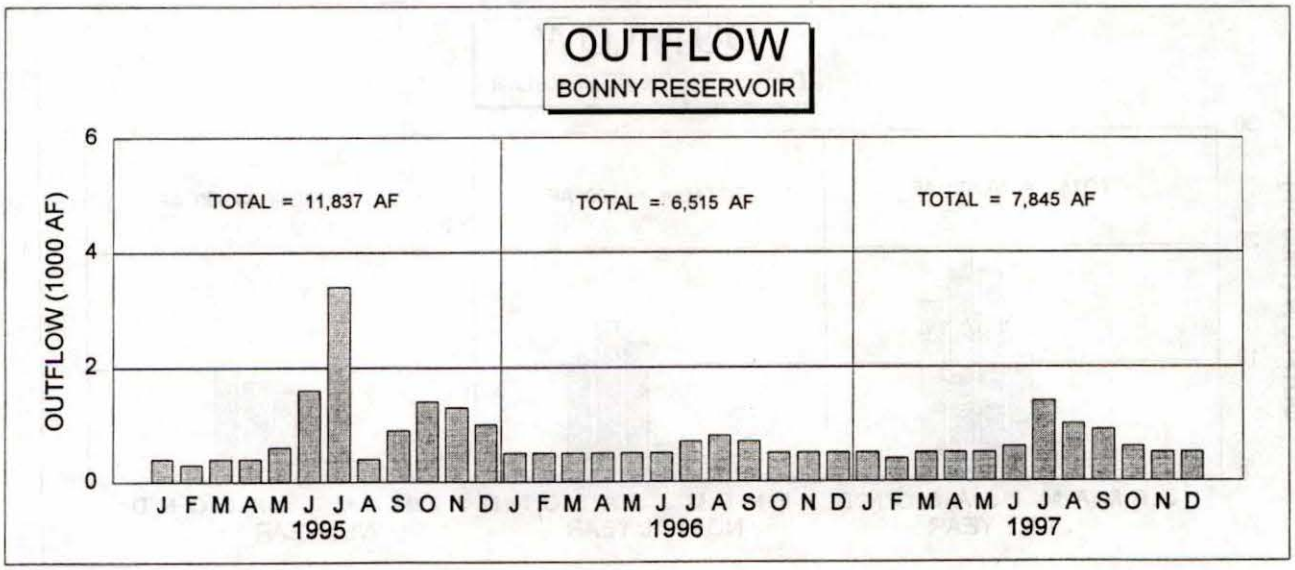


EXHIBIT 6A

BONNY RESERVOIR
OPERATION

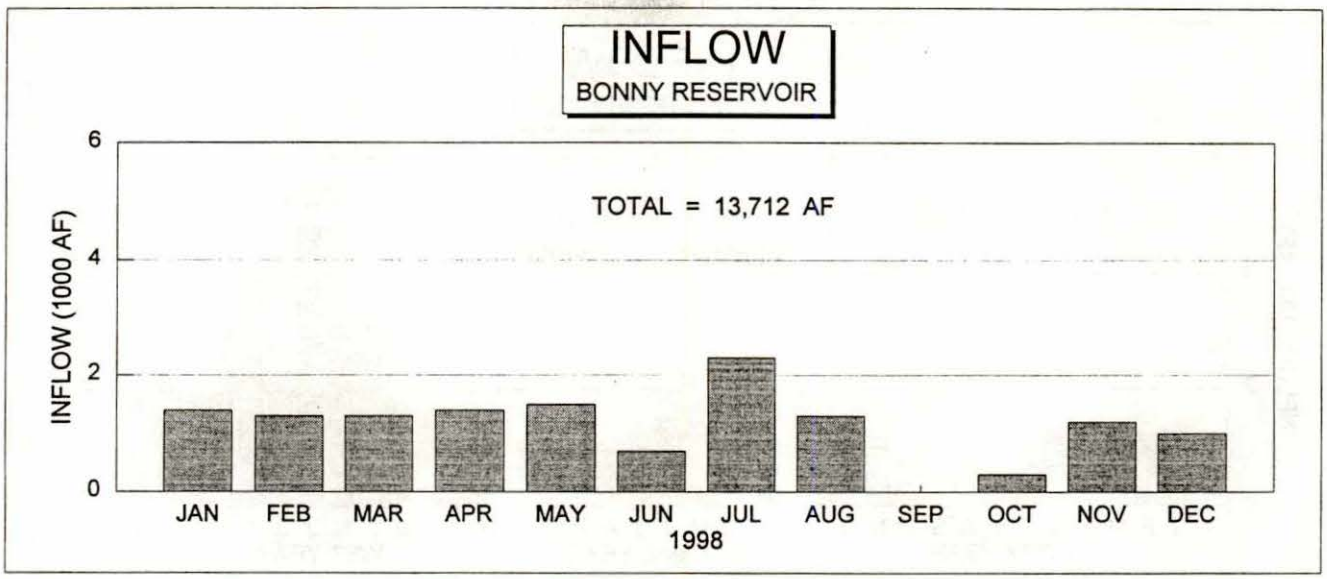


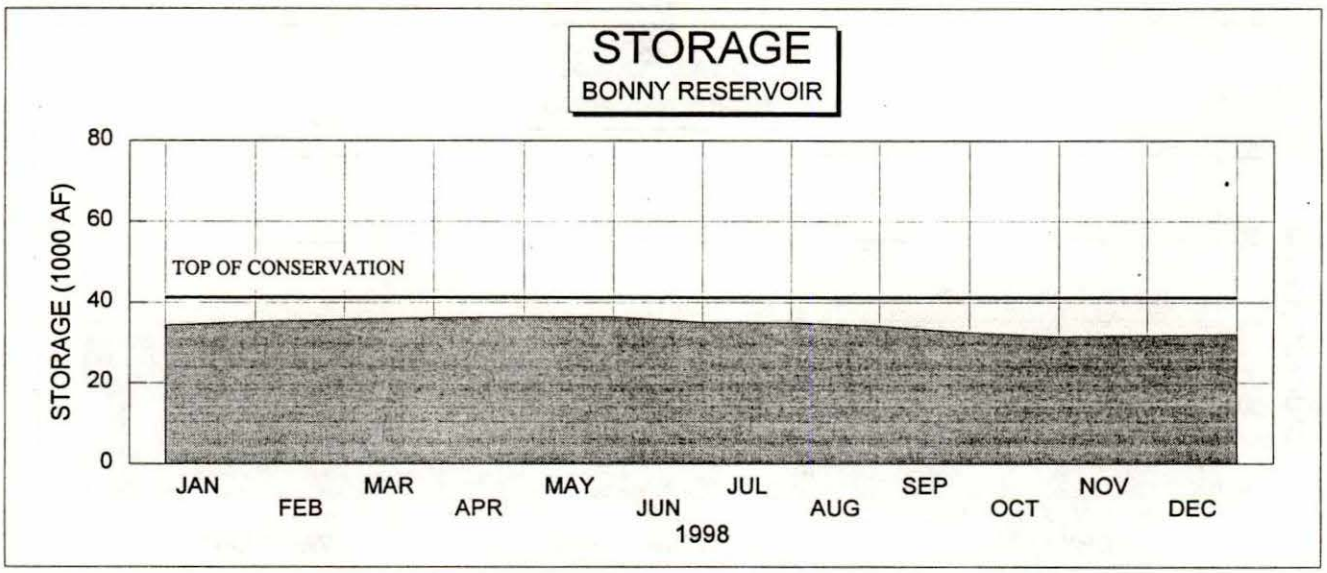




BONNY RESERVOIR

1998 OPERATION





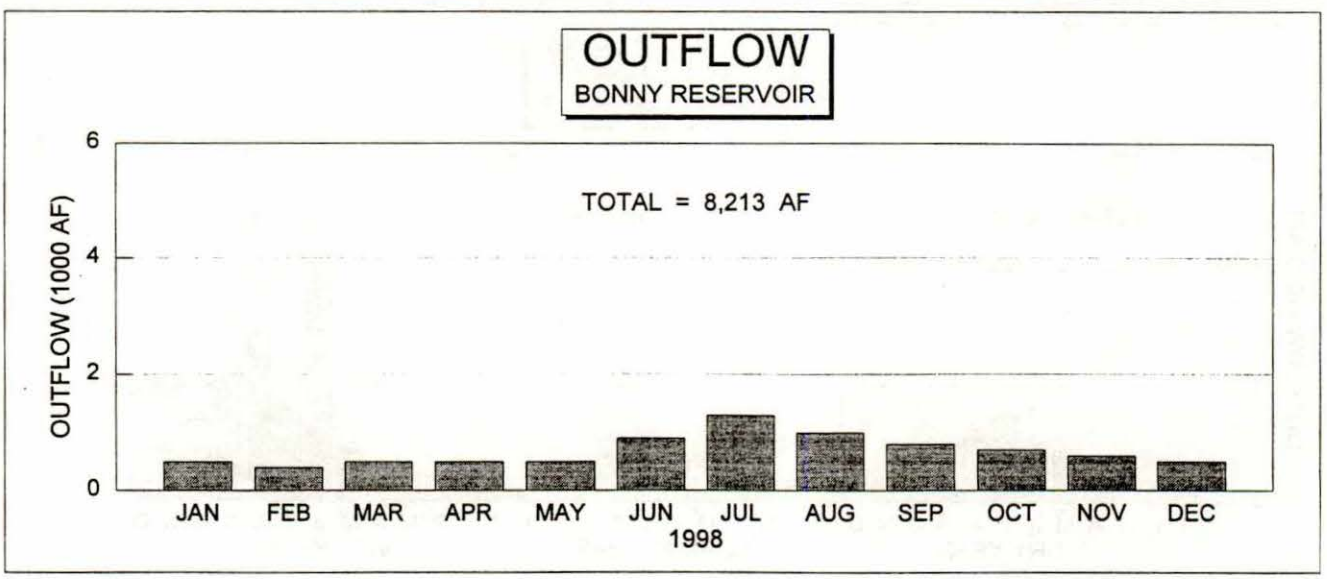
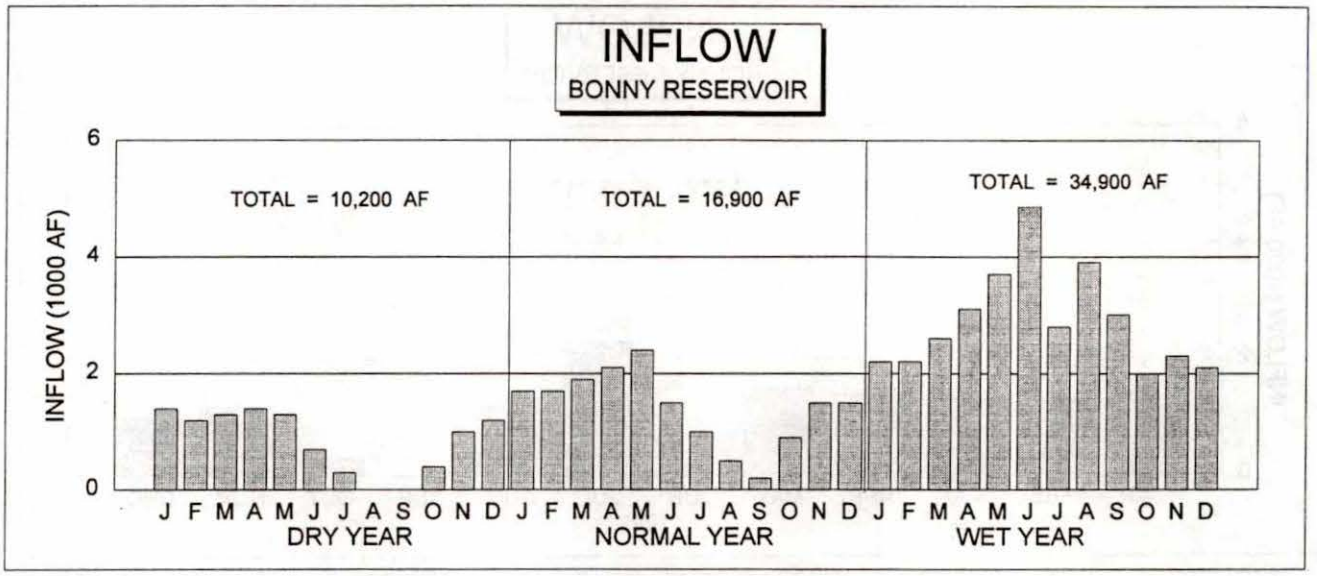
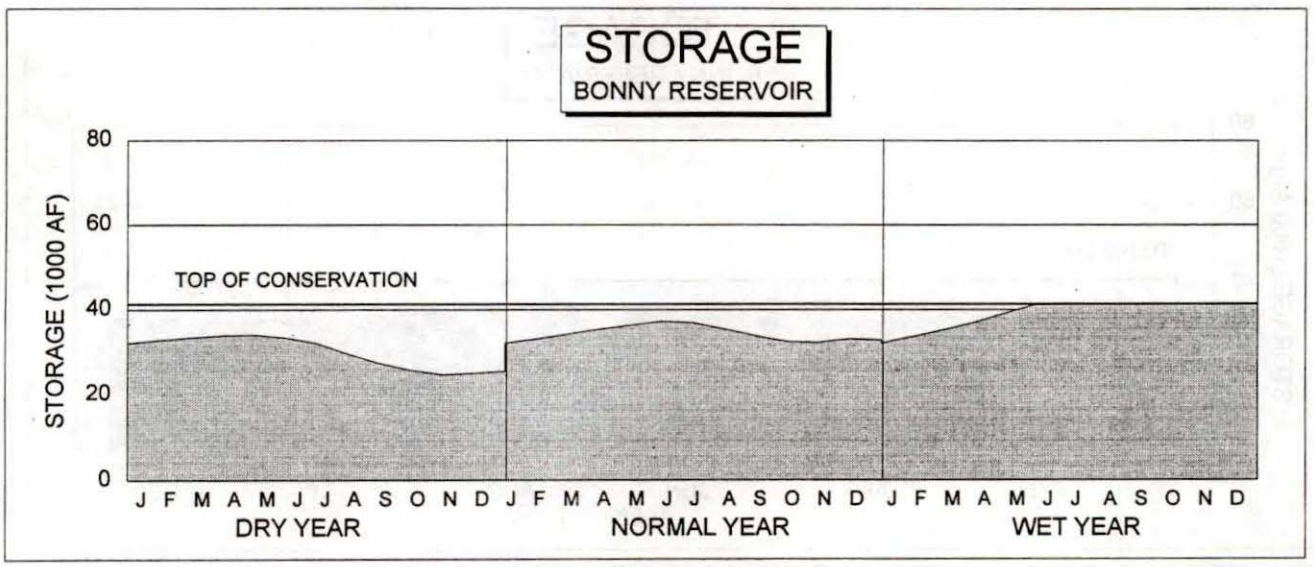


EXHIBIT 6C

BONNY RESERVOIR
1999 OPERATION PLAN





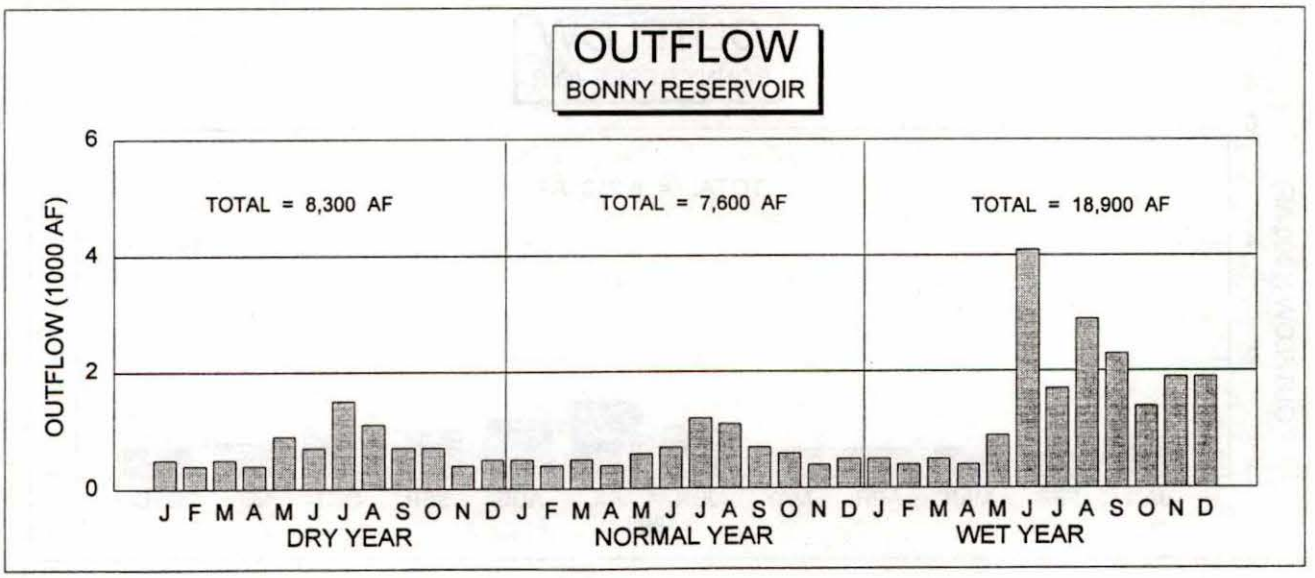
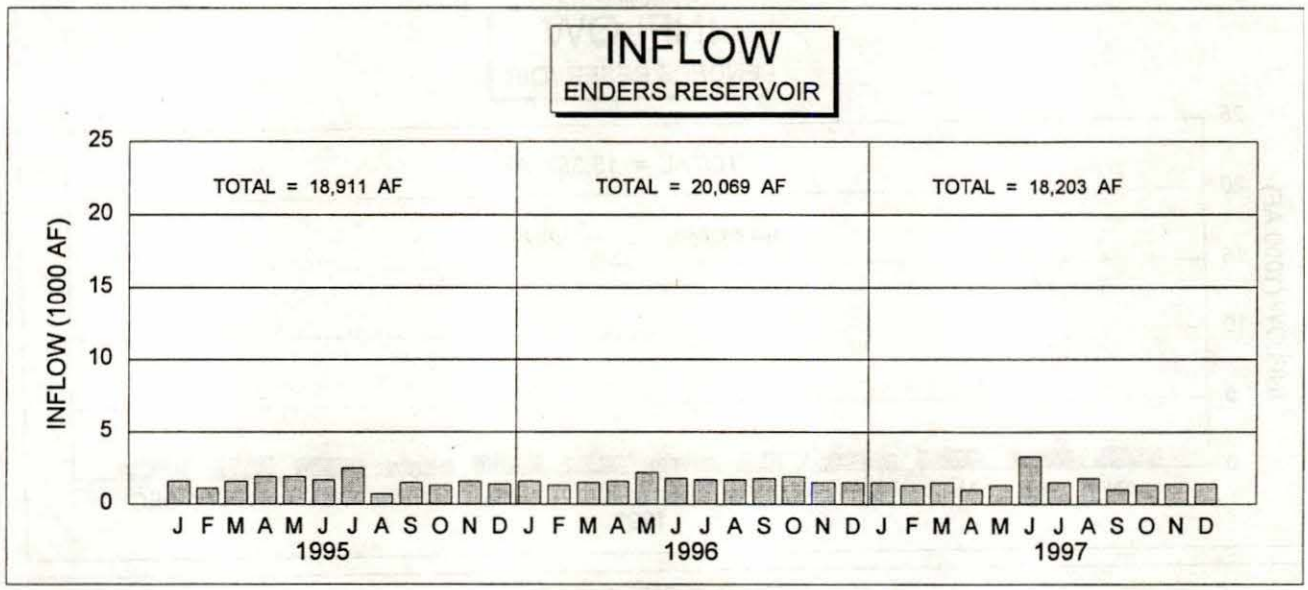
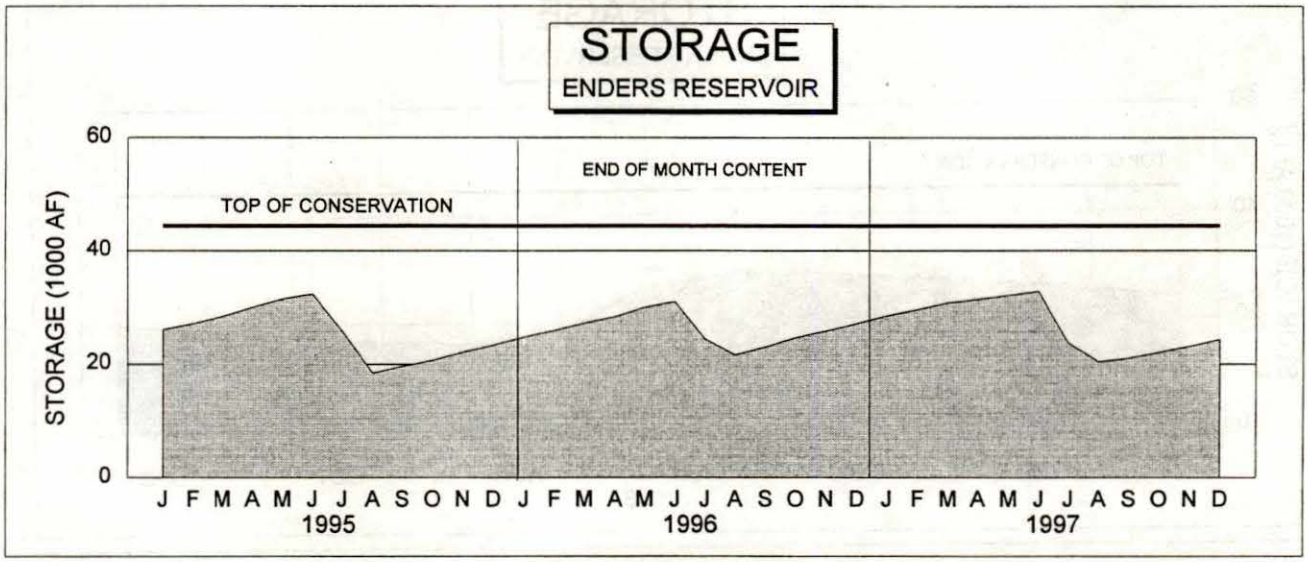


EXHIBIT 7A

ENDERS RESERVOIR
OPERATION





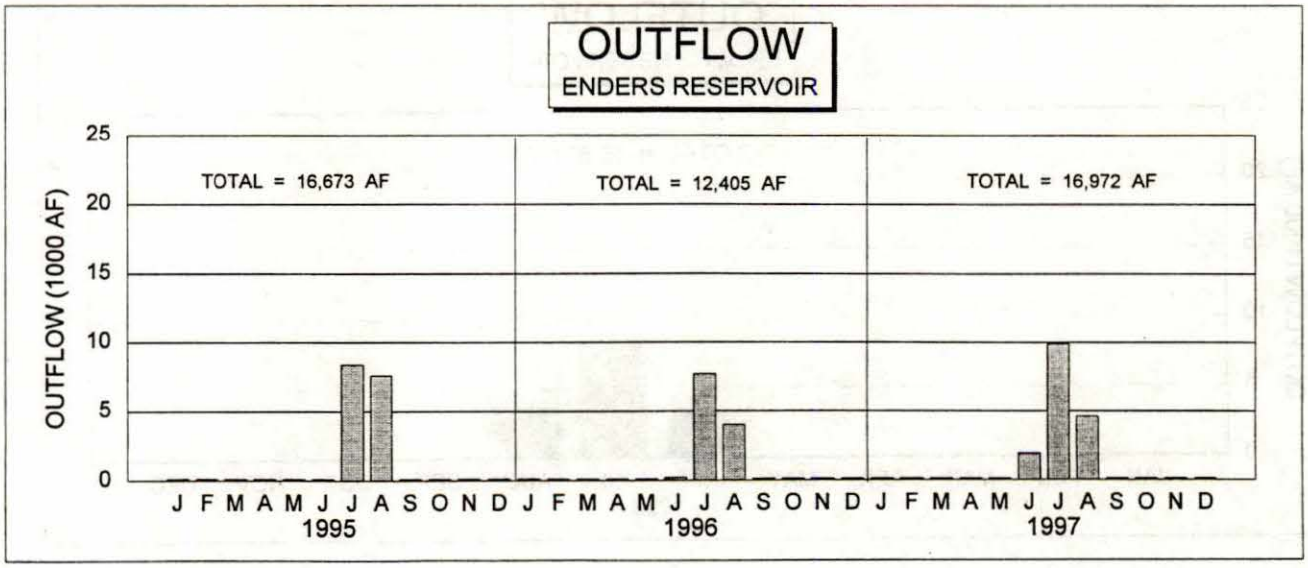
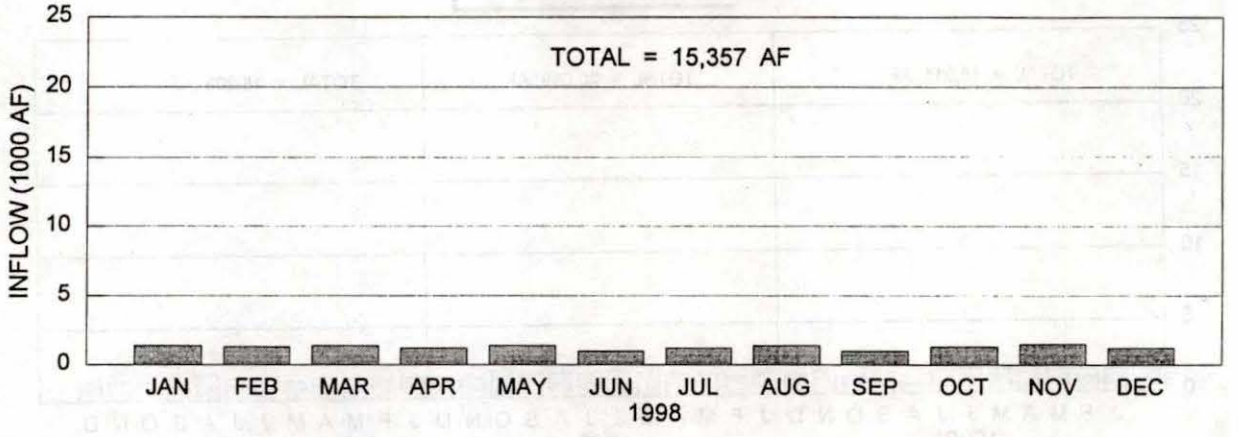


EXHIBIT 7B

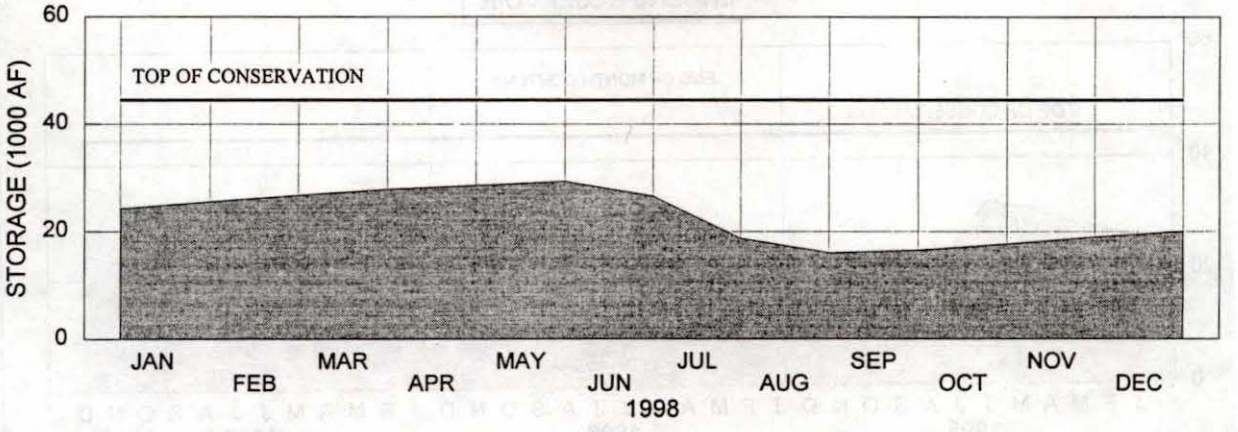
ENDERS RESERVOIR

1998 OPERATION

INFLOW
ENDERS RESERVOIR



STORAGE
ENDERS RESERVOIR



OUTFLOW
ENDERS RESERVOIR

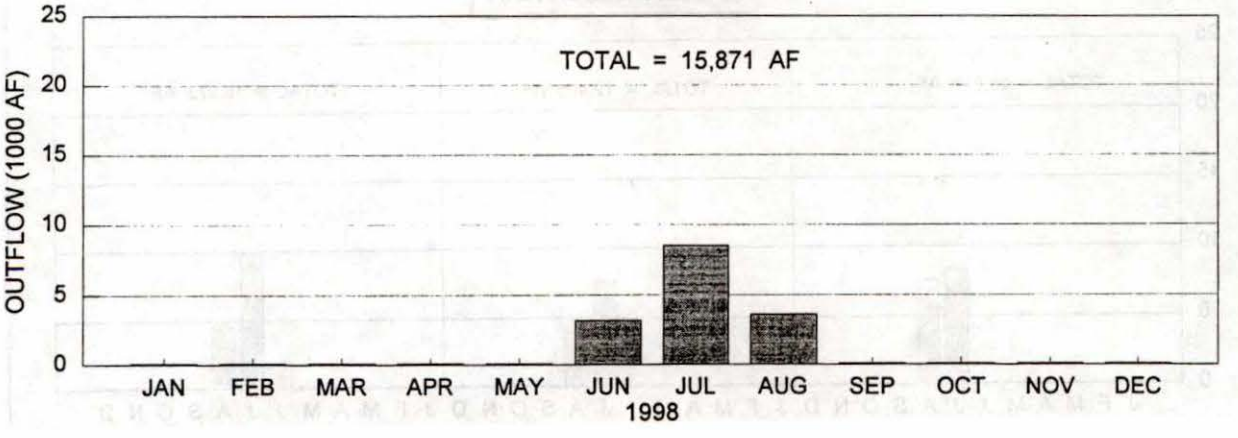
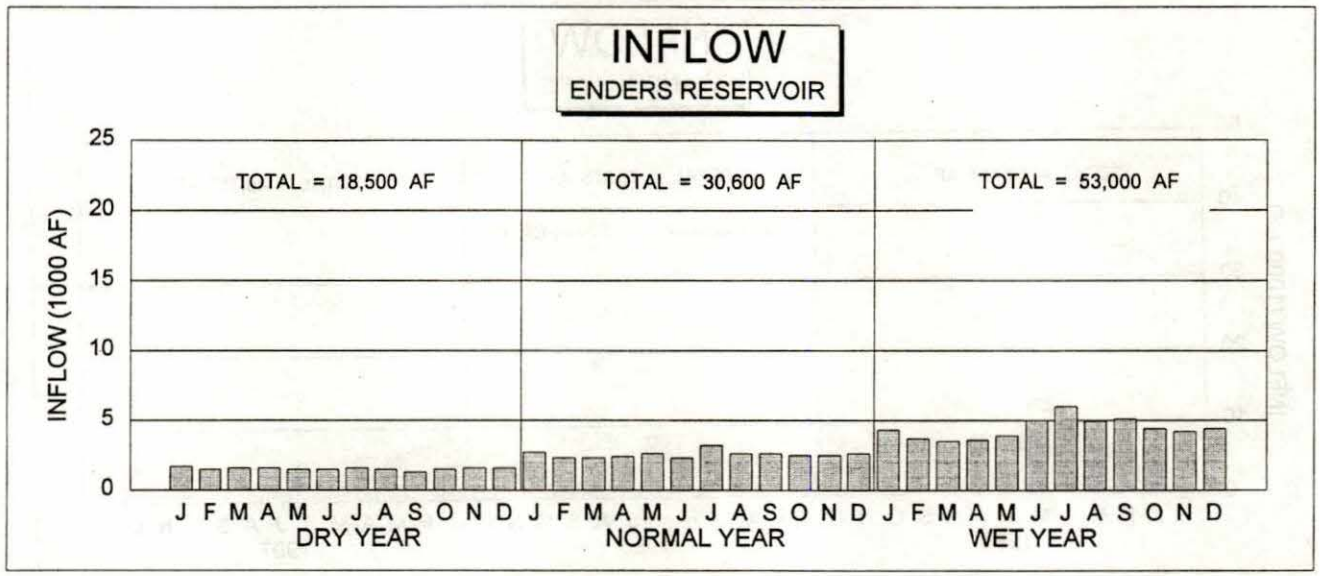
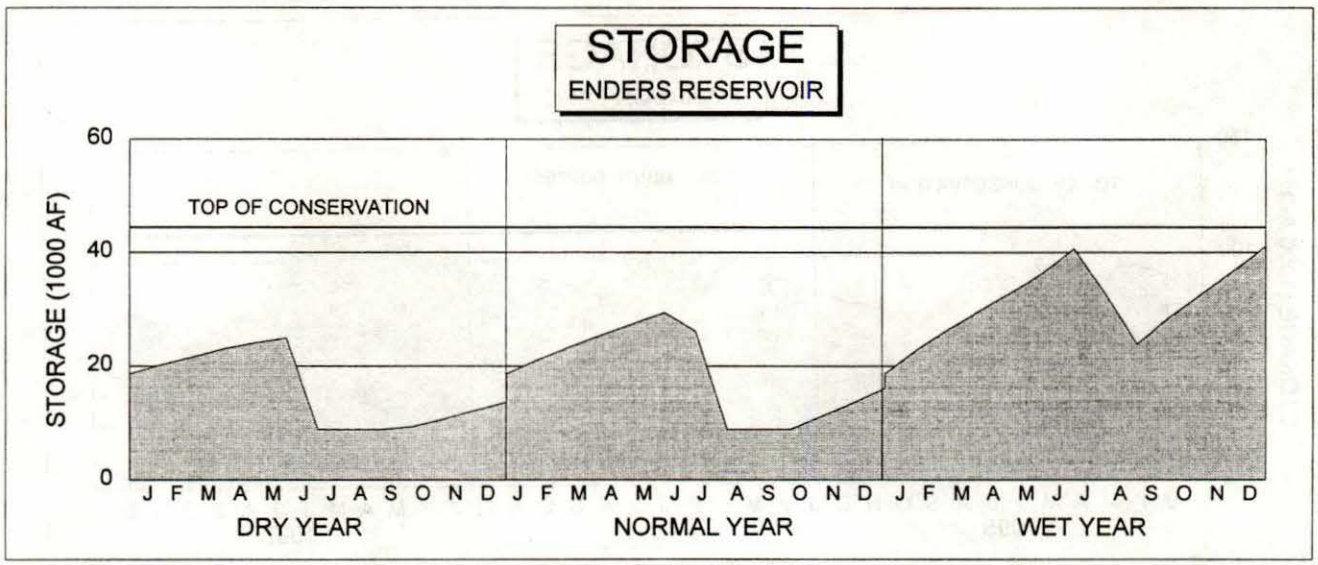


