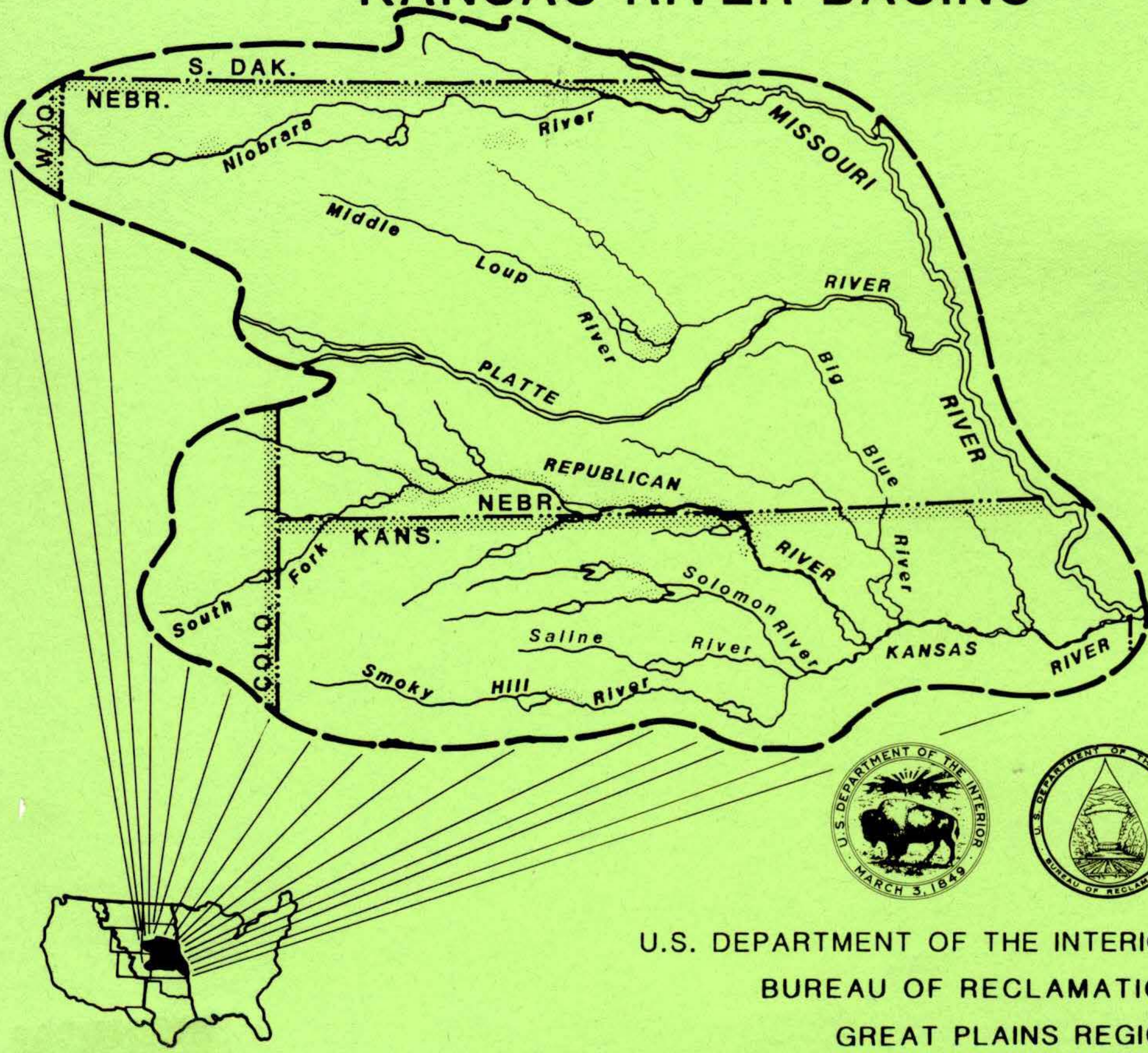
CALENDAR YEARS
1990–1991

ANNUAL OPERATING PLANS

NIOBRARA, LOWER PLATTE, AND KANSAS RIVER BASINS



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

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BILLINGS, MONTANA

ANNUAL OPERATING PLANS

NIOBRARA, LOWER PLATTE, AND KANSAS RIVER BASINS

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General

This year is the thirty-eighth 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 Control Field Branch, McCook, Nebraska for the 17 dams and reservoirs that are located in Colorado, Nebraska, and Kansas. These reservoirs, together with 10 diversion dams, 11 pumping plants, and 25 canal systems, serve approximately 307,500 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. Davis Creek Dam is a feature of the North Loup Division and was completed this past year. The first stage of the reservoir filling process is scheduled to begin this spring.

Public Law 101-359 dated August 10, 1990, changed the name of Calamus Dam to Virginia Smith Dam effective January 3, 1991.

The reservoirs in the Niobrara and Lower Platte River Basins are operated by either irrigation or reclamation districts, and the reservoirs in the Kansas River Basin are operated by either the Bureau of Reclamation (Reclamation), or the Corps of Engineers. Virginia Smith and Davis Creek Dams are operated and maintained by the Twin Loups Reclamation District under an agreement with Reclamation. 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 located at McCook is used to assist in operational management of all eleven dams under Reclamation's jurisdiction that are located in the Kansas River Basin.

The Headlines 90 that follows this synopsis is indicative of the awareness of the local people of the natural resource development and conservation in the Niobrara, Lower Platte, and Kansas River Basins.

1990 Summary

Climatic Conditions

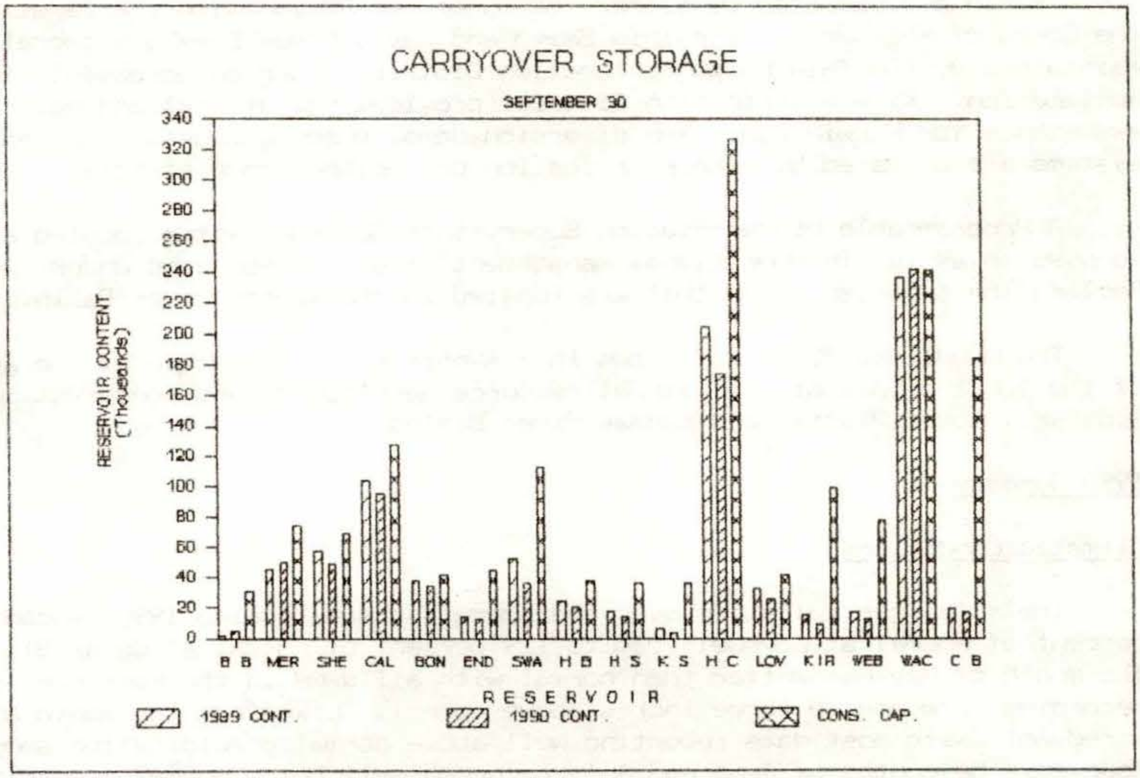
The total precipitation over the operating area during 1990 ranged from 82 percent of normal at Lovewell Dam to 129 percent of normal at Cedar Bluff Dam. The month of May was wetter than normal with all dams in the Kansas River Basin recording from one to three inches above normal. Likewise, the month of August fared well with most dams reporting well above normal precipitation amounts. However, the months of June and July recorded well below normal precipitation amounts throughout the basin with a few exceptions. Temperatures for the months of January and November averaged well above normal during 1990. The warmest temperatures in 1990 were experienced during the last week of June and the first week of July when several daily highs exceeded the 100 degree mark. The coldest temperatures occurred in the last ten days of the year with temperatures dropping to nearly 20 degrees below zero over much of the projects area. March was an active month with a record breaking 17 tornadoes reported in Nebraska on March 14. Kansas also reported several tornadoes during the month. Planting of crops occurred 10 to 14 days earlier than normal. Fall harvest conditions were excellent.

Storage Reservoirs

1. Conservation Operations. The 1990 inflows were below the dry-year forecast at Box Butte, Cedar Bluff, Enders and Bonny Reservoirs and Swanson, Hugh Butler, Harry Strunk and Harlan County Lakes. Keith Sebelius and Waconda Lakes and Kirwin and Webster Reservoirs had inflows between the dry- and normal-year forecasts. Lovewell, Sherman, Merritt, and Calamus Reservoirs had inflows between the normal- and wet-year forecast.

Carryover storage in the Nebraska-Kansas Projects reservoirs at the end of September was approximately 73,000 A.F. less than it was in 1989. Several reservoirs were at or near a ten year low in reservoir storage at the end of September. The following reservoirs were at their lowest end of September storage since; Enders Reservoir, 1978; Harlan County Lake, 1978; Swanson Lake, 1979; Hugh Butler Lake, 1980; Harry Strunk Lake, 1980; Kirwin Reservoir, 1980; Norton Reservoir, 1982; Lovewell Reservoir, 1982; and Webster Reservoir, 1983. The Republican River Basin reservoir storage was at its lowest level since 1978, and the combined reservoir storage in the Projects area was at its lowest level since 1980.

The following summarized graph shows a comparison of 1989 and 1990 carryover storage and total conservation storage for all reservoirs in the Niobrara, Lower Platte, and Kansas River Basins.



2. Flood Control Operations. The total 1990 flood control benefits accrued by the operation of the Nebraska-Kansas Projects dams was $562,000. The accumulative total of flood control benefits for the years 1951 through 1990 by facilities in this report total $76,809,000 (see table 5). To date no benefits have been accrued by the operation of Box Butte, Merritt, Sherman, or Virginia Smith Dams.

Water Service

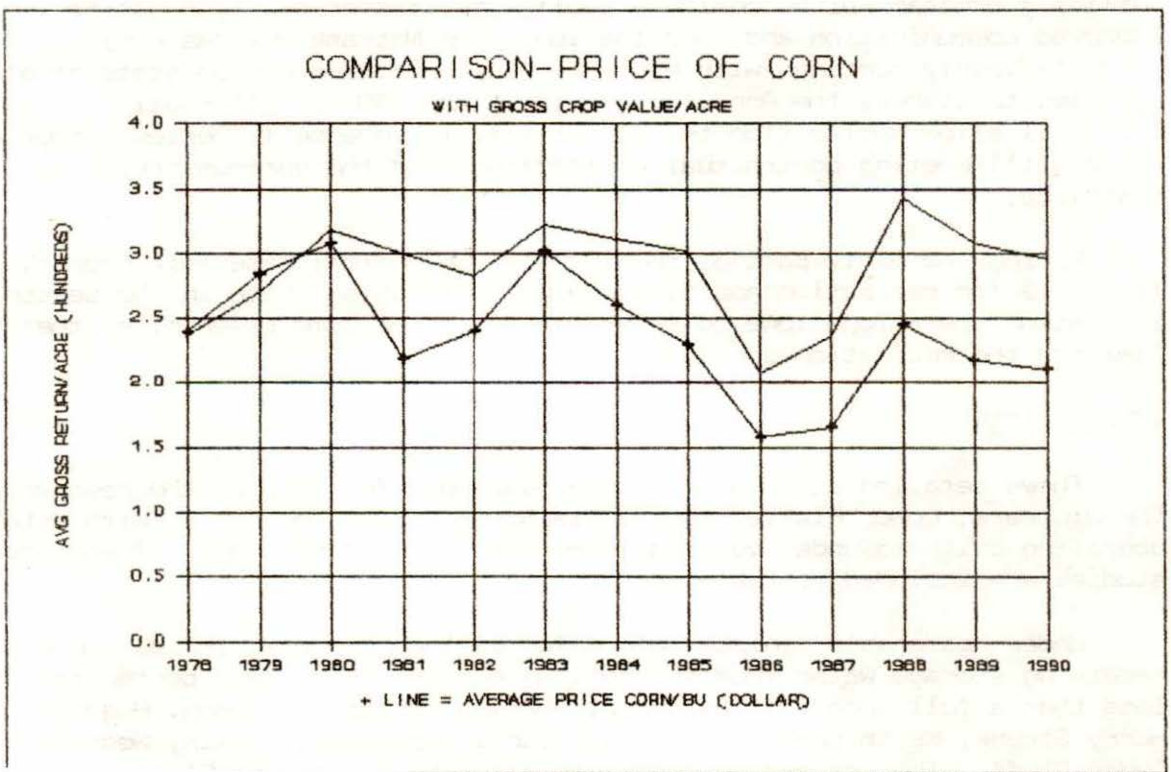
There were 460,532 acre-feet of water diverted to irrigate 251,597 acres of projects lands in 13 of the 14 irrigation districts (see tables 3 and 6). The project water supply was either inadequate or limited for 174,925 acres of the total project lands. This includes lands in Mirage Flats, Frenchman Valley, H&RW, Frenchman-Cambridge, Nebraska and Kansas Bostwick, Almena, Kirwin, Webster, and Cedar Bluff Irrigation Districts. No project water was available for delivery to Cedar Bluff Irrigation District. The project water supplies for the other units mentioned in this report were adequate in 1990.

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

Under a long-term contract with Reclamation for use of the Arcadia Diversion Dam, the Middle Loup Public Power and Irrigation District diverted 39,294 acre-feet to irrigate 14,252 acres of non-project lands. These diversions were made under natural-flow water rights granted by the state of Nebraska.

Irrigation Production

The 1990 crop yields from lands receiving project water exceeded or equalled those of 1989 for all districts except H&RW, Nebraska and Kansas Bostwick, and Farwell. Corn, the principal crop, increased from an average of 133 bushels per acre to 138 bushels per acre. Unit prices for grain and soybeans were slightly lower than those in 1989. The total gross crop value for districts receiving project water was $74,537,664. The average gross crop value per acre decreased from $307.87 to $296.26 during 1990. The following graph compares corn prices with the gross crop value per acre.



The following summary shows the comparison of corn yields for each irrigation district.

Irrigation District	Corn Yield (bu/acre) 1989	1990
Mirage Flats	107	133
Ainsworth	111	144
Sargent	124	130
Farwell	139	132
Twin Loups	131	136
Frenchman Valley	152	154
H&RW	148	139
Frenchman-Cambridge	134	145
Almena	149	155
Bostwick in Nebraska	147	141
Kansas-Bostwick	159	139
Kirwin	128	133
Webster	103	113
Cedar Bluff	*	*
Average of Districts Reporting	133	138

*No project water supplied; not included in averages.

Fish and Wildlife and Recreation Benefits

The National Recreational Fisheries Policy declares that the Governments vested with stewardship responsibilities must work in concert with the state managing agencies 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 area. These guidelines outline a program which considers public use, fisheries, fish habitat, and improved communication and coordination. The Nebraska-Kansas Projects Office conducts yearly meetings 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 1990 season, normal reservoir operations were favorable for recreation and fish and wildlife uses. Late in the season, irrigation operations lowered reservoir levels at some reservoirs, thereby limiting the recreation benefits.

1991 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 as table 4.

Under reasonable minimum inflow forecast conditions, irrigation districts receiving storage water from the following reservoirs are expected to receive less than a full supply: Box Butte, Sherman, Enders, Swanson, Hugh Butler, Harry Strunk, Keith Sebelius, Harlan County, Lovewell, Kirwin, Webster and Cedar Bluff. The irrigation districts affected are Mirage Flats; Sargent and Farwell; Frenchman Valley and H&RW; Frenchman-Cambridge; Almena; Nebraska and Kansas Bostwick; Kirwin and Webster; and Cedar Bluff, respectively. If 1991 is a dry year, 211,700 of the total 266,700 acres estimated to be irrigated (79 percent) will have an inadequate water supply.

Under most probable inflow conditions, it is also expected that Almena, Frenchman Valley, H&RW, Kirwin, Cedar Bluff, Mirage Flats, Sargent, and Farwell Irrigation Districts would experience some shortages to irrigation demands from Keith Sebelius Lake and Enders, Kirwin, Cedar Bluff, Box Butte, and Sherman Reservoirs. Irrigators in several districts (Mirage Flats, Kirwin, Webster, Almena, Frenchman Valley, and H&RW) plan to use water from private wells to supplement the project water supply. The municipal and rural water district water supply requirements will be met under all three inflow forecast conditions for all units except Cedar Bluff. Under a share-shortage procedure adopted for the currently extremely low storage conditions at Cedar Bluff, the city of Russell could experience shortages in dry-year inflow forecast conditions.

During 1991, 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. Reclamation will also make Waconda Lake storage water available under temporary water service contracts.

Even under reasonable minimum inflow conditions, the conservation pools at Merritt, Sherman, Calamus, and Lovewell Reservoirs would fill during 1991. Harry Strunk Lake will fill under most probable inflow conditions.

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 '90

Bureau installing new devices

Groundwater is precious resource

Irrigators organize to keep water rights

Omaha World-Herald

Districts' Farmers Adjust To Irrigation Shutdown

McCook Daily Gazette Thursday, March 29, 1990

Water quality hasn't escaped area

McCook Daily Gazette

Tornados hit area farms, homes

Reservoirs at decade low point

Water table decline in NRD third largest since 1973

Weather, heavy irrigation blamed

State plans to study ground water in area

NRD board supports special protection area

Is it too late to save the Ogallala Aquifer?

Irrigation ranks as billion dollar industry for Nebraska

Drilling of irrigation wells increases 300% last year

Moratorium on New Water Rights Issued for Upper Niobrara River

Nebraska water yields good corn

McCook Daily Gazette Thursday, May 24, 1990

Below-normal inflows reported for 22nd year at Enders Reservoir

Rivers share low-water problems

Hearing Scheduled On Senate Measure For Irrigation Limits

Irrigation system could help lower water use

Bureau begins releases from Swanson Reservoir

Wind erosion rises in Great Plains area

181,750 Nebraska Acres Fall Under Wetlands Plan

May rains welcome relief for area crops

Irrigation cutoff earliest ever

Agriculture
Irrigation farmers need to be vigilant

McCook Daily Gazette Thursday, March 29, 1990

Southwest Nebraska land values increase

One-third of tested wells high in nitrates

Water costs threatened

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 1990 and serves as a guideline for the 1991 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 area. 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. 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, and Sherman Dams and Reservoirs. The Corps of Engineers operates and maintains Harlan County Dam and Lake. The state of Colorado provides operational guidelines for Bonny Reservoir. Reclamation operates and maintains 12 dams and reservoirs in the Lower Platte, Republican, Solomon, and Smoky Hill River Basins. A three year contract, which became effective July 1, 1988, provides for Kirwin Irrigation District to perform certain operational and maintenance functions at Kirwin Dam. Under a contract with Reclamation, the Twin Loups Reclamation District will operate and maintain Virginia Smith and Davis Creek Dams during 1991.

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.

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 equalled 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 1990 were used for the analysis of those reservoirs in the Kansas River Basin. Inflow records from 1967 through 1990 were used for the analysis of the reservoirs located in the Niobrara and Lower Platte Basins, except for Calamus Reservoir where the more recent record of 1986 through 1990 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 carryover 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 a part of the Pick-Sloan Missouri Basin Program and include 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 Dam in the Lower Platte River Basin. Under a contract with Reclamation, the Twin Loups Reclamation District will operate and maintain Virginia Smith and Davis Creek Dams during 1991. Following completion of the North Loup Project distribution works the responsibility for the operation and maintenance of Virginia Smith Dam and Davis Creek Dam will be transferred to the district.

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.

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

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. Construction of the Calamus Fish Hatchery continues to make good progress with Phase II work nearly complete and over half of the Phase III work completed. Operation of this fish hatchery is scheduled to begin this year.

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.

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 1991 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.

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 1981 to 1990, the project water supply averaged 14,646 acre-feet, which is about 1.26 acre-foot per irrigable acre. This amount is 1.06 acre-foot per acre short of the average diversion requirement of 2.32 acre-feet per acre. The March 1965 report on the project estimated this amount to be necessary for a full water supply. Many irrigators supplement their water supply by private wells.

The Mirage Flats Irrigation District cooperates with the Nebraska Game and Parks Commission by operating the Box Butte Dam outlet works gates and the Dunlap Diversion Dam gates in a manner to avoid sudden large changes in the flows of the Niobrara River.

1990 Summary

The flows of the Niobrara River plus the carryover storage in Box Butte Reservoir were not adequate to provide a full water supply for the project lands. The total precipitation in the Mirage Flats area was 15.16 inches, which is 97 percent of normal. The total inflow (15,124 acre-feet) was below the dry-year forecast.

From July through August, diversions of 8,662 acre-feet to the Mirage Flats Canal provided irrigation water for 9,875 acres, 85 percent of the service available acreage. The farm deliveries from the project water supply were 2,967 acre-feet (0.25 acre-foot per irrigable acre), which is a delivery efficiency of 34 percent. The reservoir contained only 3,947 acre-feet of water at the end of the irrigation season. Privately owned irrigation wells supplemented the project water supply. The gross crop value was $2,795,567 which is $572,379 less than the 1989 value.

1991 Outlook

The project water supply is expected to be inadequate in 1991 like it has been since the early 1960's. In the spring, the district will announce to their water users the amount of water that will be available from storage in Box Butte Reservoir. However, the district plans for the irrigators to continue the use of water from privately owned irrigation wells as a supplemental supply. In 1991, 10,900 acres are expected to be irrigated.

An agreement has been made 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. In return the district received an upfront payment which is being used to improve the efficiency of the project's delivery 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 2945.00 feet to reduce shoreline erosion around the reservoir and minimize sand accumulations on the dam. This reservoir level is maintained until May at which time the reservoir is slowly filled. A minimum release of 75 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 cubic feet per second below Merritt Dam. Whenever possible, daily changes in releases to the river should be made in no more than 50 cubic feet per second increments. This will minimize adverse impacts on the Snake River trout fishery downstream of the dam.

The basic water supply for the district is 63,712 acre-feet. If available, additional water can be purchased by the district as a supplemental supply.

1990 Summary

Precipitation, as recorded near Merritt Dam, totaled 18.80 inches of rainfall, which was 97 percent of normal. The water supply was more than adequate to meet the project's irrigation requirement. There were 68,286 acre-feet diverted from Merritt Reservoir into the Ainsworth Canal, with 44,091 acre-feet delivered to the farm headgates (delivery efficiency of 65 percent). There were 33,542 acres of land irrigated in 1990. The gross crop value was $12,283,862, which is $622,761 more than the previous year.

The district executed several temporary water service contracts which provided a total of 108.22 acre-feet of irrigation water from holding ponds located within the district's service area.

1991 Outlook

In 1990-91 winter months and future years, 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. Holding 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 in two stages during the spring months. 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 2945.00 feet. A minimum river release of 75 cfs will be made during this filling operation. The reservoir level will be maintained through the end of April and then slowly filled to the top of conservation pool by late May. 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 1991 for the irrigation of 34,000 acres.

Sargent Unit, Middle Loup Division in Nebraska

General

The Sargent Irrigation District has contracted with the Loup Basin Reclamation District for the O&M of the 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 cubic feet per second 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.

1990 Summary

The precipitation over the Sargent Unit (19.58 inches at district headquarters) was 84 percent of normal. The irrigation diversions into the Sargent Canal totaled 27,351 acre-feet (17,717 acre-feet were delivered to the farm headgates--delivery efficiency 65 percent). The diversions exceeded the direct-flow water right for 20 days. There were 13,235 acres irrigated, and the gross crop value totaled $3,211,746, which is $28,637 less than in 1989. The irrigators grow corn as the principal crop, creating very high water demands in July and August. The demands cannot be met within canal capacity, so the district institutes a rationing process through the peak period, when necessary.

1991 Outlook

The Loup Basin Reclamation District estimates that 13,000 acres in the Sargent Unit will be irrigated in 1991. Under normal- and 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

The Loup Basin Reclamation 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 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 5 feet or more below the top of the conservation capacity. Doing so minimizes seepage from the reservoir into the groundwater table. Maintenance of 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.

Whenever the flows in the Middle Loup River at Arcadia, Nebraska, exceed 6,000 cubic feet per second, flows will be diverted through Sherman Feeder Canal into Sherman Reservoir. Flood control benefits can be accrued to Sherman Reservoir by such operations.

1990 Summary

The diversions from the Middle Loup River at Arcadia Diversion Dam were 39,294 acre-feet to the Middle Loup Public Power and Irrigation District and 99,974 acre-feet 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 1,396 acre-feet and the losses charged as a result of these deliveries totaled 140 acre-feet.

Sherman Feeder Canal diversions into Sherman Reservoir were started on April 12, and the conservation capacity was filled on May 22. The precipitation at Sherman Dam was 22.32 inches, which is 102 percent of normal. Releases into the Farwell Canals totaled 77,011 acre-feet (46,009 acre-feet were delivered to the farm headgates--delivery efficiency 60 percent). The Farwell Irrigation District reported that 44,975 acres of land were irrigated in 1990. The gross crop value was $12,405,562, which is $1,405,831 less than in 1989. Sherman Feeder Canal was shut off October 11.

Under an ongoing program the Farwell Irrigation District has installed a total of about 111 miles of pipe to replace open laterals.

1991 Outlook

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

Under normal- and dry-year inflow conditions, irrigation shortages are expected in 1991. 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. When completed, water will be diverted from the Calamus and North Loup Rivers. The plan provides for direct surface water service to 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 will include Virginia Smith Dam and Calamus Reservoir, Kent Diversion Dam, Davis Creek Dam and Reservoir, five principal canals, one major and one small pumping plant and numerous laterals.

Calamus Reservoir is normally regulated at 3 to 4 feet below the top of conservation capacity during the winter months. Holding 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 regulated to slowly fill to conservation capacity. This operation enhances the spring fish spawn. During the months of July, August, and September, inflows to the reservoir are required to be bypassed under the Power Interference Agreement between Reclamation, the Twin Loups Reclamation District, and the Loup River Public Power District.

Davis Creek Dam was completed in the fall of 1990 with the first stage of reservoir filling scheduled to begin this spring.

1990 Summary

Precipitation at Virginia Smith Dam was 22.33 inches which is 99 percent of normal. The inflow was 227,814 acre-feet which was between the normal- and wet-year forecasts. There were 29,148 acre-feet diverted from Calamus Reservoir into the Mirdan Canal, with 16,537 acre-feet delivered to the farm headgates. Land irrigated in 1990 totaled 17,768 acres. The gross crop value was $4,597,207 which is $759,105 more than the 1989 value. As required, bypasses of the inflows were made during July, August, and September.

1991 Outlook

The reservoir water surface will be held at the present elevation of approximately 2240.00 feet until ice-out, at which time the reservoir will be rapidly filled to an elevation of 2243.50 feet (6 inches below the top of conservation capacity). This reservoir level will be maintained in order to minimize shoreline erosion until demands begin to draw on the reservoir. Bypasses of inflows will be made during July, August and September. In the fall the reservoir will be filled to about elevation 2240.00 feet.

Water has been declared available to serve all irrigable acres with service from the Mirdan, Geranium and Scotia Canals and Lateral Systems. It is estimated that approximately 21,000 acres will be irrigated from Mirdan, Geranium, and Scotia Canals. Water supplies will be sufficient to meet the full dry-year requirements.

Spring releases will be made to initiate filling of Davis Creek Reservoir to elevation 2035. This elevation will be maintained until surfacing of the relocated county road is completed.

The fish hatchery is expected to begin operations this year.

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 hunting conditions each fall.

1990 Summary

The 18.00 inches of precipitation during 1990 was 109 percent of normal. The inflow (14,135 acre-feet) to Bonny Reservoir was below the dry-year forecast. As directed by the Colorado Water Commissioner, 525 acre-feet of reservoir inflows from the South Fork of the Republican River and Landsman Creek were passed through Bonny Reservoir into Hale Ditch. In addition, the Colorado Department of Natural Resources requested storage releases of 1,925 acre-feet for irrigation purposes into Hale Ditch.

1991 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.

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.

1990 Summary

The 17.67 inches of precipitation at Enders Dam was 96 percent of normal. The 1990 inflow into Enders Reservoir (19,308 acre-feet) was below the dry-year forecast. Due to extensive groundwater pumping above the reservoir, the inflow was only 32 percent of the average historical preconstruction runoff at the Enders dam site (60,700 acre-feet from 1929-1947). This year was the twenty-third consecutive year with below-normal inflows in which the conservation pool did not fill. A total of 2,747 acre-feet of water was conserved between the 1989 and 1990 irrigation seasons by pumping seepage back into the reservoir. Irrigation releases began June 16 and were stopped on August 5.

The farm delivery averaged about 0.54 feet per irrigated acre for the two districts. Some farmers were able to supplement their project water supply from private irrigation wells. The Frenchman Valley Irrigation District reports that 8,048 acres received water in 1990, and the H&RW Irrigation District reports 10,604 acres, which are 84 and 92 percent, respectively, of the lands with service available. The gross crop value for Frenchman Valley Irrigation District was $2,512,083 which is a decrease of $136,606 from the previous year. The gross crop value for the H&RW Irrigation District was $2,936,144, which is a decrease of $216,919 from the previous year.

1991 Outlook

The fall and early winter inflows into Enders Reservoir were below the dry-year forecast. If reasonable minimum inflow conditions prevail, the project water supply is expected to experience a shortage of about 30,300 acre feet. Most probable inflow conditions are expected to be inadequate by 3,700 acre-feet, to irrigate the 7,800 acres in the Frenchman Valley Irrigation District and 10,000 acres in the H&RW Irrigation District. Approximately 3,000 acre-feet are expected to be conserved by pumping seepage water back into the Enders Reservoir.

Meeker-Driftwood, Red Willow, and Cambridge Units, Frenchman-Cambridge Division in Nebraska

General

During the spring months, Swanson, Hugh Butler, and Harry Strunk Lakes normally have a rising or stable pool which enhances the spawning of northern pike and walleye. These lakes provide excellent opportunities for fishing, water sports, and recreation.

Service is provided for Frenchman-Cambridge Irrigation District by Meeker-Driftwood Canal to 16,476 acres; Red Willow Canal to 4,932 acres; Bartley Canal to 6,539 acres; and Cambridge Canal to 17,053 acres. The water supply for these lands is provided by storage in Swanson, Hugh Butler, and Harry Strunk Lakes, and inflows of the Republican River and Red Willow and Medicine Creeks.

1990 Summary

The precipitation of 17.26 inches at Trenton Dam was 88 percent of normal. The inflow of 46,738 acre-feet to Swanson Lake was below the dry-year forecast. The reservoir's conservation pool did not fill in 1990, with the maximum water surface elevation of 2747.65 feet reached on June 11. At the beginning of the 1990 irrigation season (June 18), there was 91,886 acre-feet of water stored in Swanson Lake, which is 20,328 acre-feet below the top of conservation capacity. This storage, along with inflows and river pickup flows was sufficient in furnishing a limited water supply to each irrigable acre of the project lands served by the Meeker-Driftwood and Bartley Canal systems. The Frenchman-Cambridge Irrigation District diverted 32,301 acre-feet into Meeker-Driftwood Canal to irrigate 15,193 acres and 9,478 acre-feet into Bartley Canal for 6,012 acres.

The precipitation of 16.44 inches at Red Willow Dam was 84 percent of normal, while the inflow of 14,056 acre-feet into Hugh Butler Lake was below the dry-year forecast. The reservoir's maximum water surface elevation for the year was 2577.66 feet, reached on June 9 (4.14 feet below top of conservation). The water supply was adequate to meet the limited supply designated for Red Willow Canal. The district diverted 8,803 acre-feet of water to irrigate 4,569 acres of land served by Red Willow Canal.

The precipitation of 18.84 inches was 92 percent of normal at Medicine Creek Dam, while the inflow of 30,144 acre-feet was below the dry-year forecast. The reservoir's conservation pool was filled on May 6 with the maximum water surface elevation for the year of 2367.15 feet reached on June 5. Releases were made during April to defer flows from overtopping the uncontrolled spillway until after the walleye spawning period. These releases were made in cooperation with the Nebraska Game and Parks Commission. The water supply was adequate for the limited supply and 28,378 acre-feet of water was diverted to irrigate 15,808 acres of land served by the Cambridge Canal.

The 1990 gross crop value from the lands served by Meeker-Driftwood, Bartley, Red Willow, and Cambridge Canals was $12,938,194, which is $1,171,223 more than in 1989.

1991 Outlook

Forecasts show that carryover 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. In an effort to conserve water, the District management has elected to operate with a limited water supply to each irrigable acre.

It is estimated that 14,900 acres will be served from the Meeker-Driftwood Canal; 16,400 acres will be served from the Cambridge Canal; 4,700 acres will be served from the Red Willow Canal; and 5,900 acres will be served from the Bartley Canal.

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 acre-feet from Keith Sebelius Lake.

1990 Summary

The precipitation at Norton Dam was 21.76 inches, which is 91 percent of normal. The total inflow was 3,979 acre-feet, which was between dry- and normal-year forecasts. Farm delivery averaged about 0.23 acre-foot per irrigated acre from the project water supply. The remaining demands were supplied from privately owned irrigation wells for the twentieth consecutive year. The 5,145 acres irrigated in 1990 produced a gross crop value of $1,769,900, which is $119,577 more than in 1989.

The city of Norton used 503 acre-feet of municipal water during 1990.

The maximum content of Keith Sebelius Lake for the year was 7,657 acre-feet, which was reached on June 12, 1990. At the end of irrigation season (July 17) approximately 382 acre-feet was still available for release.

1991 Outlook

The district expects to deliver water to 5,200 acres if an adequate water supply is available. If 1991 is a dry year without significant run-off producing storms above Keith Sebelius Lake, it is anticipated that significant irrigation shortages of 17,400 acre-feet would occur. If normal inflow into the lake and normal rainfall over the irrigated area occur in 1991, a shortage of 8,300 acre-feet may be experienced.

Requirements for the city of Norton are expected to be met in full in 1991.

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 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 cubic feet per second 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 5 cubic feet per second or zero. At the request of the state of Nebraska, releases of 30 cubic feet per second 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 cubic feet per second 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.

Following a survey of the sediment ranges in 1988, Harlan County Lake area-capacity data was revised and the new data placed in use January 1, 1990.

1990 Summary - Bostwick Division - Harlan County Lake Operations

The precipitation at Harlan County Dam totaled 21.62 inches of rainfall, which is 97 percent of normal. The inflow (92,191 acre-feet) was below the dry-year forecast. No release was required during January, February, or December in accordance to the environmental assessment and the annual operating plan because of the low reservoir level. The highest water surface elevation for the year was 1941.02 feet which was reached on June 22 (4.98 feet below the top of conservation). At the end of irrigation season (September 13) 177,074 acre-feet of storage remained in Harlan County Lake.

The 30,584 irrigated acres of the Bostwick District in Nebraska and the Kansas-Bostwick District above Lovewell Dam could not be furnished a full water supply so the irrigators operated with a limited supply. A total of 48,654 acre-feet (approximately 73 percent of total inflow) were delivered to Lovewell Reservoir through the Courtland Canal.

1990 Summary - Bostwick Division - Nebraska

The Bostwick Irrigation District in Nebraska diverted 41,837 acre-feet for the irrigation of 18,724 acres. The gross crop value was $6,042,805, which is $73,565 less than in 1989.

1990 Summary - Bostwick Division - Kansas

The 1990 precipitation at Lovewell Dam totaled 23.26 inches, which was 82 percent of normal. The reservoir's conservation space filled on May 13. A flood release was not required as releases for large irrigation demands dropped the reservoir from the flood pool. The maximum elevation of the water surface was 1584.69 feet, which was reached on June 22. Anticipating the possibility of water shortages in 1991, natural flow from the Republican River was diverted into Lovewell Reservoir through Courtland Canal from the end of irrigation season until December 19.

The Kansas-Bostwick Irrigation District diverted a total of 80,909 acre-feet to serve 11,860 acres above Lovewell Dam and 24,805 acres below Lovewell Dam. Irrigators operated with a limited supply since a full water supply could not be furnished to these acreages. The gross crop value was $10,399,998, which is $1,039,459 less than the previous year.

1991 Outlook - Bostwick Division

The Bostwick Irrigation District in Nebraska and the Kansas-Bostwick Irrigation District No. 2 expect to deliver water to 20,600 and 38,000 acres, respectively. The storage in Harlan County Lake and Lovewell Reservoir and flows of the Republican River and White Rock Creek will be inadequate to meet the full dry-year irrigation requirement for the Bostwick lands. In an effort to conserve water, the District management has again elected to operate with a limited water supply to each irrigable acre.

Inflow to Lovewell Reservoir from the Courtland Canal will start as necessary to allow for filling the reservoir from natural flow in the Republican River without storage releases from Harlan County Lake.

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 storage from Kirwin Reservoir and inflows from the North Fork of the 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.

1990 Summary

The precipitation totaled 25.60 inches, which was 111 percent of normal. The inflow (12,320 acre-feet) was between the dry- and normal-year forecasts. Kirwin Canal was operated from June 26 until August 16. The district diverted 13,855 acre-feet for irrigation of 6,994 acres. Irrigators in the district continued to pump water from private wells to supplement irrigation of project lands. The district reported a gross crop value of $1,665,663, which is an $80,350 increase from the previous year.

1991 Outlook

The district estimates that 7,000 acres may be irrigated in 1991. Normal precipitation and normal forecasted inflows from the North Fork of the Solomon River would be inadequate to irrigate these lands. A shortage of 2,500 acre-feet may be experienced with normal-year forecasts. Under dry-year forecasts, a shortage of about 18,700 acre-feet may be experienced.

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 of the Solomon River.

1990 Summary

In 1990, the precipitation at Webster Dam was 117 percent of normal (26.70 inches). The inflow of 12,099 acre-feet was between the dry- and normal-year forecasts.

The district diverted 9,070 acre-feet for irrigation of 4,440 acres. Irrigators with private wells provided water for part of the project lands as a supplemental supply. The district reported a gross crop value of $978,933, which is $173,133 more than the previous year.

1991 Outlook

The carryover storage and the flows in the South Fork of the Solomon River are expected to be adequate under normal- or wet-year forecasts to irrigate 4,500 acres in the district in 1991. However, if dry-year inflows continue a shortage of 15,000 acre-feet may be experienced.

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, temporary short-term water service contracts, and water right administration. The water service contract with Beloit, Kansas, provides for the annual use of up to 2,000 acre-feet 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 acre-feet per calendar year.

To lessen ice damage to the upstream face of Glen Elder Dam during winter months, releases from Waconda Lake will be regulated each year to maintain a constant water surface level while the lake is ice-covered. This level will be varied from 0 to 5 feet below the top of conservation capacity.

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 prevents wind erosion and provides winter food and cover for wildlife and fish with spawning habitat in the spring when these areas are inundated.

1990 Summary

The precipitation at Glen Elder Dam was 105 percent of normal (26.27 inches). The inflow (100,728 acre-feet) was between dry- and normal-year forecasts. Storage releases of 75 acre-feet were made for the City of Beloit and 1,099 acre-feet was bypassed for quality control as directed by the State Water Commissioner. Other controlled releases were 54,872 acre-feet. This amount includes 1,296 acre-feet purchased by irrigators under temporary contracts. Releases of 651 acre-feet were made to the Mitchell County Rural Water District No. 2.

1991 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 a Kansas Water Commissioner will request that inflows be passed through the lake for water right administration. Waconda Lake storage water will be available to natural flow appropriators under short-term water service contracts. To minimize ice damage, the reservoir will be regulated to maintain a constant level during the months the reservoir is ice-covered. Waconda Lake will be operated with a stable or slowly rising pool early in the year and refilled with available inflows starting in late spring of 1991. Under normal-year conditions, the lake will be maintained at about 3.0 feet below the top of the conservation pool for next winter.

Cedar Bluff Unit, Smoky Hill Division in Kansas

General

Cedar Bluff Reservoir storage and Smoky Hill River Flows provide a water supply for the 6,800 acres in the Cedar Bluff Irrigation District. If required Cedar Bluff storage also furnishes a maximum of 2,000 acre-feet each year for the city of Russell, Kansas. No water has been available for delivery to the district since 1978.

Following several years of below-normal inflows, a share-shortage procedure was adopted July 31, 1981. Separate pools were established for each user with inflow, outflow, and evaporation allocated on a monthly basis. Inflow and initial pool allocations were made on the basis of perfected maximum annual usage with the maximum accumulated storage being that allowed by each user's water right.

A memorandum of understanding between Reclamation, Fish and Wildlife Service, the State of Kansas and Cedar Bluff Irrigation District No. 6 concerning the reformulation and operation of the Cedar Bluff Unit was executed on December 17, 1987. Implementation of the memorandum of understanding awaits appropriate legislative action by the Congress.

1990 Summary

The precipitation was 26.48 inches which is 129 percent of normal. The inflow (3,653 acre-feet) was below the dry-year forecast. This year's high content of 18,964 acre-feet was reached on May 28 and was 16,356 acre-feet below the bottom of active storage. Due to continuing low water levels, no irrigation releases were made in 1990 (twelfth consecutive year). The state of Kansas used the fish hatchery facility with 67 acre-feet released to the facility. No releases were made for the city of Russell.

1991 Outlook

The reservoir elevation of 2096.69 feet on December 31, 1990, remains in the inactive pool. With dry-and normal-year inflows, the total irrigation demand of 21,000 and 14,800 acre-feet respectively, would be shorted. With wet-year conditions, a shortage of about 500 acre-feet would be experienced. No irrigation releases are anticipated during 1991. The Kansas Department of

Wildlife and Parks estimates that 400 acre-feet will be used in the operations of the fish hatchery facility during 1991.

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	131	280	32,459	---
	Net Acre-feet	131	149	32,179	---
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	- Elevation Ft.	3080.0	3082.4	3112.3	3127.0
	Total Acre-feet	8,467	9,968	44,480	74,520
	Net Acre-feet	8,467	1,501	34,512	30,040
Swanson Lake	- Elevation Ft.	2710.0	2720.0	2752.0	2773.0
	Total Acre-feet	2,118	12,430	112,214	246,291
	Net Acre-feet	2,118	10,312	99,784	134,077
Hugh Butler Lake	- Elevation Ft.	2552.0	2558.0	2581.8	2604.9
	Total Acre-feet	6,313	10,450	37,776	86,627
	Net Acre-feet	6,313	4,137	27,326	48,851
Harry Strunk Lake	- Elevation Ft.	2335.0	2343.0	2366.1	2386.2
	Total Acre-feet	4,160	8,859	35,705	88,420
	Net Acre-feet	4,160	4,699	26,846	52,715
Keith Sebelius Lake	- Elevation Ft.	2275.0	2280.4	2304.3	2331.4
	Total Acre-feet	2,718	5,284	35,935	134,738
	Net Acre-feet	2,718	2,566	30,651	98,803
Harlan County Lake 3/	- Elevation Ft.	1885.0	1927.0	1946.0	1973.5
	Total Acre-feet	0	120,790	315,090	811,808
	Net Acre-feet	0	120,790	194,300	496,718
Lovewell	- Elevation Ft.	1562.0	1571.7	1582.6	1595.3
	Total Acre-feet	5,054	16,760	41,690	92,150
	Net Acre-feet	5,054	11,706	24,930	50,460
Kirwin	- Elevation Ft.	1693.0	1697.0	1729.25	1757.3
	Total Acre-feet	6,385	9,785	99,435	314,550
	Net Acre-feet	6,385	3,400	89,650	215,115
Webster	- Elevation Ft.	1855.5	1860.0	1892.45	1923.7
	Total Acre-feet	2,184	5,300	77,371	260,740
	Net Acre-feet	2,184	3,116	72,071	183,369
Waconda Lake	- Elevation Ft.	1407.8	1428.0	1455.6	1488.3
	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.)		55,355	318,248	1,602,067	3,955,210 2/
Total Net Acre-feet		55,355	262,893	1,283,819	2,353,143

1/ Includes space for sediment storage.
2/ Includes total active storage for Box Butte, Merritt, Sherman, Calamus, and Davis Creek Reservoirs.
3/ Harlan County Lake data revised and placed in use January 1, 1990.

TABLE 2
SUMMARY OF 1990 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.	1,587	41	52	0.05	6,242	0	0
Feb.	1,586	44	74	0.42	7,710	0	0
Mar.	2,418	52	152	1.45	9,924	0	0
Apr.	2,087	53	281	2.08	11,677	0	0
May	1,107	53	249	2.94	12,482	0	0
June	545	56	459	2.25	12,512	0	0
July	0	5,661	732	2.26	6,119	5,773	1,656
Aug.	1,509	2,886	277	0.65	4,465	2,889	1,311
Sep.	880	43	227	1.33	5,075	0	0
Oct.	1,193	46	152	0.86	6,070	0	0
Nov.	1,147	44	91	0.64	7,082	0	0
Dec.	1,065	44	57	0.23	8,046	0	0
TOTAL	15,124	9,023	2,803	15.16	--	8,662	2,967

NOTE.--Mirage Flats Canal: Acres irrigated 1990 -- 9,875

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.	14,994	15,025	240	0.02	68,560	0	0
Feb.	14,144	13,289	305	0.29	69,110	0	0
Mar.	17,227	11,415	436	1.97	74,486	0	0
Apr.	14,472	13,726	746	1.47	74,486	1,301	0
May	15,591	14,212	790	5.33	75,075	2,415	4
June	14,184	13,678	1,382	2.07	74,199	3,751	898
July	15,199	30,218	1,245	2.58	57,935	28,217	20,333
Aug.	19,303	23,280	952	2.57	53,006	20,899	14,295
Sep.	12,731	15,253	772	0.66	49,712	11,703	8,561
Oct.	16,240	3,074	685	0.58	62,193	0	0
Nov.	14,867	7,785	444	0.88	68,831	0	0
Dec.	13,737	13,418	319	0.38	68,831	0	0
TOTAL	182,689	174,373	8,316	18.80	--	68,286	44,091

NOTE.--Ainsworth Canal: Acres irrigated 1990 -- 33,542

MIDDLE LOUP DIVISION

	SARGENT UNIT SARGENT CANAL		MIDDLE LOUP UNIT 1/ MIDDLE LOUP PUBLIC POWER CANALS	FARWELL UNIT							
					SHERMAN RESERVOIR					FARWELL CANALS	
Month	Diversions To Canal (AF)	Delivered To Farms (AF)	Diversions To Canals (AF)	Diversions To Sherman Feeder Canal (AF)	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Canals (AF)	Delivered To Farms (AF)
Jan.	0	0	0	0	614	1,309	259	0.50	51,768	0	0
Feb.	0	0	0	0	662	1,291	319	0.51	50,820	0	0
Mar.	0	0	0	0	1,632	1,309	559	3.67	50,584	0	0
Apr.	0	0	0	10,937	8,840	1,303	944	0.48	57,177	0	0
May	0	0	3,205	16,129	14,140	1,533	708	3.41	69,076	0	0
June	1,821	155	5,018	14,660	12,555	11,266	1,000	6.37	69,365	9,745	22
July	14,489	9,974	14,290	13,835	13,394	34,625	991	1.64	47,143	33,277	21,680
Aug.	7,988	5,609	11,090	24,171	21,191	28,262	766	1.37	39,306	27,196	18,782
Sep.	3,053	1,979	5,691	20,242	18,227	7,620	722	1.29	49,191	6,793	5,525
Oct.	0	0	0	0	5,600	1,083	742	0.95	52,966	0	0
Nov.	0	0	0	0	752	1,303	411	1.65	52,004	0	0
Dec.	0	0	0	0	122	1,309	233	0.48	50,584	0	0
TOTAL	27,351	17,717	39,294	99,974	97,729	92,213	7,654	22.32	--	77,011	46,009

1/ Non-Project. Includes 1,396 a.f. diverted from Sherman Feeder Canal and 140 a.f. loss.

NOTE.--Sargent Canal: Acres irrigated 1990 -- 13,235
Middle Loup P.P. Canals: Acres irrigated 1990 -- 14,252
Farwell Canals: Acres irrigated 1990 -- 44,975

NORTH LOUP DIVISION

	CALAMUS RESERVOIR					MIRDAN 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.	17,992	17,457	444	0.98	106,823	0	0
Feb.	17,091	16,217	554	0.15	107,143	0	0
Mar.	21,414	14,553	999	2.12	113,005	0	0
Apr.	18,977	7,694	1,695	1.32	122,593	1,234	0
May	25,212	21,380	1,317	3.98	125,108	2,640	73
June	19,192	17,433	2,265	3.25	124,602	3,055	86
July	16,122	29,706	2,314	1.16	108,704	11,574	8,661
Aug.	20,285	26,176	2,077	3.16	100,736	7,442	5,474
Sep.	16,422	20,071	2,120	1.43	94,967	3,203	2,243
Oct.	19,083	9,606	1,230	2.14	103,214	0	0
Nov.	19,192	14,293	696	1.96	107,417	0	0
Dec.	16,832	17,018	408	0.68	106,823	0	0
TOTAL	227,814	211,604	16,119	22.33	--	29,148	16,537

NOTE.--Mirdan, Geranium & Scotia Canals: Acres irrigated 1990 -- 17,768

TABLE 2
SUMMARY OF 1990 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.	1,551	381	176	1.01	39,031	0
Feb.	1,302	333	200	0.25	39,800	0
Mar.	1,702	369	323	1.67	40,810	0
Apr.	1,527	357	724	1.18	41,256	0
May	2,310	528	877	4.38	42,161	0
June	870	1,150	1,501	1.44	40,380	158
July	332	1,680	1,395	1.65	37,637	1,220
Aug.	948	1,164	1,056	2.62	36,365	703
Sep.	258	713	1,074	1.03	34,836	267
Oct.	913	563	606	1.68	34,580	102
Nov.	1,322	446	344	1.09	35,112	0
Dec.	1,100	461	212	0.00	35,539	0
TOTAL	14,135	8,145	8,488	18.00	--	2,450

TABLE 2
SUMMARY OF 1990 OPERATIONS

FRENCHMAN-CAMBRIDGE DIVISION
FRENCHMAN UNIT

Month	ENDERS RESERVOIR Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	CULBERTSON CANAL Diversions To Canal (AF)	Delivered To Farms (AF)	CULBERTSON EXT.CANAL Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	1,882	61	77	1.00	20,474	0	0	0	0
Feb.	1,609	56	88	0.04	21,939	0	0	0	0
Mar.	1,705	61	165	0.98	23,418	0	0	0	0
Apr.	1,551	60	344	0.91	24,565	2,012	83	0	0
May	1,959	61	438	4.29	26,025	2,247	59	0	0
June	1,701	3,769	723	0.89	23,234	1,715	1,007	2,885	244
July	1,097	13,589	560	2.98	10,182	4,415	3,445	8,867	4,394
Aug.	1,882	379	309	2.13	11,376	680	508	747	273
Sep.	1,158	60	295	0.74	12,179	0	0	0	0
Oct.	1,633	61	179	1.85	13,572	0	0	0	0
Nov.	1,722	63	136	1.81	15,095	0	0	0	0
Dec.	1,409	61	81	0.05	16,362	0	0	0	0
TOTAL	19,308	18,281	3,395	17.67	--	11,069	5,102	12,499	4,911

NOTE.--Culbertson Canal:
Acres irrigated 1990 -- 8,048

Culbertson Extension Canal:
Acres irrigated 1990 -- 10,604

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
MEEKER-DRIFTWOOD UNIT

Month	SWANSON LAKE Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	MEEKER-DRIFTWOOD Release To Canal (AF)	Delivered To Farms (AF)	BARTLEY CANAL Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	5,506	61	252	1.33	63,725	0	0	0	0
Feb.	6,110	56	297	0.08	69,482	0	0	0	0
Mar.	7,920	61	568	1.81	76,773	0	0	0	0
Apr.	6,853	60	1,295	0.83	82,271	0	0	0	0
May	9,298	61	1,460	5.34	90,048	0	0	0	0
June	3,913	6,706	2,560	0.41	84,695	3,058	1,074	1,507	728
July	1,205	28,096	2,256	1.86	55,548	16,692	11,715	4,936	3,930
Aug.	939	17,316	1,508	1.65	37,663	12,551	8,777	3,035	2,335
Sep.	0	60	1,188	0.71	36,415	0	0	0	0
Oct.	528	61	651	1.71	36,231	0	0	0	0
Nov.	1,962	60	444	1.45	37,689	0	0	0	0
Dec.	2,504	61	251	0.08	39,881	0	0	0	0
TOTAL	46,738	52,659	12,730	17.26	--	32,301	21,566	9,478	6,993

NOTE.--Meeker-Driftwood Canal:
Acres irrigated 1990 -- 15,193

Bartley Canal:
Acres irrigated 1990 -- 6,012

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
RED WILLOW UNIT

Month	HUGH BUTLER LAKE Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	RED WILLOW CANAL Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	1,356	246	81	0.49	27,520	0	0
Feb.	1,203	222	95	0.08	28,406	0	0
Mar.	1,607	246	185	1.85	29,582	0	0
Apr.	1,423	238	528	1.66	30,239	0	0
May	1,740	246	510	4.91	31,223	0	0
June	1,255	2,069	923	1.46	29,486	1,422	835
July	640	5,113	931	0.77	24,082	4,306	3,437
Aug.	917	4,280	635	2.10	20,084	3,075	2,396
Sep.	686	238	544	0.88	19,988	0	0
Oct.	1,015	246	311	1.15	20,446	0	0
Nov.	1,210	198	175	1.08	21,283	0	0
Dec.	1,004	246	95	0.01	21,946	0	0
TOTAL	14,056	13,588	5,013	16.44	--	8,803	6,668

NOTE.--Red Willow Canal: Acres irrigated 1990 -- 4,569

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
CAMBRIDGE UNIT

Month	HARRY STRUNK LAKE Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	CAMBRIDGE CANAL Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	3,079	18	91	0.78	27,626	0	0
Feb.	2,871	17	110	0.16	30,370	0	0
Mar.	3,743	18	227	2.49	33,868	0	0
Apr.	2,995	967	649	0.49	35,247	0	0
May	3,582	736	758	4.40	37,335	0	0
June	3,617	6,441	1,185	1.69	33,326	4,501	2,259
July	199	13,555	993	1.36	18,977	15,377	11,400
Aug.	2,156	7,230	535	4.95	13,368	8,500	5,586
Sep.	1,140	62	450	0.54	13,996	0	0
Oct.	2,078	2	270	0.77	15,802	0	0
Nov.	2,439	0	162	1.13	18,079	0	0
Dec.	2,245	0	93	0.08	20,231	0	0
TOTAL	30,144	29,046	5,523	18.84	--	28,378	19,245

NOTE.--Cambridge Canal: Acres irrigated 1990 -- 15,808

TABLE 2
SUMMARY OF 1990 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)	ALMENA CANAL Delivered To Farms (AF)
Jan.	255	18	45	0.46	6.360	18	0	0
Feb.	207	18	57	0.10	6.492	18	0	0
Mar.	497	23	99	3.08	6.867	23	0	0
Apr.	399	42	267	1.09	6.957	42	0	0
May	990	47	339	7.39	7.561	47	0	0
June	398	107	527	0.92	7.325	72	0	0
July	656	2.880	465	0.63	4.636	81	1.875	1.204
Aug.	331	62	318	5.56	4.587	59	0	0
Sep.	7	54	271	0.82	4.269	54	0	0
Oct.	62	37	168	0.59	4.126	37	0	0
Nov.	87	27	79	0.73	4.107	27	0	0
Dec.	90	25	41	0.39	4.131	25	0	0
TOTAL	3.979	3.340	2.676	21.76	--	503	1.875	1.204

NOTE.--Almena Canal: Acres irrigated 1990 -- 5.145

BOSTWICK DIVISION
FRANKLIN UNIT
HARLAN COUNTY LAKE

Month	Data from Corps of Engineers 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.	8.450	0	645	0.60	207.527	0	0	0	0
Feb.	8.743	0	766	0.11	215.504	0	0	0	0
Mar.	14.295	0	1.045	2.94	228.754	0	0	0	0
Apr.	10.231	0	2.180	0.59	236.805	0	0	0	0
May	16.433	0	3.023	4.57	250.215	0	0	0	0
June	6.137	3.522	5.270	1.94	247.560	941	80	228	132
July	5.873	48.565	6.621	2.35	198.247	12.759	5.265	1.800	1.022
Aug.	14.432	18.347	5.131	6.46	189.201	3.713	923	320	157
Sep.	155	9.592	5.607	0.36	174.157	3.973	1.744	237	115
Oct.	139	0	3.864	0.77	170.432	0	0	0	0
Nov.	3.663	0	2.144	0.56	171.951	0	0	0	0
Dec.	3.640	0	952	0.37	174.639	0	0	0	0
TOTAL	92.191	80.026	37.248	21.62	--	21.386	8.012	2.585	1.426

NOTE.--Harlan County Lake area-capacity revised January 1, 1990.
Franklin Canal: Acres irrigated 1990 - 9.312 Naponee Canal: Acres irrigated 1990 - 1.534

BOSTWICK DIVISION (Continued)
SUPERIOR-COURTLAND UNIT

Month	FRANKLIN PUMP CANAL Div. To Canal (AF)	FRANKLIN PUMP CANAL Del. To Farms (AF)	SUPERIOR CANAL Div. To Canal (AF)	SUPERIOR CANAL Div. To Farms (AF)	COURTLAND CANAL - ABOVE LOVEWELL Total Div. (AF)	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	1.835	0	0	0	0
Mar.	0	0	0	0	4.961	0	0	0	0
Apr.	0	0	0	0	66	0	0	0	0
May	0	0	0	0	6.295	0	0	0	0
June	0	0	577	45	6.753	39	23	3.271	313
July	1.871	1.165	7.694	3.715	26.881	1.169	875	12.874	7.810
Aug.	0	0	4.029	1.724	19.818	650	448	7.890	4.739
Sep.	269	109	1.328	363	11.056	240	183	1.710	906
Oct.	0	0	0	0	6.062	0	0	0	0
Nov.	0	0	0	0	6.026	0	0	0	0
Dec.	0	0	0	0	3.338	0	0	0	0
	2.140	1.274	13.628	5.847	93.091	2.098	1.529	25.745	13.768

NOTE.--Franklin Pump Canal:
Acres irrigated 1990 -- 1.927
Superior Canal:
Acres irrigated 1990 -- 4.761

NOTE.--Courtland Canal--Nebraska Use:
Acres irrigated 1990 -- 1.190
Courtland Canal--Kansas Use:
Acres irrigated 1990 -- 11.860

BOSTWICK DIVISION (Continued)
COURTLAND UNIT
LOVEWELL RESERVOIR

Month	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.	548	6	142	0.47	32.280	0	0
Feb.	1.199	11	188	0.10	33.280	0	0
Mar.	6.230	12	348	3.50	39.150	0	0
Apr.	1.040	18	652	0.98	39.520	0	0
May	6.578	675	703	5.92	44.720	611	0
June	7.672	4.276	1.296	4.53	46.820	4.388	618
July	12.905	24.243	1.402	1.96	34.080	24.044	15.521
Aug.	10.987	18.864	833	2.73	25.370	20.004	11.153
Sep.	6.593	5.330	603	0.63	26.030	6.117	2.454
Oct.	4.423	12	461	1.23	29.980	0	0
Nov.	4.769	12	377	0.60	34.360	0	0
Dec.	3.275	12	193	0.61	37.430	0	0
TOTAL	66.219	53.471	7.198	23.26	--	55.164	29.746

NOTE.--Courtland Canal below Lovewell: Acres irrigated 1990 -- 24.805

TABLE 2
SUMMARY OF 1990 OPERATIONS

SOLOMON DIVISION
KIRWIN UNIT

Month	KIRWIN RESERVOIR Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	KIRWIN CANAL Release To Canal (AF)	Delivered To Farms (AF)
Jan.	588	0	88	0.48	15,446	0	0
Feb.	682	0	122	0.08	16,006	0	0
Mar.	1,720	0	201	3.55	17,525	0	0
Apr.	1,255	0	455	2.23	18,325	0	0
May	4,779	0	570	6.20	22,534	0	0
June	1,816	607	937	2.79	22,806	727	0
July	0	8,745	1,493	1.82	12,568	9,308	3,694
Aug.	1,314	3,850	507	5.71	9,525	3,820	1,754
Sep.	0	0	425	1.16	9,100	0	0
Oct.	58	0	302	0.39	8,856	0	0
Nov.	92	0	147	0.54	8,801	0	0
Dec.	16	0	73	0.65	8,744	0	0
TOTAL	12,320	13,202	5,320	25.60	--	13,855	5,448

NOTE.--Kirwin Canal: Acres irrigated 1990 -- 6,994

SOLOMON DIVISION (Continued)
WEBSTER UNIT

Month	WEBSTER RESERVOIR Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	OSBORNE CANAL Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	563	0	114	0.65	17,047	0	0
Feb.	303	0	143	0.00	17,207	0	0
Mar.	1,547	0	245	2.43	18,509	0	0
Apr.	1,362	0	469	2.33	19,402	0	0
May	2,621	0	646	4.75	21,377	0	0
June	1,790	341	1,144	1.32	21,682	0	0
July	2,455	7,860	1,036	5.35	15,241	6,363	2,447
Aug.	1,329	2,640	755	6.98	13,175	2,707	1,135
Sep.	0	0	562	1.09	12,613	0	0
Oct.	0	0	407	0.62	12,206	0	0
Nov.	11	0	224	0.62	11,993	0	0
Dec.	118	0	118	0.56	11,993	0	0
TOTAL	12,099	10,841	5,863	26.70	--	9,070	3,582

NOTE.--Osborne Canal: Acres irrigated 1990 -- 4,440

SOLOMON DIVISION (Continued)
GLEN ELDER UNIT

Month	WACONDA LAKE Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	OUTFLOW TO RIVER: City of Beloit Storage Release (AF)	City of Beloit Quality Bypass (AF)	Other Controlled Releases 1/ (AF)	Release To Mitchell Co. RWD No.2 (AF)
Jan.	4,516	3,364	684	0.78	220,141	0	0	3,311	53
Feb.	2,344	2,823	925	0.13	218,737	0	0	2,777	46
Mar.	8,660	3,126	1,642	3.50	222,629	0	0	3,075	51
Apr.	6,919	2,812	3,621	1.31	223,115	0	147	2,608	57
May	27,014	1,280	4,625	5.95	244,224	0	952	278	50
June	12,315	1,311	7,965	3.54	247,263	0	0	1,255	56
July	18,282	4,824	9,310	5.58	251,411	75	0	4,684	65
Aug.	15,667	5,279	7,147	3.00	254,652	0	0	5,228	51
Sep.	0	5,115	7,072	0.65	242,465	0	0	5,059	56
Oct.	544	5,280	4,414	0.62	233,315	0	0	5,226	54
Nov.	1,452	5,110	1,928	0.77	227,729	0	0	5,057	53
Dec.	3,015	16,373	900	0.44	213,471	0	0	16,314	59
TOTAL	100,728	56,697	50,233	26.27	--	75	1,099	54,872	651

1/ Includes releases for water right administration and 1,296 acre-feet delivered under Temporary Contracts for irrigation of 4,855 acres.

SMOKY HILL DIVISION
ELLIS UNIT
CEDAR BLUFF RESERVOIR

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	STORAGES 1/ Fish & Wildlife (AF)	City of Russell (AF)	Irrigation (AF)	Release To Fish Hatchery (AF)
Jan.	185	0	110	0.88	18,735	1,392	863	8,219	0
Feb.	34	5	134	0.19	18,630	1,374	855	8,140	5
Mar.	208	15	238	2.55	18,585	1,360	852	8,112	15
Apr.	752	6	551	4.76	18,780	1,401	867	8,251	6
May	800	22	594	4.30	18,964	1,428	882	8,393	22
June	585	12	1,117	2.92	18,420	1,360	837	7,962	12
July	226	7	999	3.45	17,640	1,255	773	7,351	7
Aug.	794	0	850	4.07	17,584	1,268	766	7,289	0
Sep.	27	0	761	2.07	16,850	1,168	705	6,716	0
Oct.	0	0	532	0.17	16,318	1,096	661	6,300	0
Nov.	0	0	238	0.70	16,080	1,064	641	6,114	0
Dec.	42	0	125	0.42	15,997	1,054	634	6,048	0
TOTAL	3,653	67	6,249	26.48	--	--	--	--	67

1/ Total Storage = 8,261 A.F. + Fish & Wildlife + City of Russell + Irrigation.
NOTE.--Cedar Bluff Canal: Due to the shortage of storage water in Cedar Bluff Reservoir, Cedar Bluff Canal was not in operation during the 1990 irrigation season. No releases were made for the City of Russell, Kansas.

TABLE 3
ACRES IRRIGATED IN 1990 AND ESTIMATES FOR 1991

Irrigation District and Canal	Acres With Service Available	Acres Irrigated in 1990	Estimated Acres to be Irrigated in 1991
Mirage Flats Irrigation District			
Mirage Flats Canal	11,662	9,875	10,900
Ainsworth Irrigation District			
Ainsworth Canal	34,539	33,542	34,000
Sargent Irrigation District			
Sargent Canal	13,922	13,235	13,000
Farwell Irrigation District			
Farwell Canal	50,051	44,975	46,000
Twin Loups Irrigation District			
Above Davis Creek	34,012	17,768	21,000
Below Davis Creek	0	0	0
Total Twin Loups Irrigation District	34,012	17,768	21,000
Frenchman Valley Irrigation District			
Culbertson Canal	9,600	8,048	7,800
H & RW Irrigation District			
Culbertson Extension Canal	11,490	10,604	10,000
Frenchman-Cambridge Irrigation District			
Meeker-Driftwood Canal	16,476	15,193	14,900
Red Willow Canal	4,932	4,569	4,700
Bartley Canal	6,539	6,012	5,900
Cambridge Canal	17,053	15,808	16,400
Total Frenchman-Cambridge Irrigation District	45,000	41,582	41,900
Almena Irrigation District			
Almena Canal	5,763	5,145	5,200
Bostwick Irrigation District in Nebraska			
Franklin Canal	11,116	9,312	10,100
Naponee Canal	1,737	1,534	1,700
Franklin Pump Canal	2,091	1,927	2,050
Superior Canal	5,863	4,761	5,150
Courtland Canal (Nebraska)	1,980	1,190	1,600
Total Bostwick Irrigation Dist. in Nebraska	22,787	18,724	20,600
Kansas-Bostwick Irrigation District			
Courtland Canal above Lovewell	13,550	11,860	13,000
Courtland Canal below Lovewell	28,338	24,805	25,000
Total Kansas-Bostwick Irrigation District	41,888	36,665	38,000
Kirwin Irrigation District			
Kirwin Canal	11,435	6,994	7,000
Webster Irrigation District			
Osborne Canal	8,500	4,440	4,500
Cedar Bluff Irrigation District			
Cedar Bluff Canal	6,800	0	6,800
TOTAL PROJECT USES	307,449	251,597	266,700
Non-Project Uses			
Middle Loup Public Power & Irrig. Dist. Canals	15,000	14,252	14,400
Hale Ditch	700	700	700
TOTAL NON-PROJECT USES	15,700	14,952	15,100
TOTAL PROJECT AND NON-PROJECT	323,149	266,549	281,800

BOX BUTTE RESERVOIR OPERATION ESTIMATES - 1991

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	1.06	.1	2.	.1	.0	.0	3988.3	8.9	.9
FEB	25.	1.4	1.32	.1	2.	.1	.0	.0	3989.8	10.1	1.2
MAR	34.	2.1	2.33	.2	2.	.1	.0	.0	3991.8	11.9	1.8
APR	25.	1.5	3.79	.3	27.	1.6	.0	.0	3991.4	11.5	-.4
MAY	16.	1.0	5.85	.4	55.	3.4	.0	.0	3988.1	8.7	-2.8
JUN	0.	.0	7.15	.4	57.	3.4	.0	.0	3982.3	4.9	-3.8
JUL	0.	.0	7.83	.3	163.	10.0	.0	8.2	3977.9	2.8	-2.1
AUG	10.	.6	6.19	.2	164.	10.1	.0	9.7	3977.9	2.8	.0
SEP	12.	.7	5.39	.2	84.	5.0	.0	4.5	3977.9	2.8	.0
OCT	10.	.6	3.08	.1	2.	.1	.0	.0	3978.9	3.2	.4
NOV	22.	1.3	1.67	.1	2.	.1	.0	.0	3981.2	4.3	1.1
DEC	20.	1.2	.97	.0	2.	.1	.0	.0	3983.2	5.4	1.1
TOTAL		11.5	46.63	2.4		34.1	.0	22.4			-2.6
MOST PROBABLE INFLOW CONDITIONS											
JAN	26.	1.6	1.06	.1	2.	.1	.0	.0	3989.0	9.4	1.4
FEB	34.	1.9	1.32	.1	2.	.1	.0	.0	3990.9	11.1	1.7
MAR	46.	2.8	2.33	.2	2.	.1	.0	.0	3993.5	13.6	2.5
APR	37.	2.2	3.79	.3	20.	1.2	.0	.0	3994.2	14.3	.7
MAY	26.	1.6	4.73	.4	18.	1.1	.0	.0	3994.3	14.4	.1
JUN	5.	.3	6.01	.5	40.	2.4	.0	.0	3991.7	11.8	-2.6
JUL	2.	.1	6.55	.4	140.	8.6	.0	.0	3978.1	2.9	-8.9
AUG	21.	1.3	5.75	.2	141.	8.7	.0	7.5	3977.9	2.8	-.1
SEP	22.	1.3	4.21	.1	40.	2.4	.0	1.2	3977.9	2.8	.0
OCT	26.	1.6	3.08	.1	2.	.1	.0	.0	3981.0	4.2	1.4
NOV	32.	1.9	1.67	.1	2.	.1	.0	.0	3984.0	5.9	1.7
DEC	28.	1.7	.97	.1	2.	.1	.0	.0	3986.3	7.4	1.5
TOTAL		18.3	41.47	2.6		25.0	.0	8.7			-.6
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	33.	2.0	1.06	.1	2.	.1	.0	.0	3989.4	9.8	1.8
FEB	45.	2.5	1.32	.1	2.	.1	.0	.0	3992.0	12.1	2.3
MAR	55.	3.4	2.33	.2	2.	.1	.0	.0	3995.1	15.2	3.1
APR	52.	3.1	3.79	.4	10.	.6	.0	.0	3997.0	17.3	2.1
MAY	41.	2.5	3.49	.3	13.	.8	.0	.0	3998.1	18.7	1.4
JUN	89.	5.3	4.48	.5	27.	1.6	.0	.0	4000.7	21.9	3.2
JUL	54.	3.3	5.40	.6	106.	6.5	.0	.0	3997.6	18.1	-3.8
AUG	37.	2.3	4.40	.4	104.	6.4	.0	.0	3993.5	13.6	-4.5
SEP	34.	2.0	2.84	.2	29.	1.7	.0	.0	3993.6	13.7	.1
OCT	33.	2.0	3.08	.3	2.	.1	.0	.0	3995.2	15.3	1.6
NOV	42.	2.5	1.67	.2	2.	.1	.0	.0	3997.1	17.5	2.2
DEC	34.	2.1	.97	.1	2.	.1	.0	.0	3998.7	19.4	1.9
TOTAL		33.0	34.83	3.4		18.2	.0	.0			11.4

MERRITT RESERVOIR OPERATION ESTIMATES - 1991

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	RES 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	198.	12.2	1.05	.2	.0	12.0	195.	12.0	.0	.0	2944.0	68.8	.0
FEB	216.	12.0	1.33	.3	.0	11.7	211.	11.7	.0	.0	2944.0	68.8	.0
MAR	228.	14.0	1.85	.4	.0	10.8	176.	10.8	.0	.0	2945.0	71.6	2.8
APR	224.	13.3	3.08	.7	.0	11.5	193.	11.5	.0	.0	2945.4	72.7	1.1
MAY	213.	13.1	5.36	1.3	5.4	4.6	163.	10.0	.0	.0	2946.0	74.5	1.8
JUN	210.	12.5	6.29	1.5	16.3	1.0	291.	17.3	.0	.0	2943.8	68.2	-6.3
JUL	211.	13.0	7.20	1.4	35.7	1.0	597.	36.7	.0	.0	2932.9	43.1	-25.1
AUG	208.	12.8	6.36	.7	35.7	1.0	597.	36.7	.0	.0	2914.5	18.5	-24.6
SEP	205.	12.2	5.29	.4	15.0	1.0	269.	16.0	.0	.0	2909.4	14.3	-4.2
OCT	220.	13.5	3.50	.3	.0	1.0	16.	1.0	.0	.0	2922.0	26.5	12.2
NOV	215.	12.8	2.00	.2	.0	1.0	17.	1.0	.0	.0	2930.1	38.1	11.6
DEC	210.	12.9	1.39	.2	.0	1.0	16.	1.0	.0	.0	2936.2	49.8	11.7
TOTAL		154.3	44.70	7.6	108.1	57.6		165.7	.0	.0			-19.0
					MOST PROBABLE INFLOW CONDITIONS								
JAN	231.	14.2	1.05	.2	.0	14.0	228.	14.0	.0	.0	2944.0	68.8	.0
FEB	243.	13.5	1.33	.3	.0	13.2	238.	13.2	.0	.0	2944.0	68.8	.0
MAR	262.	16.1	1.85	.4	.0	12.9	210.	12.9	.0	.0	2945.0	71.6	2.8
APR	267.	15.9	3.08	.7	.0	15.2	255.	15.2	.0	.0	2945.0	71.6	.0
MAY	250.	15.4	4.17	1.0	4.1	7.4	187.	11.5	.0	.0	2946.0	74.5	2.9
JUN	237.	14.1	5.52	1.3	6.8	1.0	131.	7.8	5.0	.0	2946.0	74.5	.0
JUL	241.	14.8	6.20	1.4	31.6	1.0	530.	32.6	.0	.0	2938.7	55.3	-19.2
AUG	249.	15.3	5.32	.9	31.6	1.0	530.	32.6	.0	.0	2929.5	37.1	-18.2
SEP	247.	14.7	4.26	.6	5.4	1.0	108.	6.4	.0	.0	2933.8	44.8	7.7
OCT	250.	15.4	3.50	.6	.0	1.0	16.	1.0	.0	.0	2940.1	58.6	13.8
NOV	237.	14.1	2.00	.4	.0	3.5	59.	3.5	.0	.0	2944.0	68.8	10.2
DEC	231.	14.2	1.39	.3	.0	13.9	226.	13.9	.0	.0	2944.0	68.8	.0
TOTAL		177.7	39.67	8.1	79.5	85.1		164.6	5.0	.0			.0
					REASONABLE MAXIMUM INFLOW CONDITIONS								
JAN	267.	16.4	1.05	.2	.0	16.2	263.	16.2	.0	.0	2944.0	68.8	.0
FEB	286.	15.9	1.33	.3	.0	15.6	281.	15.6	.0	.0	2944.0	68.8	.0
MAR	299.	18.4	1.85	.4	.0	15.2	247.	15.2	.0	.0	2945.0	71.6	2.8
APR	313.	18.6	3.08	.7	.0	17.9	301.	17.9	.0	.0	2945.0	71.6	.0
MAY	299.	18.4	3.47	.8	2.4	12.3	239.	14.7	.0	.0	2946.0	74.5	2.9
JUN	279.	16.6	4.59	1.1	4.1	1.0	86.	5.1	10.4	.0	2946.0	74.5	.0
JUL	294.	18.1	5.41	1.3	20.4	1.0	348.	21.4	.0	.0	2944.4	69.9	-4.6
AUG	316.	19.4	4.36	1.0	20.4	1.0	348.	21.4	.0	.0	2943.3	66.9	-3.0
SEP	287.	17.1	3.48	.8	3.4	11.0	242.	14.4	.0	.0	2944.0	68.8	1.9
OCT	278.	17.1	3.50	.8	.0	16.3	265.	16.3	.0	.0	2944.0	68.8	.0
NOV	260.	15.5	2.00	.5	.0	15.0	252.	15.0	.0	.0	2944.0	68.8	.0
DEC	252.	15.5	1.39	.3	.0	15.2	247.	15.2	.0	.0	2944.0	68.8	.0
TOTAL		207.0	35.51	8.2	50.7	137.7		188.4	10.4	.0			.0

SHERMAN RESERVOIR OPERATION ESTIMATES - 1991

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	1.30	.3	21.	1.3	.0	.0	2154.5	49.0	-1.6
FEB	0.	.0	1.62	.3	23.	1.3	.0	.0	2153.8	47.4	-1.6
MAR	0.	.0	2.86	.5	21.	1.3	.0	.0	2153.0	45.6	-1.8
APR	158.	9.4	4.63	.9	22.	1.3	.0	.0	2156.1	52.8	7.2
MAY	307.	18.9	5.19	1.1	24.	1.5	.0	.0	2162.3	69.1	16.3
JUN	240.	14.3	6.44	1.5	395.	23.5	.0	.0	2158.4	58.4	-10.7
JUL	106.	6.5	7.45	1.1	992.	61.0	.0	7.7	2129.0	10.5	-47.9
AUG	200.	12.3	6.59	.5	987.	60.7	.0	48.9	2129.0	10.5	.0
SEP	499.	29.7	4.88	.4	381.	22.7	.0	.0	2135.6	17.1	6.6
OCT	407.	25.0	3.77	.5	18.	1.1	.0	.0	2150.6	40.5	23.4
NOV	0.	.0	2.05	.3	22.	1.3	.0	.0	2149.8	38.9	-1.6
DEC	0.	.0	1.18	.2	21.	1.3	.0	.0	2149.0	37.4	-1.5
TOTAL		116.1	47.96	7.6		178.3	.0	56.6			-13.2
MOST PROBABLE INFLOW CONDITIONS											
JAN	0.	.0	1.30	.3	21.	1.3	.0	.0	2154.5	49.0	-1.6
FEB	0.	.0	1.62	.3	23.	1.3	.0	.0	2153.8	47.4	-1.6
MAR	2.	.1	2.86	.5	21.	1.3	.0	.0	2153.0	45.7	-1.7
APR	163.	9.7	4.63	.9	22.	1.3	.0	.0	2156.3	53.2	7.5
MAY	298.	18.3	4.25	.9	24.	1.5	.0	.0	2162.3	69.1	15.9
JUN	141.	8.4	4.97	1.2	121.	7.2	.0	.0	2162.3	69.1	.0
JUL	327.	20.1	5.84	1.2	831.	51.1	.0	.0	2148.7	36.9	-32.2
AUG	389.	23.9	4.99	.6	812.	49.9	.0	.2	2129.0	10.5	-26.4
SEP	499.	29.7	3.69	.4	121.	7.2	.0	.0	2146.4	32.6	22.1
OCT	353.	21.7	3.77	.7	18.	1.1	.0	.0	2156.0	52.5	19.9
NOV	0.	.0	2.05	.4	22.	1.3	.0	.0	2155.3	50.8	-1.7
DEC	0.	.0	1.18	.2	21.	1.3	.0	.0	2154.6	49.3	-1.5
TOTAL		131.9	41.15	7.6		125.8	.0	.2			-1.3
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	11.	.7	1.30	.3	21.	1.3	.0	.0	2154.8	49.7	-.9
FEB	23.	1.3	1.62	.3	23.	1.3	.0	.0	2154.7	49.4	-.3
MAR	83.	5.1	2.86	.6	21.	1.3	.0	.0	2156.0	52.6	3.2
APR	118.	7.0	4.63	1.0	22.	1.3	.0	.0	2157.9	57.3	4.7
MAY	229.	14.1	3.45	.8	24.	1.5	.0	.0	2162.3	69.1	11.8
JUN	106.	6.3	3.84	.9	91.	5.4	.0	.0	2162.3	69.1	.0
JUL	359.	22.1	4.54	1.0	569.	35.0	.0	.0	2157.1	55.2	-13.9
AUG	397.	24.4	3.77	.7	550.	33.8	.0	.0	2152.8	45.1	-10.1
SEP	224.	13.3	2.49	.5	91.	5.4	.0	.0	2156.0	52.5	7.4
OCT	31.	1.9	3.77	.8	18.	1.1	.0	.0	2156.0	52.5	.0
NOV	13.	.8	2.05	.4	22.	1.3	.0	.0	2155.6	51.6	-.9
DEC	16.	1.0	1.18	.2	21.	1.3	.0	.0	2155.4	51.1	-.5
TOTAL		98.0	35.50	7.5		90.0	.0	.0			.5

CALAMUS RESERVOIR OPERATION ESTIMATES - 1991

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	RES 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	293.	18.0	1.17	.4	.0	17.6	286.	17.6	.0	.0	2239.7	106.8	.0
FEB	277.	15.4	1.46	.6	.0	14.8	266.	14.8	.0	.0	2239.7	106.8	.0
MAR	330.	20.3	2.58	1.0	.0	13.3	216.	13.3	.0	.0	2241.0	112.8	6.0
APR	297.	17.7	4.18	1.7	.0	3.9	66.	3.9	.0	.0	2243.5	124.9	12.1
MAY	311.	19.1	5.43	2.3	.0	16.8	273.	16.8	.0	.0	2243.5	124.9	.0
JUN	308.	18.3	8.41	3.5	8.3	6.5	249.	14.8	.0	.0	2243.5	124.9	.0
JUL	268.	16.5	8.54	3.4	18.4	16.5	568.	34.9	.0	.0	2238.9	103.1	-21.8
AUG	291.	17.9	6.97	2.4	18.4	17.9	590.	36.3	.0	.0	2233.9	82.3	-20.8
SEP	274.	16.3	6.31	1.9	12.9	16.3	491.	29.2	.0	.0	2229.8	67.5	-14.8
OCT	260.	16.0	3.40	1.0	.0	3.1	50.	3.1	.0	.0	2233.1	79.4	11.9
NOV	262.	15.6	1.85	.6	.0	3.0	50.	3.0	.0	.0	2236.2	91.4	12.0
DEC	268.	16.5	1.07	.4	.0	3.1	50.	3.1	.0	.0	2239.2	104.4	13.0
TOTAL		207.6	51.37	19.2	58.0	132.8		190.8	.0	.0			-2.4
					MOST PROBABLE INFLOW CONDITIONS								
JAN	329.	20.2	1.17	.4	.0	19.8	322.	19.8	.0	.0	2239.7	106.8	.0
FEB	331.	18.4	1.46	.6	.0	17.8	321.	17.8	.0	.0	2239.7	106.8	.0
MAR	369.	22.7	2.58	1.0	.0	15.7	255.	15.7	.0	.0	2241.0	112.8	6.0
APR	345.	20.5	4.18	1.7	.0	6.7	113.	6.7	.0	.0	2243.5	124.9	12.1
MAY	384.	23.6	3.45	1.5	.0	22.1	359.	22.1	.0	.0	2243.5	124.9	.0
JUN	328.	19.5	5.52	2.3	.0	17.2	289.	17.2	.0	.0	2243.5	124.9	.0
JUL	327.	20.1	6.47	2.6	12.8	20.1	535.	32.9	.0	.0	2240.3	109.5	-15.4
AUG	324.	19.9	6.06	2.2	13.4	19.9	542.	33.3	.0	.0	2236.8	93.9	-15.6
SEP	299.	17.8	5.01	1.7	8.5	17.8	442.	26.3	.0	.0	2234.3	83.7	-10.2
OCT	299.	18.4	3.40	1.1	.0	5.7	93.	5.7	.0	.0	2237.1	95.3	11.6
NOV	319.	19.0	1.85	.7	.0	5.6	94.	5.6	.0	.0	2240.0	108.0	12.7
DEC	317.	19.5	1.07	.4	.0	19.1	311.	19.1	.0	.0	2240.0	108.0	.0
TOTAL		239.6	42.22	16.2	34.7	187.5		222.2	.0	.0			1.2
					REASONABLE MAXIMUM INFLOW CONDITIONS								
JAN	366.	22.5	1.17	.4	.0	22.1	359.	22.1	.0	.0	2239.7	106.8	.0
FEB	380.	21.1	1.46	.6	.0	20.5	369.	20.5	.0	.0	2239.7	106.8	.0
MAR	499.	30.7	2.58	1.0	.0	23.7	385.	23.7	.0	.0	2241.0	112.8	6.0
APR	462.	27.5	4.18	1.7	.0	13.7	230.	13.7	.0	.0	2243.5	124.9	12.1
MAY	441.	27.1	2.82	1.2	.0	25.9	421.	25.9	.0	.0	2243.5	124.9	.0
JUN	355.	21.1	4.32	1.8	.0	19.3	324.	19.3	.0	.0	2243.5	124.9	.0
JUL	376.	23.1	5.57	2.3	6.2	23.1	477.	29.3	.0	.0	2241.8	116.4	-8.5
AUG	356.	21.9	5.47	2.1	7.9	21.9	485.	29.8	.0	.0	2239.6	106.4	-10.0
SEP	366.	21.8	3.58	1.4	.0	21.8	366.	21.8	.0	.0	2239.3	105.0	-1.4
OCT	361.	22.2	3.40	1.3	.0	19.3	314.	19.3	.0	.0	2239.7	106.6	1.6
NOV	351.	20.9	1.85	.7	.0	18.8	316.	18.8	.0	.0	2240.0	108.0	1.4
DEC	358.	22.0	1.07	.4	.0	21.6	351.	21.6	.0	.0	2240.0	108.0	.0
TOTAL		281.9	37.47	14.9	14.1	251.7		265.8	.0	.0			1.2

BONNY RESERVOIR OPERATION ESTIMATES - 1991

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	RES 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	1.16	.2	.0	.5	8.	.5	.0	.0	3669.4	36.2	.7
FEB	23.	1.3	1.35	.2	.0	.4	7.	.4	.0	.0	3669.7	36.9	.7
MAR	21.	1.3	1.95	.3	.0	.5	8.	.5	.0	.0	3670.0	37.4	.5
APR	24.	1.4	5.64	.9	.0	.4	7.	.4	.0	.0	3670.1	37.5	.1
MAY	26.	1.6	7.10	1.1	.0	.5	8.	.5	.0	.0	3670.1	37.5	.0
JUN	12.	.7	8.51	1.3	.9	.4	22.	1.3	.0	.0	3669.0	35.6	-1.9
JUL	5.	.3	9.21	1.4	.9	.5	23.	1.4	.0	.0	3667.7	33.1	-2.5
AUG	0.	.0	8.13	1.2	.8	.5	21.	1.3	.0	.0	3666.3	30.6	-2.5
SEP	0.	.0	7.30	1.0	.6	.4	17.	1.0	.0	.0	3665.1	28.6	-2.0
OCT	7.	.4	5.17	.7	.0	.5	8.	.5	.0	.0	3664.6	27.8	-.8
NOV	17.	1.0	2.24	.3	.0	.4	7.	.4	.0	.0	3664.8	28.1	.3
DEC	20.	1.2	1.41	.2	.0	.5	8.	.5	.0	.0	3665.1	28.6	.5
TOTAL		10.6	59.17	8.8	3.2	5.5		8.7	.0	.0			-6.9
MOST PROBABLE INFLOW CONDITIONS													
JAN	28.	1.7	1.11	.2	.0	.5	8.	.5	.0	.0	3669.5	36.5	1.0
FEB	31.	1.7	1.25	.2	.0	.4	7.	.4	.0	.0	3670.1	37.6	1.1
MAR	33.	2.0	1.93	.3	.0	.5	8.	.5	.0	.0	3670.7	38.8	1.2
APR	35.	2.1	4.53	.7	.0	.4	7.	.4	.0	.0	3671.2	39.8	1.0
MAY	37.	2.3	5.73	1.0	.0	.5	8.	.5	.0	.0	3671.6	40.6	.8
JUN	25.	1.5	6.92	1.2	.4	.4	13.	.8	.0	.0	3671.4	40.1	-.5
JUL	16.	1.0	8.27	1.4	.6	.5	18.	1.1	.0	.0	3670.6	38.6	-1.5
AUG	7.	.4	6.92	1.1	.6	.5	18.	1.1	.0	.0	3669.7	36.8	-1.8
SEP	5.	.3	5.34	.8	.4	.4	13.	.8	.0	.0	3669.0	35.5	-1.3
OCT	15.	.9	3.64	.6	.0	.5	8.	.5	.0	.0	3668.9	35.3	-.2
NOV	27.	1.6	2.24	.3	.0	.4	7.	.4	.0	.0	3669.4	36.2	.9
DEC	26.	1.6	1.33	.2	.0	.5	8.	.5	.0	.0	3669.8	37.1	.9
TOTAL		17.1	49.21	8.0	2.0	5.5		7.5	.0	.0			1.6
REASONABLE MAXIMUM INFLOW CONDITIONS													
JAN	36.	2.2	1.08	.2	.0	.5	8.	.5	.0	.0	3669.8	37.0	1.5
FEB	40.	2.2	1.18	.2	.0	.4	7.	.4	.0	.0	3670.6	38.6	1.6
MAR	44.	2.7	1.88	.3	.0	.5	8.	.5	.0	.0	3671.6	40.5	1.9
APR	55.	3.3	3.26	.6	.0	.4	7.	.4	1.5	.0	3672.0	41.3	.8
MAY	63.	3.9	4.63	.8	.0	.5	8.	.5	2.6	.0	3672.0	41.3	.0
JUN	89.	5.3	5.38	.9	.2	.4	10.	.6	3.8	.0	3672.0	41.3	.0
JUL	42.	2.6	6.20	1.1	.2	.5	11.	.7	.8	.0	3672.0	41.3	.0
AUG	65.	4.0	5.78	1.0	.4	.5	15.	.9	2.1	.0	3672.0	41.3	.0
SEP	49.	2.9	4.19	.7	.4	.4	13.	.8	1.4	.0	3672.0	41.3	.0
OCT	34.	2.1	2.42	.4	.0	.5	8.	.5	1.2	.0	3672.0	41.3	.0
NOV	39.	2.3	2.24	.4	.0	.4	7.	.4	1.5	.0	3672.0	41.3	.0
DEC	36.	2.2	1.23	.2	.0	.5	8.	.5	1.5	.0	3672.0	41.3	.0
TOTAL		35.7	39.47	6.8	1.2	5.5		6.7	16.4	.0			5.8

ENDERS RESERVOIR OPERATION ESTIMATES - 1991

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	33.	2.0	.95	.1	0.	.0	.0	.0	3092.6	18.3	1.9
FEB	32.	1.8	1.03	.1	0.	.0	.0	.0	3094.3	20.0	1.7
MAR	29.	1.8	1.77	.2	0.	.0	.0	.0	3095.8	21.6	1.6
APR	30.	1.8	5.29	.5	0.	.0	.0	.0	3096.9	22.9	1.3
MAY	31.	1.9	6.55	.6	47.	2.9	.0	.0	3095.5	21.3	-1.6
JUN	27.	1.6	7.86	.7	55.	3.3	.0	.0	3093.2	18.9	-2.4
JUL	28.	1.7	8.51	.6	306.	18.8	.0	8.8	3082.4	10.0	-8.9
AUG	28.	1.7	7.65	.4	286.	17.6	.0	16.3	3082.4	10.0	.0
SEP	29.	1.7	5.61	.3	111.	6.6	.0	5.2	3082.4	10.0	.0
OCT	29.	1.8	4.26	.2	2.	.1	.0	.0	3084.6	11.5	1.5
NOV	30.	1.8	1.96	.1	0.	.0	.0	.0	3086.9	13.2	1.7
DEC	29.	1.8	1.16	.1	0.	.0	.0	.0	3088.9	14.9	1.7
TOTAL		21.4	52.60	3.9		49.3	.0	30.3			-1.5
MOST PROBABLE INFLOW CONDITIONS											
JAN	47.	2.9	.88	.1	0.	.0	.0	.0	3093.5	19.2	2.8
FEB	45.	2.5	.95	.1	0.	.0	.0	.0	3095.8	21.6	2.4
MAR	41.	2.5	1.73	.2	0.	.0	.0	.0	3097.8	23.9	2.3
APR	44.	2.6	4.50	.4	0.	.0	.0	.0	3099.6	26.1	2.2
MAY	44.	2.7	5.31	.6	10.	.6	.0	.0	3100.8	27.6	1.5
JUN	42.	2.5	6.62	.7	12.	.7	.0	.0	3101.7	28.7	1.1
JUL	59.	3.6	7.47	.7	218.	13.4	.0	.0	3092.5	18.2	-10.5
AUG	46.	2.8	6.40	.4	231.	14.2	.0	3.6	3082.4	10.0	-8.2
SEP	50.	3.0	4.57	.3	47.	2.8	.0	.1	3082.4	10.0	.0
OCT	46.	2.8	3.03	.2	0.	.0	.0	.0	3086.1	12.6	2.6
NOV	45.	2.7	1.96	.1	0.	.0	.0	.0	3089.3	15.2	2.6
DEC	47.	2.9	1.06	.1	0.	.0	.0	.0	3092.3	18.0	2.8
TOTAL		33.5	44.48	3.9		31.7	.0	3.7			1.6
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	72.	4.4	.81	.1	0.	.0	.0	.0	3094.9	20.7	4.3
FEB	68.	3.8	.90	.1	0.	.0	.0	.0	3098.2	24.4	3.7
MAR	60.	3.7	1.67	.2	0.	.0	.0	.0	3101.1	27.9	3.5
APR	62.	3.7	3.44	.4	0.	.0	.0	.0	3103.6	31.2	3.3
MAY	67.	4.1	4.50	.5	0.	.0	.0	.0	3106.2	34.8	3.6
JUN	91.	5.4	5.52	.7	0.	.0	.0	.0	3109.3	39.5	4.7
JUL	104.	6.4	6.57	.9	122.	7.5	.0	.0	3108.0	37.5	-2.0
AUG	83.	5.1	5.24	.6	137.	8.4	.0	.0	3105.3	33.6	-3.9
SEP	89.	5.3	3.47	.4	18.	1.1	.0	.0	3107.9	37.4	3.8
OCT	75.	4.6	2.23	.3	0.	.0	.0	.0	3110.6	41.7	4.3
NOV	74.	4.4	1.96	.3	0.	.0	1.3	.0	3112.3	44.5	2.8
DEC	73.	4.5	.97	.1	0.	.0	4.4	.0	3112.3	44.5	.0
TOTAL		55.4	37.28	4.6		17.0	5.7	.0			28.1

SWANSON LAKE OPERATION ESTIMATES - 1991

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	RES 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	.92	.2	.0	.1	2.	.1	.0	.0	2734.2	42.7	2.8
FEB	95.	5.3	1.06	.3	.0	.1	2.	.1	.0	.0	2735.8	47.6	4.9
MAR	111.	6.8	1.76	.5	.0	.1	2.	.1	.0	.0	2737.7	53.8	6.2
APR	97.	5.8	5.47	1.5	.0	.1	2.	.1	.0	.0	2739.0	58.0	4.2
MAY	80.	4.9	6.60	1.9	4.0	1.2	85.	5.2	.0	.0	2738.3	55.8	-2.2
JUN	54.	3.2	7.60	2.1	4.0	1.3	89.	5.3	.0	.0	2737.0	51.6	-4.2
JUL	11.	.7	8.96	2.1	12.1	7.2	314.	19.3	.0	.0	2729.7	30.9	-20.7
AUG	2.	.1	7.90	1.3	12.1	5.8	291.	17.9	.0	.6	2720.0	12.4	-18.5
SEP	0.	.0	5.92	.7	6.0	4.2	171.	10.2	.0	10.1	2719.4	11.6	-.8
OCT	0.	.0	3.93	.4	2.1	1.3	55.	3.4	.0	3.3	2719.0	11.1	-.5
NOV	20.	1.2	2.01	.2	.0	.1	2.	.1	.0	.0	2719.7	12.0	.9
DEC	44.	2.7	1.16	.1	.0	.1	2.	.1	.0	.0	2721.4	14.5	2.5
TOTAL		33.8	53.29	11.3	40.3	21.6		61.9	.0	14.0			-25.4
MOST PROBABLE INFLOW CONDITIONS													
JAN	96.	5.9	.88	.2	.0	.1	2.	.1	.0	.0	2735.1	45.5	5.6
FEB	142.	7.9	.97	.3	.0	.1	2.	.1	.0	.0	2737.5	53.0	7.5
MAR	155.	9.5	1.73	.5	.0	.1	2.	.1	.0	.0	2740.1	61.9	8.9
APR	163.	9.7	4.59	1.4	.0	.1	2.	.1	.0	.0	2742.3	70.1	8.2
MAY	158.	9.7	5.16	1.7	1.3	.1	23.	1.4	.0	.0	2744.0	76.7	6.6
JUN	119.	7.1	6.50	2.2	1.5	.1	27.	1.6	.0	.0	2744.8	80.0	3.3
JUL	54.	3.3	7.58	2.5	9.8	4.6	234.	14.4	.0	.0	2741.3	66.4	-13.6
AUG	31.	1.9	6.62	1.9	11.3	5.7	276.	17.0	.0	.0	2736.3	49.4	-17.0
SEP	5.	.3	4.90	1.3	2.8	1.7	76.	4.5	.0	.0	2734.5	43.9	-5.5
OCT	18.	1.1	3.06	.7	1.5	.1	26.	1.6	.0	.0	2734.2	42.7	-1.2
NOV	69.	4.1	2.01	.5	.0	.1	2.	.1	.0	.0	2735.3	46.2	3.5
DEC	73.	4.5	1.09	.3	.0	.1	2.	.1	.0	.0	2736.6	50.3	4.1
TOTAL		65.0	45.09	13.5	28.2	12.9		41.1	.0	.0			10.4
REASONABLE MAXIMUM INFLOW CONDITIONS													
JAN	120.	7.4	.85	.2	.0	.1	2.	.1	.0	.0	2735.6	47.0	7.1
FEB	184.	10.2	.92	.2	.0	.1	2.	.1	.0	.0	2738.6	56.9	9.9
MAR	220.	13.5	1.68	.5	.0	.1	2.	.1	.0	.0	2742.2	69.8	12.9
APR	276.	16.4	3.44	1.2	.0	.1	2.	.1	.0	.0	2746.0	84.9	15.1
MAY	291.	17.9	4.23	1.6	.7	.1	13.	.8	.0	.0	2749.5	100.4	15.5
JUN	250.	14.9	5.33	2.1	.9	.1	17.	1.0	.0	.0	2752.0	112.2	11.8
JUL	200.	12.3	6.52	2.7	5.8	2.8	140.	8.6	1.0	.0	2752.0	112.2	.0
AUG	81.	5.0	5.52	2.2	6.7	3.3	163.	10.0	.0	.0	2750.5	105.0	-7.2
SEP	104.	6.2	3.77	1.5	1.6	.1	29.	1.7	.0	.0	2751.1	108.0	3.0
OCT	133.	8.2	2.18	.9	.9	.1	16.	1.0	2.1	.0	2752.0	112.2	4.2
NOV	143.	8.5	2.01	.8	.0	.1	2.	.1	7.6	.0	2752.0	112.2	.0
DEC	112.	6.9	.99	.4	.0	.1	2.	.1	6.4	.0	2752.0	112.2	.0
TOTAL		127.4	37.44	14.3	16.6	7.1		23.7	17.1	.0			72.3

HUGH BUTLER LAKE OPERATION ESTIMATES - 1991

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	.83	.1	5.	.3	.0	.0	2570.6	22.5	.6
FEB	22.	1.2	.97	.1	5.	.3	.0	.0	2571.3	23.3	.8
MAR	23.	1.4	1.67	.2	5.	.3	.0	.0	2572.1	24.2	.9
APR	22.	1.3	5.64	.6	5.	.3	.0	.0	2572.4	24.6	.4
MAY	23.	1.4	7.01	.7	26.	1.6	.0	.0	2571.7	23.7	-.9
JUN	20.	1.2	8.39	.8	27.	1.6	.0	.0	2570.6	22.5	-1.2
JUL	15.	.9	9.38	.8	137.	8.4	.0	.0	2562.4	14.2	-8.3
AUG	11.	.7	8.02	.6	72.	4.4	.0	.5	2557.9	10.4	-3.8
SEP	7.	.4	6.08	.4	39.	2.3	.0	2.0	2557.6	10.1	-.3
OCT	15.	.9	4.62	.3	15.	.9	.0	.6	2557.9	10.4	.3
NOV	17.	1.0	1.93	.1	5.	.3	.0	.0	2558.7	11.0	.6
DEC	18.	1.1	1.09	.1	5.	.3	.0	.0	2559.5	11.7	.7
TOTAL		12.5	55.63	4.8		21.0	.0	3.1			-10.2
MOST PROBABLE INFLOW CONDITIONS											
JAN	21.	1.3	.78	.1	5.	.3	.0	.0	2570.9	22.8	.9
FEB	29.	1.6	.88	.1	5.	.3	.0	.0	2571.9	24.0	1.2
MAR	31.	1.9	1.64	.2	5.	.3	.0	.0	2573.1	25.4	1.4
APR	34.	2.0	4.99	.5	5.	.3	.0	.0	2574.1	26.6	1.2
MAY	34.	2.1	5.72	.6	11.	.7	.0	.0	2574.7	27.4	.8
JUN	34.	2.0	6.90	.7	12.	.7	.0	.0	2575.1	28.0	.6
JUL	24.	1.5	7.72	.8	59.	3.6	.0	.0	2572.8	25.1	-2.9
AUG	24.	1.5	6.70	.6	67.	4.1	.0	.0	2570.1	21.9	-3.2
SEP	20.	1.2	5.10	.5	20.	1.2	.0	.0	2569.6	21.4	-.5
OCT	21.	1.3	3.35	.3	11.	.7	.0	.0	2569.9	21.7	.3
NOV	22.	1.3	1.93	.2	5.	.3	.0	.0	2570.6	22.5	.8
DEC	23.	1.4	.99	.1	5.	.3	.0	.0	2571.5	23.5	1.0
TOTAL		19.1	46.70	4.7		12.8	.0	.0			1.6
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	29.	1.8	.76	.1	5.	.3	.0	.0	2571.3	23.3	1.4
FEB	40.	2.2	.84	.1	5.	.3	.0	.0	2572.8	25.1	1.8
MAR	49.	3.0	1.58	.2	5.	.3	.0	.0	2574.8	27.6	2.5
APR	49.	2.9	3.62	.4	5.	.3	.0	.0	2576.5	29.8	2.2
MAY	50.	3.1	4.78	.6	8.	.5	.0	.0	2577.9	31.8	2.0
JUN	66.	3.9	5.32	.7	8.	.5	.0	.0	2579.7	34.5	2.7
JUL	55.	3.4	6.33	.8	36.	2.2	.0	.0	2580.0	34.9	.4
AUG	42.	2.6	5.68	.7	41.	2.5	.0	.0	2579.6	34.3	-.6
SEP	37.	2.2	3.91	.5	15.	.9	.0	.0	2580.1	35.1	.8
OCT	31.	1.9	2.17	.3	8.	.5	.0	.0	2580.8	36.2	1.1
NOV	30.	1.8	1.93	.3	5.	.3	.0	.0	2581.6	37.4	1.2
DEC	28.	1.7	.89	.1	5.	.3	.9	.0	2581.8	37.8	.4
TOTAL		30.5	37.81	4.8		8.9	.9	.0			15.9

HARRY STRUNK LAKE OPERATION ESTIMATES - 1991

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	.88	.1	2.	.1	.0	.0	2357.4	22.5	2.3
FEB	47.	2.6	.95	.1	2.	.1	.0	.0	2359.2	24.9	2.4
MAR	50.	3.1	1.63	.2	2.	.1	.0	.0	2361.3	27.7	2.8
APR	55.	3.3	5.64	.7	2.	.1	.0	.0	2362.9	30.2	2.5
MAY	52.	3.2	6.86	.9	59.	3.6	.0	.0	2362.0	28.9	-1.3
JUN	45.	2.7	8.11	1.0	61.	3.6	.0	.0	2360.8	27.0	-1.9
JUL	24.	1.5	9.00	.9	226.	13.9	.0	.0	2349.1	13.7	-13.3
AUG	33.	2.0	7.85	.5	187.	11.5	.0	5.2	2343.0	8.9	-4.8
SEP	24.	1.4	6.05	.4	106.	6.3	.0	5.3	2343.0	8.9	.0
OCT	34.	2.1	4.35	.3	18.	1.1	.0	.0	2344.0	9.6	.7
NOV	40.	2.4	1.89	.1	2.	.1	.0	.0	2346.9	11.8	2.2
DEC	41.	2.5	1.05	.1	2.	.1	.0	.0	2349.6	14.1	2.3
TOTAL		29.3	54.26	5.3		40.6	.0	10.5			-6.1
MOST PROBABLE INFLOW CONDITIONS											
JAN	52.	3.2	.81	.1	2.	.1	.0	.0	2357.9	23.2	3.0
FEB	63.	3.5	.85	.1	2.	.1	.0	.0	2360.4	26.5	3.3
MAR	60.	3.7	1.59	.2	2.	.1	.0	.0	2362.7	29.9	3.4
APR	69.	4.1	4.78	.7	2.	.1	.0	.0	2364.7	33.2	3.3
MAY	70.	4.3	5.46	.8	2.	.1	.9	.0	2366.1	35.7	2.5
JUN	71.	4.2	6.79	1.0	7.	.4	2.8	.0	2366.1	35.7	.0
JUL	80.	4.9	7.77	1.1	176.	10.8	.0	.0	2361.9	28.7	-7.0
AUG	52.	3.2	6.57	.7	203.	12.5	.0	.0	2354.2	18.7	-10.0
SEP	35.	2.1	4.89	.4	34.	2.0	.0	.0	2353.9	18.4	-.3
OCT	44.	2.7	3.22	.3	2.	.1	.0	.0	2355.9	20.7	2.3
NOV	49.	2.9	1.89	.2	2.	.1	.0	.0	2358.0	23.3	2.6
DEC	47.	2.9	.95	.1	2.	.1	.0	.0	2360.0	26.0	2.7
TOTAL		41.7	45.57	5.7		26.5	3.7	.0			5.8
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	65.	4.0	.76	.1	2.	.1	.0	.0	2358.5	24.0	3.8
FEB	94.	5.2	.82	.1	2.	.1	.0	.0	2362.1	29.0	5.0
MAR	93.	5.7	1.52	.2	2.	.1	.0	.0	2365.4	34.4	5.4
APR	87.	5.2	3.65	.6	55.	3.3	.0	.0	2366.1	35.7	1.3
MAY	104.	6.4	4.66	.7	2.	.1	5.6	.0	2366.1	35.7	.0
JUN	168.	10.0	5.52	.8	2.	.1	9.1	.0	2366.1	35.7	.0
JUL	124.	7.6	6.55	1.0	91.	5.6	1.0	.0	2366.1	35.7	.0
AUG	96.	5.9	5.59	.8	111.	6.8	.0	.0	2365.2	34.0	-1.7
SEP	59.	3.5	3.70	.6	8.	.5	.7	.0	2366.1	35.7	1.7
OCT	62.	3.8	2.44	.4	2.	.1	3.3	.0	2366.1	35.7	.0
NOV	66.	3.9	1.89	.3	2.	.1	3.5	.0	2366.1	35.7	.0
DEC	59.	3.6	.85	.1	2.	.1	3.4	.0	2366.1	35.7	.0
TOTAL		64.8	37.95	5.7		17.0	26.6	.0			15.5

KEITH SEBELIUS OPERATIONS ESTIMATES - 1991

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	.85	.0	2.	.1	.0	.0	2278.0	4.0	-.1
FEB	2.	.1	.99	.0	2.	.1	.0	.0	2278.0	4.0	.0
MAR	3.	.2	1.71	.1	2.	.1	.0	.0	2278.0	4.0	.0
APR	3.	.2	5.73	.2	2.	.1	.0	.0	2277.7	3.9	-.1
MAY	7.	.4	7.38	.3	2.	.1	.0	.0	2277.7	3.9	.0
JUN	3.	.2	8.70	.3	2.	.1	.0	.0	2277.3	3.7	-.2
JUL	0.	.0	9.98	.4	111.	6.8	.0	6.6	2275.9	3.1	-.6
AUG	0.	.0	8.66	.3	111.	6.8	.0	6.7	2275.0	2.7	-.4
SEP	0.	.0	6.22	.2	47.	2.8	.0	2.8	2274.4	2.5	-.2
OCT	0.	.0	5.12	.2	18.	1.1	.0	1.1	2273.9	2.3	-.2
NOV	0.	.0	1.96	.1	2.	.1	.0	.1	2273.6	2.2	-.1
DEC	2.	.1	1.06	.0	2.	.1	.0	.1	2273.9	2.3	.1
TOTAL		1.2	58.36	2.1		18.3	.0	17.4			-1.8
MOST PROBABLE INFLOW CONDITIONS											
JAN	3.	.2	.82	.0	2.	.1	.0	.0	2278.4	4.2	.1
FEB	5.	.3	.95	.0	2.	.1	.0	.0	2278.7	4.4	.2
MAR	5.	.3	1.69	.1	2.	.1	.0	.0	2278.9	4.5	.1
APR	8.	.5	5.06	.2	2.	.1	.0	.0	2279.3	4.7	.2
MAY	15.	.9	5.73	.3	2.	.1	.0	.0	2280.2	5.2	.5
JUN	10.	.6	7.24	.4	2.	.1	.0	.0	2280.4	5.3	.1
JUL	13.	.8	8.38	.3	65.	4.0	.0	2.5	2278.6	4.3	-1.0
AUG	5.	.3	7.11	.2	75.	4.6	.0	4.5	2278.6	4.3	.0
SEP	2.	.1	5.26	.2	18.	1.1	.0	1.0	2278.2	4.1	-.2
OCT	2.	.1	3.60	.1	7.	.4	.0	.3	2278.0	4.0	-.1
NOV	3.	.2	1.96	.1	2.	.1	.0	.0	2278.0	4.0	.0
DEC	3.	.2	1.02	.0	2.	.1	.0	.0	2278.2	4.1	.1
TOTAL		4.5	48.82	1.9		10.9	.0	8.3			0.0
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	5.	.3	.79	.0	2.	.1	.0	.0	2278.6	4.3	.2
FEB	11.	.6	.91	.0	2.	.1	.0	.0	2279.5	4.8	.5
MAR	15.	.9	1.67	.1	2.	.1	.0	.0	2280.7	5.5	.7
APR	20.	1.2	4.31	.2	2.	.1	.0	.0	2282.2	6.4	.9
MAY	31.	1.9	4.80	.3	2.	.1	.0	.0	2284.2	7.9	1.5
JUN	42.	2.5	5.63	.4	2.	.1	.0	.0	2286.6	9.9	2.0
JUL	63.	3.9	6.76	.5	13.	.8	.0	.0	2289.3	12.5	2.6
AUG	57.	3.5	5.85	.5	31.	1.9	.0	.0	2290.4	13.6	1.1
SEP	39.	2.3	4.11	.4	2.	.1	.0	.0	2291.9	15.4	1.8
OCT	24.	1.5	2.58	.3	2.	.1	.0	.0	2292.8	16.5	1.1
NOV	7.	.4	1.96	.2	2.	.1	.0	.0	2292.9	16.6	.1
DEC	7.	.4	.96	.1	2.	.1	.0	.0	2293.1	16.8	.2
TOTAL		19.4	40.33	3.0		3.7	.0	.0			12.7

HARLAN COUNTY LAKE OPERATION ESTIMATES - 1991

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	85.	5.2	.74	.6	0.	.0	.0	.0	1933.8	179.4	4.6
FEB	144.	8.0	.94	.8	0.	.0	.0	.0	1934.6	186.6	7.2
MAR	208.	12.8	1.63	1.3	0.	.0	.0	.0	1935.7	198.1	11.5
APR	205.	12.2	5.36	4.5	0.	.0	.0	.0	1936.5	205.8	7.7
MAY	229.	14.1	6.43	5.4	324.	19.9	.0	.0	1935.4	194.6	-11.2
JUN	148.	8.8	7.90	6.5	255.	15.2	.0	.0	1934.1	181.7	-12.9
JUL	96.	5.9	9.05	7.0	585.	36.0	.0	.0	1930.0	144.6	-37.1
AUG	91.	5.6	7.95	5.2	587.	36.1	.0	11.9	1927.0	120.8	-23.8
SEP	10.	.6	5.57	3.4	269.	16.0	.0	16.0	1926.6	118.0	-2.8
OCT	11.	.7	4.31	2.6	0.	.0	.0	.0	1926.4	116.1	-1.9
NOV	67.	4.0	1.89	1.2	0.	.0	.0	.0	1926.7	118.9	2.8
DEC	76.	4.7	.97	.6	0.	.0	.0	.0	1927.3	123.0	4.1
TOTAL		82.6	52.74	39.1		123.2	.0	27.9			-51.8
MOST PROBABLE INFLOW CONDITIONS											
JAN	153.	9.4	.71	.6	0.	.0	.0	.0	1934.3	183.6	8.8
FEB	239.	13.3	.88	.7	0.	.0	.0	.0	1935.5	196.2	12.6
MAR	314.	19.3	1.60	1.4	0.	.0	.0	.0	1937.3	214.1	17.9
APR	341.	20.3	4.40	3.9	0.	.0	.0	.0	1938.8	230.5	16.4
MAY	382.	23.5	5.22	4.8	24.	1.5	.0	.0	1940.4	247.7	17.2
JUN	350.	20.8	6.45	6.1	27.	1.6	.0	.0	1941.6	260.8	13.1
JUL	236.	14.5	7.36	6.9	499.	30.7	.0	.0	1939.5	237.7	-23.1
AUG	184.	11.3	6.20	5.5	522.	32.1	.0	.0	1937.0	211.4	-26.3
SEP	195.	11.6	4.73	4.1	103.	6.1	.0	.0	1937.2	212.8	1.4
OCT	181.	11.1	3.23	2.8	0.	.0	.0	.0	1938.0	221.1	8.3
NOV	134.	8.0	1.89	1.7	0.	.0	.0	.0	1938.6	227.4	6.3
DEC	137.	8.4	.92	.8	10.	.6	.0	.0	1939.2	234.4	7.0
TOTAL		171.5	43.59	39.3		72.6	.0	.0			59.6
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	263.	16.2	.69	.6	0.	.0	.0	.0	1935.0	190.4	15.6
FEB	459.	25.5	.85	.7	0.	.0	.0	.0	1937.4	215.2	24.8
MAR	545.	33.5	1.55	1.4	0.	.0	.0	.0	1940.4	247.3	32.1
APR	558.	33.2	3.47	3.3	0.	.0	.0	.0	1943.0	277.2	29.9
MAY	709.	43.6	4.32	4.5	13.	.8	.4	.0	1946.0	315.1	37.9
JUN	1144.	68.1	5.08	5.6	13.	.8	61.7	.0	1946.0	315.1	.0
JUL	688.	42.3	5.71	6.3	101.	6.2	29.8	.0	1946.0	315.1	.0
AUG	385.	23.7	4.85	5.4	101.	6.2	12.1	.0	1946.0	315.1	.0
SEP	287.	17.1	3.82	4.2	25.	1.5	11.4	.0	1946.0	315.1	.0
OCT	247.	15.2	2.32	2.6	0.	.0	12.6	.0	1946.0	315.1	.0
NOV	301.	17.9	1.89	2.1	0.	.0	15.8	.0	1946.0	315.1	.0
DEC	273.	16.8	.87	1.0	10.	.6	15.2	.0	1946.0	315.1	.0
TOTAL		353.1	35.42	37.7		16.1	159.0	.0			140.3

The COE recommends the minimum elevation for Harlan County Lake be set at 1931 ft MSL to avoid safety problems. The higher minimum pool will increase shortages from 27,400 acre-feet to 60,400 acre-feet at reasonable minimum conditions.

LOVEWELL RESERVOIR OPERATION ESTIMATES - 1991

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	RES CHANGE 1000 AF
					REASONABLE MINIMUM INFLOW CONDITIONS								
JAN	.0	.0	0.	.0	.71	.2	0.	.0	.0	.0	1581.0	37.2	-.2
FEB	.2	.0	4.	.2	.89	.2	0.	.0	.0	.0	1581.0	37.2	.0
MAR	.4	.0	7.	.4	1.56	.4	0.	.0	.0	.0	1581.0	37.2	.0
APR	.6	.0	10.	.6	4.59	1.0	0.	.0	.0	.0	1580.9	36.8	-.4
MAY	.8	12.0	208.	12.8	5.78	1.4	106.	6.5	.0	.0	1582.6	41.7	4.9
JUN	.3	8.0	139.	8.3	7.05	1.8	109.	6.5	.0	.0	1582.6	41.7	.0
JUL	.1	6.4	106.	6.5	8.37	1.8	314.	19.3	.0	.0	1577.0	27.1	-14.6
AUG	.0	1.2	20.	1.2	7.33	1.2	366.	22.5	.0	12.2	1571.7	16.8	-10.3
SEP	.0	1.2	20.	1.2	5.03	.7	165.	9.8	.0	9.3	1571.7	16.8	.0
OCT	.0	.0	0.	.0	3.61	.5	0.	.0	.0	.0	1571.4	16.3	-.5
NOV	.0	.0	0.	.0	1.82	.3	0.	.0	.0	.0	1571.2	16.0	-.3
DEC	.0	.0	0.	.0	.90	.1	0.	.0	.0	.0	1571.2	15.9	-.1
TOTAL	2.4	28.8		31.2	47.64	9.6		64.6	.0	21.5			-21.5
					MOST PROBABLE INFLOW CONDITIONS								
JAN	.5	.0	8.	.5	.69	.2	0.	.0	.0	.0	1581.2	37.7	.3
FEB	1.4	.0	25.	1.4	.83	.2	0.	.0	.0	.0	1581.6	38.9	1.2
MAR	2.2	.0	36.	2.2	1.53	.4	0.	.0	.0	.0	1582.3	40.7	1.8
APR	2.1	.0	35.	2.1	3.84	.9	0.	.0	.2	.0	1582.6	41.7	1.0
MAY	3.3	1.2	73.	4.5	4.75	1.2	37.	2.3	1.0	.0	1582.6	41.7	.0
JUN	5.2	1.2	108.	6.4	5.87	1.5	39.	2.3	2.6	.0	1582.6	41.7	.0
JUL	3.5	10.4	226.	13.9	6.73	1.6	301.	18.5	.0	.0	1580.4	35.5	-6.2
AUG	.7	8.7	153.	9.4	5.71	1.1	306.	18.8	.0	.0	1576.0	25.0	-10.5
SEP	.3	1.2	25.	1.5	3.91	.7	81.	4.8	.0	.0	1574.0	21.0	-4.0
OCT	.5	.0	8.	.5	2.62	.4	0.	.0	.0	.0	1574.1	21.1	.1
NOV	.5	.0	8.	.5	1.82	.3	0.	.0	.0	.0	1574.2	21.3	.2
DEC	.6	.0	10.	.6	.85	.1	0.	.0	.0	.0	1574.4	21.8	.5
TOTAL	20.8	22.7		43.5	39.15	8.6		46.7	3.8	.0			-15.6
					REASONABLE MAXIMUM INFLOW CONDITIONS								
JAN	3.5	.0	57.	3.5	.67	.2	0.	.0	.0	.0	1582.3	40.7	3.3
FEB	5.3	.0	95.	5.3	.81	.2	0.	.0	4.1	.0	1582.6	41.7	1.0
MAR	12.4	.0	202.	12.4	1.50	.4	0.	.0	12.0	.0	1582.6	41.7	.0
APR	9.2	.0	155.	9.2	3.13	.8	0.	.0	8.4	.0	1582.6	41.7	.0
MAY	14.3	.0	233.	14.3	3.72	.9	16.	1.0	12.4	.0	1582.6	41.7	.0
JUN	7.9	.0	133.	7.9	4.75	1.2	22.	1.3	5.4	.0	1582.6	41.7	.0
JUL	11.3	1.2	203.	12.5	5.49	1.4	146.	9.0	2.1	.0	1582.6	41.7	.0
AUG	11.2	1.2	202.	12.4	4.19	1.0	146.	9.0	2.4	.0	1582.6	41.7	.0
SEP	10.7	.0	180.	10.7	2.91	.7	39.	2.3	7.7	.0	1582.6	41.7	.0
OCT	11.3	.0	184.	11.3	1.77	.4	0.	.0	10.9	.0	1582.6	41.7	.0
NOV	5.8	.0	97.	5.8	1.82	.5	0.	.0	5.3	.0	1582.6	41.7	.0
DEC	4.7	.0	76.	4.7	.81	.2	0.	.0	4.5	.0	1582.6	41.7	.0
TOTAL	107.6	2.4		110.0	31.57	7.9		22.6	75.2	.0			4.3

KIRWIN RESERVOIR OPERATION ESTIMATES - 1991

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	.81	.1	0.	.0	.0	.0	1695.6	8.6	-.1
FEB	4.	.2	1.04	.1	0.	.0	.0	.0	1695.7	8.7	.1
MAR	10.	.6	1.69	.1	0.	.0	.0	.0	1696.3	9.2	.5
APR	3.	.2	4.73	.4	0.	.0	.0	.0	1696.1	9.0	-.2
MAY	20.	1.2	5.93	.4	31.	1.9	.0	1.9	1697.0	9.8	.8
JUN	7.	.4	7.08	.6	32.	1.9	.0	1.9	1696.8	9.6	-.2
JUL	2.	.1	8.37	.7	91.	5.6	.0	5.6	1696.1	9.0	-.6
AUG	0.	.0	7.57	.6	106.	6.5	.0	6.5	1695.4	8.4	-.6
SEP	0.	.0	5.24	.4	47.	2.8	.0	2.8	1694.9	8.0	-.4
OCT	0.	.0	4.00	.3	0.	.0	.0	.0	1694.5	7.7	-.3
NOV	0.	.0	1.91	.1	0.	.0	.0	.0	1694.4	7.6	-.1
DEC	0.	.0	1.00	.1	0.	.0	.0	.0	1694.3	7.5	-.1
TOTAL		2.7	49.37	3.9		18.7	.0	18.7			-1.2
MOST PROBABLE INFLOW CONDITIONS											
JAN	10.	.6	.76	.1	0.	.0	.0	.0	1696.3	9.2	.5
FEB	18.	1.0	.98	.1	0.	.0	.0	.0	1697.3	10.1	.9
MAR	29.	1.8	1.67	.2	0.	.0	.0	.0	1698.7	11.7	1.6
APR	49.	2.9	4.00	.4	0.	.0	.0	.0	1700.8	14.2	2.5
MAY	50.	3.1	4.84	.6	10.	.6	.0	.0	1702.1	16.1	1.9
JUN	35.	2.1	6.11	.7	10.	.6	.0	.0	1702.7	16.9	.8
JUL	39.	2.4	6.93	.8	81.	5.0	.0	.0	1700.2	13.5	-3.4
AUG	11.	.7	6.01	.6	81.	5.0	.0	1.2	1697.0	9.8	-3.7
SEP	3.	.2	4.21	.4	22.	1.3	.0	1.3	1696.8	9.6	-.2
OCT	2.	.1	2.92	.2	0.	.0	.0	.0	1696.6	9.5	-.1
NOV	5.	.3	1.91	.2	0.	.0	.0	.0	1696.8	9.6	.1
DEC	7.	.4	.96	.1	0.	.0	.0	.0	1697.1	9.9	.3
TOTAL		15.6	41.30	4.4		12.5	.0	2.5			1.2
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	23.	1.4	.74	.1	0.	.0	.0	.0	1697.2	10.0	1.3
FEB	58.	3.2	.95	.1	0.	.0	.0	.0	1699.9	13.1	3.1
MAR	68.	4.2	1.65	.2	0.	.0	.0	.0	1702.9	17.1	4.0
APR	74.	4.4	3.36	.4	0.	.0	.0	.0	1705.4	21.1	4.0
MAY	133.	8.2	4.12	.6	7.	.4	.0	.0	1709.4	28.3	7.2
JUN	183.	10.9	4.91	1.0	7.	.4	.0	.0	1713.5	37.8	9.5
JUL	99.	6.1	5.75	1.3	52.	3.2	.0	.0	1714.0	39.4	1.6
AUG	220.	13.5	4.70	1.2	52.	3.2	.0	.0	1717.0	48.5	9.1
SEP	133.	7.9	3.29	.9	13.	.8	.0	.0	1718.8	54.7	6.2
OCT	76.	4.7	2.09	.6	0.	.0	.0	.0	1719.9	58.8	4.1
NOV	49.	2.9	1.91	.6	0.	.0	.0	.0	1720.6	61.1	2.3
DEC	39.	2.4	.90	.3	0.	.0	.0	.0	1721.1	63.2	2.1
TOTAL		69.8	34.37	7.3		8.0	.0	.0			54.5

WEBSTER RESERVOIR OPERATION ESTIMATES - 1991

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	.88	.1	0.	.0	.0	.0	1865.9	11.9	-.1
FEB	2.	.1	1.03	.1	0.	.0	.0	.0	1865.9	11.9	.0
MAR	2.	.1	1.77	.2	0.	.0	.0	.0	1865.8	11.8	-.1
APR	8.	.5	5.31	.6	0.	.0	.0	.0	1865.7	11.7	-.1
MAY	20.	1.2	6.48	.7	33.	2.0	.0	.0	1864.6	10.2	-1.5
JUN	2.	.1	8.11	.8	49.	2.9	.0	.0	1861.3	6.6	-3.6
JUL	0.	.0	9.26	.7	91.	5.6	.0	5.0	1860.0	5.3	-1.3
AUG	0.	.0	8.30	.6	104.	6.4	.0	6.4	1859.3	4.7	-.6
SEP	0.	.0	5.88	.4	61.	3.6	.0	3.6	1858.8	4.3	-.4
OCT	0.	.0	4.54	.3	0.	.0	.0	.0	1858.4	4.0	-.3
NOV	0.	.0	1.96	.1	0.	.0	.0	.0	1858.3	3.9	-.1
DEC	0.	.0	1.08	.1	0.	.0	.0	.0	1858.2	3.8	-.1
TOTAL		2.0	54.60	4.7		20.5	.0	15.0			-8.2
MOST PROBABLE INFLOW CONDITIONS											
JAN	5.	.3	.84	.1	0.	.0	.0	.0	1866.1	12.2	.2
FEB	16.	.9	.97	.1	0.	.0	.0	.0	1866.7	13.0	.8
MAR	31.	1.9	1.76	.2	0.	.0	.0	.0	1867.8	14.7	1.7
APR	39.	2.3	4.31	.6	0.	.0	.0	.0	1869.0	16.4	1.7
MAY	44.	2.7	5.28	.7	10.	.6	.0	.0	1869.8	17.8	1.4
JUN	34.	2.0	6.83	1.0	10.	.6	.0	.0	1870.0	18.2	.4
JUL	8.	.5	7.71	1.0	81.	5.0	.0	.0	1866.5	12.7	-5.5
AUG	11.	.7	6.66	.7	81.	5.0	.0	.0	1862.4	7.7	-5.0
SEP	0.	.0	4.92	.4	12.	.7	.0	.0	1861.3	6.6	-1.1
OCT	2.	.1	3.37	.3	0.	.0	.0	.0	1861.1	6.4	-.2
NOV	2.	.1	1.96	.2	0.	.0	.0	.0	1861.1	6.3	-.1
DEC	5.	.3	1.04	.1	0.	.0	.0	.0	1861.2	6.5	.2
TOTAL		11.8	45.65	5.4		11.9	.0	.0			-5.5
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	24.	1.5	.81	.1	0.	.0	.0	.0	1867.0	13.4	1.4
FEB	41.	2.3	.93	.1	0.	.0	.0	.0	1868.4	15.6	2.2
MAR	50.	3.1	1.74	.2	0.	.0	.0	.0	1870.2	18.5	2.9
APR	106.	6.3	3.52	.5	0.	.0	.0	.0	1873.4	24.3	5.8
MAY	102.	6.3	4.45	.8	0.	.0	.0	.0	1876.1	29.8	5.5
JUN	77.	4.6	5.45	1.0	0.	.0	.0	.0	1877.7	33.4	3.6
JUL	124.	7.6	6.50	1.3	37.	2.3	.0	.0	1879.4	37.4	4.0
AUG	88.	5.4	5.43	1.1	37.	2.3	.0	.0	1880.2	39.4	2.0
SEP	37.	2.2	3.65	.8	0.	.0	.0	.0	1880.8	40.8	1.4
OCT	39.	2.4	2.33	.5	0.	.0	.0	.0	1881.5	42.7	1.9
NOV	27.	1.6	1.96	.4	0.	.0	.0	.0	1882.0	43.9	1.2
DEC	20.	1.2	1.00	.2	0.	.0	.0	.0	1882.3	44.9	1.0
TOTAL		44.5	37.77	7.0		4.6	.0	.0			32.9

WACONDA LAKE OPERATION ESTIMATES - 1991

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	.78	.8	13.	.8	.0	.0	1453.3	213.5	.0
FEB	40.	2.2	.95	.9	23.	1.3	.0	.0	1453.3	213.5	.0
MAR	44.	2.7	1.67	1.6	11.	.7	.0	.0	1453.3	213.9	.4
APR	52.	3.1	5.65	5.5	2.	.1	.0	.0	1453.1	211.4	-2.5
MAY	86.	5.3	6.78	6.5	2.	.1	.0	.0	1453.0	210.1	-1.3
JUN	84.	5.0	8.62	8.2	35.	2.1	.0	.0	1452.5	204.8	-5.3
JUL	41.	2.5	10.50	9.6	99.	6.1	.0	.0	1451.3	191.6	-13.2
AUG	33.	2.0	9.14	8.0	99.	6.1	.0	.0	1450.2	179.5	-12.1
SEP	2.	.1	6.59	5.6	35.	2.1	.0	.0	1449.4	171.9	-7.6
OCT	2.	.1	4.70	3.9	2.	.1	.0	.0	1449.0	168.0	-3.9
NOV	22.	1.3	1.89	1.6	2.	.1	.0	.0	1449.0	167.6	-.4
DEC	18.	1.1	.95	.8	11.	.7	.0	.0	1449.0	167.2	-.4
TOTAL		27.0	58.22	53.0		20.3	.0	.0			-46.3
MOST PROBABLE INFLOW CONDITIONS											
JAN	50.	3.1	.73	.7	39.	2.4	.0	.0	1453.3	213.5	.0
FEB	106.	5.9	.88	.9	90.	5.0	.0	.0	1453.3	213.5	.0
MAR	148.	9.1	1.65	1.6	11.	.7	.0	.0	1453.9	220.3	6.8
APR	155.	9.2	4.70	4.7	2.	.1	.0	.0	1454.2	224.7	4.4
MAY	233.	14.3	5.44	5.5	2.	.1	.0	.0	1455.0	233.4	8.7
JUN	200.	11.9	7.15	7.4	25.	1.5	.0	.0	1455.2	236.4	3.0
JUL	143.	8.8	8.52	8.8	70.	4.3	.0	.0	1454.8	232.1	-4.3
AUG	125.	7.7	7.20	7.3	70.	4.3	.0	.0	1454.5	228.2	-3.9
SEP	124.	7.4	5.33	5.3	143.	8.5	.0	.0	1454.0	221.8	-6.4
OCT	85.	5.2	3.51	3.4	133.	8.2	.0	.0	1453.4	215.4	-6.4
NOV	45.	2.7	1.89	1.8	121.	7.2	.0	.0	1452.9	209.1	-6.3
DEC	55.	3.4	.93	.9	41.	2.5	.0	.0	1452.9	209.1	.0
TOTAL		88.7	47.93	48.3		44.8	.0	.0			-4.4
REASONABLE MAXIMUM INFLOW CONDITIONS											
JAN	168.	10.3	.69	.7	156.	9.6	.0	.0	1453.3	213.5	.0
FEB	319.	17.7	.84	.8	301.	16.7	.0	.0	1453.3	213.7	.2
MAR	677.	41.6	1.61	1.6	299.	18.4	.0	.0	1455.1	235.3	21.6
APR	716.	42.6	3.80	4.0	301.	17.9	14.5	.0	1455.6	241.5	6.2
MAY	620.	38.1	4.63	4.9	2.	.1	33.1	.0	1455.6	241.5	.0
JUN	654.	38.9	5.73	6.0	2.	.1	32.8	.0	1455.6	241.5	.0
JUL	652.	40.1	6.52	6.8	2.	.1	33.2	.0	1455.6	241.5	.0
AUG	346.	21.3	5.82	6.1	2.	.1	15.1	.0	1455.6	241.5	.0
SEP	412.	24.5	4.18	4.4	2.	.1	20.0	.0	1455.6	241.5	.0
OCT	259.	15.9	2.55	2.7	299.	18.4	.0	.0	1455.2	236.3	-5.2
NOV	158.	9.4	1.89	1.9	301.	17.9	.0	.0	1454.3	225.9	-10.4
DEC	151.	9.3	.88	.9	137.	8.4	.0	.0	1454.3	225.9	.0
TOTAL		309.7	39.14	40.8		107.8	148.7	.0			12.4

CEDAR BLUFF RESERVOIR OPERATION ESTIMATES - 1991

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	1.06	.1	0.	.0	.0	.0	2096.6	15.9	-.1
FEB	0.	.0	1.18	.1	0.	.0	.0	.0	2096.5	15.8	-.1
MAR	0.	.0	1.92	.2	2.	.1	.0	.0	2096.3	15.5	-.3
APR	5.	.3	6.51	.7	2.	.1	.0	.0	2096.0	15.0	-.5
MAY	10.	.6	7.87	.9	41.	2.5	.0	2.1	2095.4	14.3	-.7
JUN	5.	.3	9.39	1.0	42.	2.5	.0	2.1	2094.6	13.2	-1.1
JUL	0.	.0	11.13	1.2	115.	7.1	.0	6.3	2092.9	11.2	-2.0
AUG	0.	.0	9.68	1.0	114.	7.0	.0	6.3	2091.3	9.5	-1.7
SEP	0.	.0	7.57	.7	55.	3.3	.0	3.1	2090.4	8.6	-.9
OCT	0.	.0	6.25	.6	18.	1.1	.0	1.1	2089.7	8.0	-.6
NOV	0.	.0	2.07	.2	0.	.0	.0	.0	2089.5	7.8	-.2
DEC	0.	.0	1.19	.1	0.	.0	.0	.0	2089.4	7.7	-.1
TOTAL		1.2	65.82	6.8		23.7	.0	21.0			-8.3
					MOST PROBABLE INFLOW CONDITIONS						
JAN	2.	.1	.95	.1	0.	.0	.0	.0	2096.7	16.0	.0
FEB	9.	.5	1.06	.1	0.	.0	.0	.0	2097.0	16.4	.4
MAR	10.	.6	1.90	.2	2.	.1	.0	.0	2097.2	16.7	.3
APR	24.	1.4	5.29	.6	2.	.1	.0	.0	2097.7	17.4	.7
MAY	31.	1.9	6.29	.8	15.	.9	.0	.7	2098.3	18.3	.9
JUN	27.	1.6	7.84	.9	15.	.9	.0	.7	2098.6	18.8	.5
JUL	20.	1.2	9.12	1.1	94.	5.8	.0	5.2	2098.3	18.3	-.5
AUG	16.	1.0	7.76	.9	104.	6.4	.0	6.0	2098.1	18.0	-.3
SEP	2.	.1	6.17	.7	27.	1.6	.0	1.5	2097.6	17.3	-.7
OCT	2.	.1	4.44	.5	11.	.7	.0	.7	2097.3	16.9	-.4
NOV	0.	.0	2.07	.2	0.	.0	.0	.0	2097.2	16.7	-.2
DEC	0.	.0	1.11	.1	0.	.0	.0	.0	2097.1	16.6	-.1
TOTAL		8.5	54.00	6.2		16.5	.0	14.8			-.6
					REASONABLE MAXIMUM INFLOW CONDITIONS						
JAN	18.	1.1	.86	.1	0.	.0	.0	.0	2097.4	17.0	1.0
FEB	29.	1.6	.97	.1	0.	.0	.0	.0	2098.4	18.5	1.5
MAR	68.	4.2	1.86	.2	2.	.1	.0	.0	2100.9	22.4	3.9
APR	91.	5.4	4.10	.6	2.	.1	.0	.0	2103.6	27.1	4.7
MAY	91.	5.6	4.93	.8	11.	.7	.0	.5	2106.0	31.7	4.6
JUN	153.	9.1	6.21	1.1	12.	.7	.0	.0	2109.5	39.0	7.3
JUL	250.	15.4	7.55	1.5	55.	3.4	.0	.0	2113.9	49.5	10.5
AUG	127.	7.8	6.36	1.4	62.	3.8	.0	.0	2114.9	52.1	2.6
SEP	61.	3.6	4.78	1.1	17.	1.0	.0	.0	2115.4	53.6	1.5
OCT	62.	3.8	3.05	.7	8.	.5	.0	.0	2116.4	56.2	2.6
NOV	27.	1.6	2.07	.5	0.	.0	.0	.0	2116.8	57.3	1.1
DEC	21.	1.3	1.00	.2	0.	.0	.0	.0	2117.2	58.4	1.1
TOTAL		60.5	43.74	8.3		10.3	.0	.5			42.4

TABLE 5
FLOOD DAMAGES PREVENTED BY NEBRASKA-KANSAS PROJECTS RESERVOIRS

BONNY

Year	$ Damages Prevented	Cumulative Total
1951	293,000	293,000
1953	135,000	428,000
1957	1,050,000	1,478,000
1960	169,000	1,647,000
1965	273,000	1,920,000
1967	42,000	1,962,000
1969	200,000	2,162,000

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

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

HUGH BUTLER

Year	$ Damages Prevented	Cumulative Total
1962	2,000	2,000
1965	137,000	139,000
1967	42,000	181,000

HARRY STRUNK

Year	$ Damages Prevented	Cumulative Total
1951	14,000	14,000
1957	5,000	19,000
1960	198,000	217,000
1962	29,000	246,000
1967	129,000	375,000
1969	6,000	381,000

KEITH SEBELIUS

Year	$ Damages Prevented	Cumulative Total
1966	132,000	132,000
1967	885,000	1,017,000
1972	498,000	1,515,000

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	64,000	11,715,000
1973	1,310,000	13,025,000
1974	1,000	13,026,000
1975	200,000	13,226,000
1976	1,000	13,227,000
1978	100,000	13,327,000
1979	21,000	13,348,000
1981	21,000	13,369,000
1982	465,000	13,834,000
1983	1,874,000	15,708,000
1984	1,639,000	17,347,000
1986	6,756,000	24,103,000
1987	2,336,000	26,439,000
1989	674,000	27,113,000
1990	183,000	27,296,000

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
1971	9,000	706,000
1973	1,728,000	2,434,000
1975	98,000	2,532,000
1978	25,000	2,557,000
1979	13,000	2,570,000
1981	8,000	2,578,000
1982	18,000	2,596,000
1983	511,000	3,107,000
1984	276,000	3,383,000
1985	140,000	3,523,000
1986	354,000	3,877,000
1987	1,185,000	5,062,000
1989	2,259,000	7,321,000
1990	77,000	7,398,000

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
1971	3,000	1,632,000
1973	40,000	1,672,000
1975	618,000	2,290,000
1978	4,000	2,294,000
1979	35,000	2,329,000
1982	25,000	2,354,000
1983	1,000	2,355,000
1985	60,000	2,415,000
1986	60,000	2,475,000
1987	441,000	2,916,000
1989	236,000	3,152,000
1990	54,000	3,206,000

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
1971	3,000	1,893,000
1973	54,000	1,947,000
1975	885,000	2,832,000
1978	2,000	2,834,000
1979	16,000	2,850,000
1982	36,000	2,886,000
1987	447,000	3,333,000
1989	286,000	3,619,000
1990	54,000	3,673,000

WACONDA

Year	$ Damages Prevented	Cumulative Total
1968	280,000	280,000
1969	606,000	886,000
1971	9,000	895,000
1973	3,797,000	4,692,000
1974	1,000	4,693,000
1975	967,000	5,660,000
1978	11,000	5,671,000
1979	959,000	6,630,000
1981	24,000	6,654,000
1982	1,398,000	8,052,000
1983	360,000	8,412,000
1984	1,363,000	9,775,000
1985	331,000	10,106,000
1986	1,269,000	11,375,000
1987	5,699,000	17,074,000
1989	1,779,000	18,853,000
1990	194,000	19,047,000

CEDAR BLUFF

Year	$ Damages Prevented	Cumulative Total
1951	597,000	597,000
1955	357,000	954,000
1956	19,000	973,000
1957	4,812,000	5,785,000
1958	829,000	6,614,000
1960	1,573,000	8,187,000
1961	101,000	8,288,000
1962	1,000	8,289,000
1964	17,000	8,306,000
1965	38,000	8,344,000
1967	42,000	8,386,000
1969	1,000	8,387,000
1971	8,000	8,395,000
1973	536,000	8,931,000
1975	11,000	8,942,000
1979	2,000	8,944,000
1981	1,000	8,945,000
1982	48,000	8,993,000
1983	1,000	8,994,000
1985	3,000	8,997,000
1987	31,000	9,028,000

PROJECT TOTALS

Year	$ Damages Prevented	Cumulative Total
1951	1,124,000	1,124,000
1953	135,000	1,259,000
1955	357,000	1,616,000
1956	123,000	1,739,000
1957	8,342,000	10,081,000
1958	953,000	11,034,000
1960	9,800,000	20,834,000
1961	523,000	21,357,000
1962	247,000	21,604,000
1964	300,000	21,904,000
1965	1,772,000	23,676,000
1966	1,790,000	25,466,000
1967	5,179,000	30,645,000
1968	326,000	30,971,000
1969	832,000	31,803,000
1971	96,000	31,899,000
1972	498,000	32,397,000
1973	7,465,000	39,862,000
1974	2,000	39,864,000
1975	2,779,000	42,643,000
1976	1,000	42,644,000
1978	142,000	42,786,000
1979	1,046,000	43,832,000
1981	54,000	43,886,000
1982	1,990,000	45,876,000
1983	2,747,000	48,623,000
1984	3,278,000	51,901,000
1985	534,000	52,435,000
1986	8,439,000	60,874,000
1987	10,139,000	71,013,000
1989	5,234,000	76,247,000
1990	562,000	76,809,000

NOTE: Construction cost of storage dams -- $208,954,130
The reservoirs upstream from Harlan County Lake have not received benefits for damages prevented since 1972.