EXHIBIT 7C

ENDERS RESERVOIR
1999 OPERATION PLAN





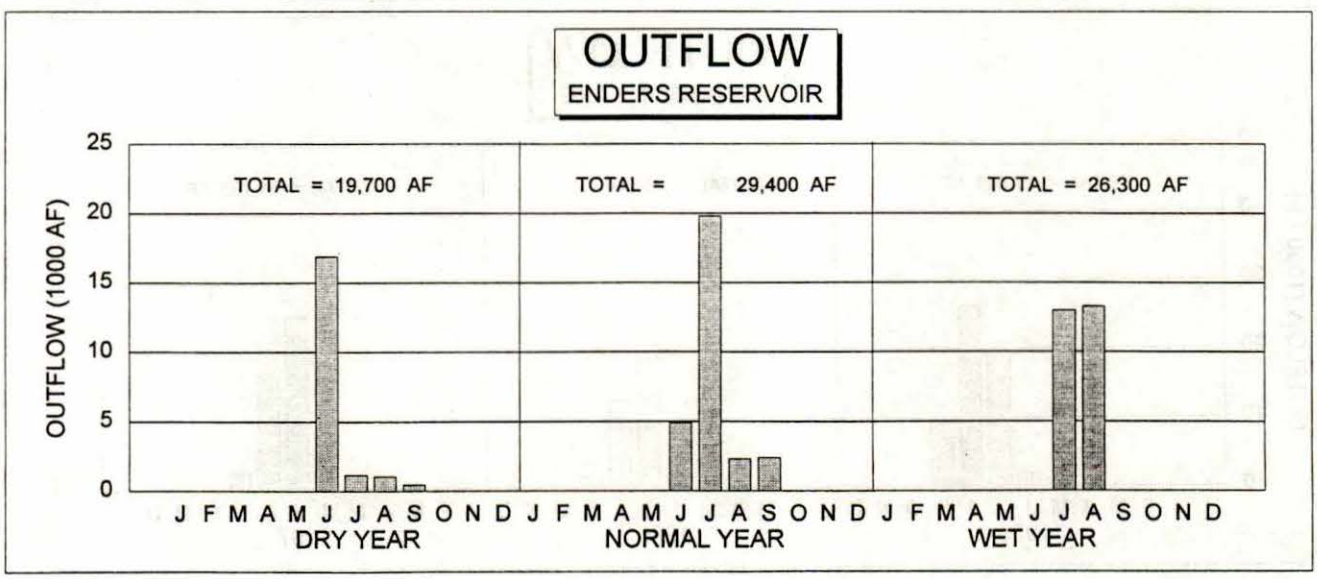
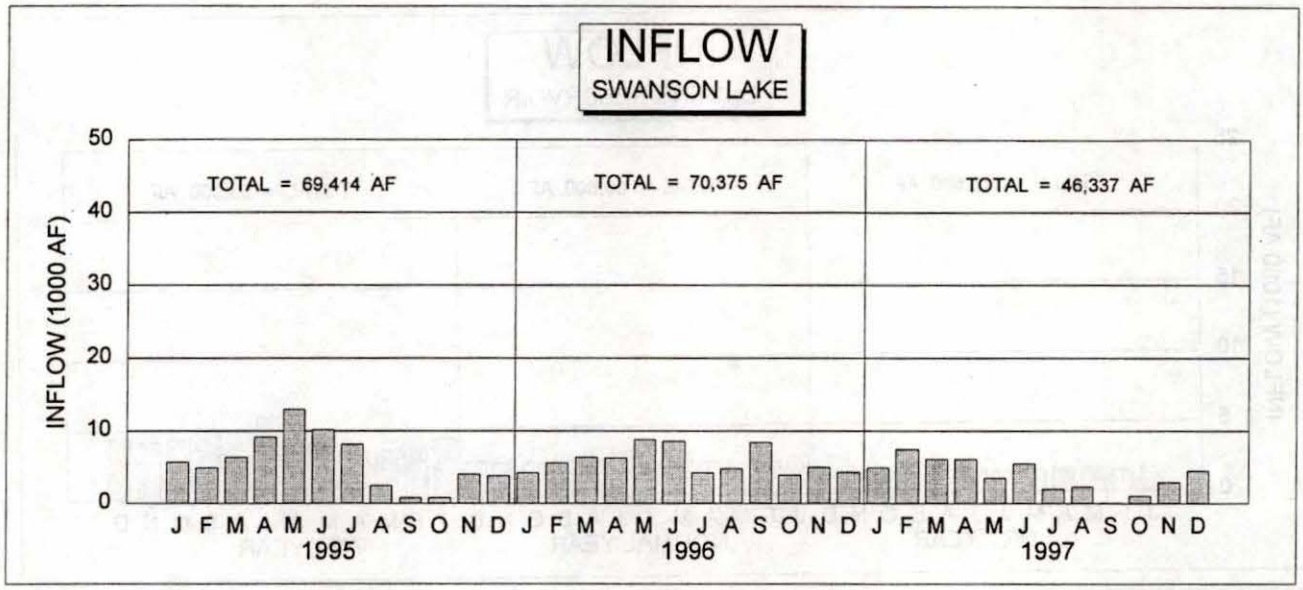
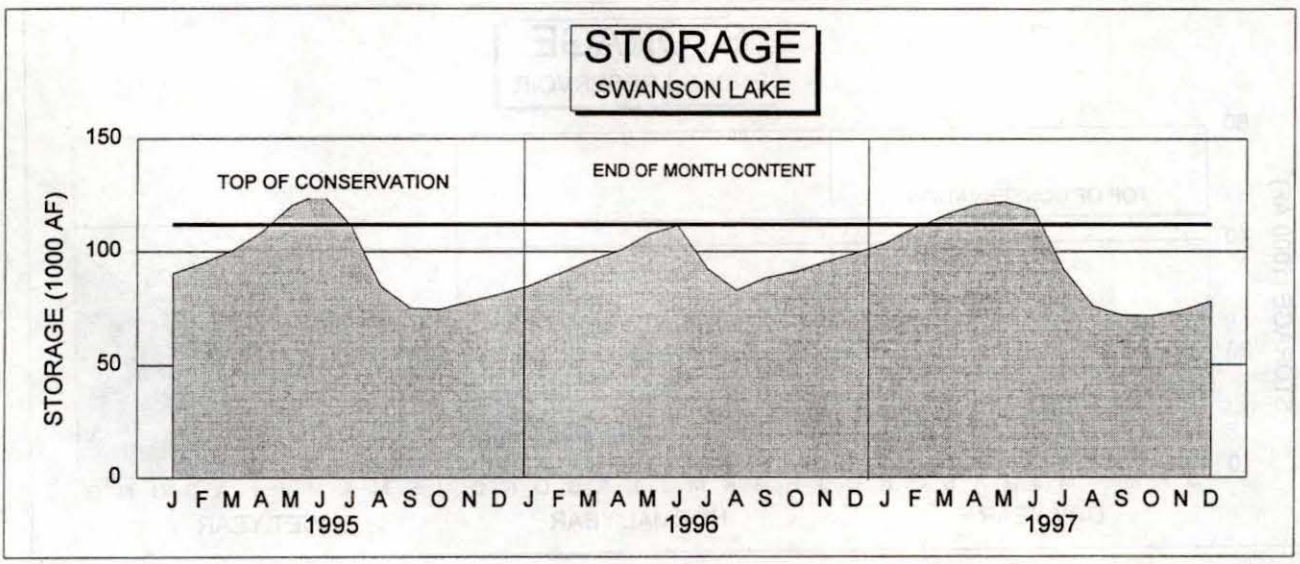
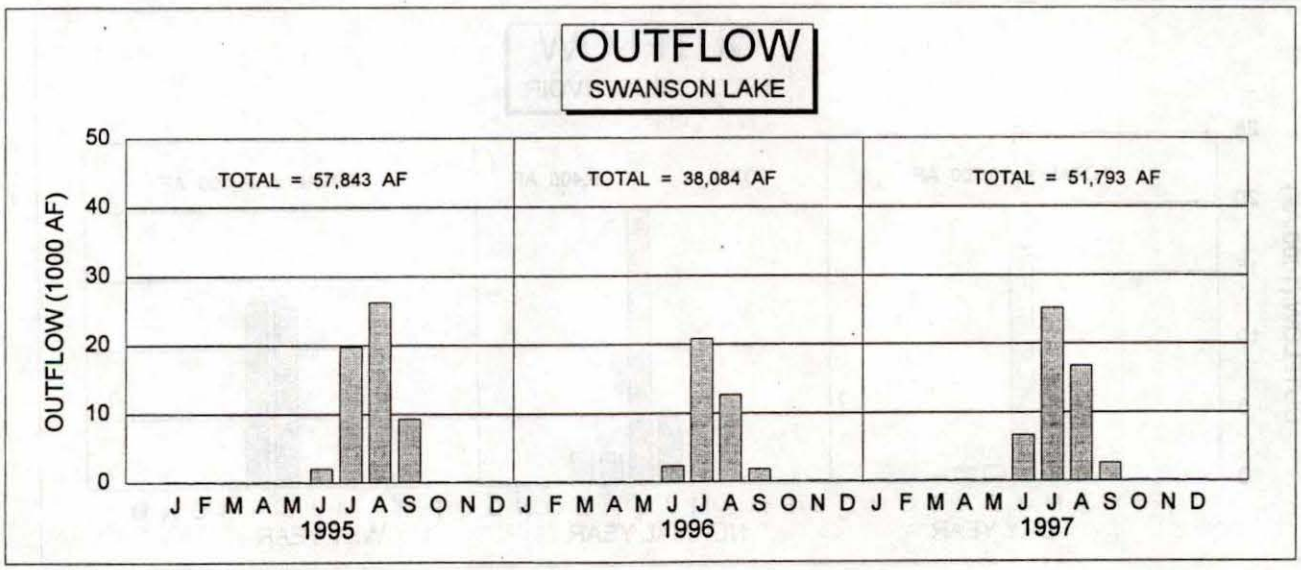


EXHIBIT 8A

SWANSON LAKE
OPERATION

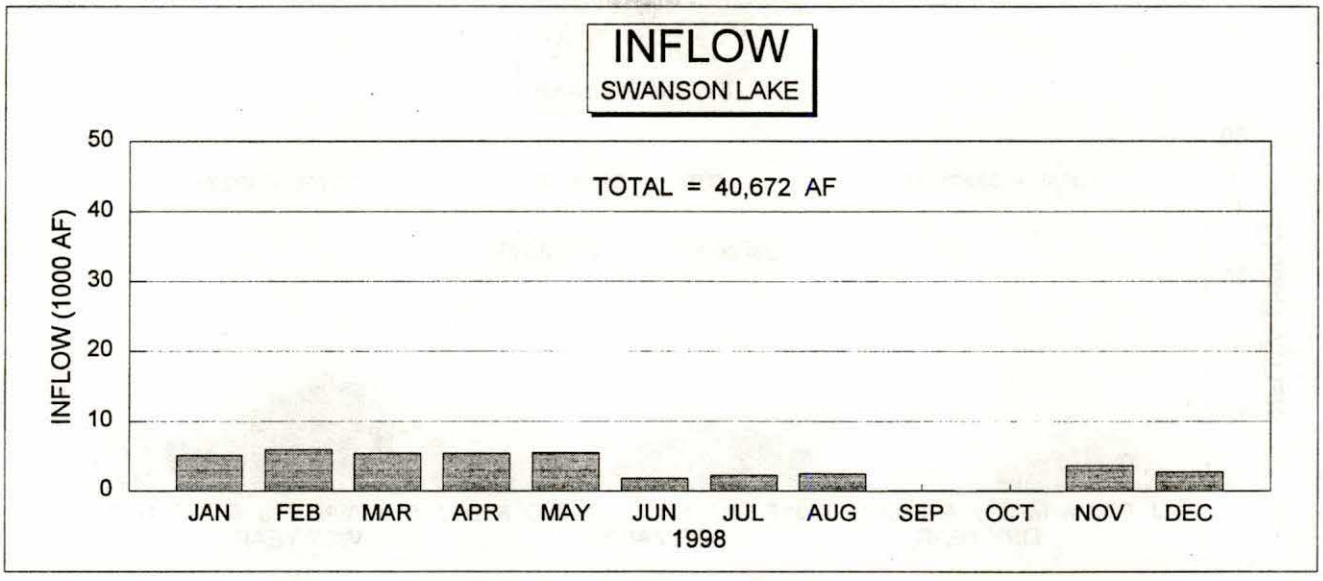


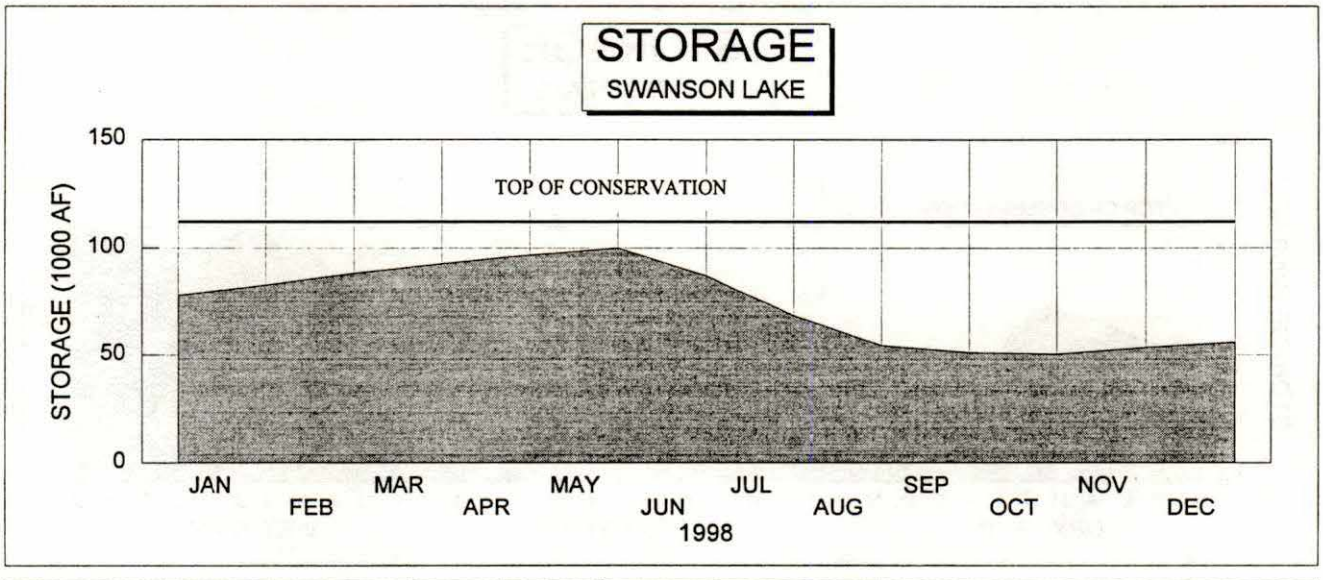




SWANSON LAKE

1998 OPERATION





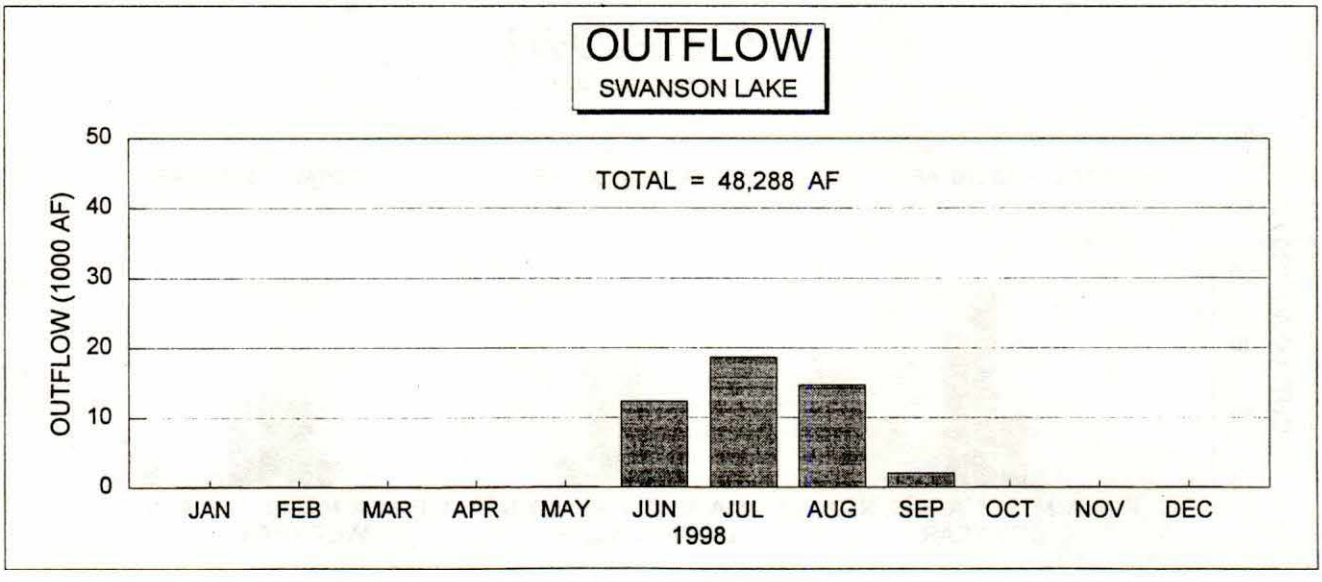
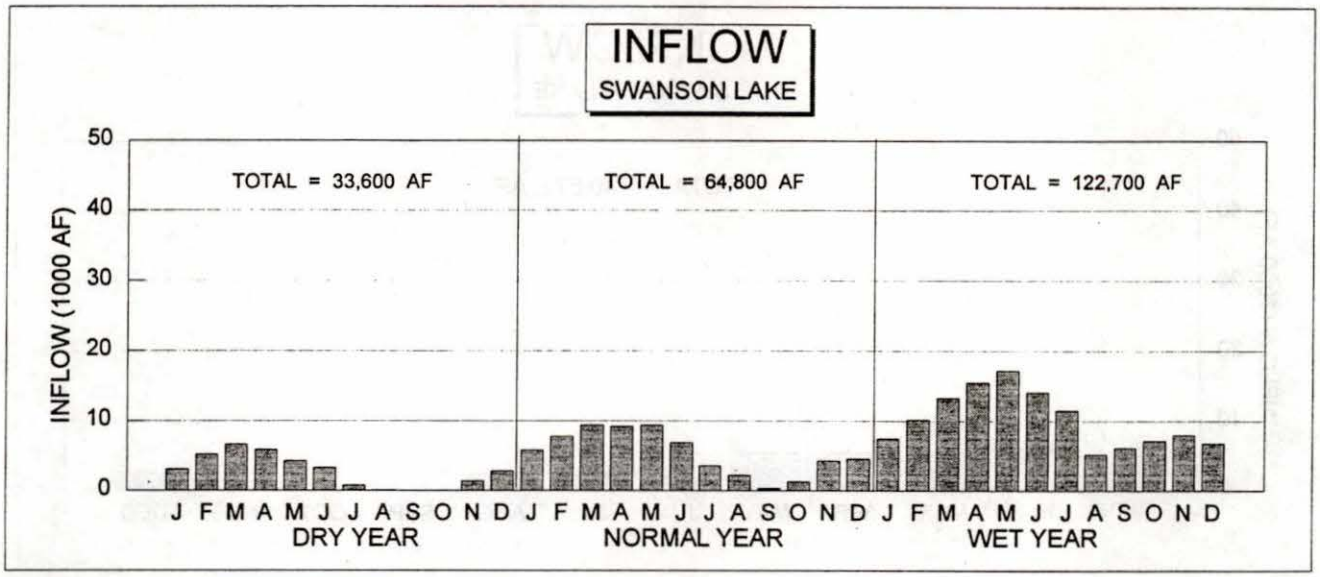
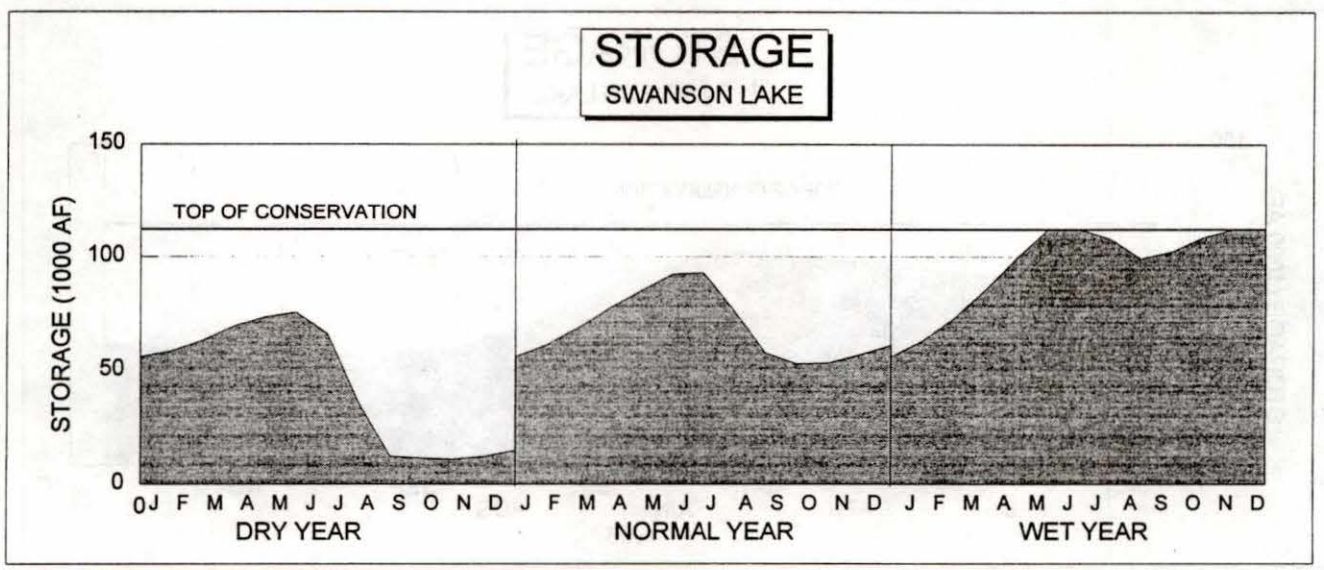


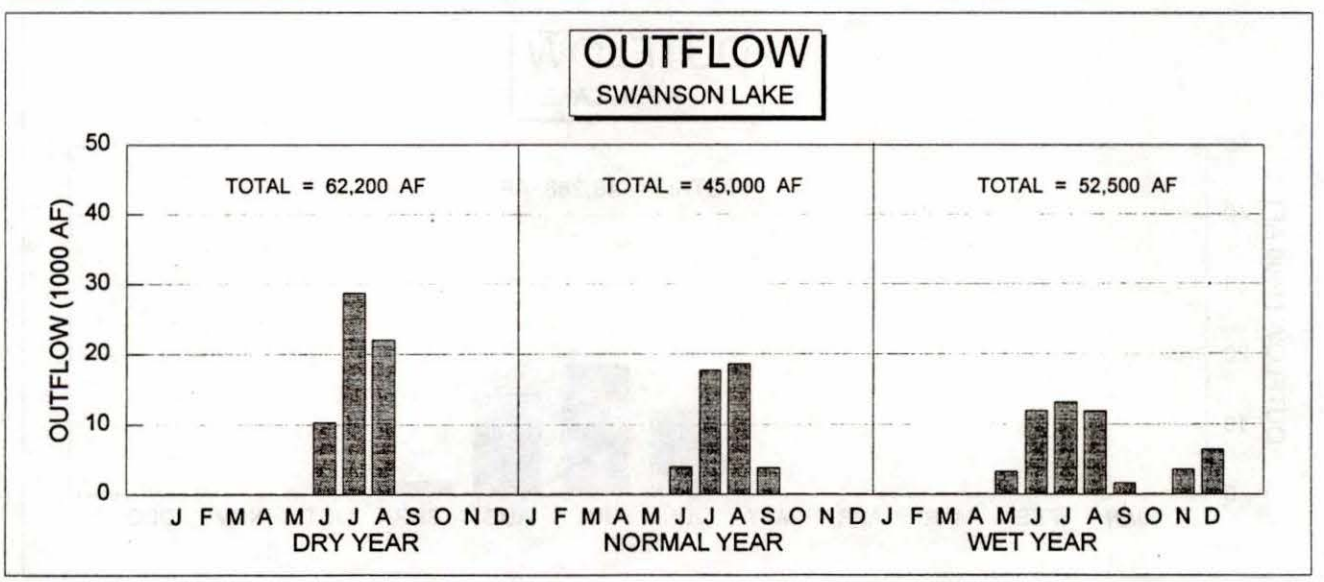
EXHIBIT 8C

SWANSON LAKE

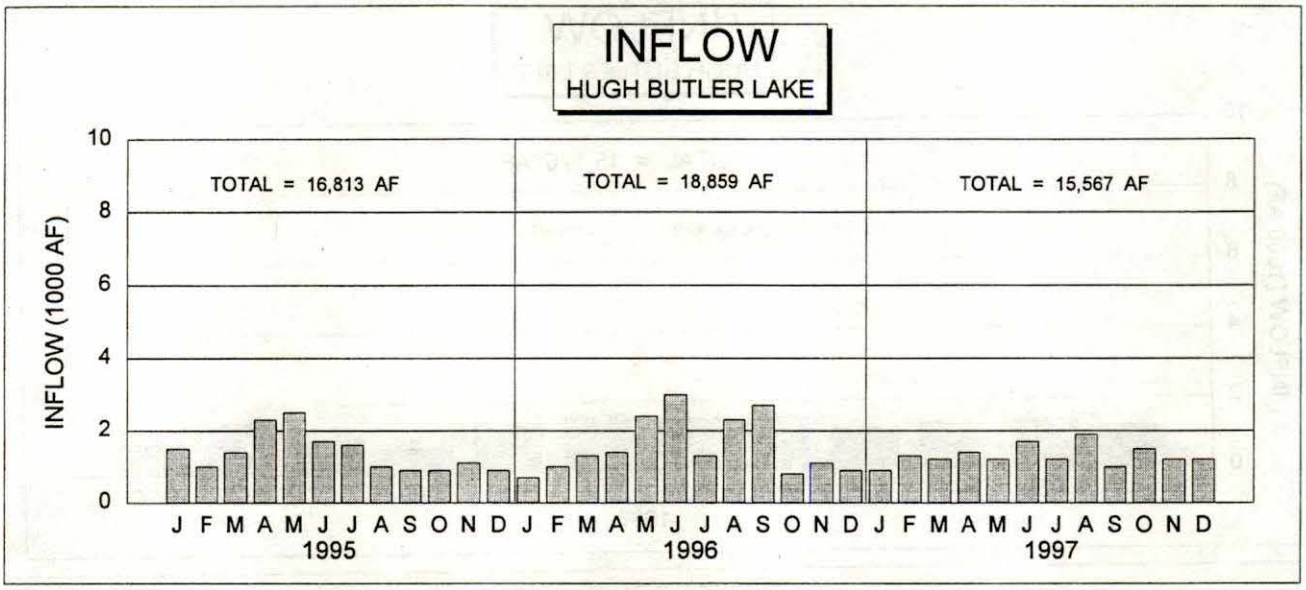
1999 OPERATION PLAN

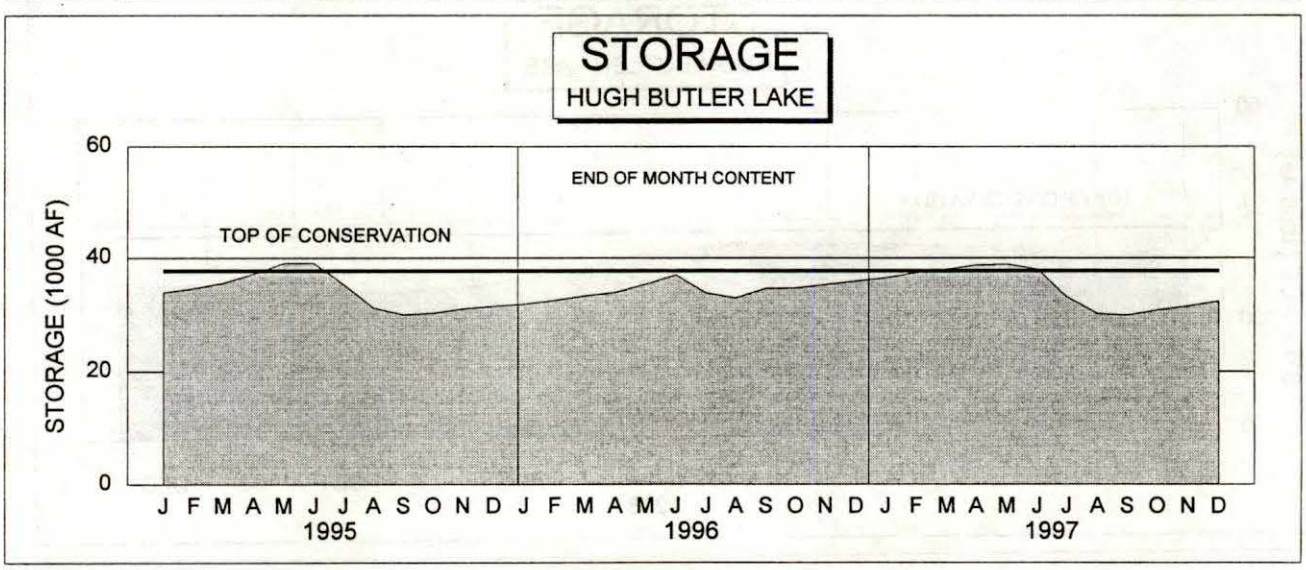






HUGH BUTLER LAKE
OPERATION





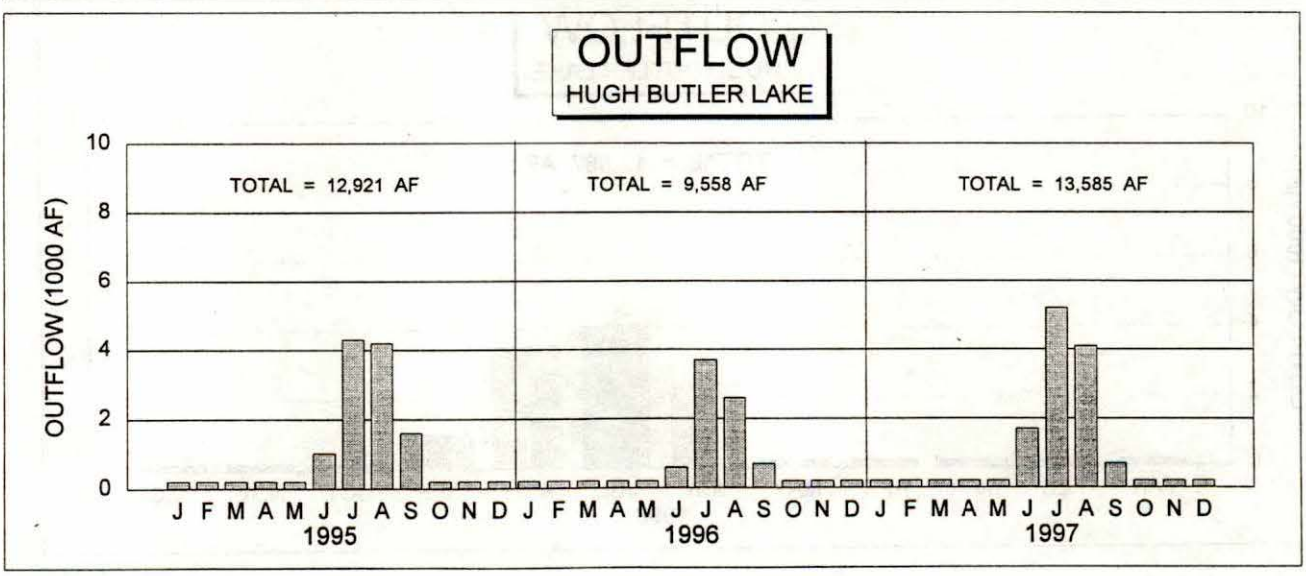
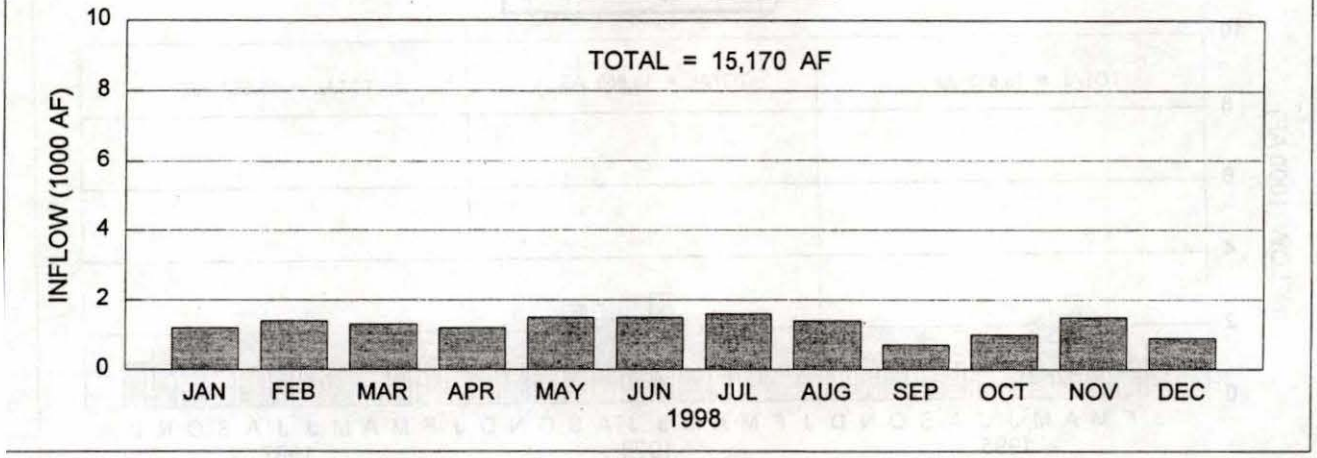


EXHIBIT 9B

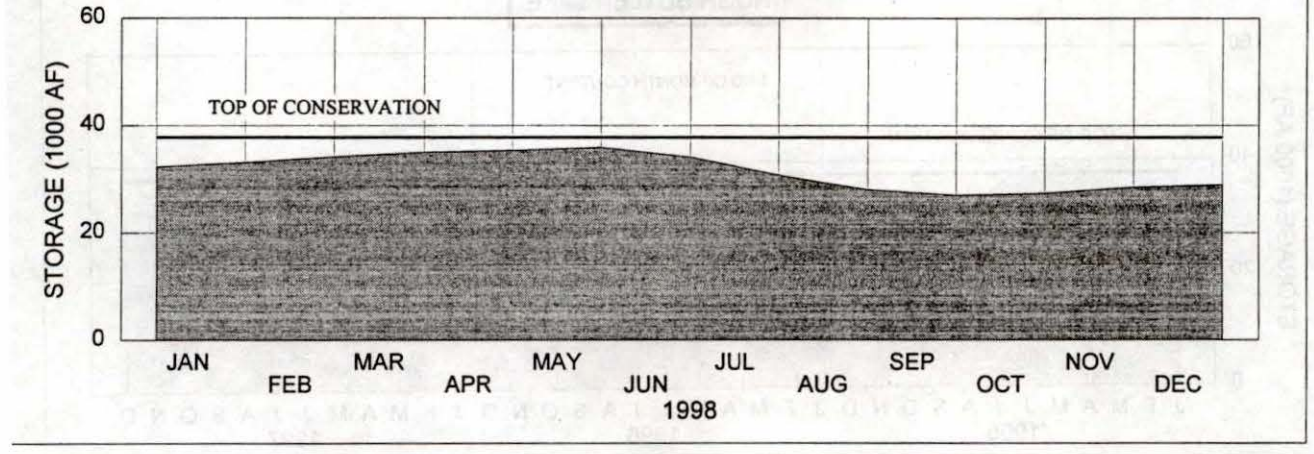
HUGH BUTLER LAKE

1998 OPERATION

INFLOW
HUGH BUTLER LAKE



STORAGE
HUGH BUTLER LAKE



OUTFLOW
HUGH BUTLER LAKE

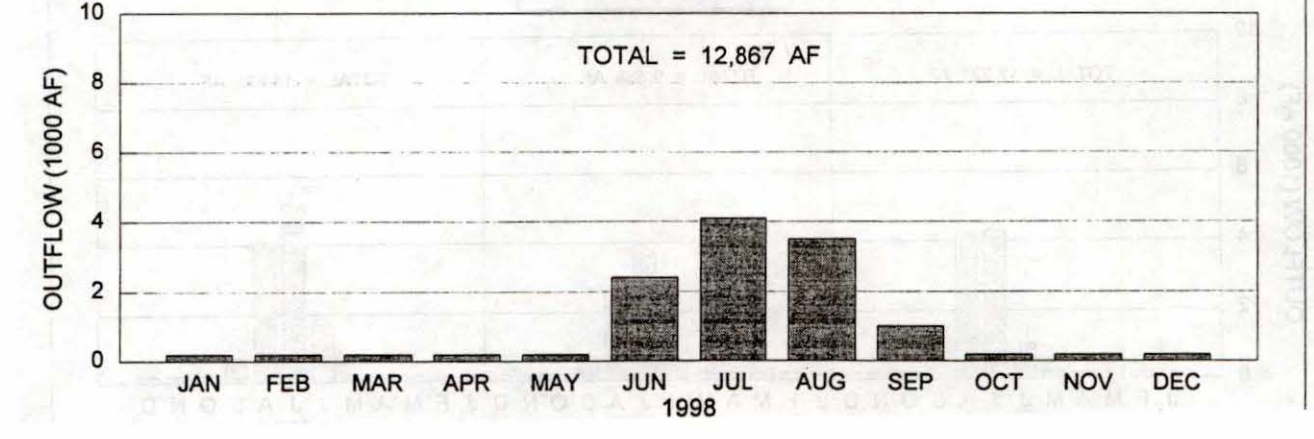
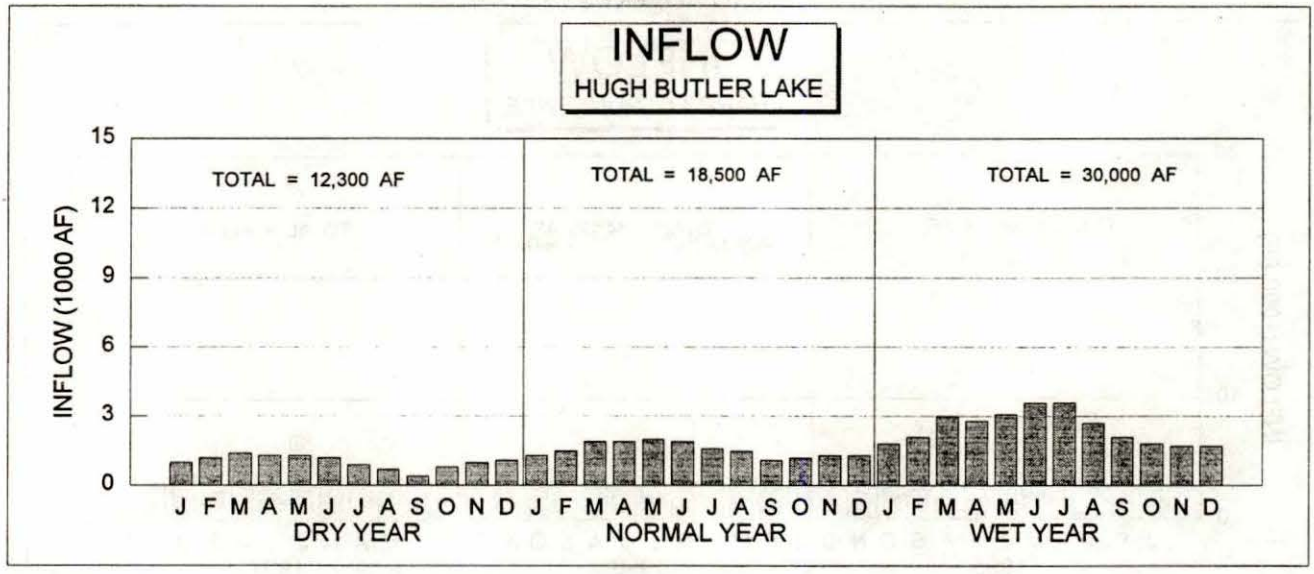
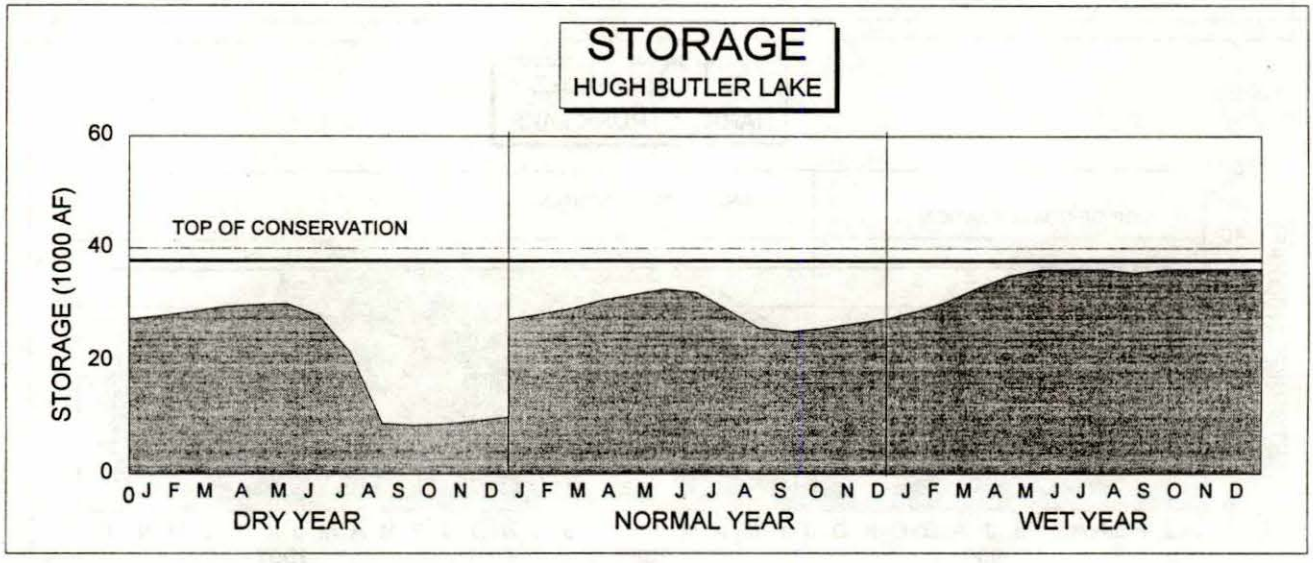