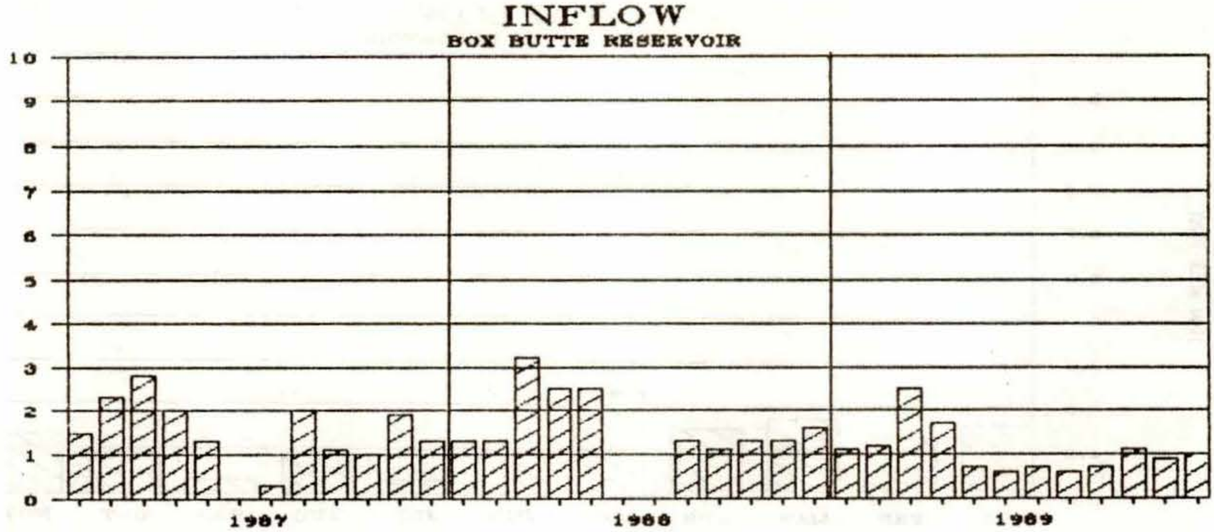
TABLE 6
WATER DIVERTED IN 1990 AND THE
ESTIMATED DIVERSION FOR 1991
(Units - Acre-Feet)

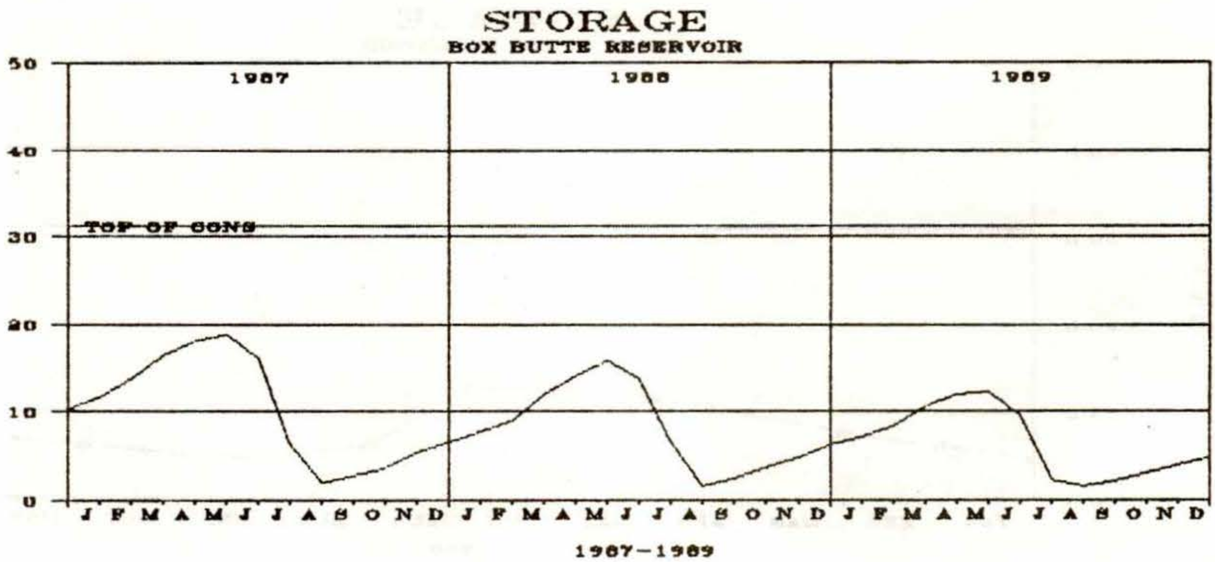
Irrigation District and Canal	1990 Irrigation Operations From	To	10-Year Average Diversion (1980-89)	1990 Diversion	Estimated Diversion in 1991
Mirage Flats Irrigation District					
Mirage Flats Canal	7/05	8/18	15,482	8,662	12,000
Ainsworth Irrigation District					
Ainsworth Canal	4/22	9/21	67,273	68,286	80,000
Sargent Irrigation District					
Sargent Canal	6/18	9/17	25,162	27,351	25,000
Farwell Irrigation District					
Farwell Canal	6/04	9/08	73,241	77,011	78,000
Twin Loups Irrigation District					
Above Davis Creek	4/23	9/16	--	29,148	46,000
Below Davis Creek	--	--	--	0	0
Total Twin Loups Irrigation District			--	29,148	46,000
Frenchman Valley Irrigation District					
Culbertson Canal	4/09	8/10	12,022	11,069	7,000
H & RW Irrigation District					
Culbertson Extension Canal	6/07	8/10	17,190	12,499	9,000
Frenchman-Cambridge Irrigation District					
Meeker-Driftwood Canal	6/19	8/31	30,288	32,301	31,000
Red Willow Canal	6/19	8/31	8,070	8,803	9,000
Bartley Canal	6/21	8/31	9,045	9,478	9,000
Cambridge Canal	6/18	8/31	27,851	28,378	30,000
Total Frenchman-Cambridge Irrigation District			75,254	78,960	79,000
Almena Irrigation District					
Almena Canal	7/03	7/18	912	1,875	0
Bostwick Irrigation District in Nebraska					
Franklin Canal	6/27	9/13	27,828	21,386	24,000
Naponee Canal	6/26	9/07	3,073	2,585	3,000
Franklin Pump Canal	7/02	9/11	3,149	2,140	3,000
Superior Canal	6/27	9/08	14,487	13,628	12,000
Courtland Canal (Nebraska)	2/13	12/20	1,722	2,098	1,800
Total Bostwick Irrigation District in Nebraska			50,259	41,837	43,800
Kansas-Bostwick Irrigation District					
Courtland Canal above Lovewell	2/13	12/19	25,916	25,745	24,000
Courtland Canal below Lovewell	5/17	9/15	46,690	55,164	46,000
Total Kansas-Bostwick Irrigation District			72,606	80,909	70,000
Kirwin Irrigation District					
Kirwin Canal	6/26	8/16	8,260	13,855	0
Webster Irrigation District					
Osborne Canal	7/02	8/24	5,453	9,070	4,000
Cedar Bluff Irrigation District					
Cedar Bluff Canal	No irrigation in 1990		0	0	0
TOTAL			423,114	460,532	453,800

EXHIBIT 1A

BOX BUTTE RESERVOIR

OPERATION





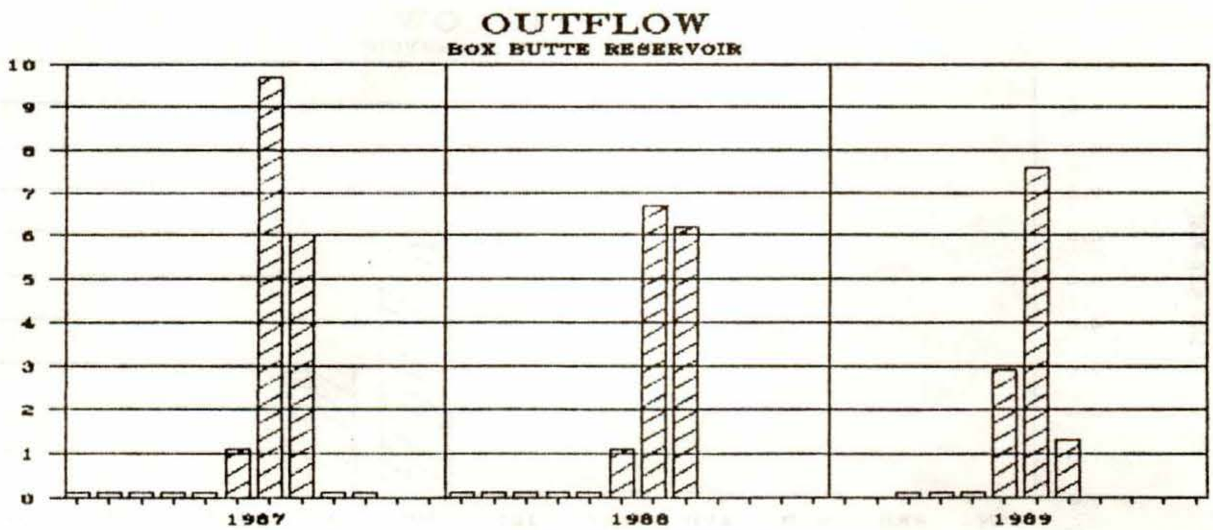
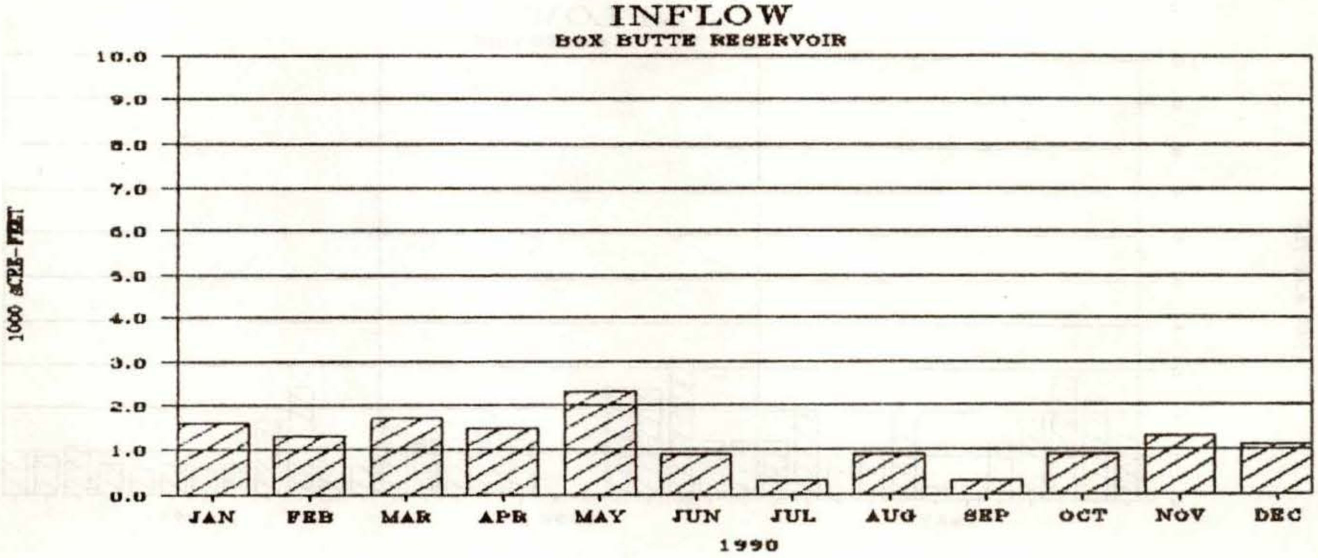
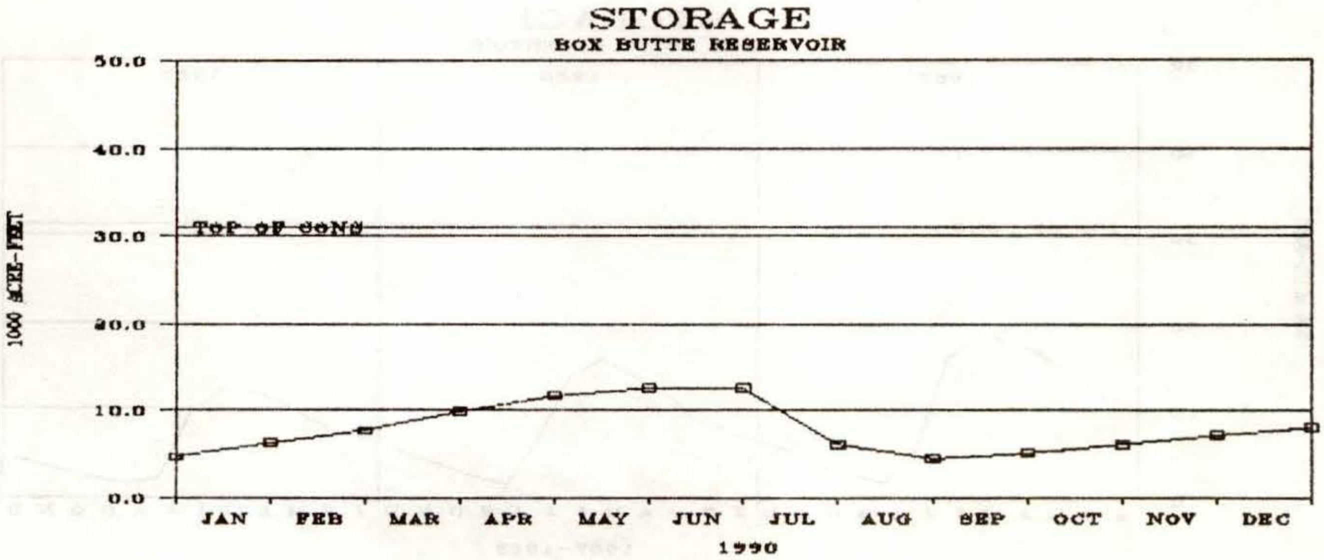


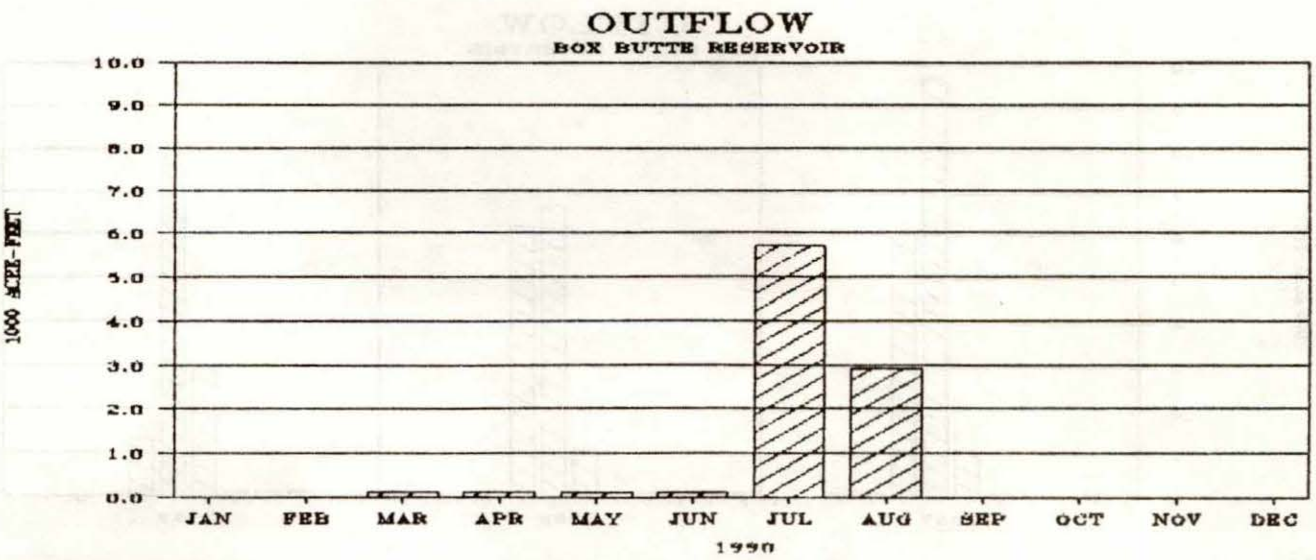
EXHIBIT 1B

BOX BUTTE RESERVOIR

1990 OPERATION

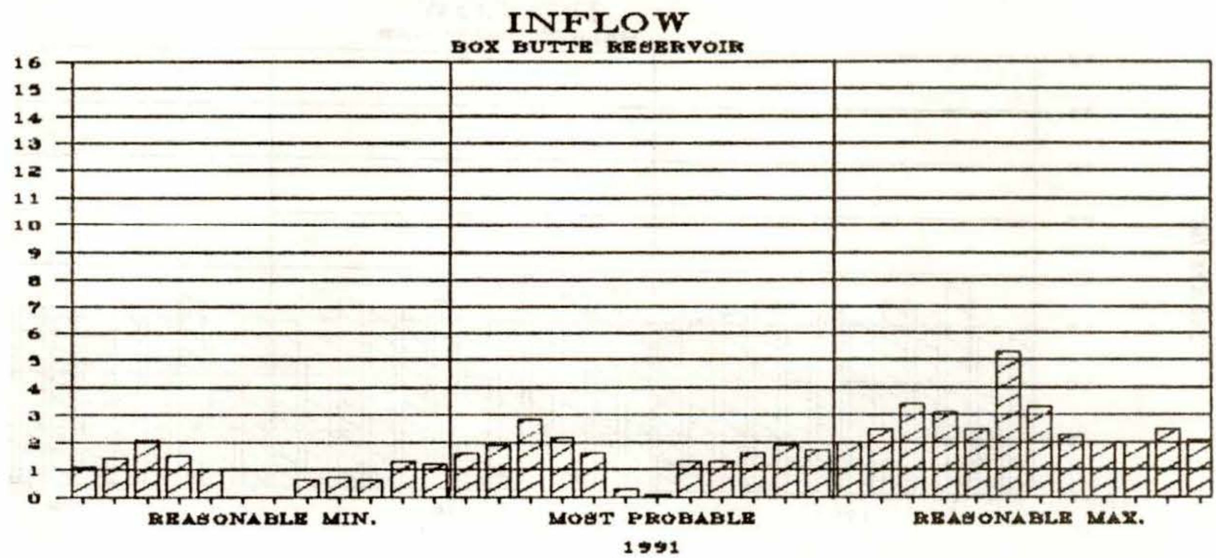


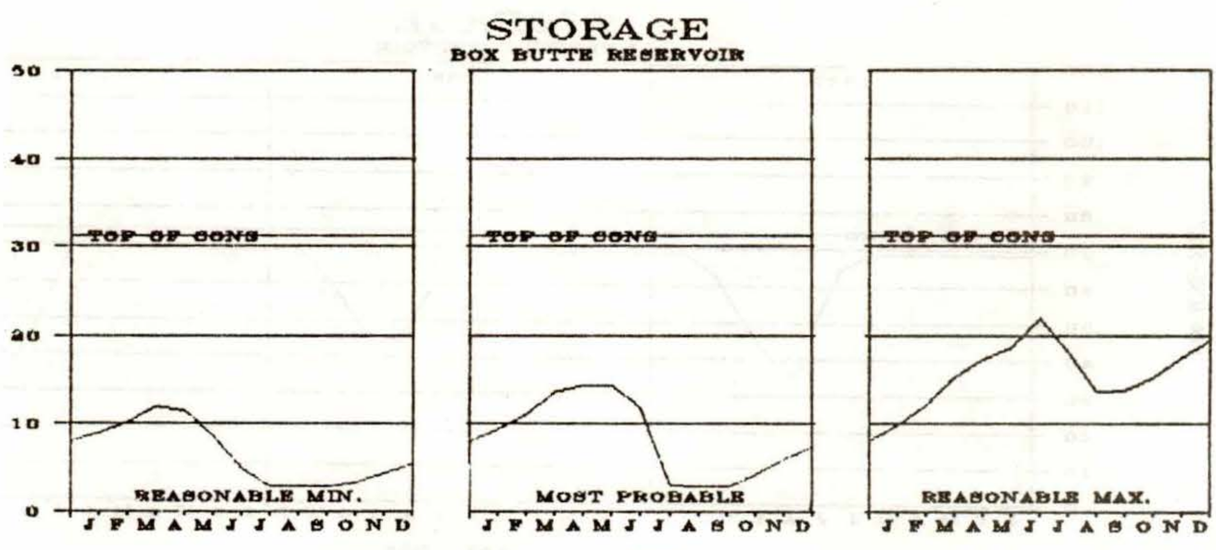




BOX BUTTE RESERVOIR

1991 OPERATION





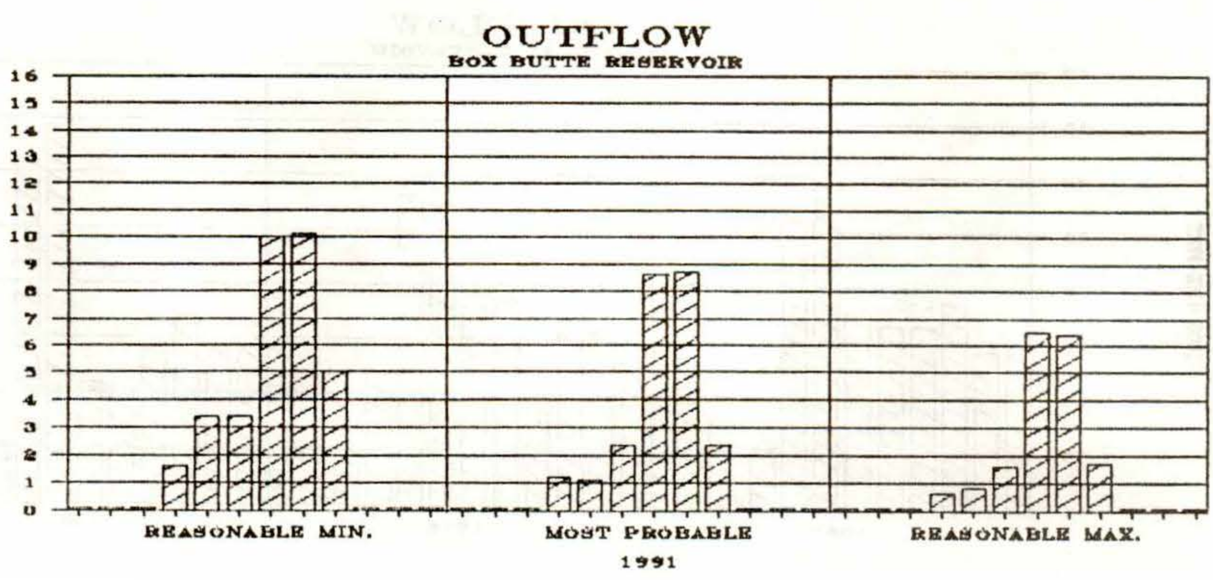
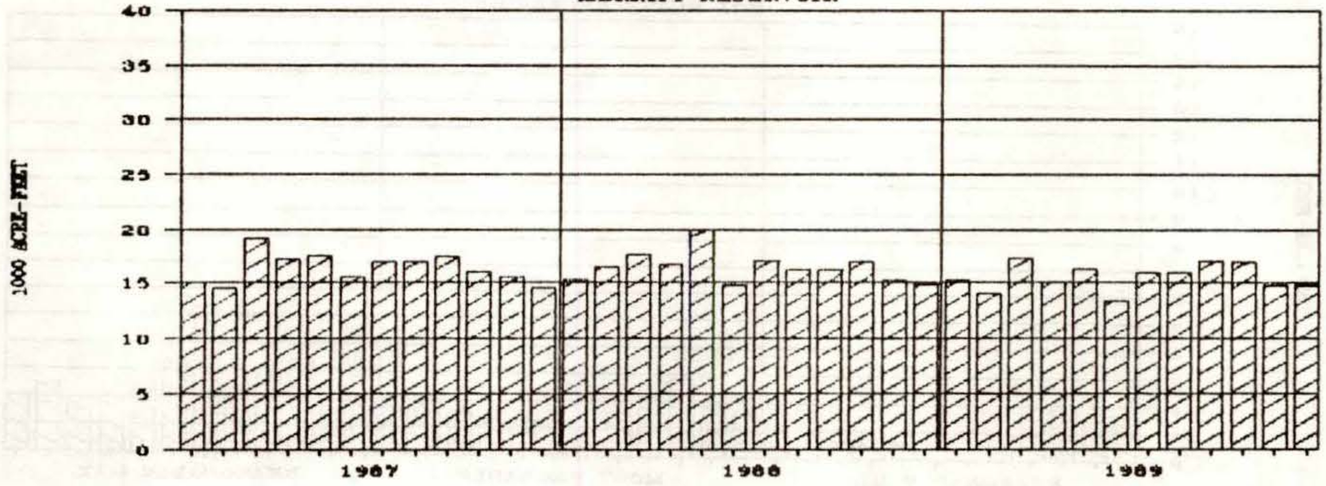


EXHIBIT 2A

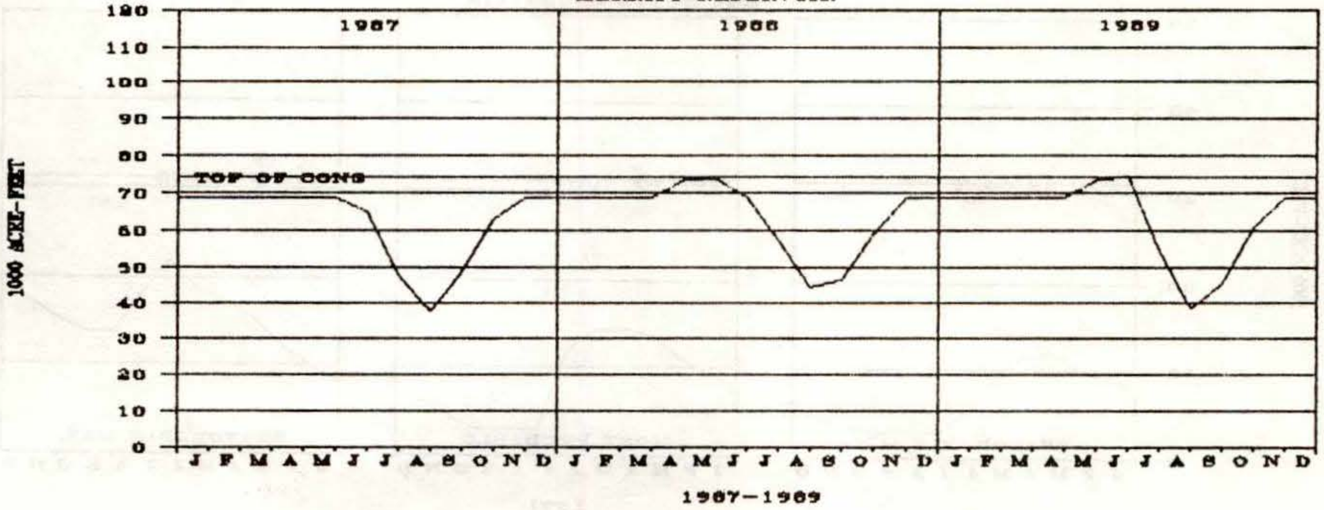
MERRITT RESERVOIR

OPERATION

INFLOW
MERRITT RESERVOIR



STORAGE
MERRITT RESERVOIR



OUTFLOW
MERRITT RESERVOIR

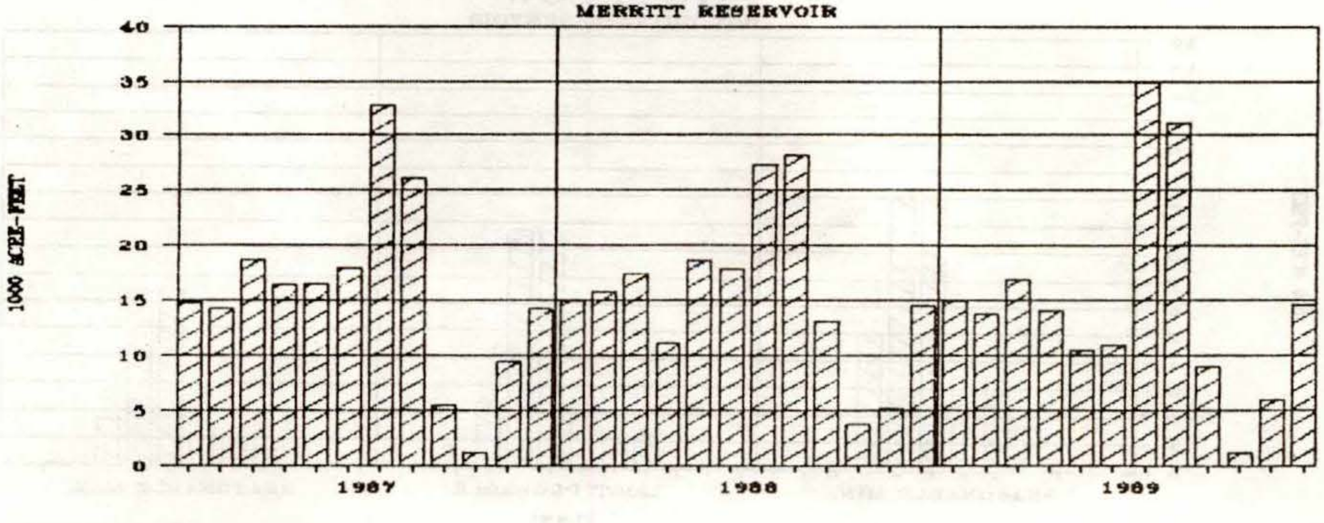
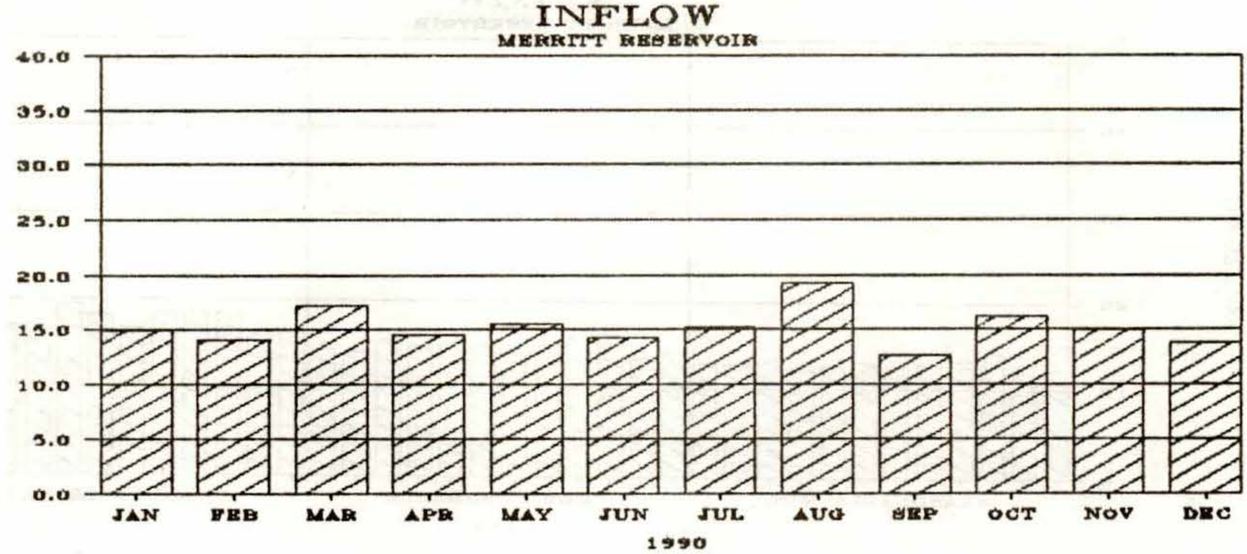
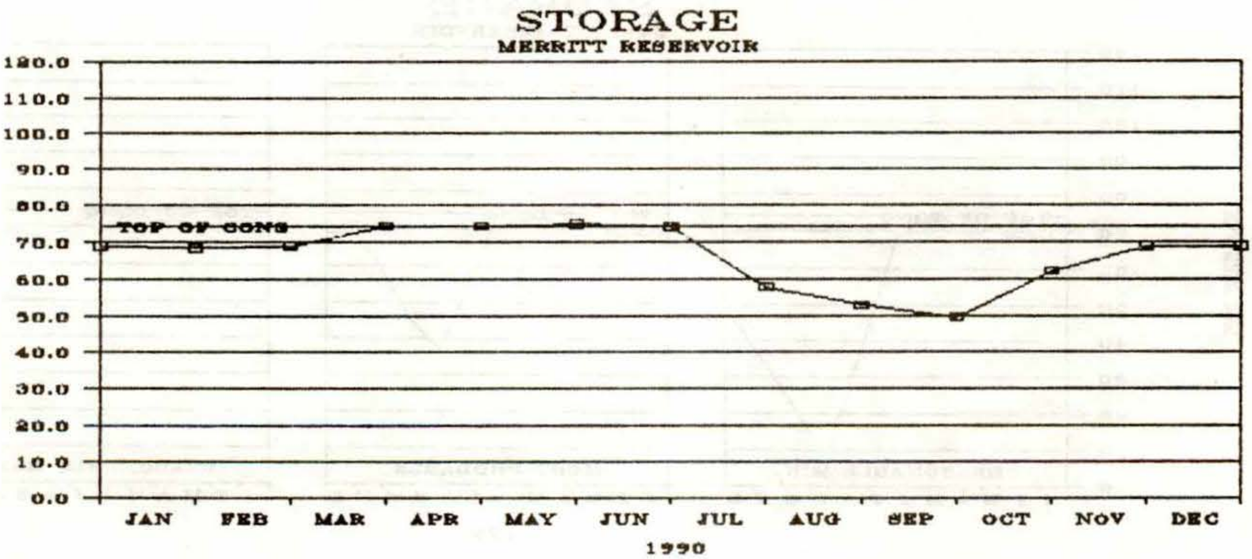


EXHIBIT 2B

MERRITT RESERVOIR

1990 OPERATION





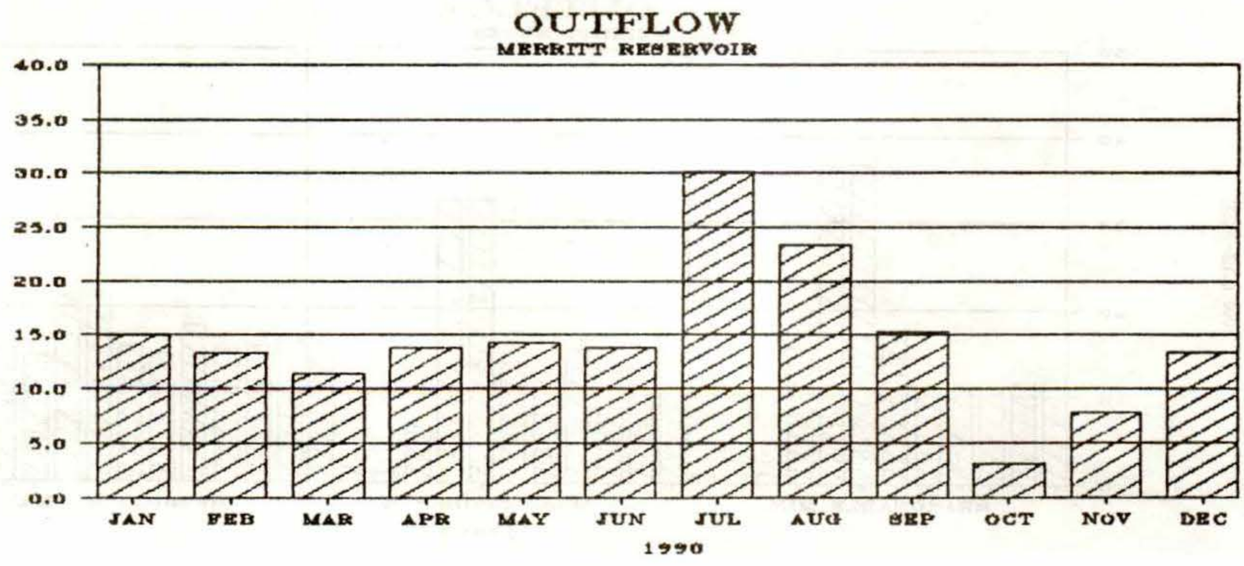
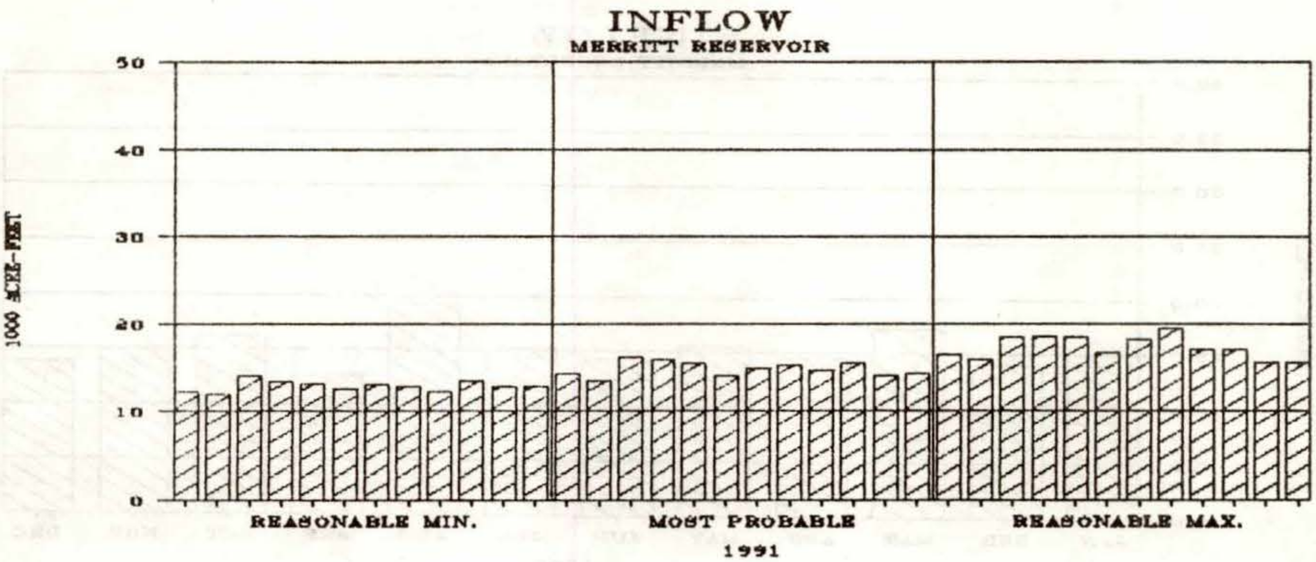
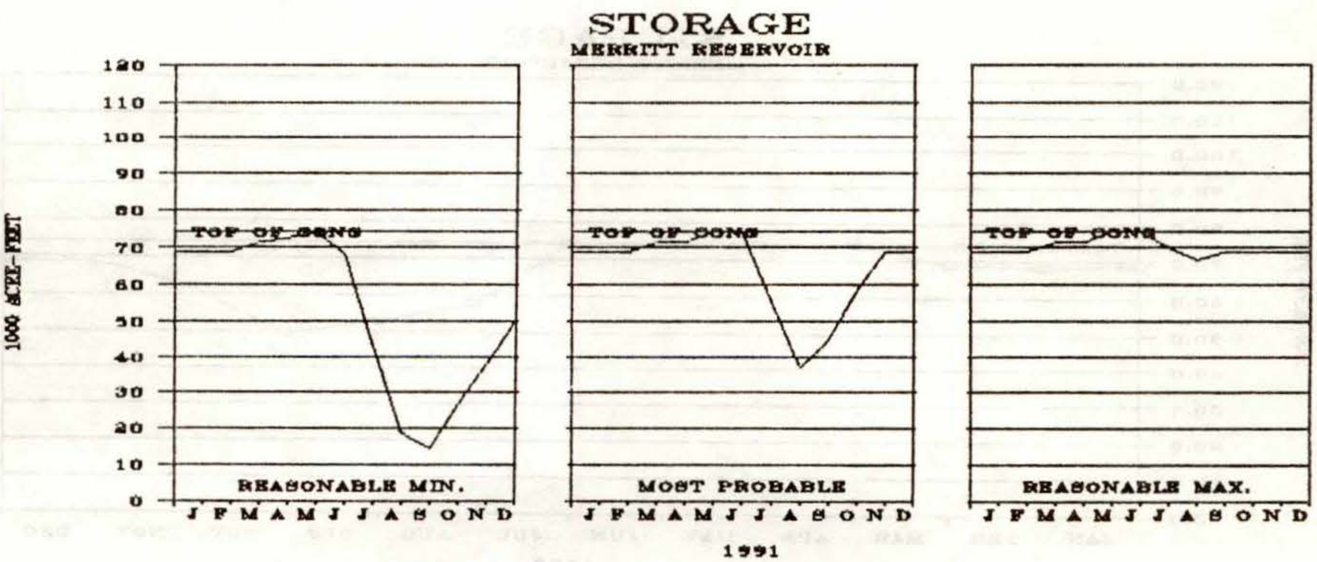


EXHIBIT 2C

MERRITT RESERVOIR

1991 OPERATION PLAN





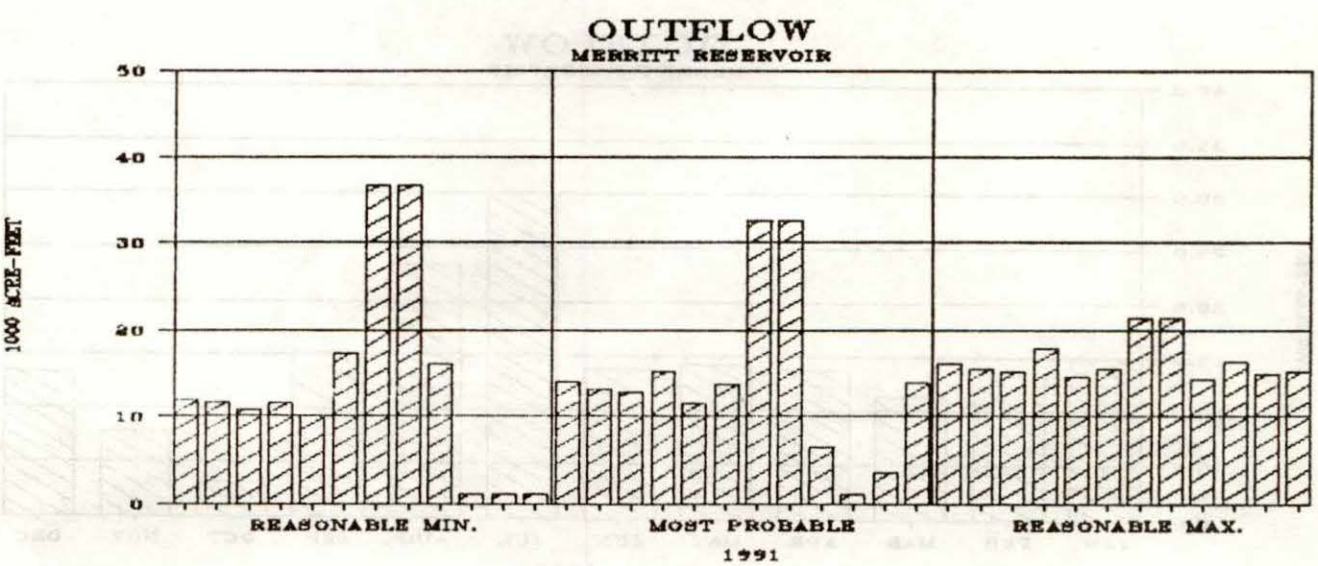
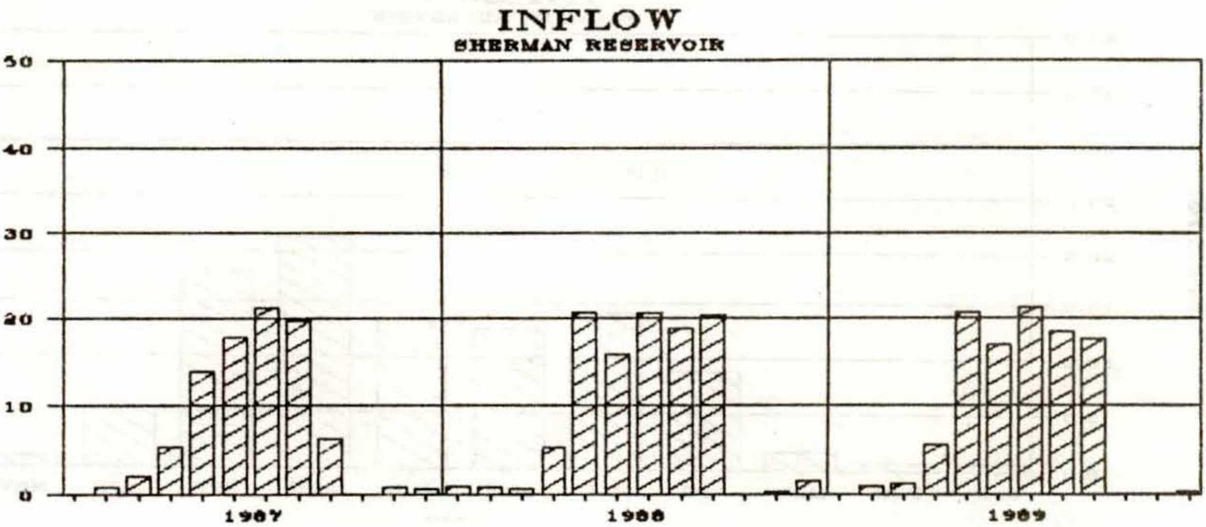
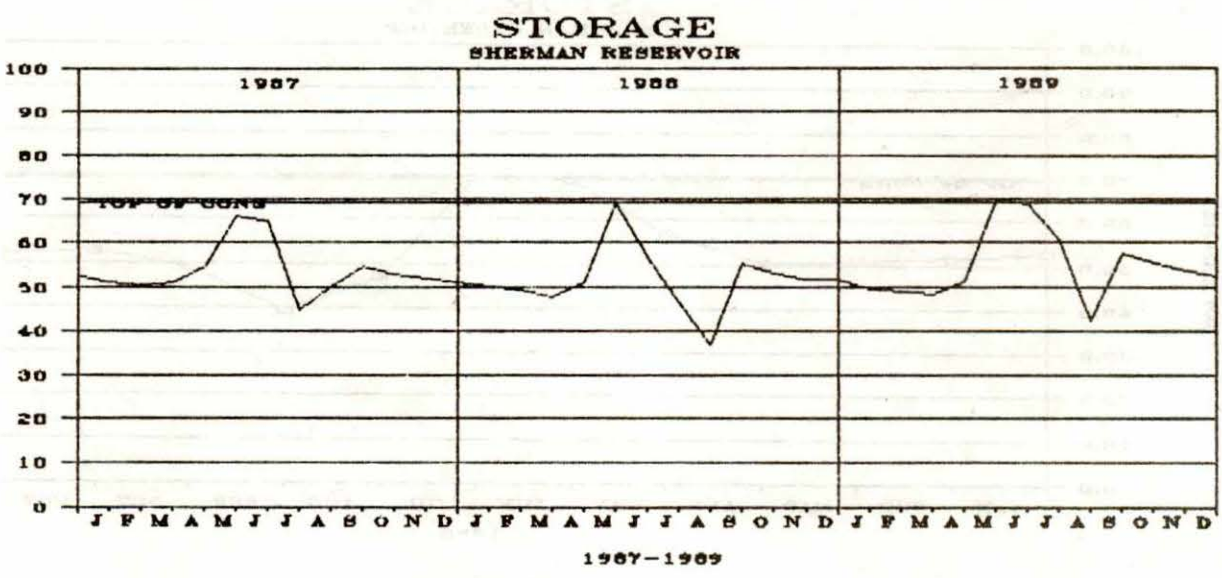


EXHIBIT 3A

SHERMAN RESERVOIR

OPERATION





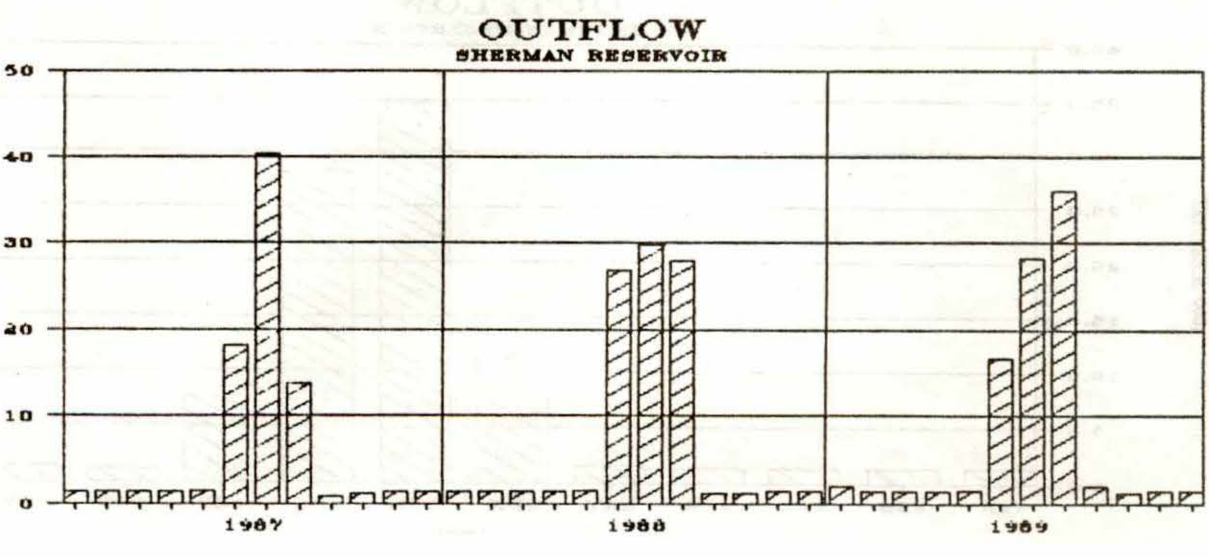
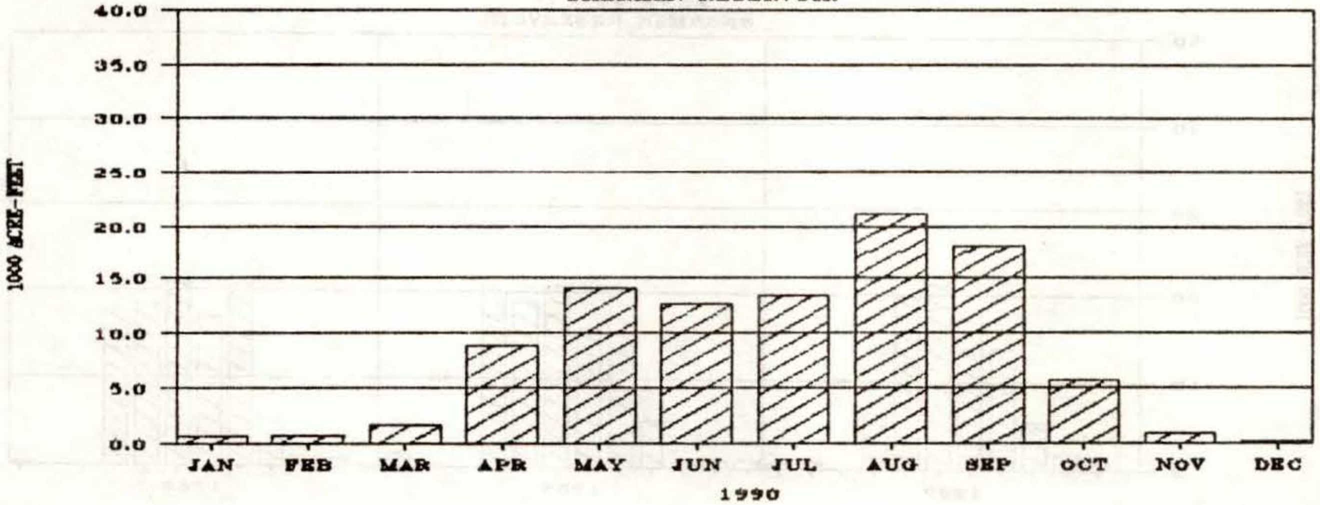


EXHIBIT 3B

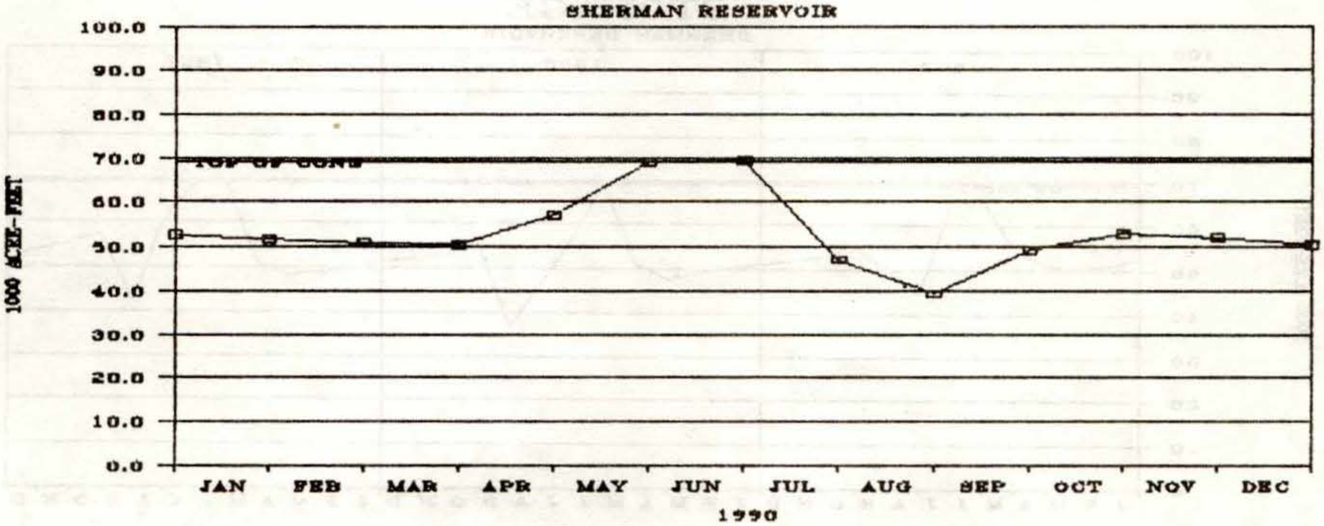
SHERMAN RESERVOIR

1990 OPERATION

INFLOW
SHERMAN RESERVOIR



STORAGE
SHERMAN RESERVOIR



OUTFLOW
SHERMAN RESERVOIR

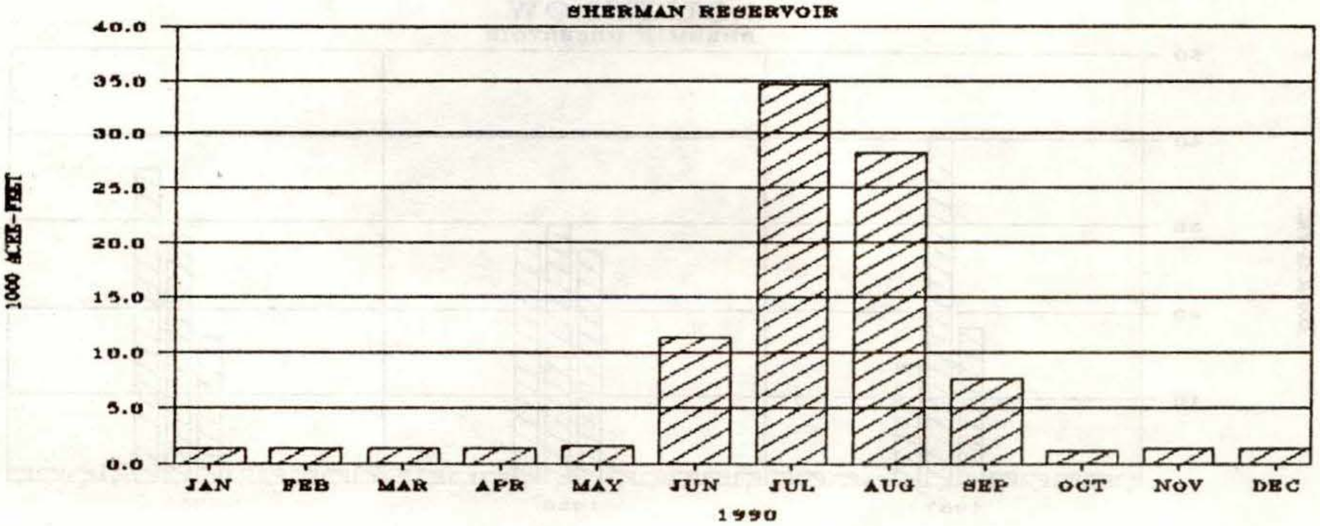
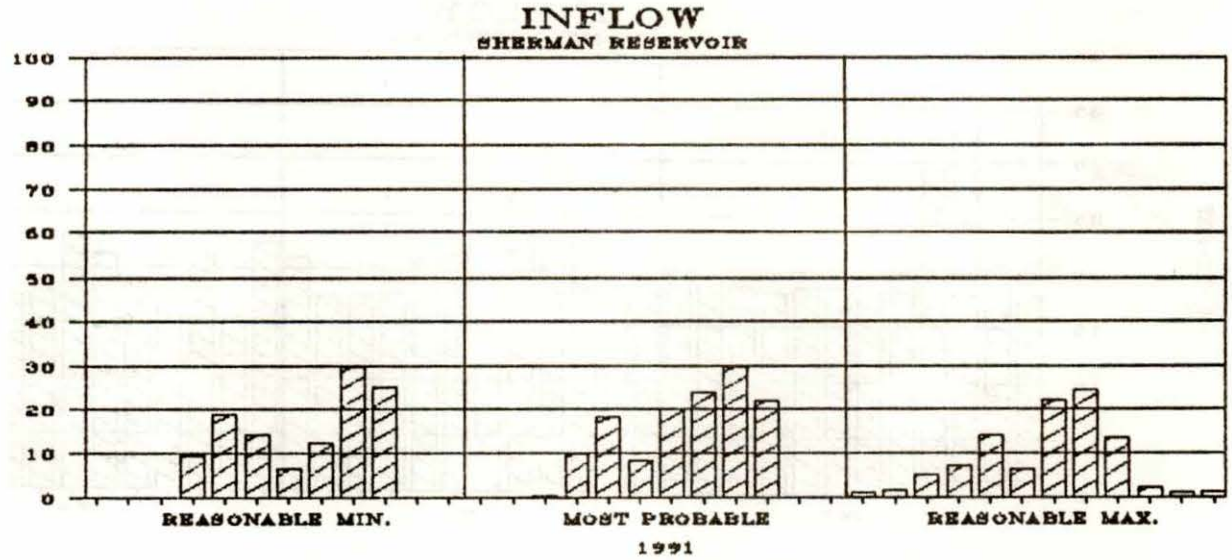
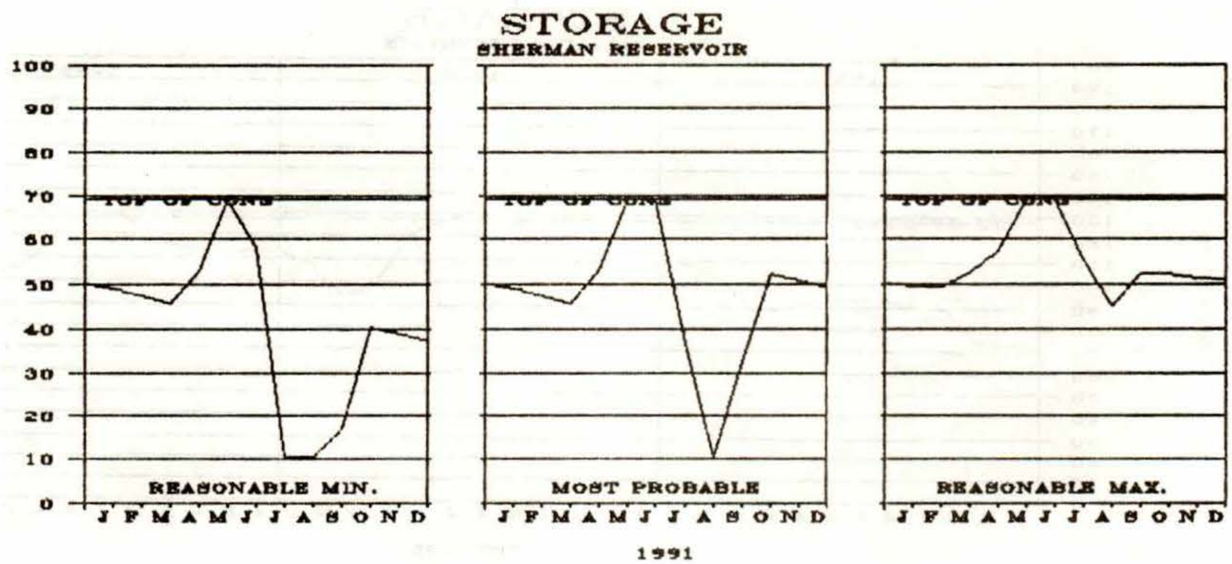