EXHIBIT 9C

HUGH BUTLER LAKE

1999 OPERATION PLAN





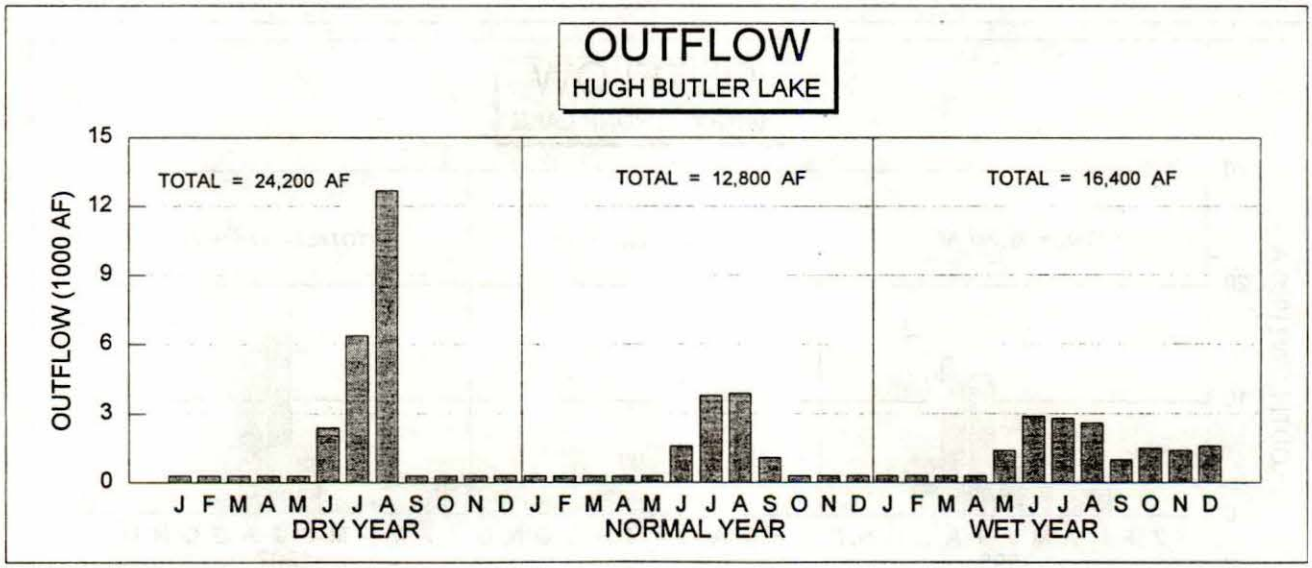
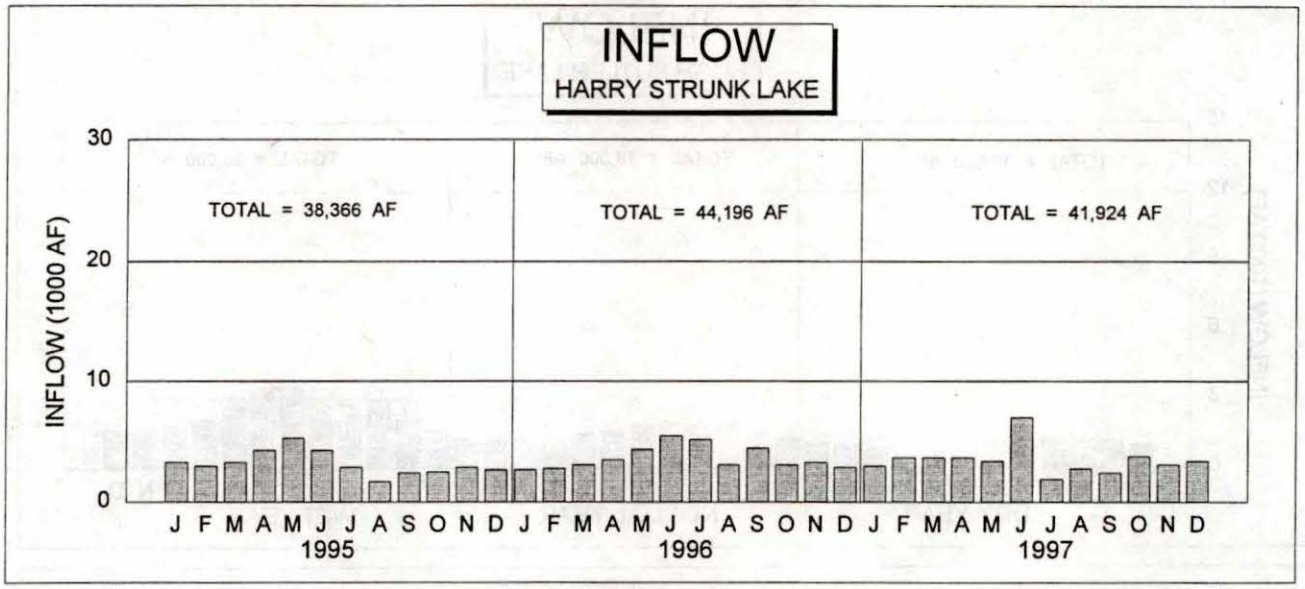
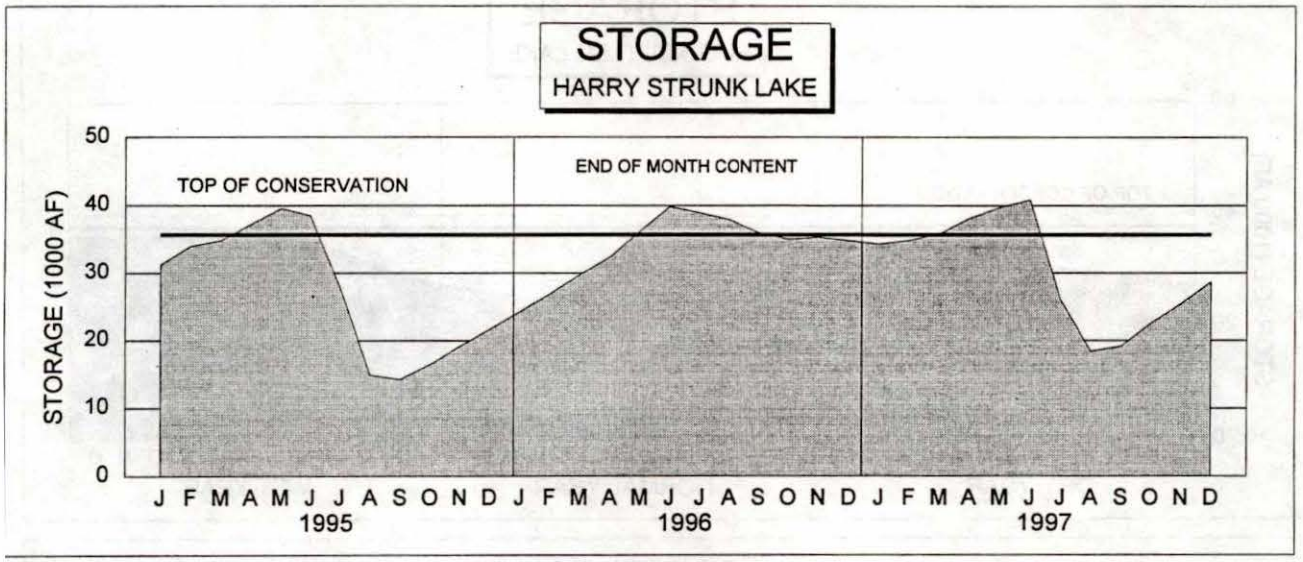


EXHIBIT 10A

HARRY STRUNK LAKE
OPERATION





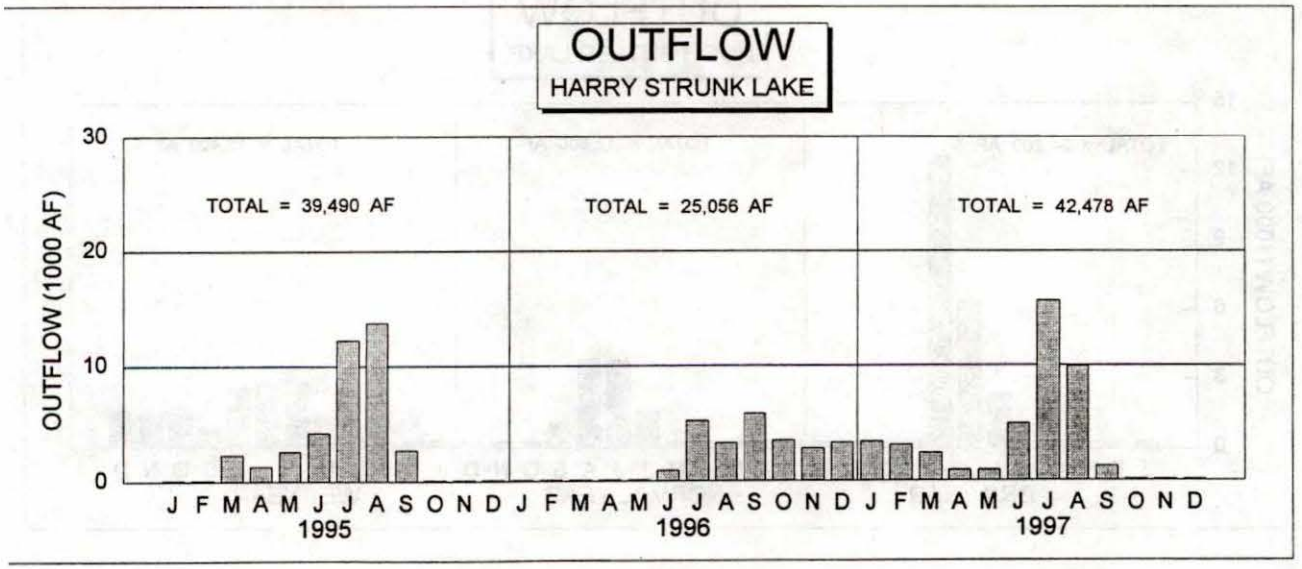
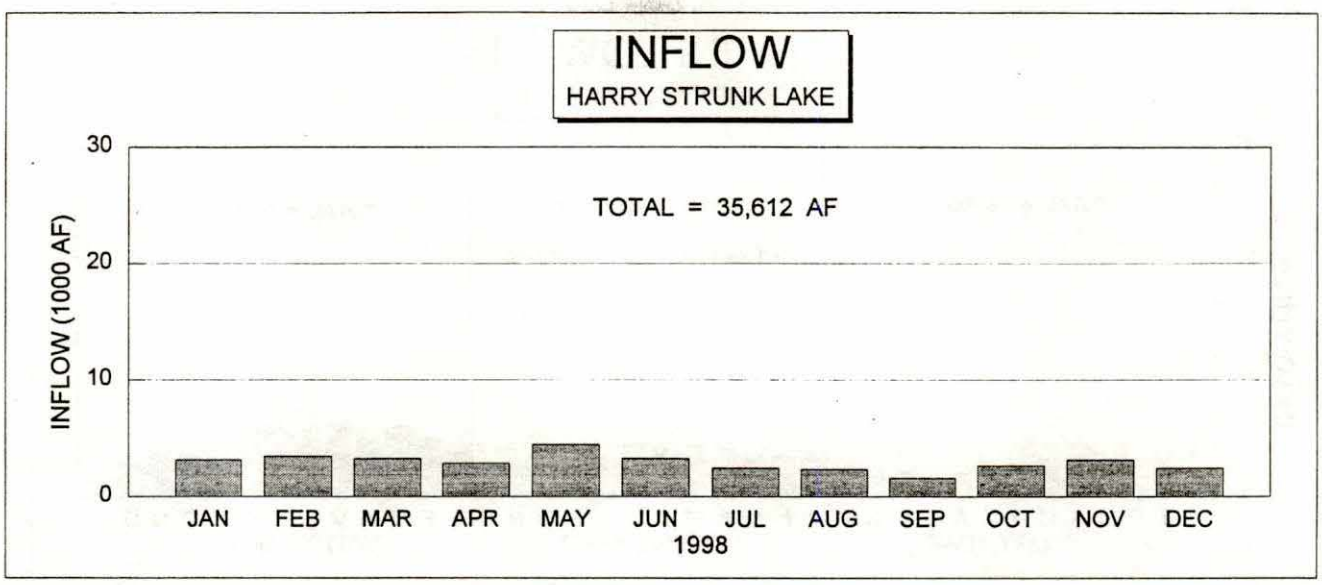
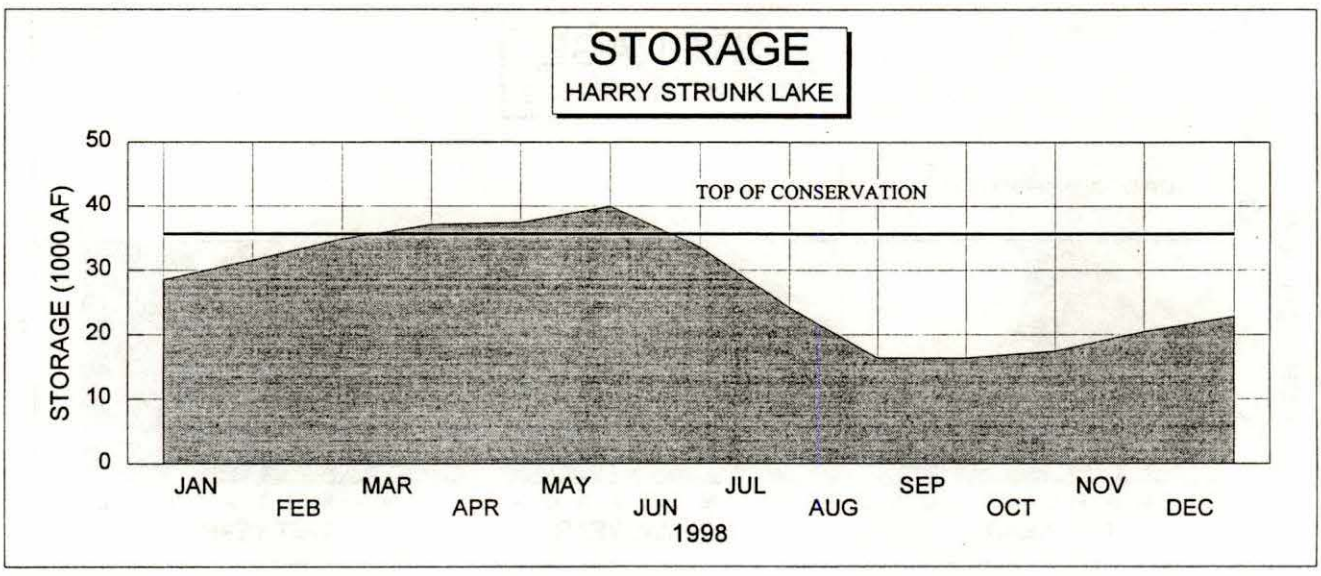


EXHIBIT 10B

HARRY STRUNK LAKE

1998 OPERATION





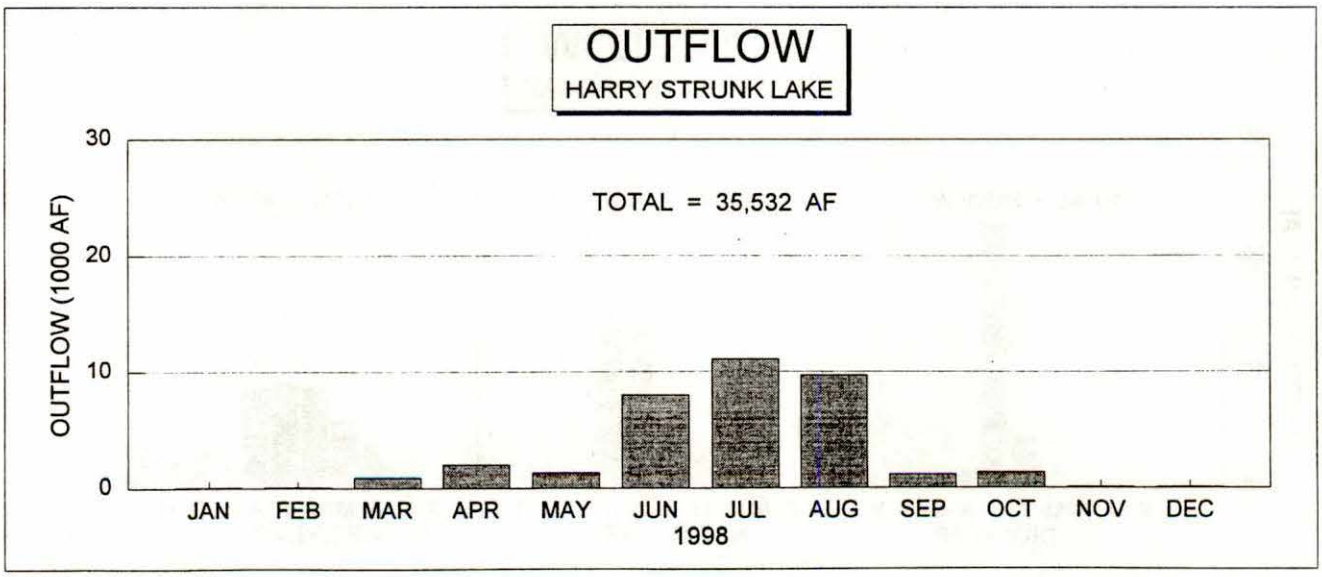
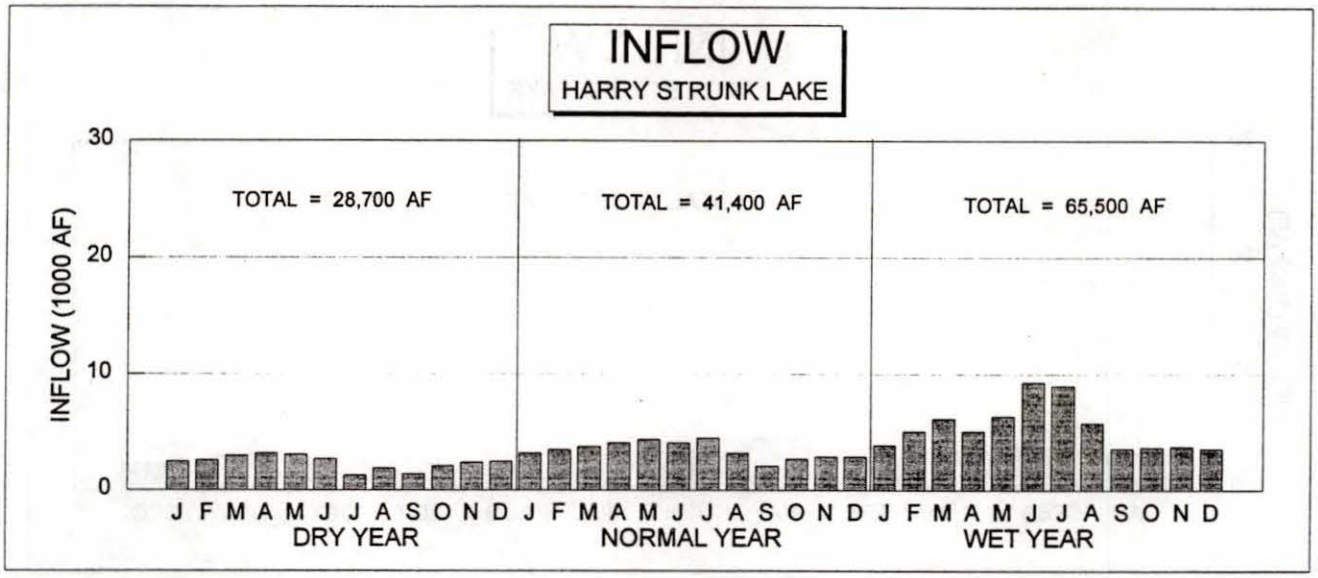
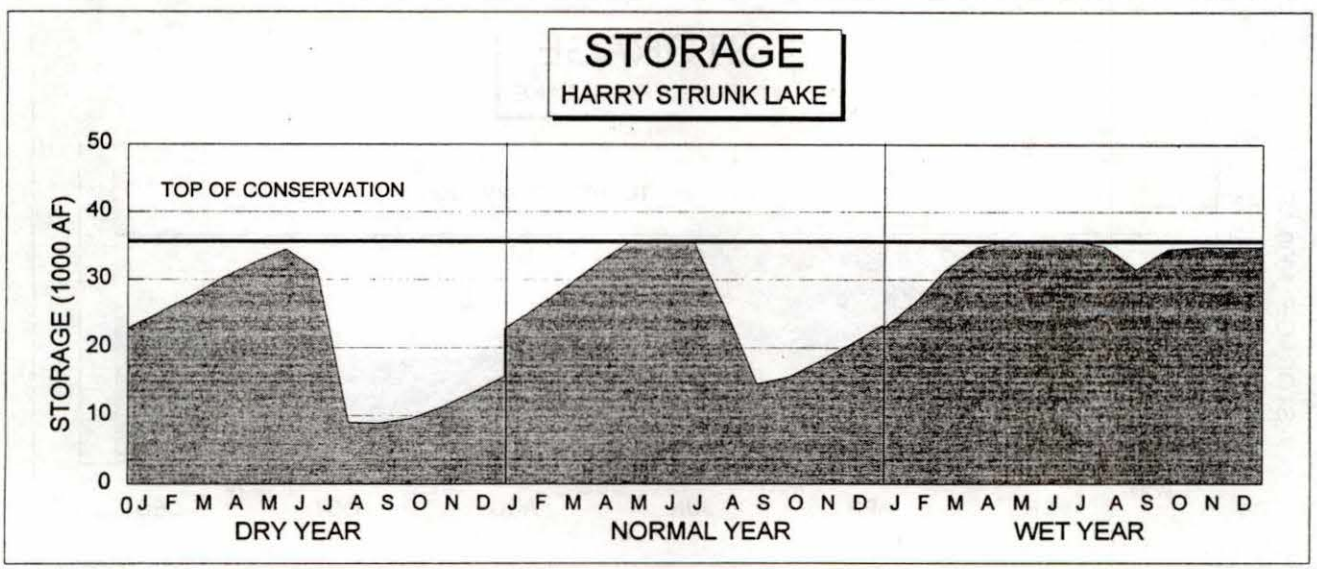


EXHIBIT 10C

HARRY STRUNK LAKE

1999 OPERATION PLAN





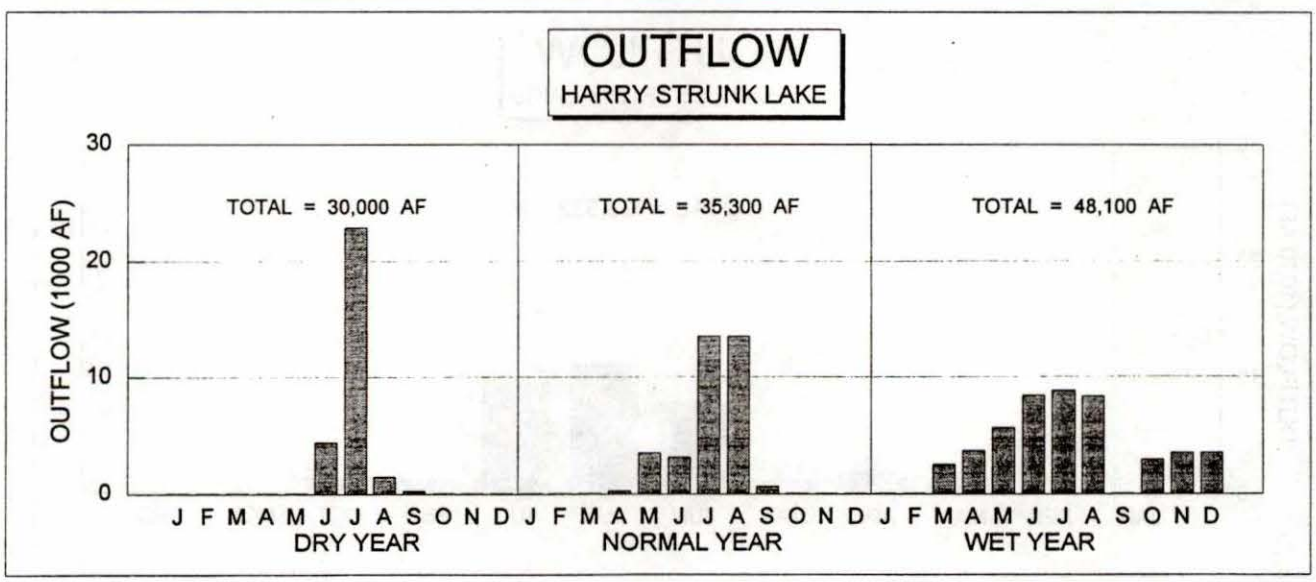
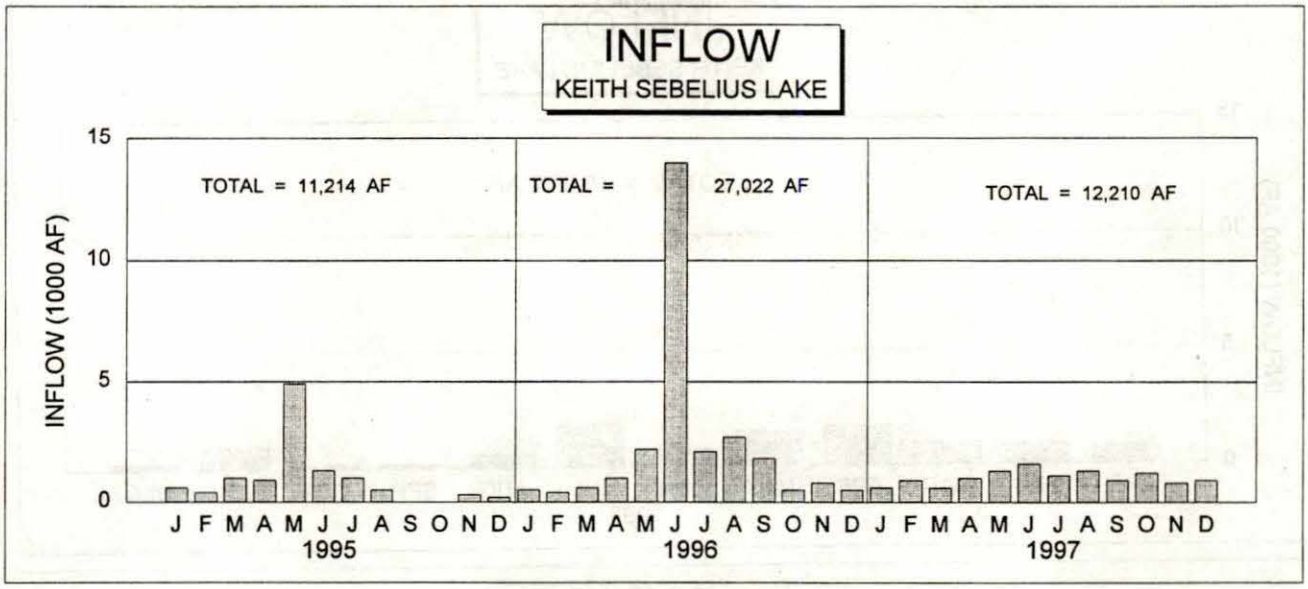
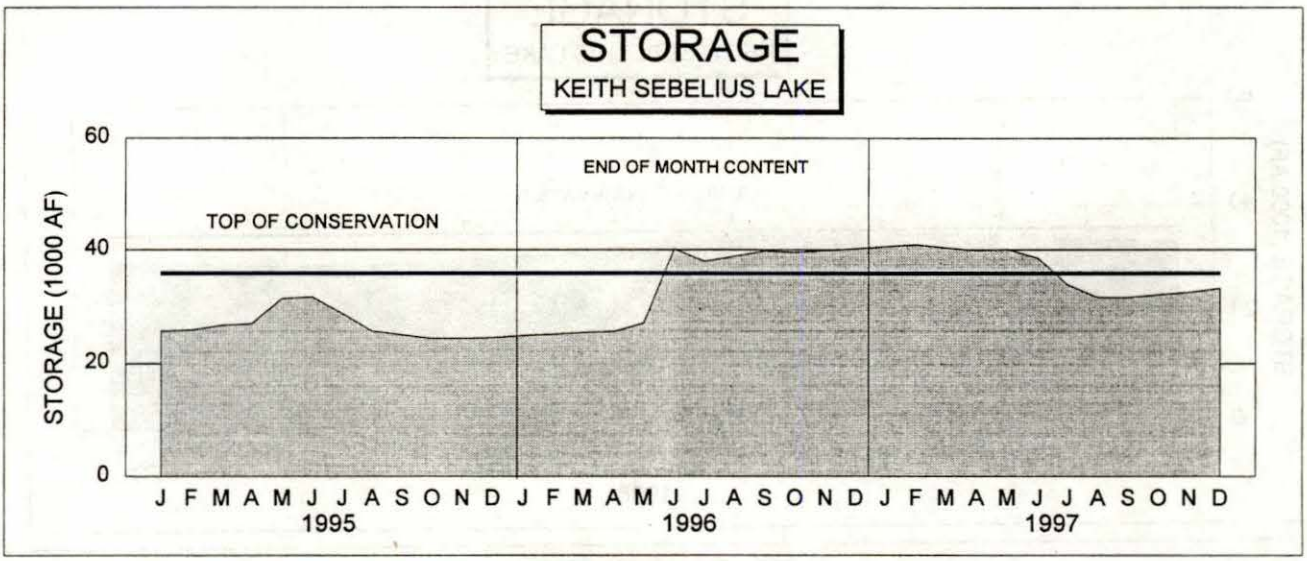


EXHIBIT 11A

KEITH SEBELIUS LAKE
OPERATION





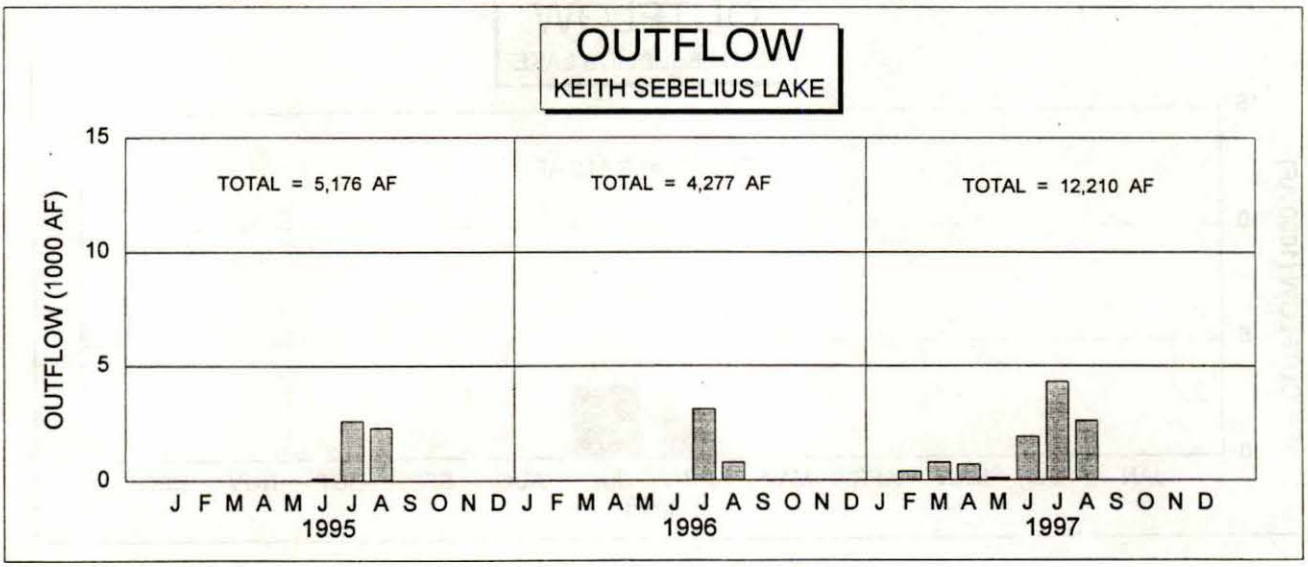
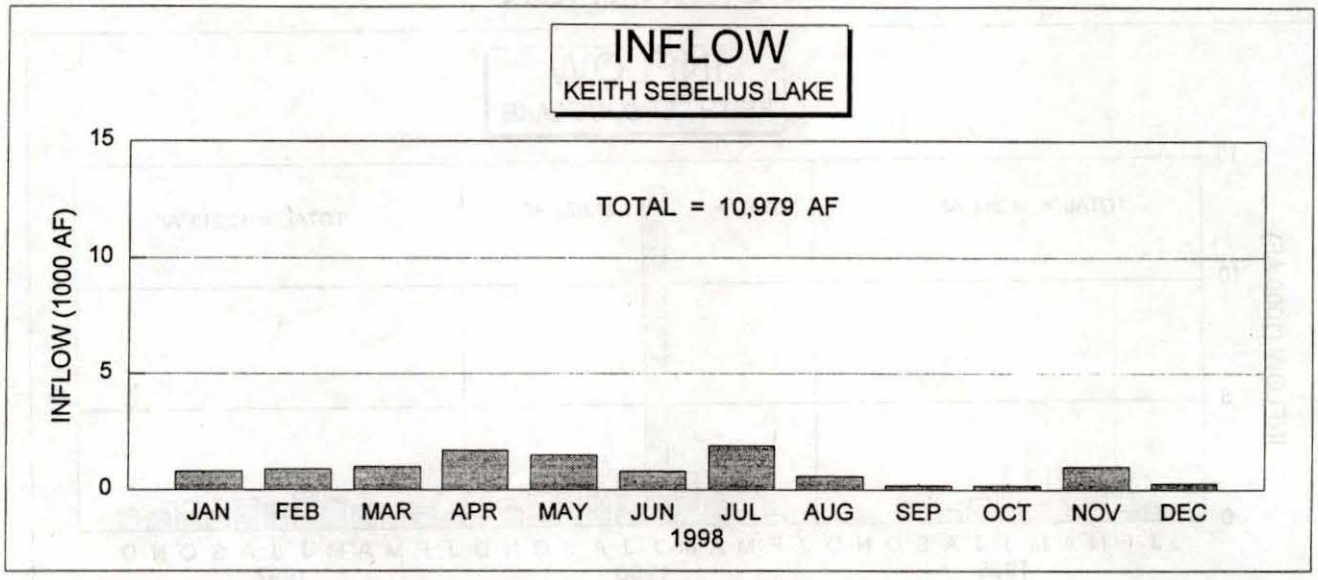
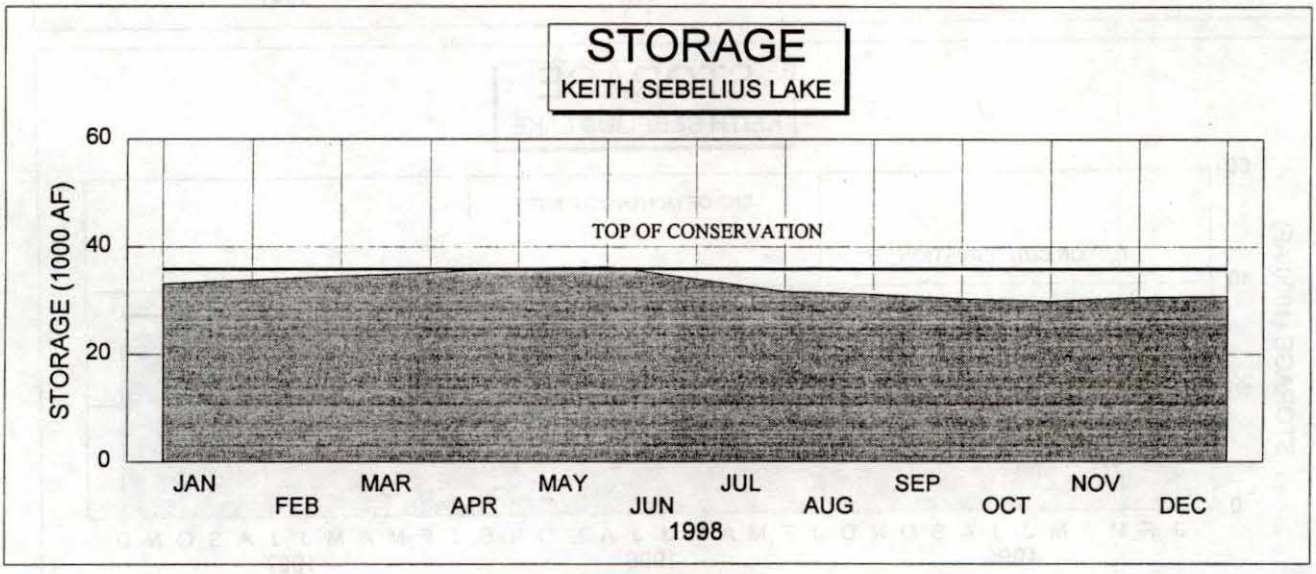


EXHIBIT 11B

KEITH SEBELIUS LAKE

1998 OPERATION





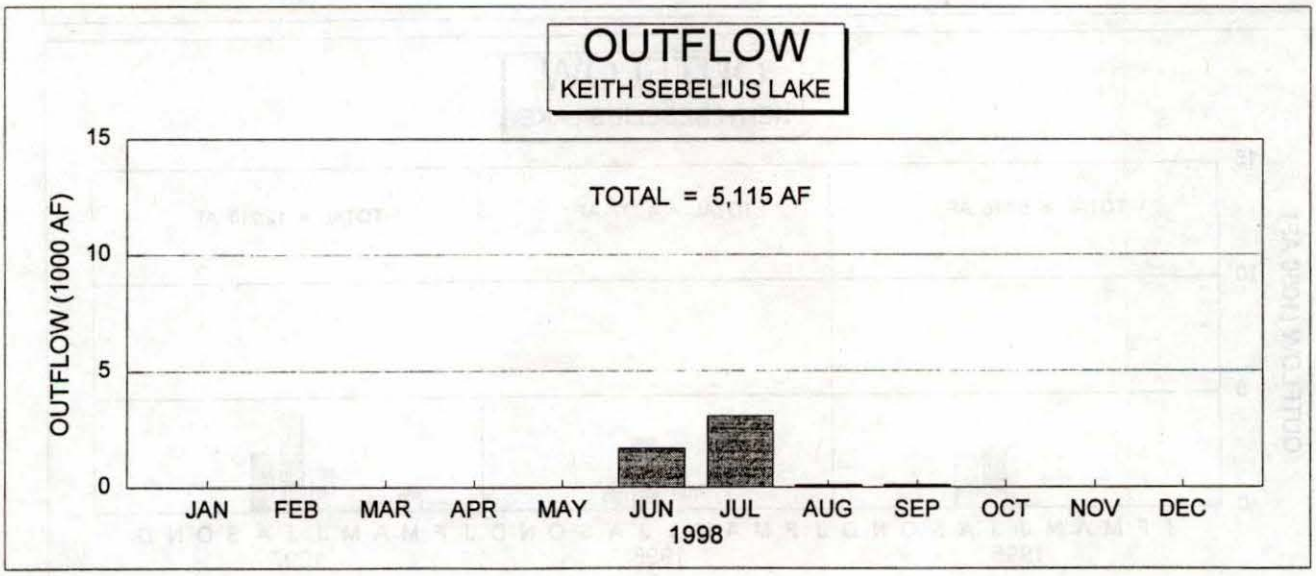
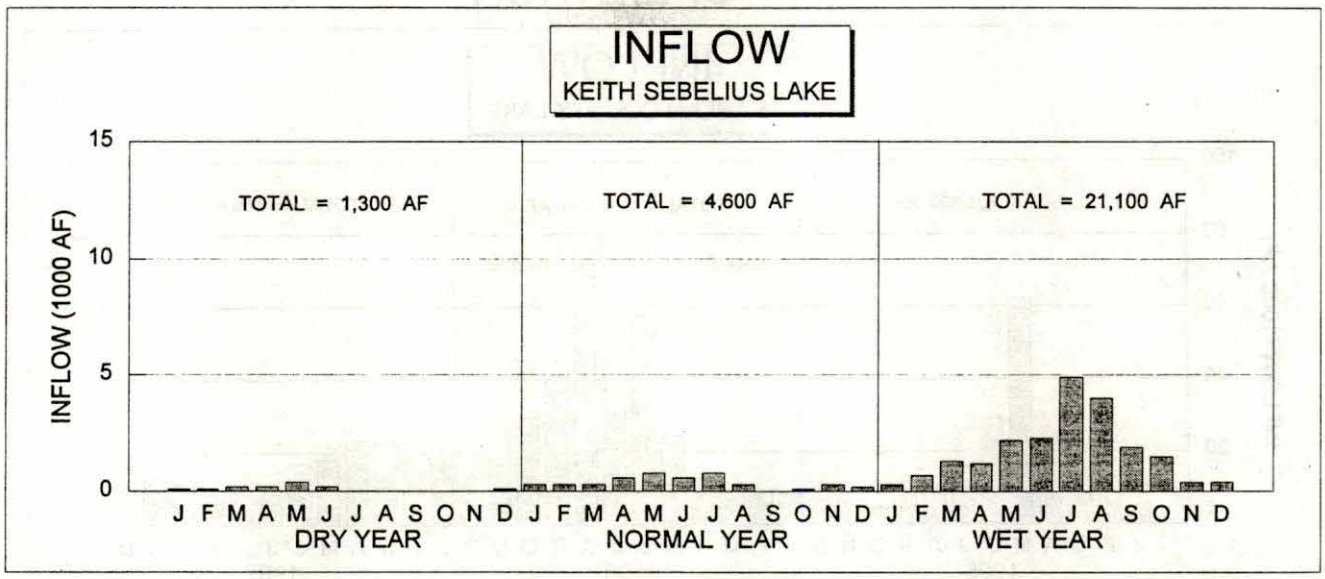
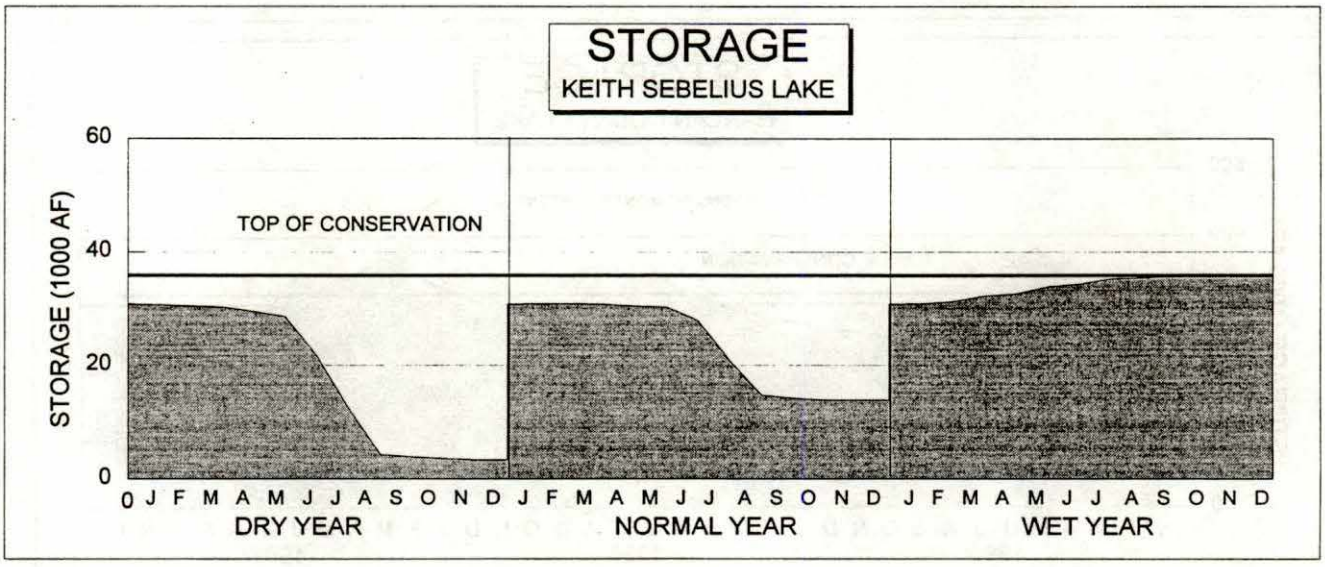


EXHIBIT 11C

KEITH SEBELIUS LAKE

1999 OPERATION PLAN





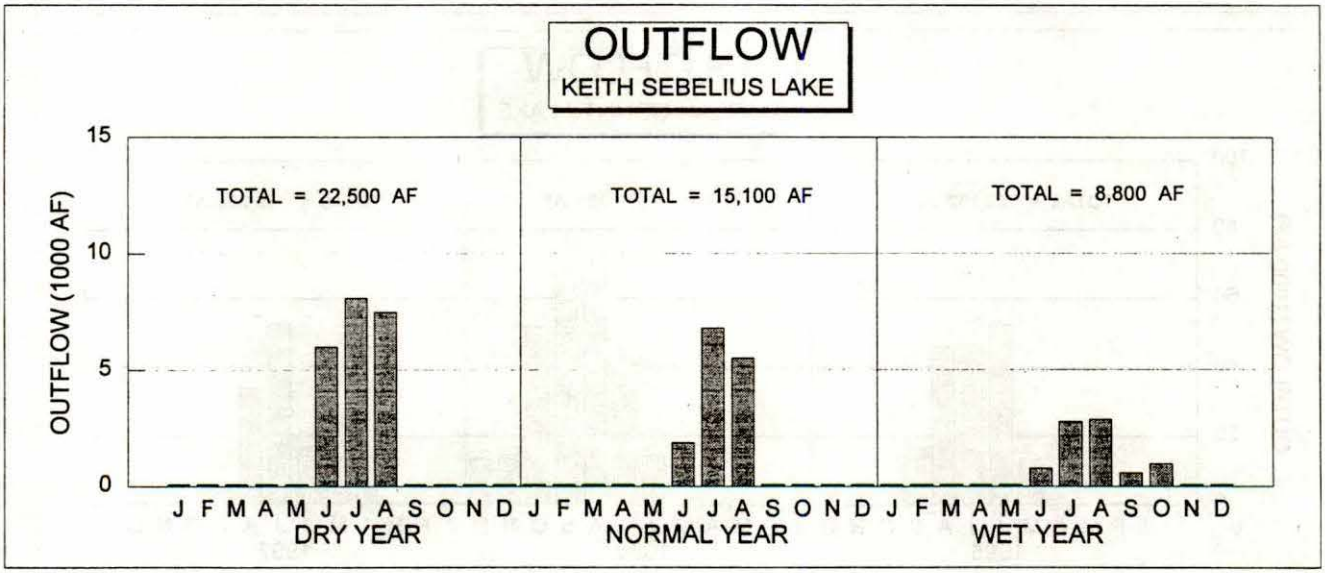
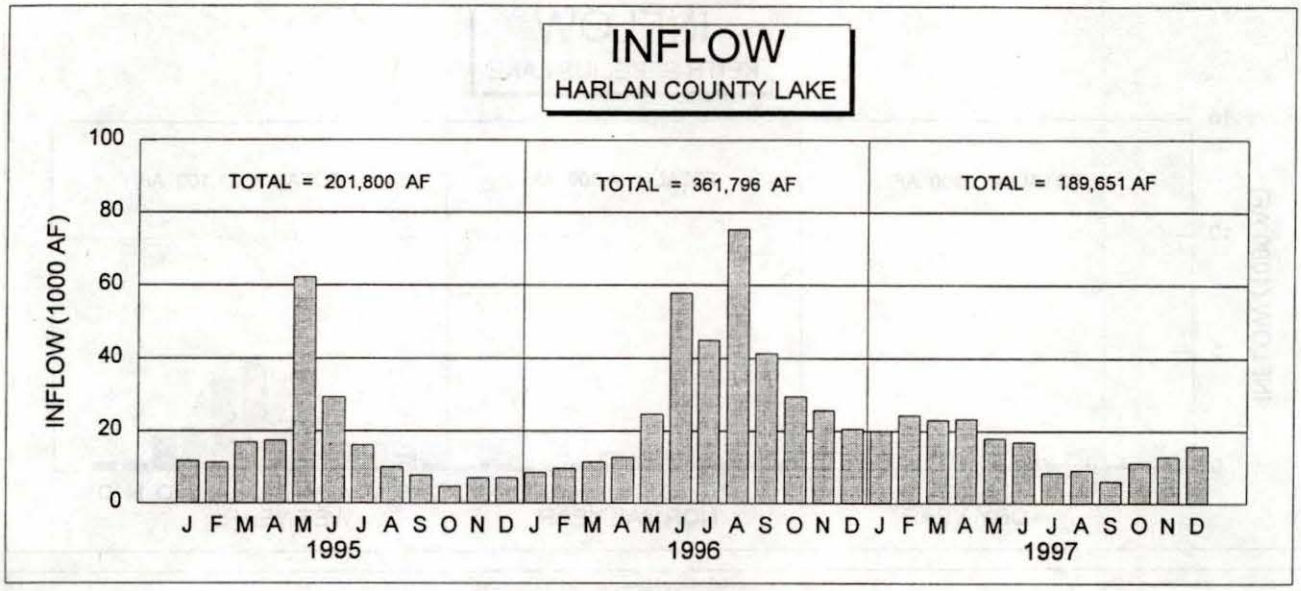
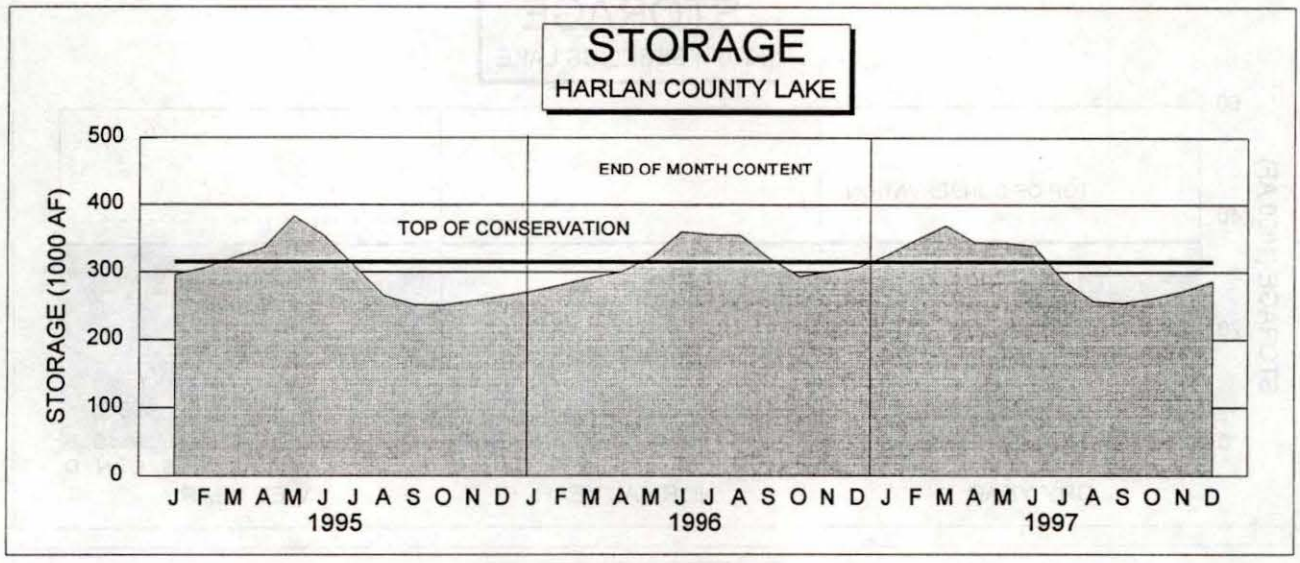
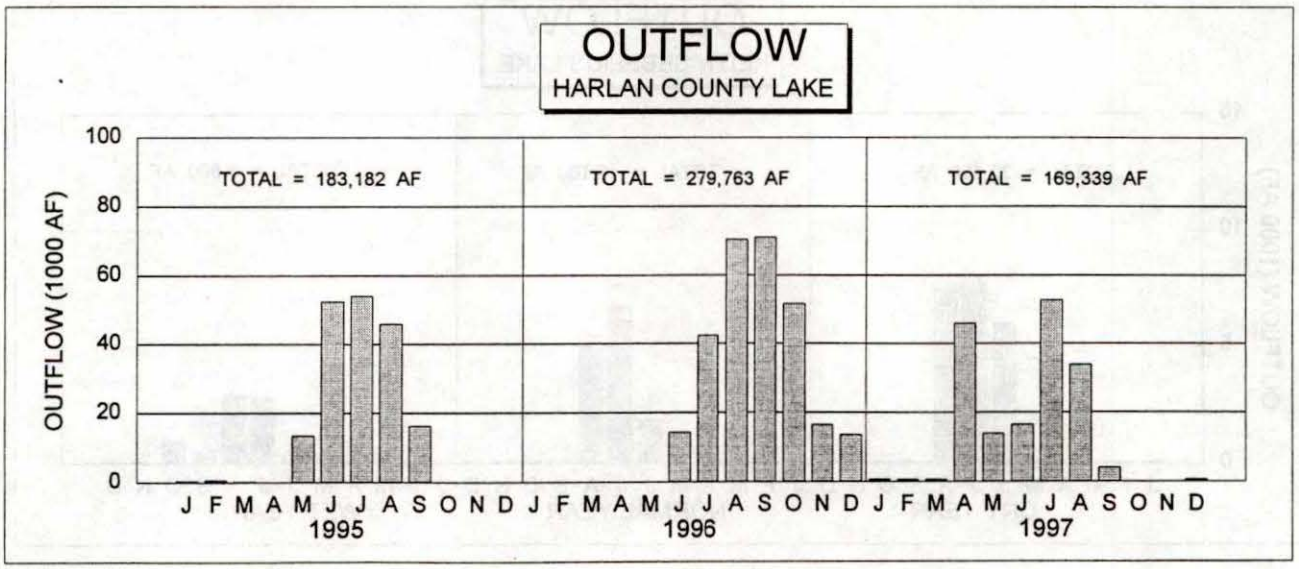


EXHIBIT 12A

HARLAN COUNTY LAKE
OPERATION

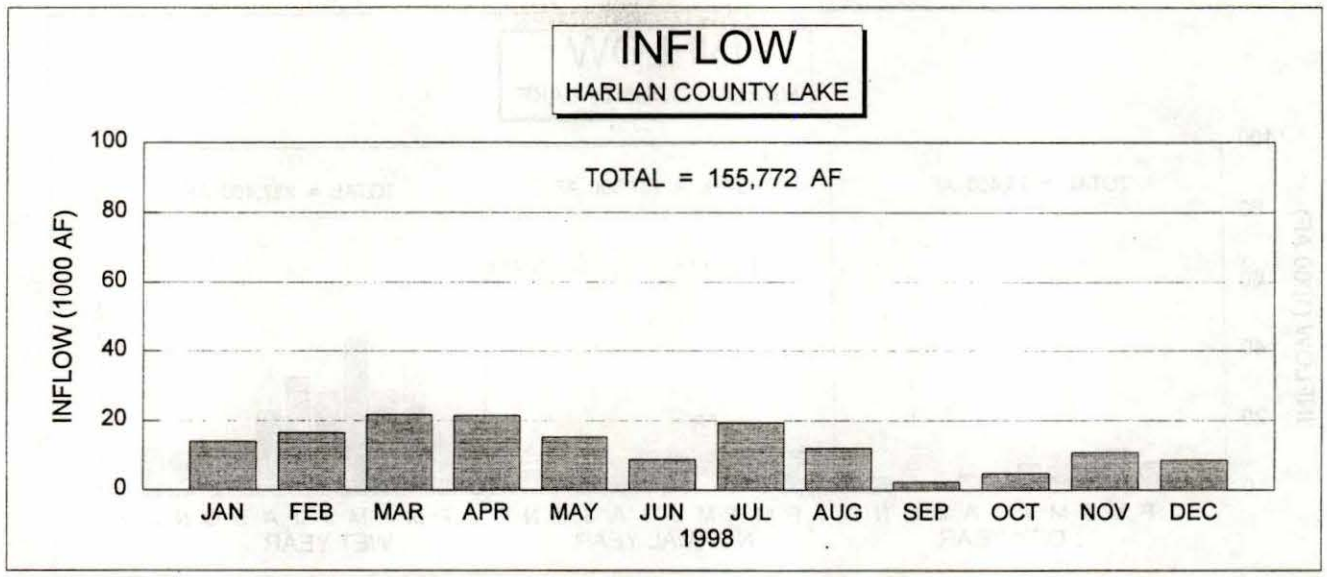


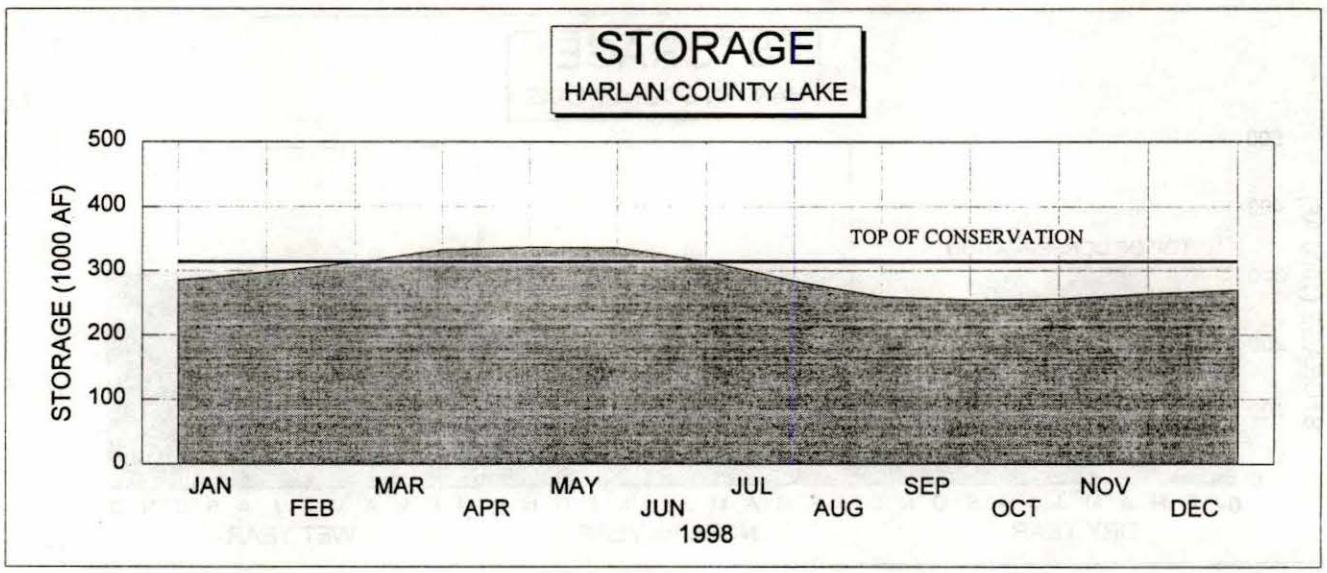




HARLAN COUNTY LAKE

1998 OPERATION





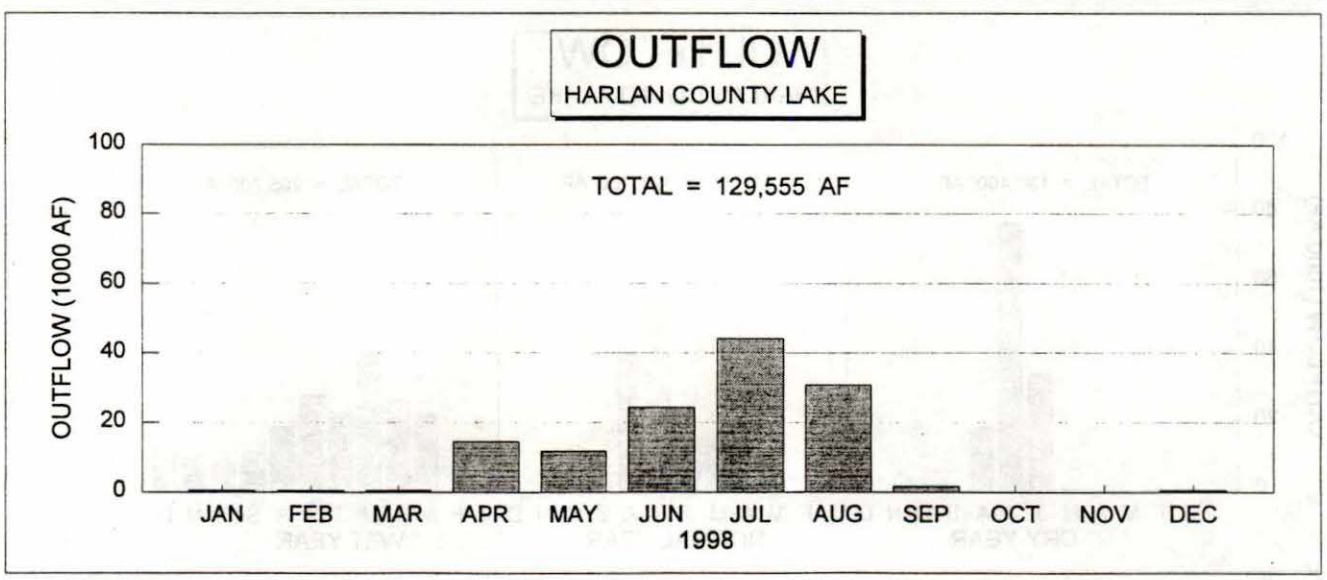
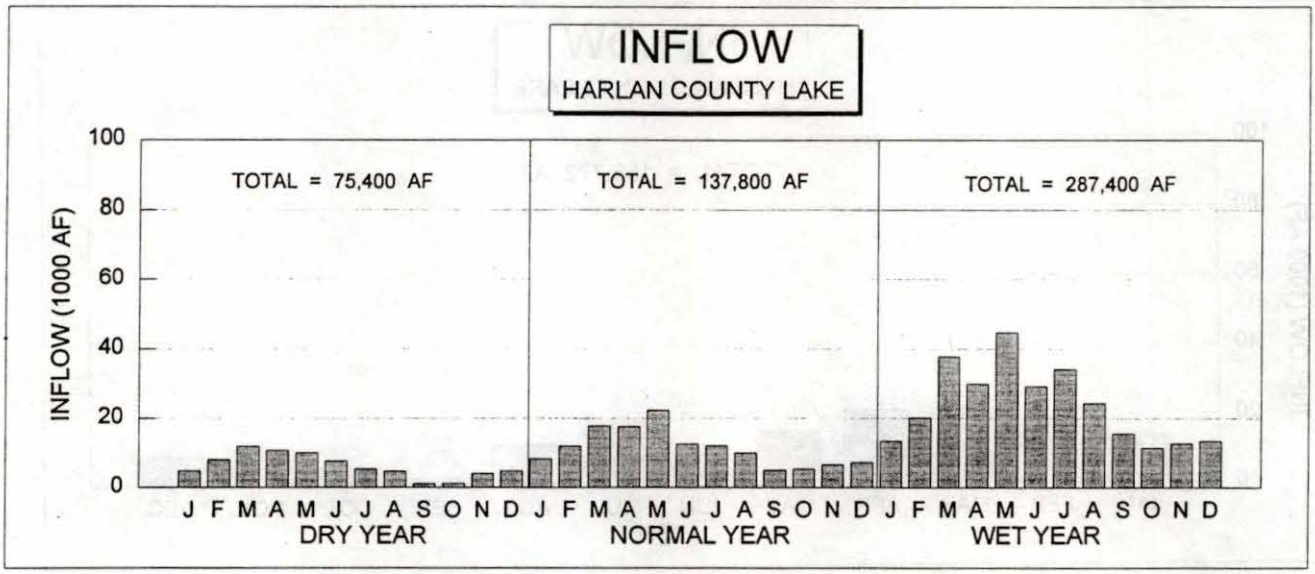
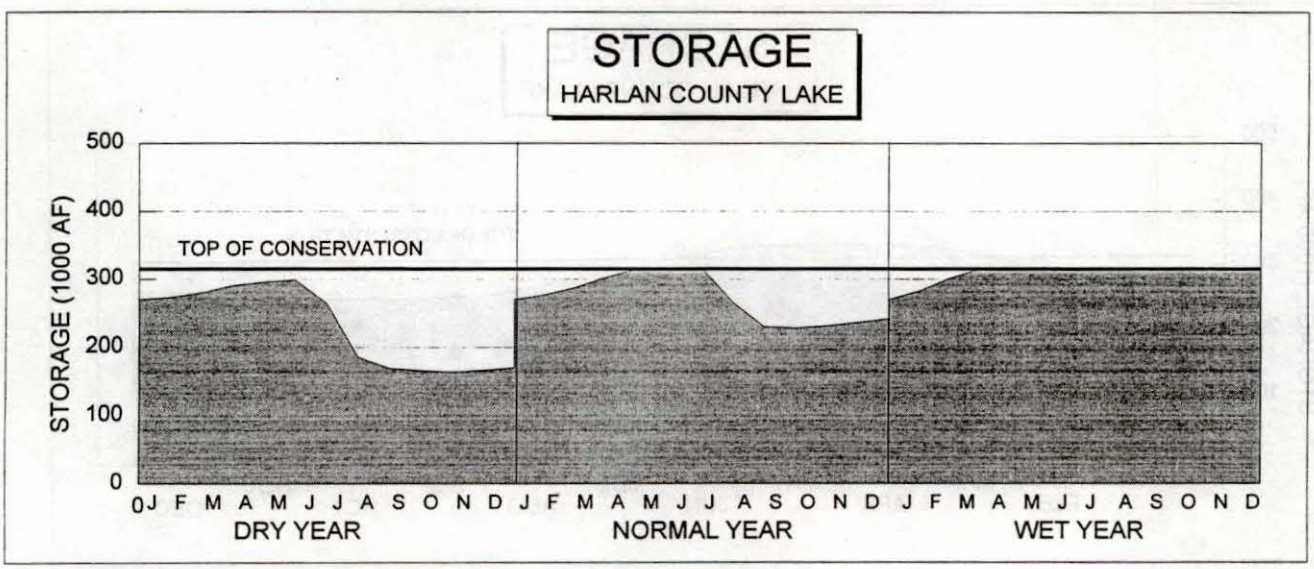


EXHIBIT 12C

HARLAN COUNTY LAKE

1999 OPERATION PLAN





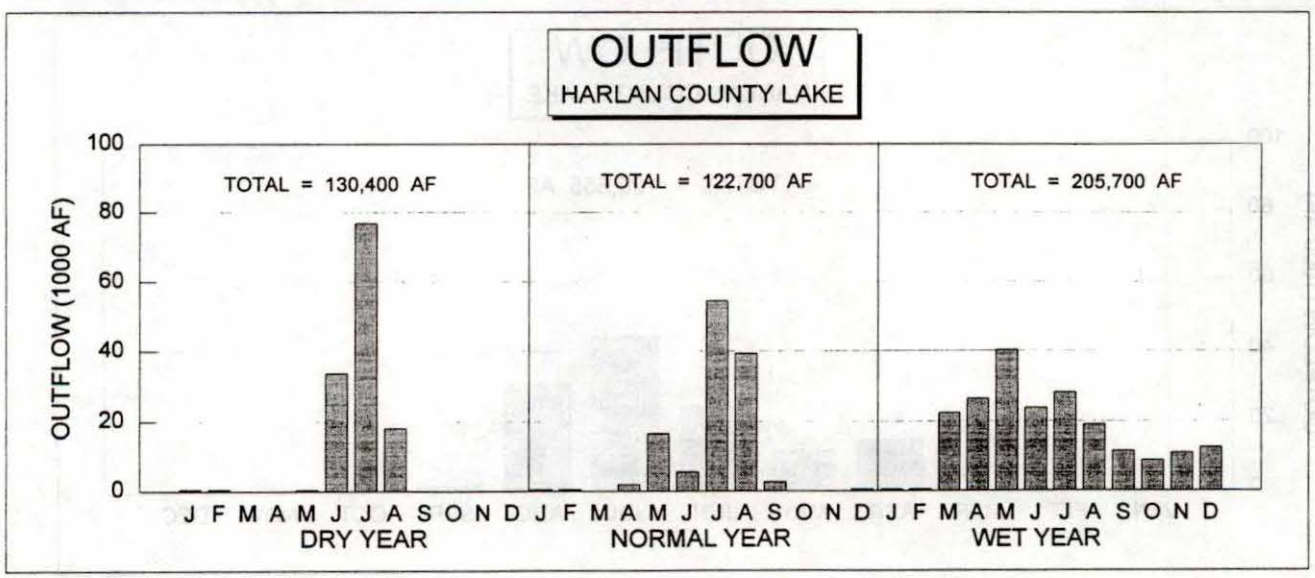
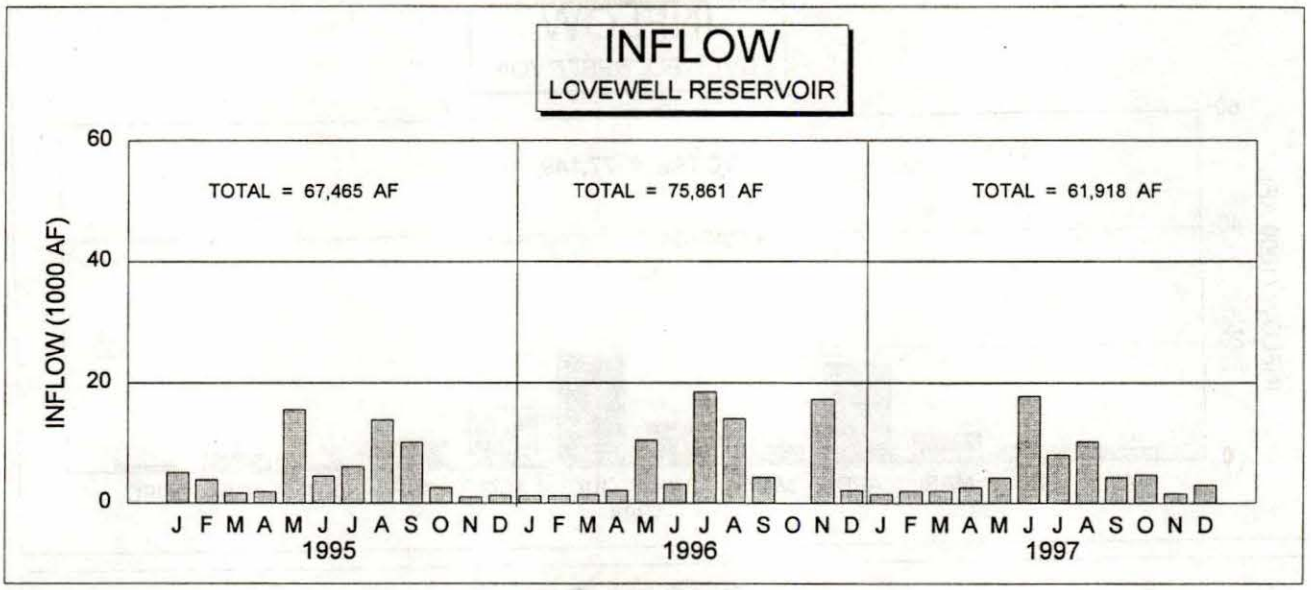
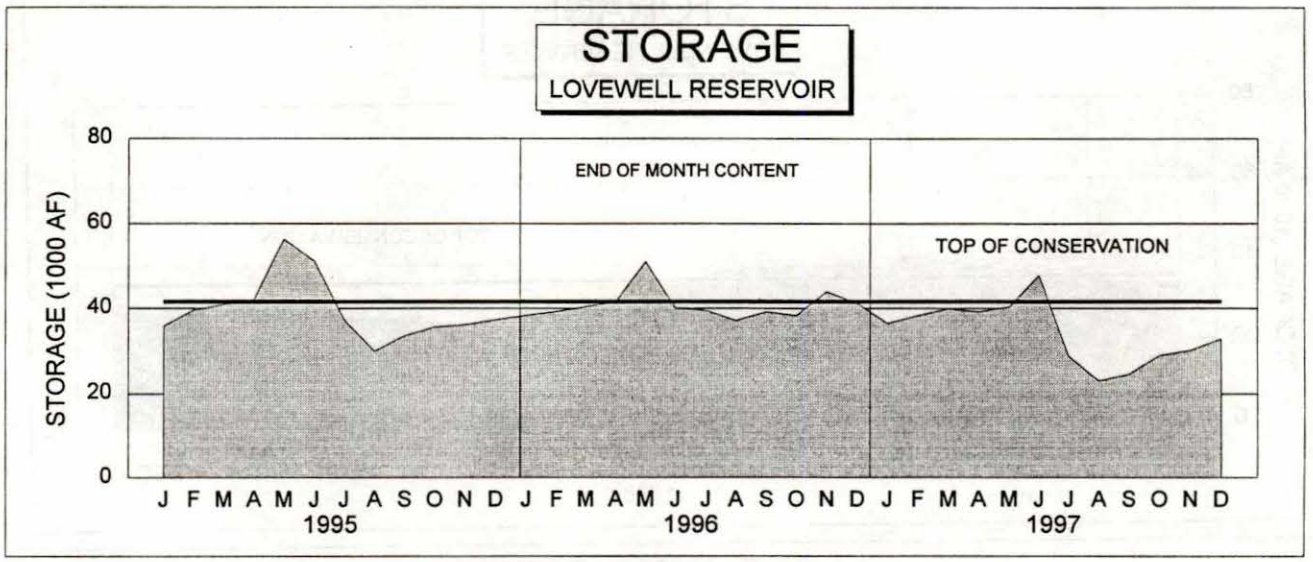


EXHIBIT 13A

LOVEWELL RESERVOIR
OPERATION





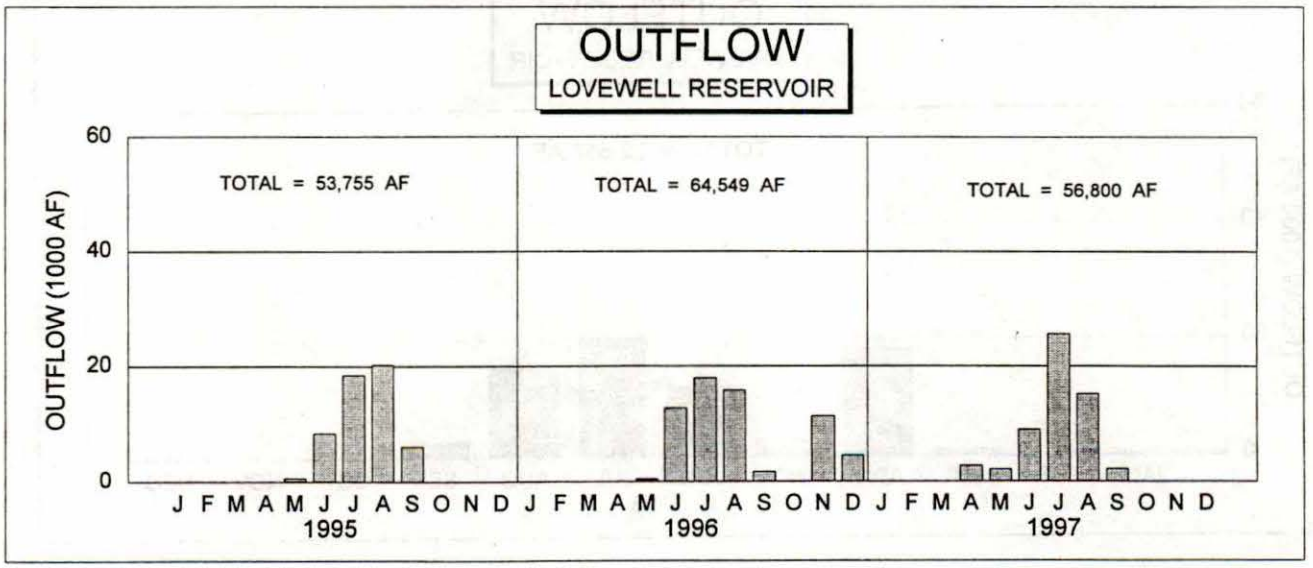
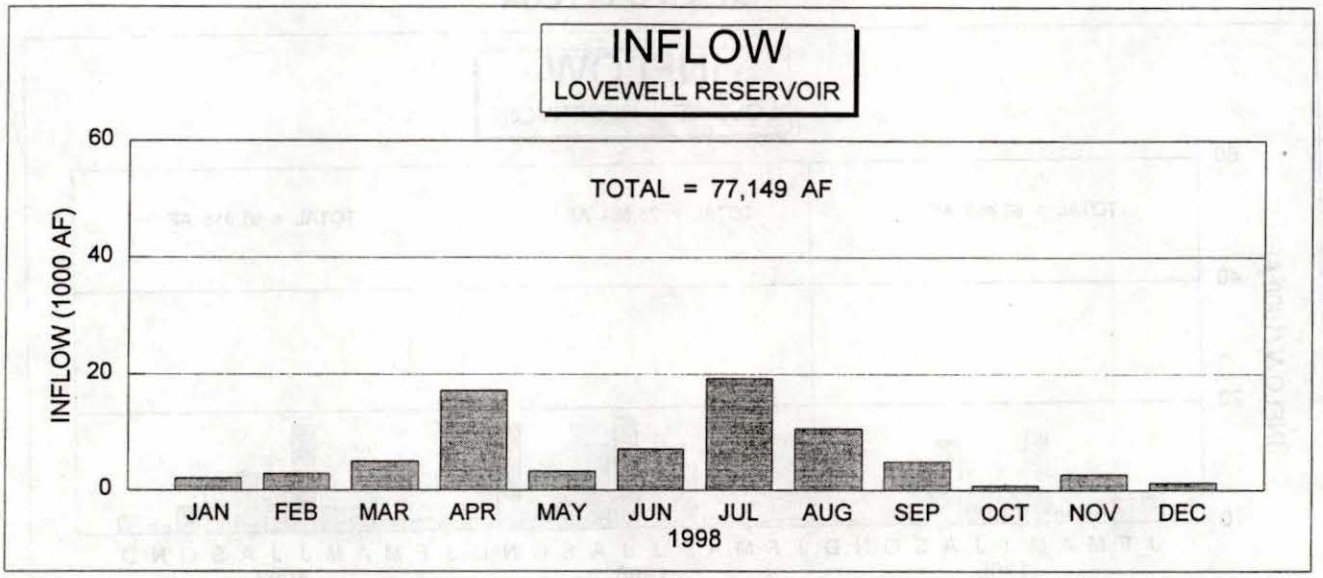
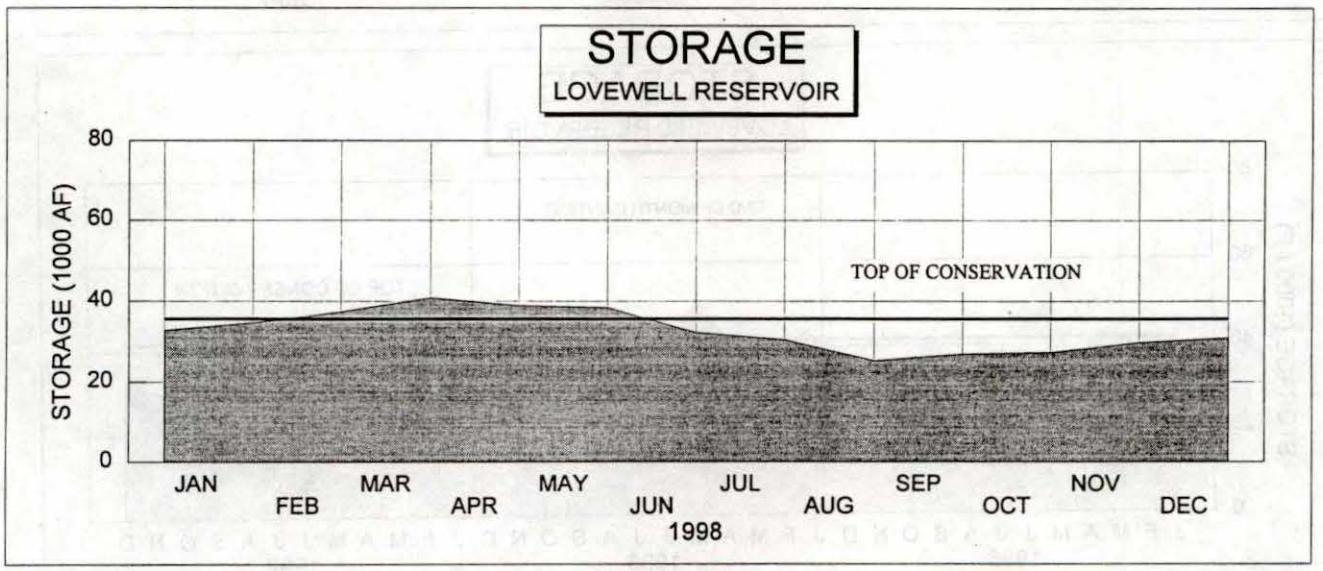