EXHIBIT 3C

SHERMAN RESERVOIR

1991 OPERATION PLAN





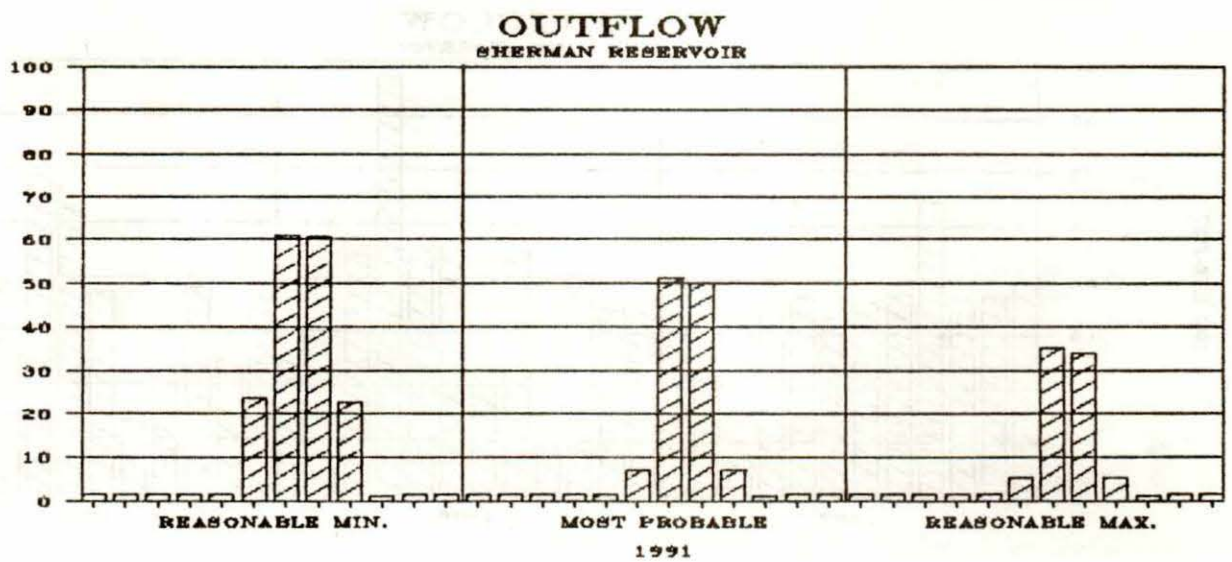
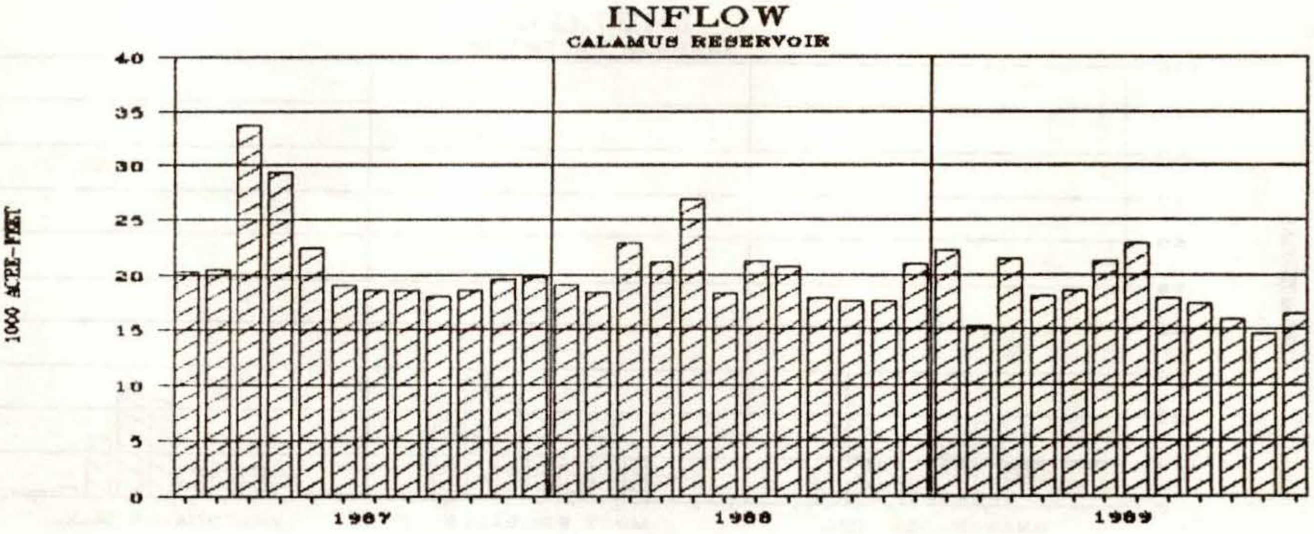
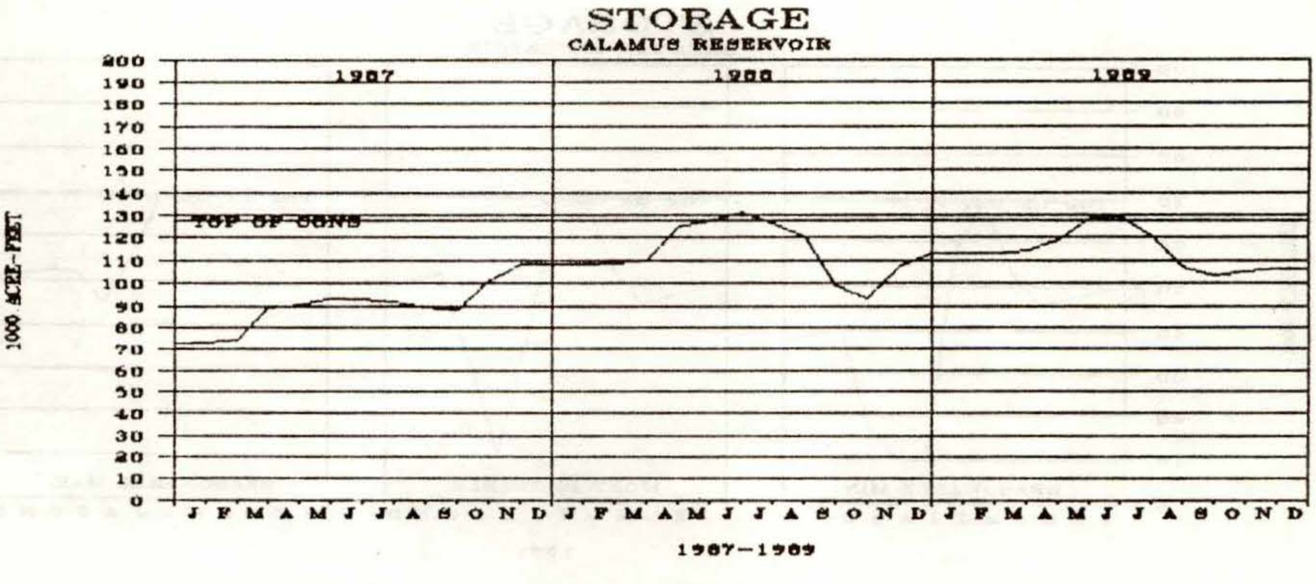


EXHIBIT 4A

CALAMUS RESERVOIR

OPERATION





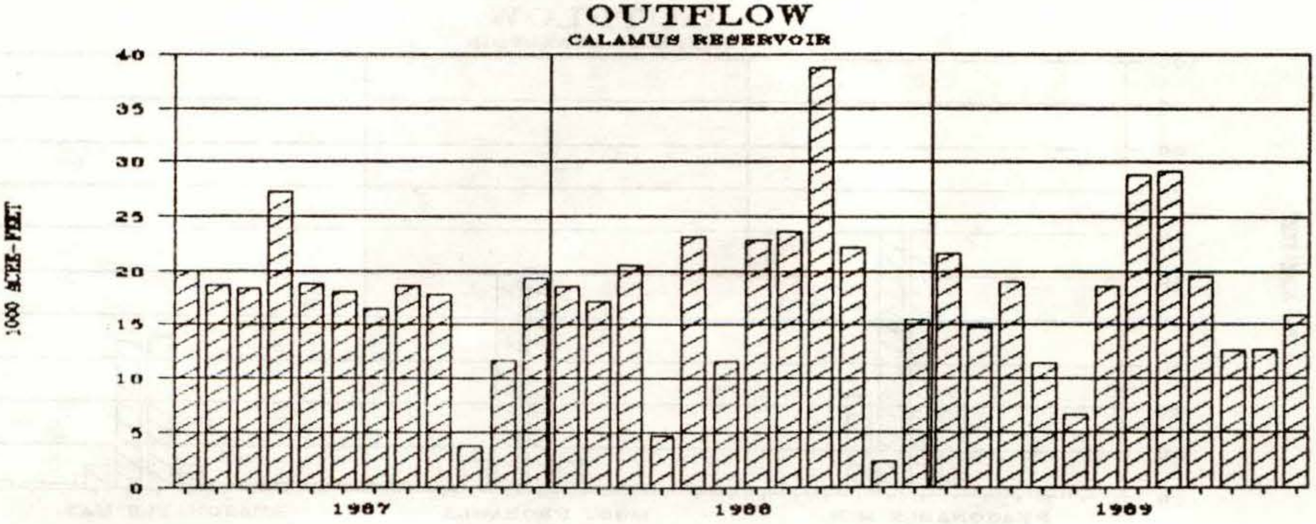
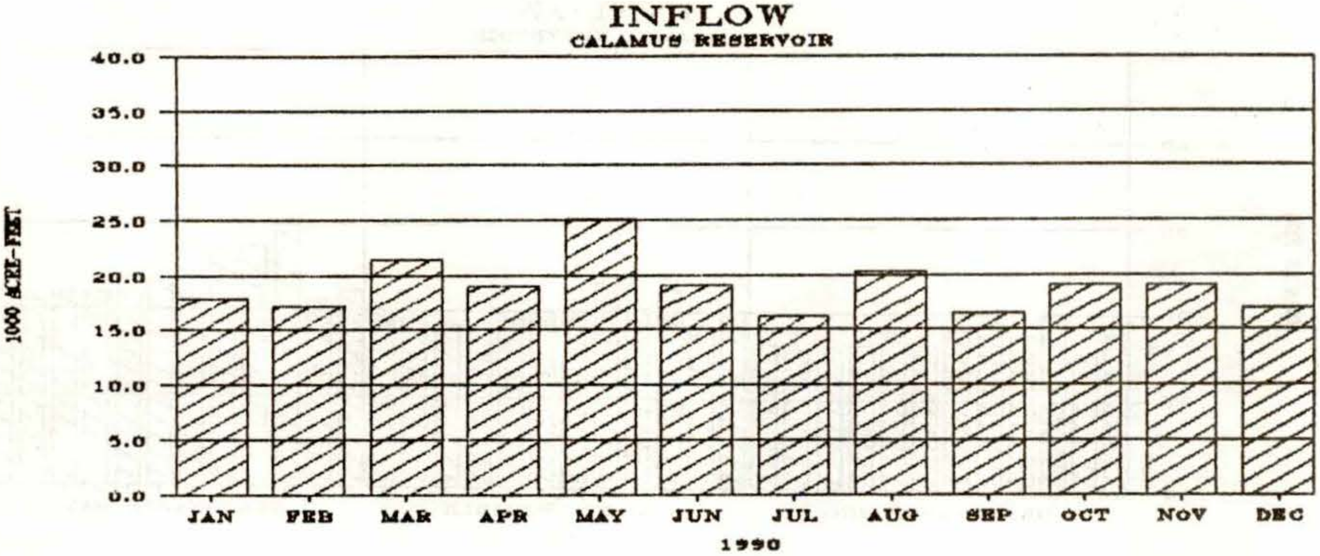
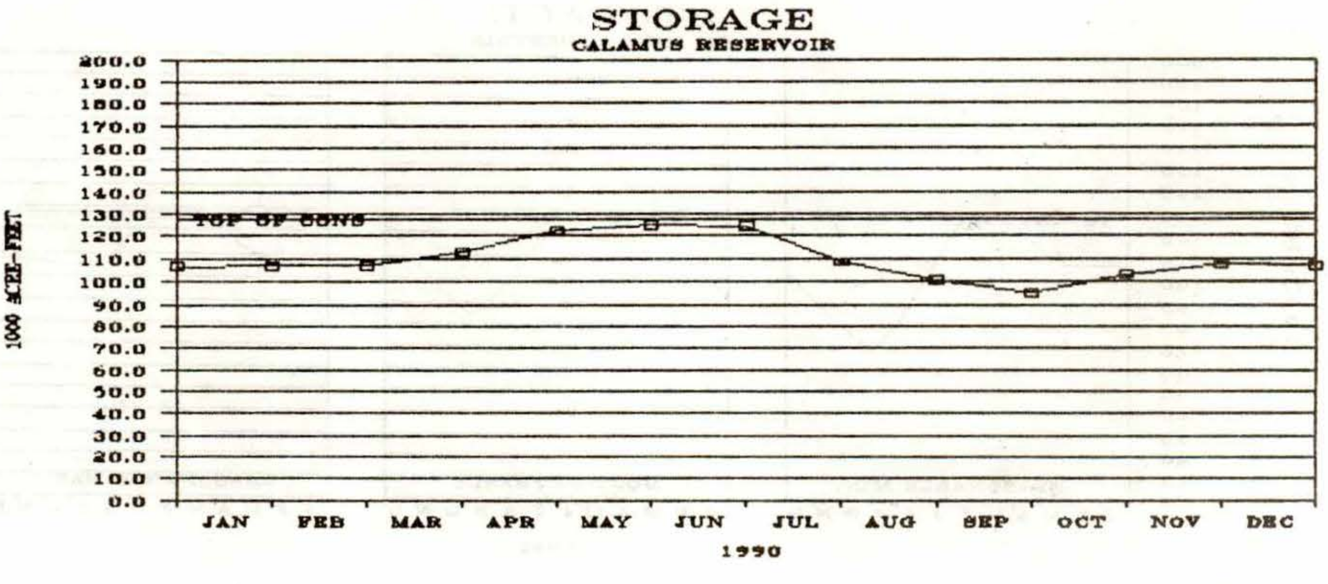


EXHIBIT 4B

CALAMUS RESERVOIR

1990 OPERATION





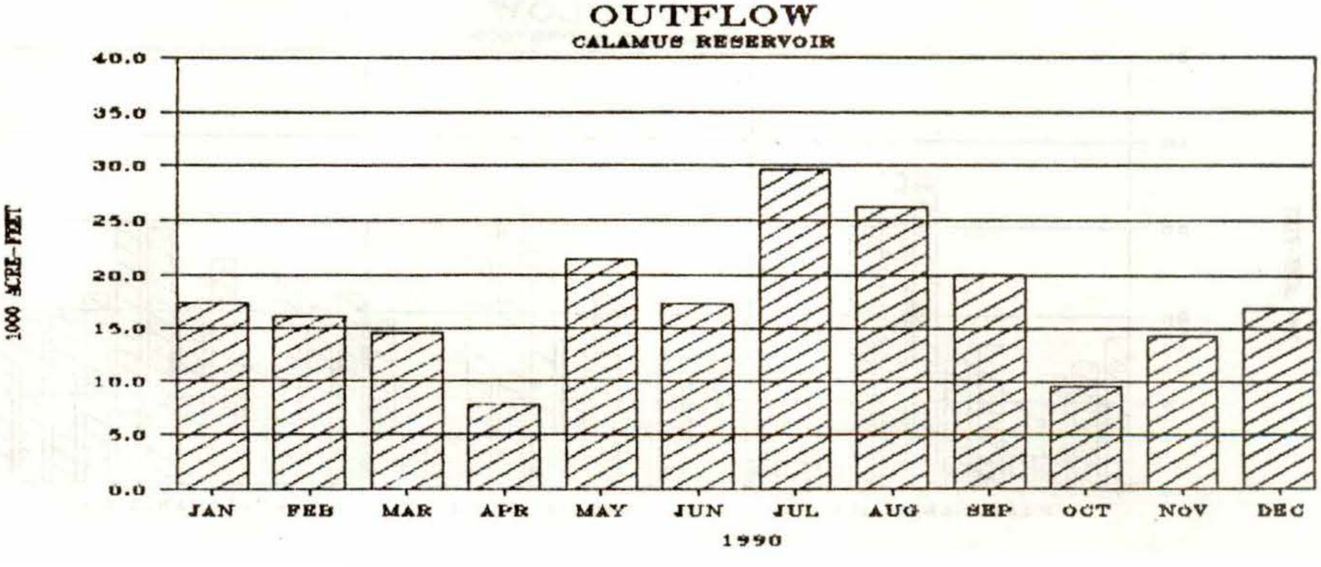
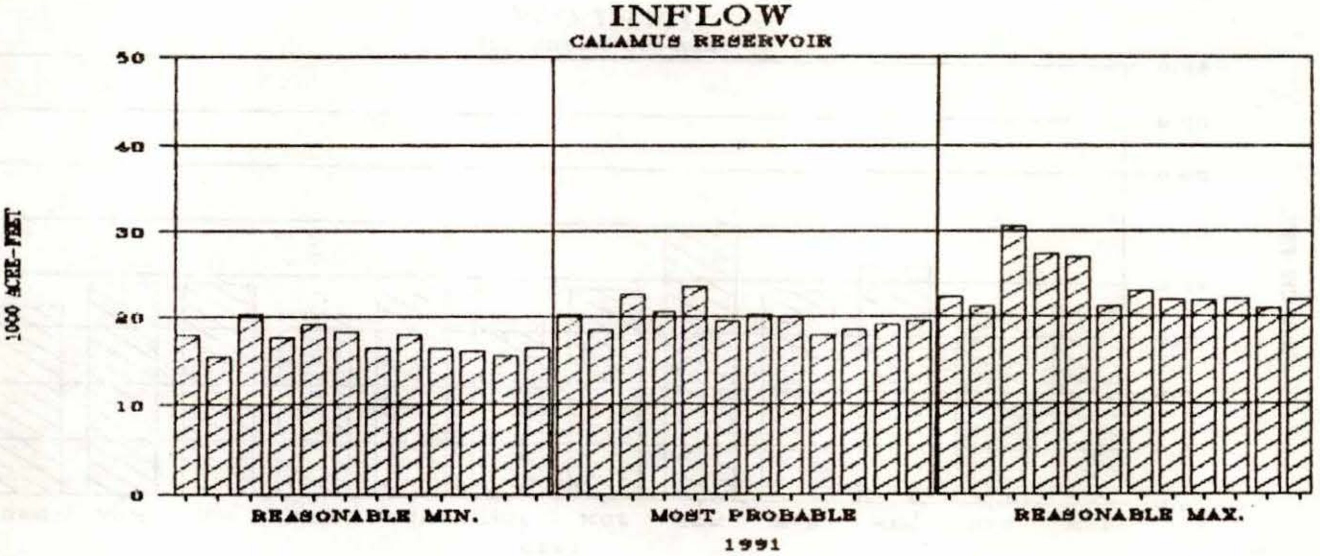
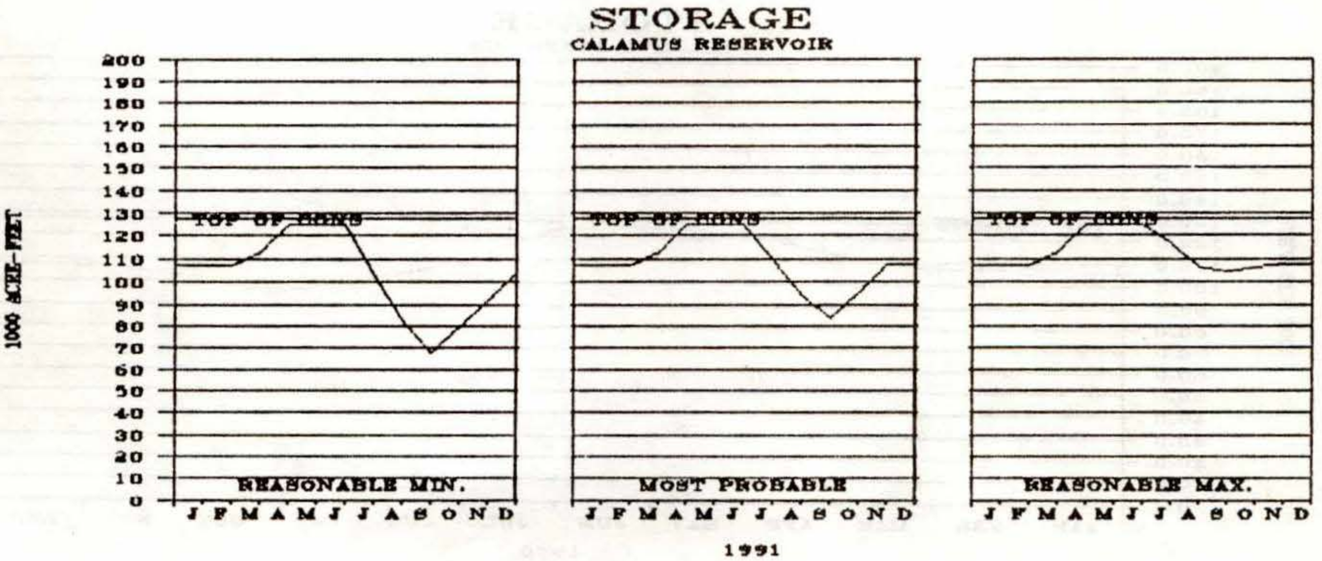


EXHIBIT 4C

CALAMUS RESERVOIR

1991 OPERATION PLAN





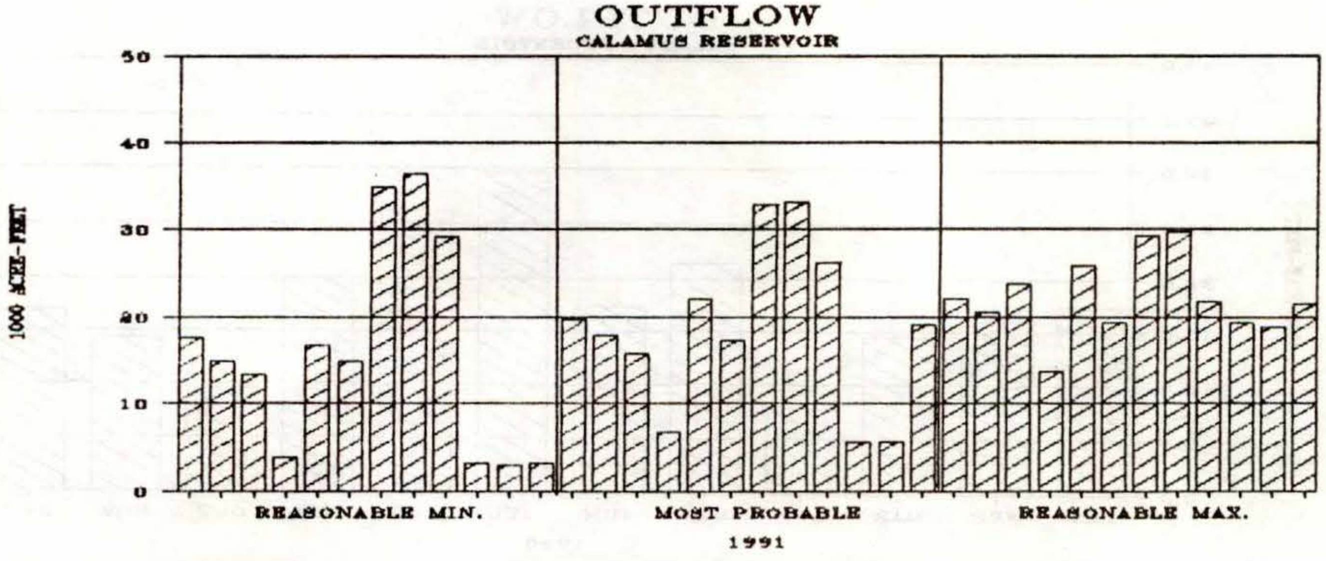
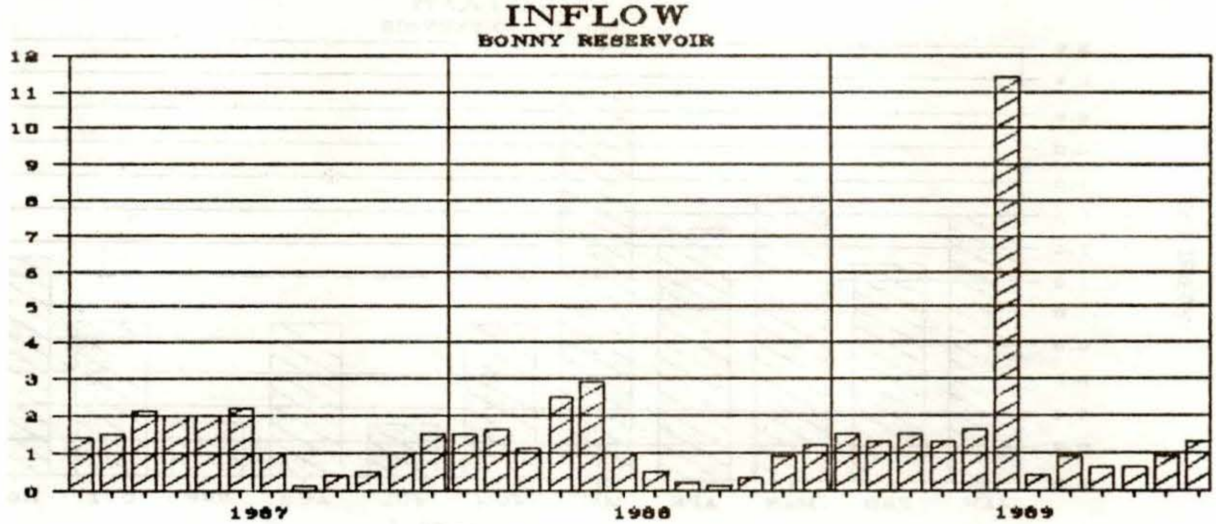
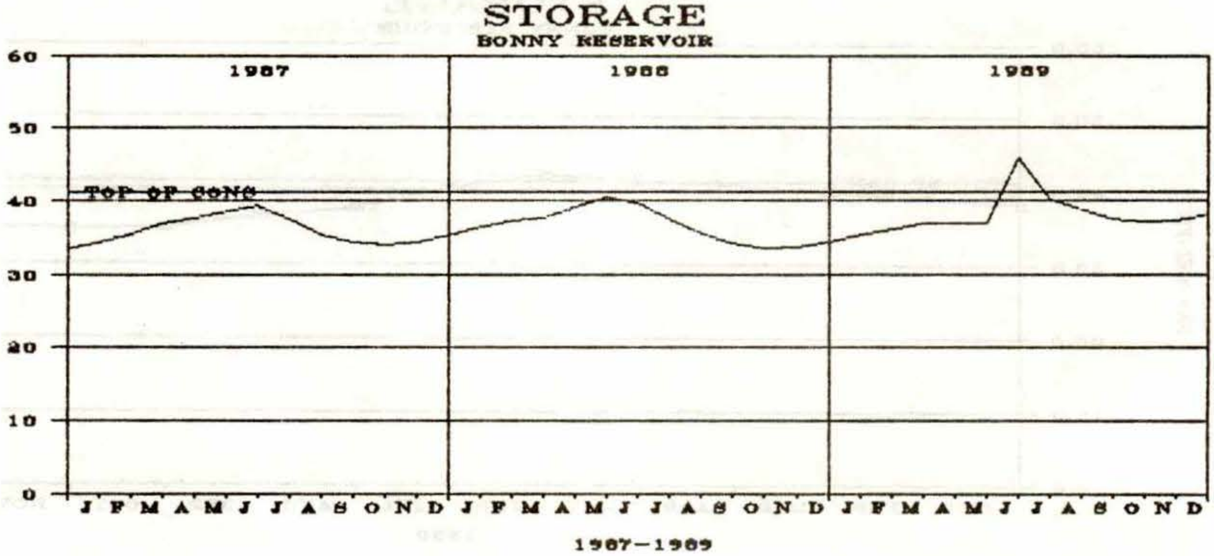


EXHIBIT 5A

BONNY RESERVOIR

OPERATION





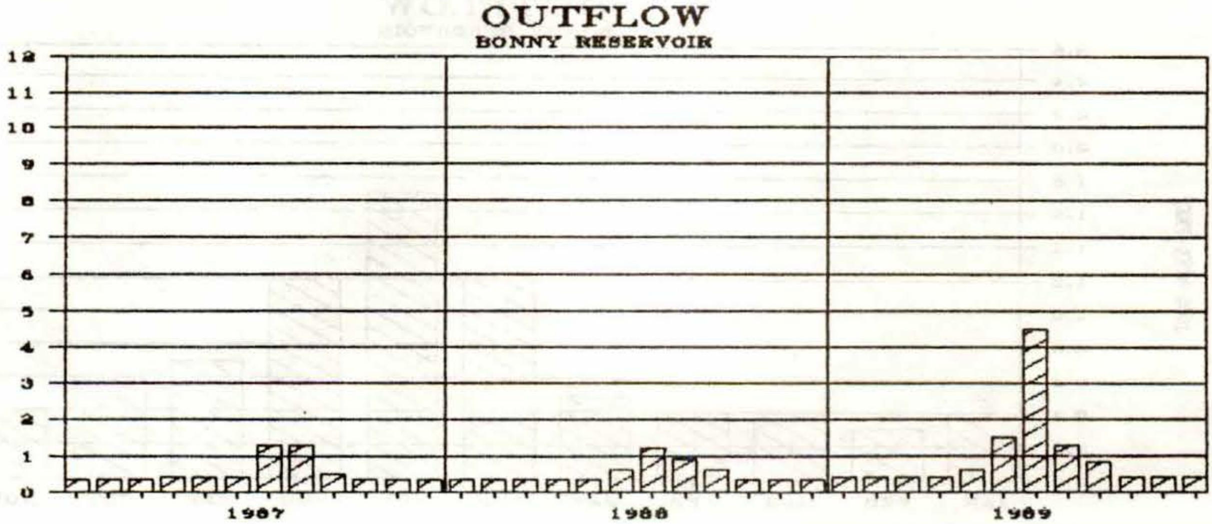
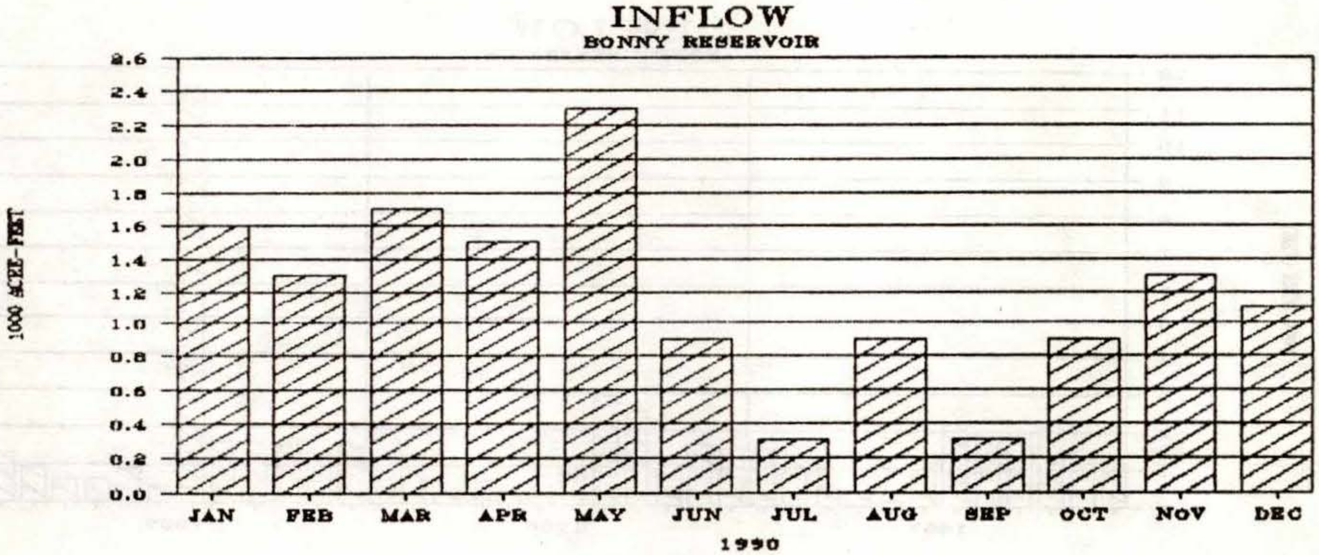
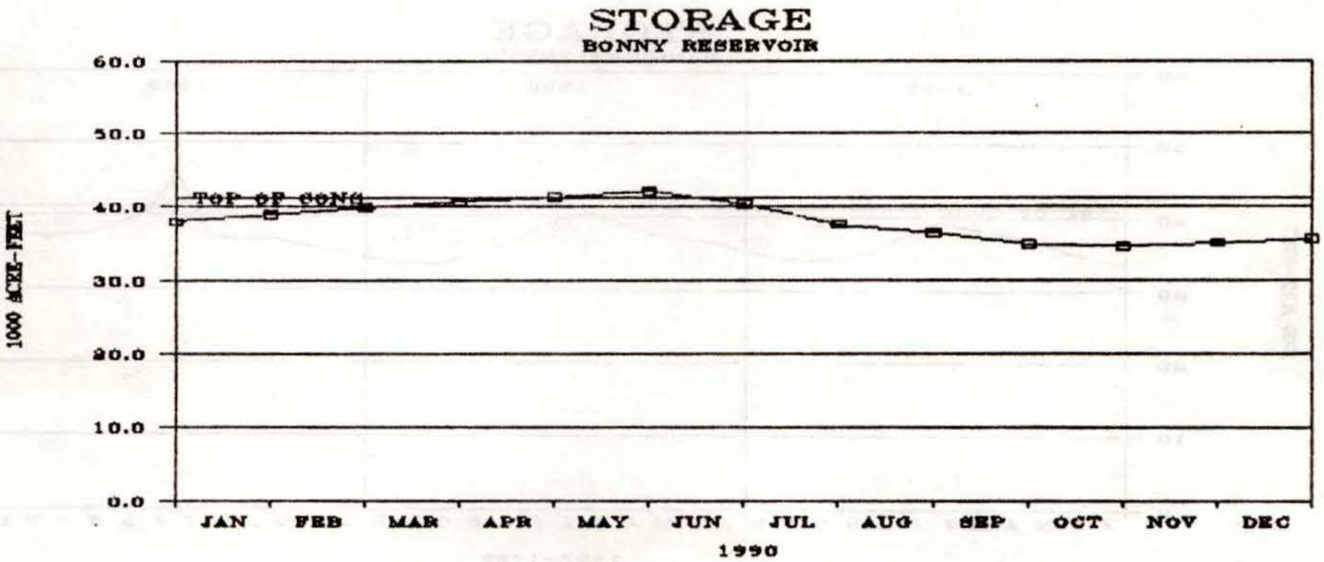


EXHIBIT 5B

BONNY RESERVOIR
1990 OPERATION





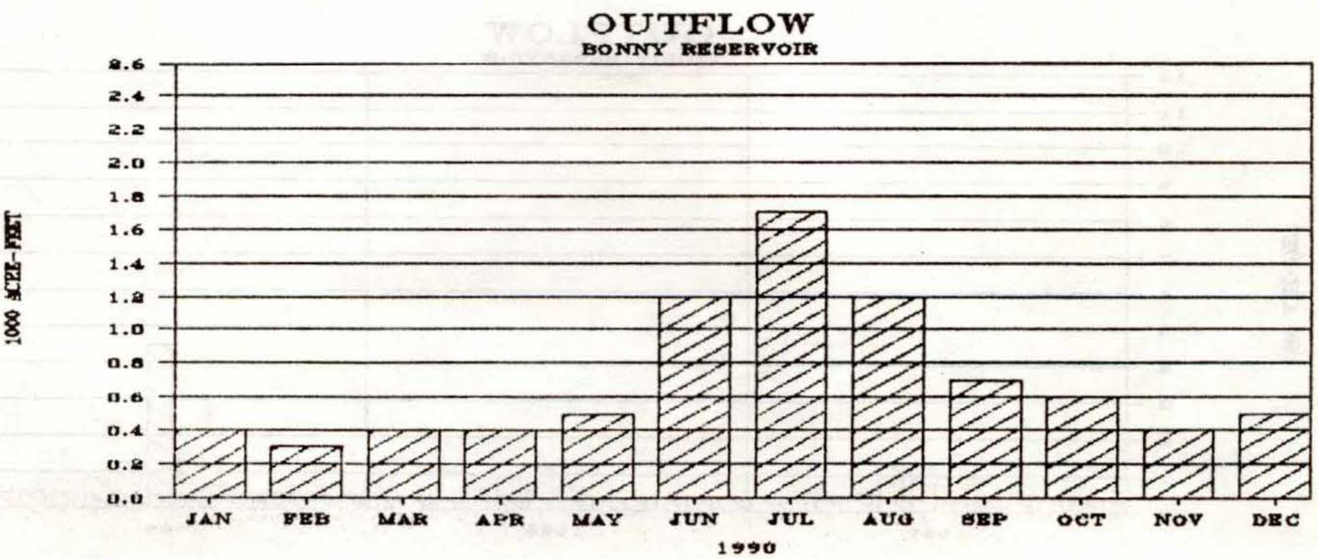
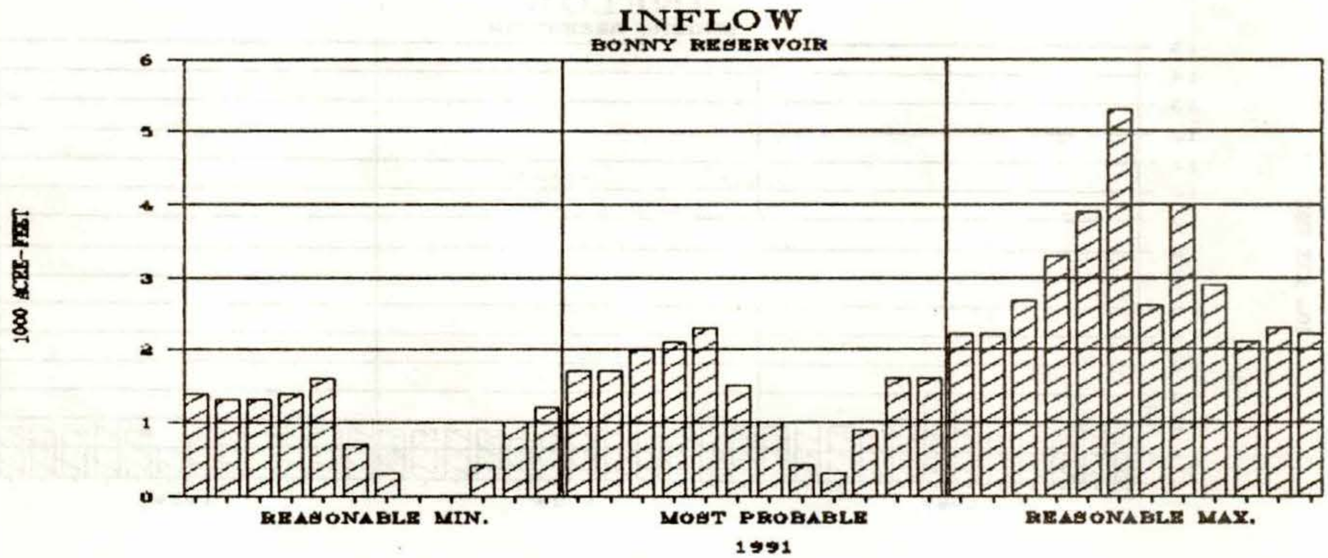
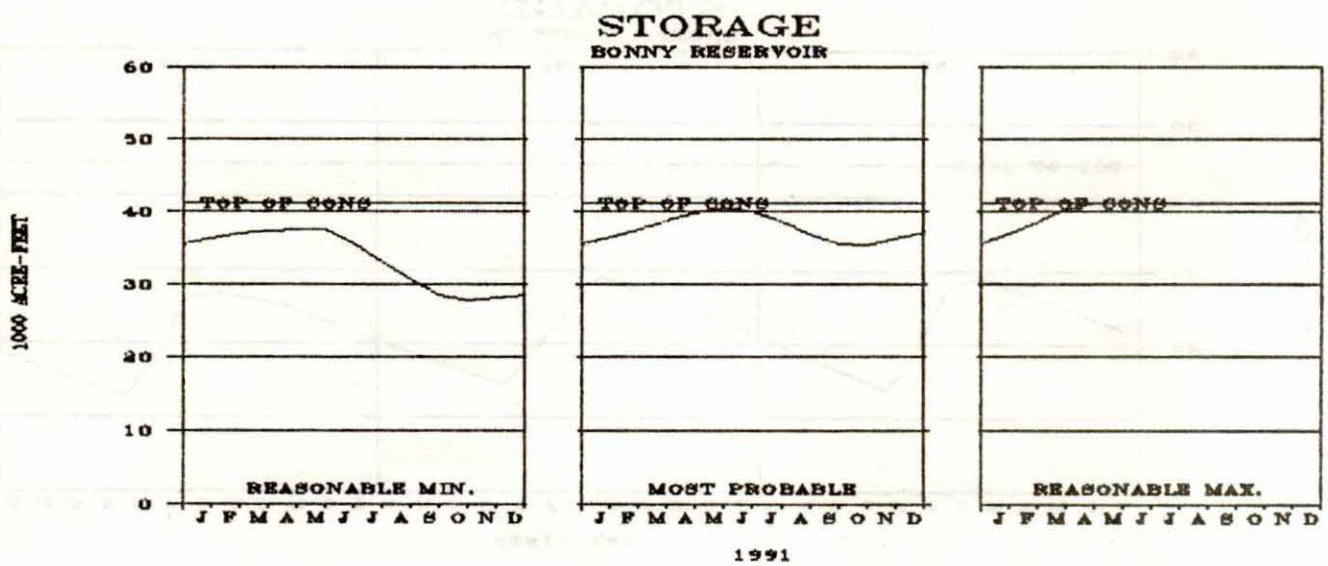


EXHIBIT 5C

BONNY RESERVOIR

1991 OPERATION PLAN





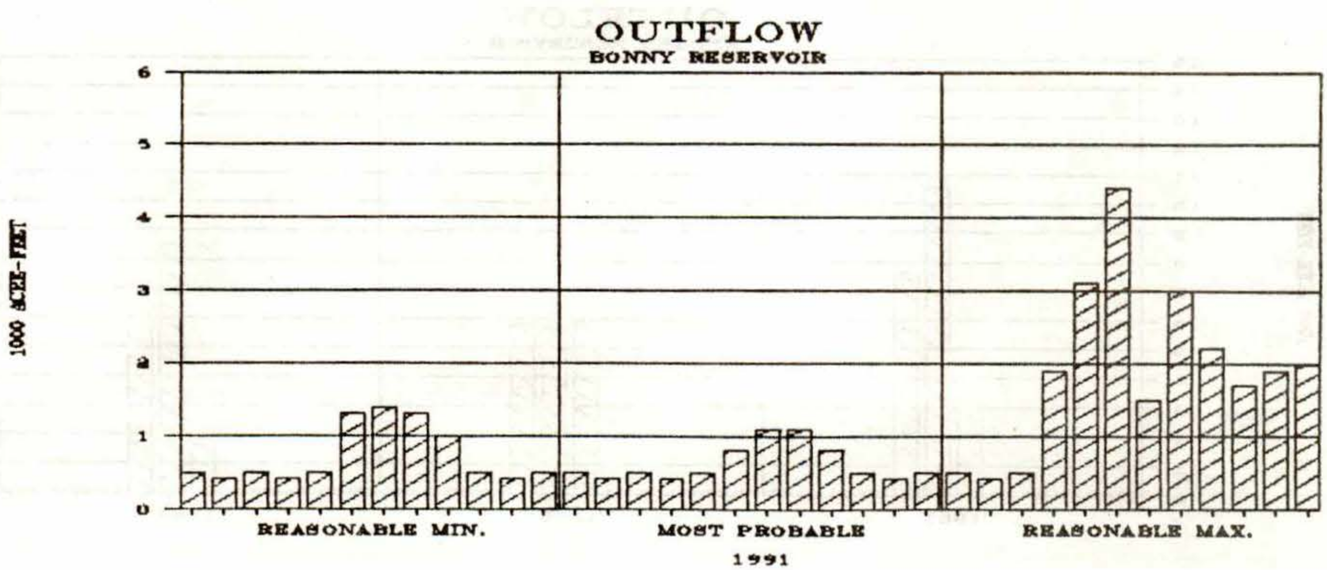
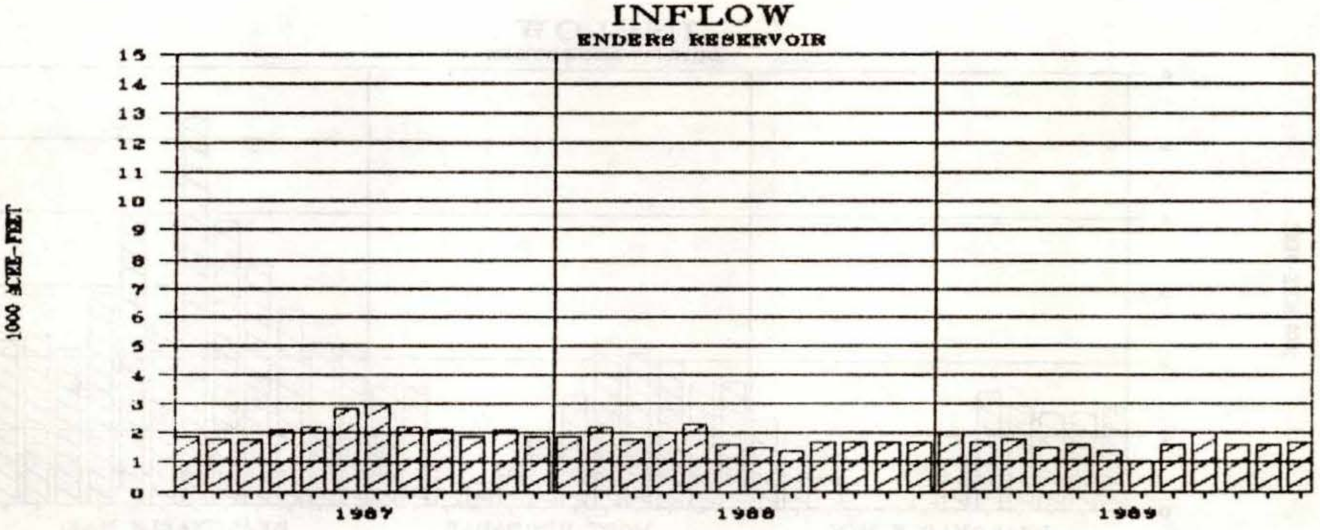
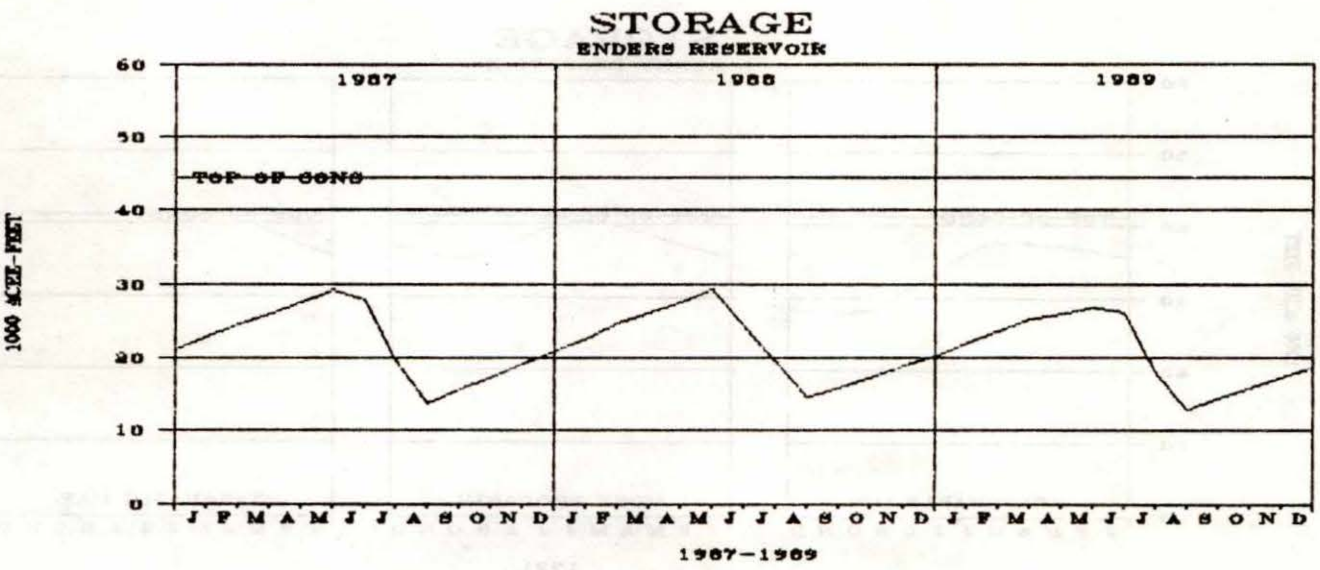


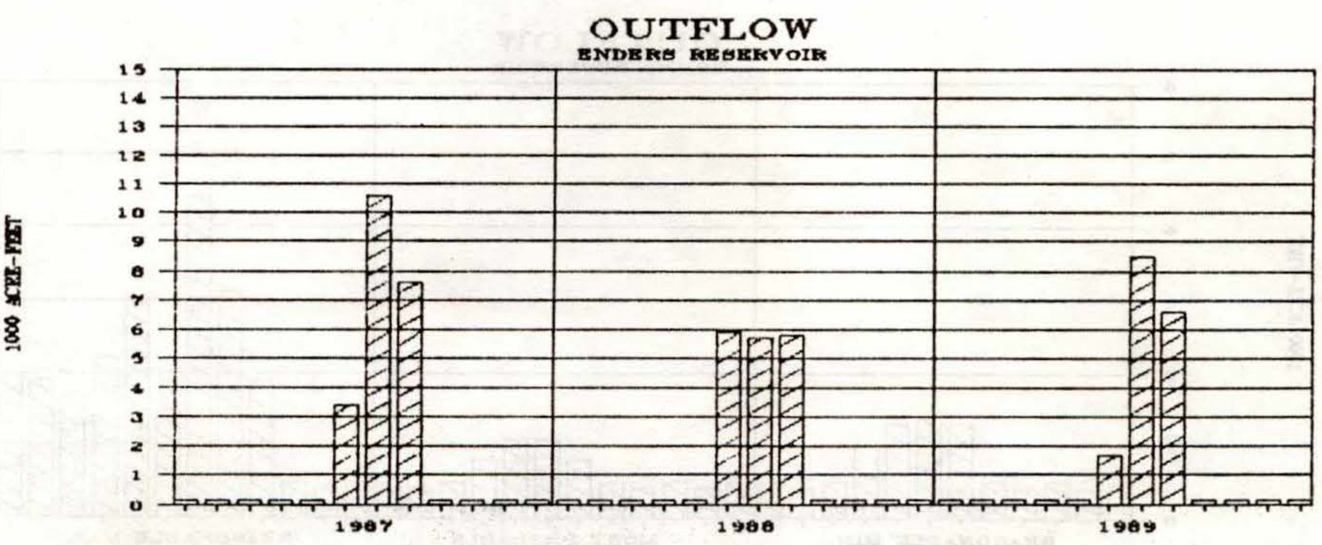
EXHIBIT 6A

ENDERS RESERVOIR

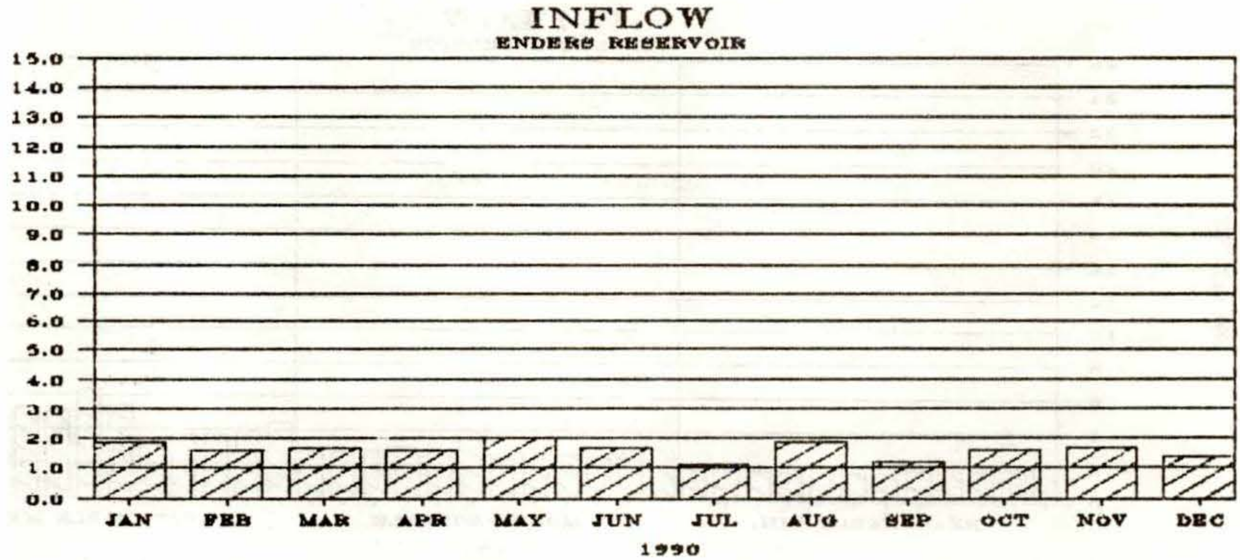
OPERATION

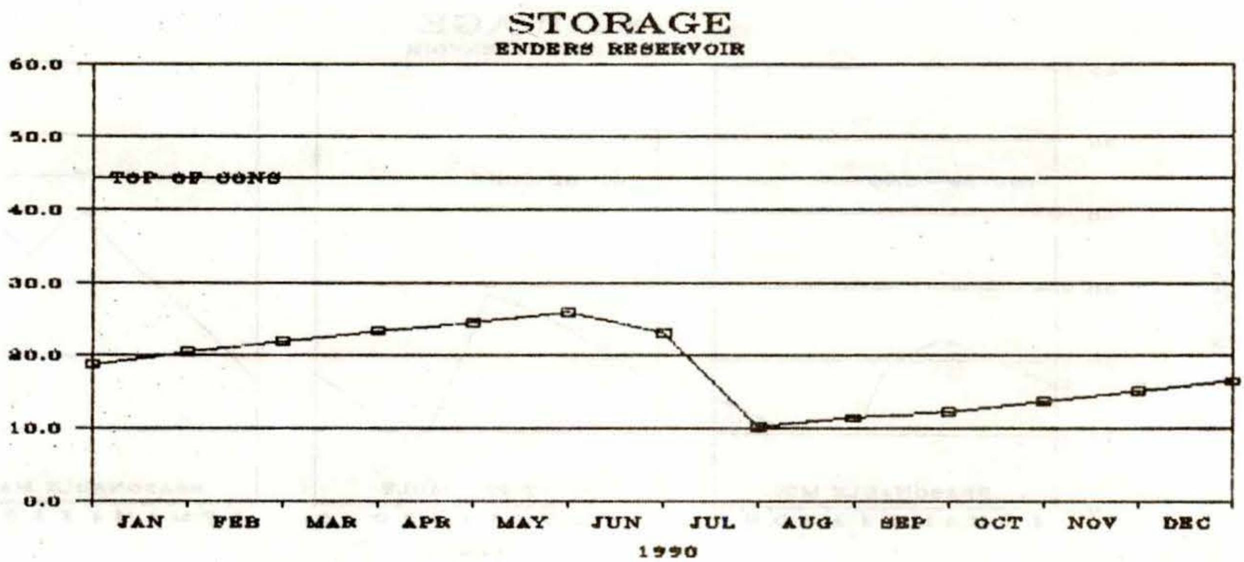






ENDERS RESERVOIR
1990 OPERATION





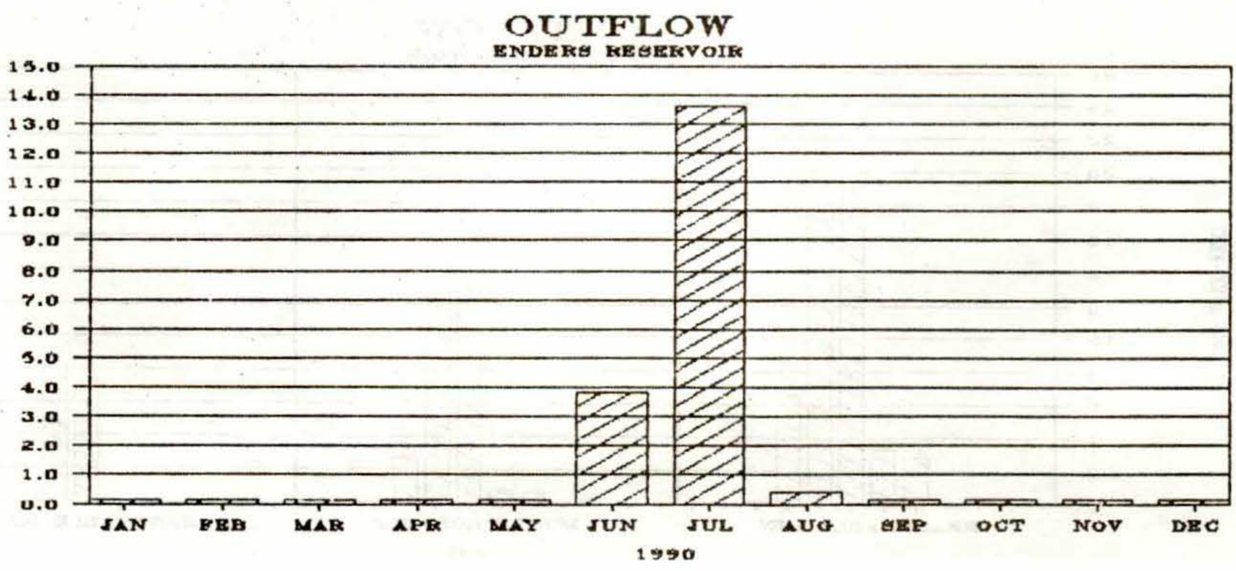
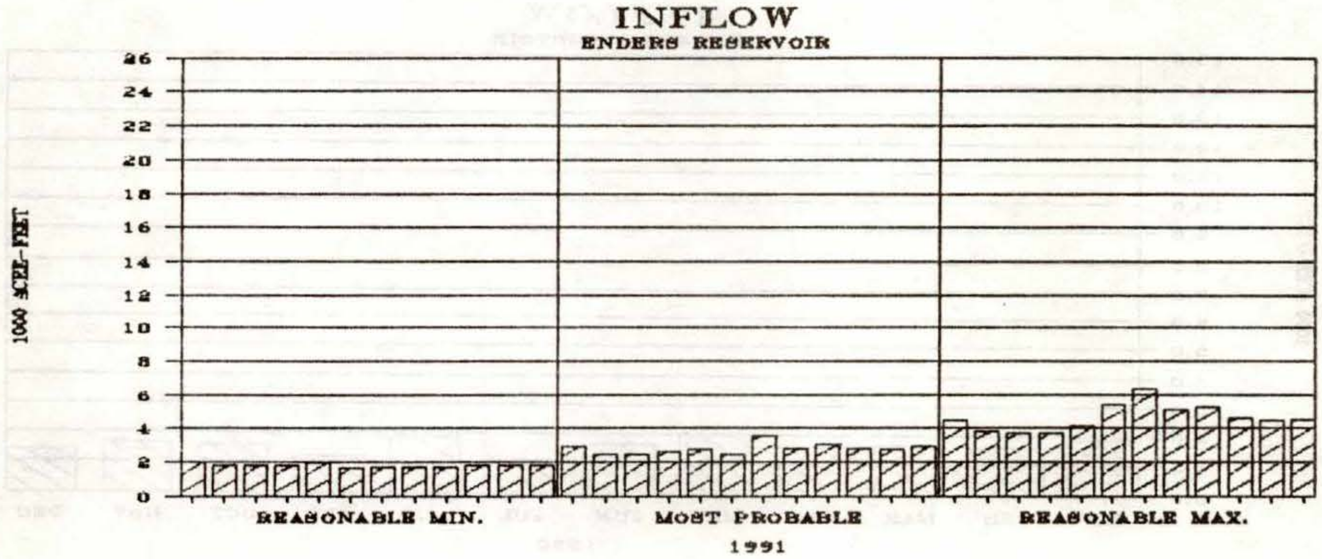
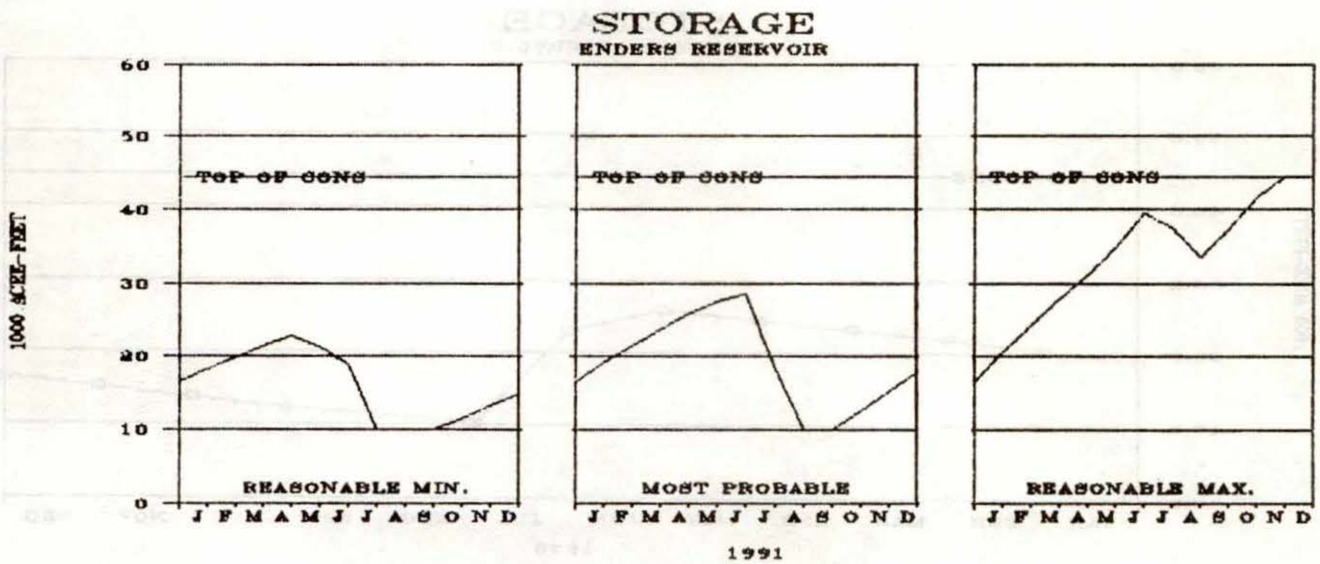