EXHIBIT 13B

LOVEWELL RESERVOIR

1998 OPERATION





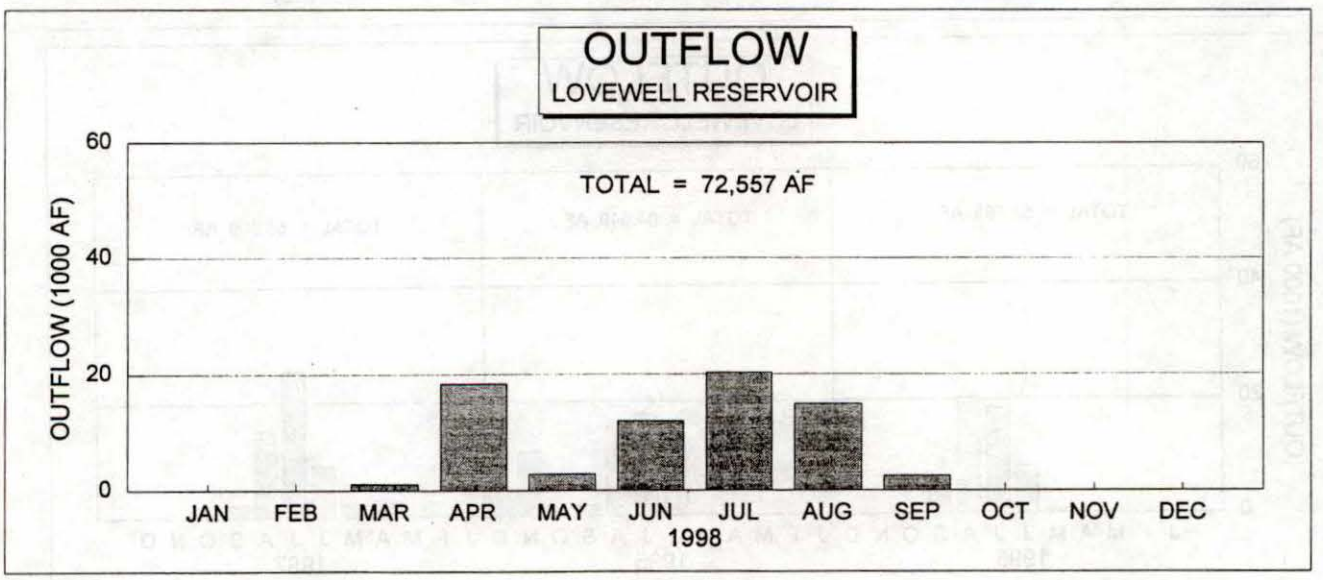
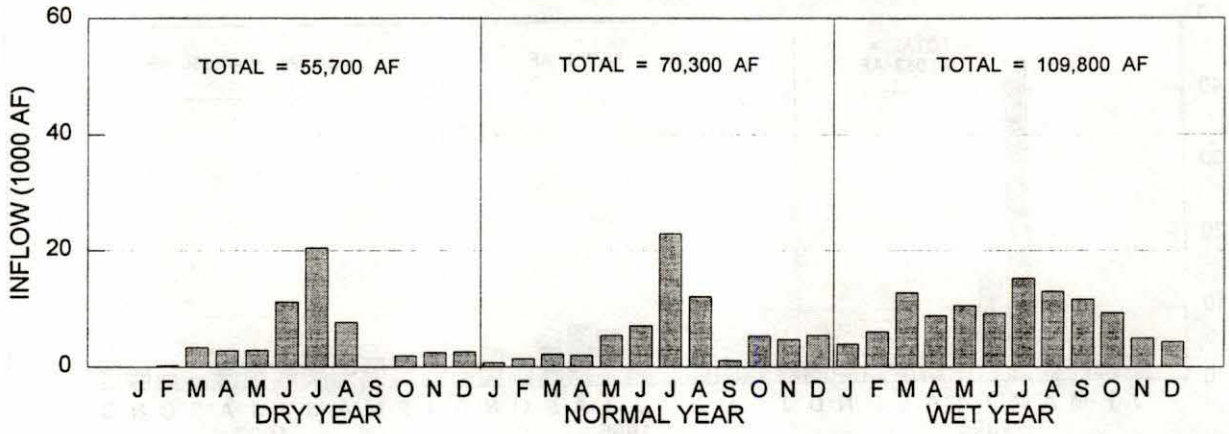


EXHIBIT 13C

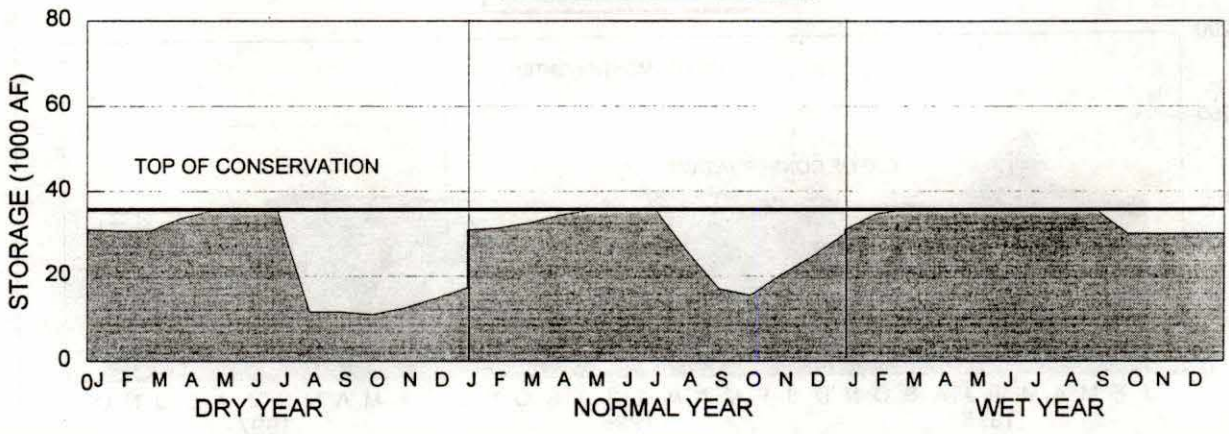
LOVEWELL RESERVOIR

1999 OPERATION PLAN

INFLOW
LOVEWELL RESERVOIR



STORAGE
LOVEWELL RESERVOIR



OUTFLOW
LOVEWELL RESERVOIR

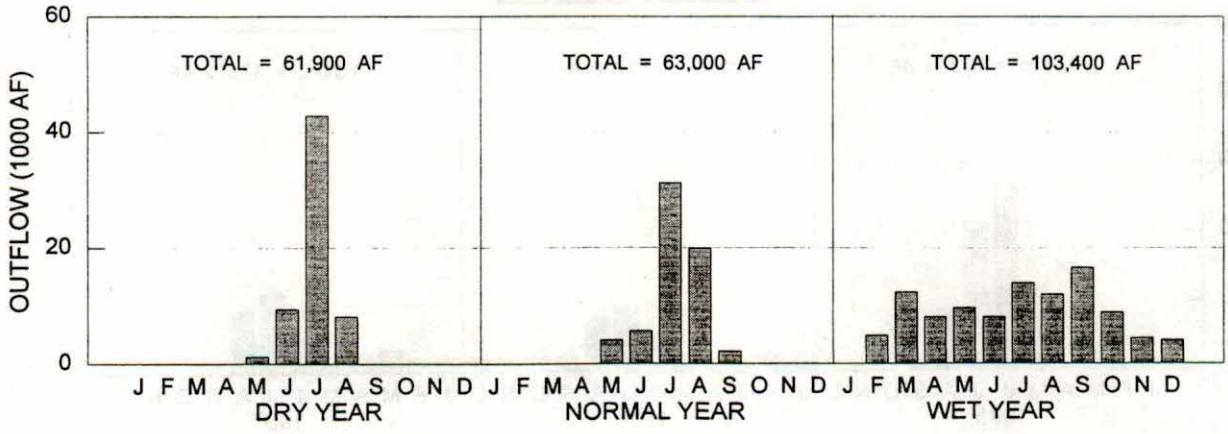
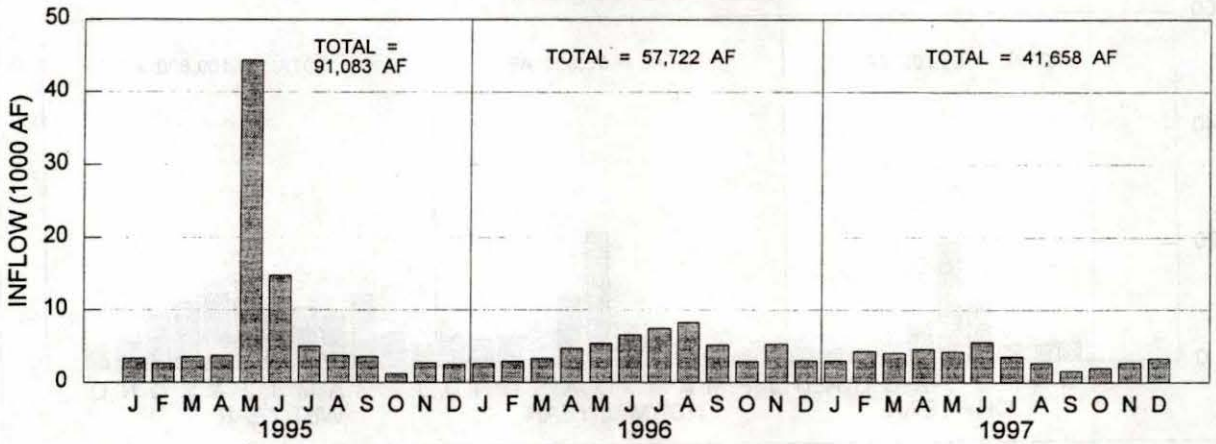


EXHIBIT 14A

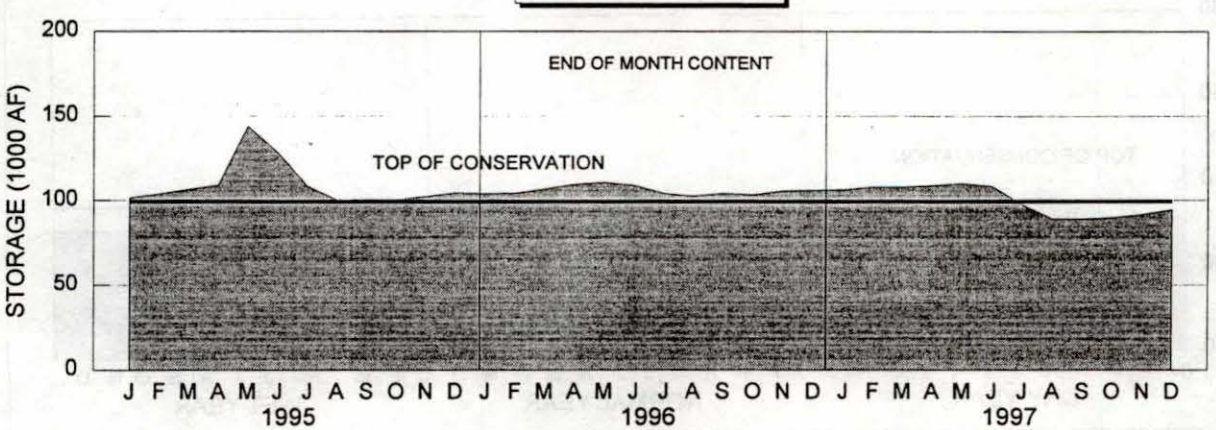
KIRWIN RESERVOIR

OPERATION

INFLOW
KIRWIN RESERVOIR



STORAGE
KIRWIN RESERVOIR



OUTFLOW
KIRWIN RESERVOIR

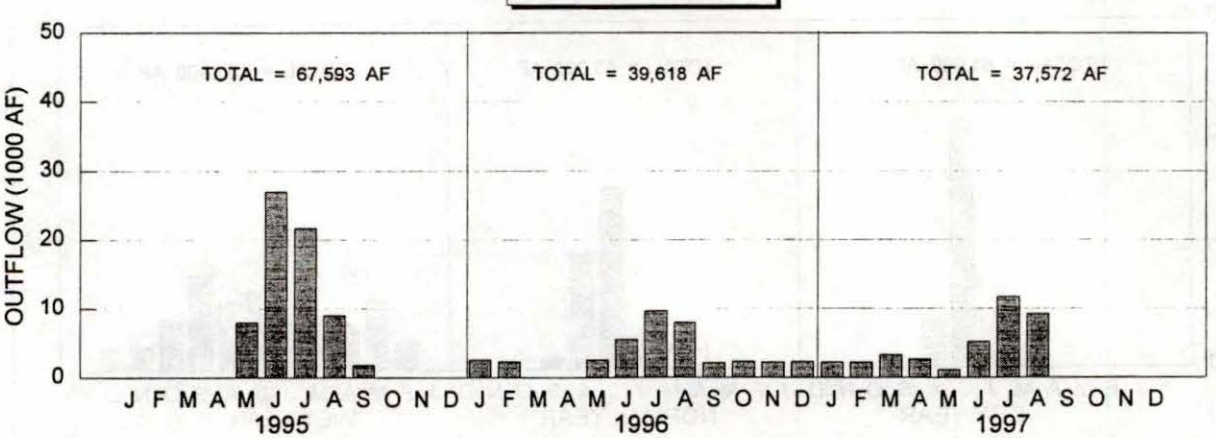
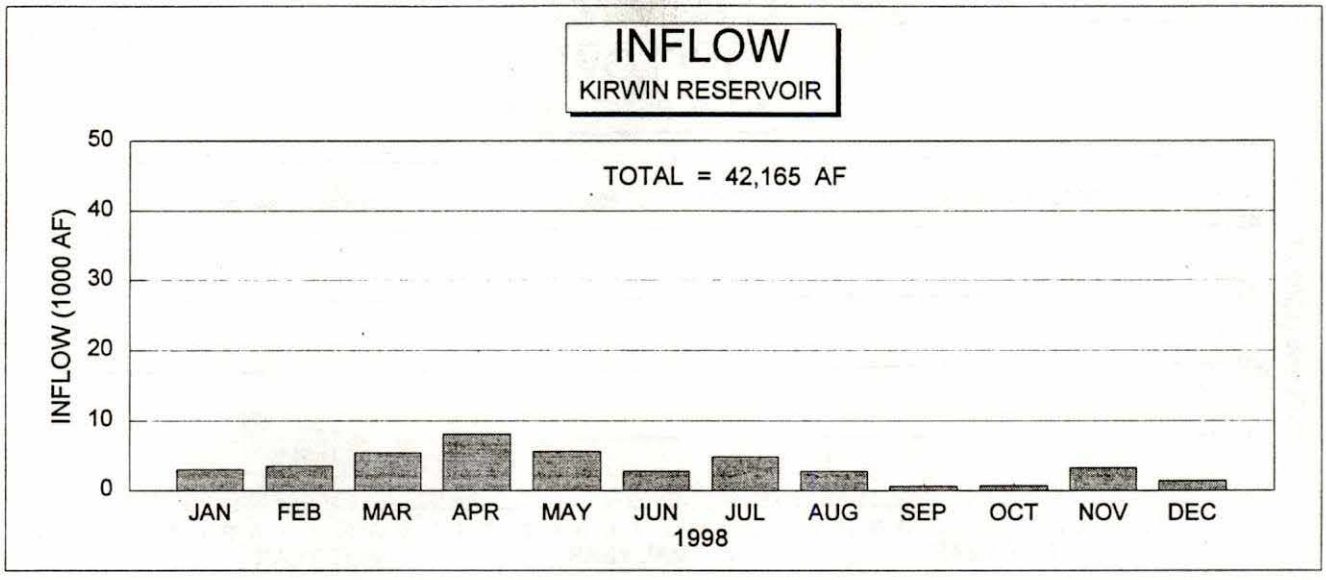
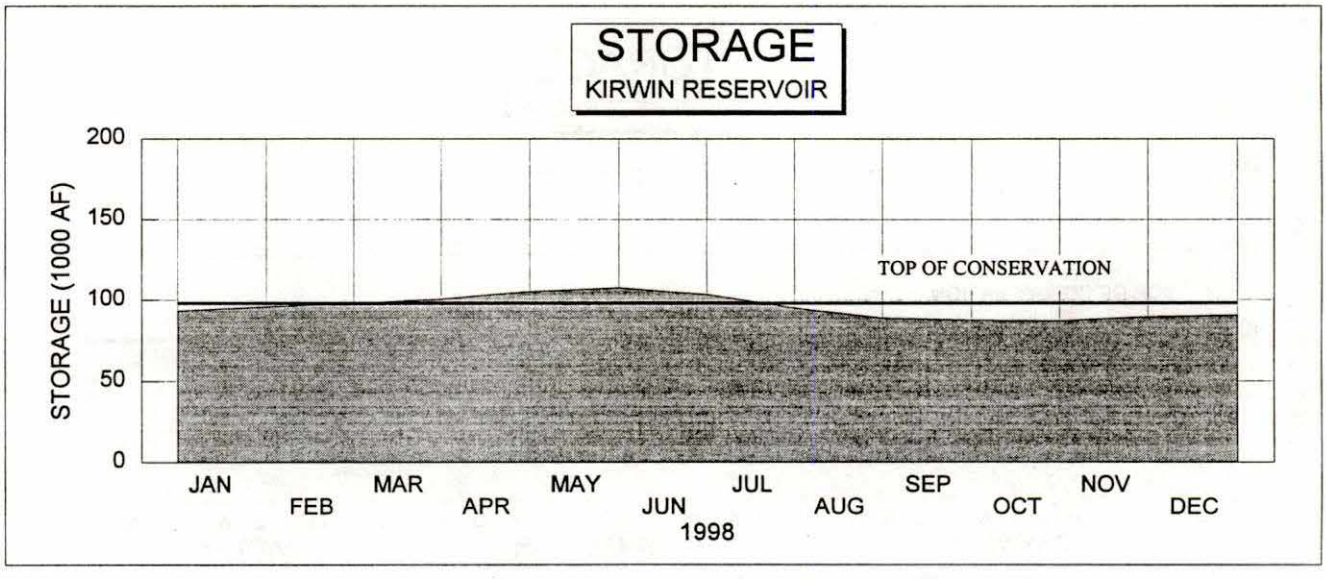


EXHIBIT 14B

KIRWIN RESERVOIR

1998 OPERATION





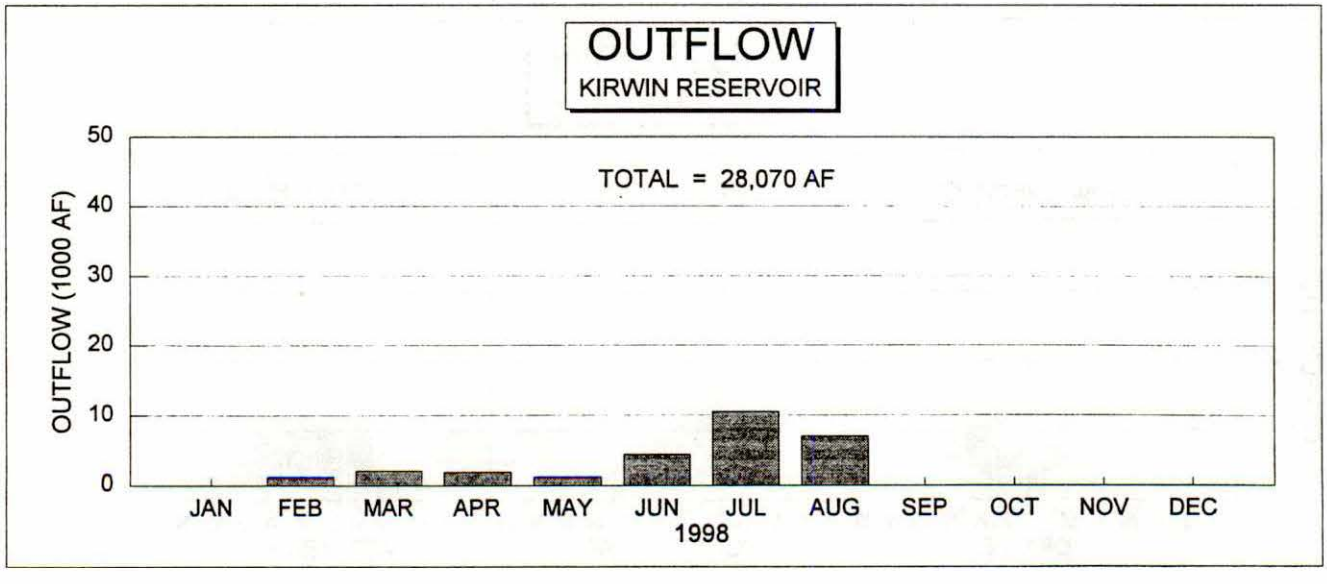
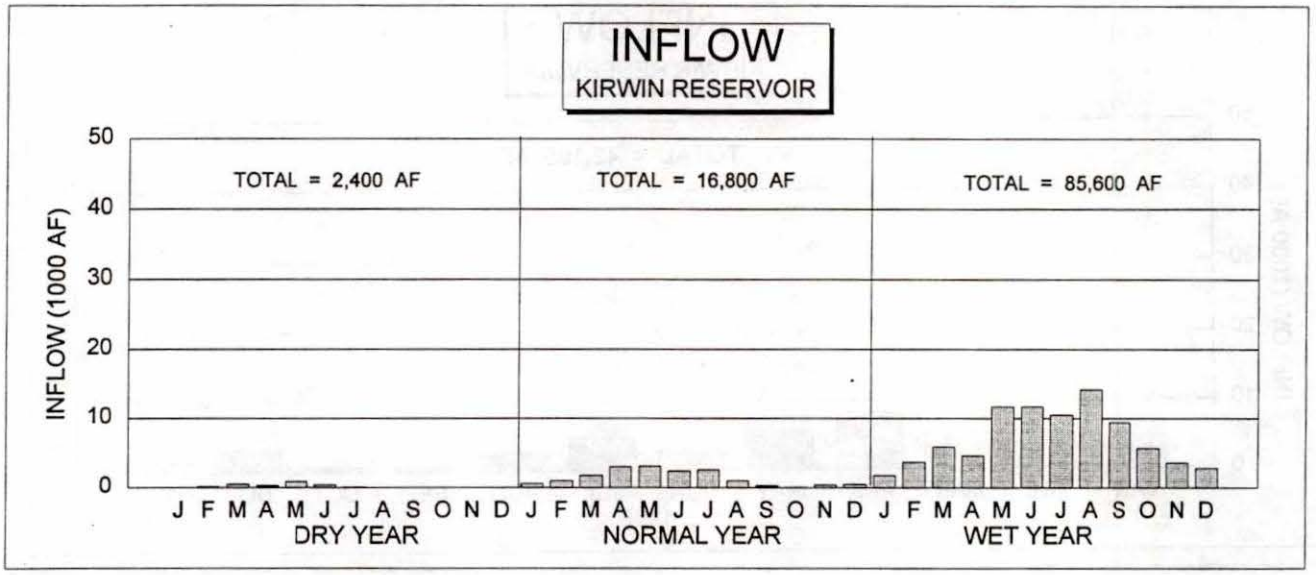
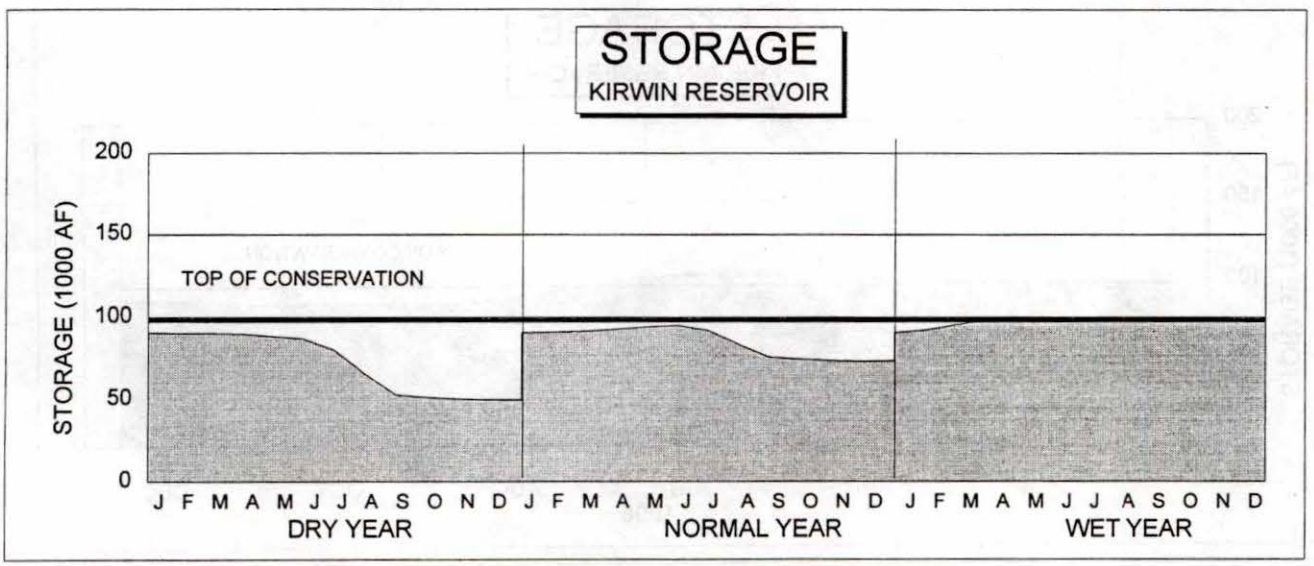


EXHIBIT 14C

KIRWIN RESERVOIR
1999 OPERATION PLAN





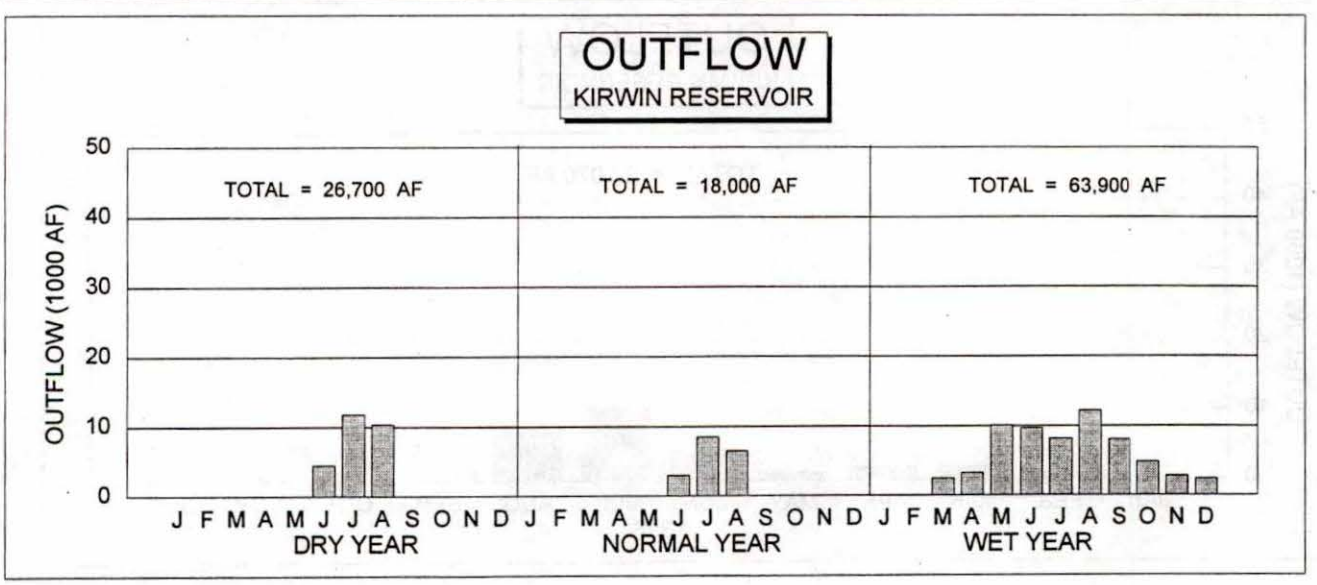
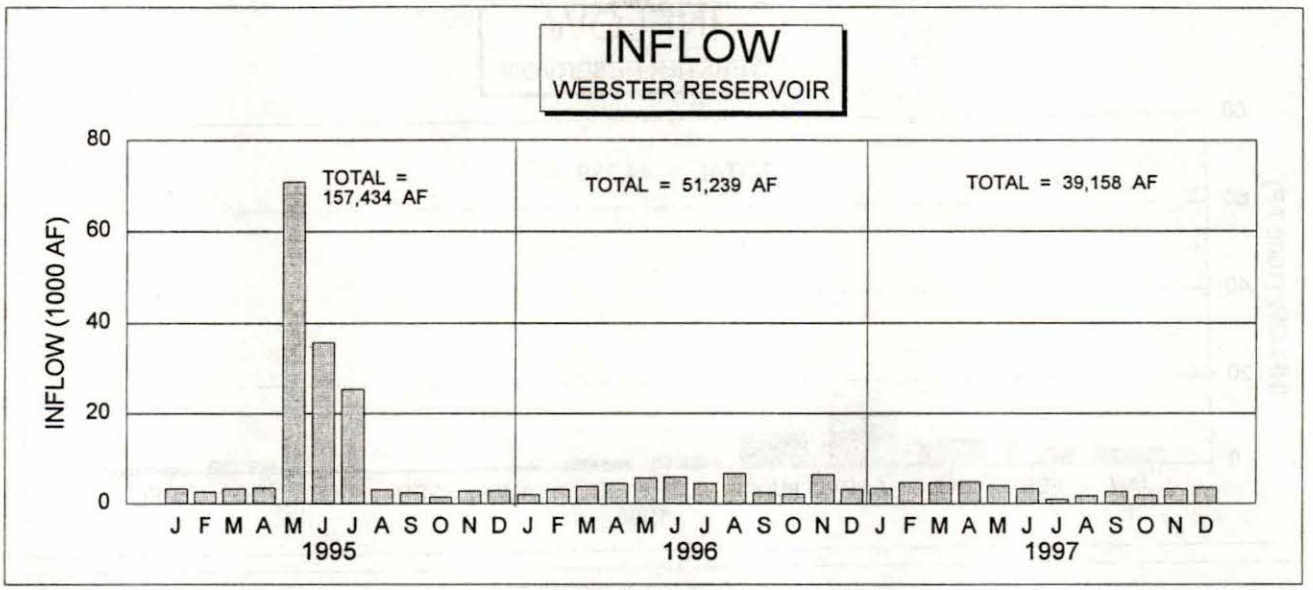
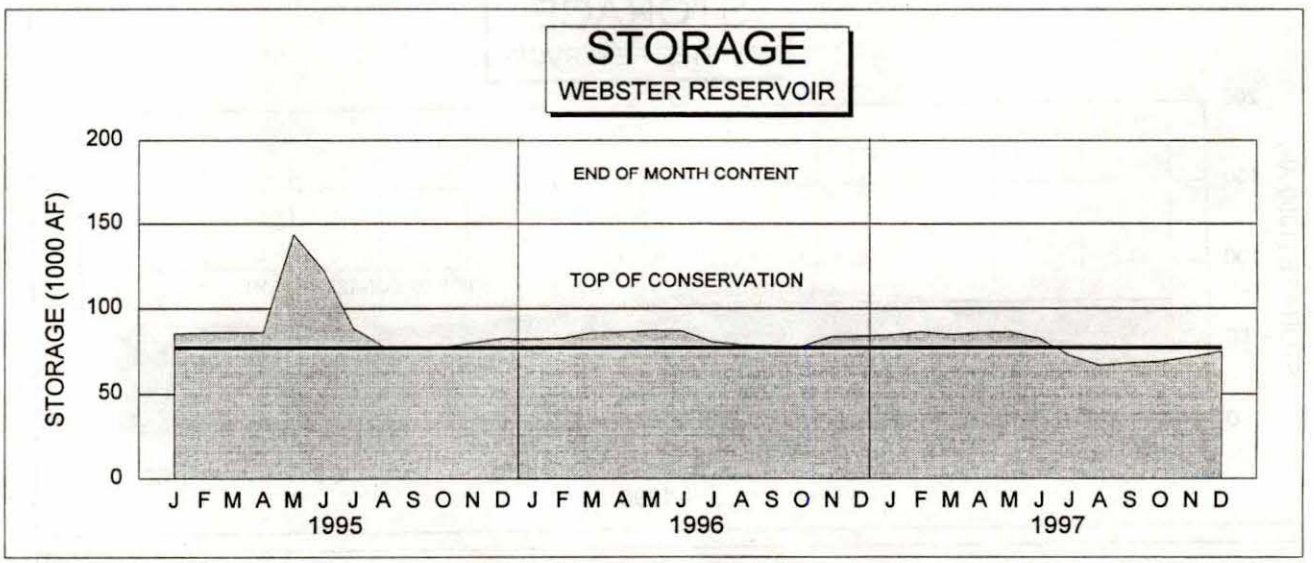


EXHIBIT 15A

WEBSTER RESERVOIR
OPERATION





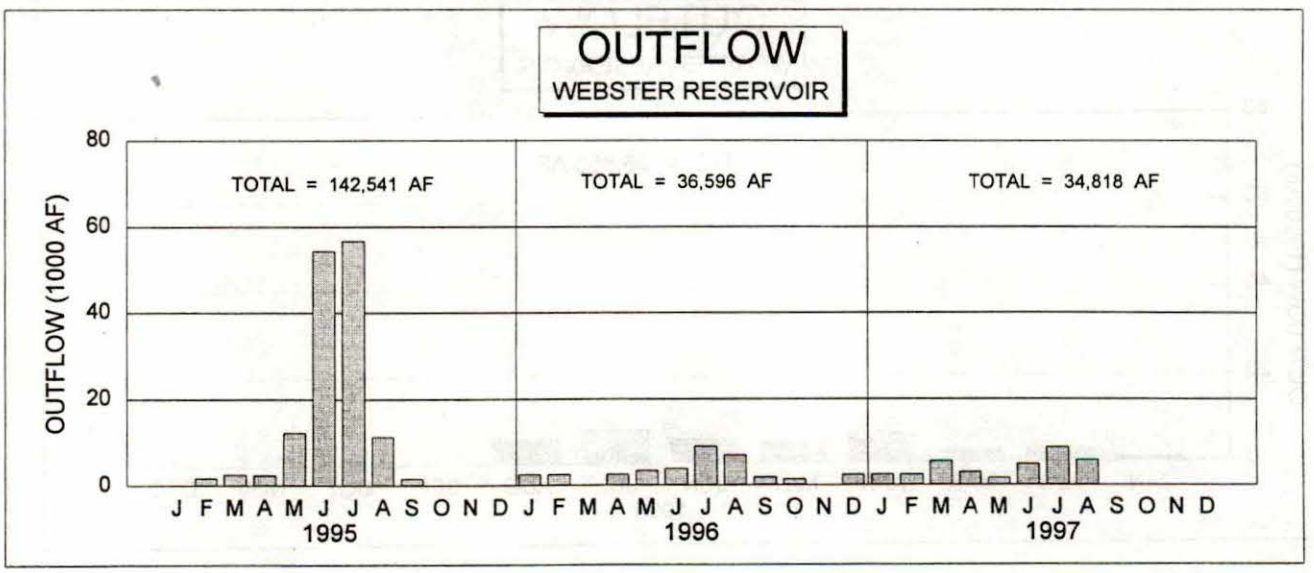
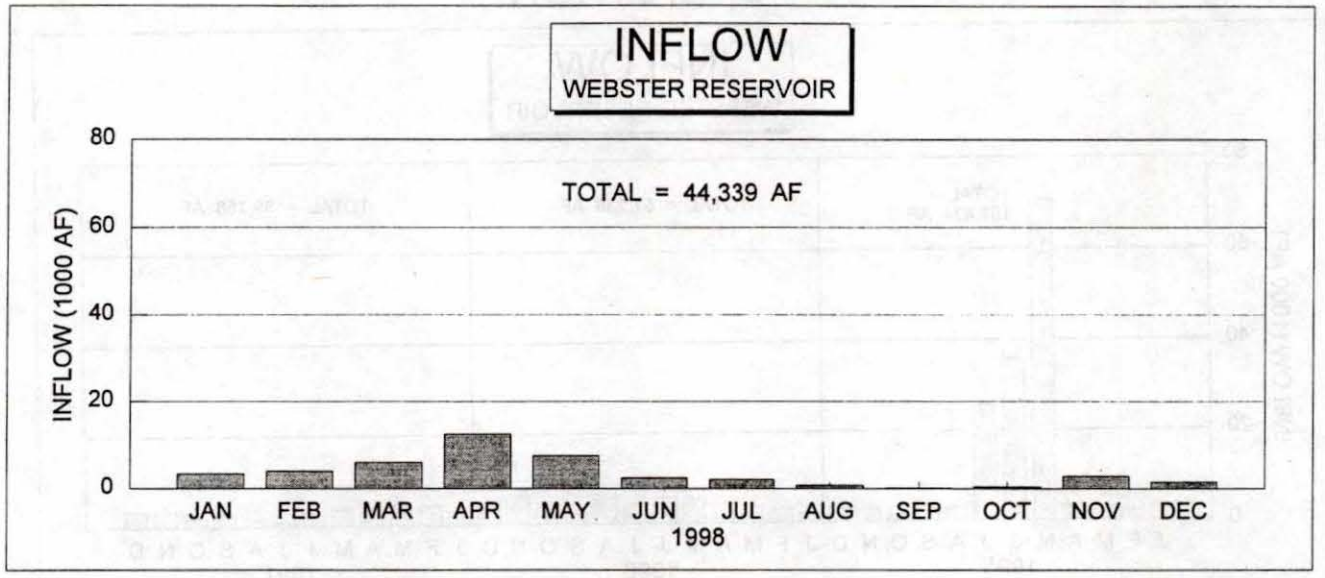
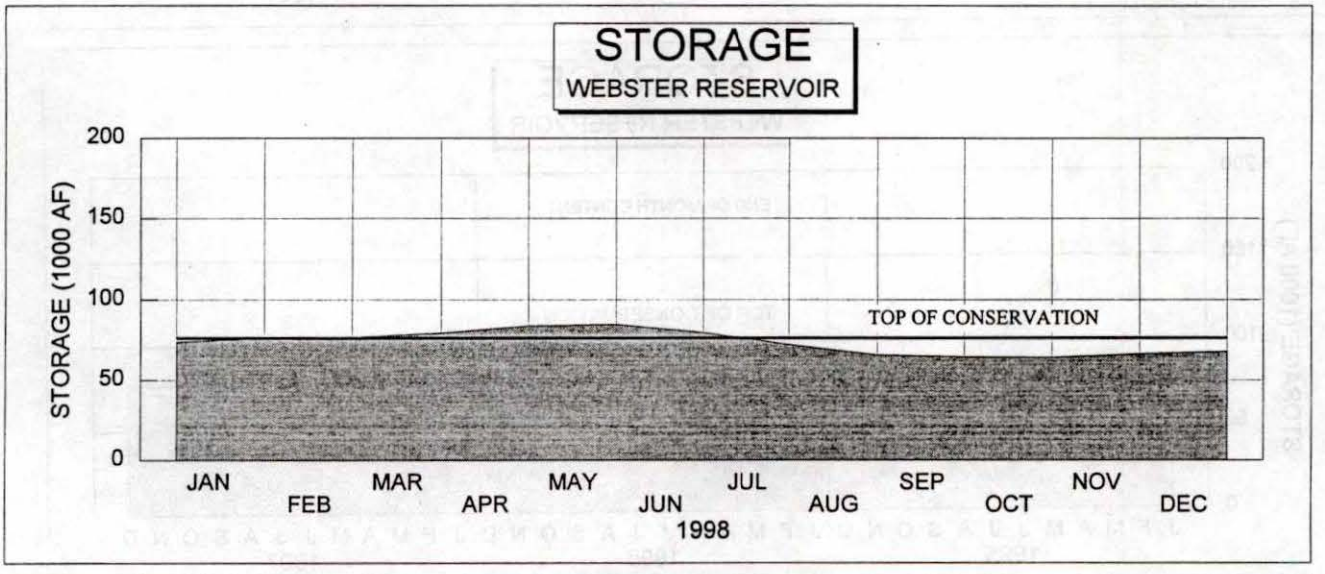