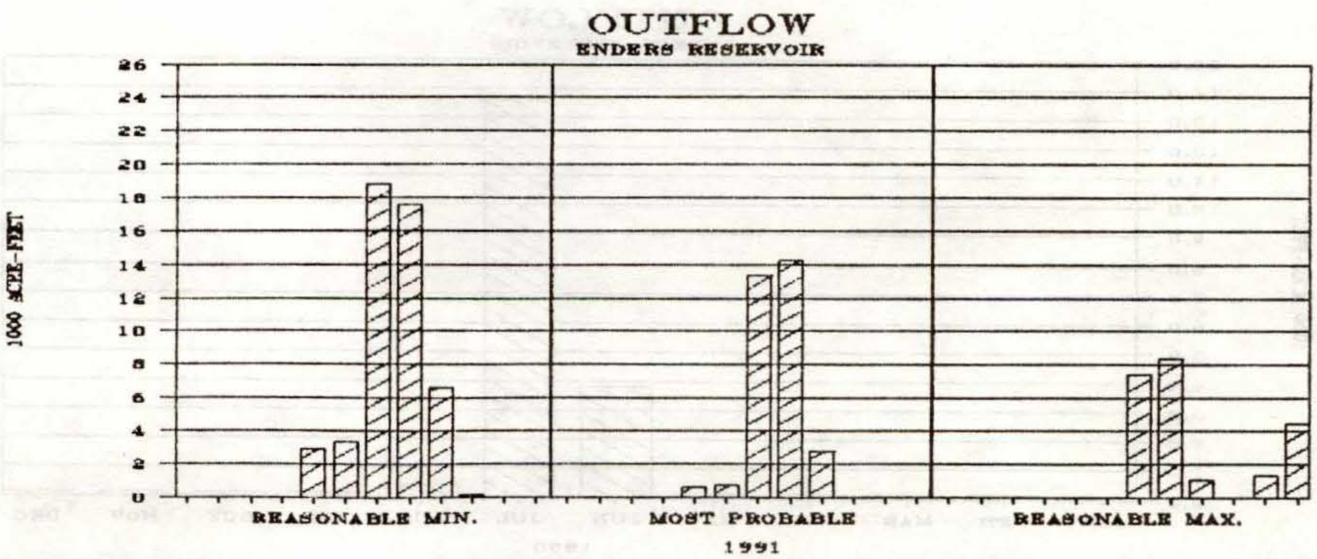
EXHIBIT 6C

ENDERS RESERVOIR

1991 OPERATION PLAN

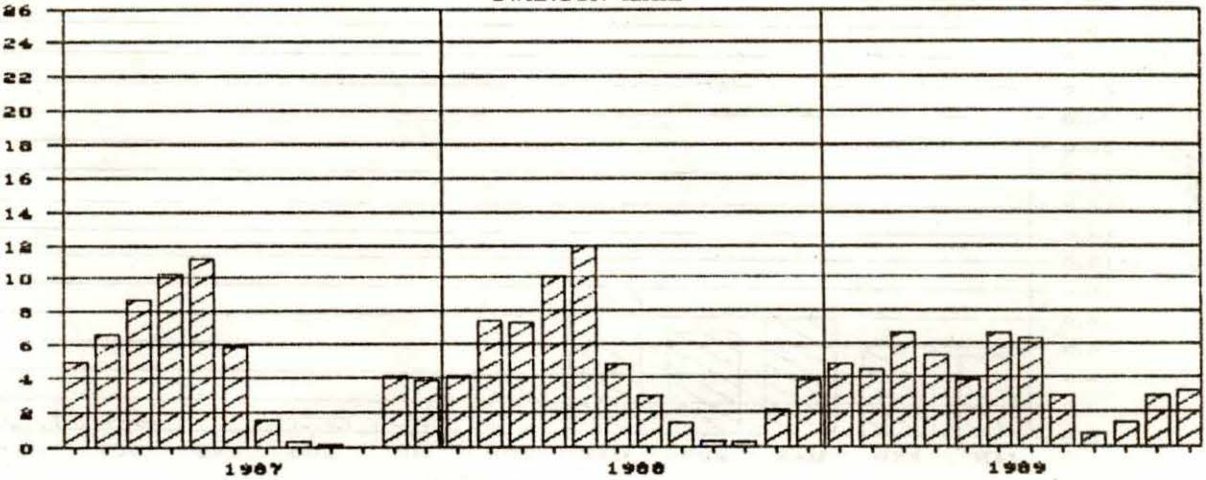




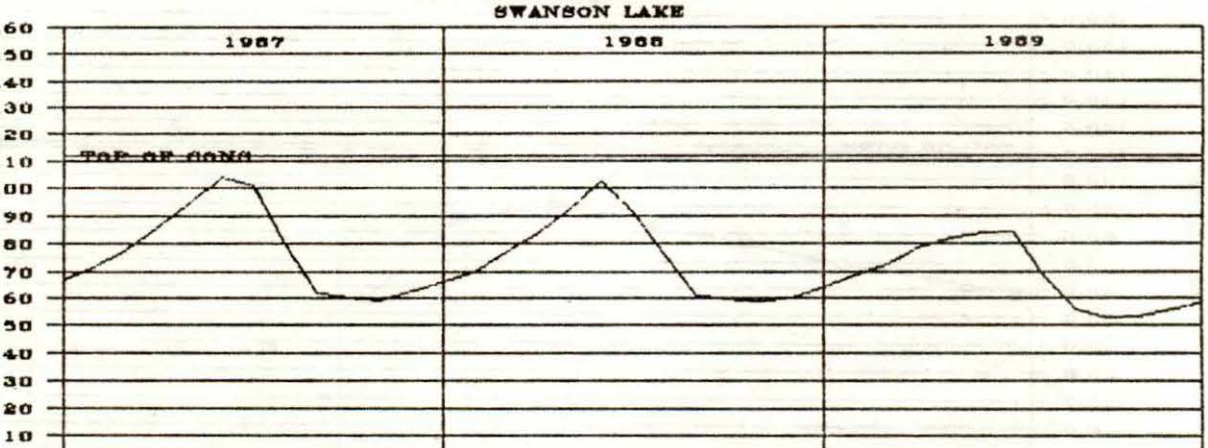


SWANSON LAKE
OPERATION

INFLOW
SWANSON LAKE



STORAGE
SWANSON LAKE



OUTFLOW
SWANSON LAKE

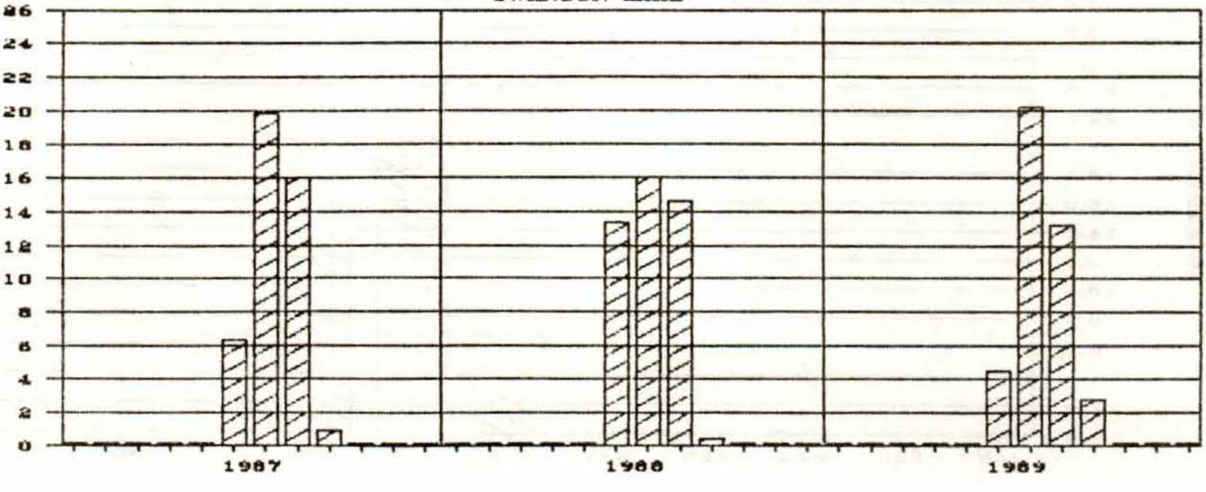
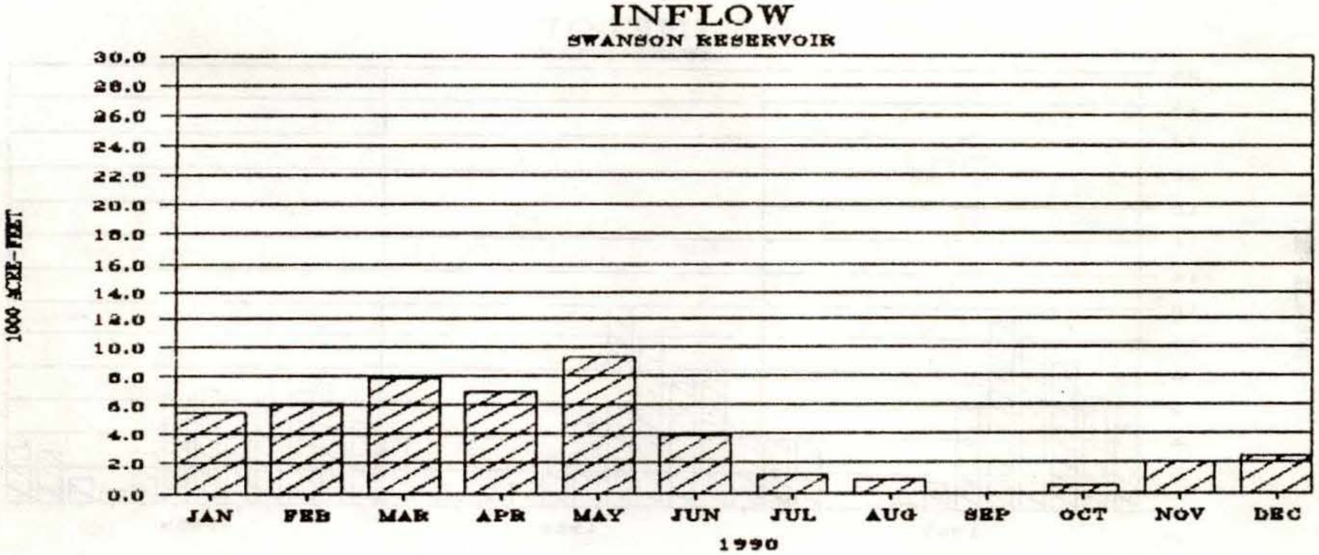
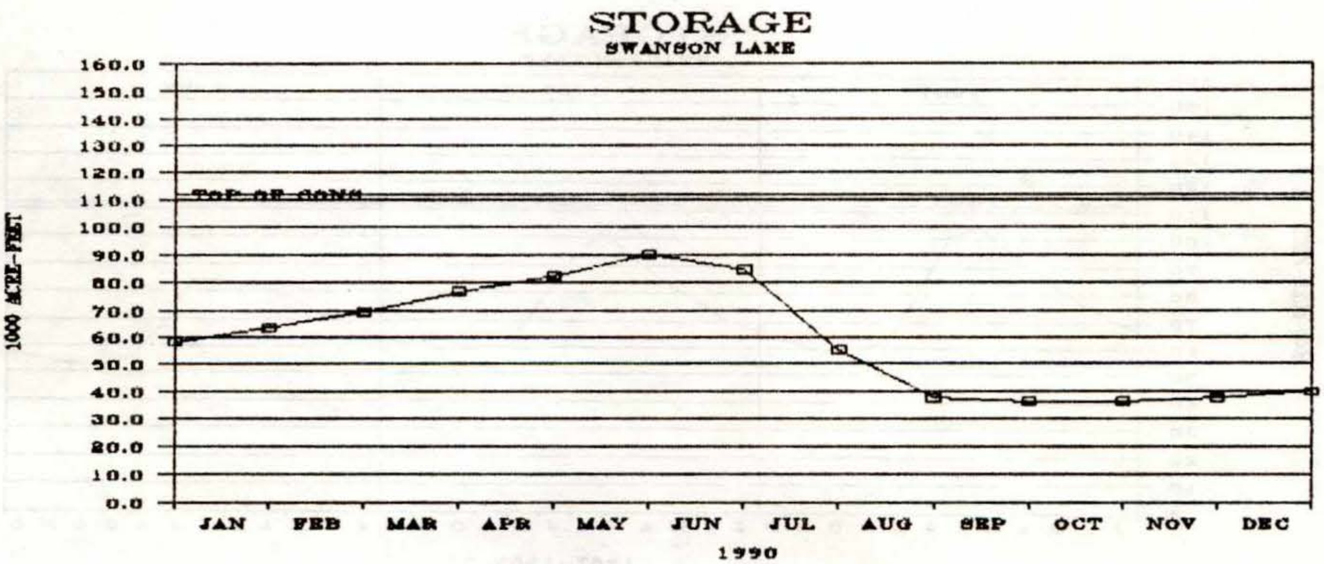


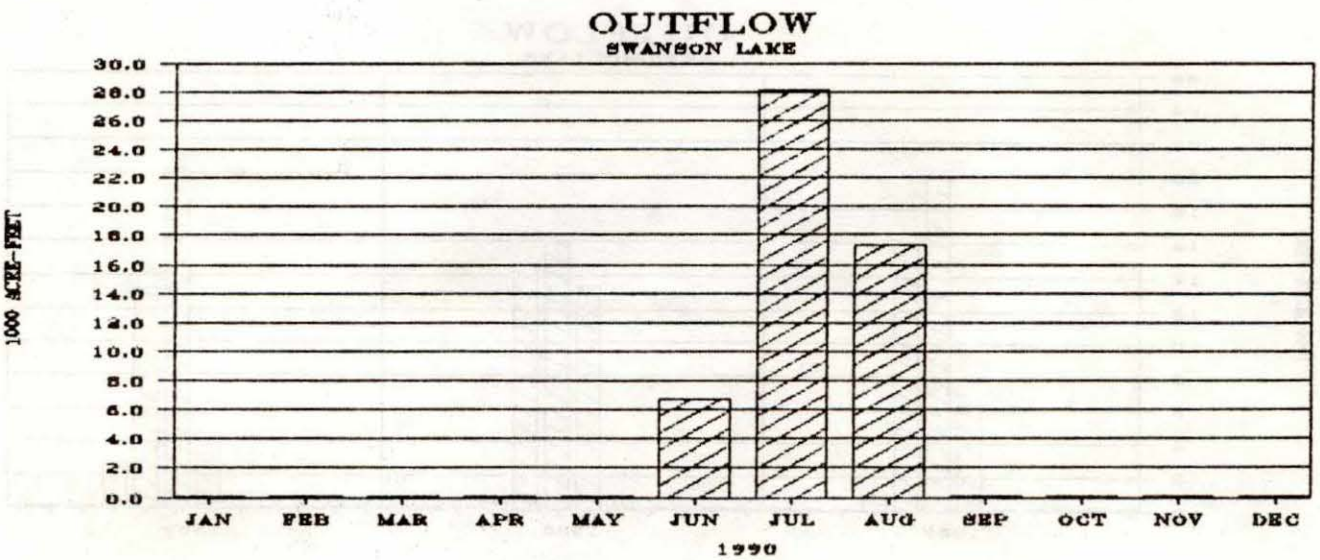
EXHIBIT 7B

SWANSON LAKE

1990 OPERATION







SWANSON LAKE
1991 OPERATION PLAN

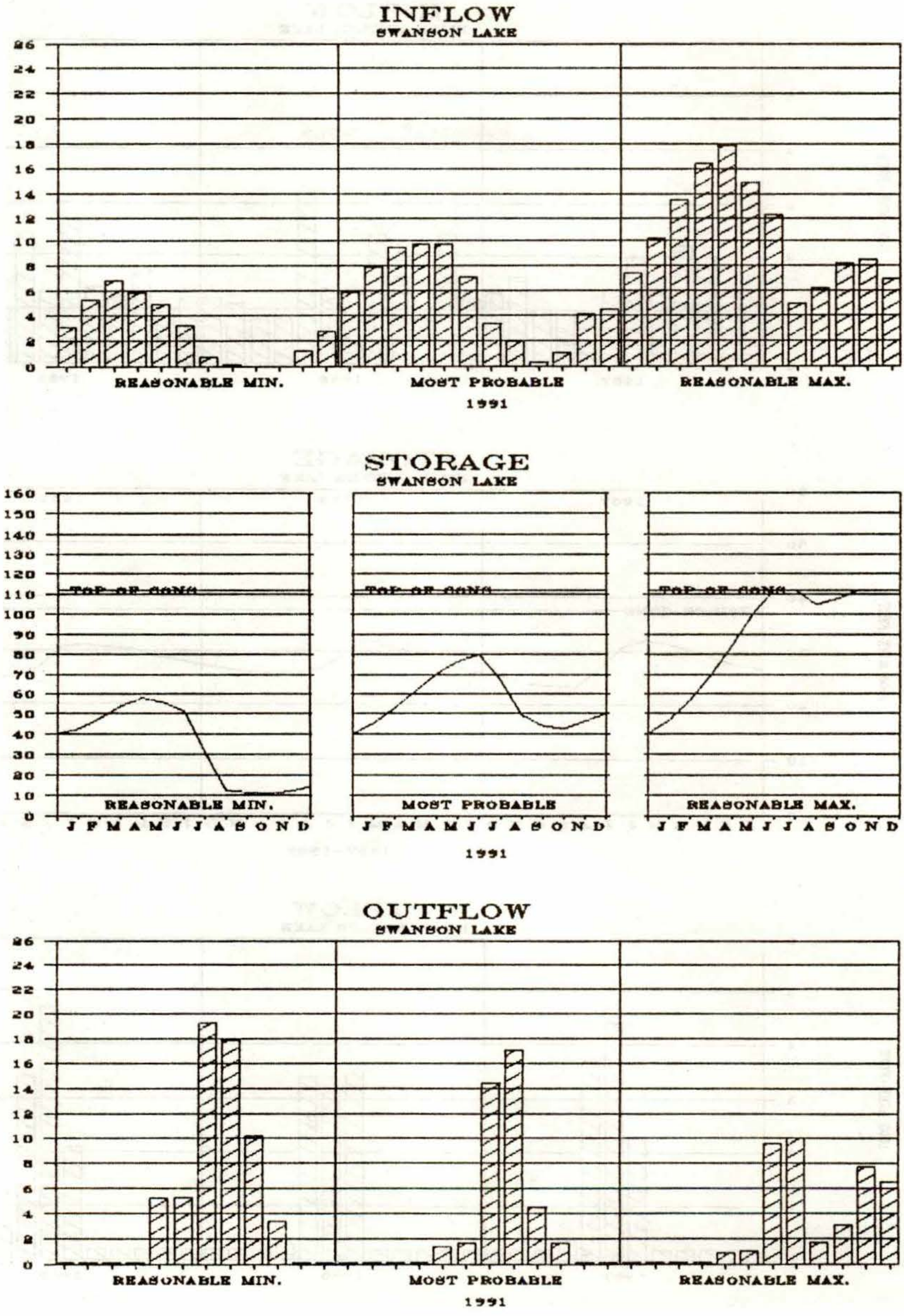
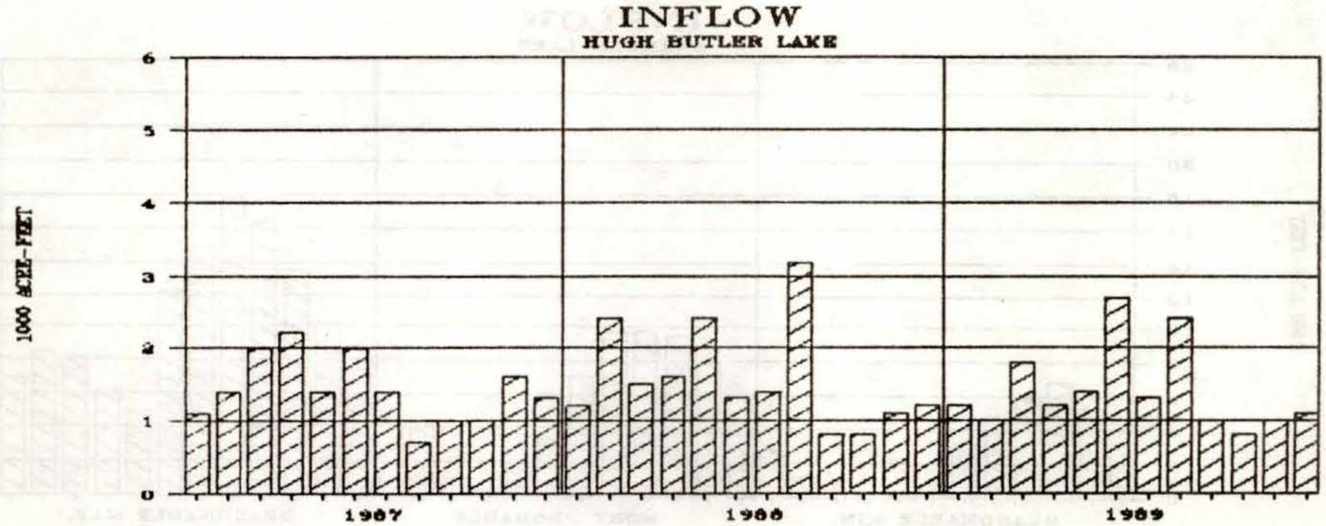
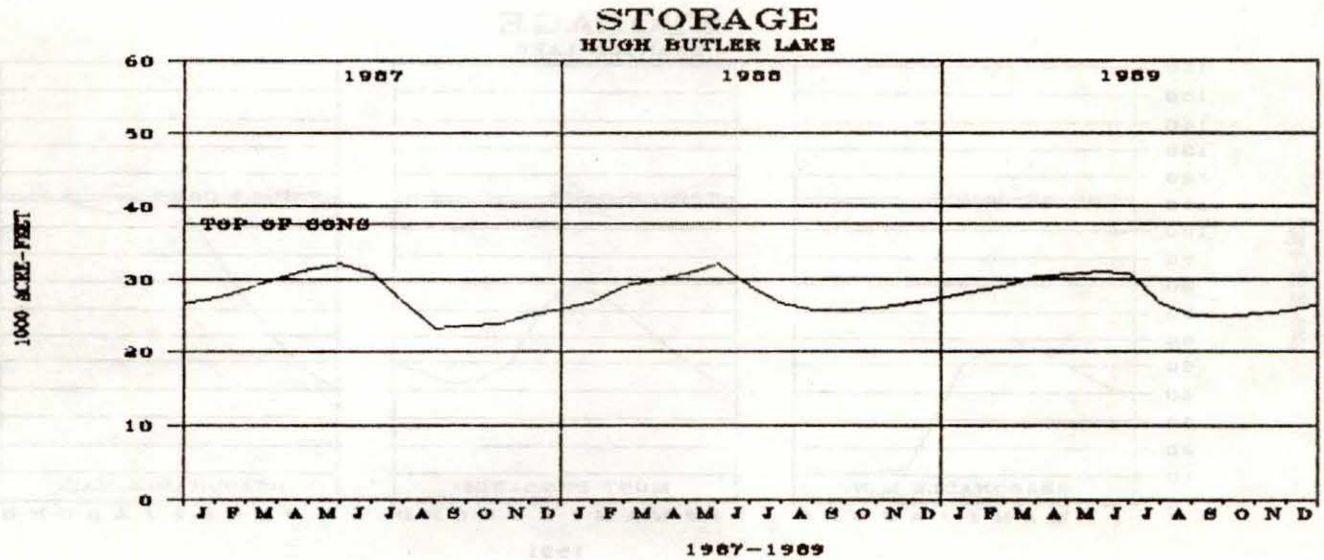
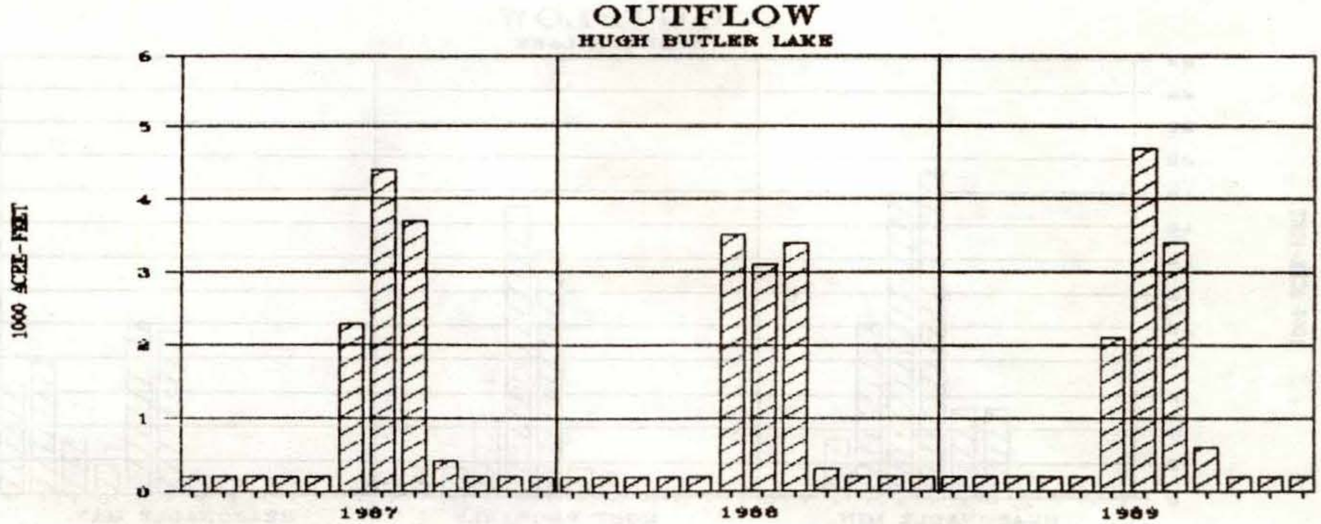


EXHIBIT 8A

HUGH BUTLER LAKE
OPERATION

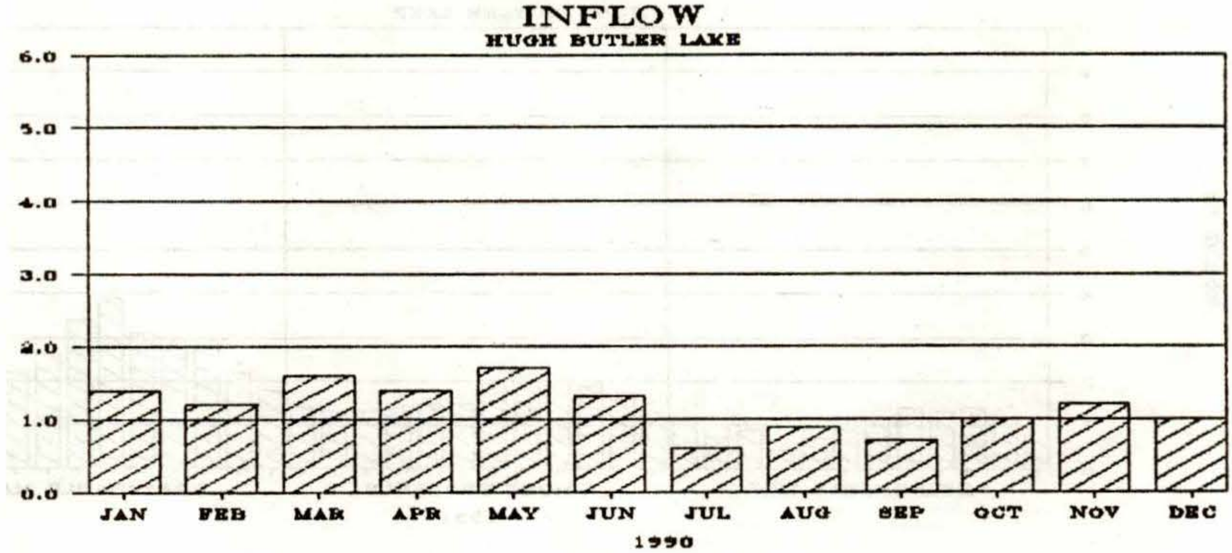


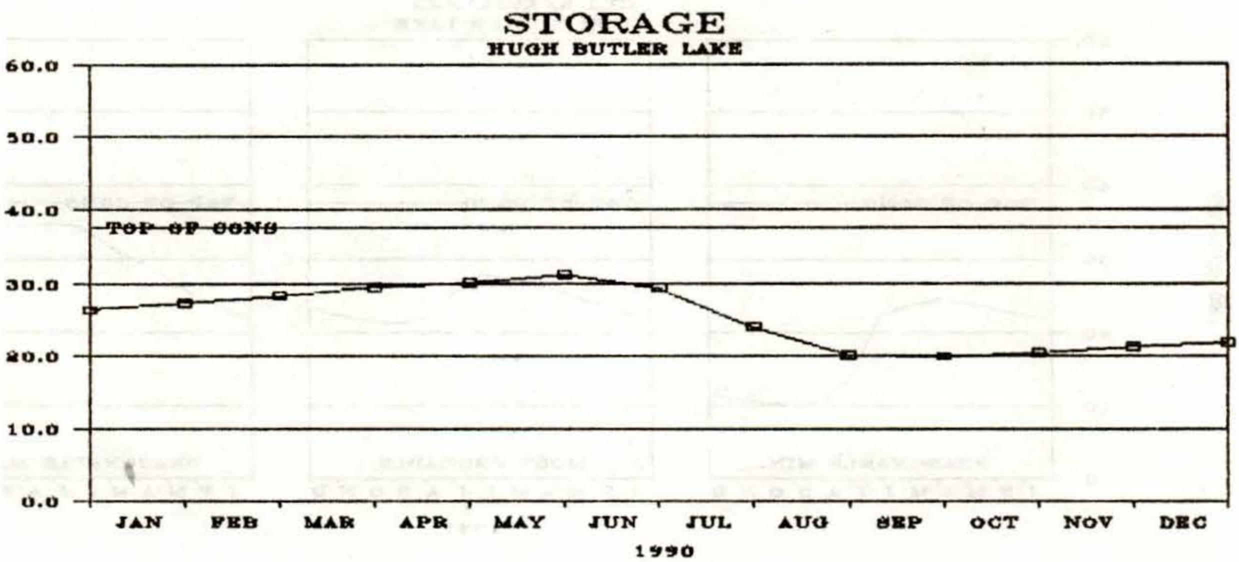




HUGH BUTLER LAKE

1990 OPERATION





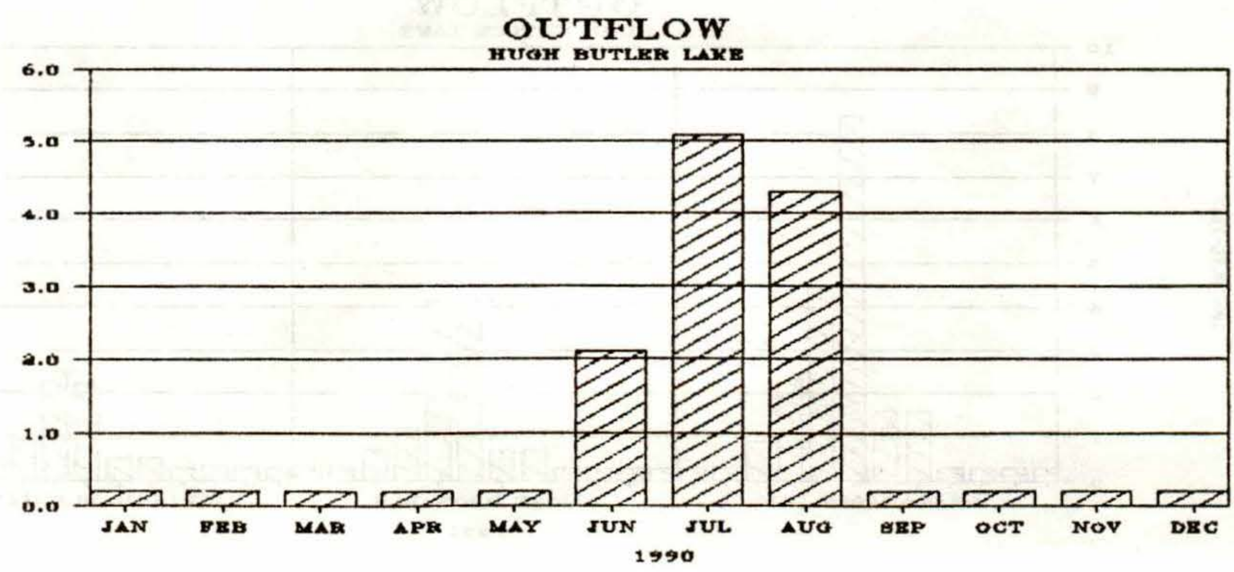
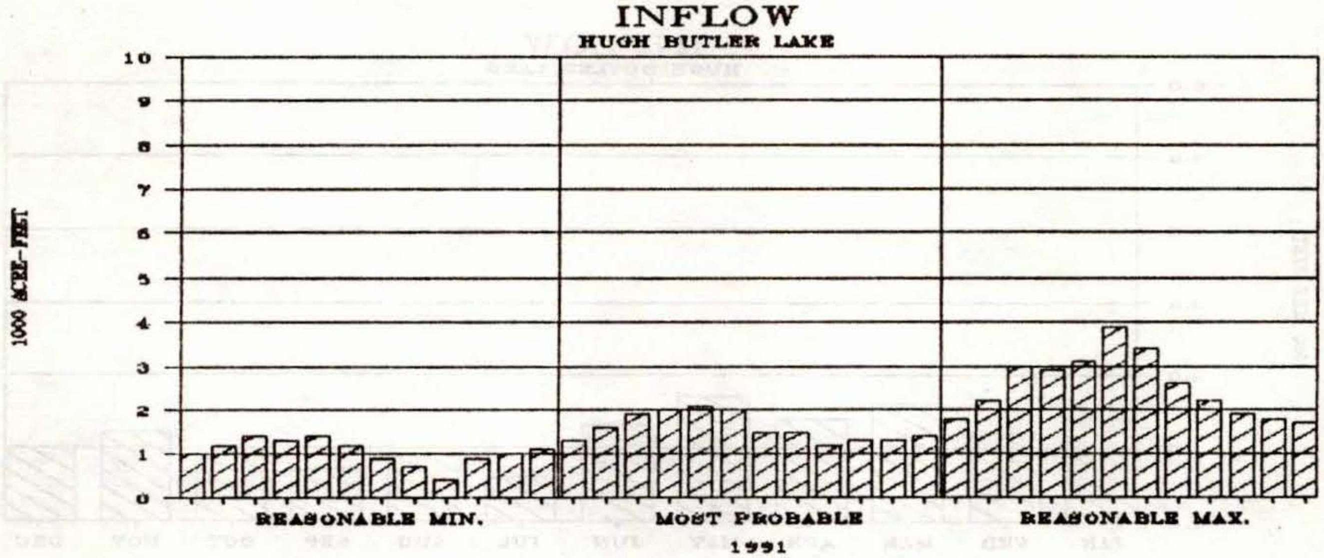
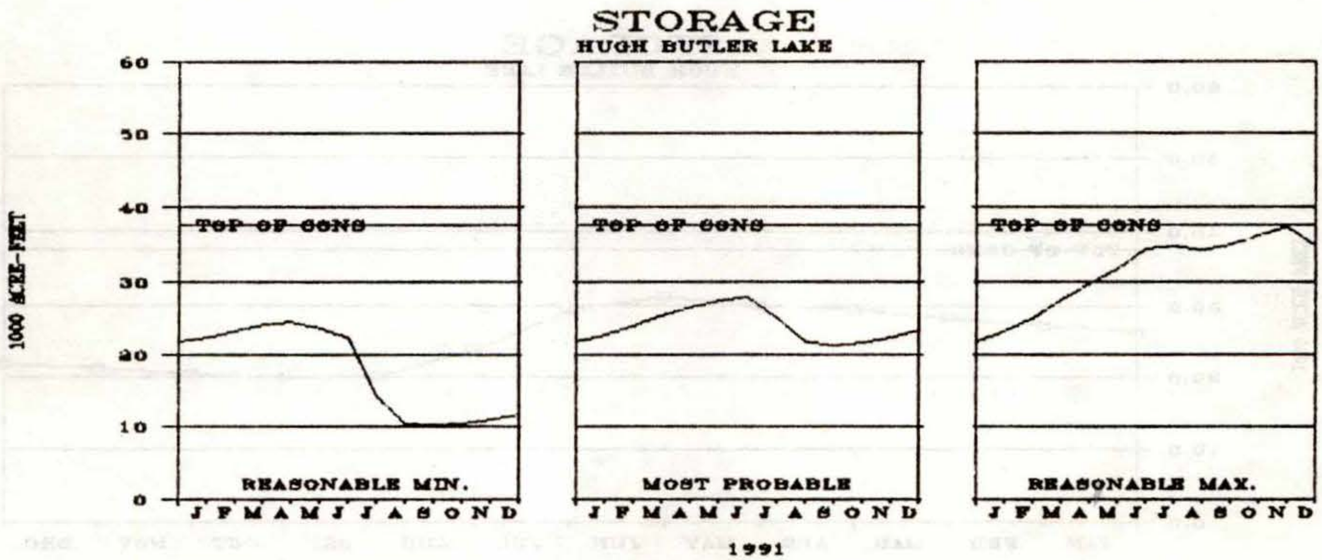


EXHIBIT 8C

HUGH BUTLER LAKE
1991 OPERATION PLAN





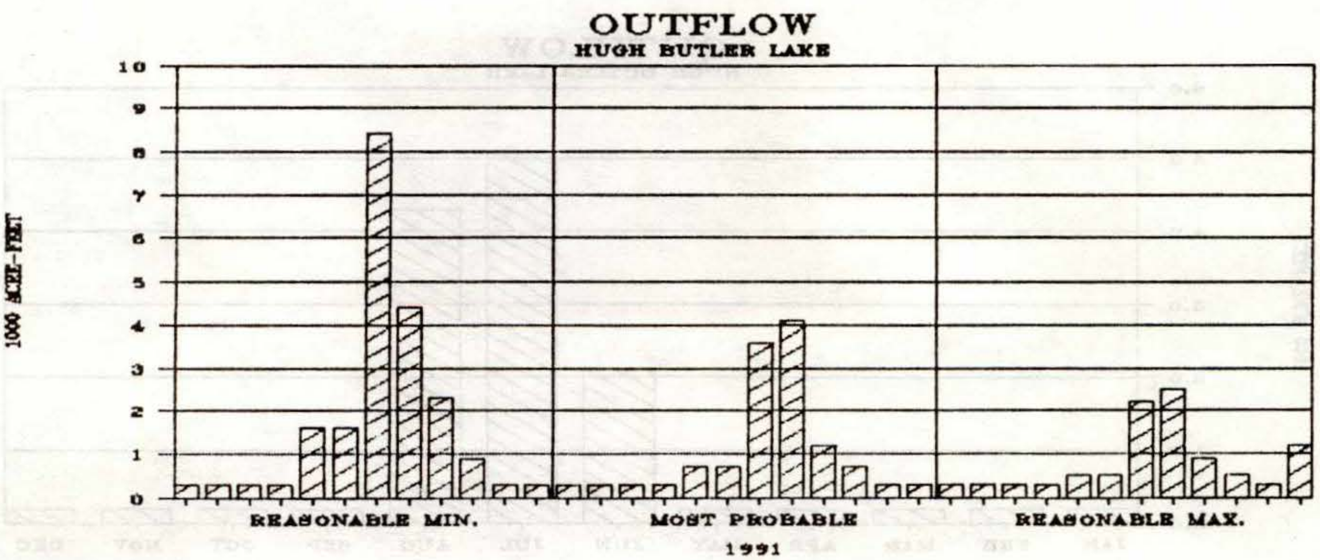
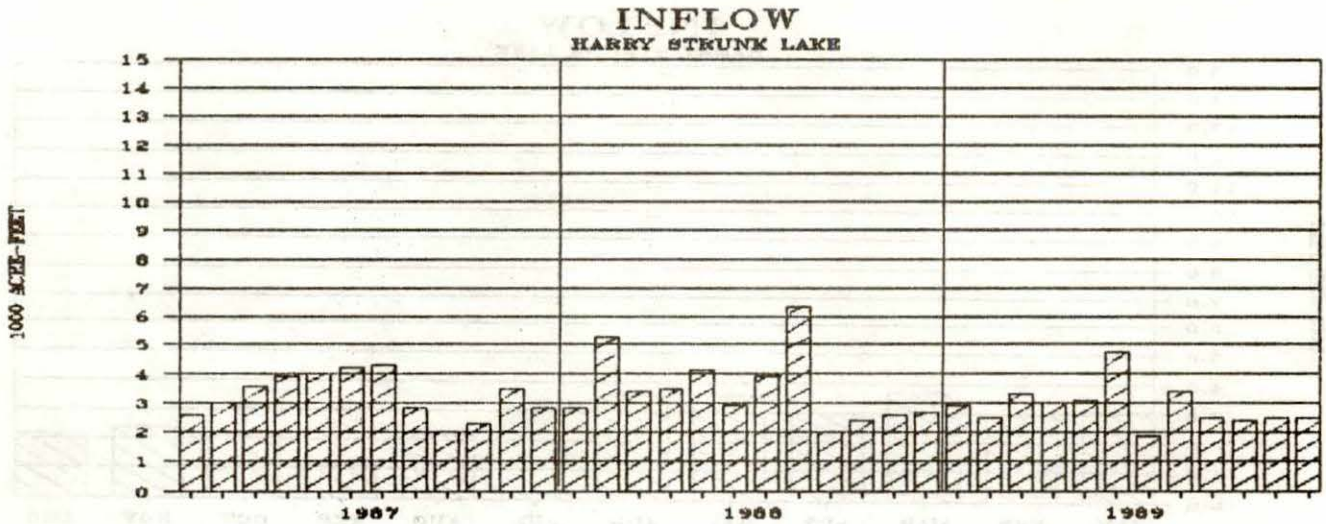
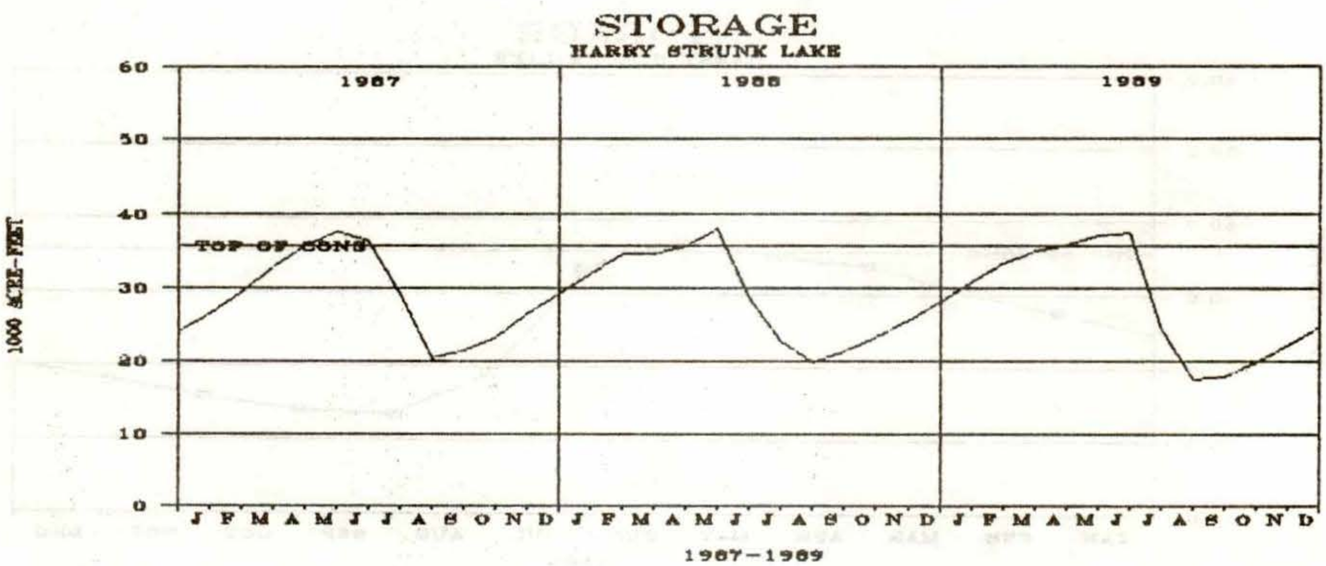


EXHIBIT 9A

HARRY STRUNK LAKE
OPERATION





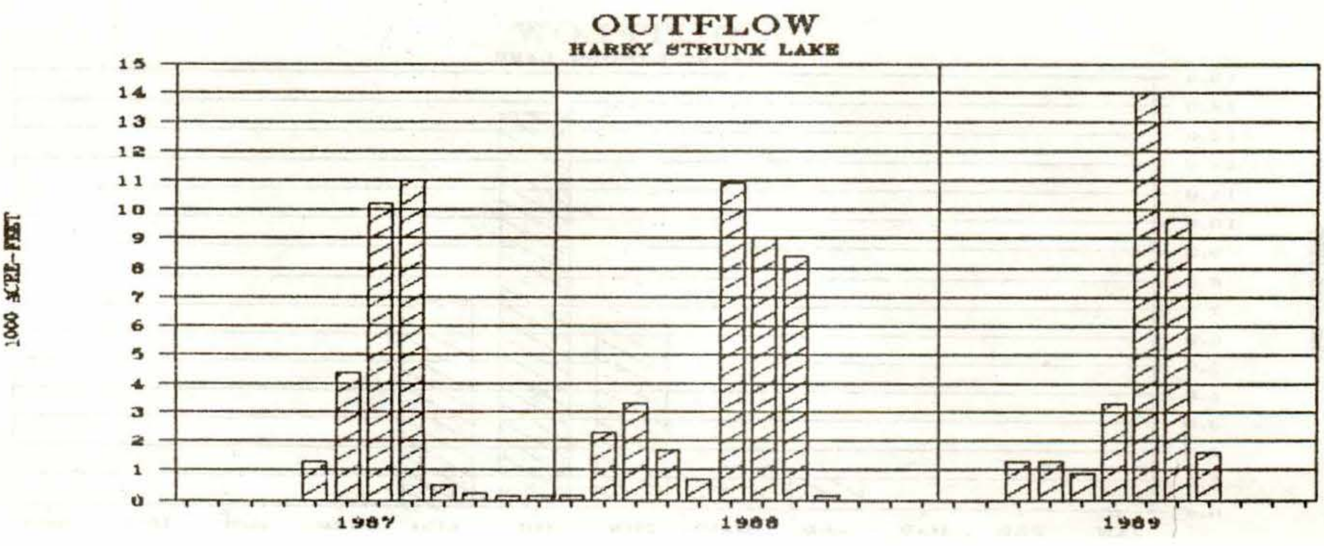
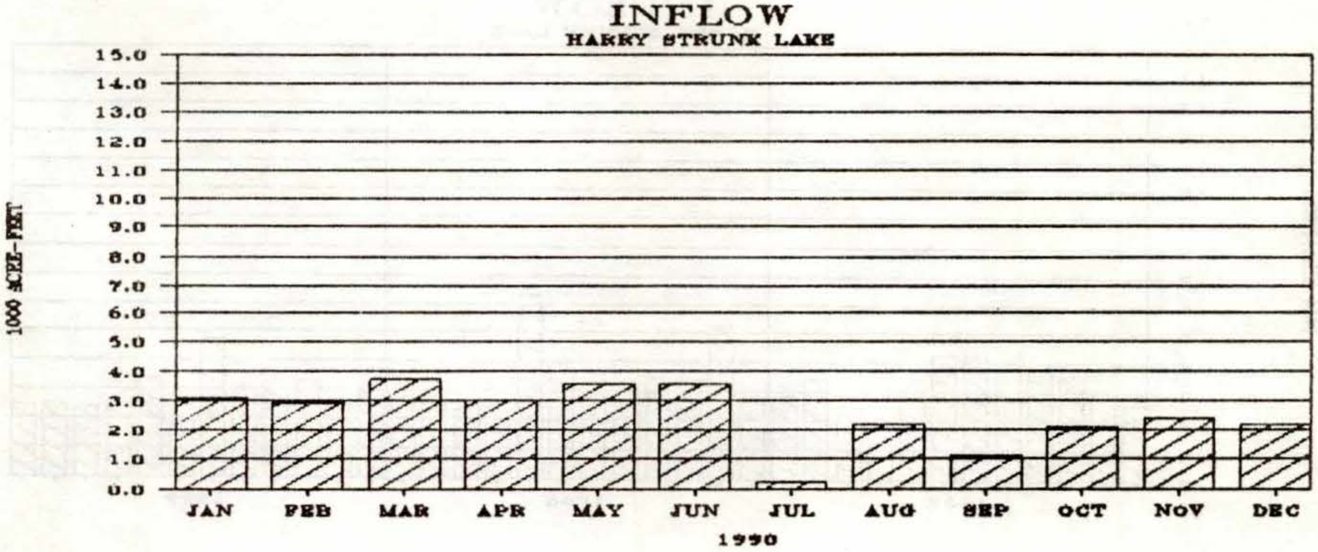
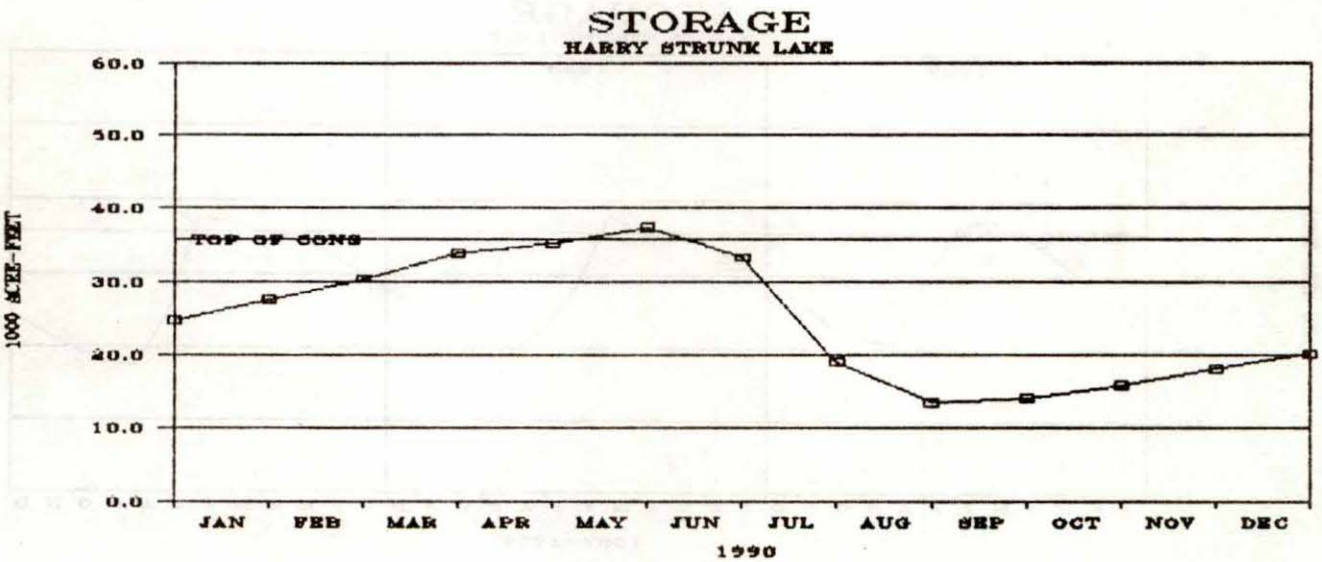


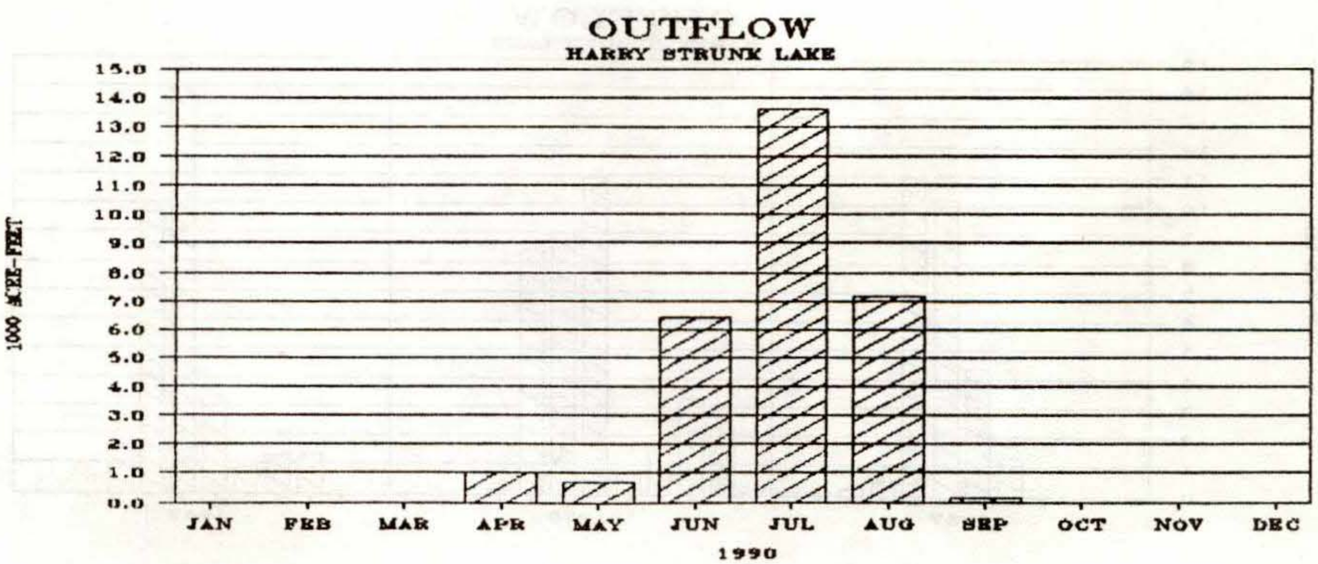
EXHIBIT 9B

HARRY STRUNK LAKE

1990 OPERATION



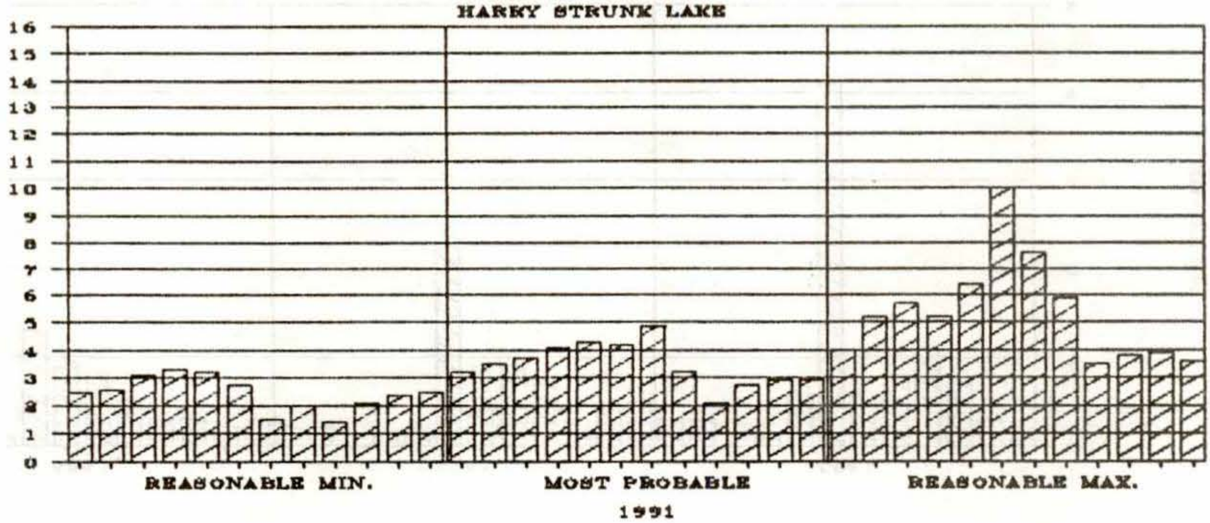




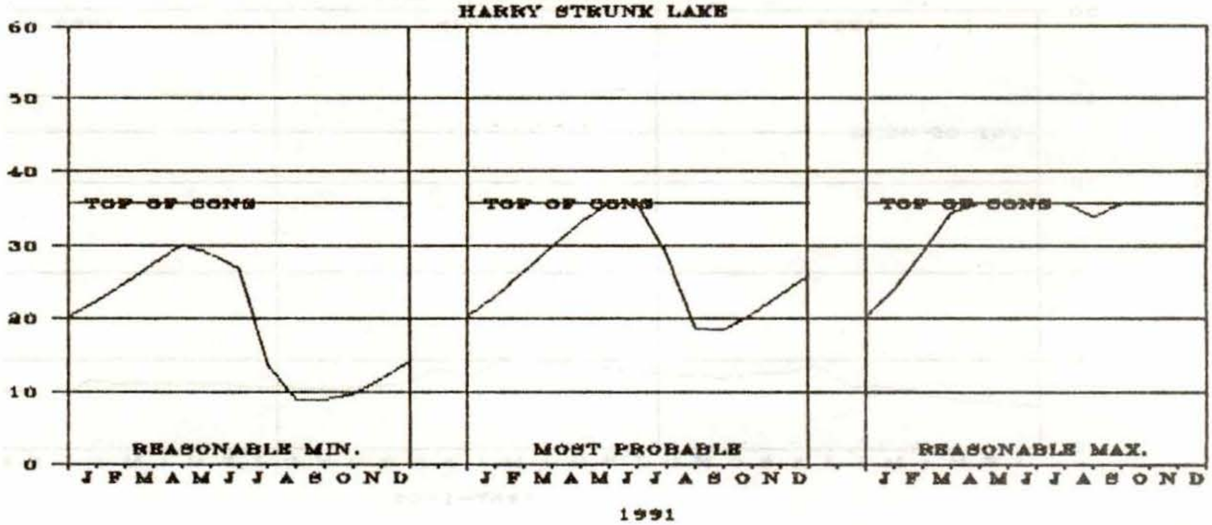
HARRY STRUNK LAKE

1991 OPERATION PLAN

INFLOW
HARRY STRUNK LAKE



STORAGE
HARRY STRUNK LAKE



OUTFLOW
HARRY STRUNK LAKE

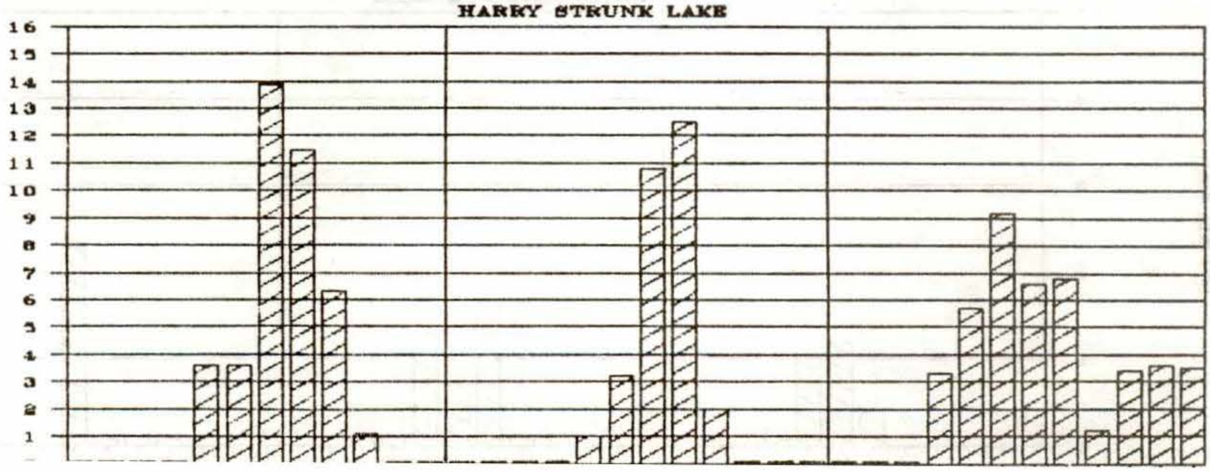
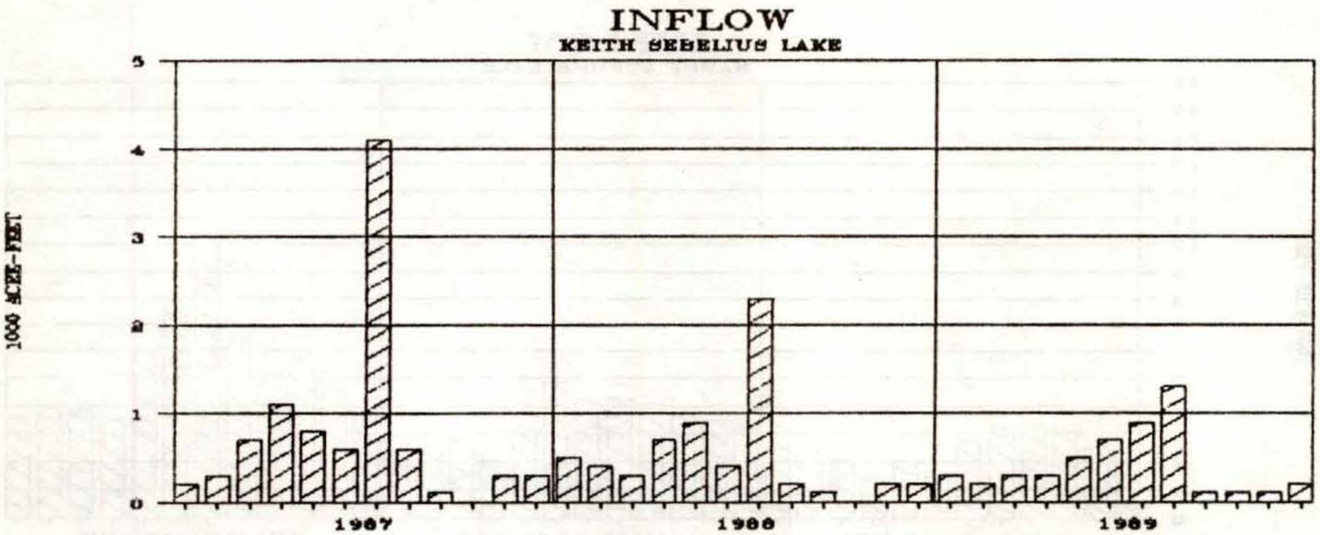
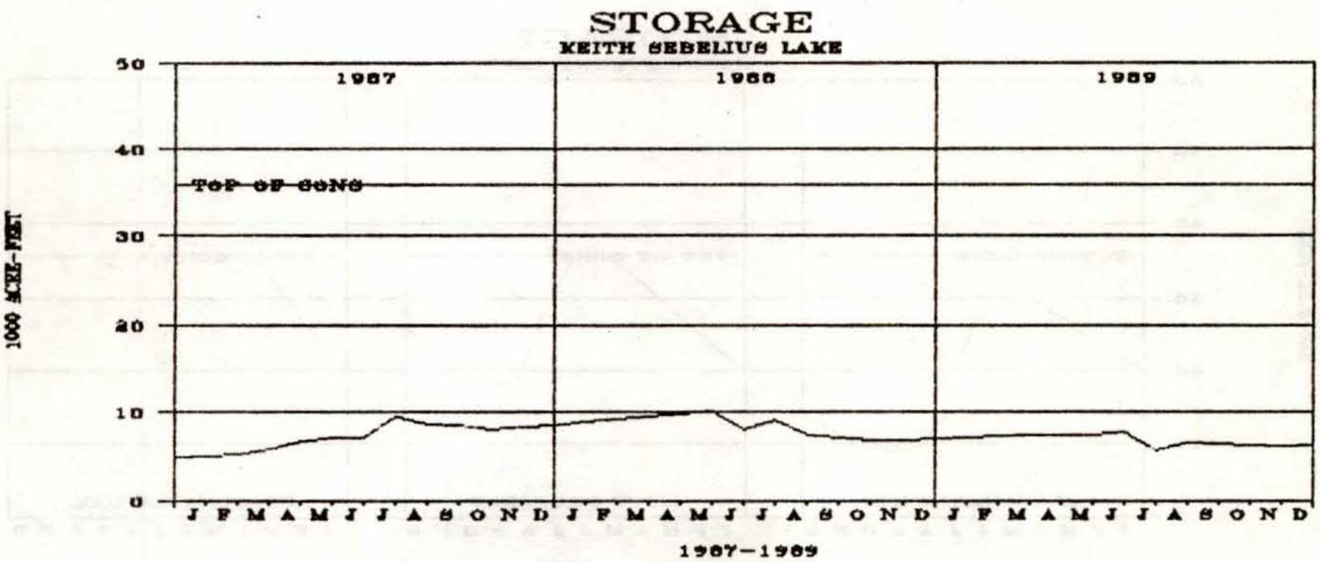
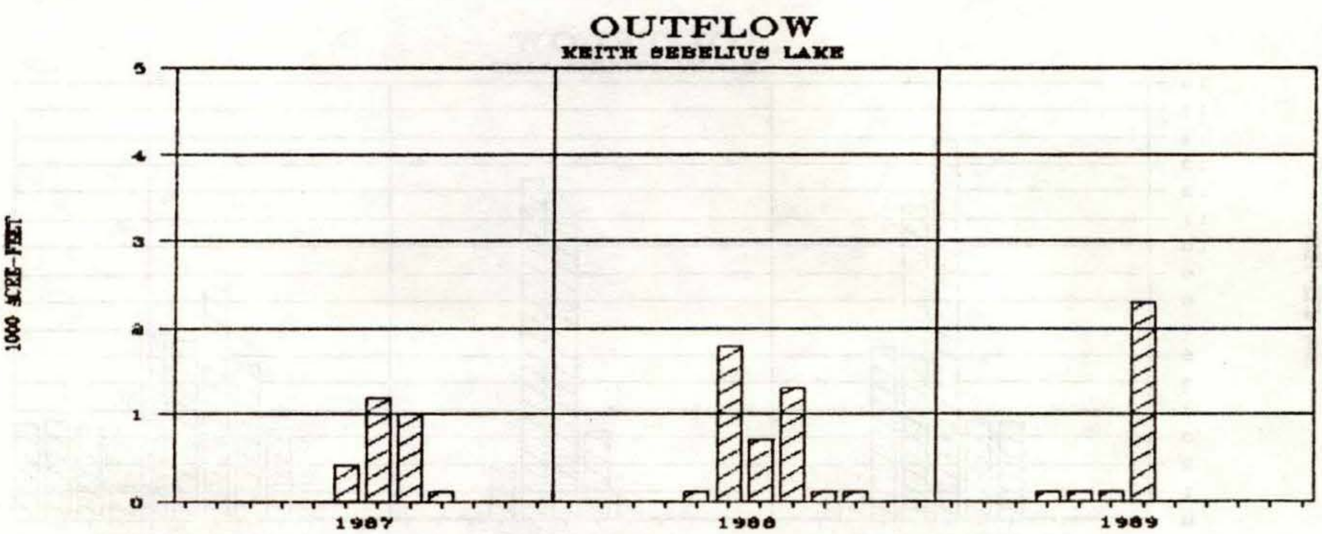


EXHIBIT 10A

KIETH SEBELIUS LAKE
OPERATION

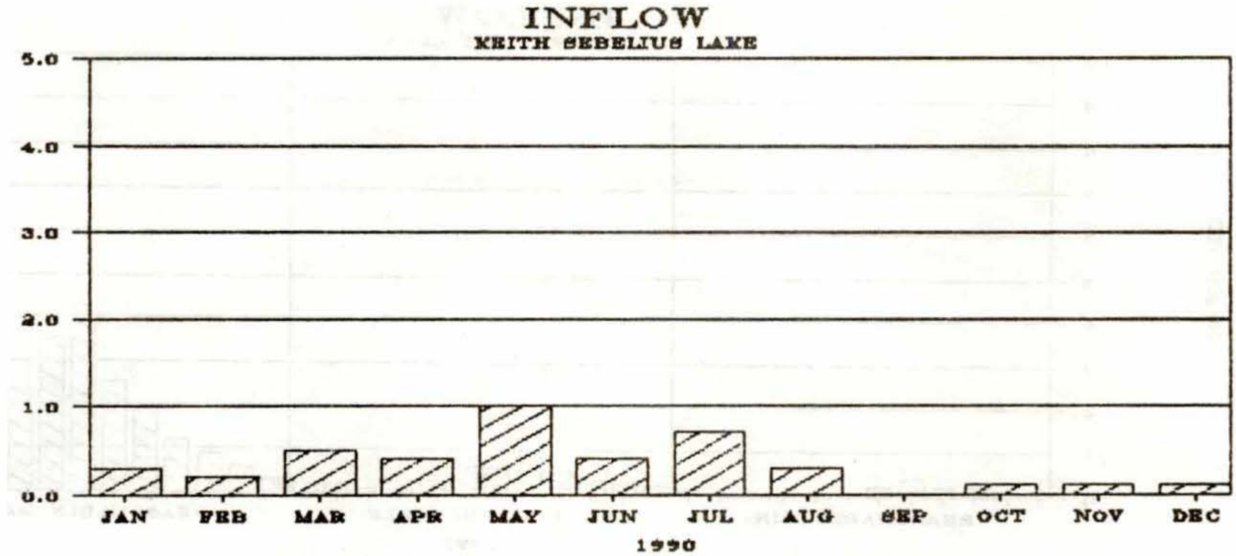


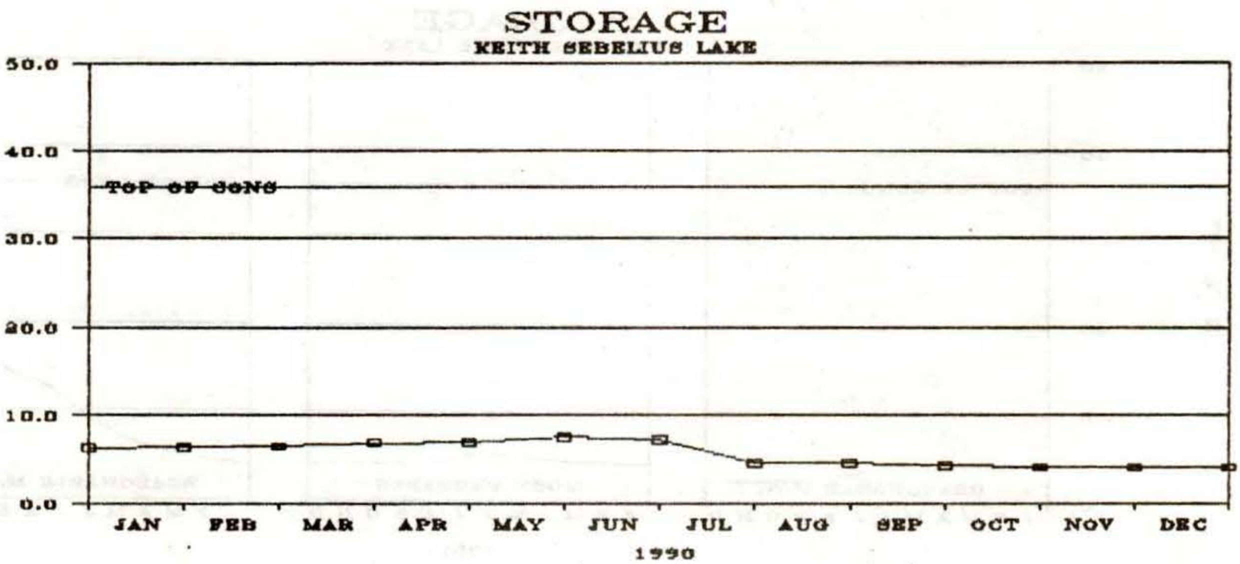




KIETH SEBELIUS LAKE

1990 OPERATION





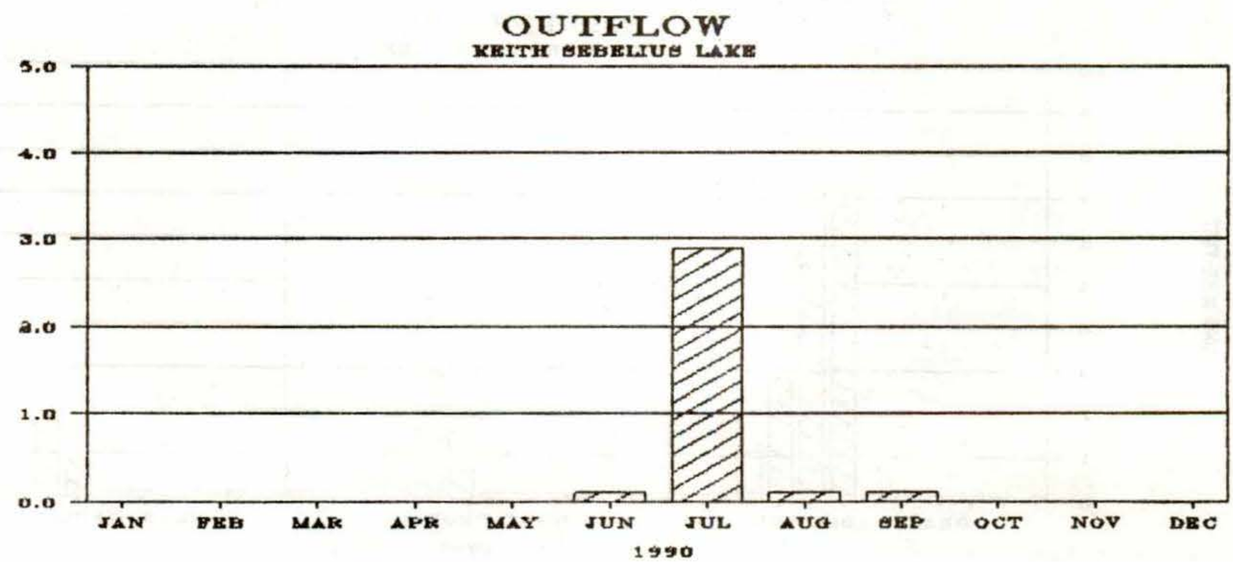
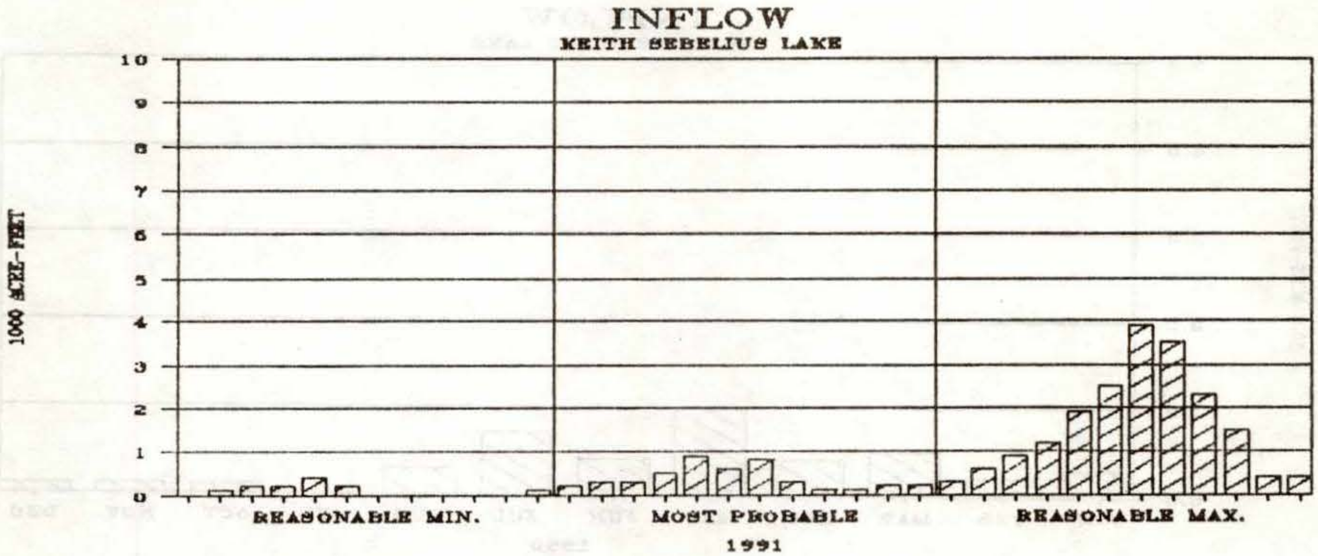
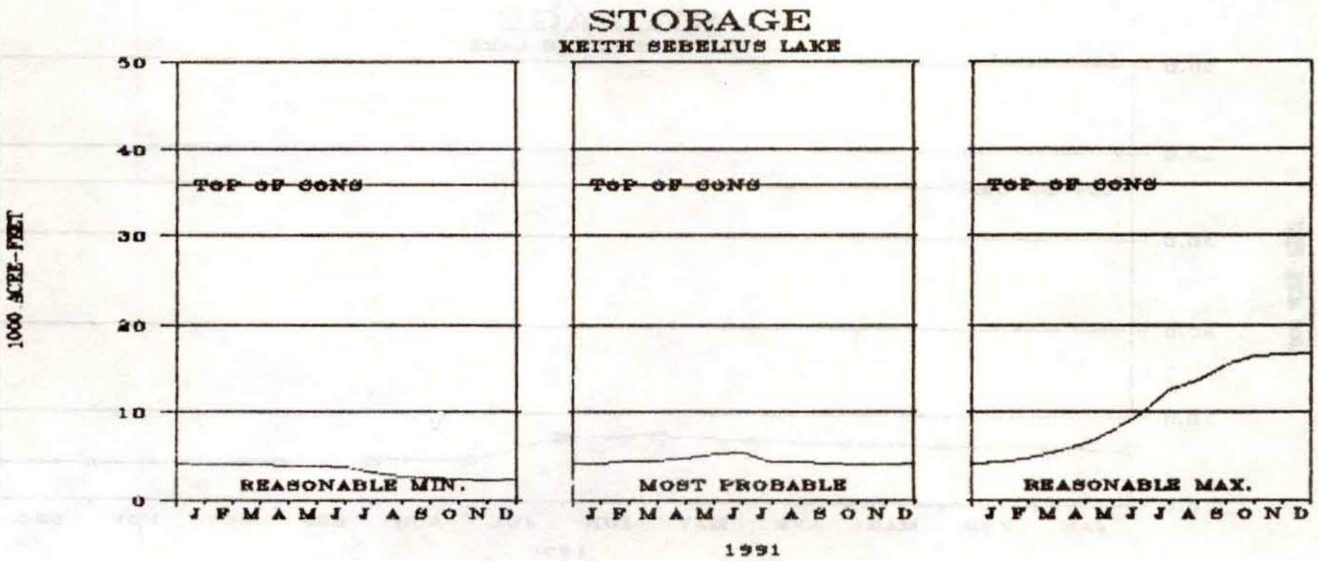


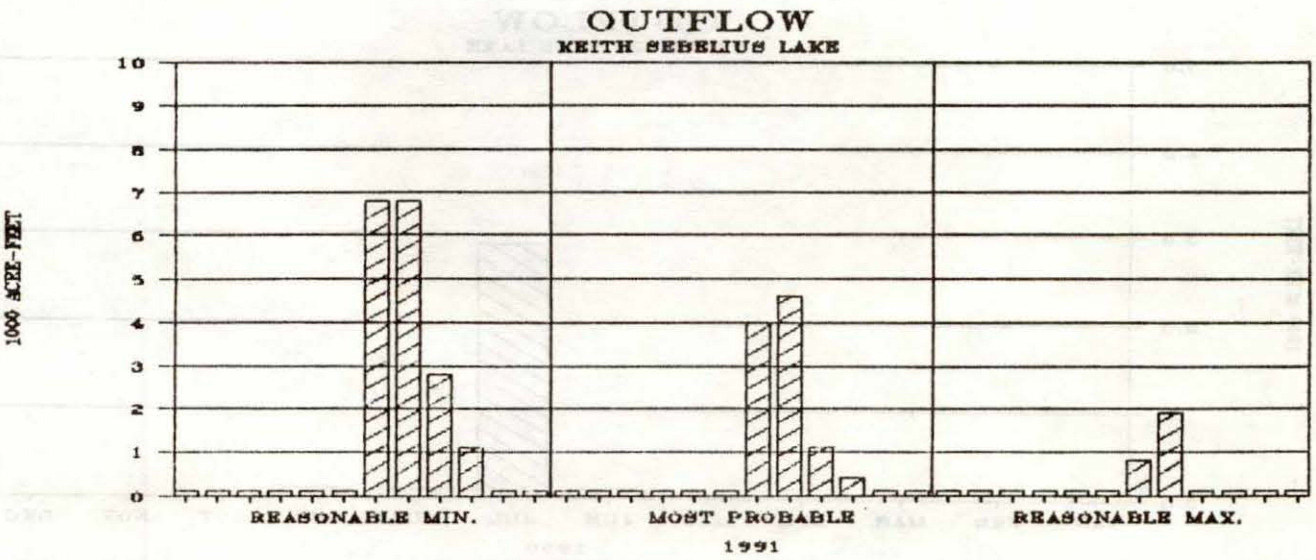
EXHIBIT 10C

KIETH SEBELIUS LAKE

1991 OPERATION

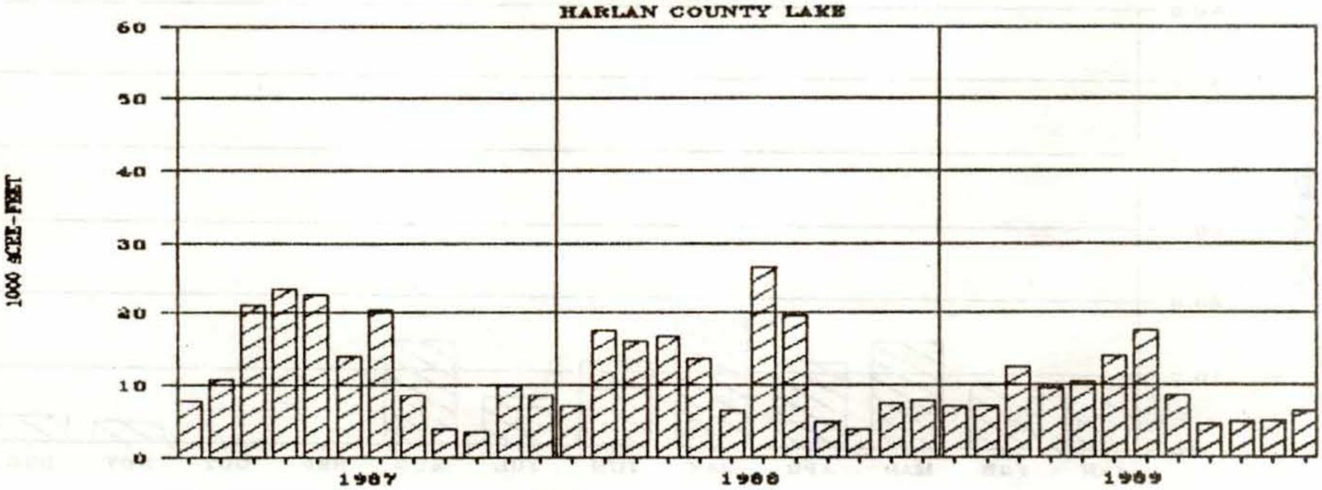




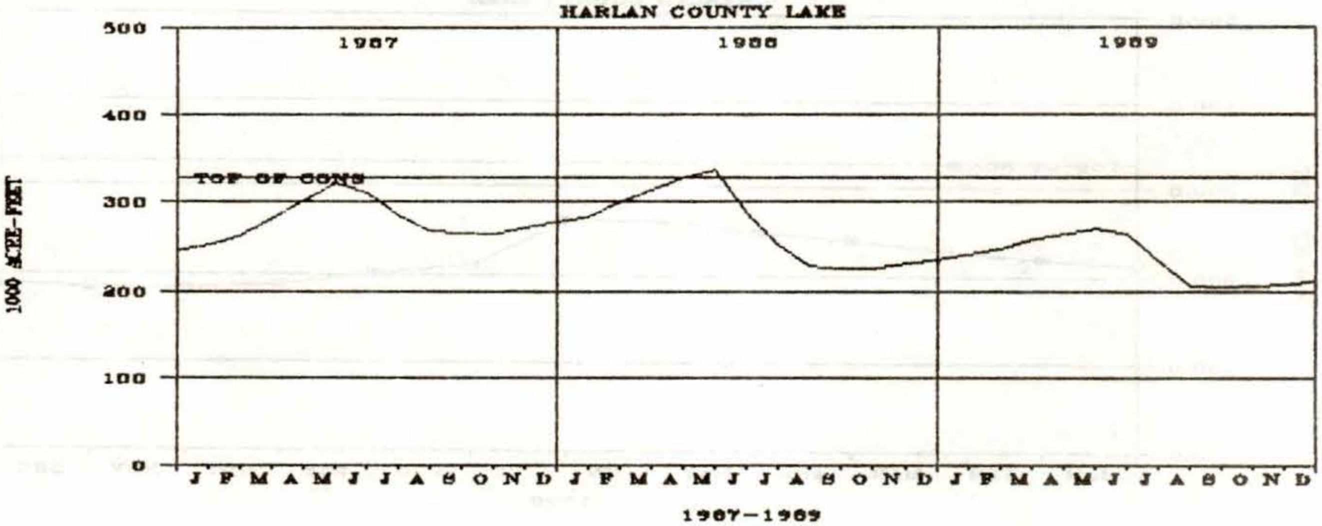


HARLAN COUNTY LAKE
OPERATION

INFLOW
HARLAN COUNTY LAKE



STORAGE
HARLAN COUNTY LAKE



OUTFLOW
HARLAN COUNTY LAKE

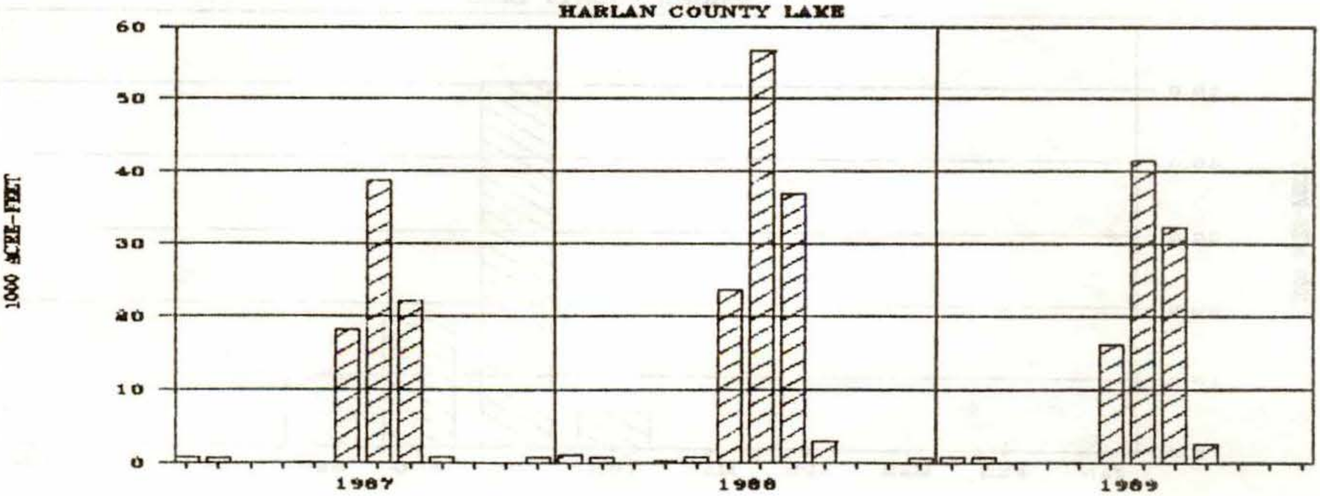
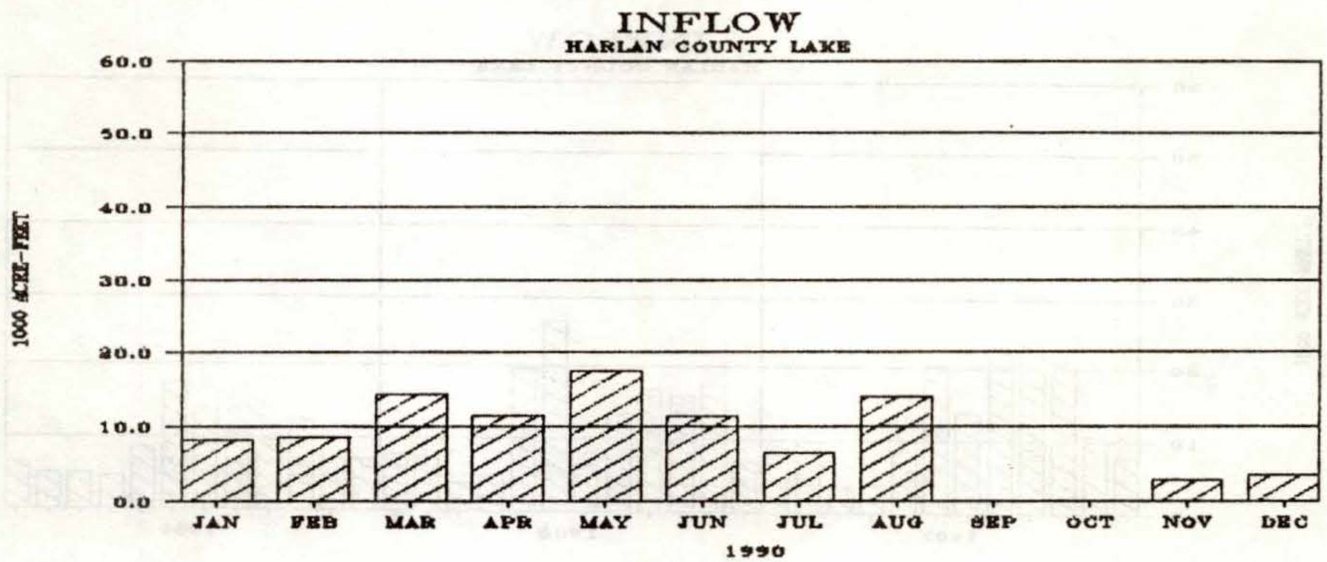
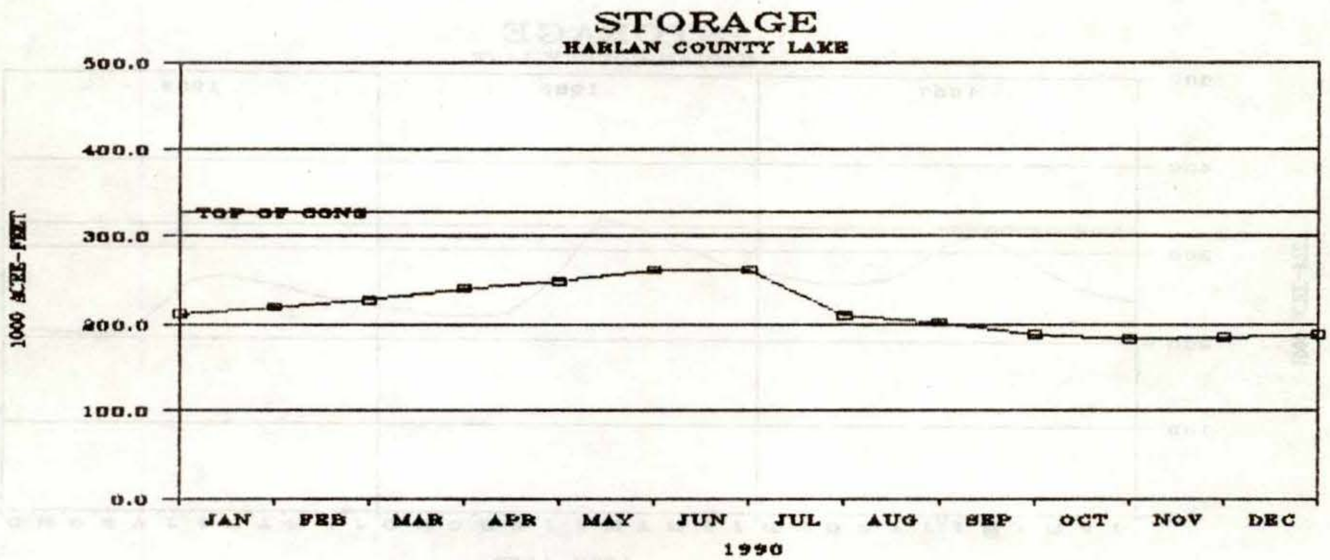
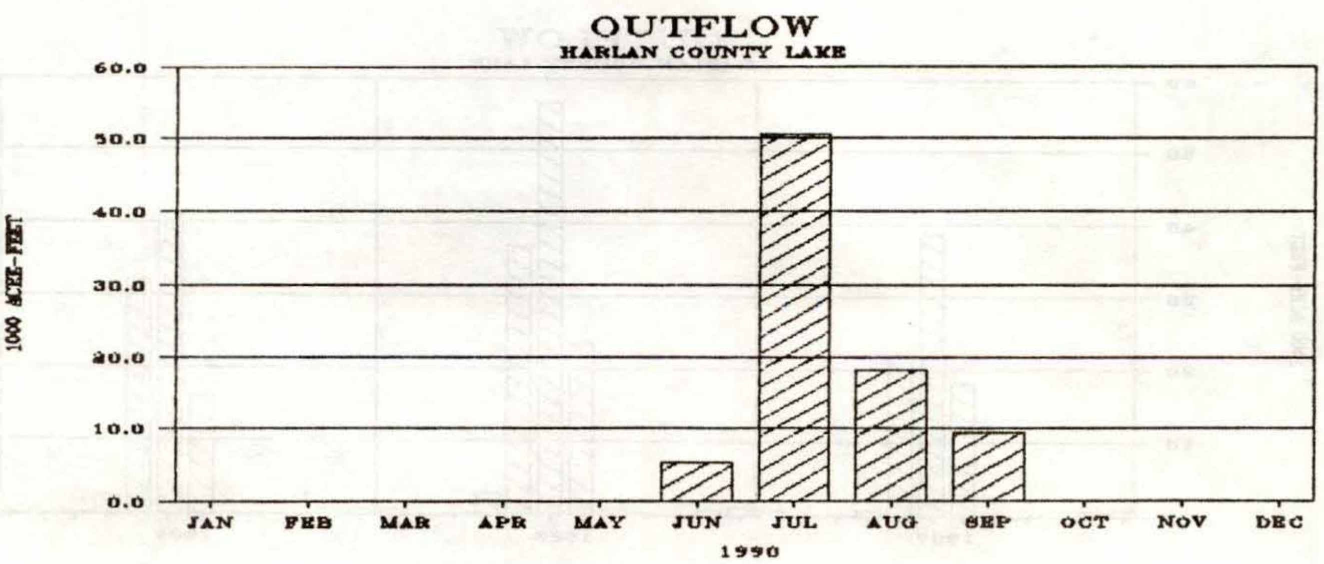


EXHIBIT 11B

HARLAN COUNTY LAKE
1990 OPERATION

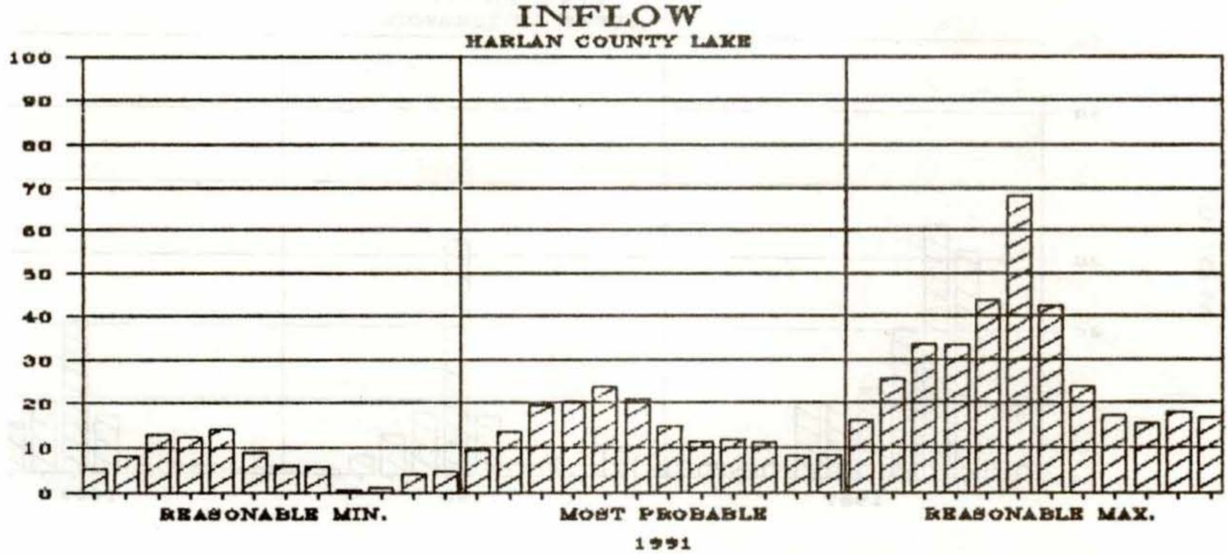


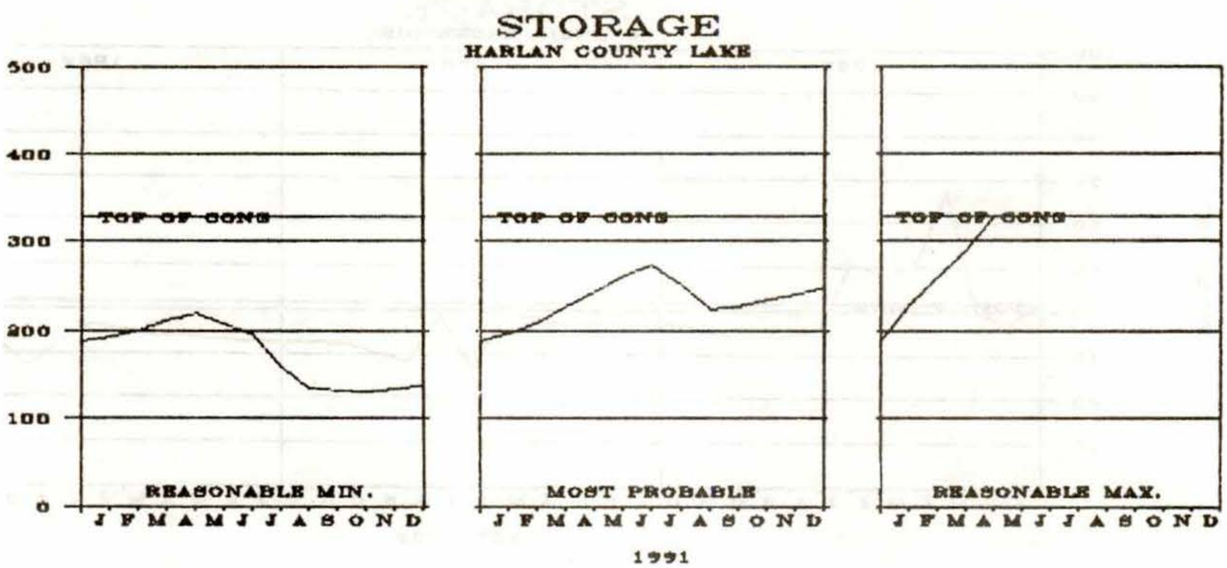




HARLAN COUNTY LAKE

1991 OPERATION PLAN





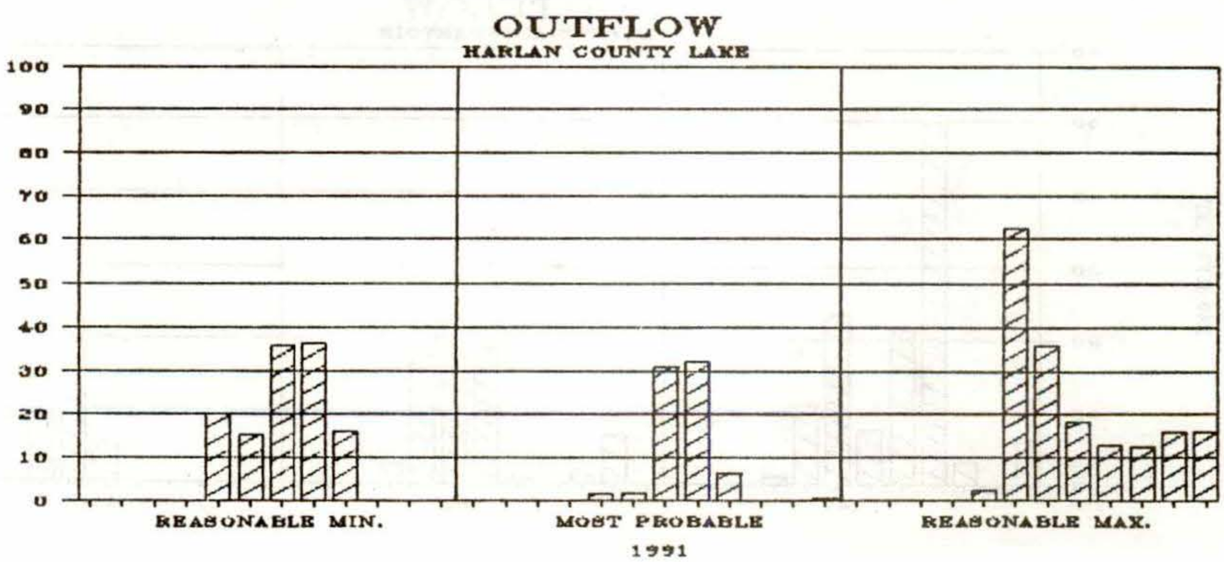
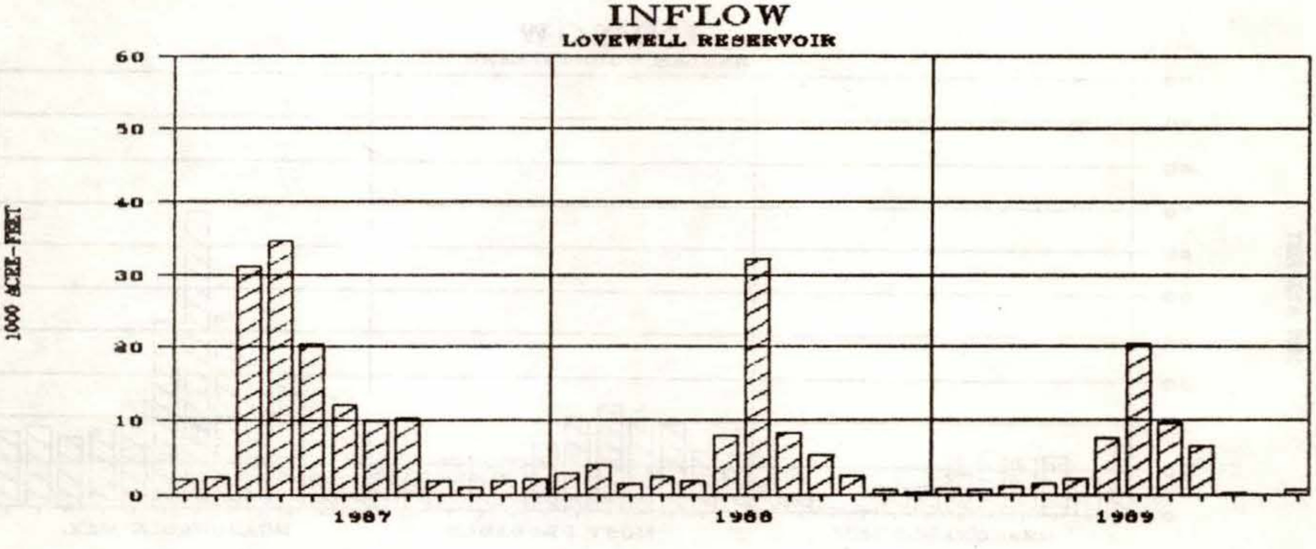
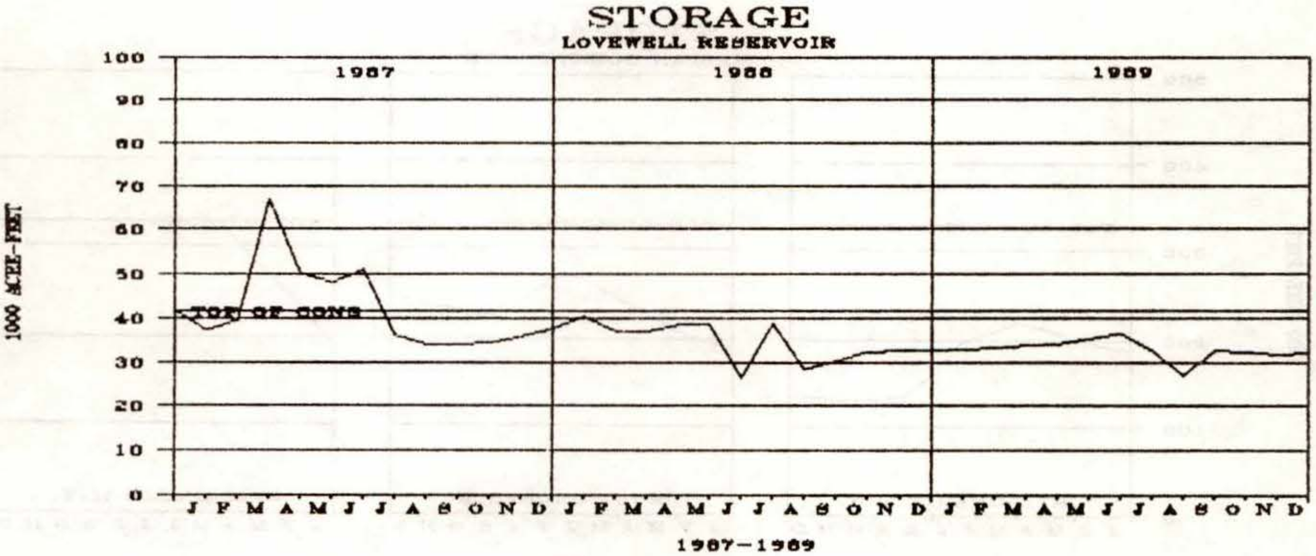
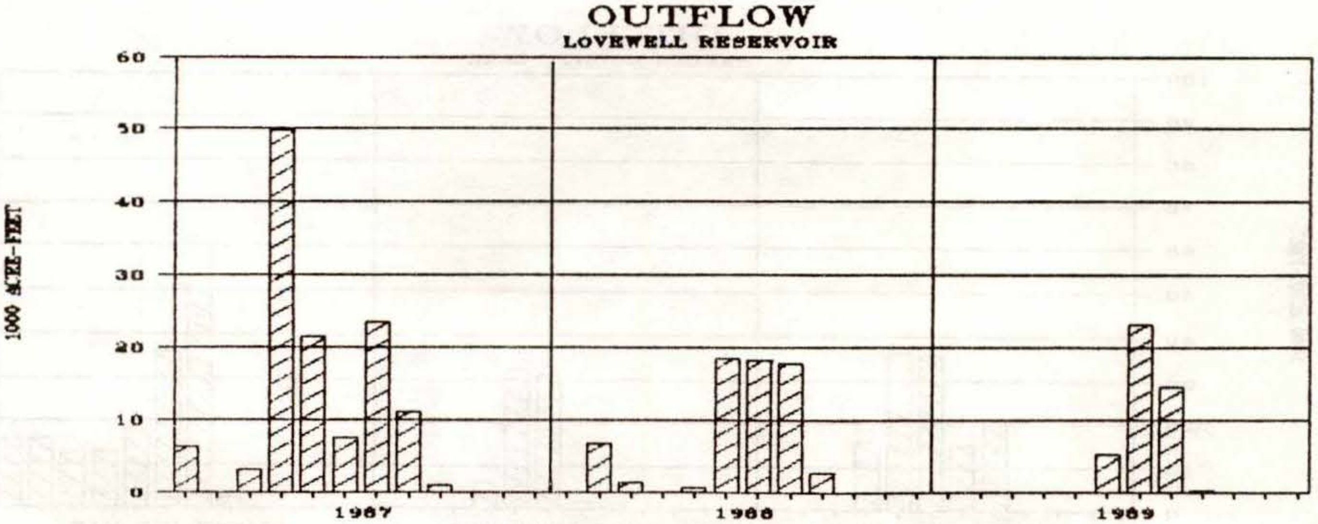


EXHIBIT 12A

LOVEWELL RESERVOIR
OPERATION

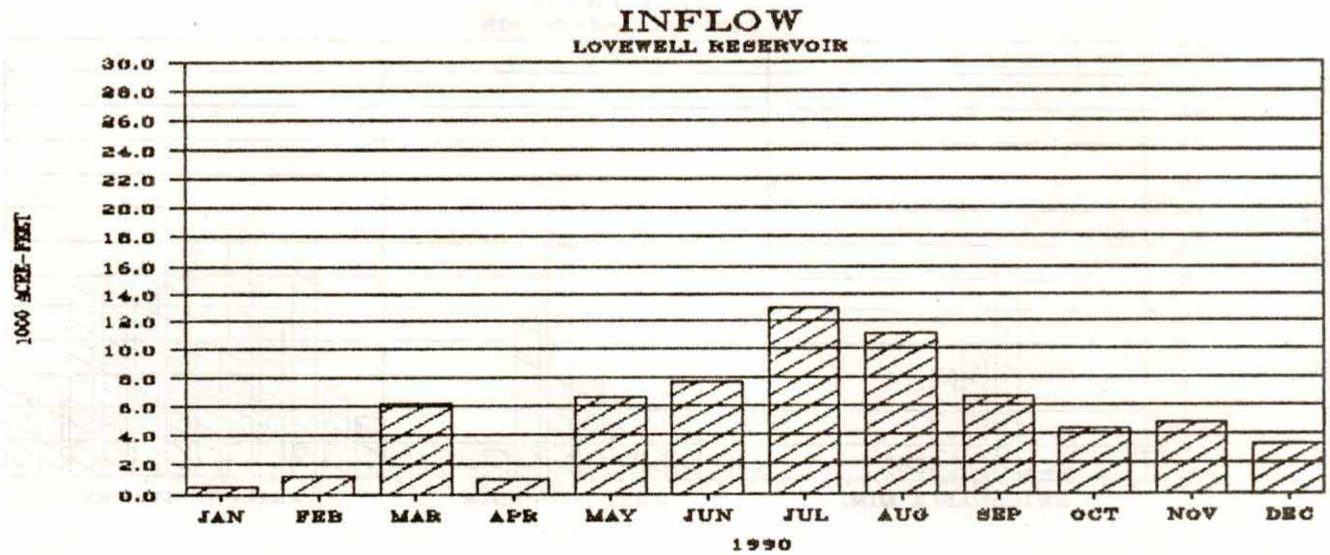


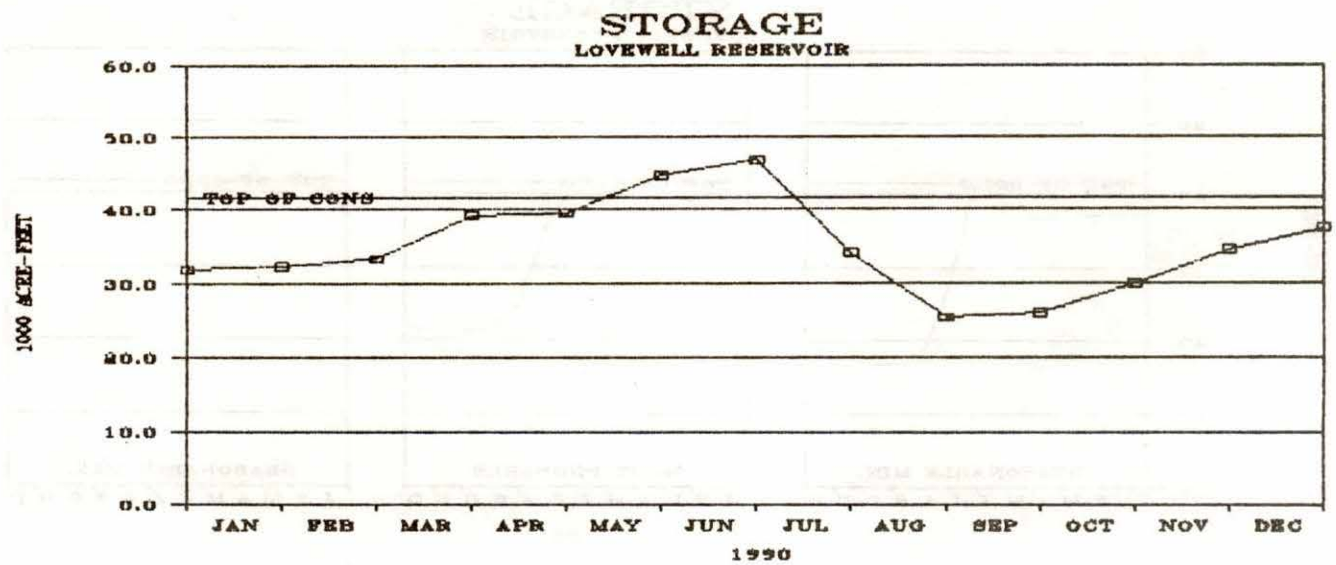




LOVEWELL RESERVOIR

1990 OPERATION





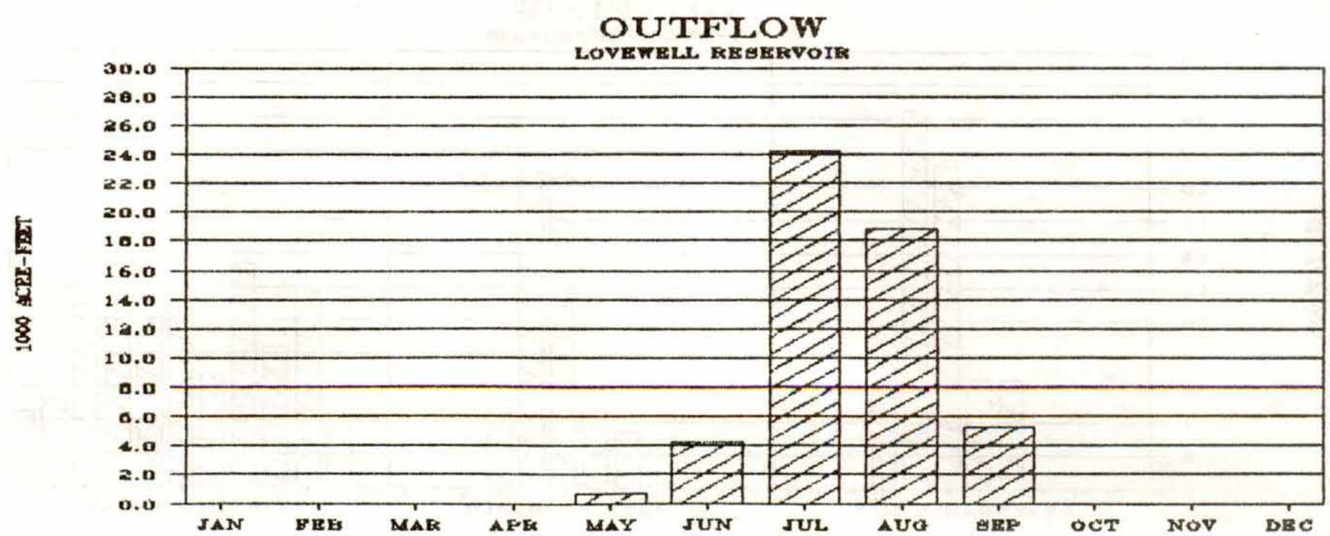
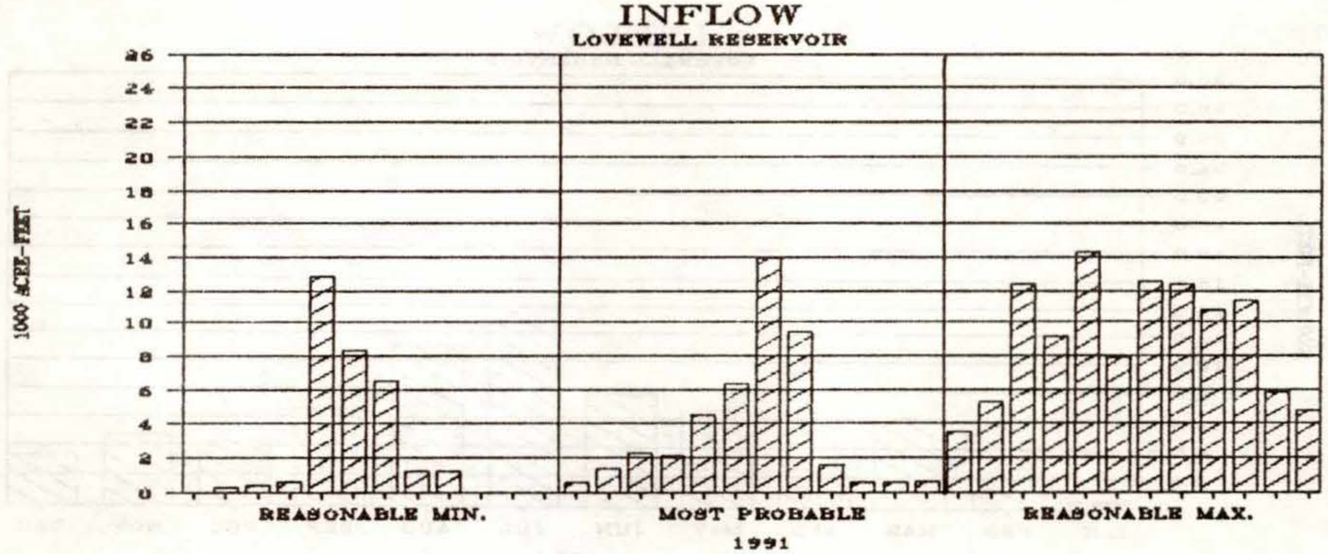
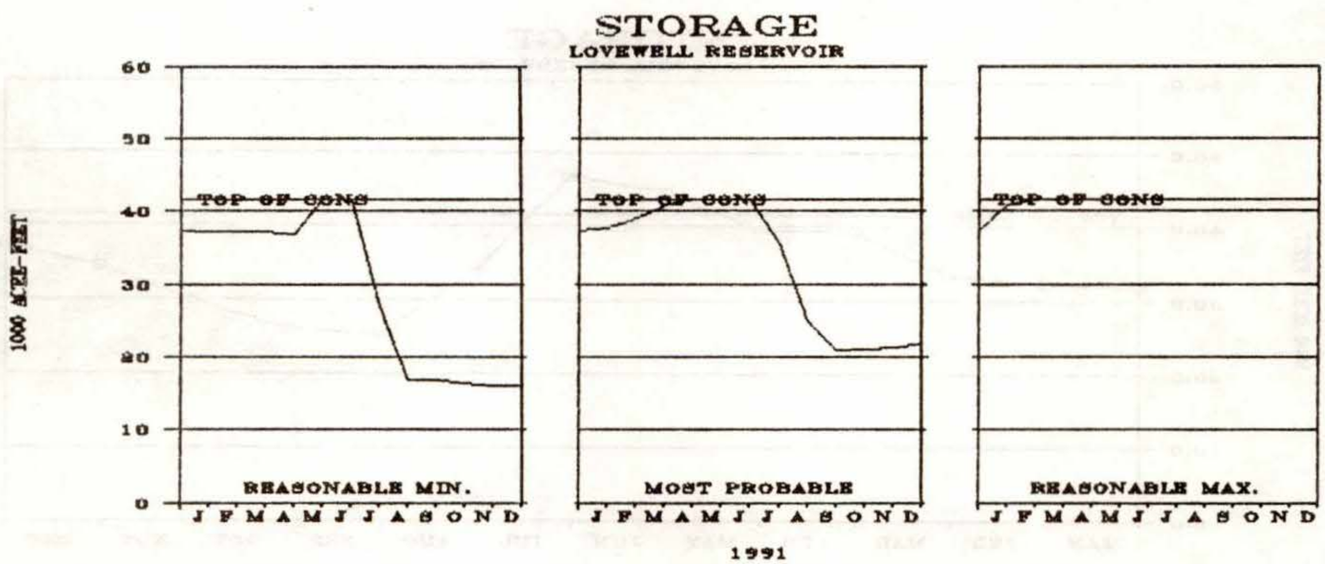
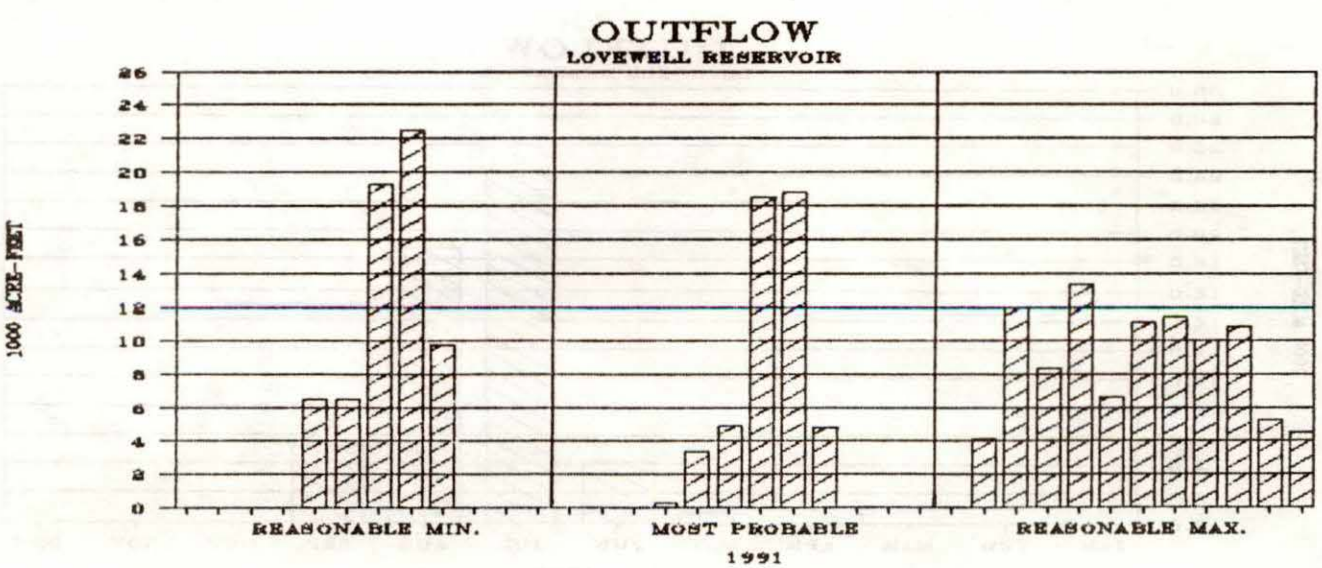


EXHIBIT 12C

LOVEWELL RESERVOIR
1991 OPERATION PLAN

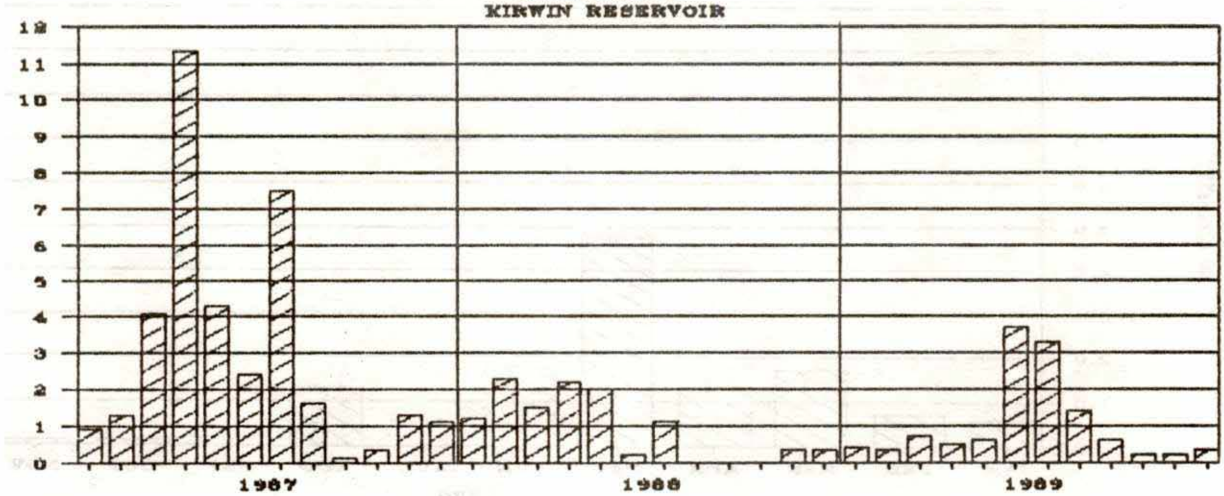




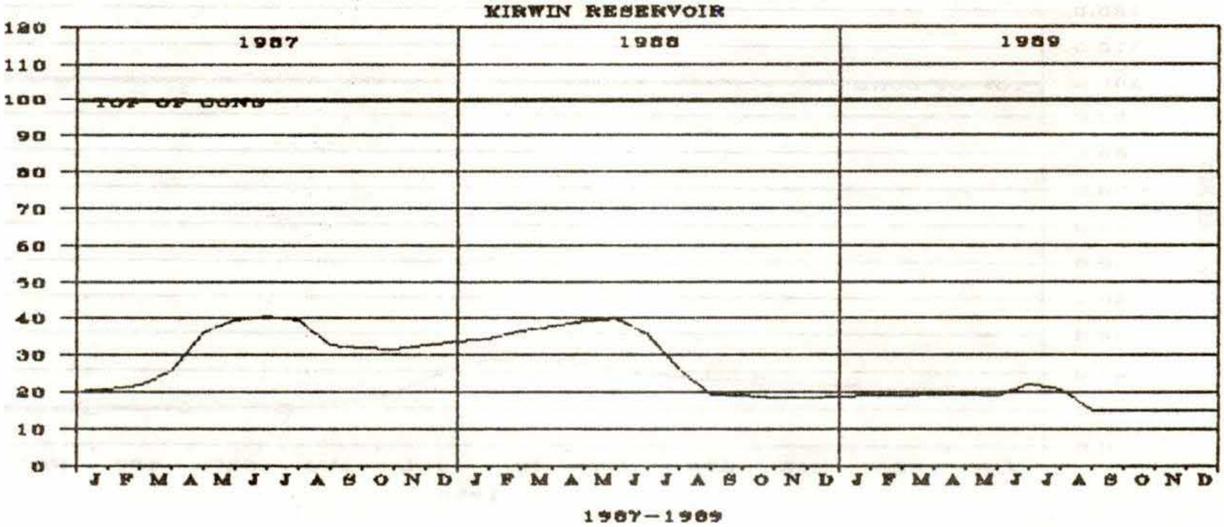


KIRWIN RESERVOIR
OPERATION

INFLOW
KIRWIN RESERVOIR



STORAGE
KIRWIN RESERVOIR



OUTFLOW
KIRWIN RESERVOIR

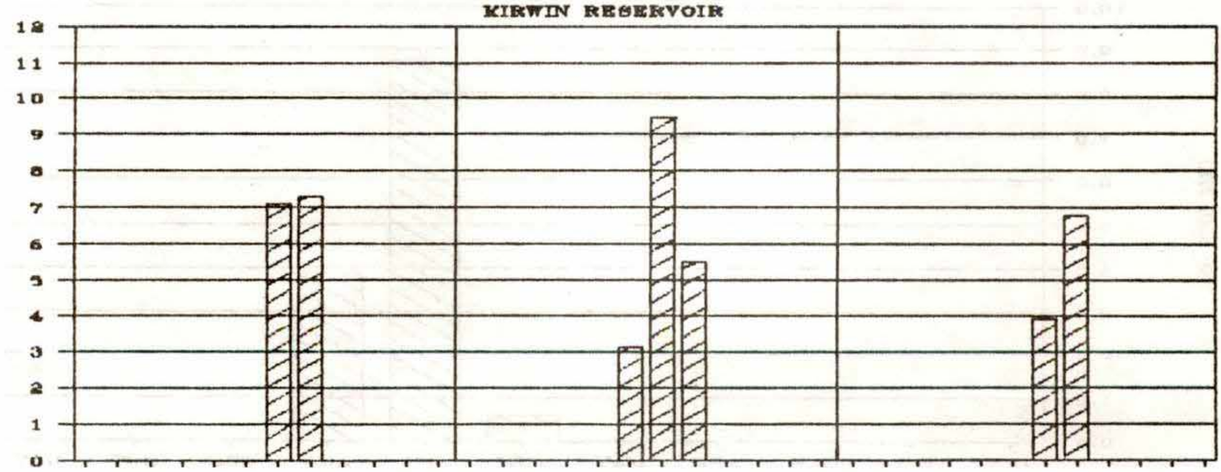
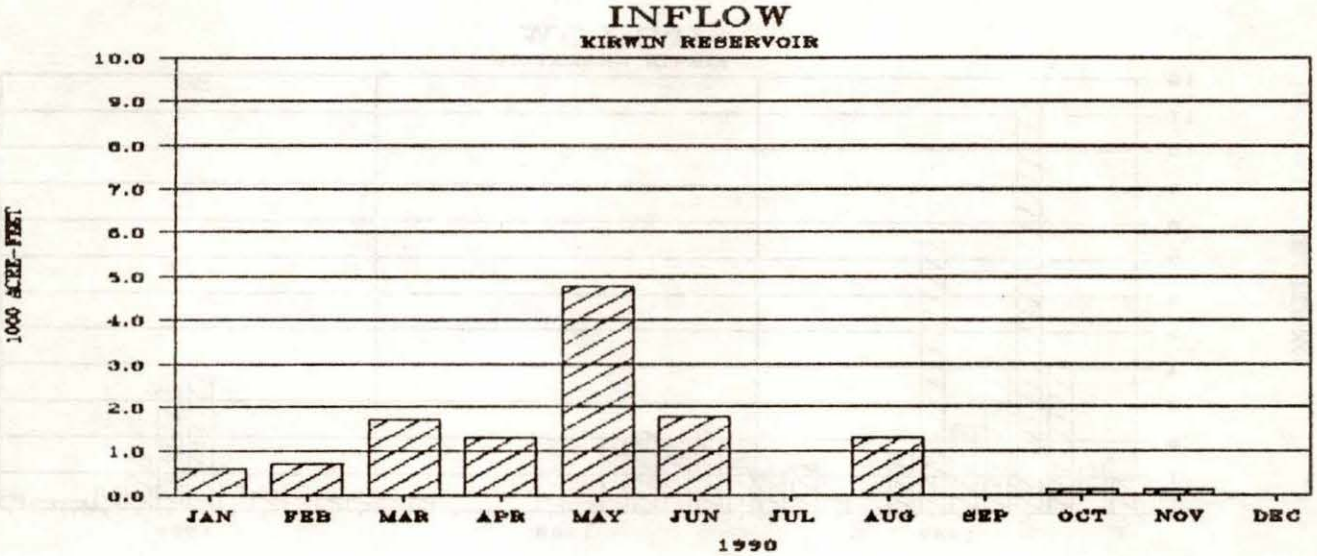
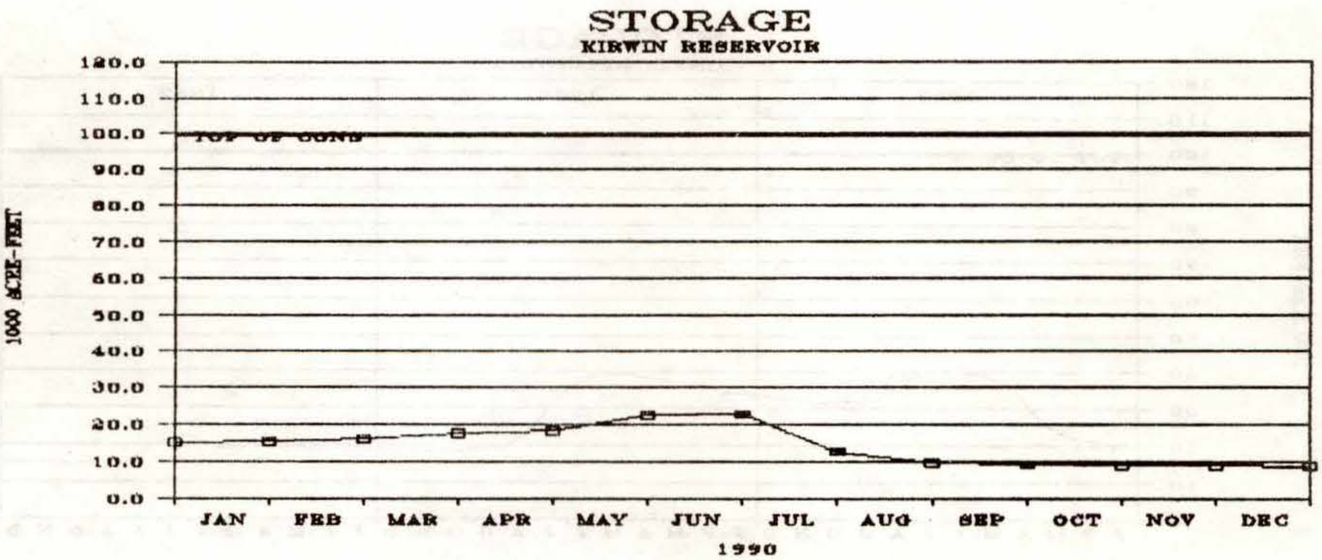


EXHIBIT 13B

KIRWIN RESERVOIR
1990 OPERATION





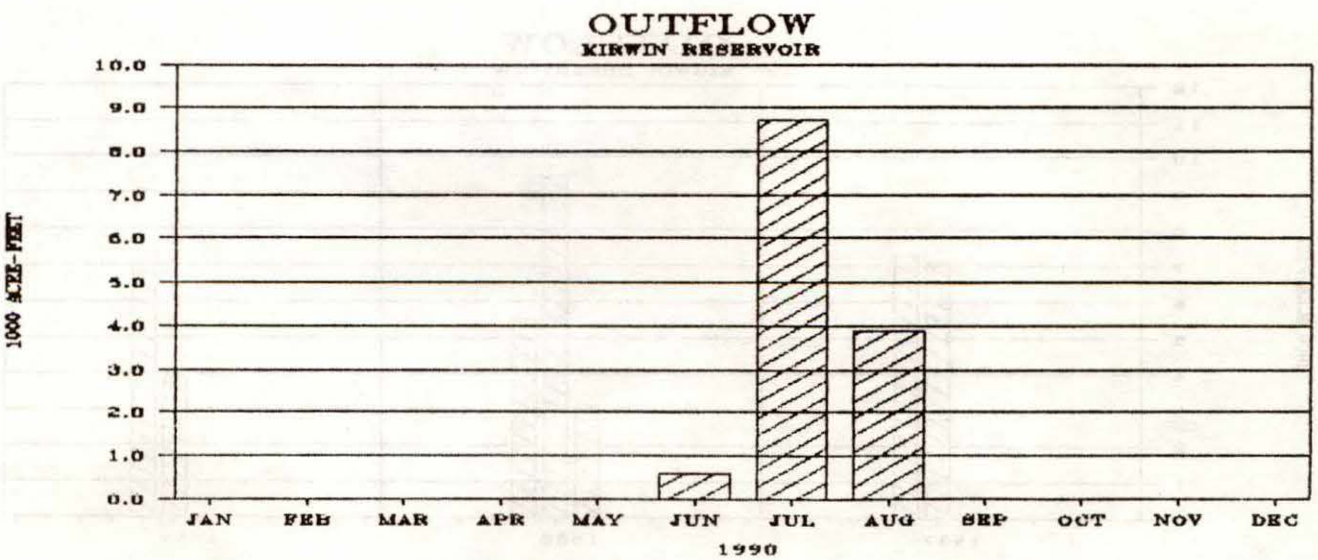
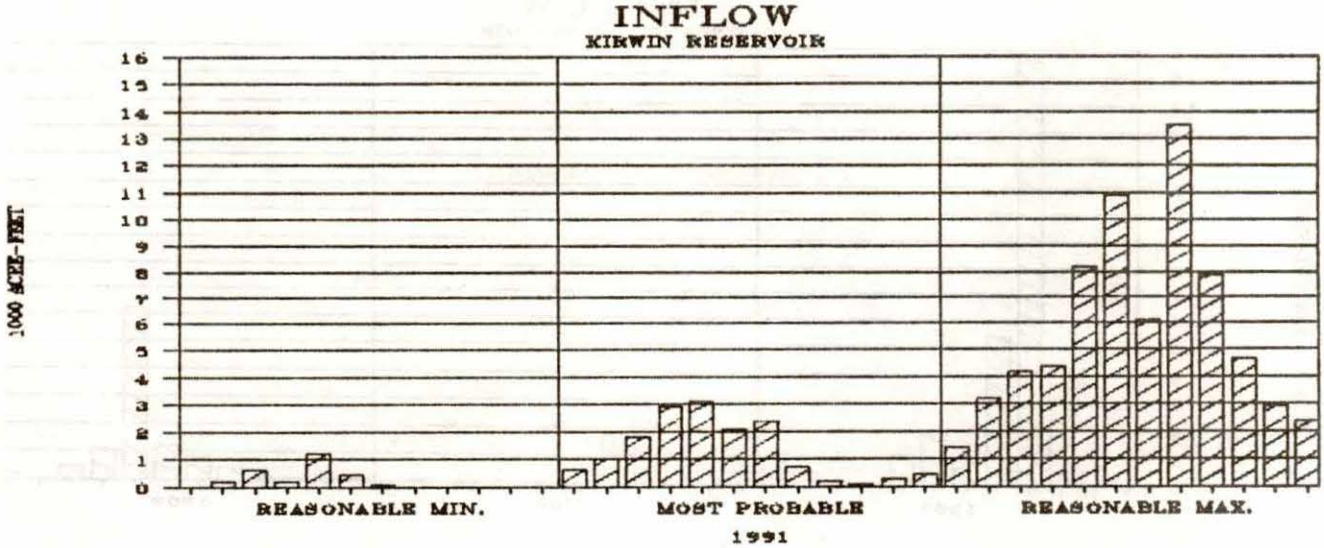
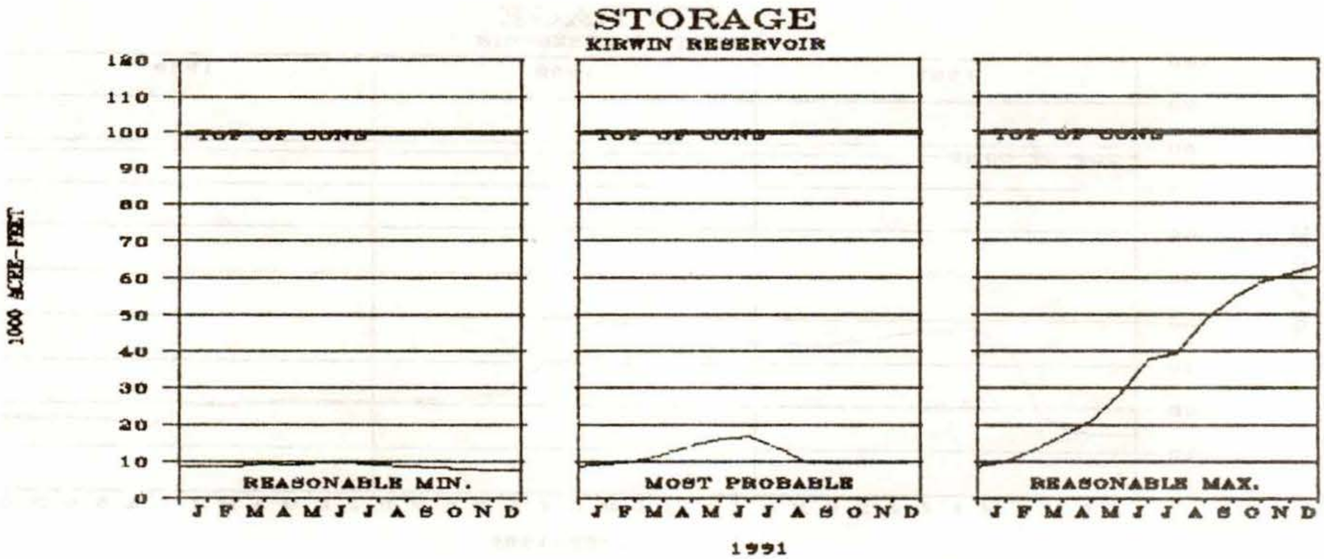