EXHIBIT 15B

WEBSTER RESERVOIR

1998 OPERATION





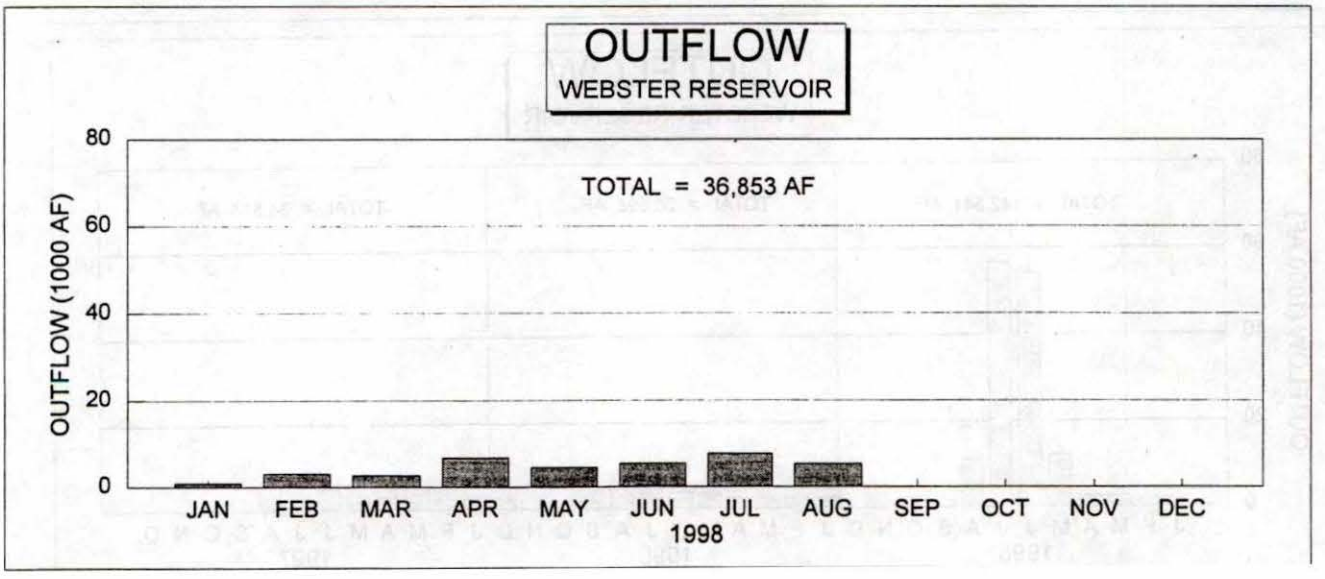
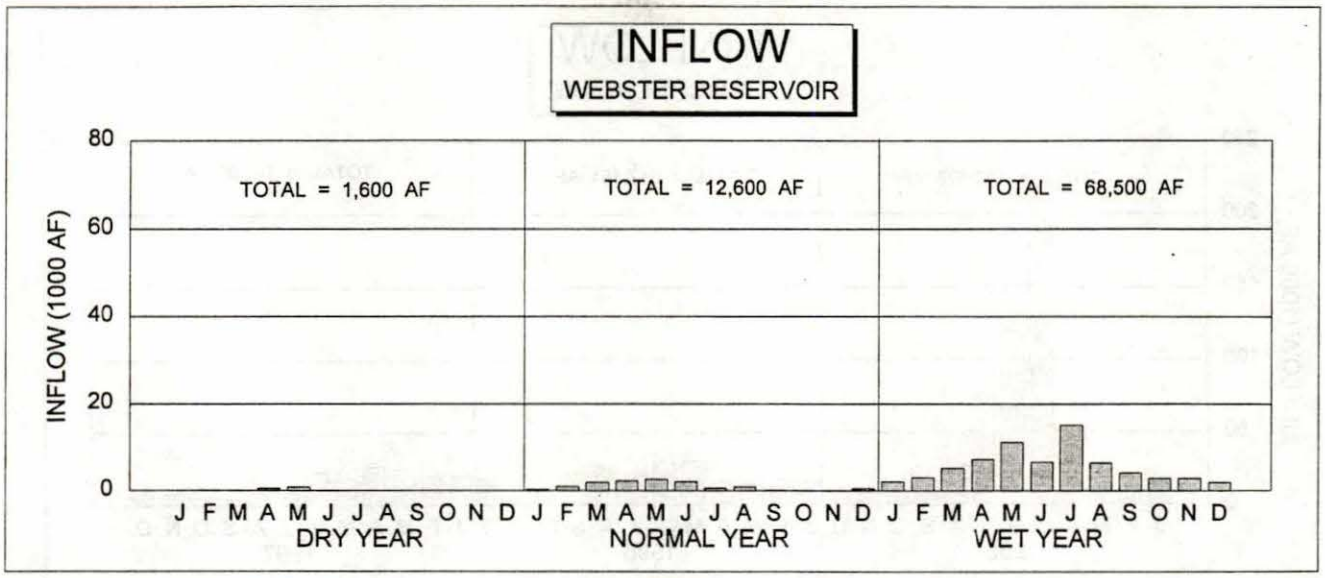
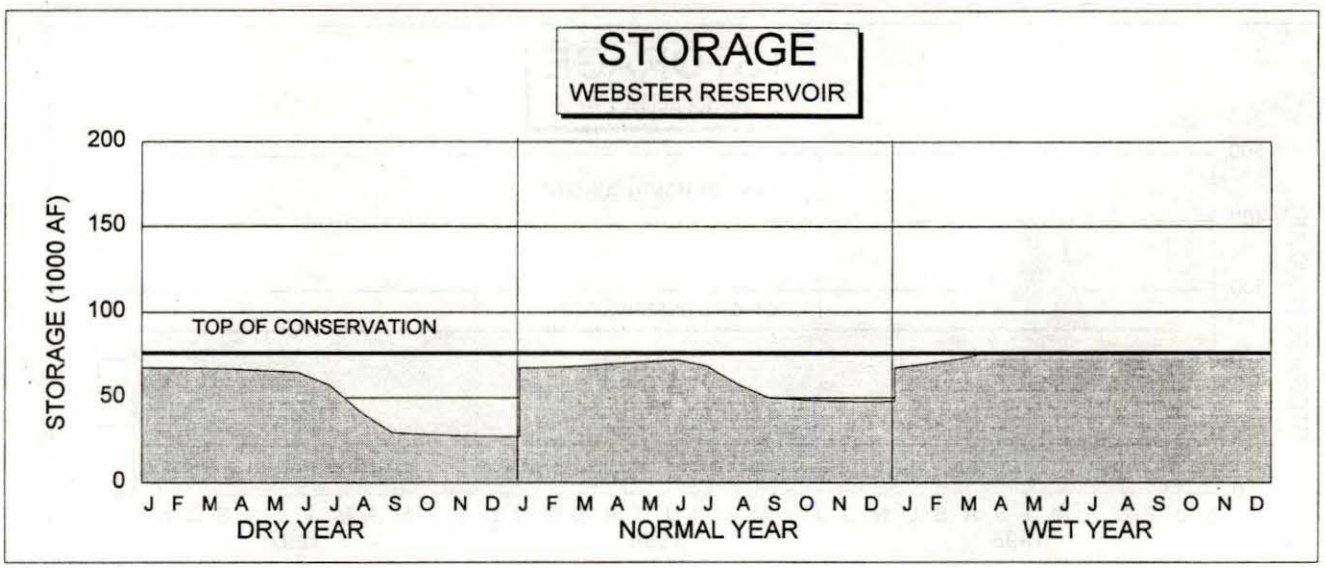


EXHIBIT 15C

WEBSTER RESERVOIR
1999 OPERATION PLAN





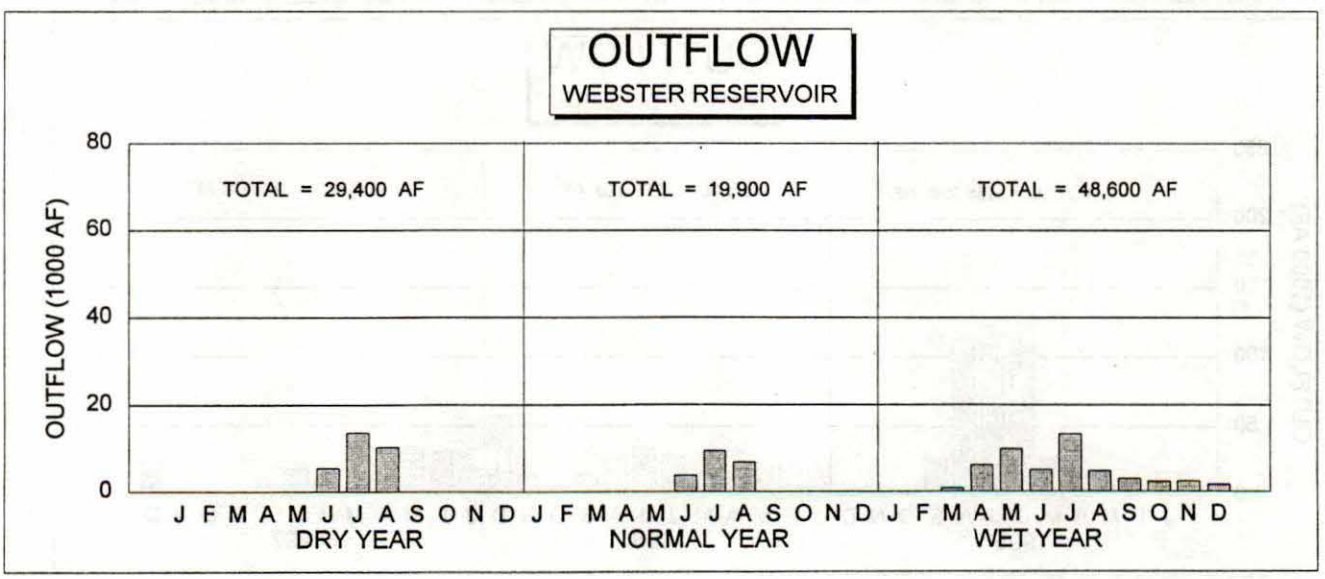
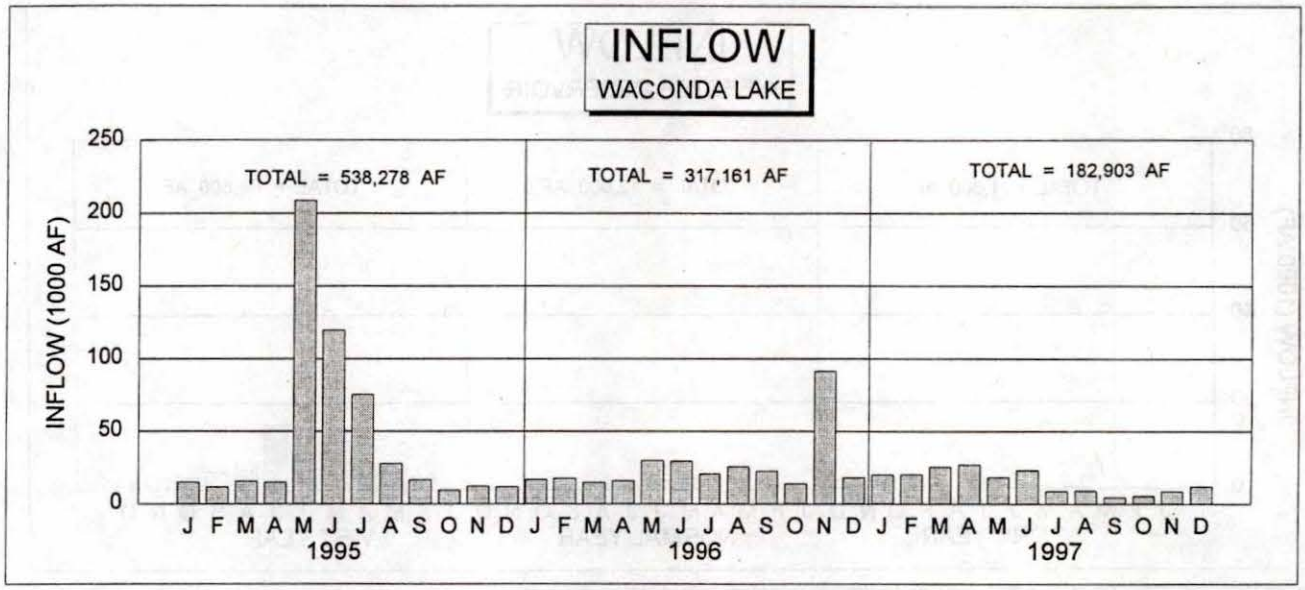
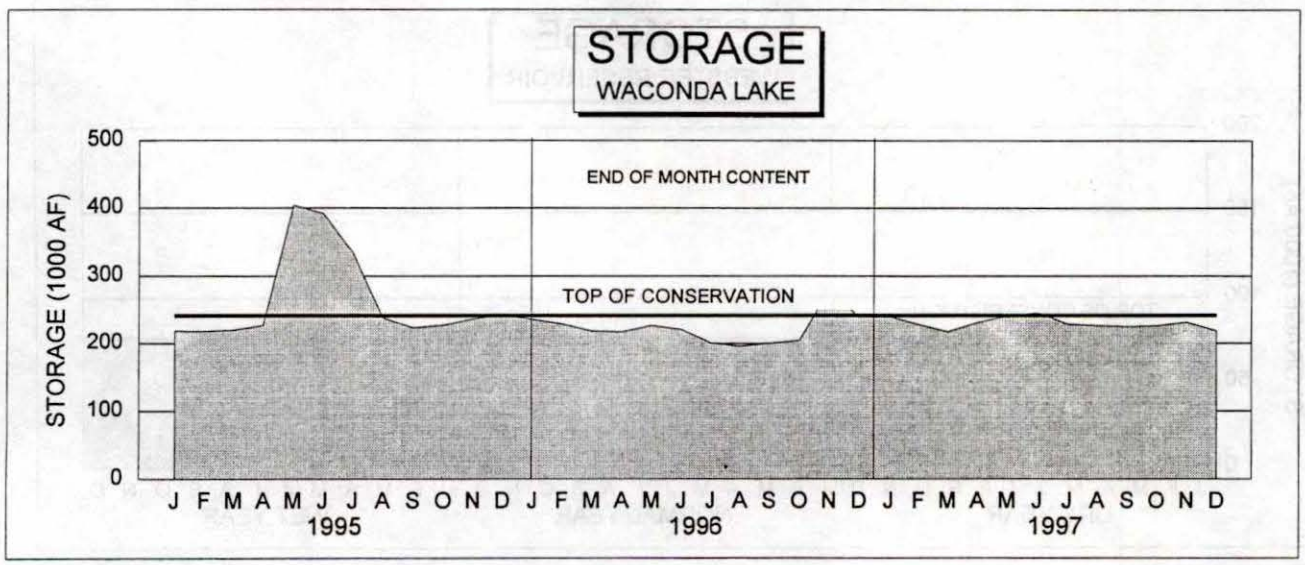
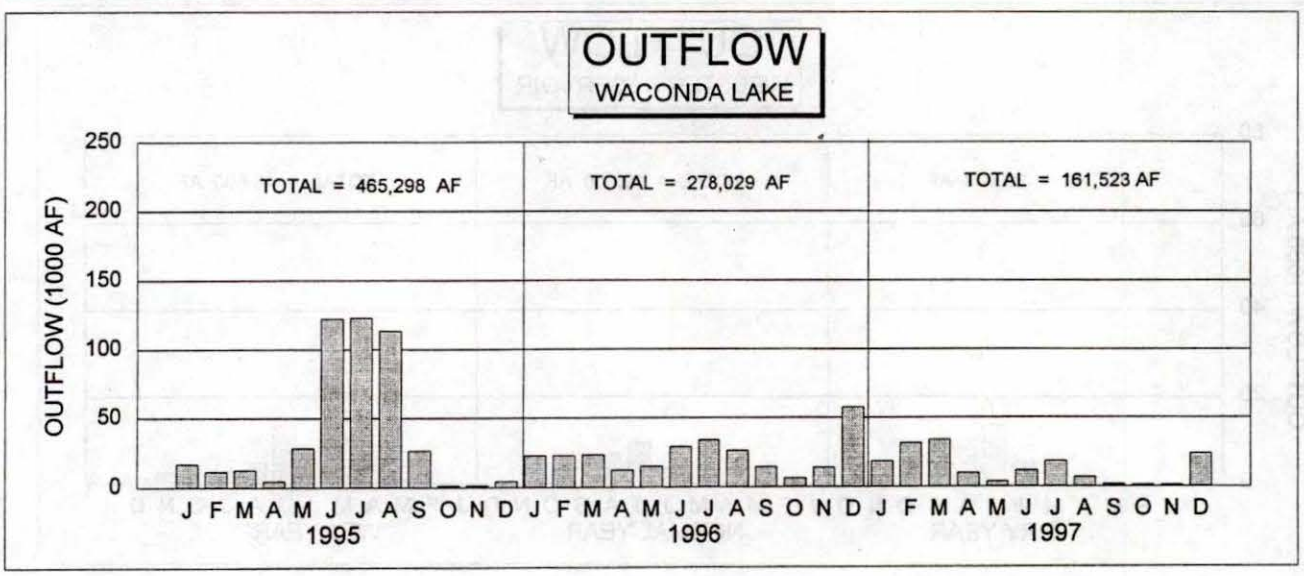


EXHIBIT 16A

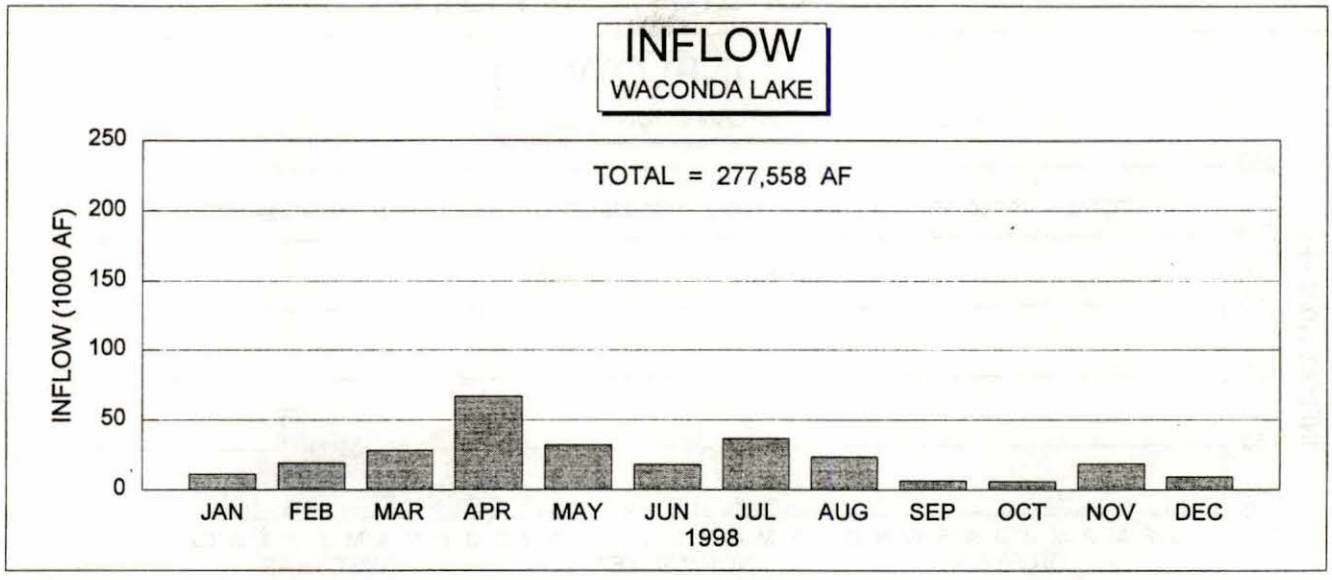
WACONDA LAKE
OPERATION

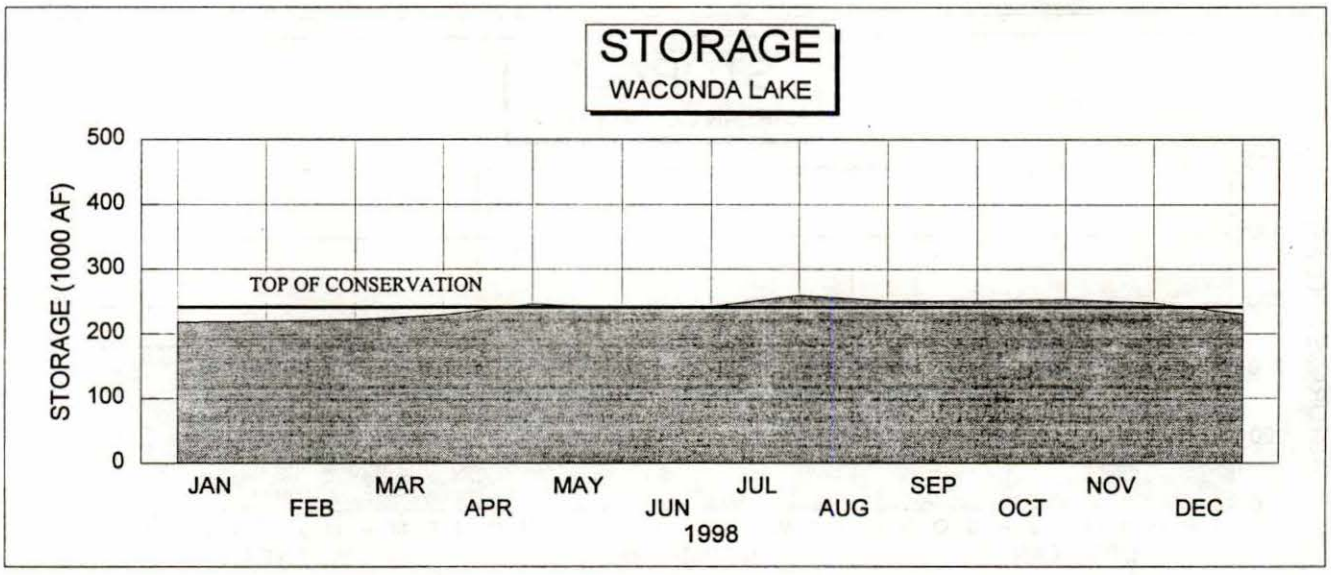






WACONDA LAKE
1998 OPERATION





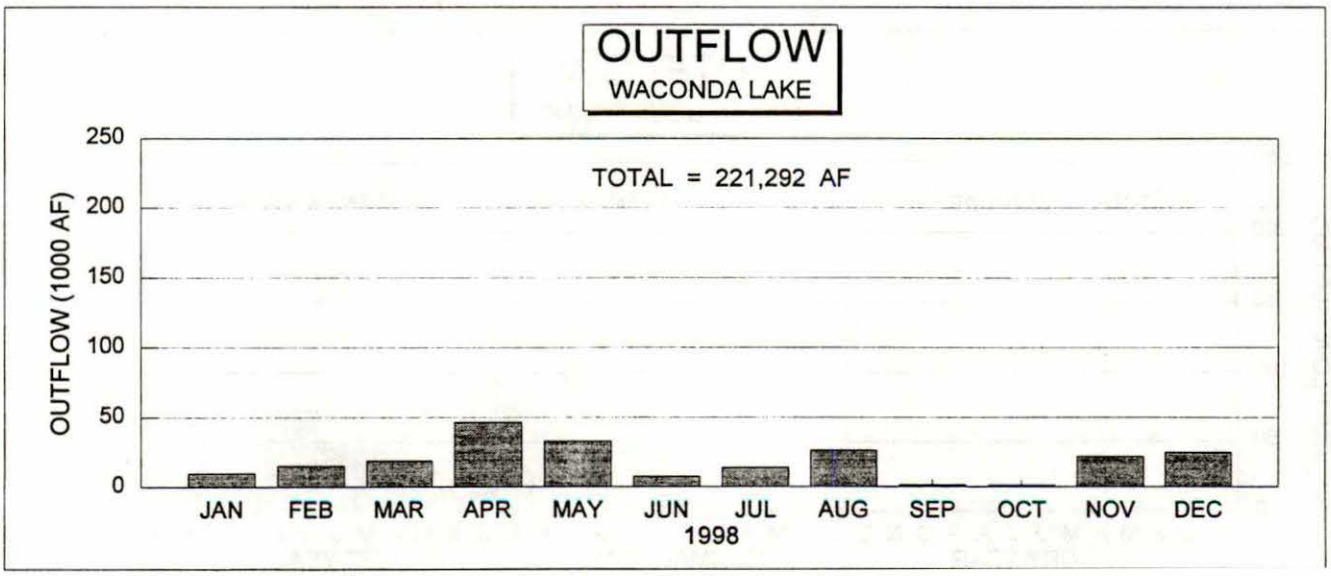
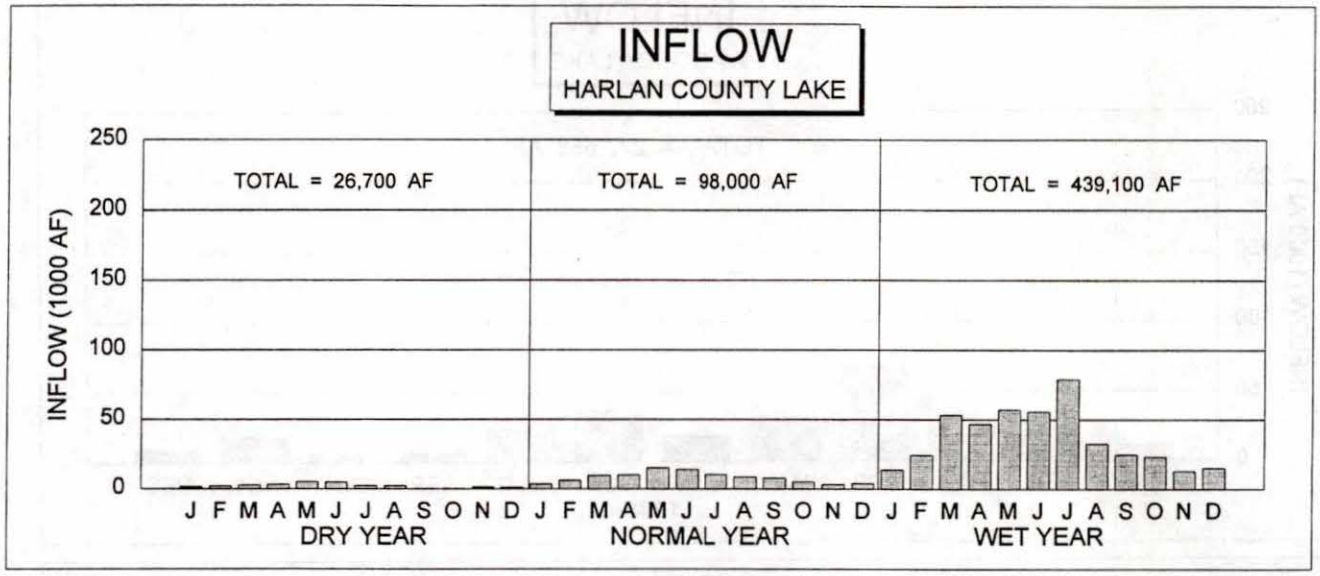
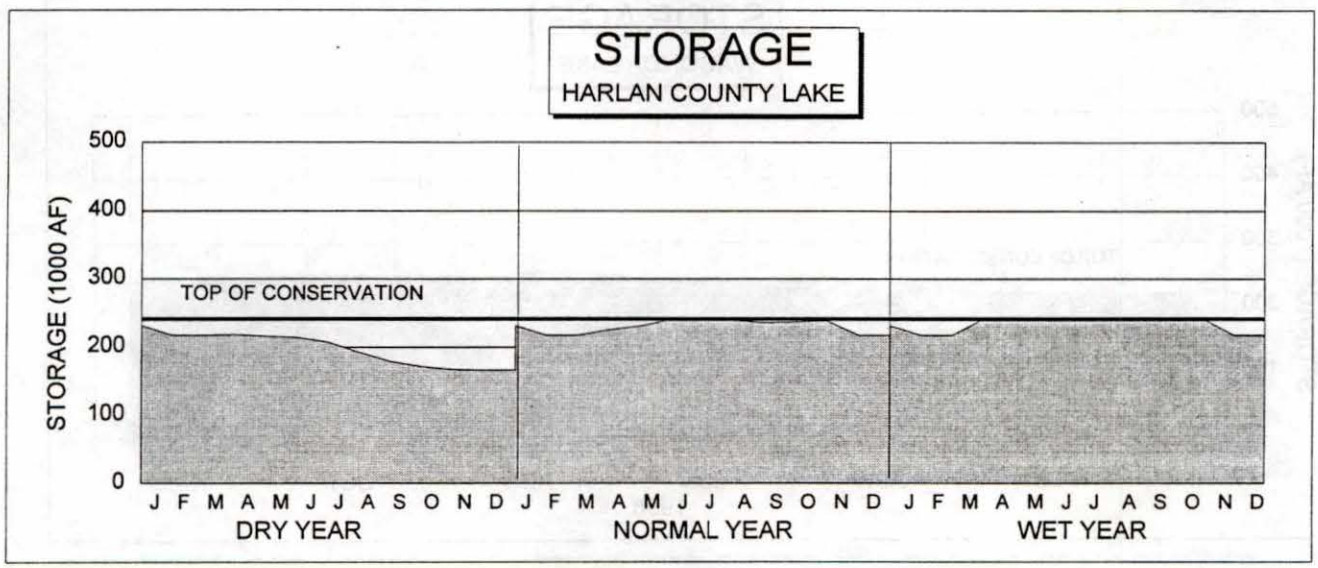


EXHIBIT 16C

WACONDA LAKE
1999 OPERATION PLAN





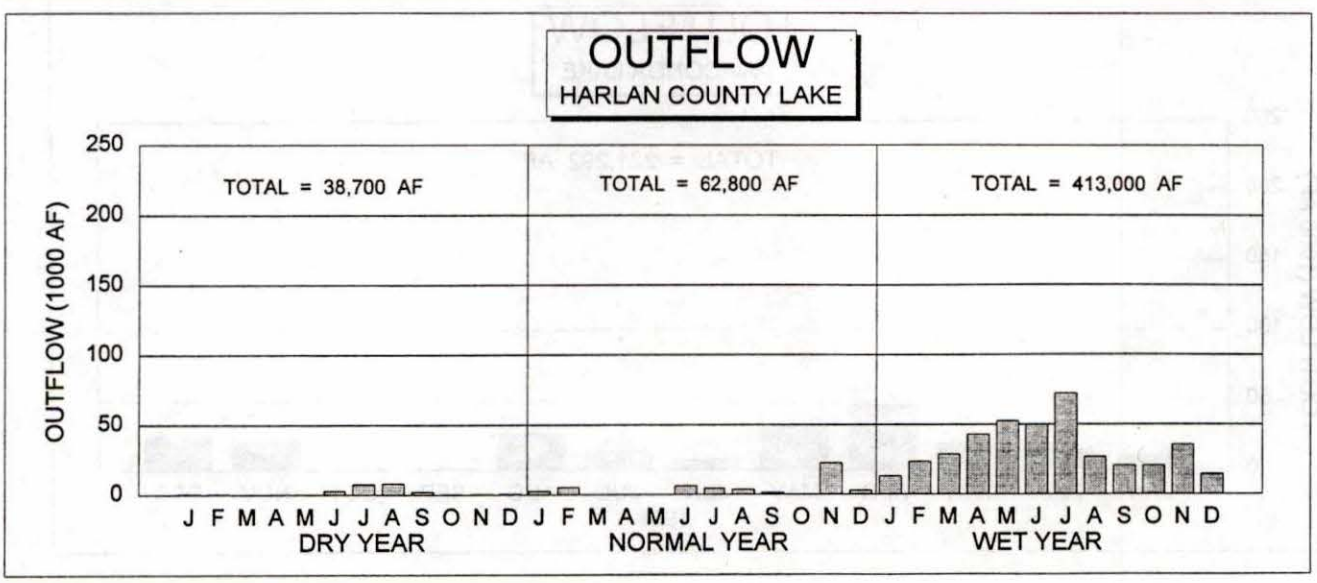
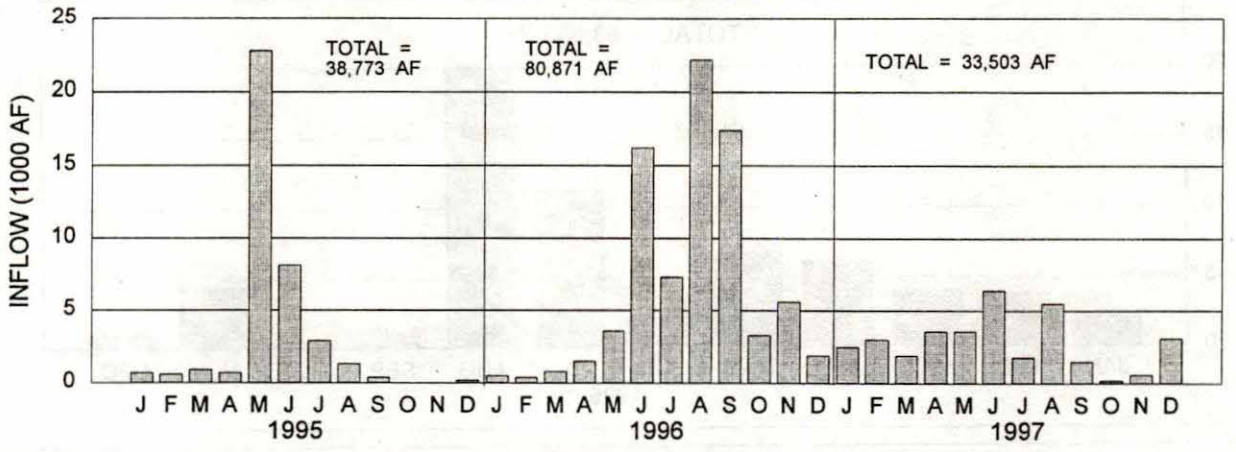


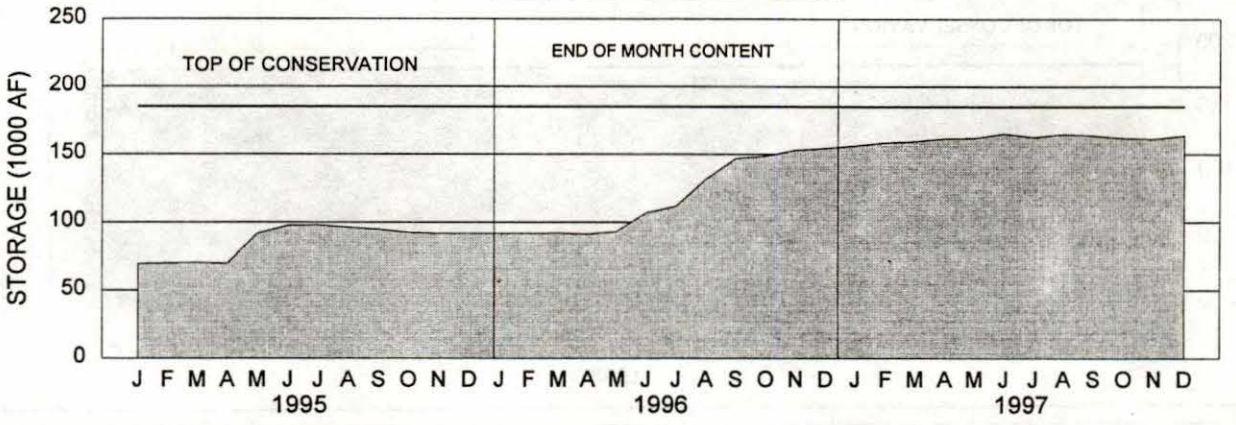
EXHIBIT 17A

CEDAR BLUFF RESERVOIR
OPERATION

INFLOW
CEDAR BLUFF RESERVOIR



STORAGE
CEDAR BLUFF RESERVOIR



OUTFLOW
CEDAR BLUFF RESERVOIR

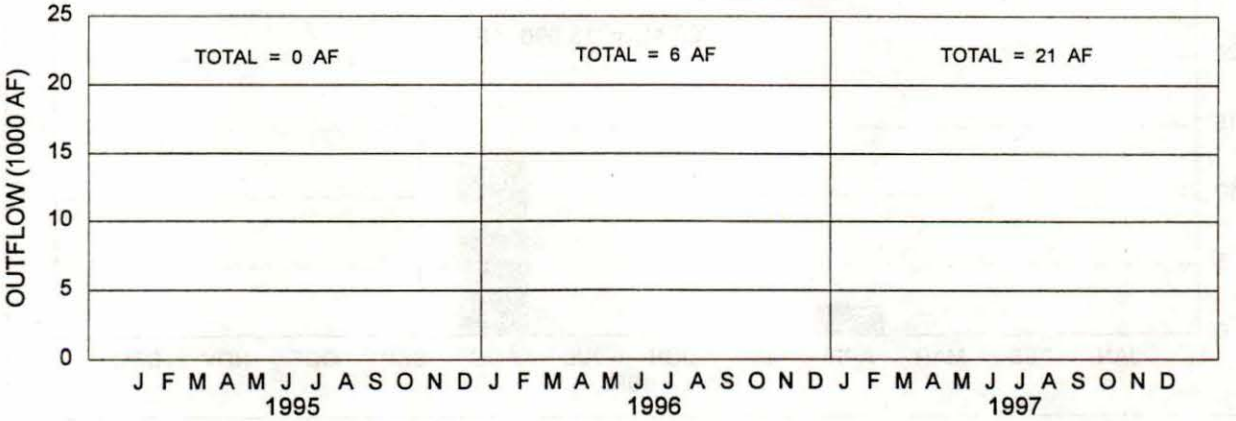
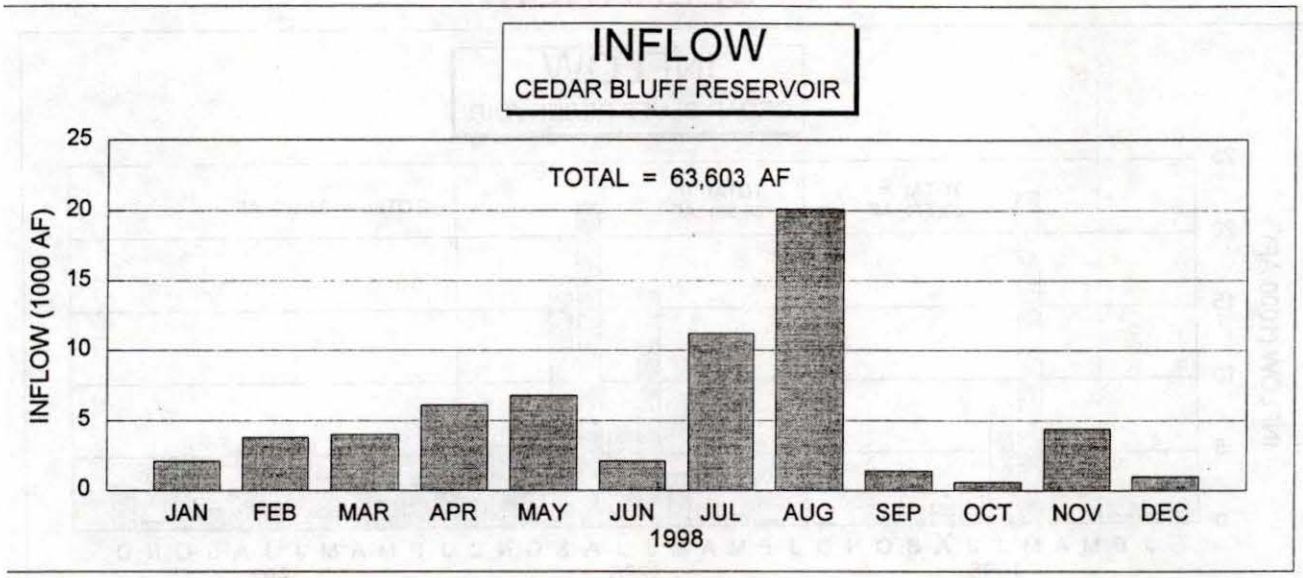
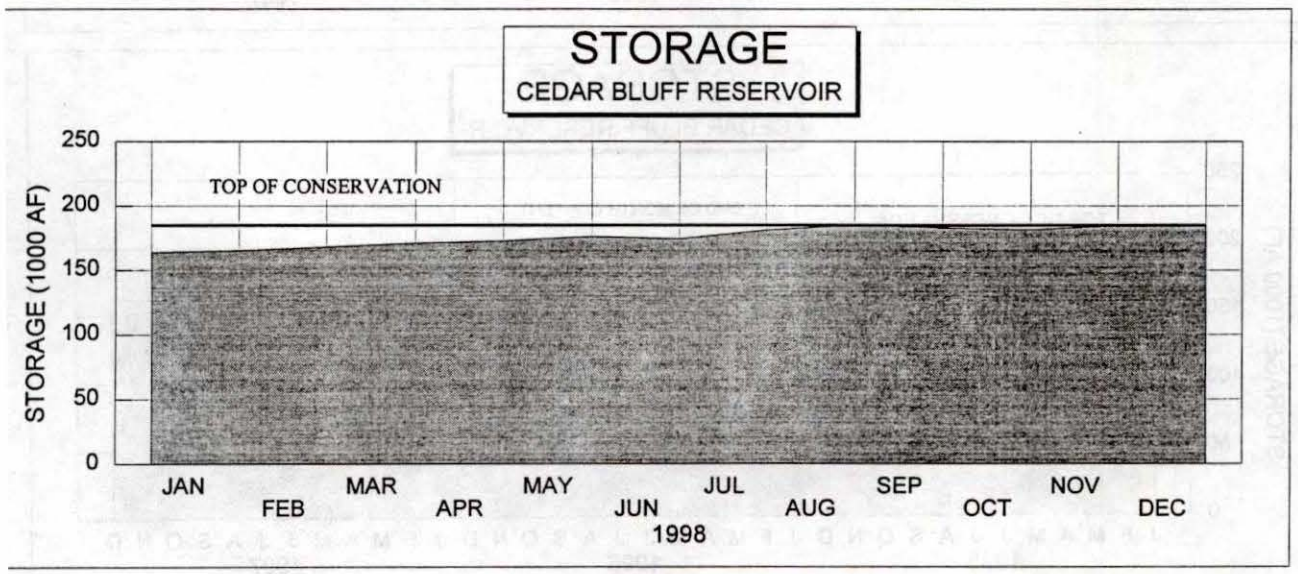


EXHIBIT 17B

CEDAR BLUFF RESERVOIR

1998 OPERATION





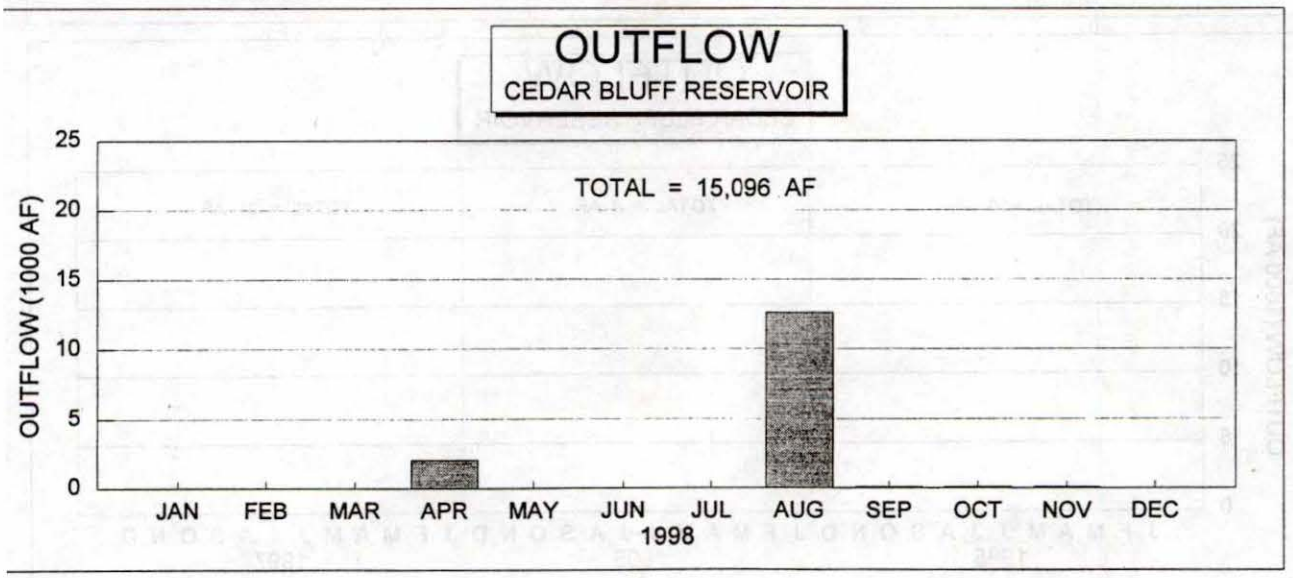
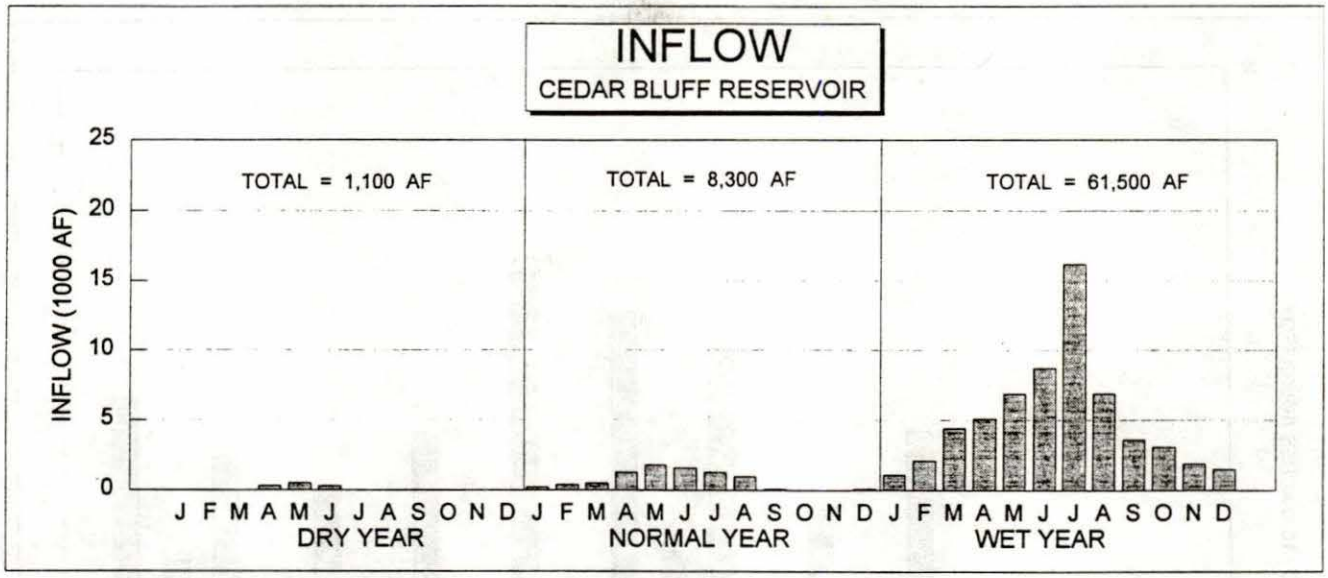
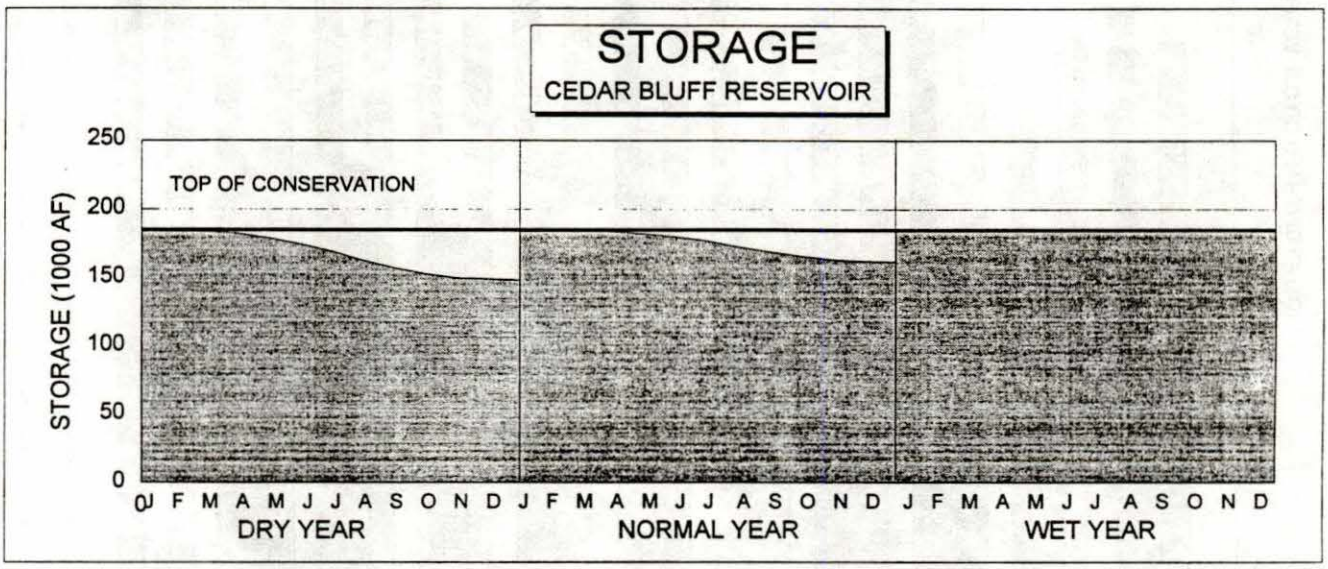


EXHIBIT 17C

CEDAR BLUFF RESERVOIR

1999 OPERATION PLAN





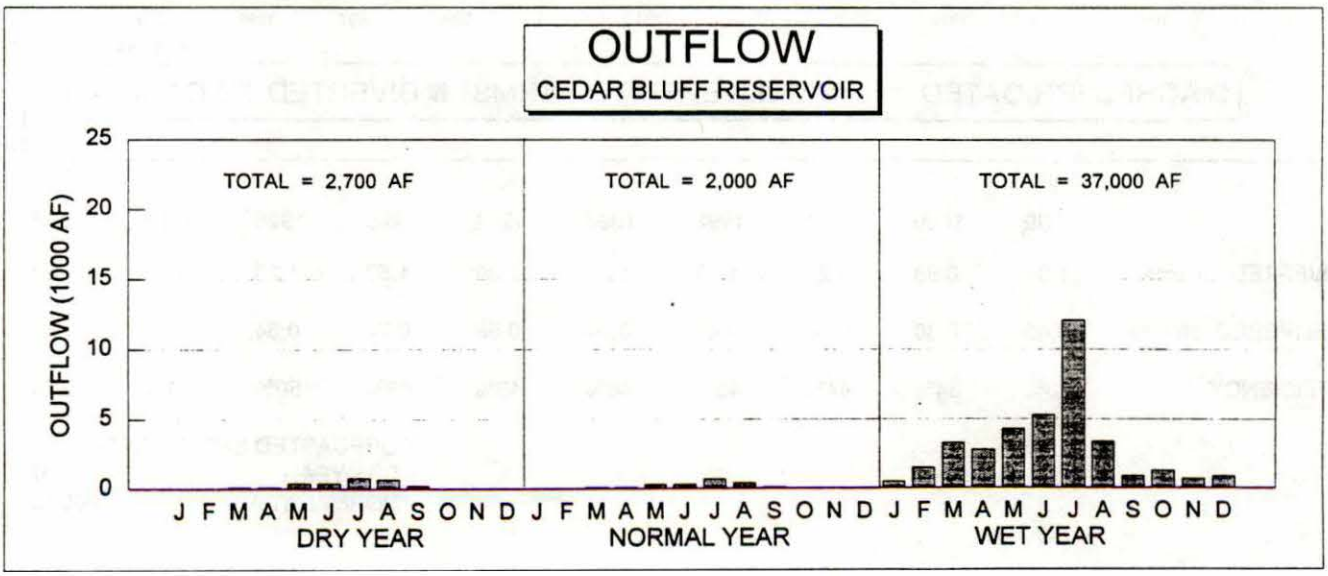
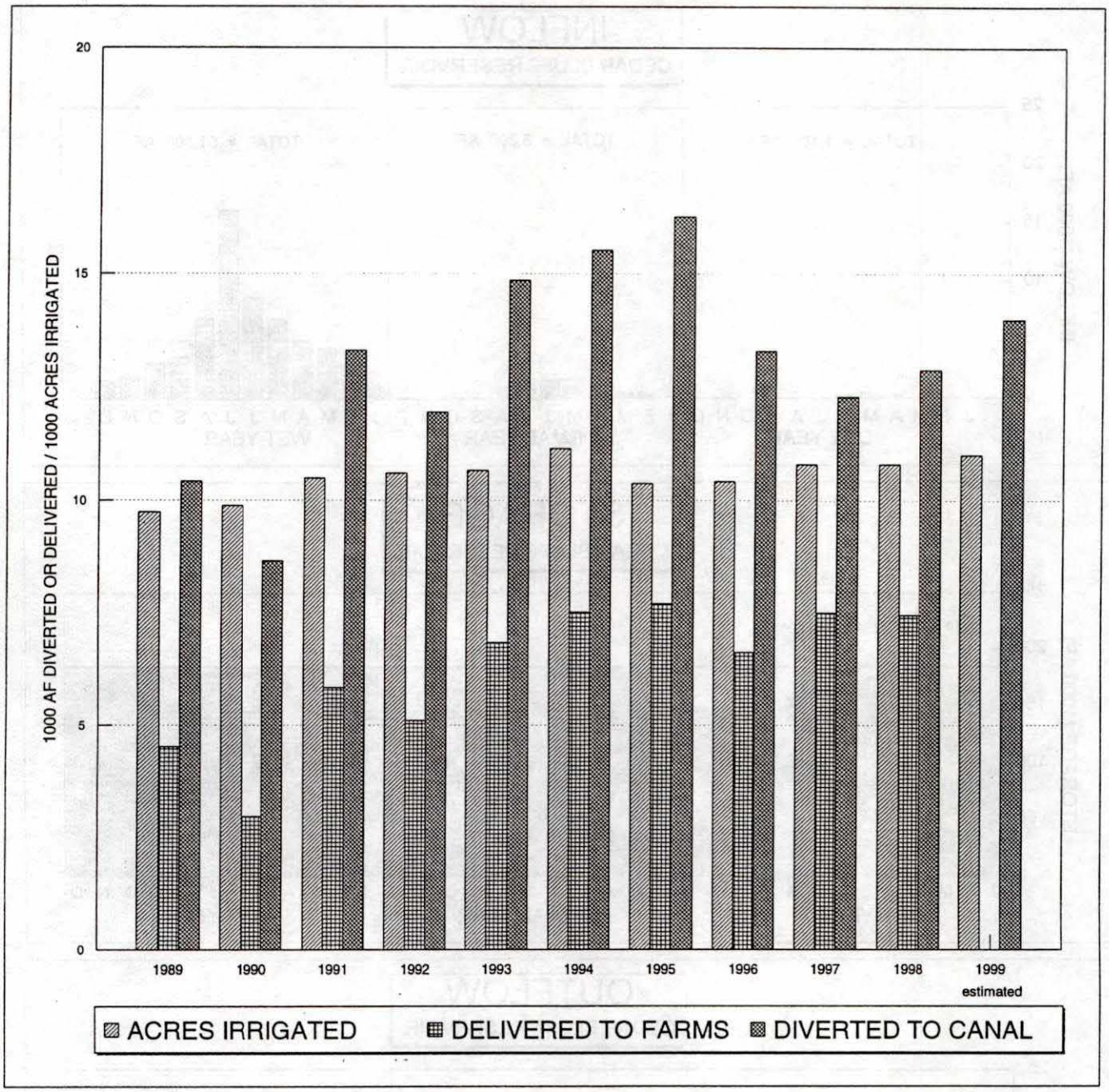


EXHIBIT 18

MIRAGE FLATS IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



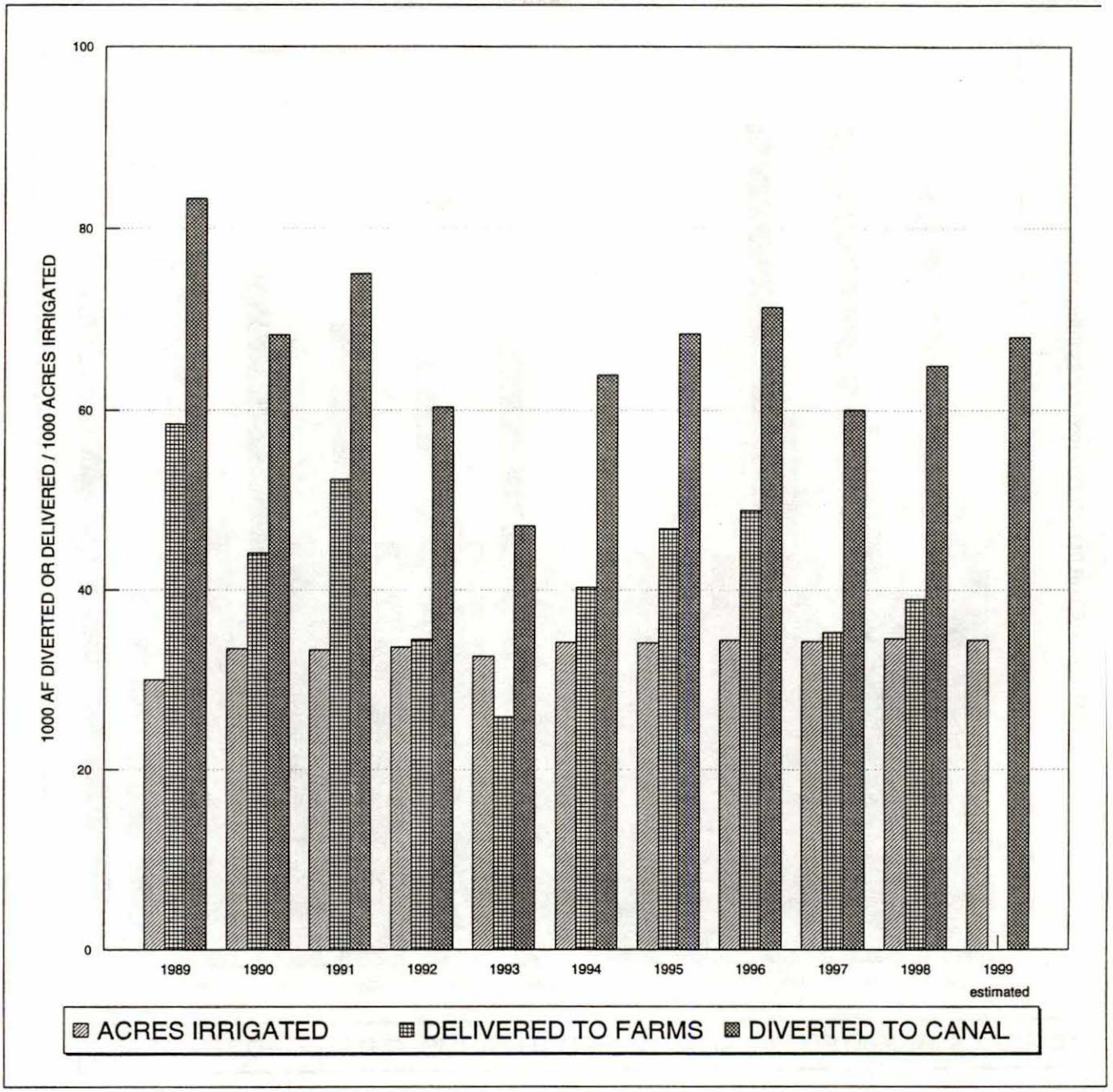
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.07	0.88	1.27	1.13	1.39	1.39	1.57	1.28	1.14	1.20
DELIVERED af/acre	0.46	0.30	0.56	0.48	0.64	0.68	0.74	0.64	0.70	0.69
EFFICIENCY	43%	34%	44%	43%	46%	49%	48%	50%	61%	58%

FORECASTED SHORTAGES (1999)

DRY YEAR	25,100 AF
NORMAL YEAR	8,900 AF

AINSWORTH IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	2.77	2.04	2.25	1.79	1.44	1.87	2.00	2.07	1.75	1.87
DELIVERED af/acre	1.94	1.31	1.56	1.02	0.79	1.18	1.37	1.42	1.03	1.13
EFFICIENCY	70%	65%	70%	57%	55%	63%	68%	68%	59%	60%

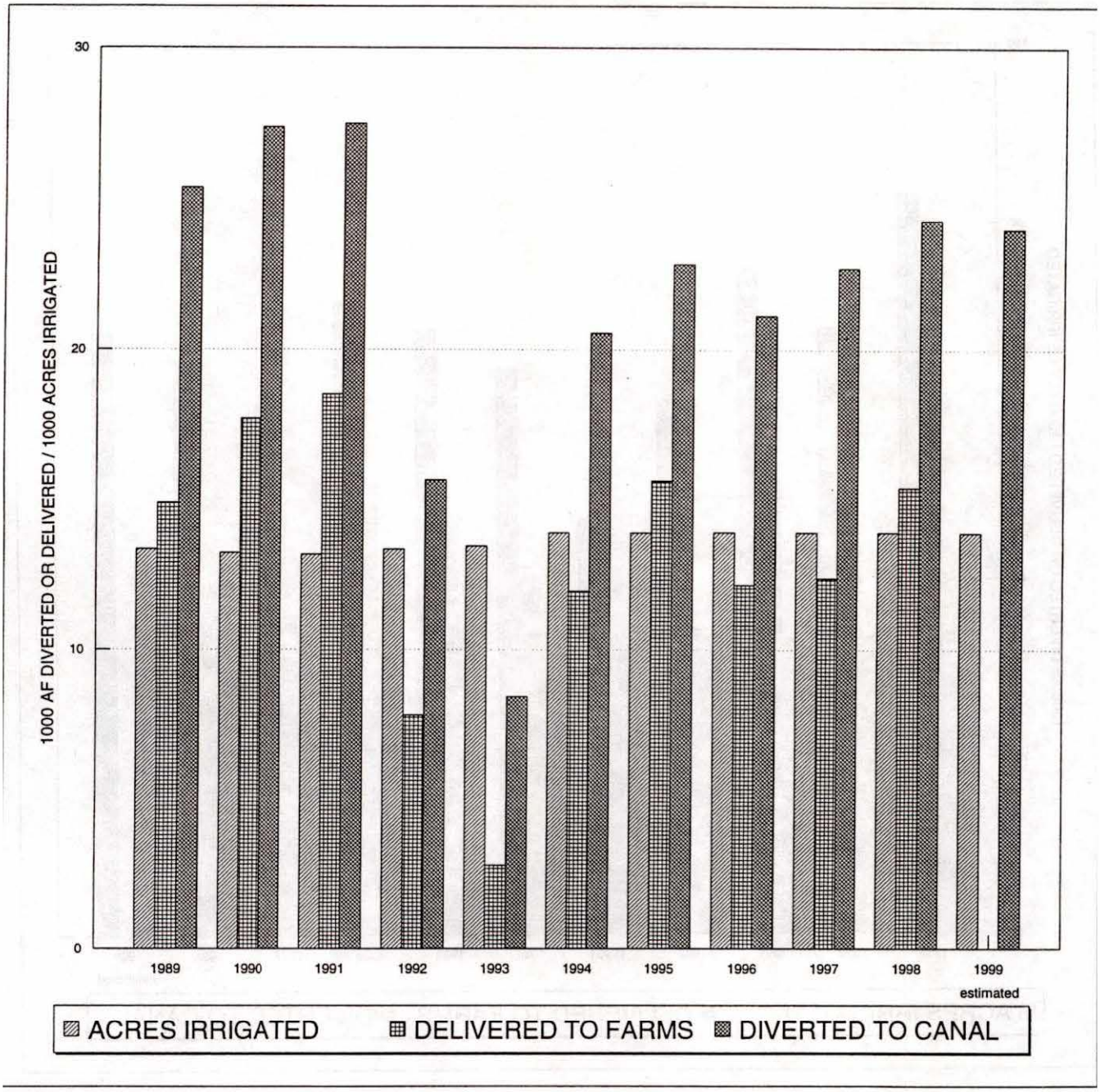
FORECASTED SHORTAGES (1999)

DRY YEAR	0 AF
NORMAL YEAR	0 AF

EXHIBIT 20

SARGENT IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.90	2.07	2.08	1.17	0.62	1.48	1.64	1.52	1.63	1.74
DELIVERED af/acre	1.12	1.34	1.40	0.58	0.21	0.86	1.13	0.88	0.89	1.11
EFFICIENCY	59%	65%	67%	50%	33%	58%	68%	58%	55%	63%

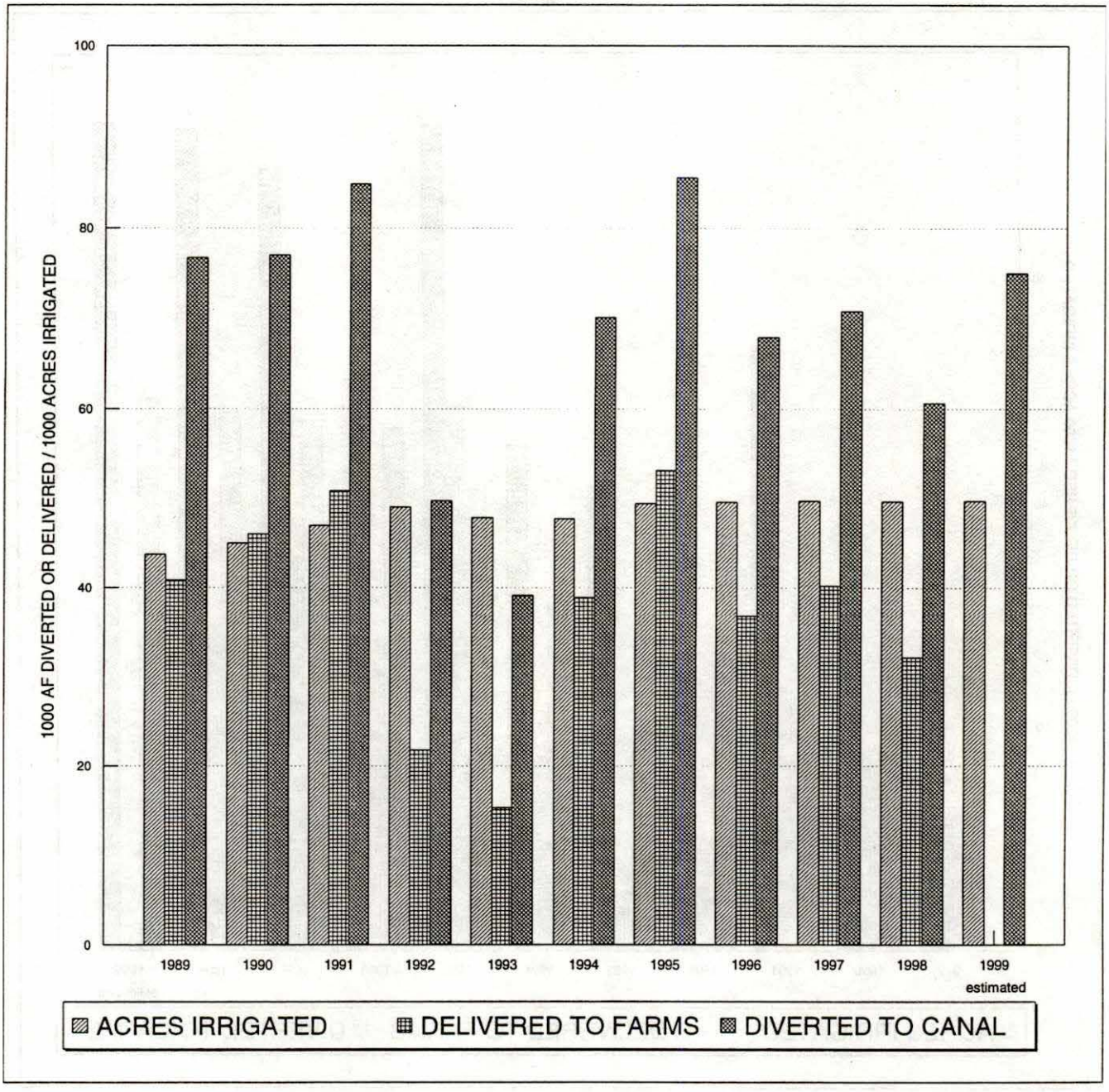
FORECASTED SHORTAGES (1999)

DRY YEAR	3,400 AF
NORMAL YEAR	0 AF

EXHIBIT 21

FARWELL IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.75	1.71	1.81	1.01	0.82	1.47	1.73	1.37	1.43	1.22
DELIVERED af/acre	0.93	1.02	1.08	0.44	0.32	0.82	1.08	0.74	0.81	0.65
EFFICIENCY	53%	60%	60%	44%	39%	55%	62%	54%	57%	53%

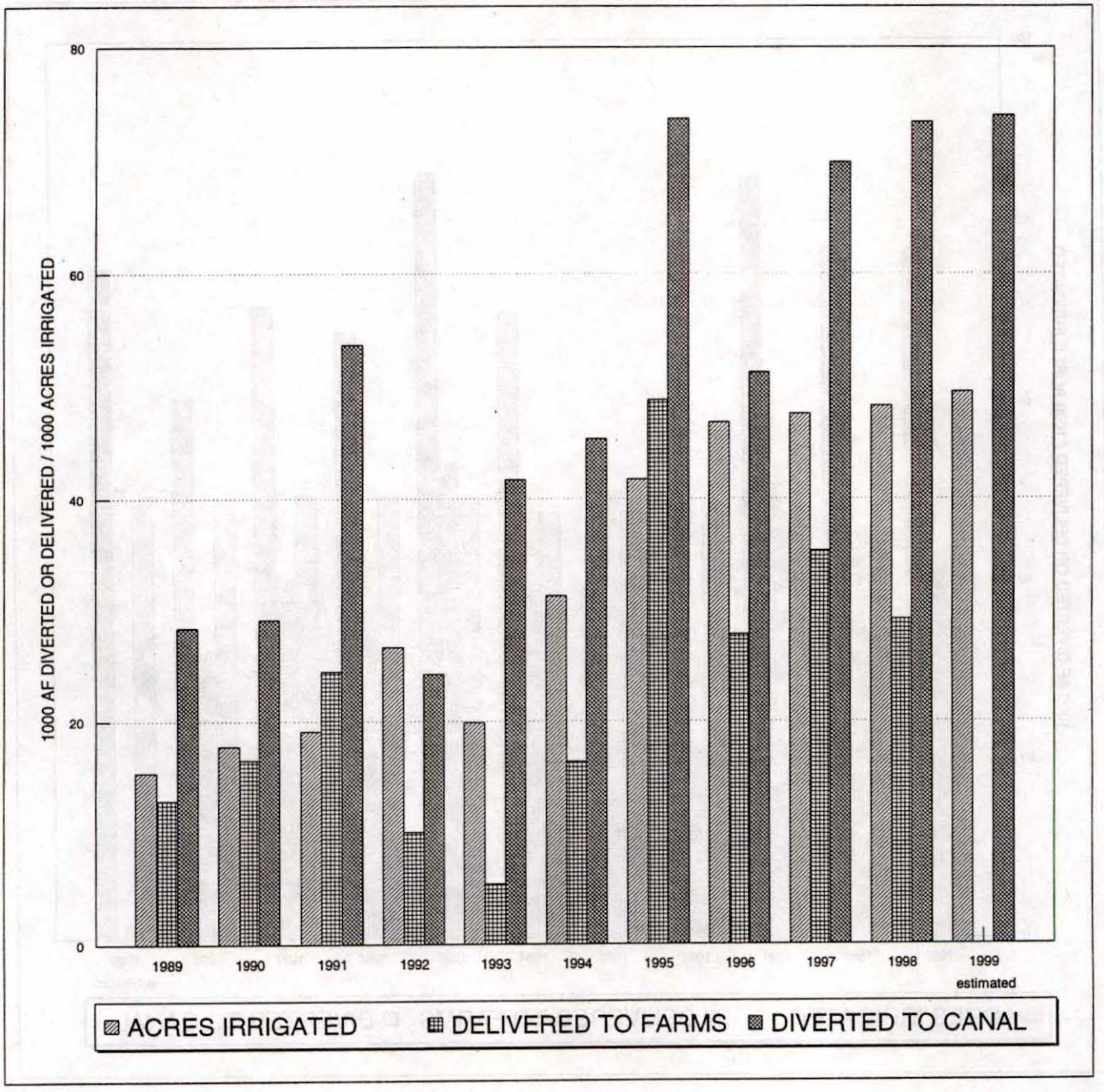
FORECASTED SHORTAGES (1999)

DRY YEAR	10,900 AF
NORMAL YEAR	0 AF

EXHIBIT 22

TWIN LOUPS IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.85	1.64	2.81	0.91	2.10	1.45	1.76	1.10	1.47	1.52
DELIVERED af/acre	0.84	0.93	1.28	0.38	0.27	0.52	1.17	0.60	0.74	0.60
EFFICIENCY	45%	57%	46%	41%	13%	36%	66%	54%	51%	40%

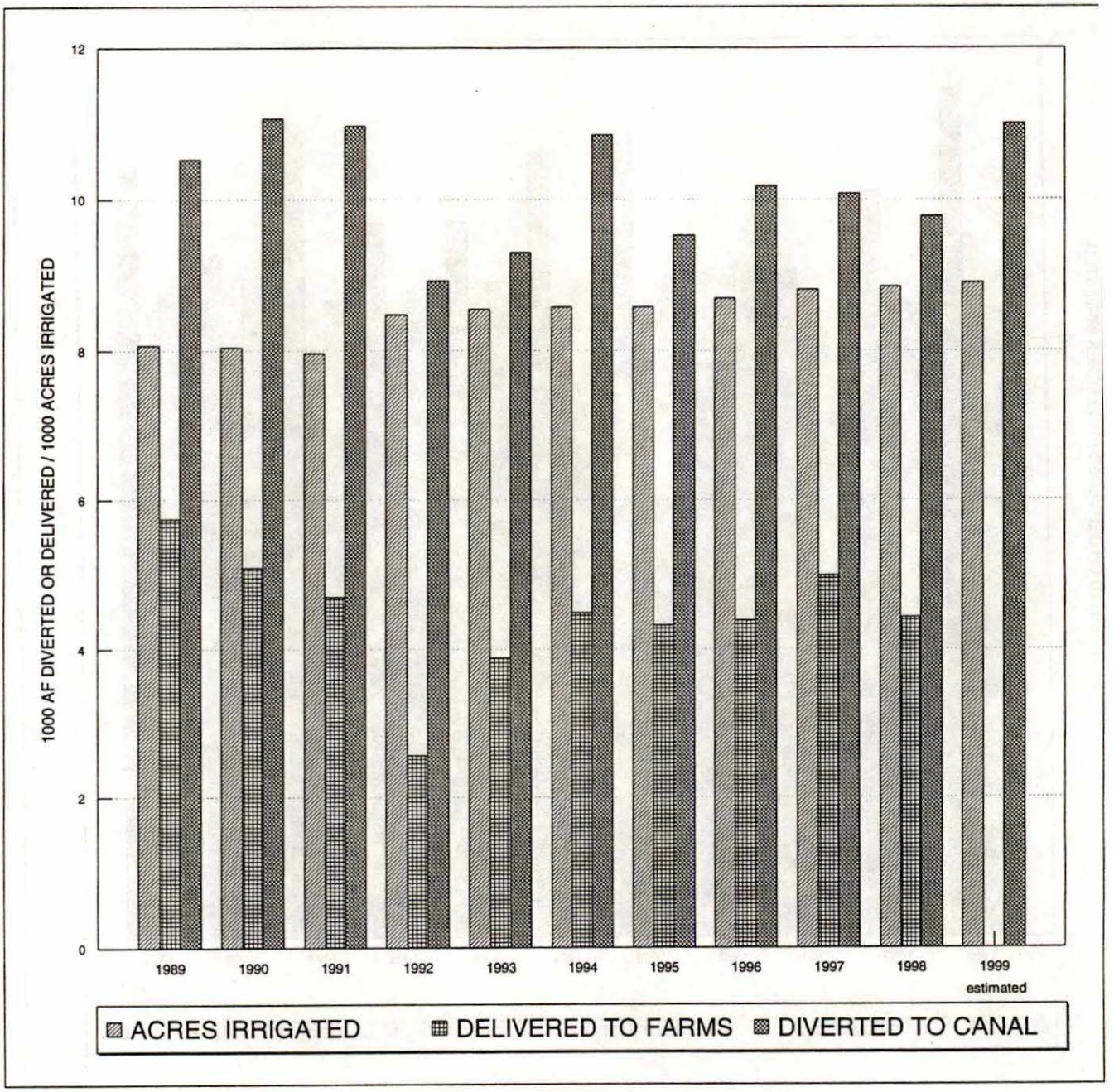
FORECASTED SHORTAGES (1999)

DRY YEAR	0 AF
NORMAL YEAR	0 AF

EXHIBIT 23

FRENCHMAN VALLEY IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.30	1.38	1.38	1.05	1.09	1.26	1.11	1.17	1.14	1.11
DELIVERED af/acre	0.71	0.63	0.59	0.30	0.45	0.52	0.50	0.50	0.57	0.50
EFFICIENCY	55%	46%	43%	29%	42%	41%	45%	43%	50%	45%