EXHIBIT 13C

KIRWIN RESERVOIR

1991 OPERATION PLAN





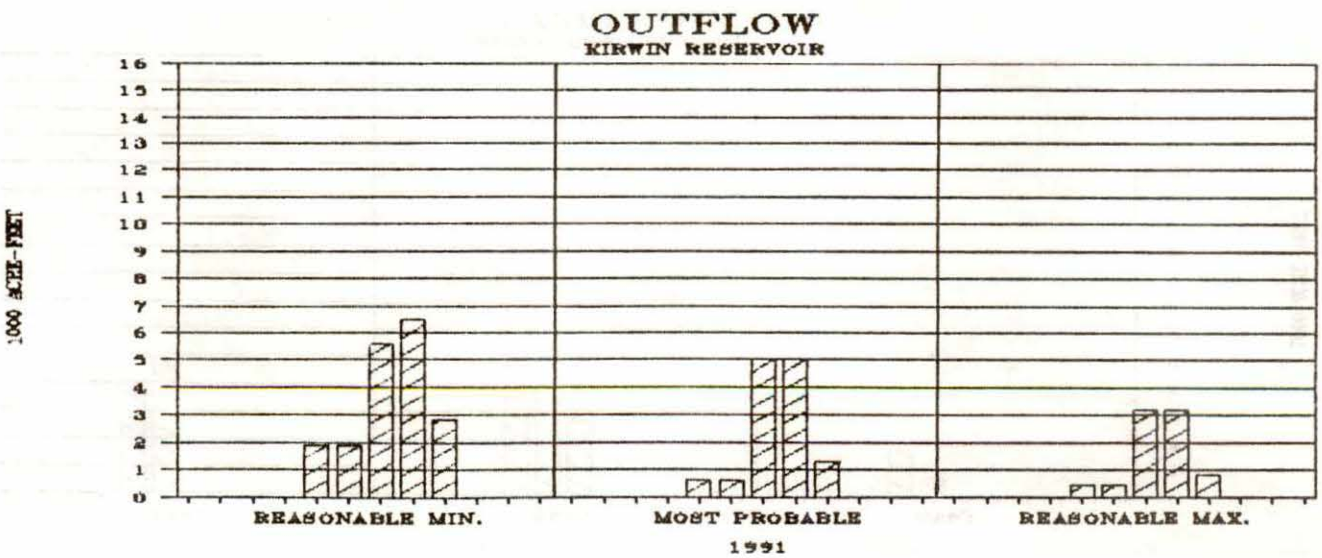
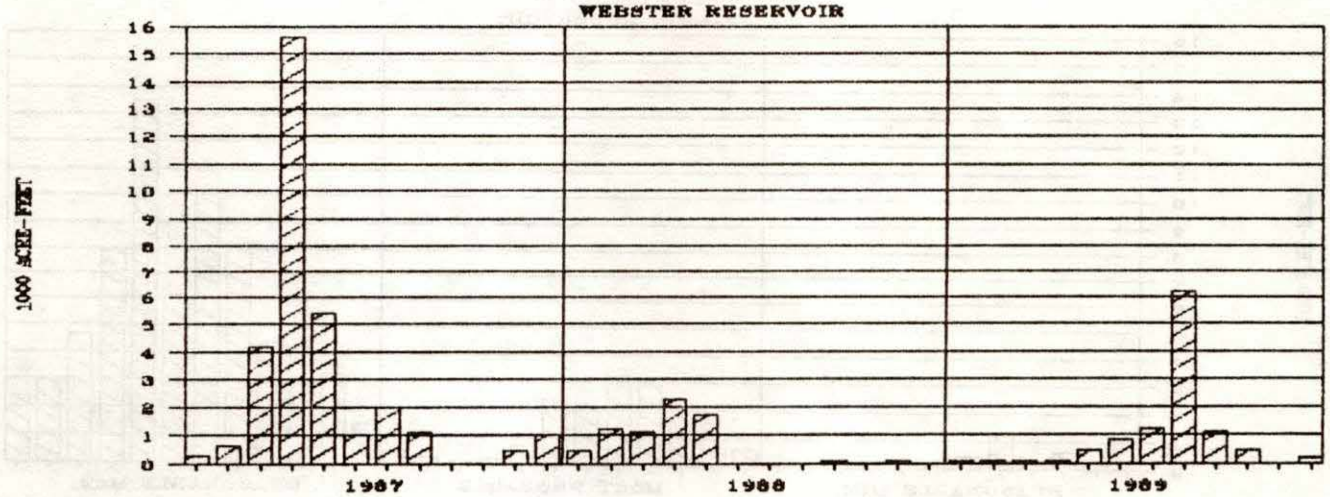


EXHIBIT 14A

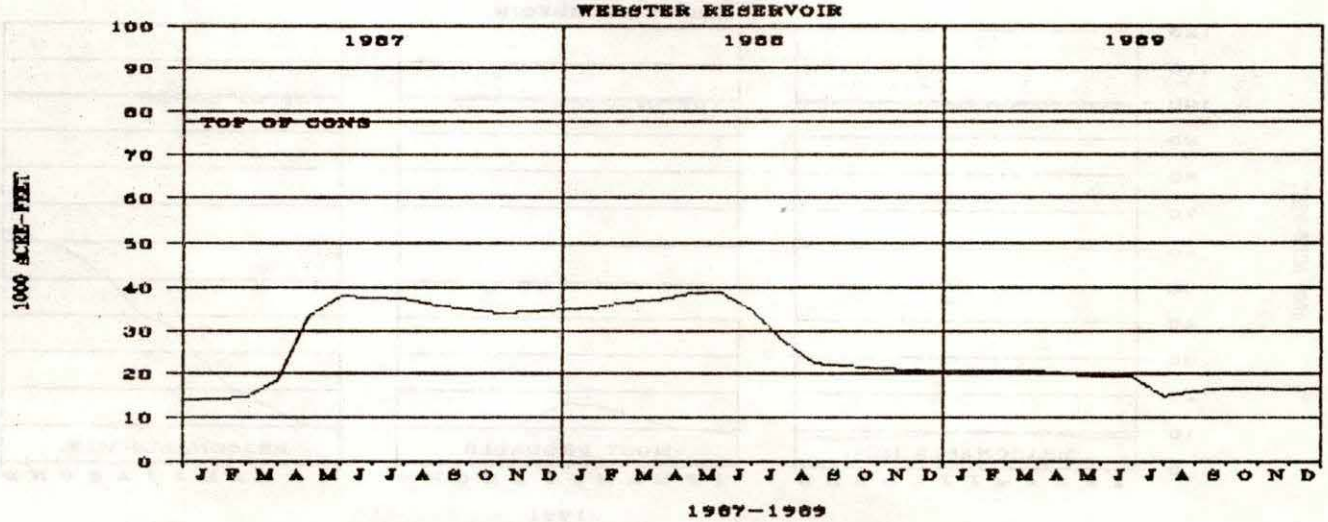
WEBSTER RESERVOIR

OPERATION

INFLOW
WEBSTER RESERVOIR



STORAGE
WEBSTER RESERVOIR



OUTFLOW
WEBSTER RESERVOIR

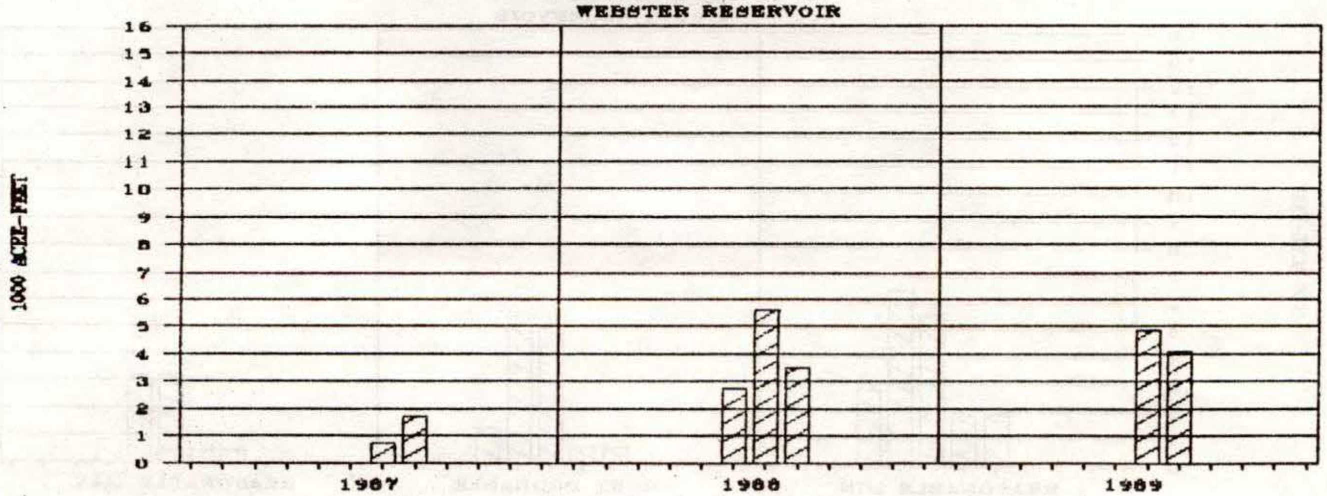
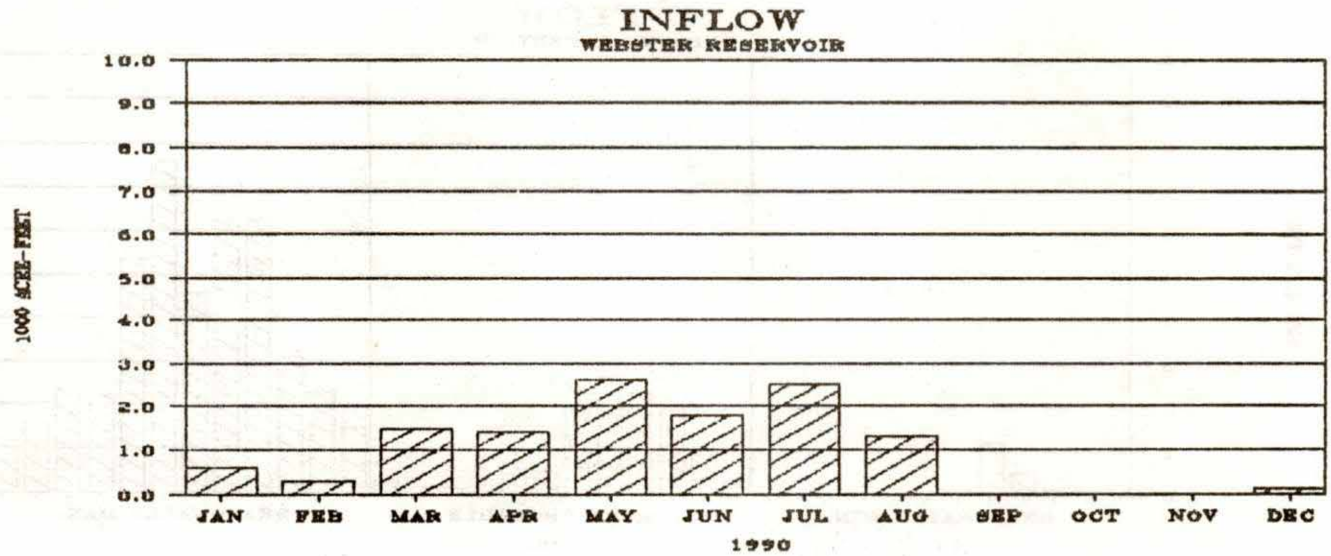
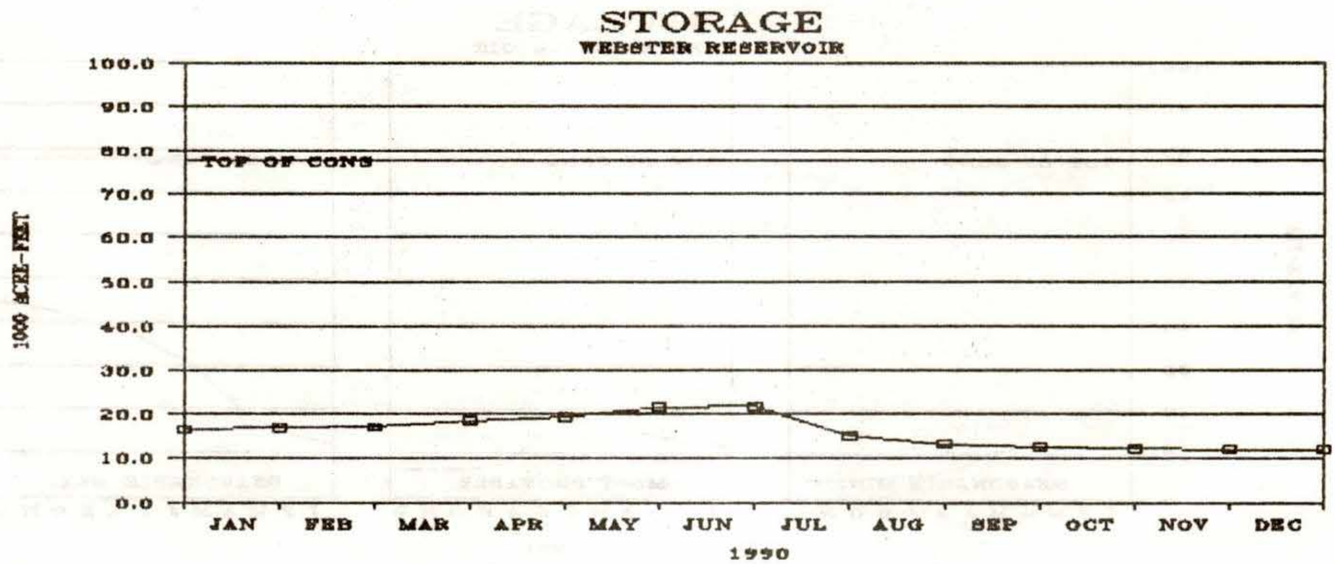


EXHIBIT 14B

WEBSTER RESERVOIR

1990 OPERATION





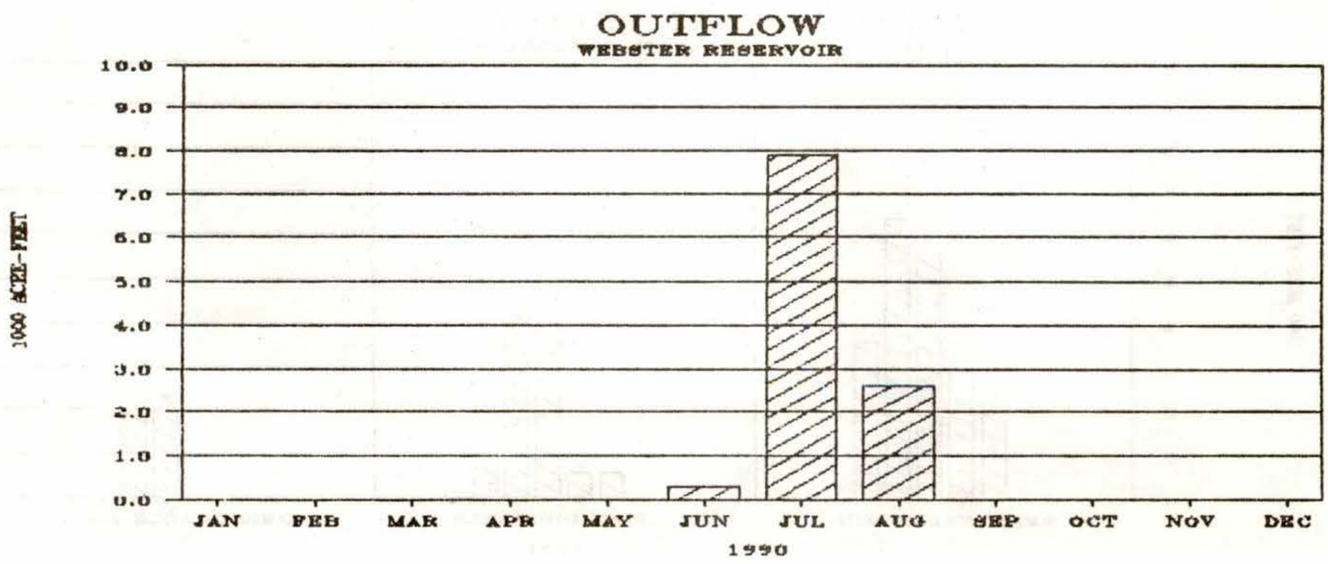
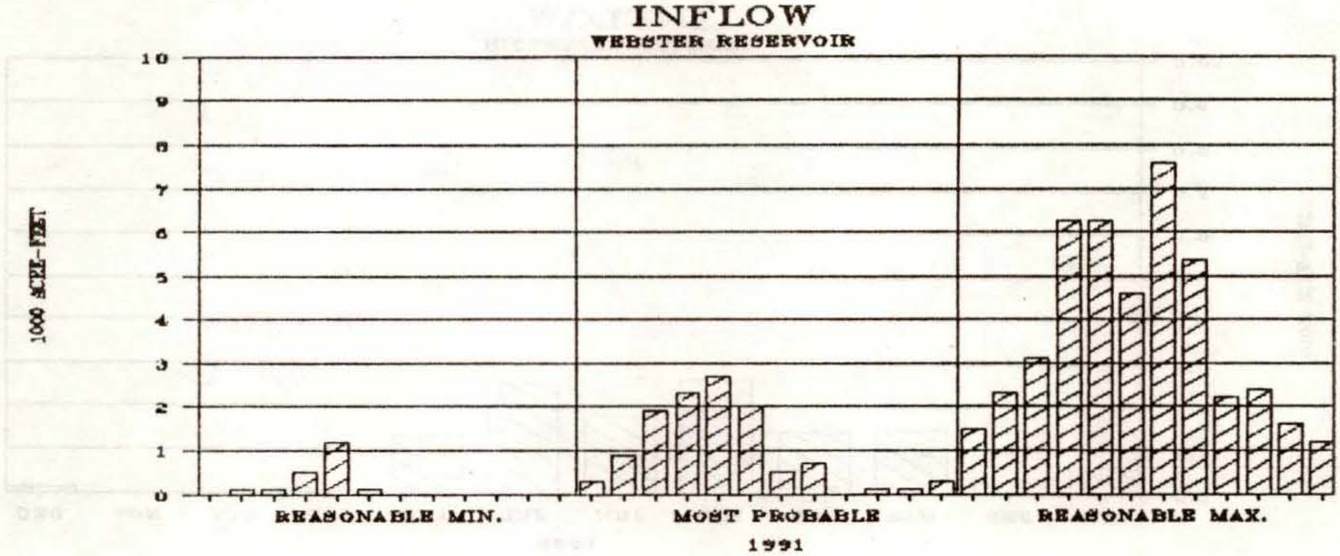
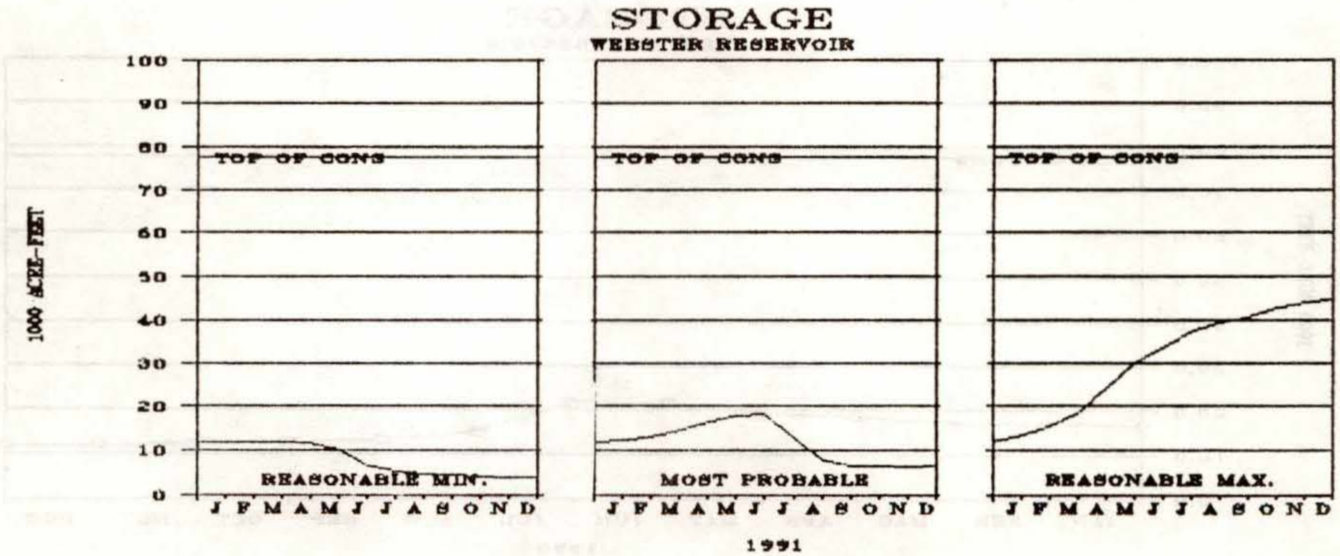


EXHIBIT 14C

WEBSTER RESERVOIR

1991 OPERATION PLAN





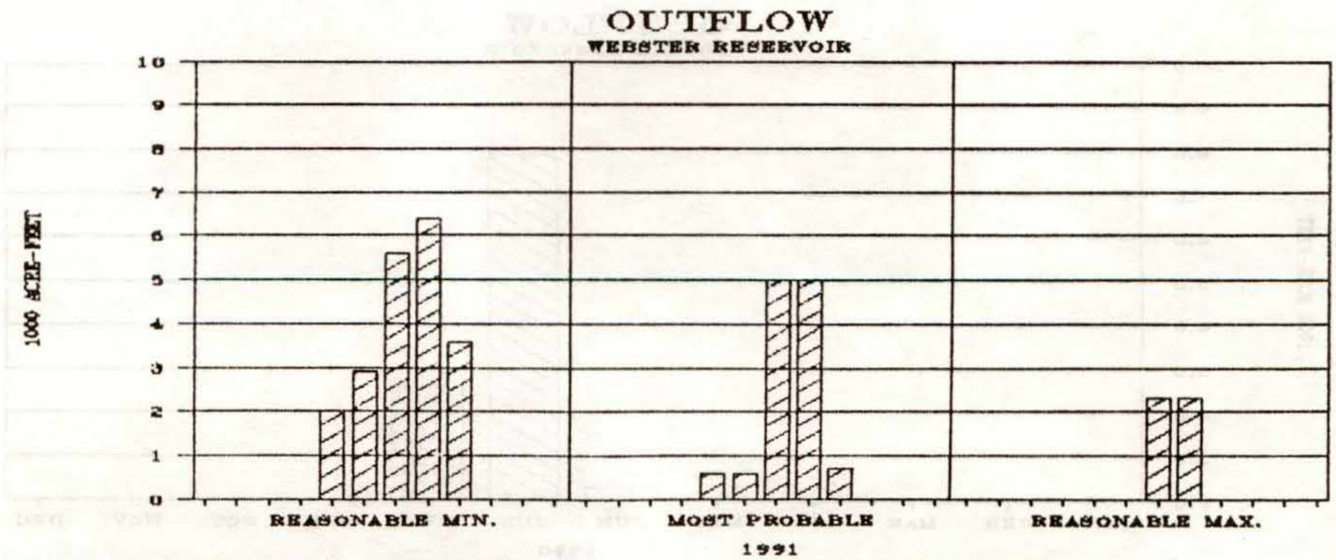
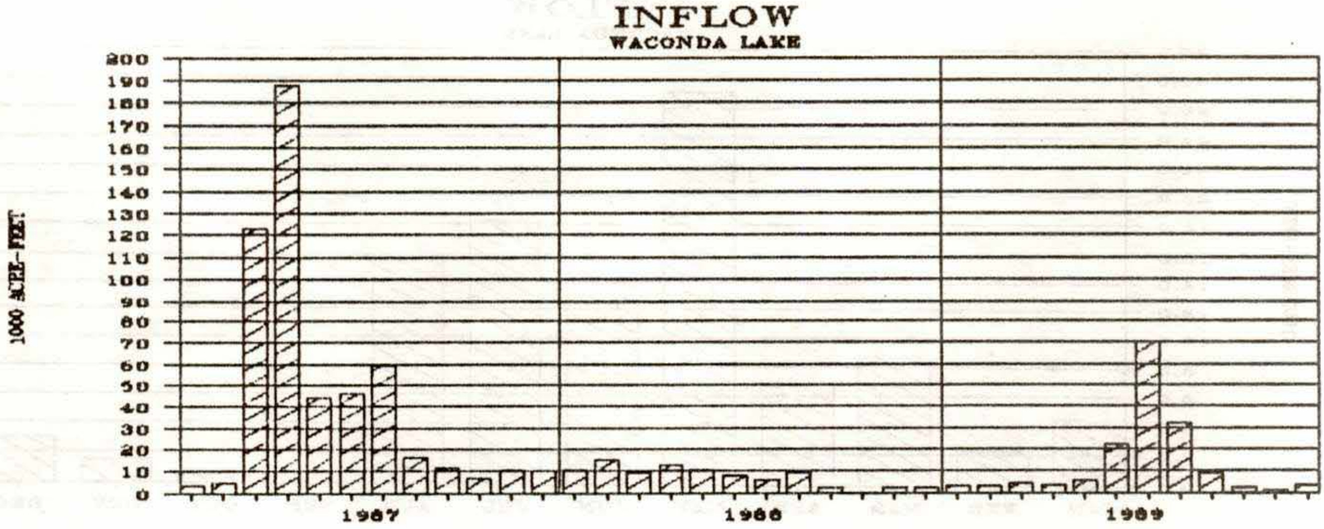
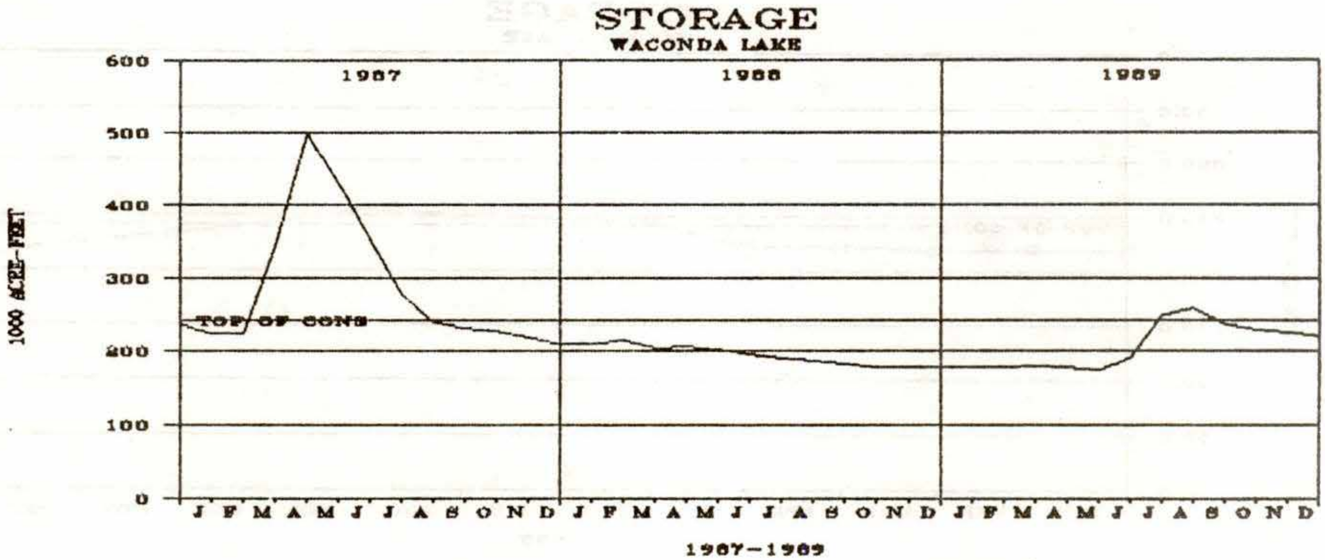


EXHIBIT 15A

WACONDA LAKE
OPERATION





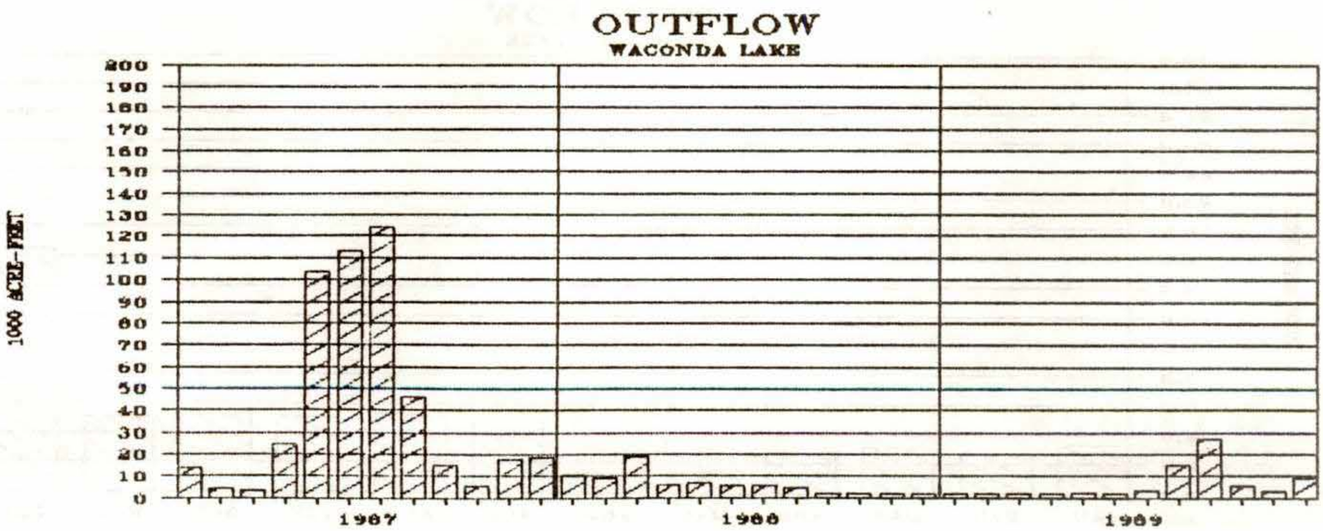
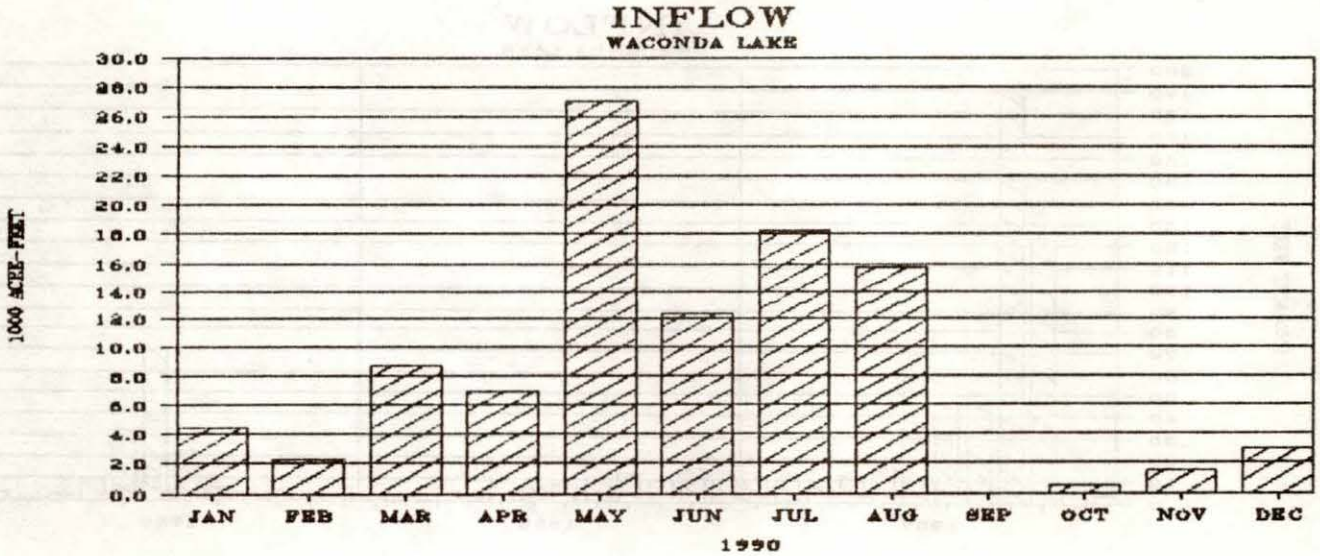
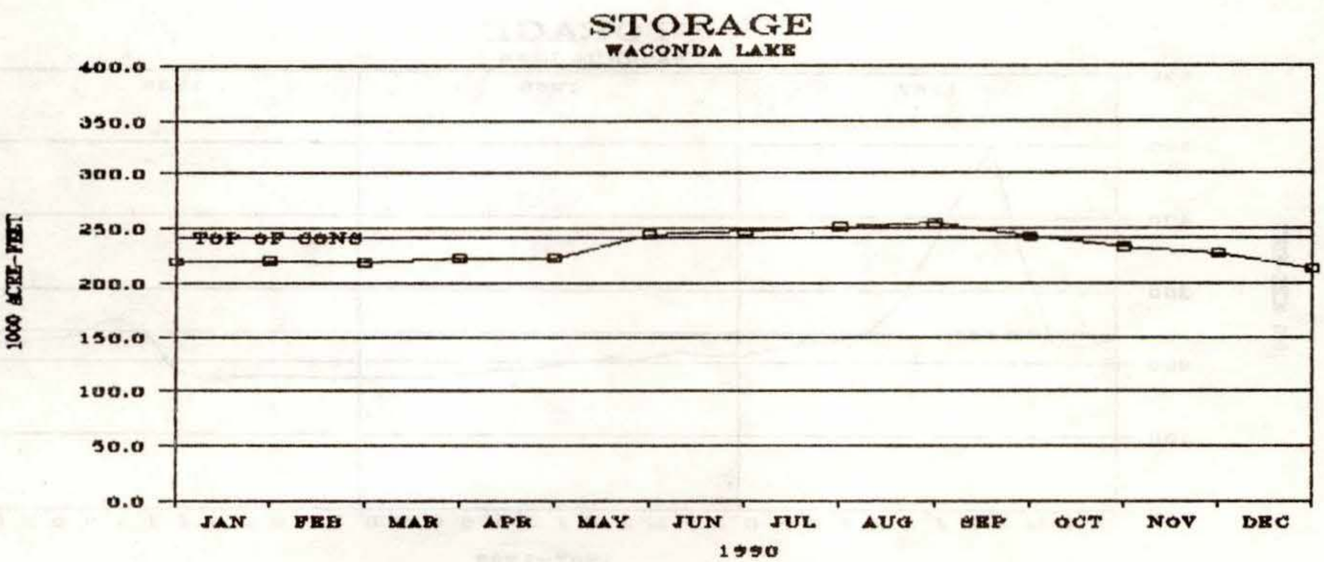


EXHIBIT 15B

WACONDA LAKE

1990 OPERATION





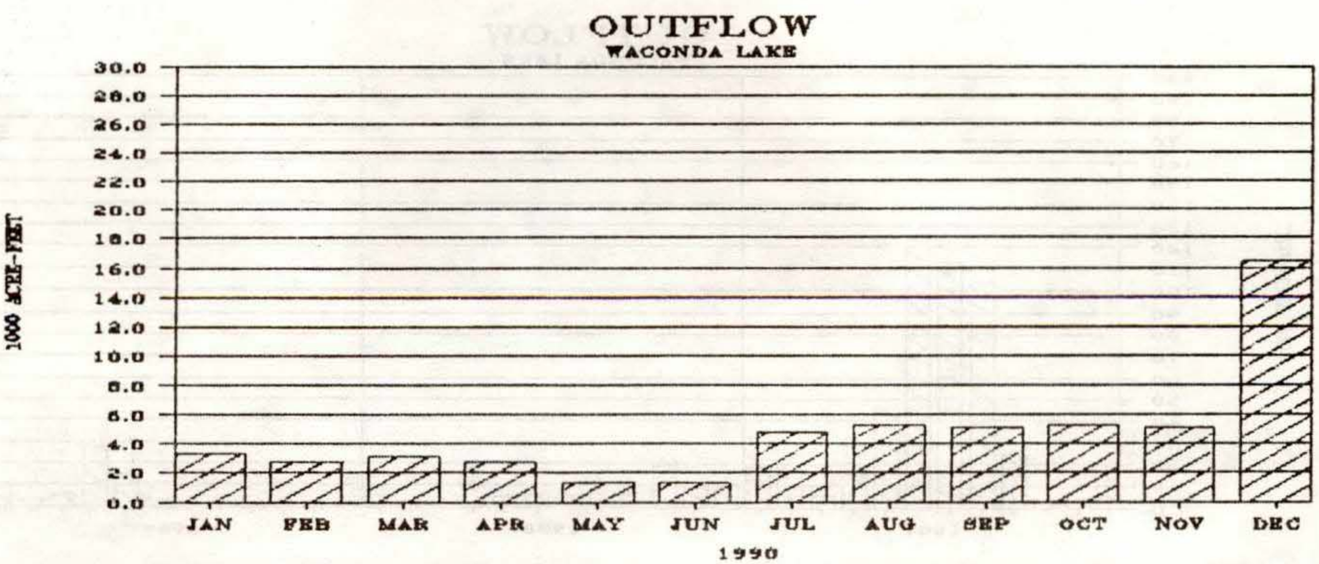
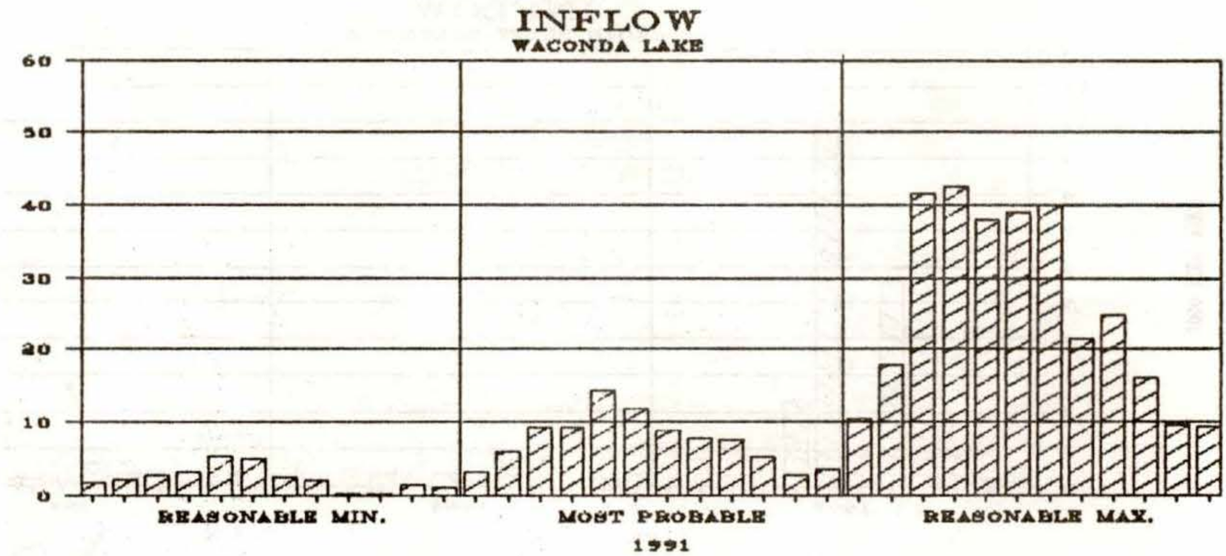
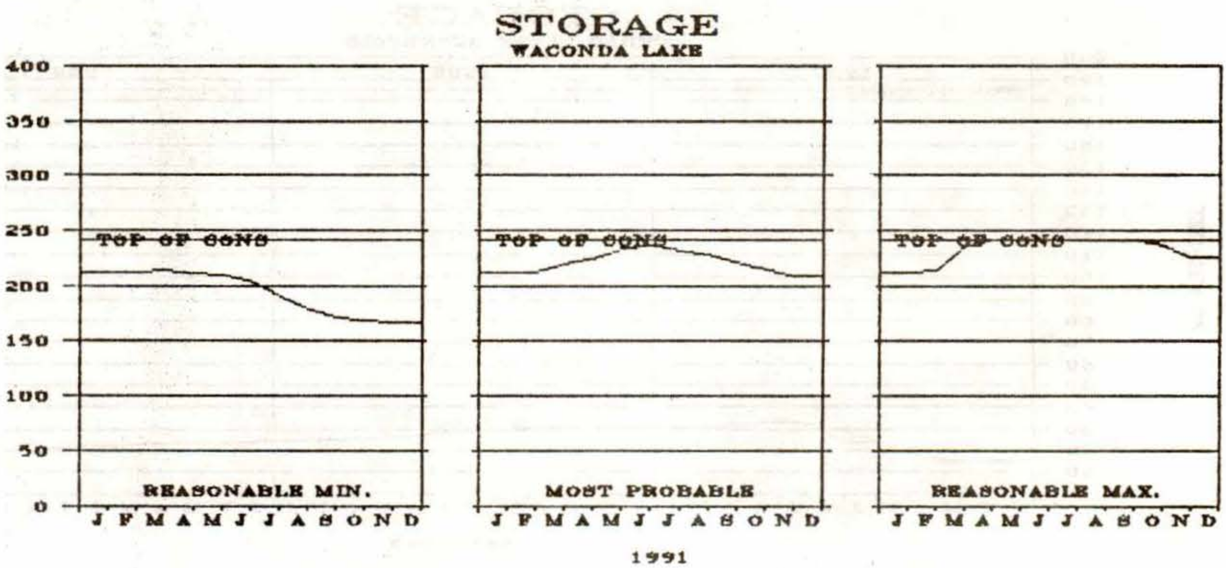


EXHIBIT 15C

WACONDA LAKE

1991 OPERATION PLAN





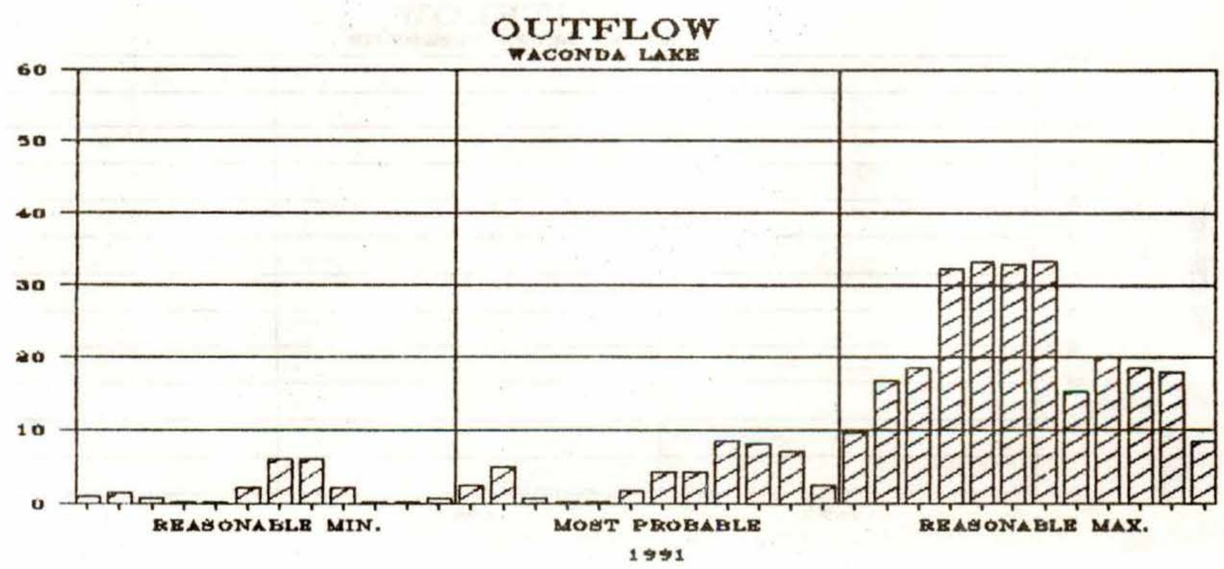
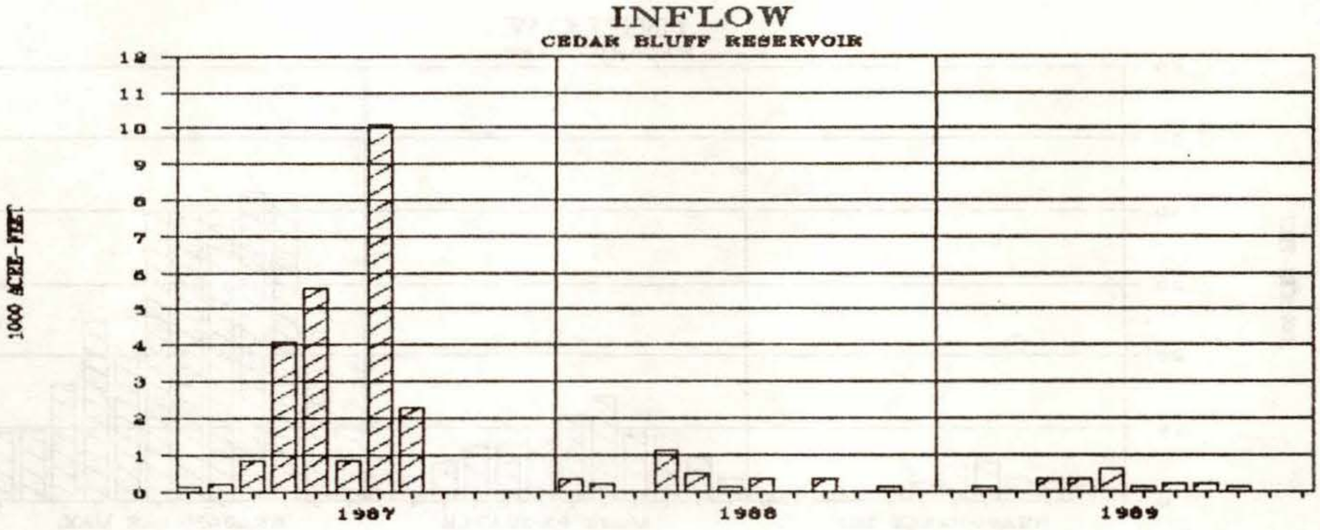
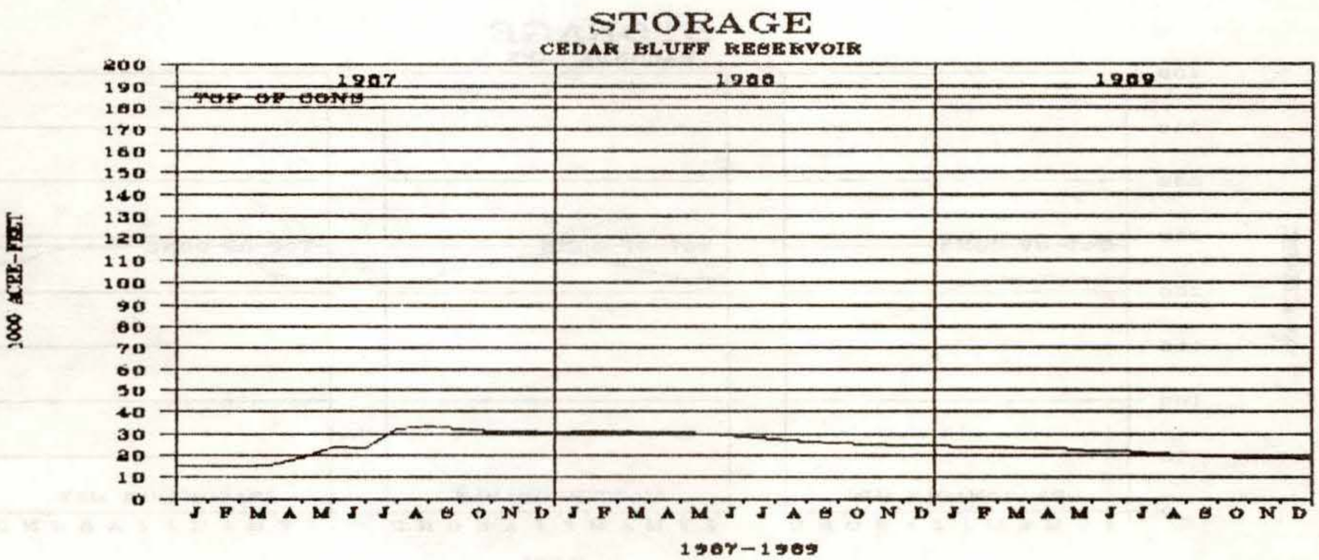


EXHIBIT 16A

CEDAR BLUFF RESERVOIR

OPERATION





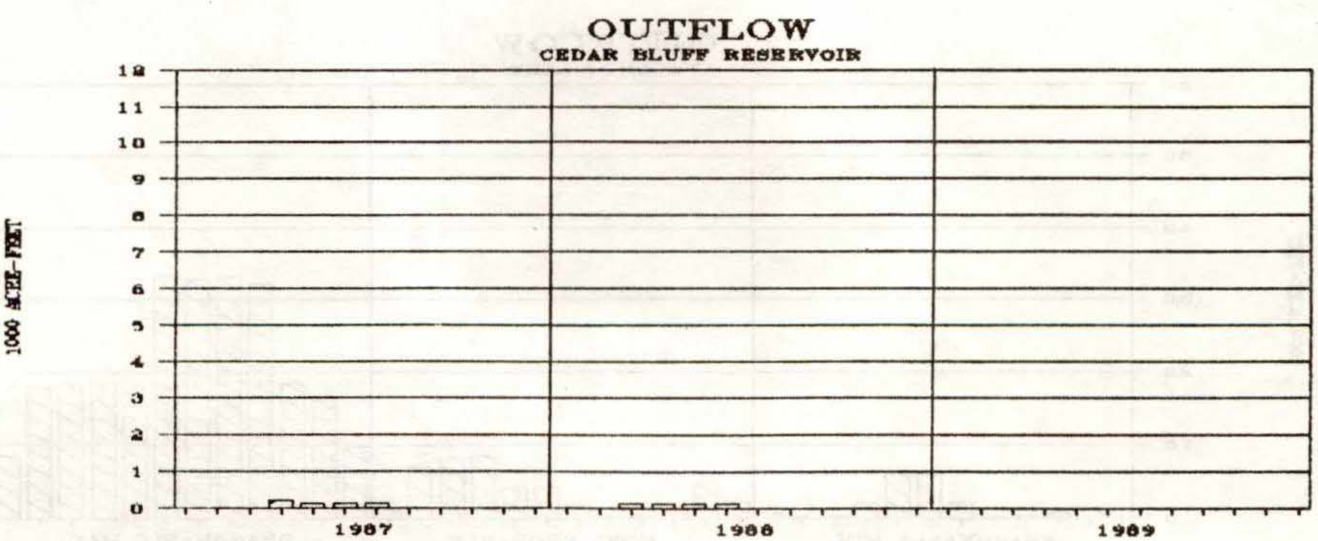
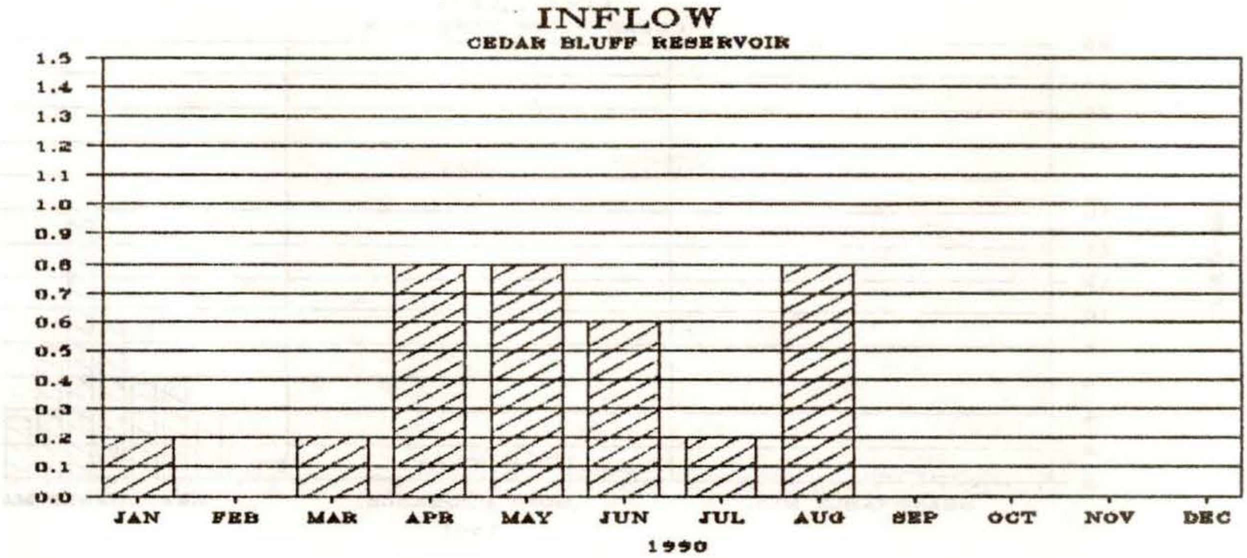
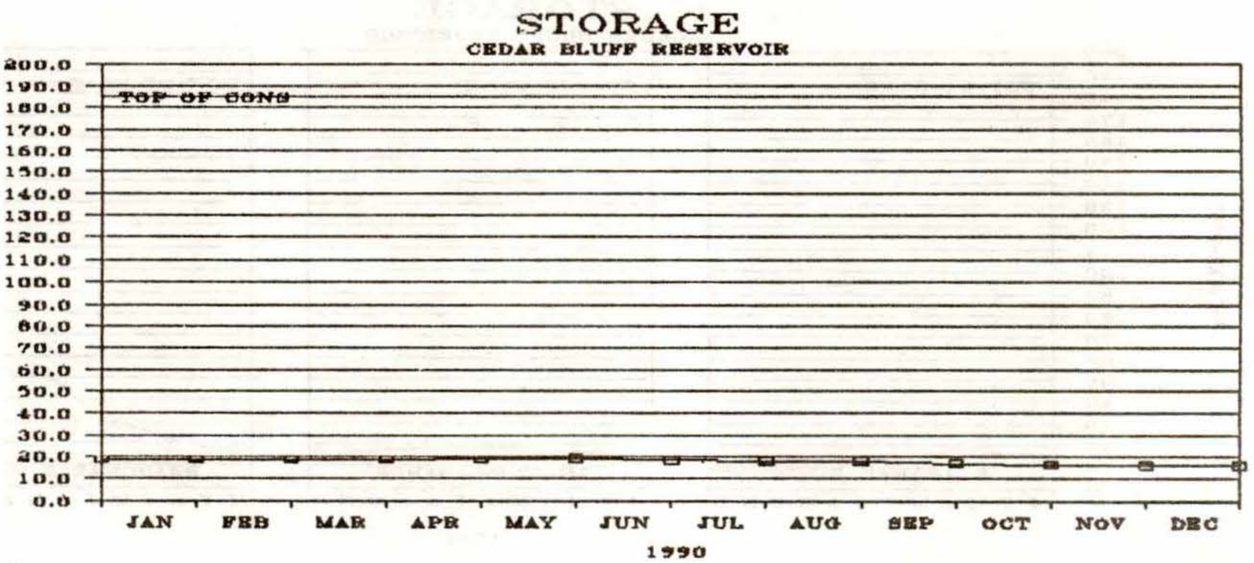


EXHIBIT 16B

CEDAR BLUFF RESERVOIR

1990 OPERATION





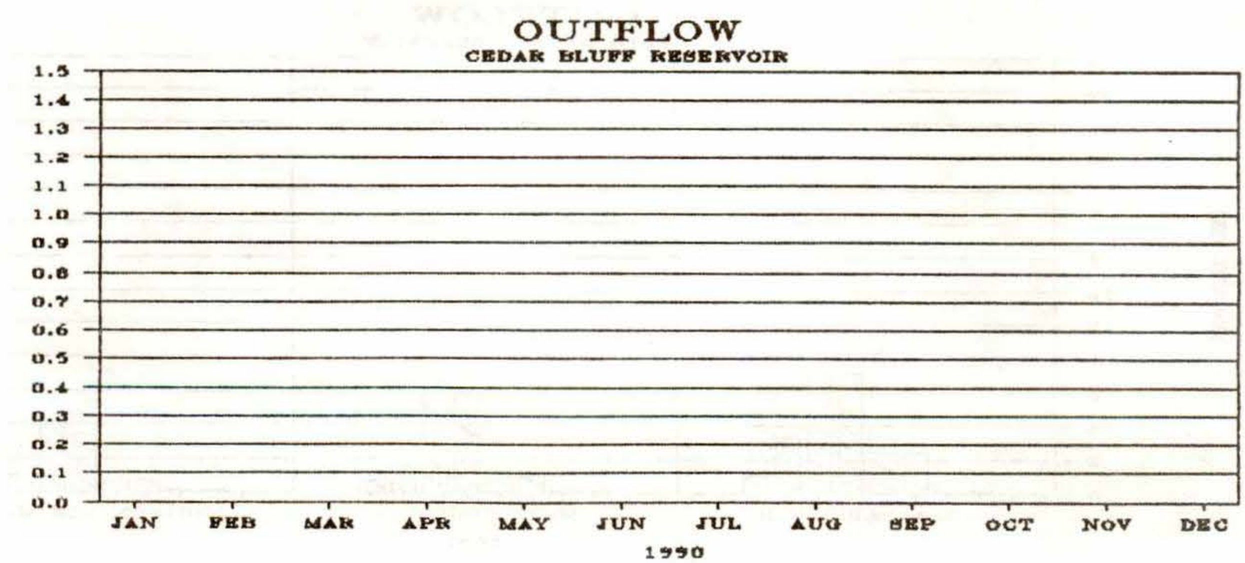
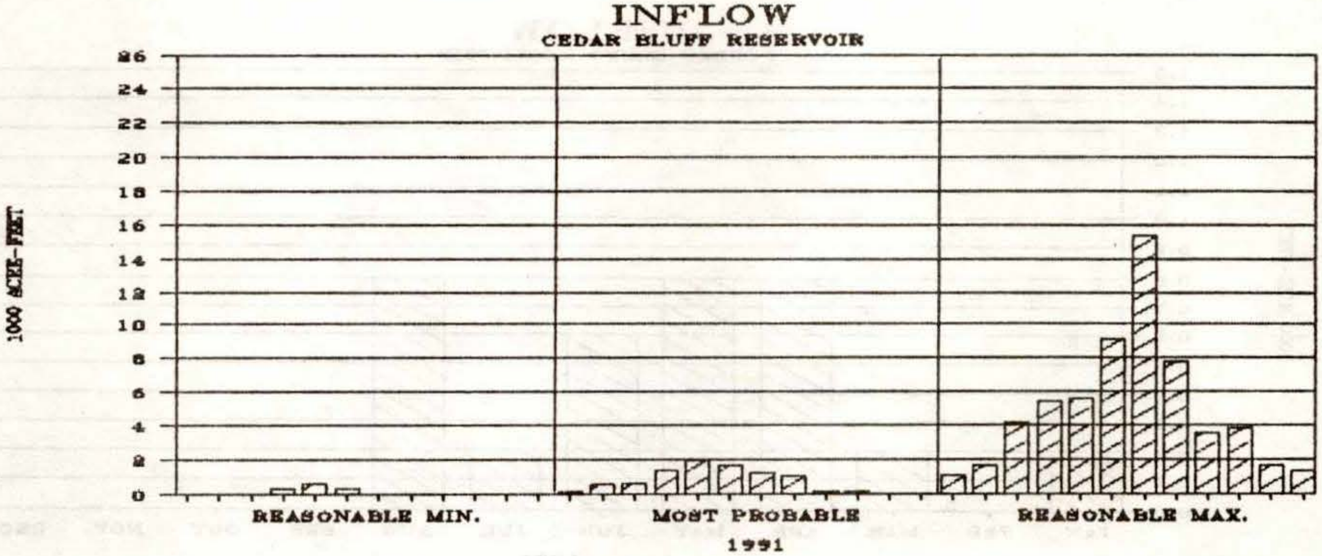
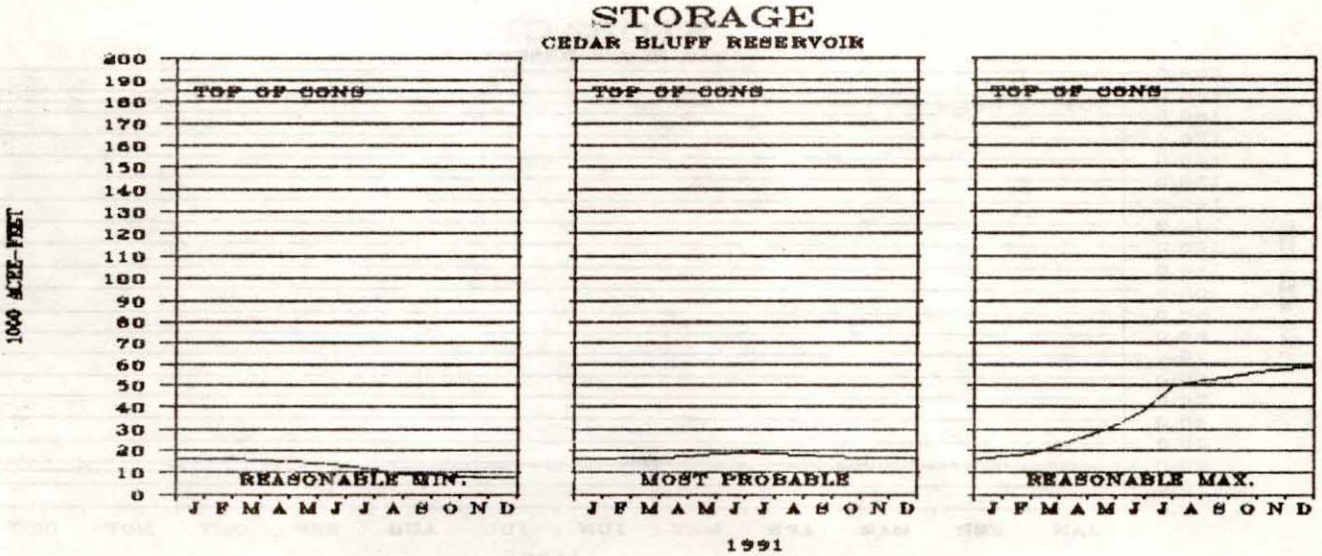