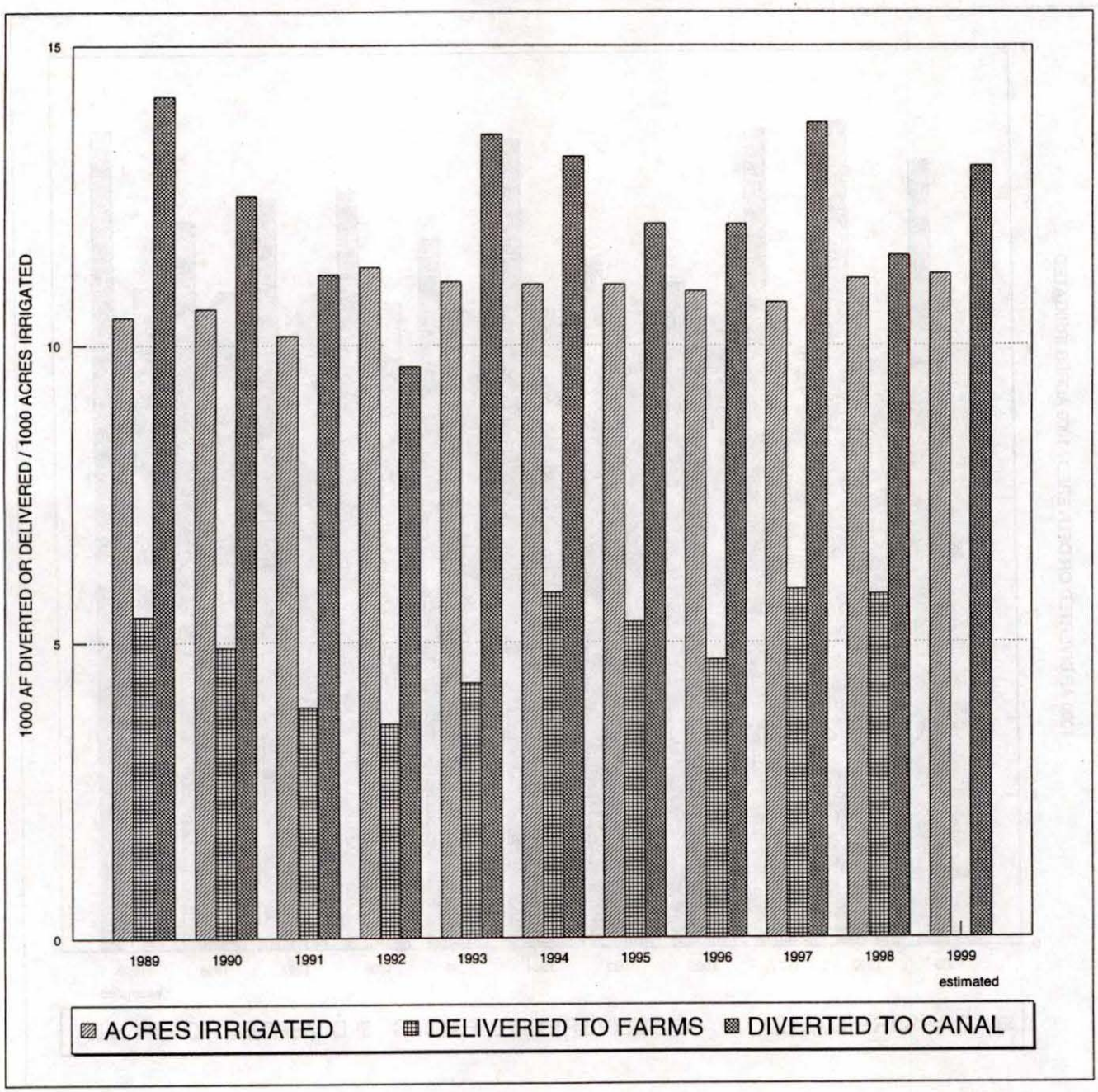
FORECASTED SHORTAGES (1999)

DRY YEAR	30,200 AF
NORMAL YEAR	11,000 AF

EXHIBIT 24

H AND RW IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.35	1.18	1.10	0.85	1.22	1.19	1.09	1.10	1.28	1.03
DELIVERED af/acre	0.52	0.46	0.38	0.32	0.39	0.53	0.48	0.43	0.55	0.52
EFFICIENCY	38%	39%	35%	37%	32%	44%	44%	39%	43%	51%

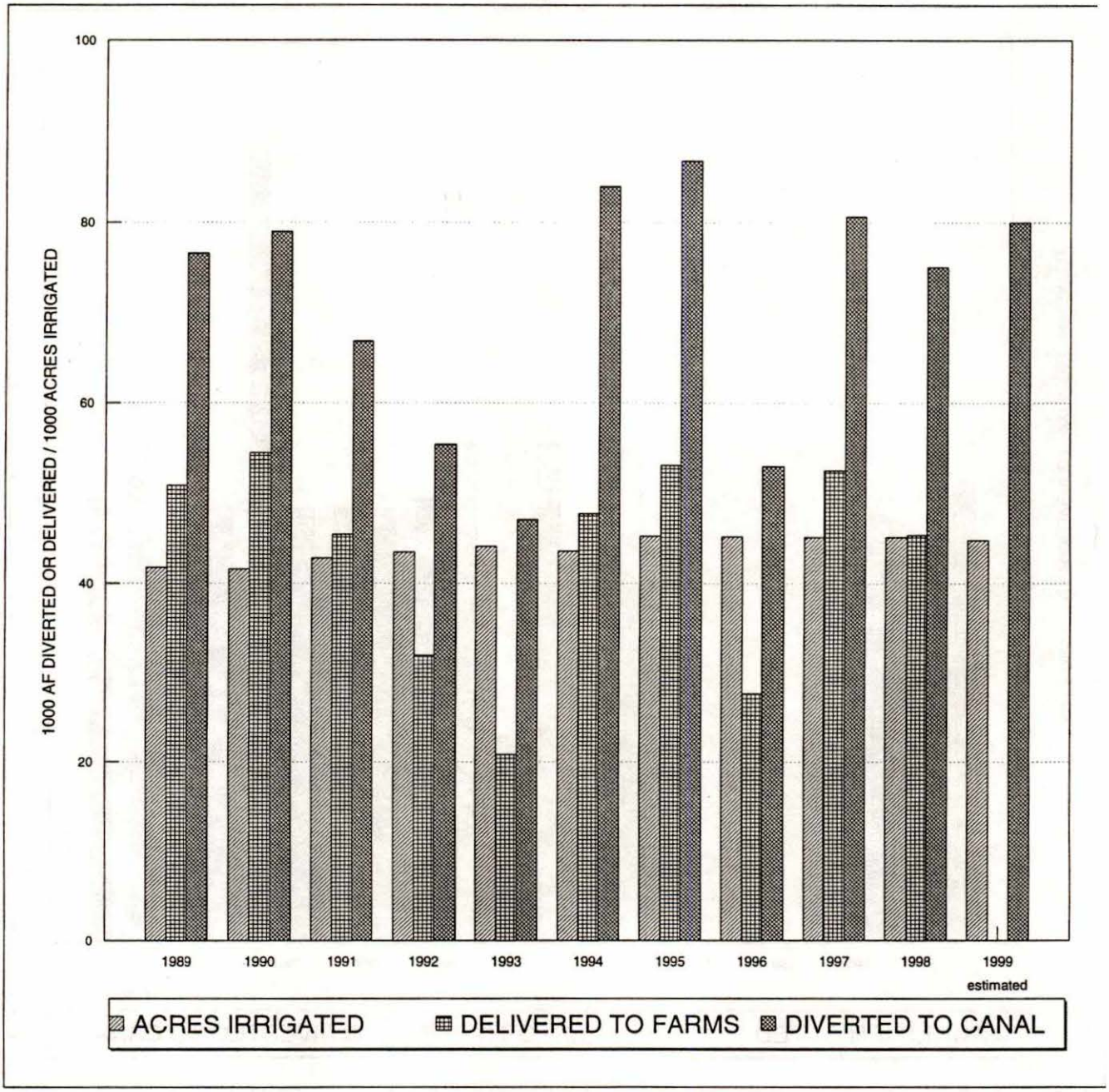
FORECASTED SHORTAGES (1999)

DRY YEAR	36,200 AF
NORMAL YEAR	13,100 AF

EXHIBIT 25

FRENCHMAN-CAMBRIDGE IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.83	1.90	1.56	1.27	1.07	1.93	1.92	1.17	1.79	1.66
DELIVERED af/acre	1.22	1.31	1.06	0.73	0.47	1.09	1.17	0.61	1.16	1.00
EFFICIENCY	66%	69%	68%	58%	44%	57%	61%	52%	65%	60%

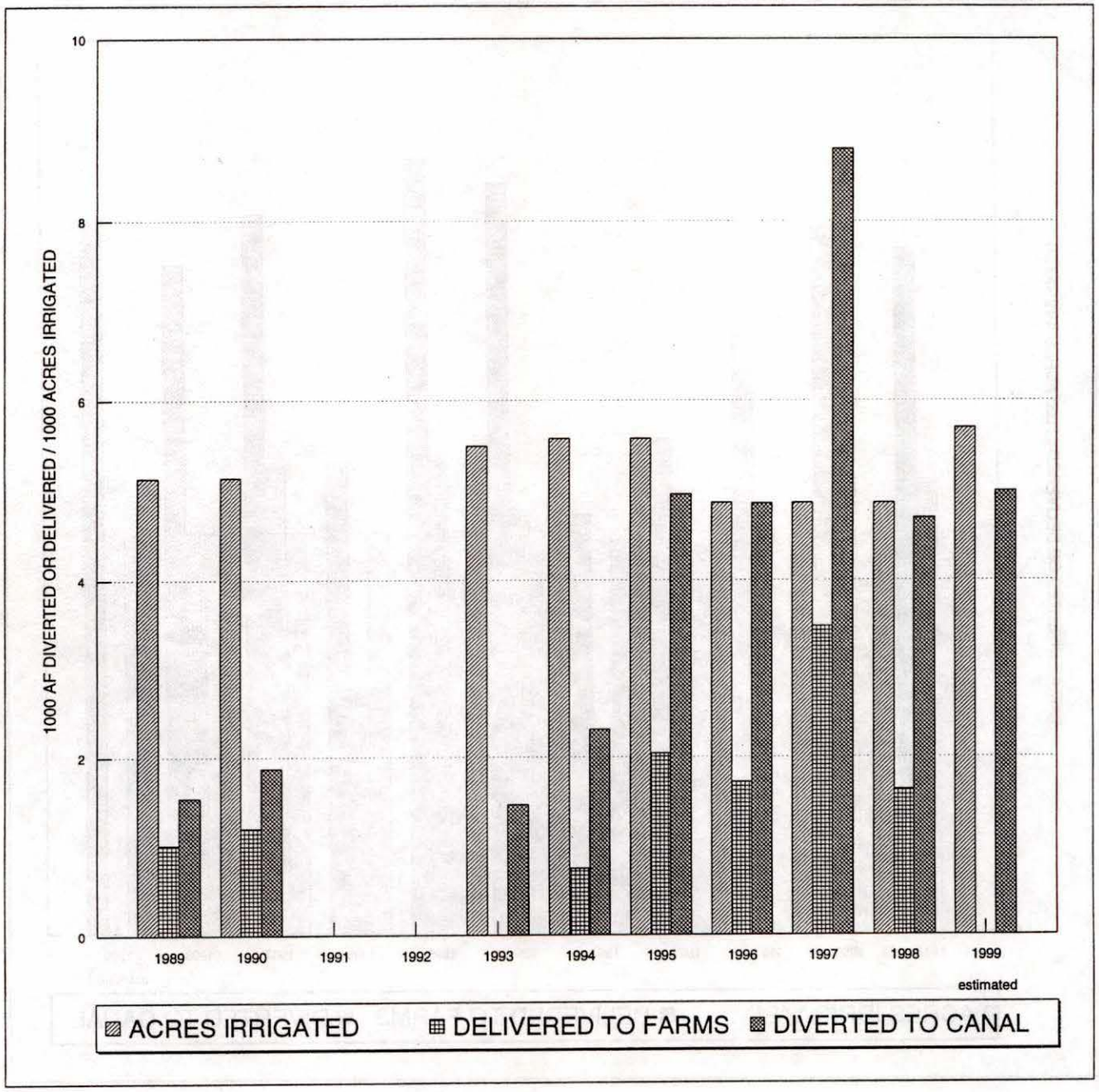
FORECASTED SHORTAGES (1999)

DRY YEAR	14,500 AF
NORMAL YEAR	0 AF

EXHIBIT 26

ALMENA IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	0.30	0.36	0.00	0.00	0.27	0.41	0.89	1.00	1.81	0.97
DELIVERED af/acre	0.20	0.23	0.00	0.00	0.00	0.13	0.37	0.35	0.72	0.34
EFFICIENCY	66%	64%	0%	0%	0%	32%	41%	35%	40%	35%

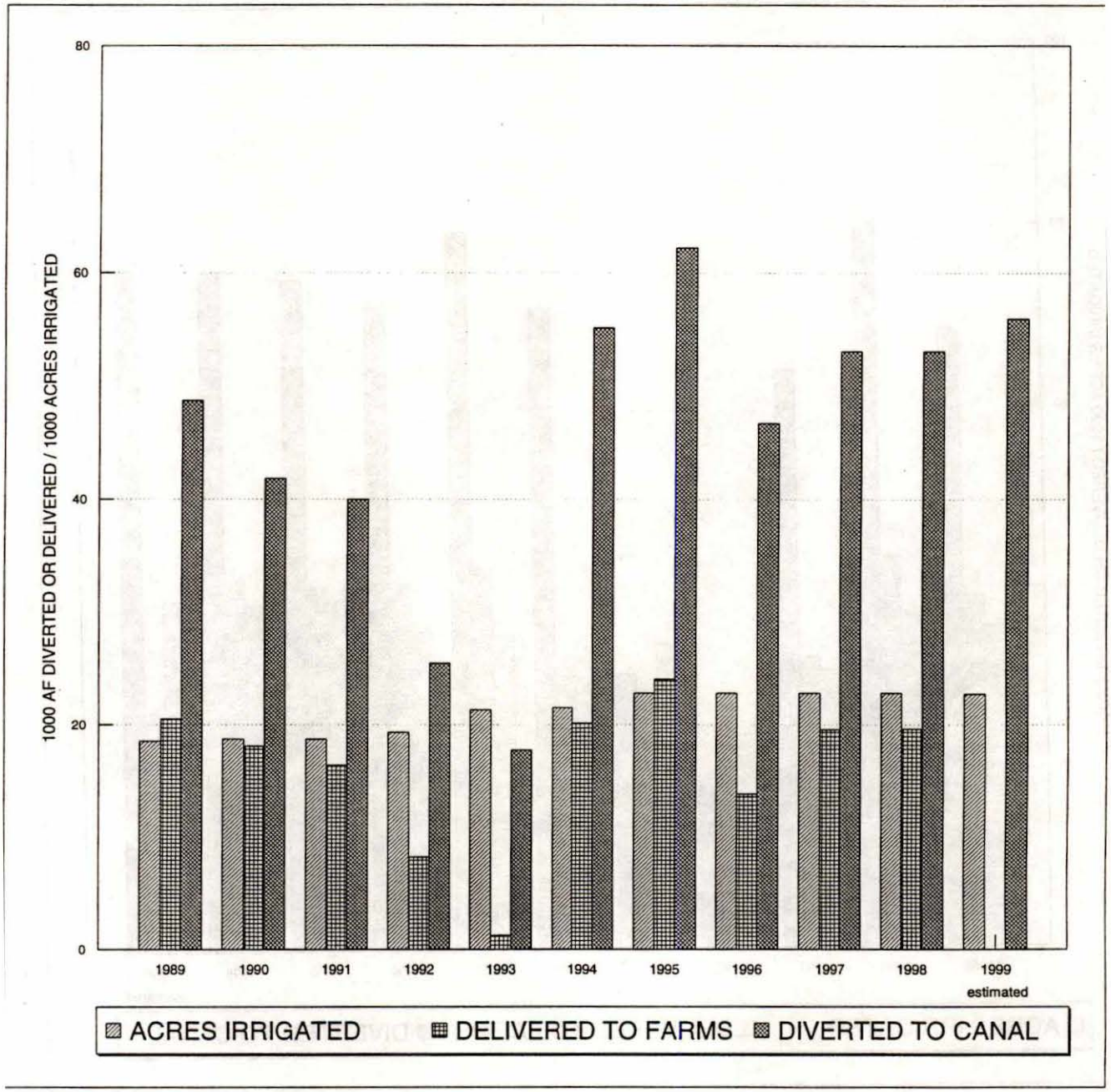
FORECASTED SHORTAGES (1999)

DRY YEAR	1,400 AF
NORMAL YEAR	0 AF

EXHIBIT 27

BOSTWICK IRRIGATION DISTRICT - NEBRASKA

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	2.63	2.23	2.14	1.32	0.83	2.57	2.73	2.05	2.33	2.33
DELIVERED af/acre	1.11	0.97	0.88	0.43	0.06	0.94	1.05	0.61	0.86	0.86
EFFICIENCY	42%	43%	41%	32%	7%	36%	39%	30%	37%	37%

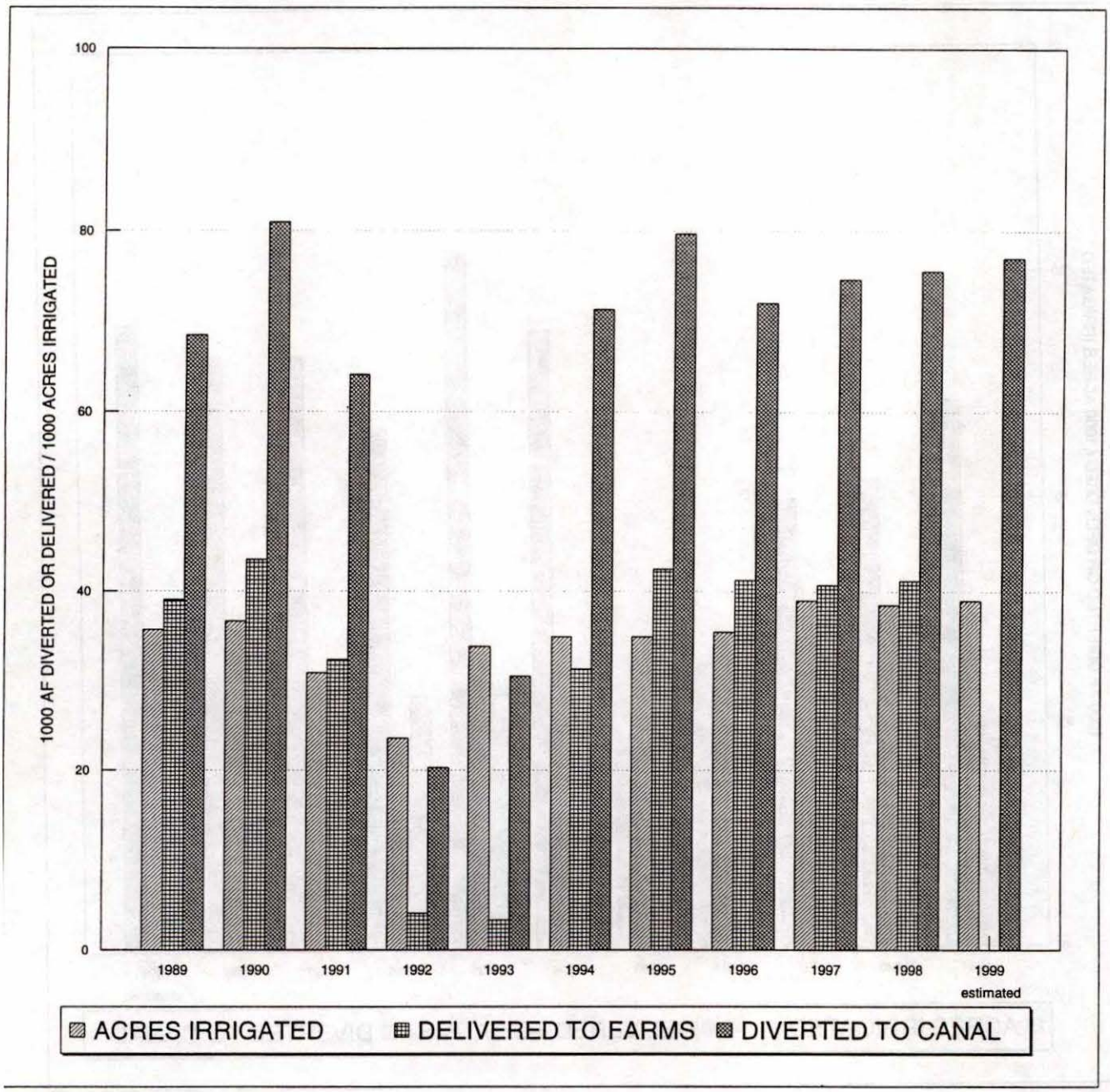
FORECASTED SHORTAGES (1999)

DRY YEAR	25,100
NORMAL YEAR	0 AF

EXHIBIT 28

KANSAS-BOSTWICK IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



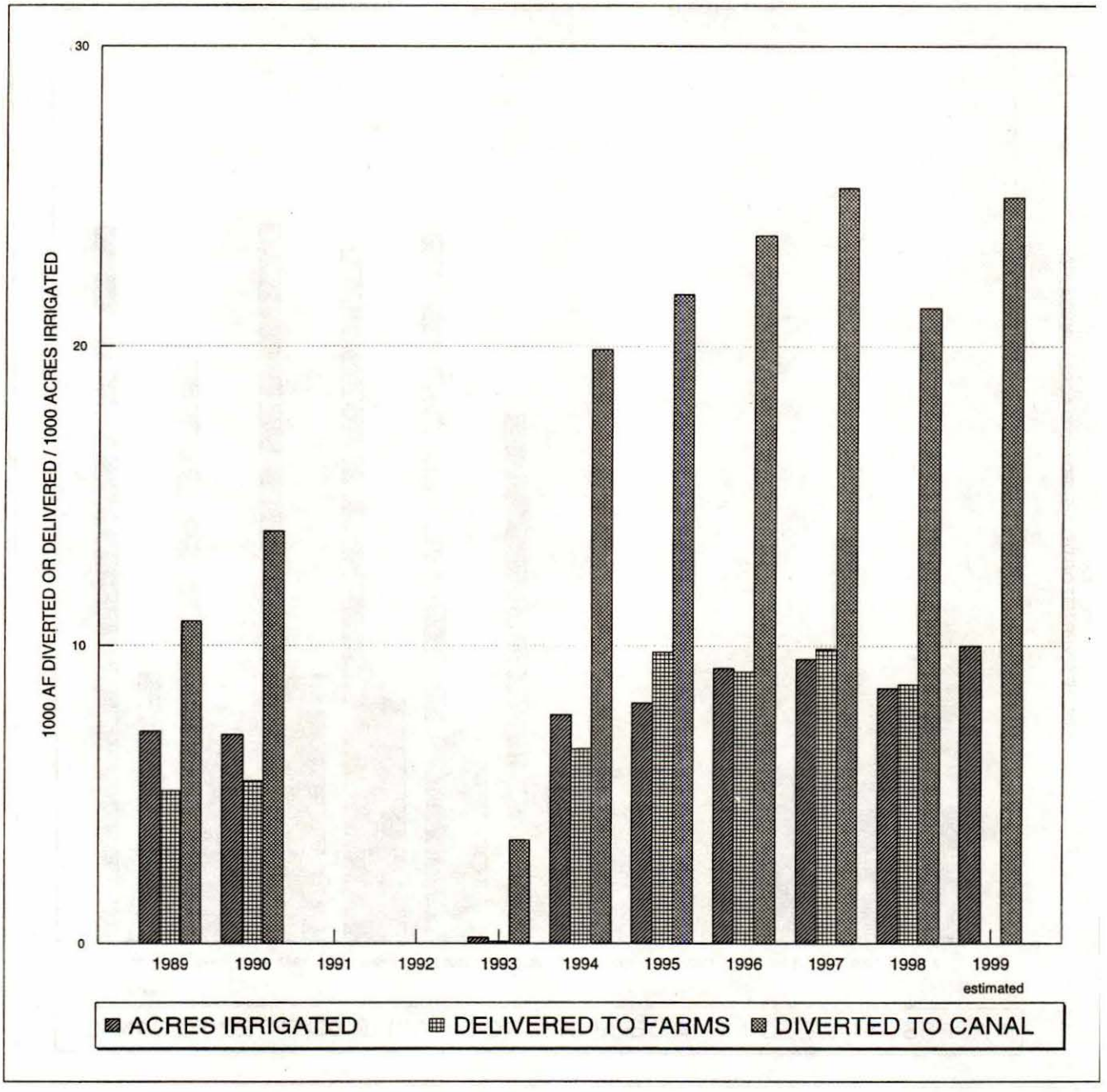
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.92	2.21	2.08	0.86	0.90	2.04	2.28	2.03	1.91	1.96
DELIVERED af/acre	1.09	1.19	1.05	0.17	0.10	0.90	1.22	1.16	1.04	1.07
EFFICIENCY	57%	54%	50%	20%	11%	44%	53%	57%	55%	55%

FORECASTED SHORTAGES (1999)

DRY YEAR	34,400
NORMAL YEAR	0 AF

KIRWIN IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.52	1.98	0.00	0.00	16.86	2.59	2.69	2.56	2.65	2.48
DELIVERED af/acre	0.72	0.78	0.00	0.00	0.26	0.85	1.21	0.99	1.04	1.01
EFFICIENCY	47%	39%	0%	0%	2%	33%	45%	39%	39%	41%

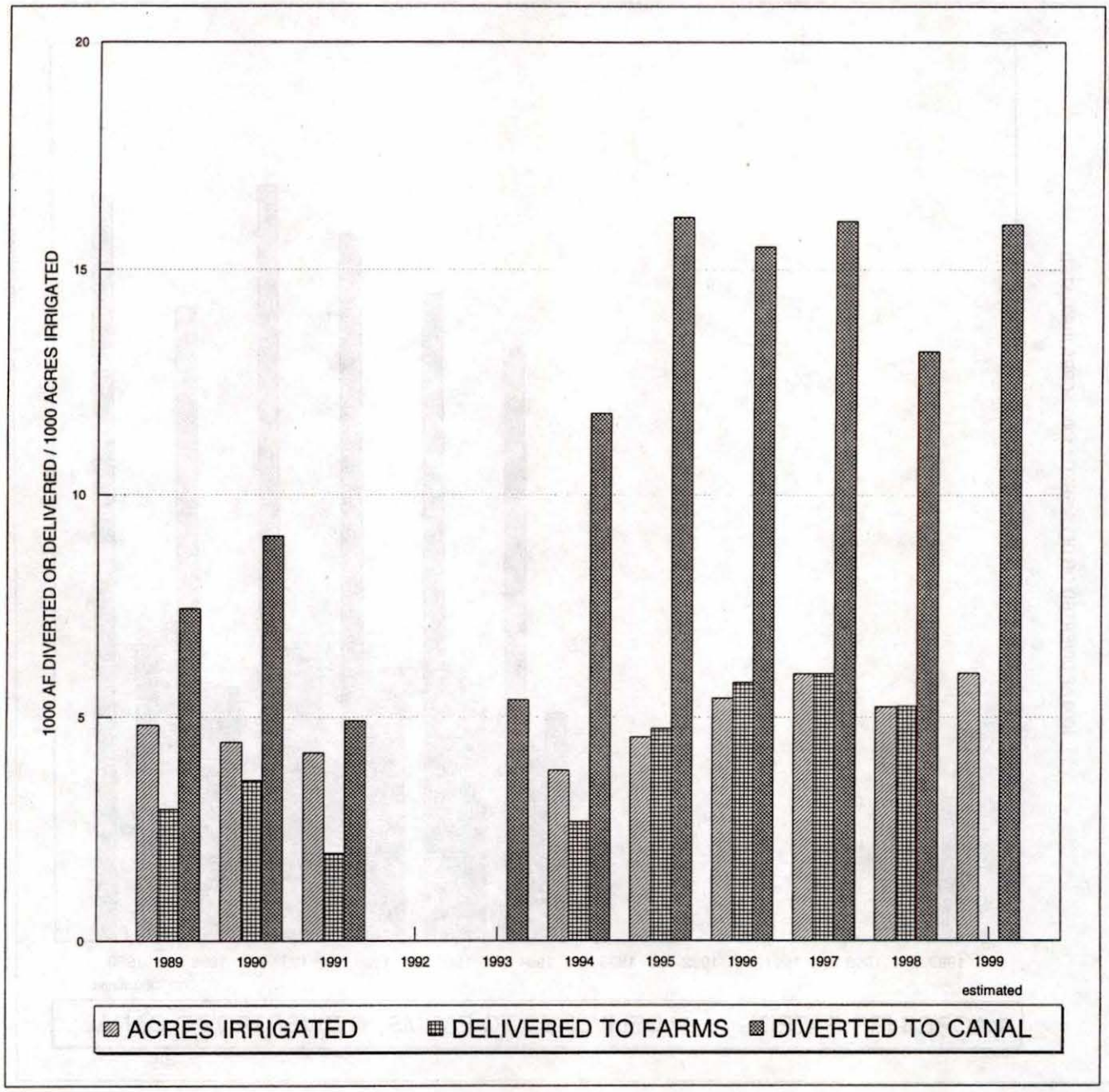
FORECASTED SHORTAGES (1999)

DRY YEAR	0 AF
NORMAL YEAR	0 AF

EXHIBIT 30

WEBSTER IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	1.55	2.04	1.17	0.00	0.00	3.09	3.55	2.86	2.68	2.52
DELIVERED af/acre	0.61	0.81	0.46	0.00	0.00	0.70	1.04	1.07	1.00	1.00
EFFICIENCY	39%	39%	40%	0%	0%	23%	29%	37%	37%	40%

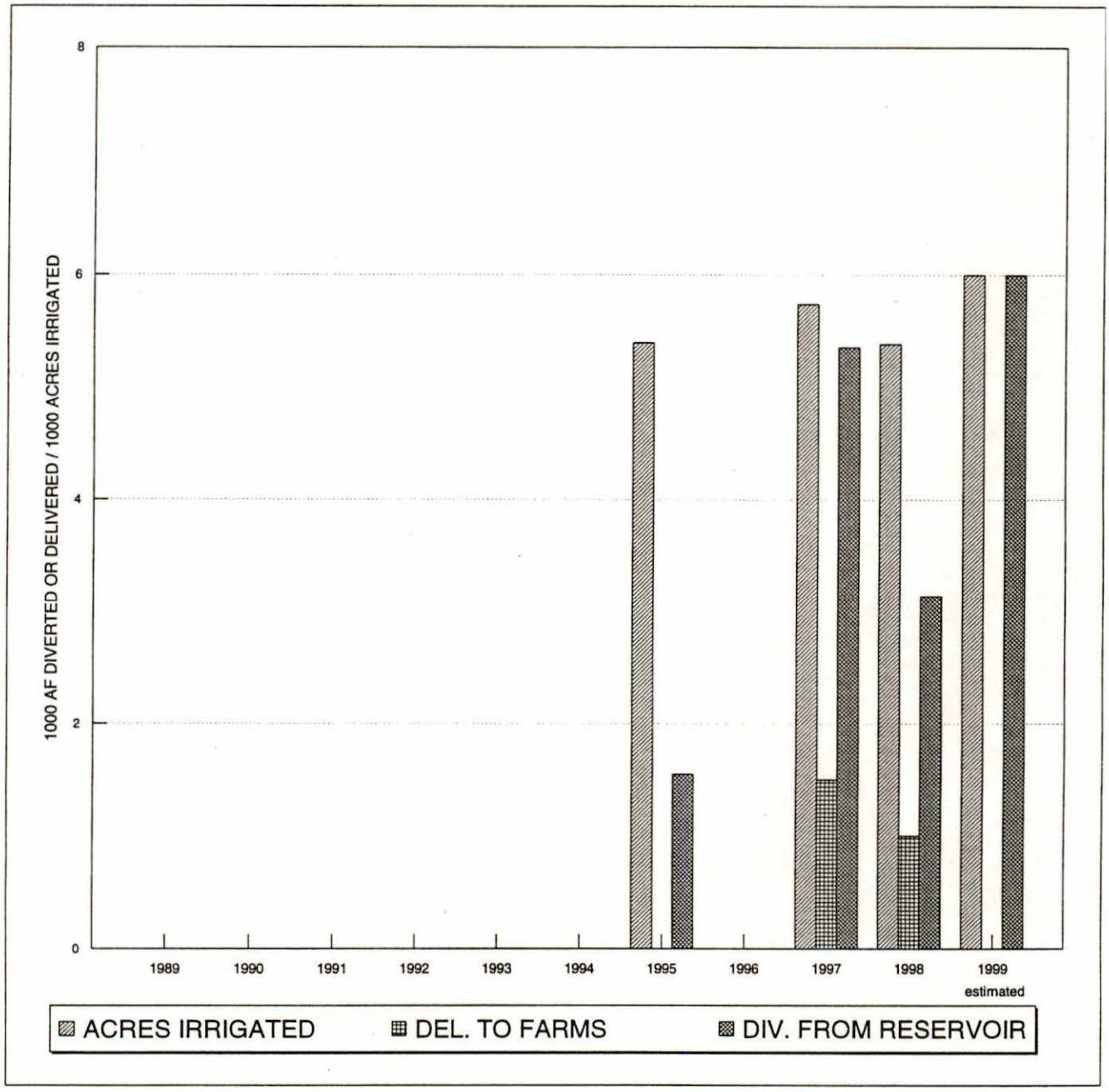
FORECASTED SHORTAGES (1999)

DRY YEAR	0 AF
NORMAL YEAR	0 AF

EXHIBIT 31

GLEN ELDER IRRIGATION DISTRICT

CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
DIVERTED af/acre	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.93	0.58
DELIVERED af/acre	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.19
EFFICIENCY	0%	0%	0%	0%	0%	0%	0%	0%	28%	32%

FORECASTED SHORTAGES (1999)

DRY YEAR	0 AF
NORMAL YEAR	0 AF

N

EXPLANATION

Reservoir
Diversion Dam
Pumping Plant
Canal
Irrigated Land

SANDHILLS DIVISION
AINSWORTH UNIT
Merritt Reservoir Capacity Allocation
Conser. 72,872 a.f.
Dead 1,614 a.f.
Total 74,486 a.f.
Merritt Dam
Ainsworth Canal
Ainsworth
Box Butte Dam
Box Butte Reservoir Capacity Allocation
Conser. 30,420 a.f.
Dead 640 a.f.
Total 31,060 a.f.
Mirage Flats Canal
Dunlap Diversion Dam
MIRAGE FLATS PROJECT
Alliance
Chadron
Gordon
Hay Springs
Valentine
Lewis & Clark Lake
Niobrara
O'Neill
Norfork
Moon Lake
Calamus River
Calamus Reservoir Capacity Allocation
Conser. 126,583 a.f.
Dead 817 a.f.
Total 127,400 a.f.
NORTH LOUP DIVISION
Kent Diversion Dam & Canal
Virginia Smith Dam
Burwell
Mirdan Canal
Geranium Canal Pumping Plant
Geranium Canal
Sargent Canal
Milburn Diversion Dam
Scotia Canal
Ord
Davis Creek Reservoir Capacity Allocation
Conser. 32,328 a.f.
Dead 131 a.f.
Total 32,459 a.f.
SARGENT UNIT
Woods Park Pumping Plant
Arcadia Diversion Dam
Sherman Feeder Canal
Davis Creek Dam
Fullerton Canal
Elba Canal
Fullerton
Columbus
Broken Bow
Sherman Reservoir Capacity Allocation
Conser. 65,237 a.f.
Dead 3,839 a.f.
Total 69,076 a.f.
Sherman Dam
Turkey Creek
Farwell Main Canal
Farwell Lower Main Canal
Farwell Central Canal
Farwell Upper South Canal
Farwell South Canal
Deer Station Lateral & Pumping Plant
FARWELL UNIT
MIDDLE LOUP DIVISION
Grand Island
Lexington
Kearney
Omaha
Lincoln
Beatrice
Scottsbluff
Oshkosh
Lake McConaughy
Sidney
Ogallala
North Platte
NEBRASKA
COLORADO
FRENCHMAN–CAMBRIDGE DIVISION
RED WILLOW UNIT
Enders Reservoir Capacity Allocation
Flood 30,048 a.f.
Conser. 35,394 a.f.
Dead 7,516 a.f.
Total 72,958 a.f.
Imperial
FRENCHMAN UNIT
Hugh Butler Lake Capacity Allocation
Flood 48,846 a.f.
Conser. 31,039 a.f.
Dead 5,185 a.f.
Total 85,070 a.f.
Red Willow Dam
Red Willow Diversion Dam
Red Willow Canal
Cambridge
Cambridge Diversion Dam
Cambridge Canal
Harry Strunk Lake Capacity Allocation
Flood 52,715 a.f.
Conser. 31,545 a.f.
Dead 4,160 a.f.
Total 88,420 a.f.
CAMBRIDGE UNIT
Harlan County Lake Capacity Allocation
Flood 496,718 a.f.
Conser. 315,090 a.f.
Dead
Total 811,808 a.f.
Harlan County Dam (U.S.C.E.)
BOSTWICK DIVISION
FRANKLIN UNIT
SUPERIOR–COURTLAND UNIT
Franklin
Franklin Canal
Franklin Pump Canal
Naponee Canal
Red Cloud
Superior–Courtland Diversion Dam
Superior Canal
Superior
Courtland Canal
Pump No. 1 Canal
North Canal
Ridge Canal
White Rock Canal & Extension
Miller Canal
Pumps No. 3A & 3B
Courtland West Canal
Pump No. 4 Canal
COURTLAND UNIT
Lovewell Dam
Lovewell Reservoir Capacity Allocation
Flood 50,465 a.f.
Conser. 34,007 a.f.
Dead 1,659 a.f.
Total 86,131 a.f.
Tuttle Creek Dam (U.S.C.E.)
Manhattan
Junction City
Abilene
Kansas City
Topeka
Lindsborg
Enders Dam
Swanson Lake Capacity Allocation
Flood 134,077 a.f.
Conser. 110,096 a.f.
Dead 2,118 a.f.
Total 246,291 a.f.
Trenton Dam
Culbertson Diversion Dam
Culbertson Canal
Culbertson Extension Canal
Trenton
McCook
Upper Meeker Sub Canal
Upper Meeker Canal
Driftwood Canal
Driftwood West Canal
Driftwood Sub Canal
Meeker Extension Canal
Bartley Diversion Dam
Bartley Canal
MEEKER–DRIFTWOOD UNIT
UPPER REPUBLICAN DIVISION
Wray
Holyoke
Bonny Reservoir Capacity Allocation
Flood 128,820 a.f.
Conser. 39,922 a.f.
Dead 1,418 a.f.
Total 170,160 a.f.
ARNEL UNIT
Bonny Dam
Hale
Burlington
St. Francis
KANASKA DIVISION
Oberlin
Atwood
Norton
ALMENA UNIT
Almena Main Canal
Almena South Canal
Almena Diversion Dam
Keith Sebelius Lake Capacity Allocation
Flood 98,803 a.f.
Conser. 33,217 a.f.
Dead 2,716 a.f.
Total 134,758 a.f.
Norton Dam
KIRWIN UNIT
Phillipsburg
Kirwin Reservoir Capacity Allocation
Flood 215,136 a.f.
Conser. 93,185 a.f.
Dead 4,959 a.f.
Total 313,290 a.f.
Kirwin Main Canal
Kirwin North Canal
Kirwin South Canal
Kirwin Dam
Glen Elder Dam
Glen Elder
Osborne Canal
Webster Reservoir Capacity Allocation
Flood 183,353 a.f.
Conser. 74,271 a.f.
Dead 1,256 a.f.
Total 258,880 a.f.
Stockton
Osborne
Woodston Diversion Dam
Webster Dam
WEBSTER UNIT
Waconda Lake Capacity Allocation
Flood 722,315 a.f.
Conser. 240,224 a.f.
Dead 1,236 a.f.
Total 963,775 a.f.
Beloit
GLEN ELDER UNIT
SOLOMON DIVISION
Cedar Bluff Reservoir Capacity Allocation
Flood 191,860 a.f.
Conser. 176,829 a.f.
Dead 8,261 a.f.
Total 376,950 a.f.
Wakeeney
Hays
Russell
Ness City
Cedar Bluff Dam
CEDAR BLUFF UNIT
SMOKY HILL DIVISION
Wilson Dam (U.S.C.E.)
Lincoln
Salina
Kanopolis Dam (U.S.C.E.)
Milford Dam (U.S.C.E.)
COLORADO
KANSAS
NEBRASKA
KANSAS

10 0 10 20 30
SCALE OF MILES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MIRAGE FLATS AND MISSOURI RIVER BASIN PROJECTS
NIOBRARA, LOWER PLATTE AND KANSAS RIVER BASINS

IRRIGATION AND FLOOD CONTROL FACILITIES

GRAND ISLAND, NEBRASKA

SUPERCEDED BY 000005PW.DWG
DWG. NO. 60–705–1

JANUARY 20, 1984
REVISED NOVEMBER 24, 1986
REVISED JANUARY 14, 1991
REVISED NOVEMBER 20, 1998