EXHIBIT 16C

CEDAR BLUFF RESERVOIR

1991 OPERATION PLAN





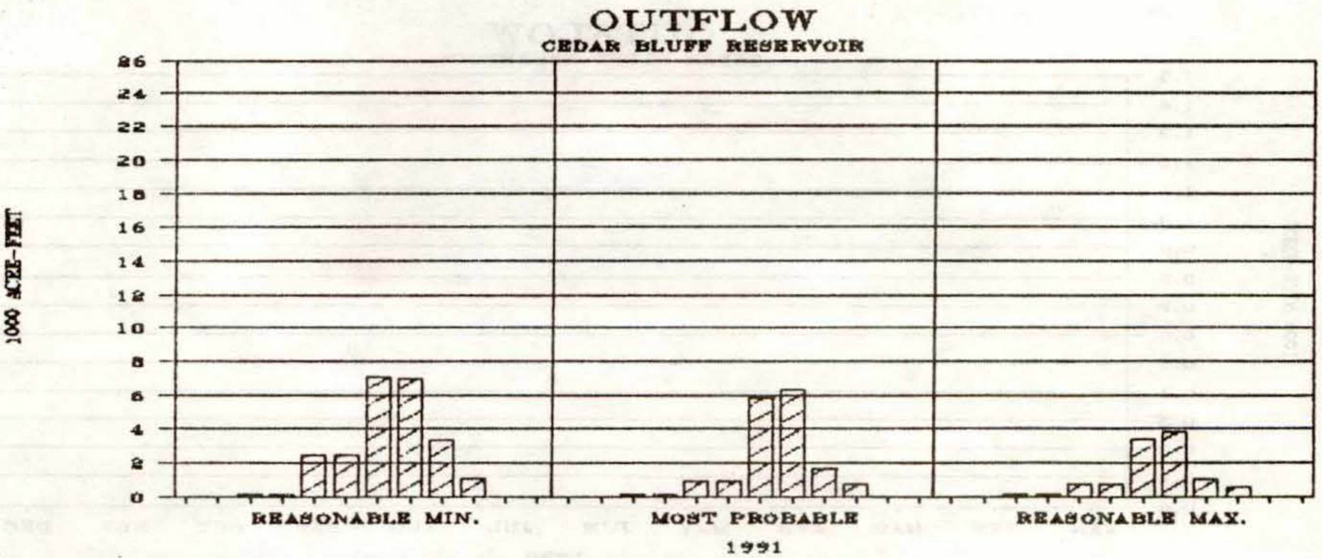
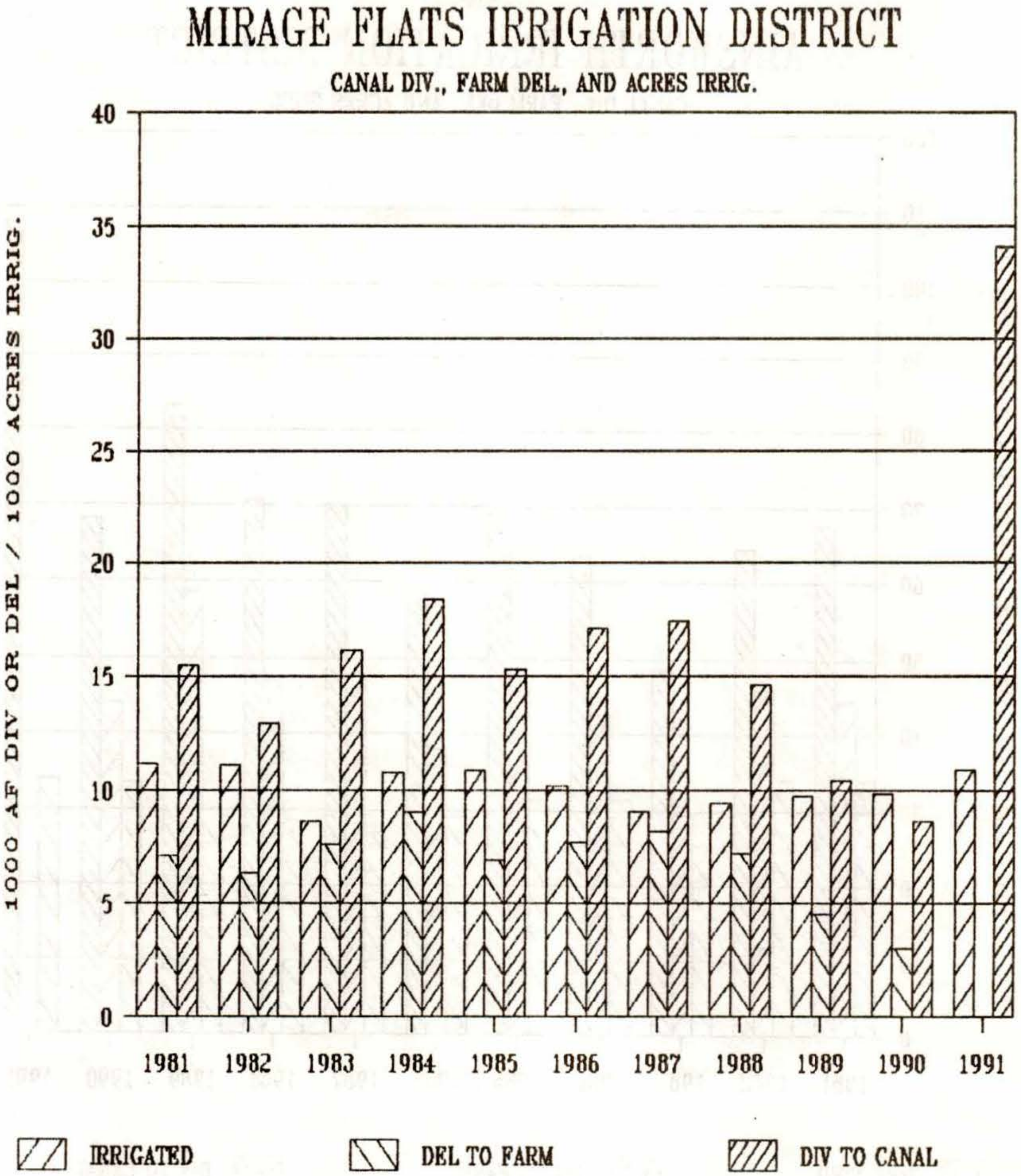


EXHIBIT 17

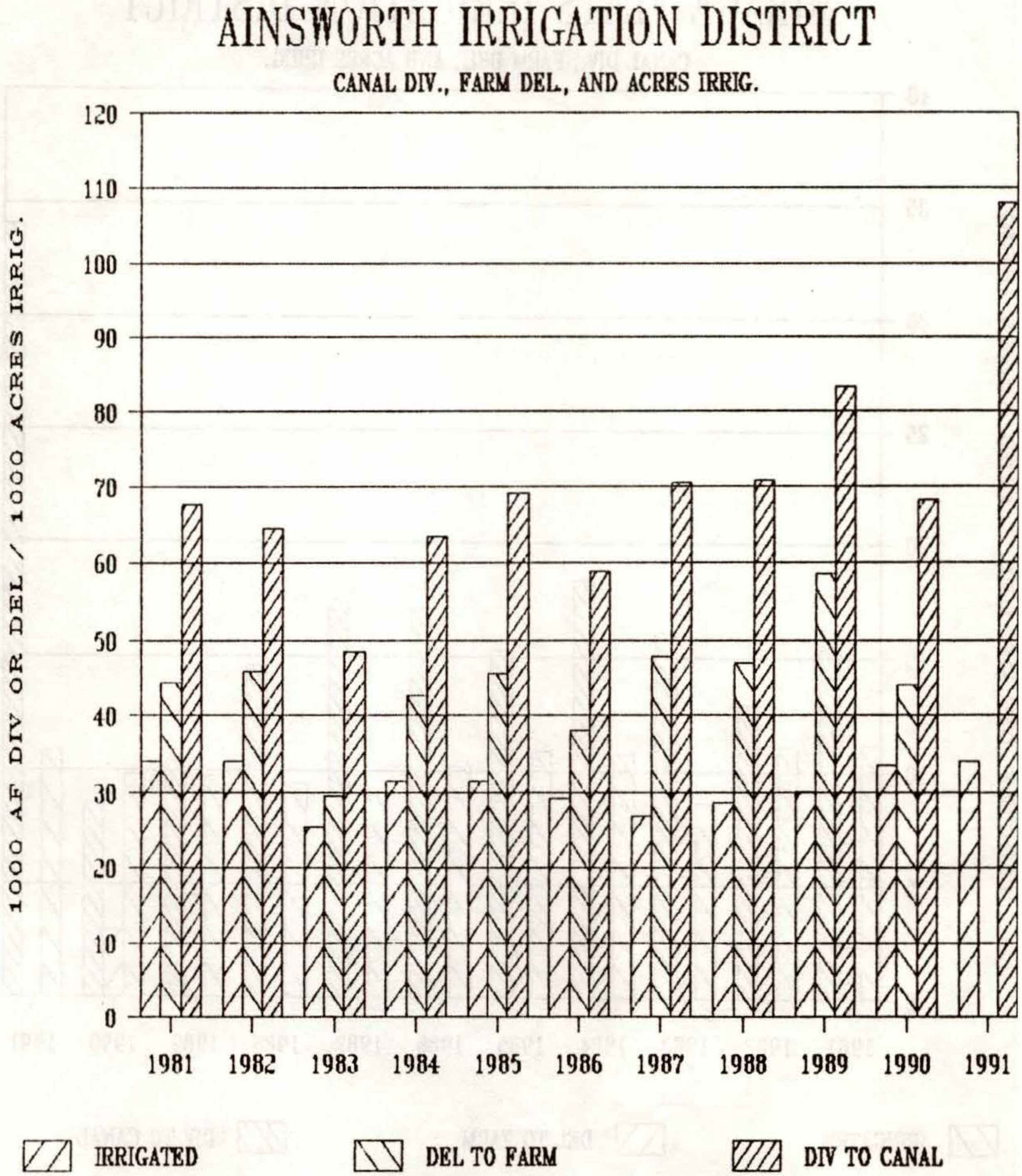


	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.39	1.16	1.87	1.71	1.41	1.68	1.92	1.54	1.07	0.88
DEL	0.64	0.57	0.88	0.84	0.64	0.76	0.90	0.76	0.46	0.30
EFF(%)	46	49	47	49	45	45	47	49	43	34

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	22.40
NORMAL YEAR	8.70

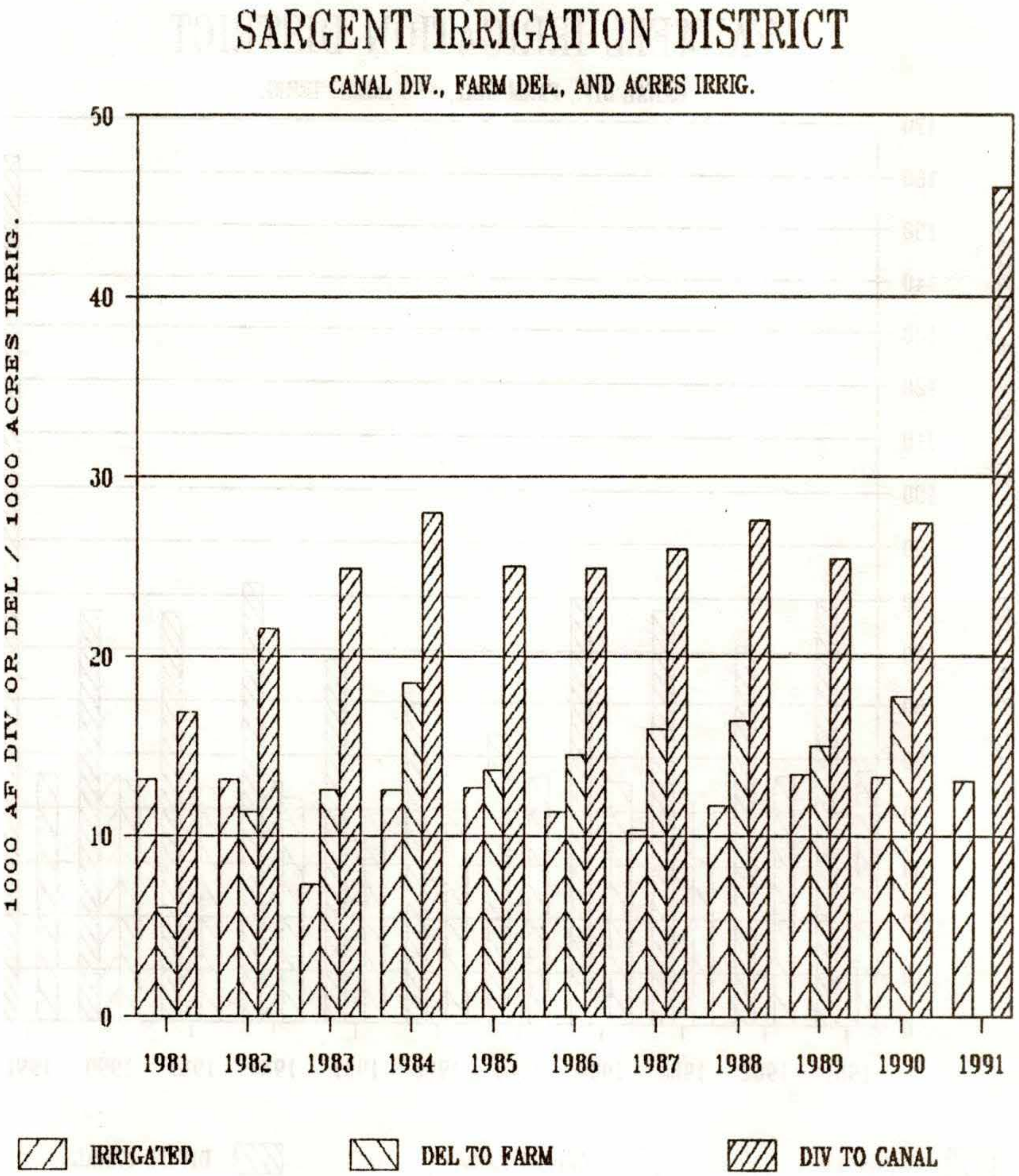
EXHIBIT 18



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.99	1.90	1.90	2.03	2.20	2.01	2.62	2.47	2.77	2.04
DEL	1.31	1.35	1.16	1.36	1.45	1.30	1.77	1.63	1.94	1.31
EFF(%)	66	71	61	67	66	65	68	66	70	65

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	0.00
NORMAL YEAR	0.00

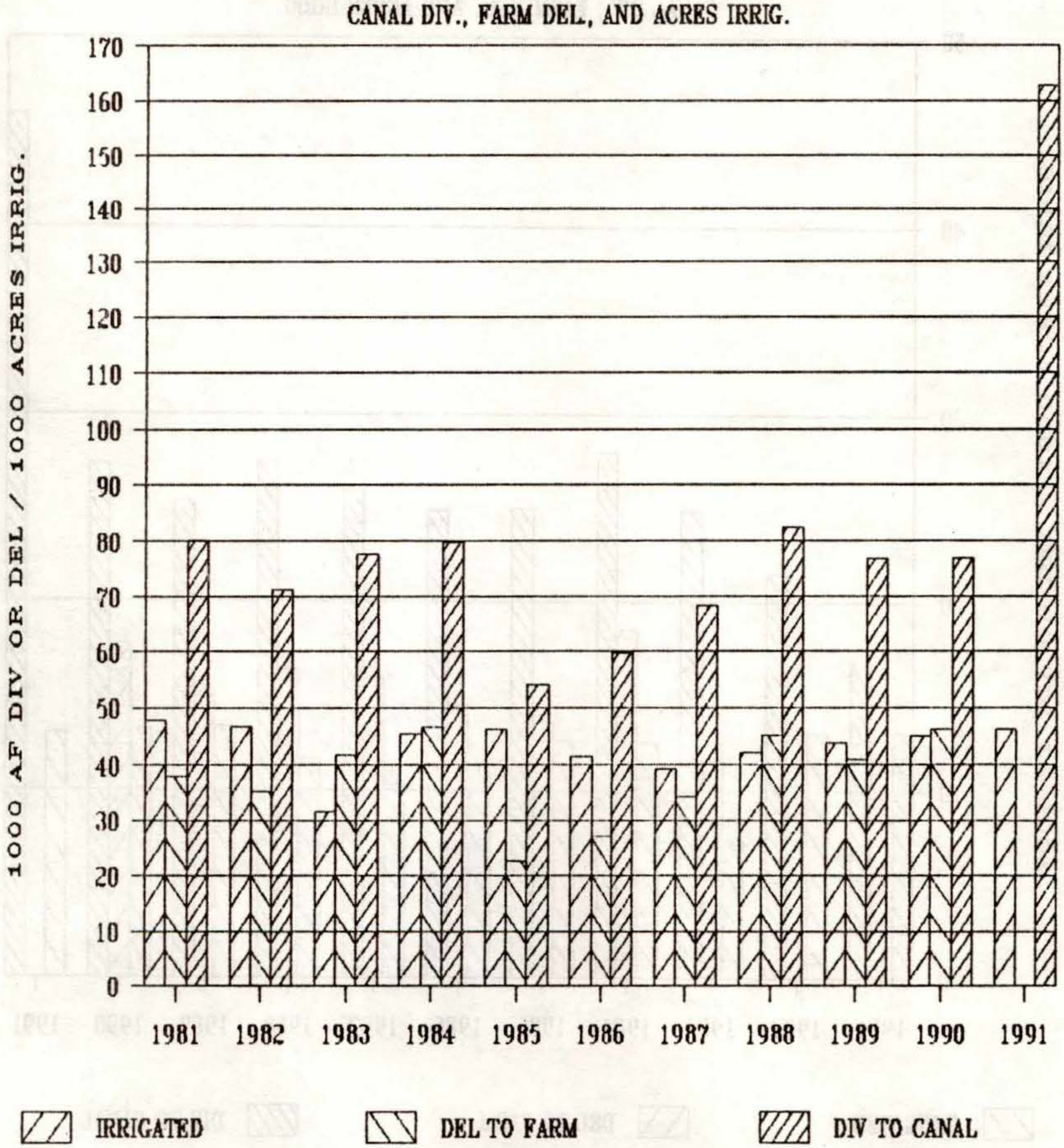


	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.29	1.64	3.37	2.22	1.98	2.18	2.52	2.35	1.90	2.07
DEL	0.47	0.87	1.70	1.47	1.08	1.27	1.54	1.40	1.12	1.34
EFF(%)	36	53	51	66	54	58	61	59	59	65

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)	
DRY YEAR	16.00
NORMAL YEAR	0.10

EXHIBIT 20

FARWELL IRRIGATION DISTRICT



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.68	1.52	2.45	1.76	1.18	1.44	1.75	1.96	1.75	1.71
DEL	0.80	0.76	1.32	1.03	0.49	0.65	0.88	1.07	0.93	1.02
EFF(%)	47	50	54	58	42	45	50	55	53	60

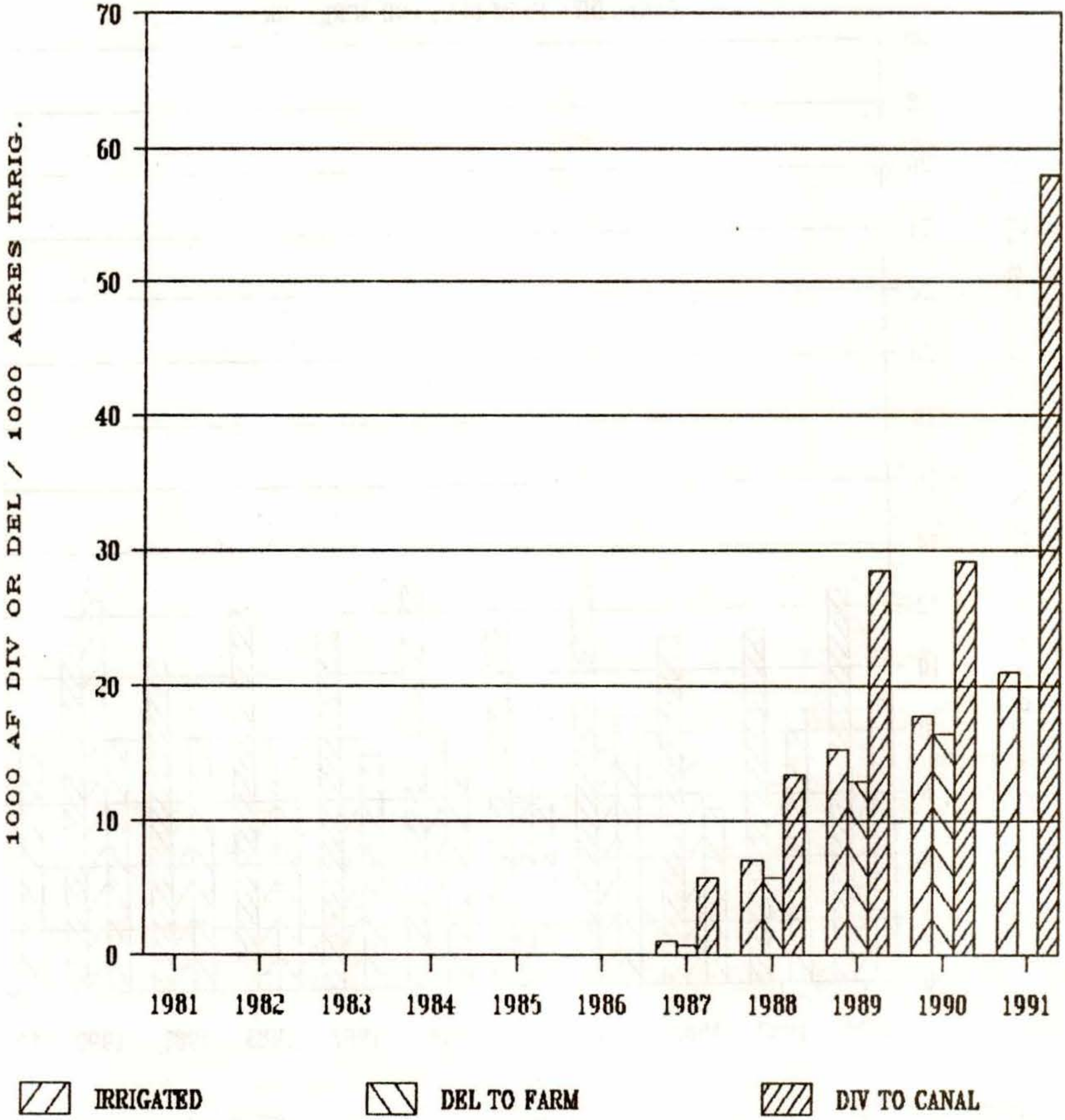
FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	56.60
NORMAL YEAR	0.20

EXHIBIT 21

TWIN LOUPS IRRIGATION DISTRICT

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



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	0.00	0.00	0.00	0.00	0.00	0.00	5.63	1.90	1.85	1.64
DEL	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.82	0.84	0.93
EFF(%)	0	0	0	0	0	0	13	43	45	57

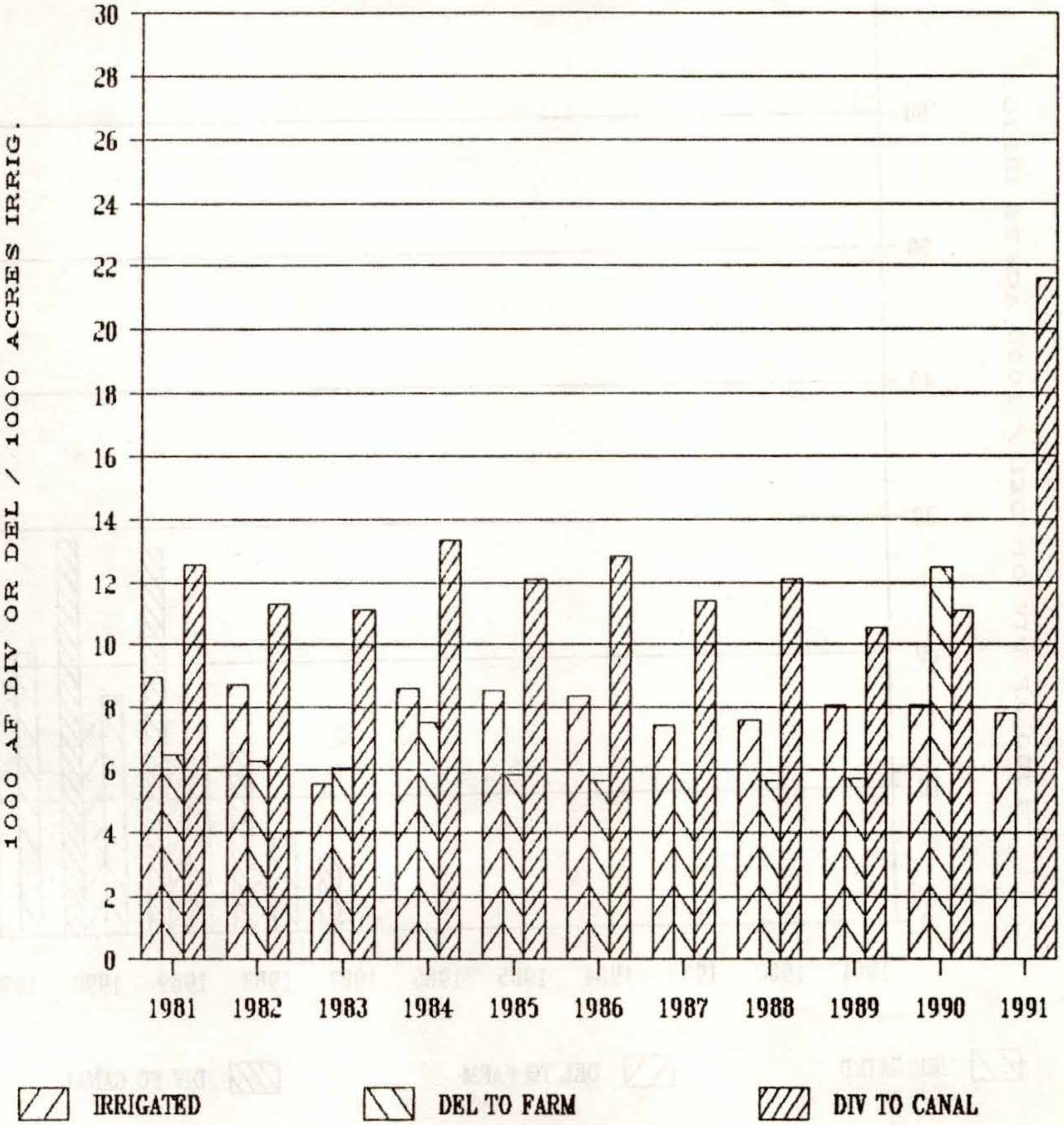
FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	0.00
NORMAL YEAR	0.00

EXHIBIT 22

FRENCHMAN VALLEY IRRIGATION DISTRICT

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

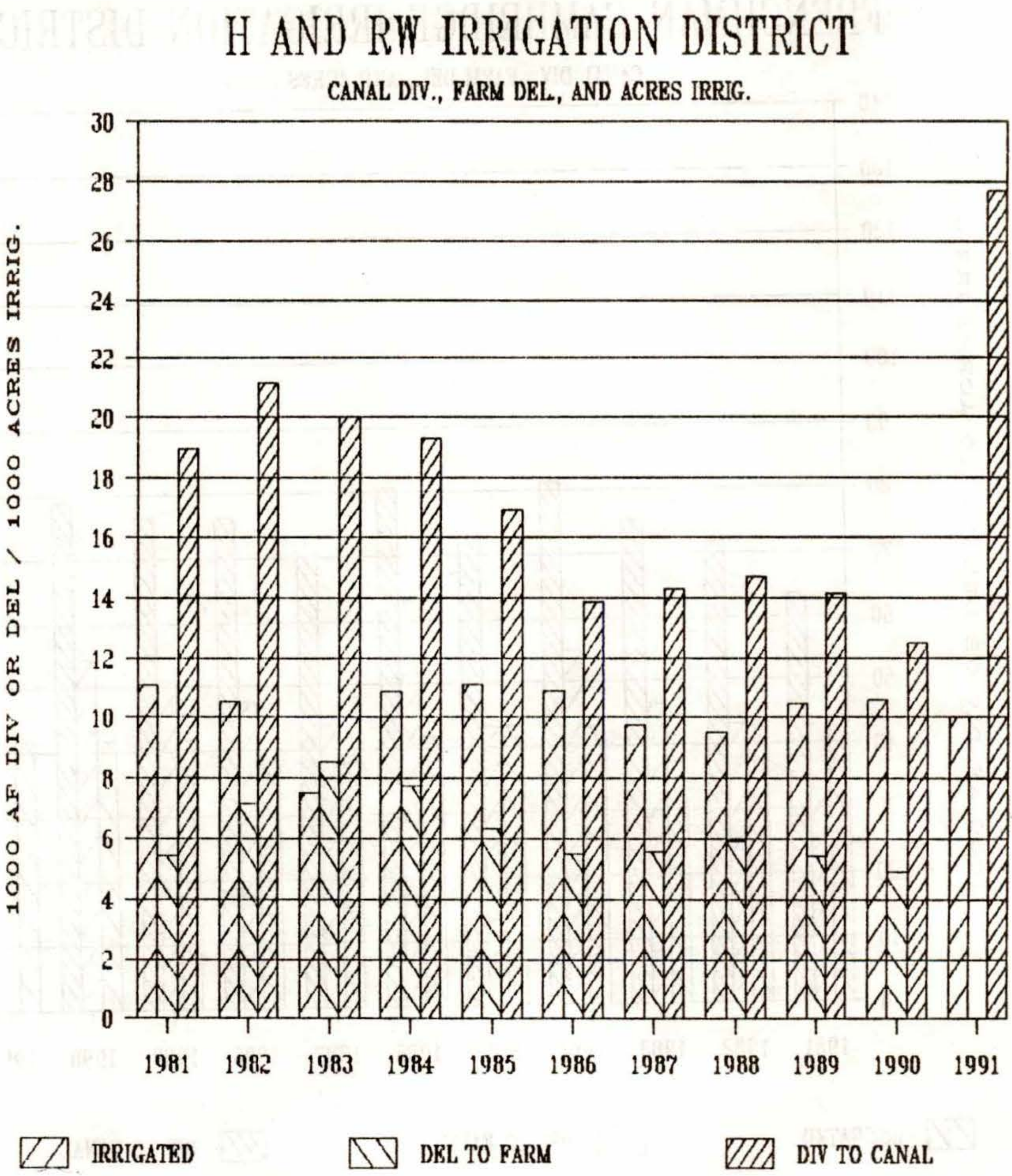


	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.40	1.30	2.00	1.55	1.42	1.54	1.53	1.60	1.30	1.38
DEL	0.72	0.73	1.09	0.87	0.68	0.68	0.81	0.75	0.71	1.55
EFF(%)	51	56	55	56	48	44	53	47	55	113

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	13.30
NORMAL YEAR	1.60

EXHIBIT 23

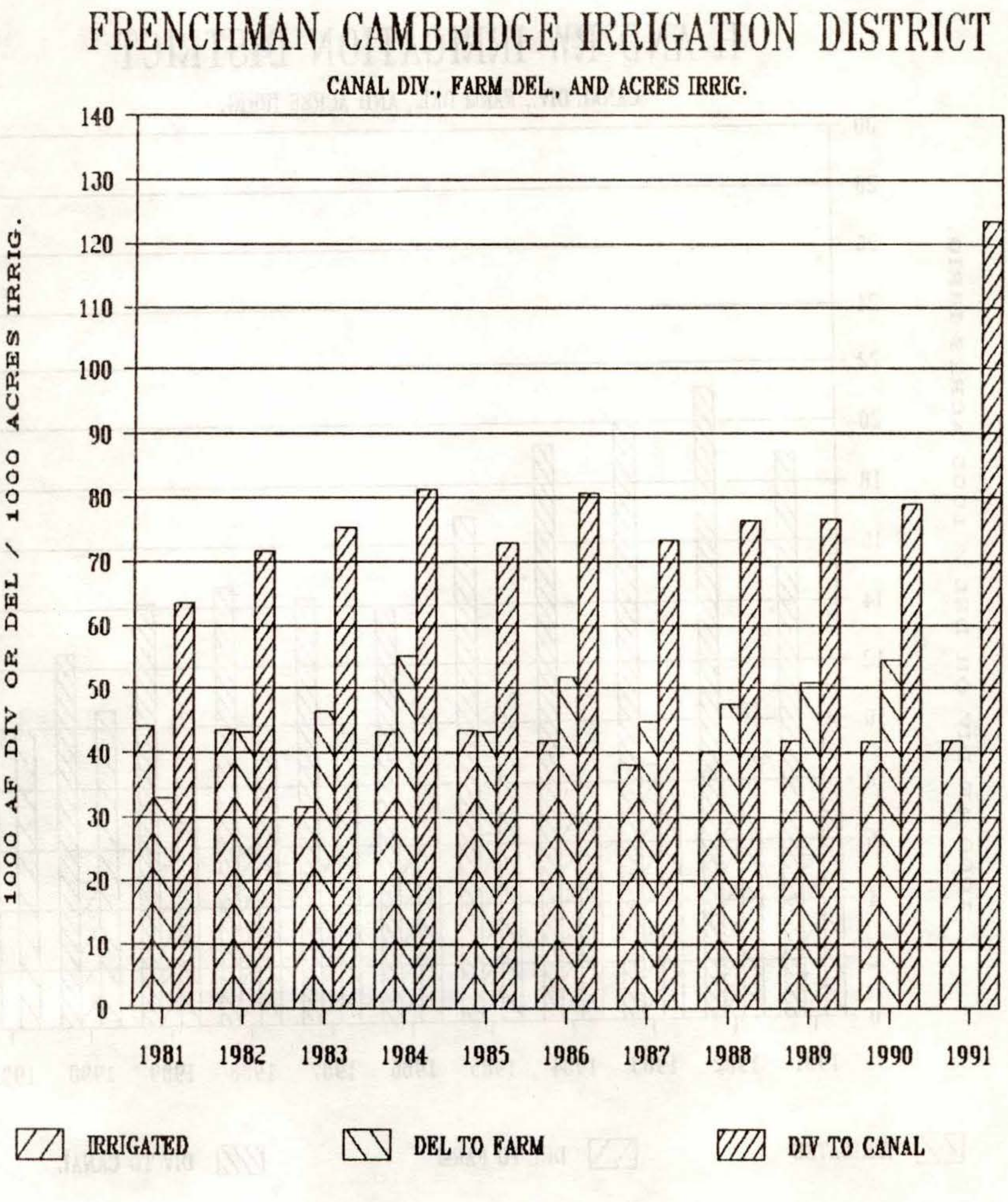


	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.71	2.00	2.66	1.78	1.52	1.27	1.47	1.55	1.35	1.18
DEL	0.49	0.68	1.14	0.71	0.57	0.50	0.57	0.63	0.52	0.46
EFF(%)	29	34	43	40	37	40	39	41	38	39

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	17.00
NORMAL YEAR	2.10

EXHIBIT 24



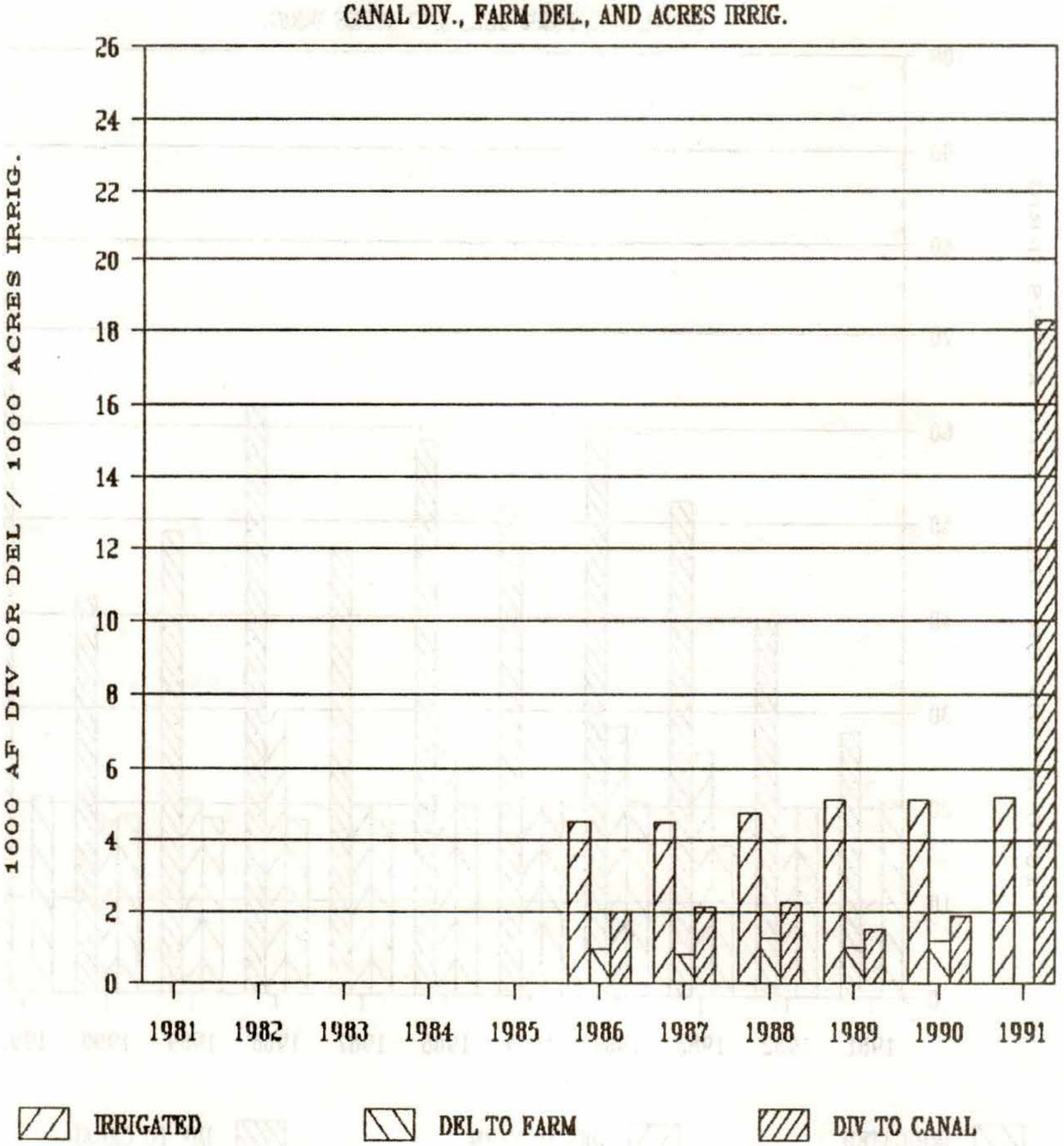
AF/ACRE	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
DIV	1.44	1.64	2.39	1.89	1.68	1.93	1.92	1.90	1.83	1.90
DEL	0.75	0.99	1.47	1.28	1.00	1.24	1.17	1.19	1.22	1.31
EFF(%)	52	60	61	68	59	64	61	62	66	69

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	27.60
NORMAL YEAR	0.00

EXHIBIT 25

ALMENA IRRIGATION DISTRICT



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	0.00	0.00	0.00	0.00	0.00	0.45	0.48	0.47	0.30	0.36
DEL	0.00	0.00	0.00	0.00	0.00	0.21	0.18	0.27	0.20	0.23
EFF(%)	0	0	0	0	0	48	39	57	66	64

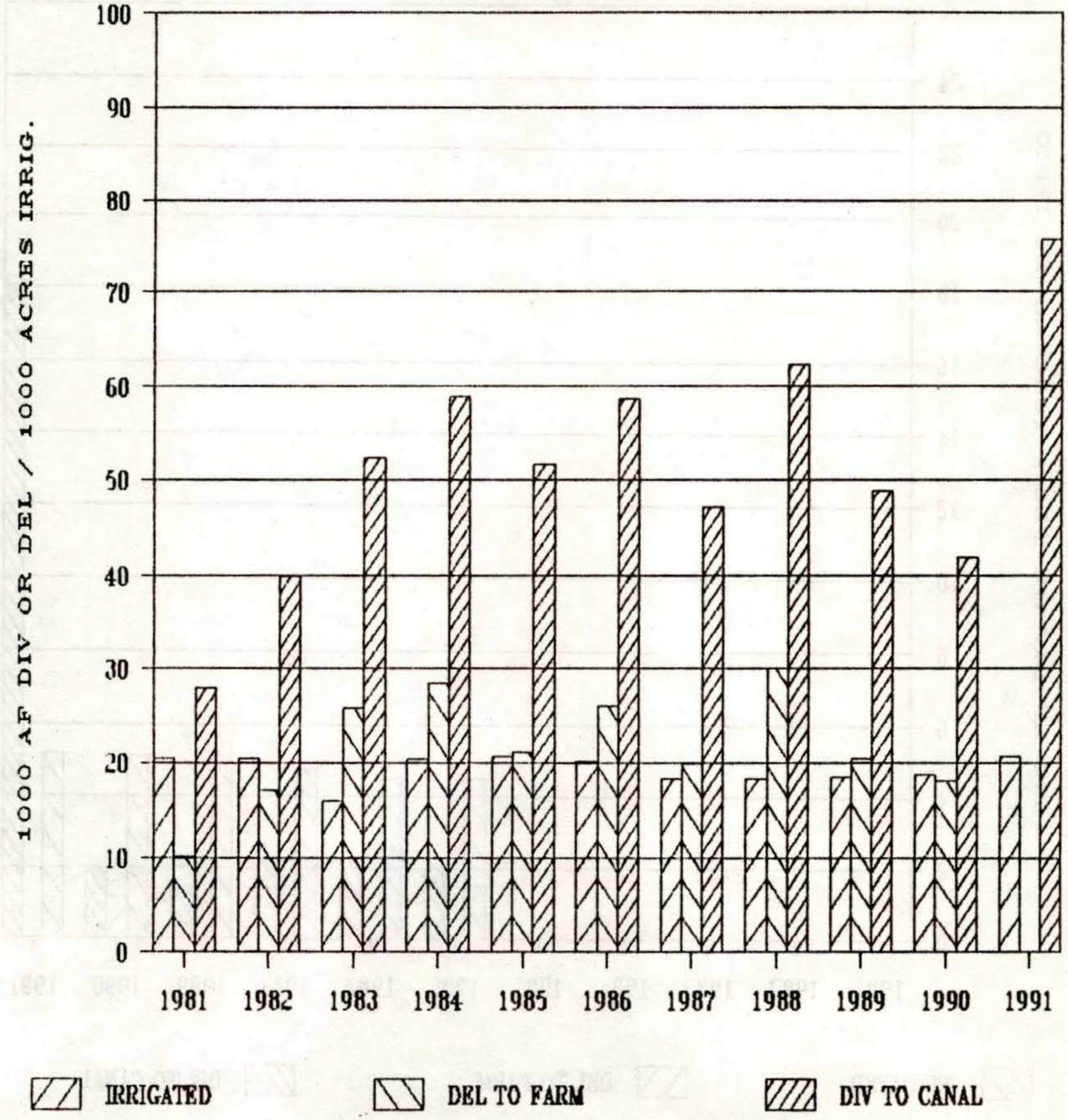
FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	17.40
NORMAL YEAR	8.30

EXHIBIT 26

BOSTWICK IRRIGATION DISTRICT - NEBRASKA

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

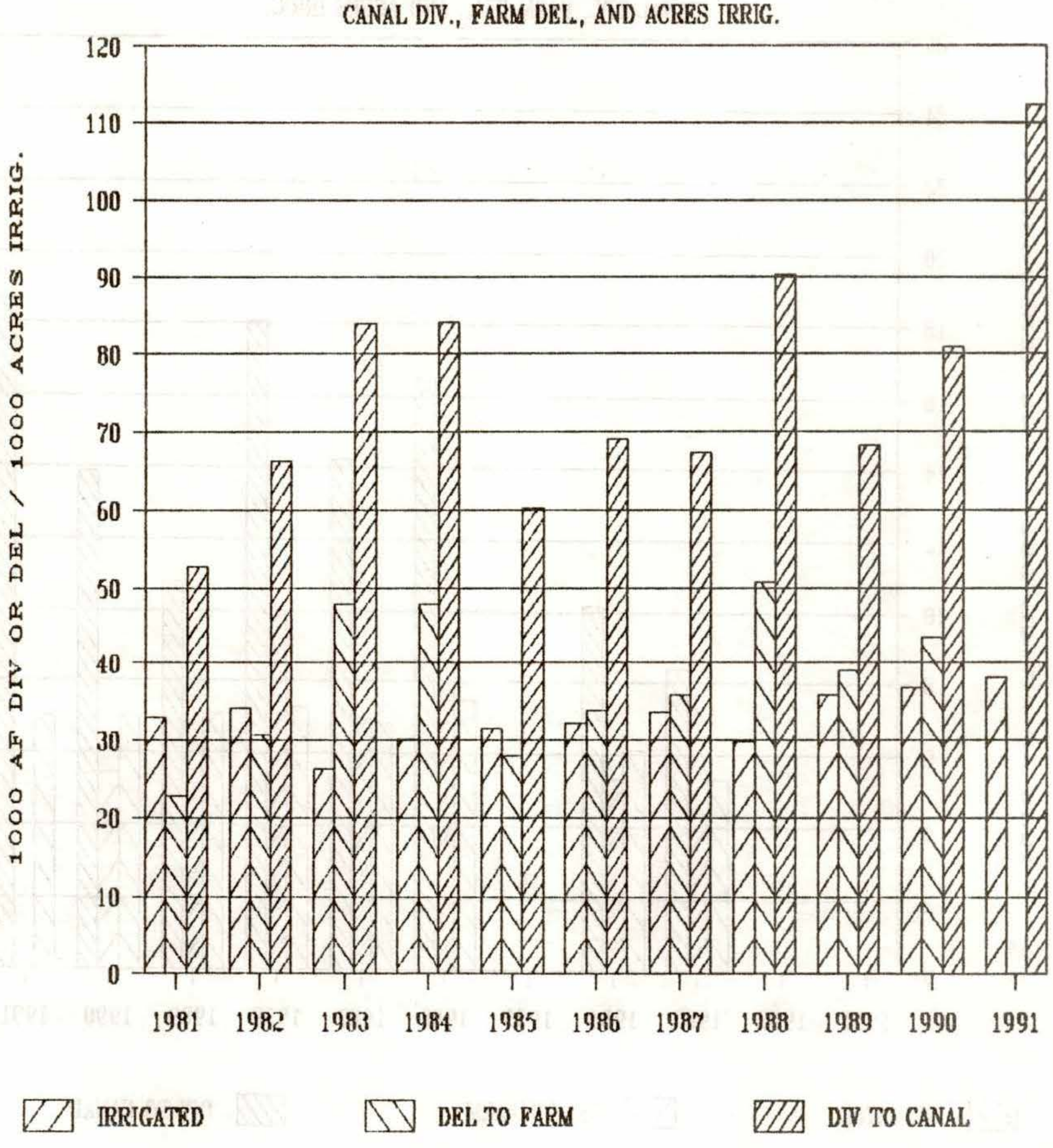


	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.36	1.94	3.27	2.88	2.50	2.90	2.56	3.38	2.63	2.23
DEL	0.50	0.83	1.62	1.39	1.02	1.29	1.08	1.63	1.11	0.97
EFF(%)	36	43	49	48	41	44	42	48	42	43

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	17.10
NORMAL YEAR	0.00

KANSAS-BOSTWICK IRRIGATION DISTRICT



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	1.60	1.96	3.20	2.80	1.92	2.15	2.00	3.02	1.92	2.21
DEL	0.69	0.90	1.82	1.59	0.89	1.05	1.06	1.69	1.09	1.19
EFF(%)	43	46	57	57	46	49	53	56	57	54

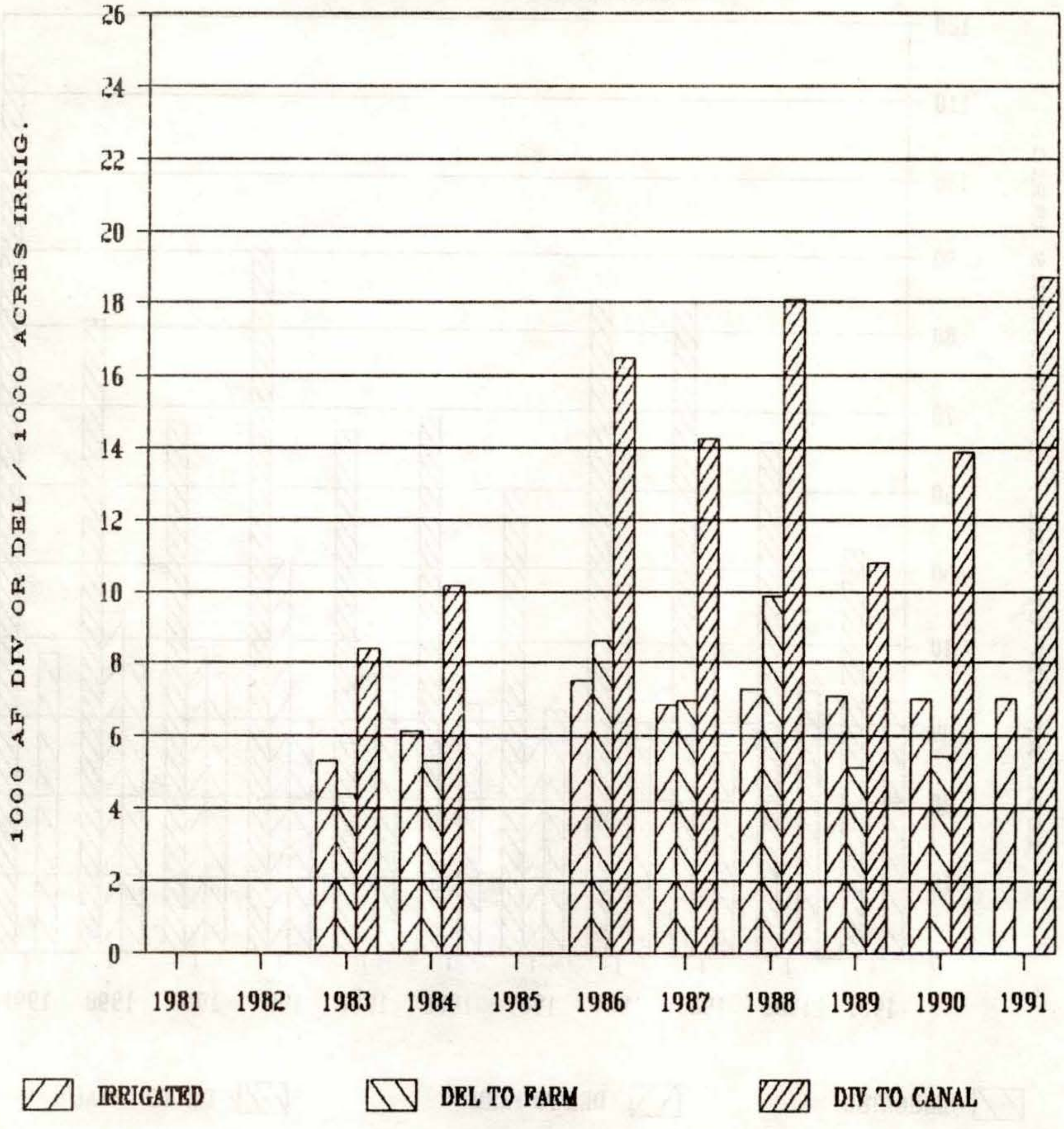
FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	32.30
NORMAL YEAR	0.00

EXHIBIT 28

KIRWIN IRRIGATION DISTRICT

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



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	0.00	0.00	1.58	1.66	0.00	2.20	2.08	2.49	1.52	1.98
DEL	0.00	0.00	0.83	0.87	0.00	1.15	1.02	1.36	0.72	0.78
EFF(%)	0	0	53	52	0	52	49	55	47	39

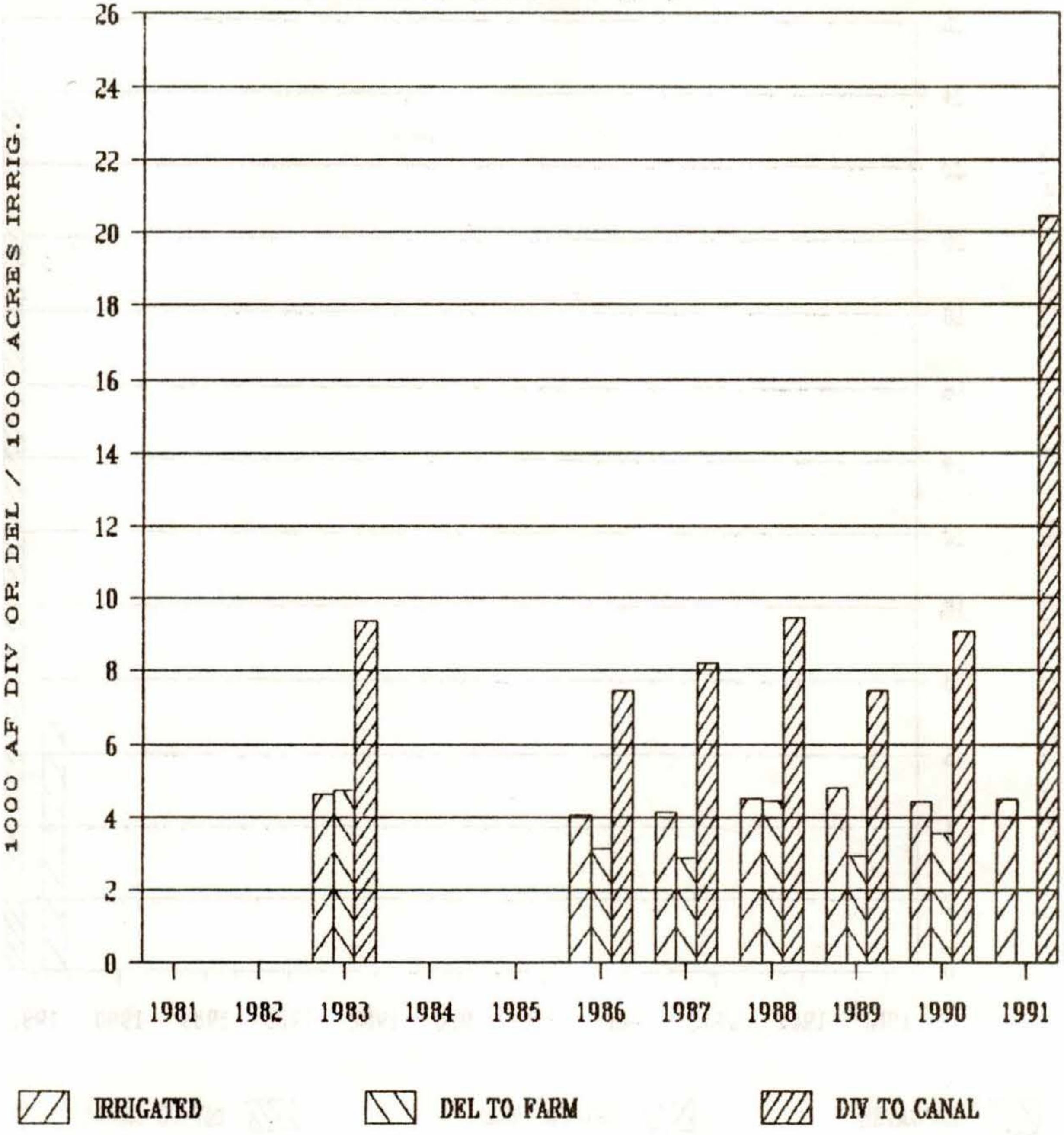
FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	18.70
NORMAL YEAR	2.50

EXHIBIT 29

WEBSTER IRRIGATION DISTRICT

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

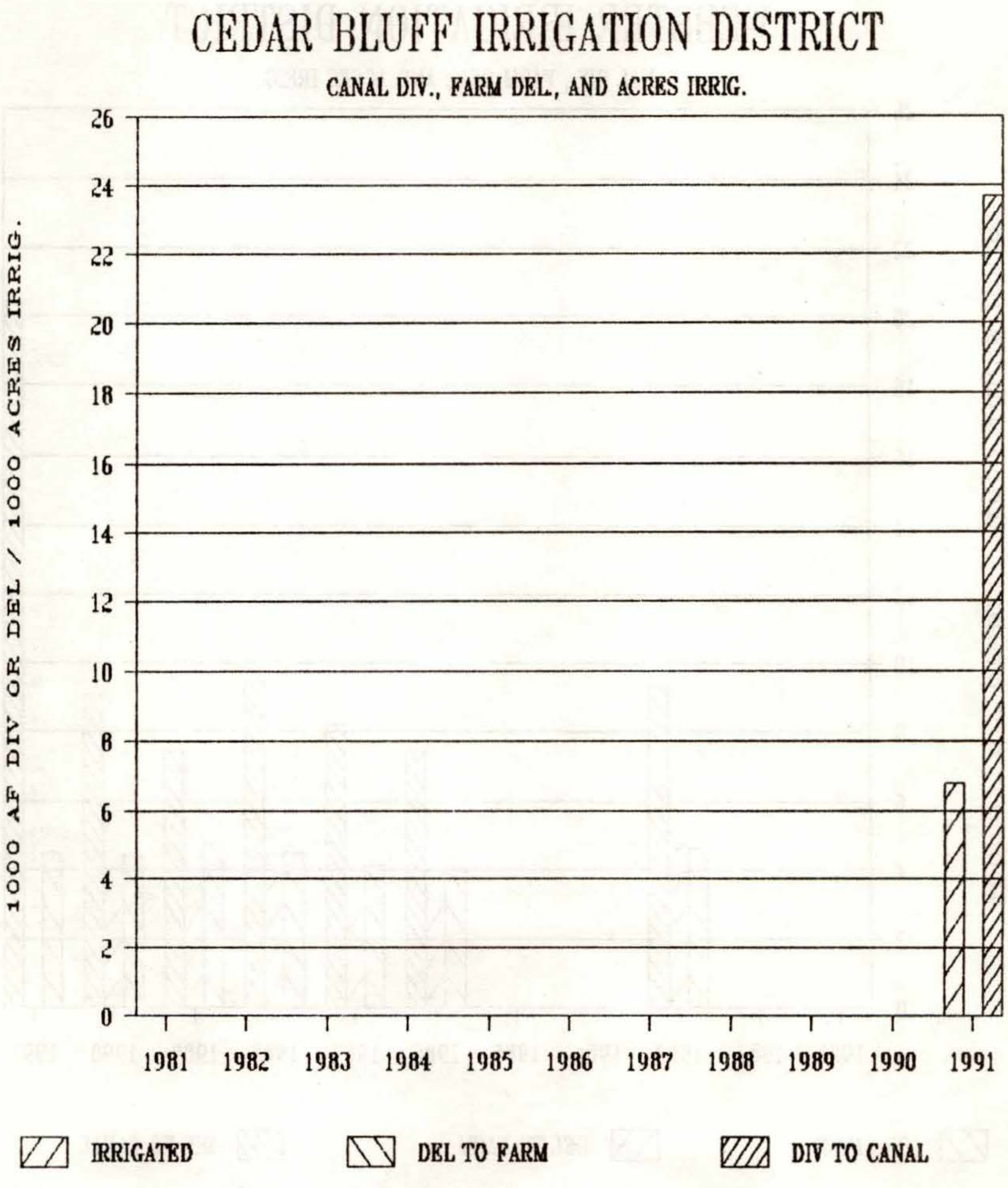


	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	0.00	0.00	2.01	0.00	0.00	1.83	1.97	2.09	1.55	2.04
DEL	0.00	0.00	1.02	0.00	0.00	0.78	0.69	0.98	0.61	0.81
EFF(%)	0	0	51	0	0	43	35	47	39	39

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	15.00
NORMAL YEAR	0.00

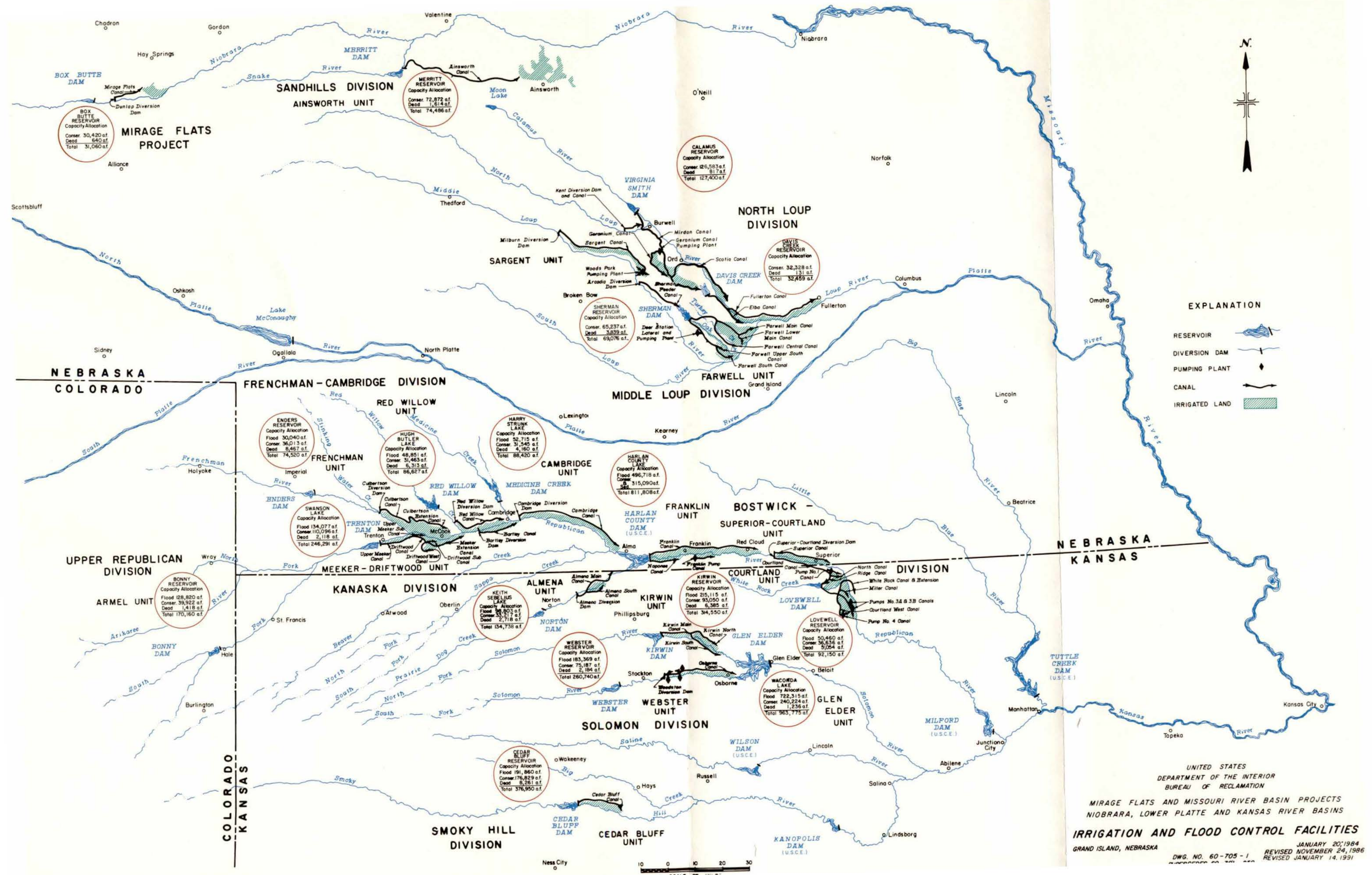
EXHIBIT 30



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AF/ACRE										
DIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EFF(%)	0	0	0	0	0	0	0	0	0	0

FORCASTED SHORTAGES (SUBTRACT FROM DIV REQ)

DRY YEAR	21.00
NORMAL YEAR	14.80



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
DWG. NO. 60-705-1
JANUARY 20, 1984
REVISED NOVEMBER 24, 1986
REVISED JANUARY 14, 1991
EXPLANATION
RESERVOIR
DIVERSION DAM
PUMPING PLANT
CANAL
IRRIGATED LAND
N.
NEBRASKA
COLORADO
KANSAS
MIRAGE FLATS PROJECT
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
SANDHILLS DIVISION
AINSWORTH UNIT
MERRITT DAM
MERRITT RESERVOIR Capacity Allocation Conser. 72,872 a.f. Dead 1,614 a.f. Total 74,486 a.f.
Ainsworth Canal
CALAMUS RESERVOIR Capacity Allocation Conser. 126,583 a.f. Dead 817 a.f. Total 127,400 a.f.
VIRGINIA SMITH DAM
NORTH LOUP DIVISION
DAVIS CREEK RESERVOIR Capacity Allocation Conser. 32,328 a.f. Dead 131 a.f. Total 32,459 a.f.
DAVIS CREEK DAM
Kent Diversion Dam and Canal
Milburn Diversion Dam
Geranium Canal
Sargent Canal
Mirdan Canal
Geranium Canal Pumping Plant
Scotia Canal
SARGENT UNIT
Woods Park Pumping Plant
Arcadia Diversion Dam
Sherman Feeder Canal
Fullerton Canal
Elba Canal
SHERMAN DAM
SHERMAN RESERVOIR Capacity Allocation Conser. 65,237 a.f. Dead 3,839 a.f. Total 69,076 a.f.
Deer Station Lateral and Pumping Plant
Farwell Main Canal
Farwell Lower Main Canal
Farwell Central Canal
Farwell Upper South Canal
Farwell South Canal
FARWELL UNIT
MIDDLE LOUP DIVISION
FRENCHMAN-CAMBRIDGE DIVISION
RED WILLOW UNIT
ENDERS RESERVOIR Capacity Allocation Flood 30,040 a.f. Conser. 36,013 a.f. Dead 8,467 a.f. Total 74,520 a.f.
HUGH BUTLER LAKE Capacity Allocation Flood 48,851 a.f. Conser. 31,463 a.f. Dead 6,313 a.f. Total 86,627 a.f.
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.
HARLAN COUNTY LAKE Capacity Allocation Flood 496,718 a.f. Conser. & Dead 315,090 a.f. Total 811,808 a.f.
FRENCHMAN UNIT
CAMBRIDGE UNIT
ENDERS DAM
RED WILLOW DAM
MEDICINE CREEK DAM
Culbertson Diversion Dam
Culbertson Canal
Culbertson Extension Canal
Red Willow Diversion Dam
Red Willow Canal
Cambridge Diversion Dam
Cambridge Canal
Bartley Canal
Bartley Diversion 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
Upper Meeker Sub Canal
Meeker Extension Canal
Upper Meeker Canal
Driftwood Canal
Driftwood West Canal
Driftwood Sub Canal
MEEKER-DRIFTWOOD UNIT
HARLAN COUNTY DAM (U.S.C.E.)
FRANKLIN UNIT
Franklin Canal
Franklin Pump Canal
Naponee Canal
BOSTWICK - SUPERIOR-COURTLAND UNIT
Superior-Courtland Diversion Dam
Superior Canal
Courtland Canal
COURTLAND UNIT
DIVISION
North Canal
Ridge Canal
Pump No. 1 Canal
White Rock Canal & Extension
Miller Canal
Pumps No. 3A & 3B Canals
Courtland West Canal
Pump No. 4 Canal
LOVEWELL DAM
LOVEWELL RESERVOIR Capacity Allocation Flood 50,460 a.f. Conser. 36,636 a.f. Dead 5,054 a.f. Total 92,150 a.f.
UPPER REPUBLICAN DIVISION
BONNY RESERVOIR Capacity Allocation Flood 128,820 a.f. Conser. 39,922 a.f. Dead 1,418 a.f. Total 170,160 a.f.
ARMEL UNIT
BONNY DAM
KANASKA DIVISION
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 2,718 a.f. Total 134,738 a.f.
NORTON DAM
KIRWIN UNIT
KIRWIN RESERVOIR Capacity Allocation Flood 215,115 a.f. Conser. 93,050 a.f. Dead 6,385 a.f. Total 314,550 a.f.
Kirwin Main Canal
Kirwin North Canal
Kirwin South Canal
KIRWIN DAM
GLEN ELDER DAM
WEBSTER RESERVOIR Capacity Allocation Flood 183,369 a.f. Conser. 75,187 a.f. Dead 2,184 a.f. Total 260,740 a.f.
Osborne Canal
Woodston Diversion Dam
WEBSTER DAM
WEBSTER UNIT
SOLOMON DIVISION
WACONDA LAKE Capacity Allocation Flood 722,315 a.f. Conser. 240,224 a.f. Dead 1,236 a.f. Total 963,775 a.f.
GLEN ELDER UNIT
TUTTLE CREEK DAM (U.S.C.E.)
MILFORD DAM (U.S.C.E.)
WILSON DAM (U.S.C.E.)
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.
Cedar Bluff Canal
CEDAR BLUFF DAM
CEDAR BLUFF UNIT
SMOKY HILL DIVISION
KANOPOLIS DAM (U.S.C.E.)
Chadron
Gordon
Valentine
Hay Springs
Niobrara
Ainsworth
Moon Lake
O'Neill
Alliance
Norfolk
Scottsbluff
Thedford
Burwell
Ord
Broken Bow
Oshkosh
Lake McConaughy
Columbus
Fullerton
Omaha
Sidney
Ogallala
North Platte
Grand Island
Lincoln
Lexington
Kearney
Holyoke
Imperial
Beatrice
Trenton
McCook
Cambridge
Alma
Franklin
Red Cloud
Superior
Wray
Oberlin
Atwood
St. Francis
Norton
Phillipsburg
Hale
Burlington
Stockton
Osborne
Glen Elder
Beloit
Manhattan
Junction City
Topeka
Kansas City
Lincoln
Abilene
Salina
Russell
Hays
Wakeeney
Lindsborg
Ness City
Niobrara River
Snake River
Calamus River
North Loup River
Middle Loup River
South Loup River
Loup River
Turkey Creek
Oak Creek
North Platte River
South Platte River
Platte River
Missouri River
Big Blue River
Little Blue River
Republican River
Frenchman Creek
Stinking Water Cr.
Red Willow Creek
Medicine Creek
North Fork
South Fork
Arikaree
Sappa Creek
Beaver Creek
Prairie Dog Creek
North Fork Solomon River
South Fork Solomon River
Solomon River
White Rock Creek
Saline River
Smoky Hill River
Big Creek
Kansas River